



# Travel Agency Personnel Information System

by

Mr. Manit Thitithammasak

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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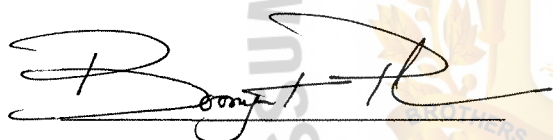


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Academic Year	March 2001

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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.

Approval Committee:



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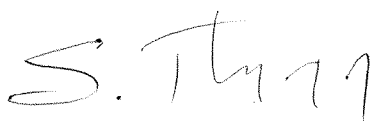
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March 2001

## ABSTRACT

Maximus Aviation Co., Ltd. is a travel agency and also is the representative of Discover the World Marketing Co., Ltd. in Thailand/Vietnam. It has provided travelling services to both the individual traveler and the corporate travelers. In order to manage its human resources effectively and efficiently, a lot of processes are required, and has to deal with several departments; therefore, this project is to develop the effective personnel information system to improve the performance of the personnel department of the company.

The current existing Personnel Information System is based on the manual. Most data are stored on paper, it requires many personnel staffs to deal with these paper works, and has to face the general problems of a manual system, which are human errors and having a high maintenance cost.

The new proposed Information System will be developed to replace the manual system. It is designed to solve problems in the existing system and provide accurate and timely information to the top managers for making decisions. It will reduce the number of personnel staffs, solve the problem of manual system and decrease the high maintenance cost.

## ACKNOWLEDGEMENTS

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## **I. INTRODUCTION**

### **1.1 Background of the Project**

Every organization is comprised of people. Acquiring their services, developing their skills, motivating them to high levels of performance, and ensuring that they continue to maintain their commitment to the organization are essential to achieving organization objectives.

Human resource management is the major function of an organization. It has to attract, develop and maintain an organization's labor force and these functions are handled by Personnel Department, including employee records.

Personnel Department has to deal with a great deal of employees' documents that are difficult to organize and update its information, It causes many problems in an organization. Computer Information System is introduced to eliminate these problems.

Personnel Information System for Maximus Aviation Company Limited is a computerized system developed to eliminate errors in existing system and provide accurate and timely information to assist the top executives in decision making.

### **1.2 Objectives of the Project**

This project is developed to provide a new proposed Personnel Information System that reduces repetitive manual works, operation time and also provide a good filing system. Objectives of the project are as follows:

- (1) To analyze the existing Personnel Information System and to design a new system to improve effectiveness and efficiency.
- (2) To identify user requirements for the new system.
- (3) To reduce redundancy of documents and employee operations.
- (4) To use the database to automatically generate management reports.

- (5) To use the database management techniques to provide up-to-date, effective and accurate information.

### **1.3 Scope of the Project**

The scope of the project is based on the functional areas of Personnel Department. These functional areas involve collecting, filing and retrieving employees' information, performing payroll activities and generating reports for the top managers for their decision making.

In this project, the existing system is analyzed and studied to locate the current problems and formulate the user requirements. The new computerized Personnel Information System is introduced to eliminate the existing problems.

### **1.4 Project Plan**

This project focuses on the information system that supports human resource operation to improve the personnel filing system. The Gantt chart shows the activities in developing this project with the estimated time that is assigned to each job. The total period required to develop this project is about six months. The activities are divided into three phases and each phase consists of sub-activities as follows:

#### **(1) System Analysis**

This is the first phase of the project plan. The activities done in this phase are survey and planning of the system and project, the study and analysis of the existing business and information system and the definition of the business requirements and priorities for new or improved system.

#### **(2) System Design**

This is the second phase of the project plan. The activities done in this phase are the evaluation of the alternative solutions and specification of a

detailed computer-based solution. Database, input and output will be designed together with a data dictionary.

### (3) System Implementation

This is the last phase of the project plan. The activities done in this phase are the construction of the new system and the delivery of that system into production. The database, input, output and interface will be constructed. Program will be coded and tested. The system test version will be installed and tested. The conversion plan will be done. We will manage the training course for users during this time. The documents will be prepared.





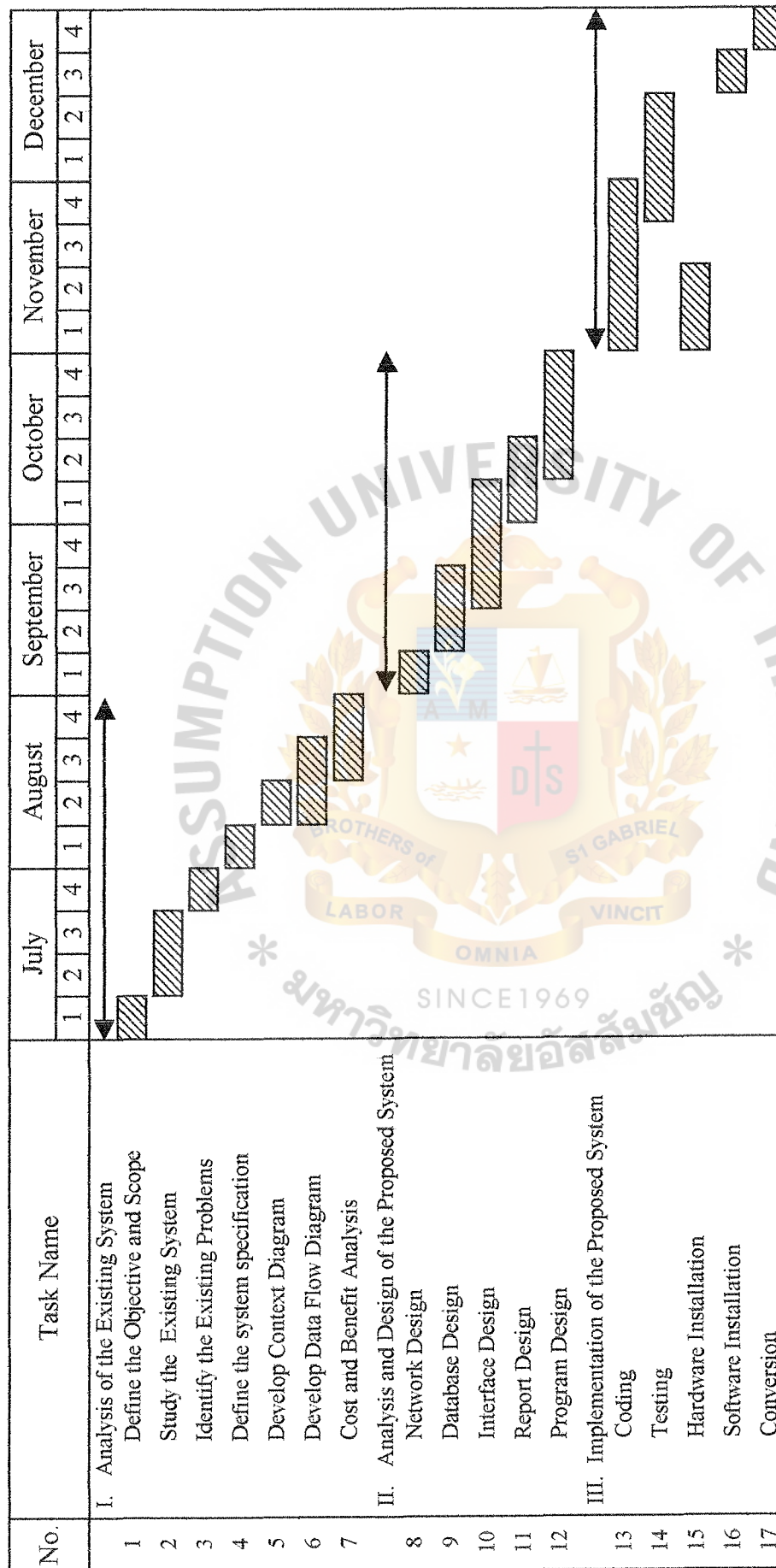


Figure 1.1. Project Plan of Personnel Information System.

## II. THE EXISTING SYSTEM

### 2.1 Background of the Organization

Maximus Aviation Co., Ltd. was established by Mr. Bernard A. Keller in February 3, 1988, it is a travel agency and also is the representative of Discover the World Marketing Co., Ltd. in Thailand and Vietnam. It has provided travelling services to both the individual traveler and the corporate traveler. Maximus Aviation Co., Ltd. has provided services as follows:

(1) Hertz Rent a Car

Hertz, the world's leading vehicle renting organization, is represented in over 140 countries, operating a fleet of 525,000 vehicles from approximately 6,500 locations.

(2) US Airways

US Airways is the inheritor of a number of famous names in U.S. aviation. US Airways has been an aviation innovator, particularly in the building of alliances through code-sharing. US Airways, Inc. is the main operating arm of US Airways Group. With almost 400 aircraft, US Airways, Inc. operates more than 2,100 flights daily, carrying an average of more than 155,000 passengers.

(3) British Midland

British Midland is the UK's second largest scheduled service airline, operating over 1500 flights a week to 30 European cities (including the five busiest routes in Europe). British Midland also operates code-share flights with 19 worldwide partner airlines to 50 global destinations.

(4) Cunard/Seabourn

In the world of cruising, one name has signified excellence for more than a century and a half. That name is none other than Cunard. Now, two ships will carry the banner of this illustrious line into the next millennium; the renowned flagship Queen Elizabeth 2 and the newly renamed Caronia, formerly the Vistafjord. These grand liners carry on a time-honoured legacy with a contemporary flair. Both have consistently been awarded the highest ratings- five stars or more from Berlitz, Fieldings and virtually every other authoritative guide to cruise ships.

(5) Hyatt Hotel Corporation within the U.S., Canada & Caribbean

Implicit in the name, Grand Hyatt Hotels are exactly that: Grand in scale, service and personal guest attention. Centrally located in major gateway cities or resort destinations, guests can expect spacious and elegantly furnished accommodations with elements of detail reflecting the local architectural and culture. Business travellers are equipped with the latest in technology to meet the lifestyle and demands of the sophisticated traveller. Well-equipped business centres are standard at all Grand Hyatt hotels, providing such services as translation and interpretation, secretarial, faxing, or assistance with meetings held in the hotel.

Maximus Aviation Co., Ltd. also has a department called “Commercial Department” for serving travellers who want to use other services such as the package tour, Hotel, Airlines, Rent a car around the world. Due to the variety of products in the company, it has to employ workers familiar with each product. The company has to manage its human resources to make the highest productivity, and minimize the error that may occur in the process. The existing personnel information system is a manual

system that operates manually is analyzed to identify the problems. The new computerized system will be designed and implemented to replace the existing one.

Maximus Aviation Co., Ltd.'s organization chart is shown in Figure 2.1.





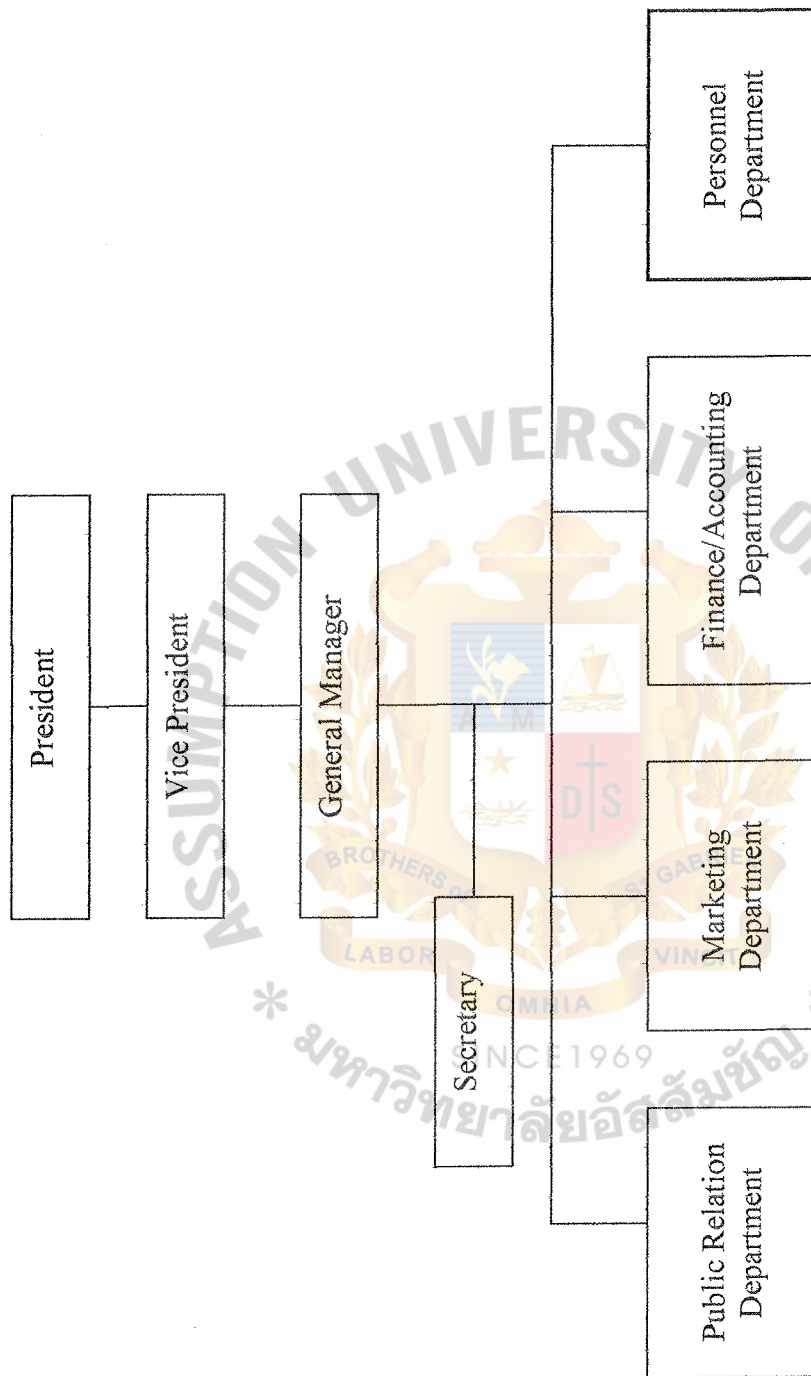


Figure 2.1. Organization Chart of Maximus Aviation Co., Ltd.

## **2.2 Existing Business Functions**

The existing information system of Personnel Department is a manual system. All departments of Maximus Aviation Co., Ltd. has to participate with this system. The head of each department has to take care of the time sheet and return it back to Personnel Department at the end of each week. This system concerns many activities as follows:

### **(1) Preparing Job Description**

Every position in the company has to have a job description. A common format for job description includes the job title, the duties to be performed, the distinguishing characteristics of the job, environmental condition, and the authority and responsibilities of the jobholder.

Job description has to describe the job to potential candidates, guide newly hired employees in what they are specifically expected to do and provide a point of comparison in appraising whether the actual activities of a job incumbent align with the stated duties.

### **(2) Recruitment and Employee Selection**

Each department can request the Personnel Department for new employees. Personnel Department has to design an application form that can fill the necessary information. Qualified applicants, who send in application letters mail or fill in the application form at the company, will be arranged for interview test.

Applicants who pass interview test will be new employees of the company. Employee selection is one of the most important management works involving recruitment and replacement, which is to find the right man to do the right job and hiring them.

(3) Preparing Employee Records

The most appropriate applicant that conforms to qualifications identified will be selected. The employee's record is then kept and employees' ID card is produced.

The employee record collects information about employee such as employee name, employee address, telephone number, education, etc. Personnel officers' works are about employee record adding, employee record modifying, employee record deleting and employee report producing.

(4) Employee Training and Developing

After selecting employees, the next step is orientation and training. The company provides the information and skills for the employees to be successful in their new positions. There are two types of employee training (new employee training and permanent employee training).

New employee training: New employees will be orientated on necessary information about the company such as organization goals, policies, working day and time, etc. This orientation will make new employees familiar with their new company. New employees will also be trained on basic skills for their new positions. At the end of this course, a training reports will be produced and submitted to the manager.

Permanent employee training: Personnel department will prepare the training requirement courses for permanent employee training according to the schedules of each department. At the end of this course, a training report will be produced and submitted to the manager.

(5) Employee Medical Treatment

Employee medical treatment is an important welfare in the company. Maximus Aviation Co., Ltd. has a contract with Mahesak Hospital, employees in the company can be treated at this hospital. The company will pay 50% for employees. Employees have to pay 50% themselves. Employees have to pay to the hospital first and request for medical reimbursement at the company later.

(6) Performing Payroll Activities

At the end of each week, personnel staff will record time-in and time-out record from the time sheets that is collected from each department including overtime, excuse time.

At the end of each month, Personnel Department will calculate salary of all employees by checking from their salary, working time, overtime and deduction. Maximus Aviation Co., Ltd. has classified overtime pay into 3 types, the first one is overtime beyond 17.00 of each day, they will get 1.5 times of their normal time. The second one is overtime on Saturday and Sunday, they will get 2.0 times of their normal time and the last one is overtime on holidays, they will get 2.5 times of their normal time. The salary information of employees will be submitted to Finance Department for paying salary.

The context diagram and data flow diagram of existing system is shown in Figure 2.2 and Figure 2.3 respectively.



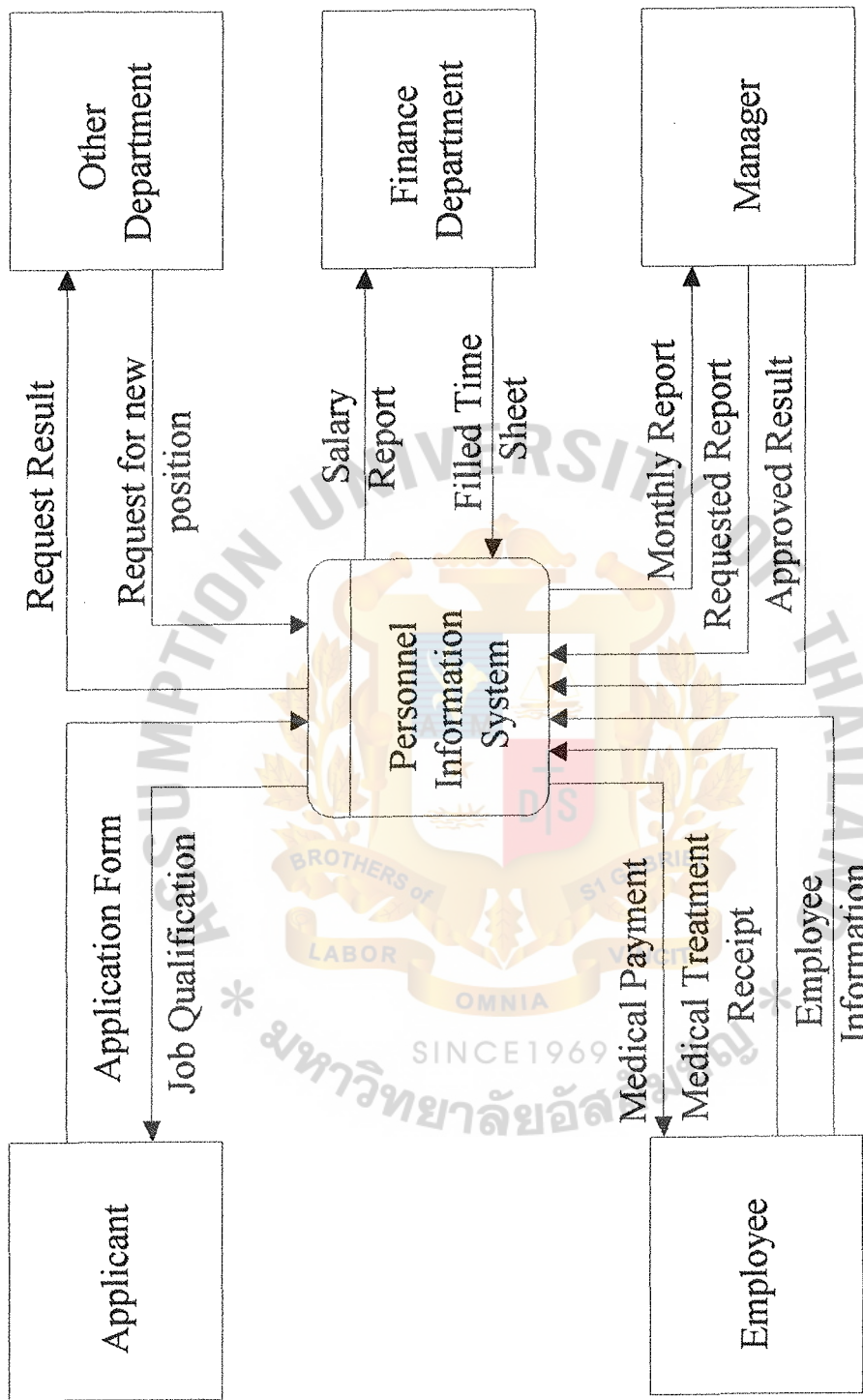


Figure 2.2. Context Diagram of the Existing System.

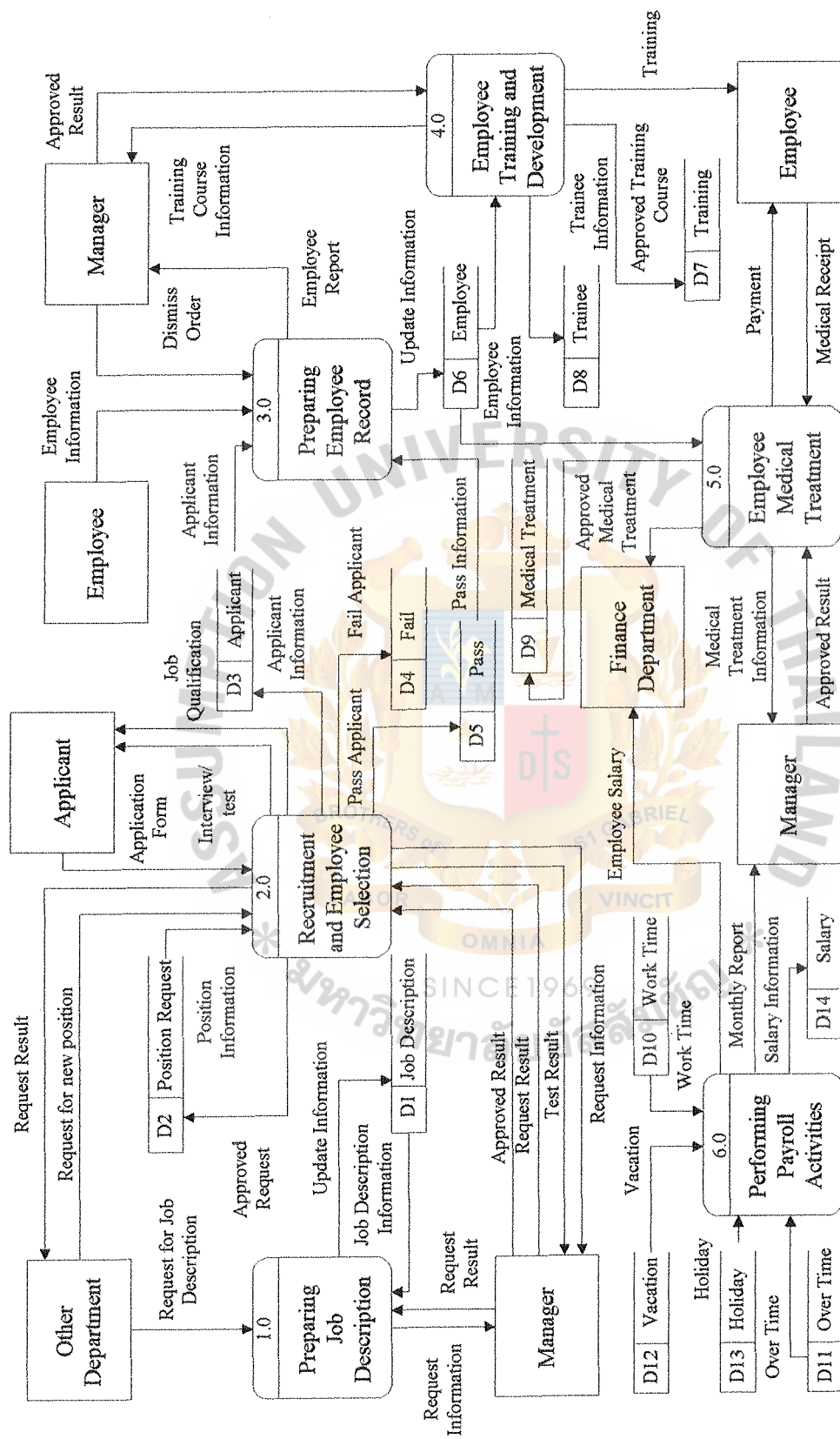


Figure 2.3. Data Flow Diagram of the Existing System.

## 2.3 Current Problems and Areas for Improvement

### Current Problems

After the interviews and discussion with personnel staffs who are involved with the existing personnel information system, the current problems of the existing personnel information system can be identified as follows:

- (1) System reports cannot be prepared immediately when needed for management decision.
- (2) The existing system takes a lot of time due to being a manual system.
- (3) The existing system lacks the ability of sharing information with other departments in the organization.
- (4) Most information is recorded on paper, it wastes the space in keeping those papers.
- (5) The existing system lacks security control, the information can be damaged and lost easily.
- (6) There is a redundancy in data processing of the operation, it causes inconsistency of the system.

### Areas for Improvement

The existing Personnel Information System is still a manual system. The speed of the operation is quite slow. Furthermore, it is difficult to find and update employee records.

Personnel Department needs to improve the Personnel Information System by reducing the amount of paperwork, reducing the redundancy of data processing, increasing the security control of the system. To eliminate the above problems, computerized information system is introduced to improve the existing Personnel Information System.

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

#### **3.1 User Requirements**

According to the previous chapter, Maximus Aviation Co., Ltd. now requires an effective Personnel Information System, which can solve the problems occurring from the existing manual system, and increase its efficiency. In order to develop a new system, users are interviewed and new requirements are observed. New requirements are as follows:

- (1) The system should always keep only the updated information in order to produce accurate reports. It is necessary for the system to be able to provide timely information to the top management for their decision.
- (2) The system should reduce the amount of the paper works in order to reduce the storage space and reduce the operating cost in searching them.
- (3) Some repetitive work must be eliminated so that the data will not be lost in the process.
- (4) There must be some way to keep, protect and backup the information and recover it when information is damaged or lost.
- (5) The system should be secured in retrieving, changing and deleting information from unauthorized persons.
- (6) The attendance time, time-in and time-out, of staffs must be accumulated every month as well as the total of overtime, absence and leaves.
- (7) The system should reduce the operating cost as much as possible.

#### **3.2 System Design**

According to the scope of the project concerning the functional areas of the Personnel Department, repetitive works have been eliminated, increasing the effectively

and efficiency of the work. The proposed System is designed according to the user requirements and workflow of personnel department of Maximus Aviation Co., Ltd. The proposed system is based on a computerized system. All data will be kept into the database, it is designed to work in the network environment which the data can share with users. With the technology of Window NT Server, the proposed system also has a high level of security. The concept of authorization is applied to control the security of data.

For the new proposed system, it can eliminate the number of departments that are involved manually in the system about the time sheet. In the existing system, all departments have to submit the time sheet to the Personnel Department at the end of each week. This may cause some human errors or mistakes and delay in the process. Time recorder is used in the new system so work time can recorded immediately through the time recorder. The new proposed system can generate the report timely to the top manager for their decision making by the computer, it solves the problem of the delay of report. It is faster and highly accurate.

The new proposed Personnel Information System is designed according to the work responsible by personnel department, which has 7 processes as follows:

(1) Preparing Job Description

When the company wants to recruit new employees for the new position, personnel department has to set the job description to state the job title, the duties to be performed, the distinguishing characteristics of the job, environmental conditions, and the authority and responsibilities of the jobholder. Every position in the company should have a job description.

Job description has to describe the job to potential candidates, guide newly hired employees in what they are specifically expected to do and



provide a point of comparison in appraising whether the actual activities of a job incumbent align with the stated duties.

### (2) Recruitment and Employee Selection

This process is designed to keep information of applicants. System users can retrieve information of applicants anytime they need. Personnel officers have to verify application forms and record it into the system. Qualified applicants, who sent application letters come into the company by mail or fill in the application form at the company, will be appointed for interview test.

Applicants who pass interview test will be new employees of the company. Personnel officers will prepare contracts for the selected applicants.

### (3) Preparing Employee Record

The most appropriate applicant that conforms to qualifications identified is selected. The employee's record must be kept and employees' ID card is produced. When the employees' information has changed, it is the duty of Personnel Department to update the records including adding new employees, changing employees' information and employee resignation.

### (4) Employee Training and Developing

After selecting employees, the next step is orientation and training. The company provides the information and skills to be successful in the new position. This process is used for maintaining the training course system. This process is also concerned about preparing training course, receiving request for training, assigning training course for employees, and recording the training information of each employee. Personnel officers are

responsible for preparing training course, approving training course, training employees and producing training report to manager.

(5) Employee Medical Treatment

When personnel department receives a request for medical reimbursement, personnel officers have to request a medical treatment receipt from employees and check medical treatment evidence. For the approved medical treatment, personnel department will pay medical treatment to employees. The medical treatment report will be produced and submitted to the manager at the end of each month.

(6) Performing Payroll Activities

This process deals with the calculation of workday, working day verification, salary payment and social insurance registration. In salary payment, personnel officers have to calculate the wage rate and produce salary report to manager at the end of each month.

(7) Generating the Report

This process deals with the request for the specific report and monthly report. The report will be printed from the computer and rechecked for some mistakes. If there is any mistake, it will be corrected and printed it again.

The report will be submitted to the person who requests it.

The context diagram of the new proposed system and the detail of the processes are shown in the data flow diagram in Figure 3.1 and Figure 3.2 respectively.

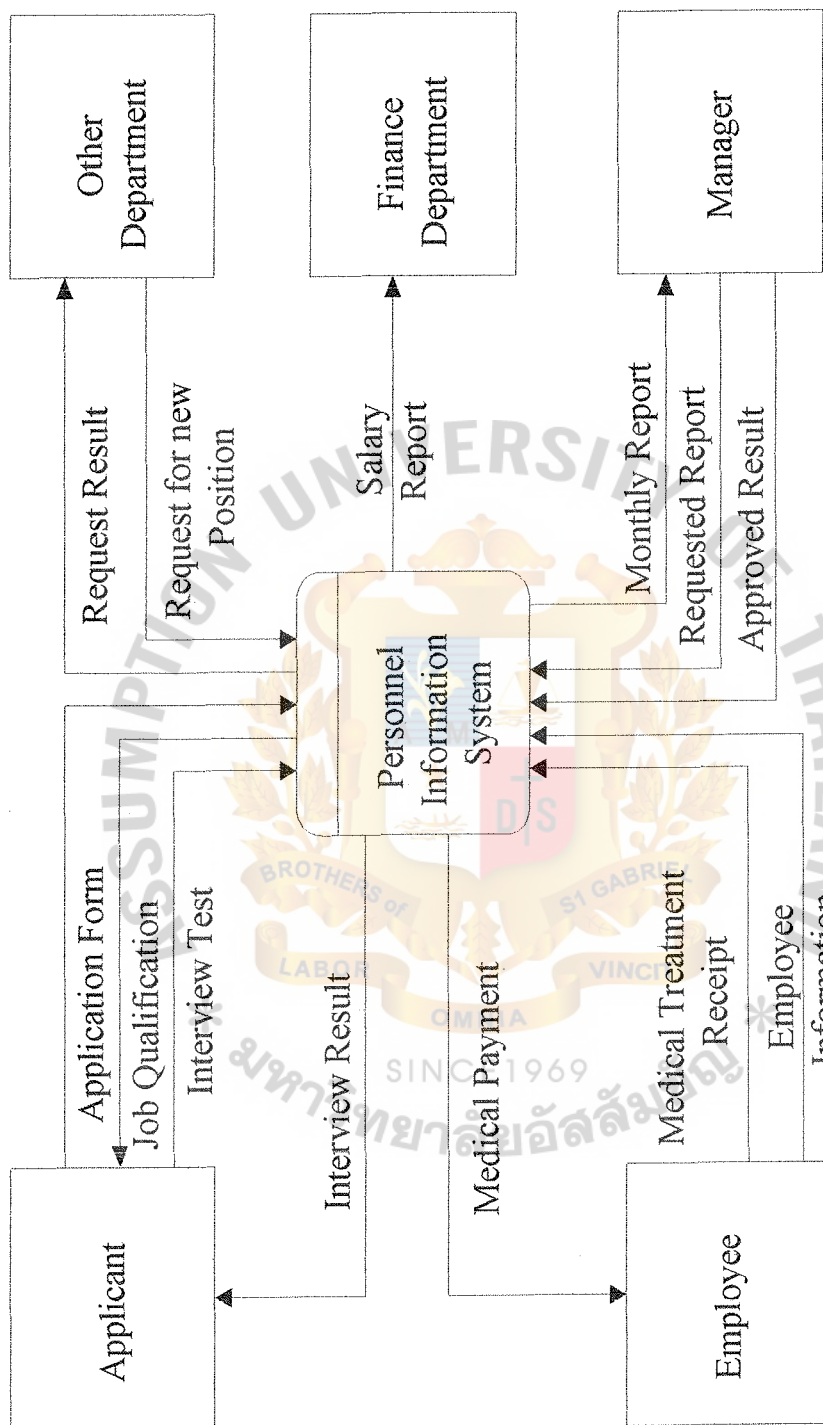


Figure 3.1. Context Diagram of the Proposed System.

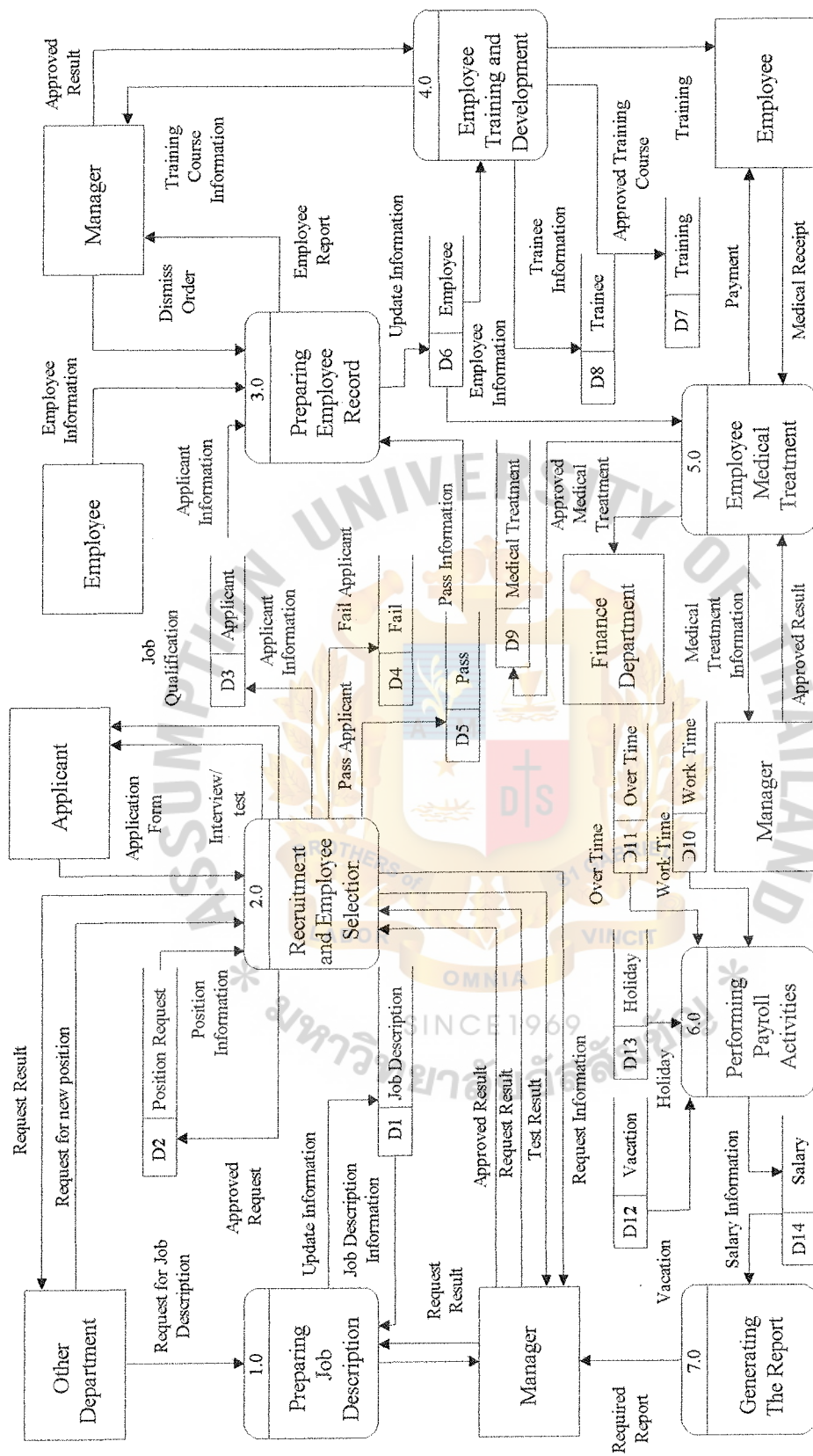


Figure 3.2. Data Flow Diagram of the Proposed System.

### 3.3 Application Architecture

Application architecture defines the technologies to be used by one, more, or all information systems in terms of its data, process, interface, and network components. It serves as a framework for general design.

#### (1) Network Architecture

The organization applies Client/Server computing in the way of Distributed Data (Two-tiered Client/Server) including Database Server to store the database and execute the database command and return only the result of the database command processing to the client. The database servers generate much less network traffic. They are connected by Local Area Network (LAN) and use Ethernet's bus topology cooperated with a LAN operating system as Microsoft Windows NT server. It manages a point-to-point communication between computers and devices on the bus topology and resolves contention that occurs when more than one computer or device attempts to send a message, instruction, or data across the bus topology at the same time.

#### (2) Data Architecture

The organization provides a distributed relational database management system (or distributed RDBMS) as Microsoft SQL Server for controls access to and maintenance of the stored data. It also provides for backup, recovery, integrity, processing and security by database engine.

#### (3) Interface Architecture

In the information technology era, the company has to compete with the competitors. One of the marketing strategies is the response time. The lower response times of most application and the desire for human



interaction during processing have driven systems development to on-line alternatives, Therefore, errors are identified and corrected more quickly.

The other points the company also thinks about is user friendly (ease to use application) so Graphical User Interface (GUIs) technology enhance the user interface in its Client/Server application. Moreover, the company uses electronic messaging and workgroup technology to improve the communication system such as electronic mail.

(4) Process Architecture

In this case, the company chooses SDE for two-tiered Client/Server applications. It consists of a client-based programming language as Microsoft Visual Basic with built-in SQL connectivity to database server. It can develop the graphic user interface that will be replicated and executed on all of the Client PCs. It has a help authoring system for the Client PCs.

### 3.4 Logical Data Model in Third Normal Form

Data storage is a critical component of most information systems so database must be carefully designed. Database design is concerned with the data focus from the perspective of the system designer. The output is called a database schema, a technical blueprint of the database. Database design translates the data models that were developed for system users during the definition phase into data structures supported by the chosen database technology.

The technique used to improve a data model in preparation for database design is called data analysis. Data analysis is a process that prepares a data model for implementation as a simple, nonredundant, flexible, and adaptable database. The specific technique is call normalization.

The normalization is a technique that organizes data attribute such that they are grouped to form stable, flexible, and adaptive entities. Normalization is a three-step technique that places the data model into first normal form, second normal form and third normal form.

### (1) First Normal Form (1NF)

An entity is in first normal form if there are no attribute that can have more than one value for a single instance of the entity (called repeating groups). Any attribute that can have multiple values actually describe a separate entity, possibly an entity (and relationship) that I have not yet included in our data model.

### (2) Second Normal Form (2NF)

An entity is in second normal form if it is already in 1NF and if the values of all non-primary key attributes are dependent on the full primary key. Any non-key attributes that are dependent on only part of the primary key should be moved to any entity where that partial key becomes the full key. Again, this may require creating a new entity and relationship on the model.

### (3) Third Normal Form (3NF)

An entity is in third normal form if it is already in 2NF, and if the values of its non-primary key attributes are not dependent on any other non-primary key attributes. Any non-key attributes that are dependent on other non-key attributes must be moved or deleted. Again, new entities and relationships may have to be added to the data model.

After normalizing the data model in the 2NF and found that the values of its non-primary key attributes are not dependent on any other non-

primary key attributes. So, the data model is already in the third normal form (3NF)



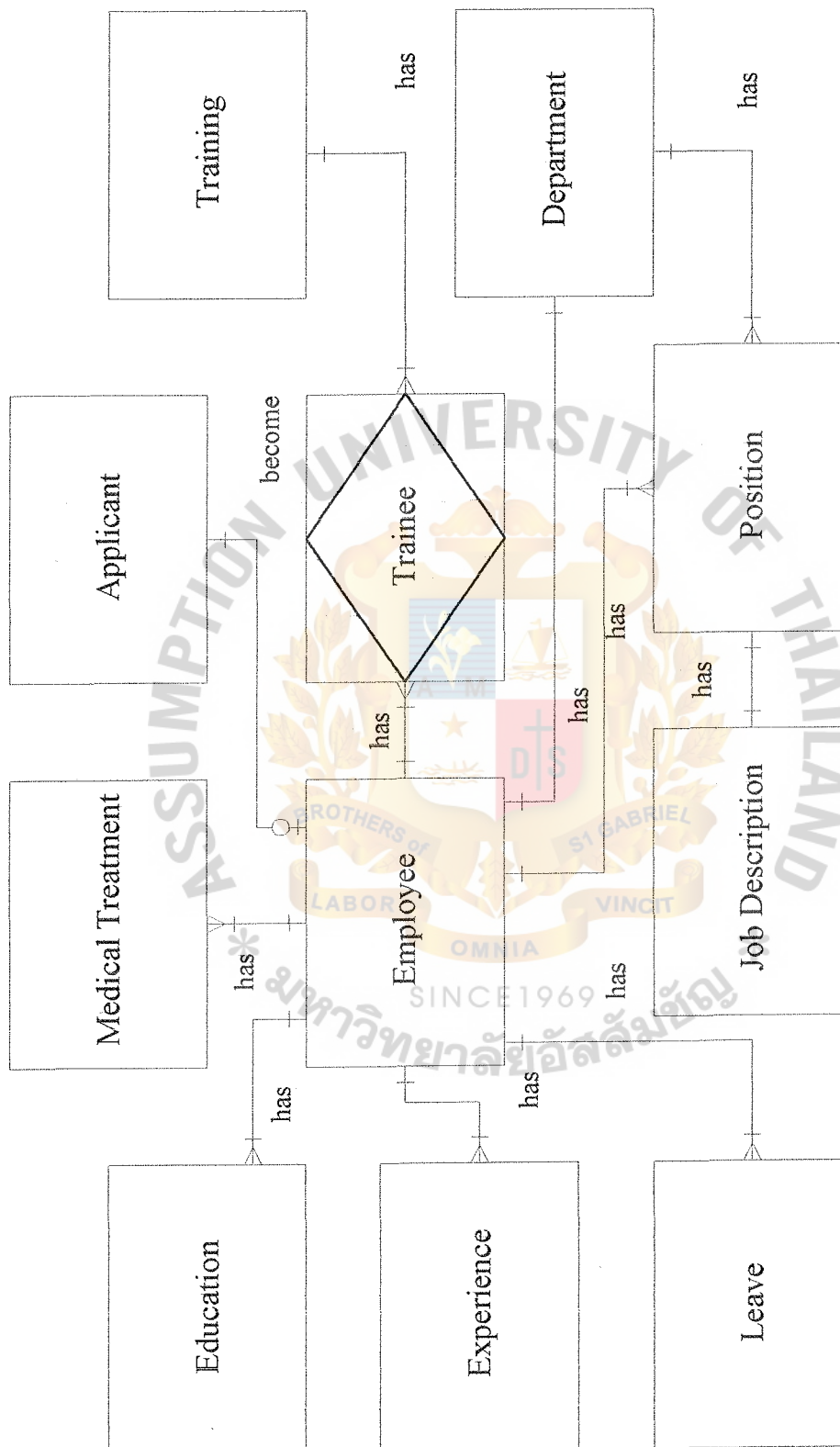


Figure 3.3. Logical Data Model in Third Normal Form.

### 3.5 Hardware and Software Requirements

The Hardware and Software specifications for the proposed Personnel Information System Server are shown in the Tables 3.1 and 3.2 respectively.

Table 3.1. The Hardware Specification for the Server.

Hardware	Specification
CPU	Pentium III 500 MHz, or higher
Cache	256 KB or higher
Memory	256 MB or higher
Hard Disk	50GB or higher
CD-Rom Drive	40X or higher
Floppy Drive	1.44 MB
Network Adapter	Ethernet 10-Base T
Display Adapter	SVGA card
Display	14" monitor
Printer	Dot Matrix or Laser

Table 3.2. The Software Specification for the Server.

Software	Specification
Operating System	Microsoft Windows NT Server 4.0 (Service Pack 3)
Database Server	Microsoft SQL Server 7.0
Application Software	Microsoft Office 97 Professional Edition



In the Personnel Information System, the client machines will have capacity only high enough to run system development software (Microsoft Access 97). It however should have specification higher than that, because it is sometimes used to run any other office automation software, such as word processing, for example. Therefore, in general standard, it should have hardware specification high enough to run Microsoft Windows 98 and Microsoft Office 97. The hardware & software specifications for each client machine are shown in the Tables 3.3 and 3.4 respectively.

Table 3.3. The Hardware Specification for Each Client Machine.

Hardware	Specification
CPU	Celeron 600 MHz, or higher
Cache	256 KB or higher
Memory	64 MB or higher
Hard Disk	4.3 GB or higher
CD-Rom Drive	40X or higher
Floppy Drive	1.44 MB
Network Adapter	Ethernet 10-Base T
Display Adapter	SVGA card
Display	14" SVGA monitor

Table 3.4. The Software Specification for Each Client Machine.

Software	Specification
Operating System	Microsoft Windows 98
Web browser	Microsoft Internet 5.0 or higher
Application Software	Microsoft Office 97 Professional Edition

In the proposed system, it is designed to run on network environment, the server and network equipment have to be used. The server will use Microsoft Windows NT Server and the operating system of clients will use Microsoft Windows 98. Database of clients will use Microsoft Access 97. With this computer system configuration, problems of security will be solved. It also increases the performance of personnel department. The Figure 3.4 shows the network configuration of proposed system.

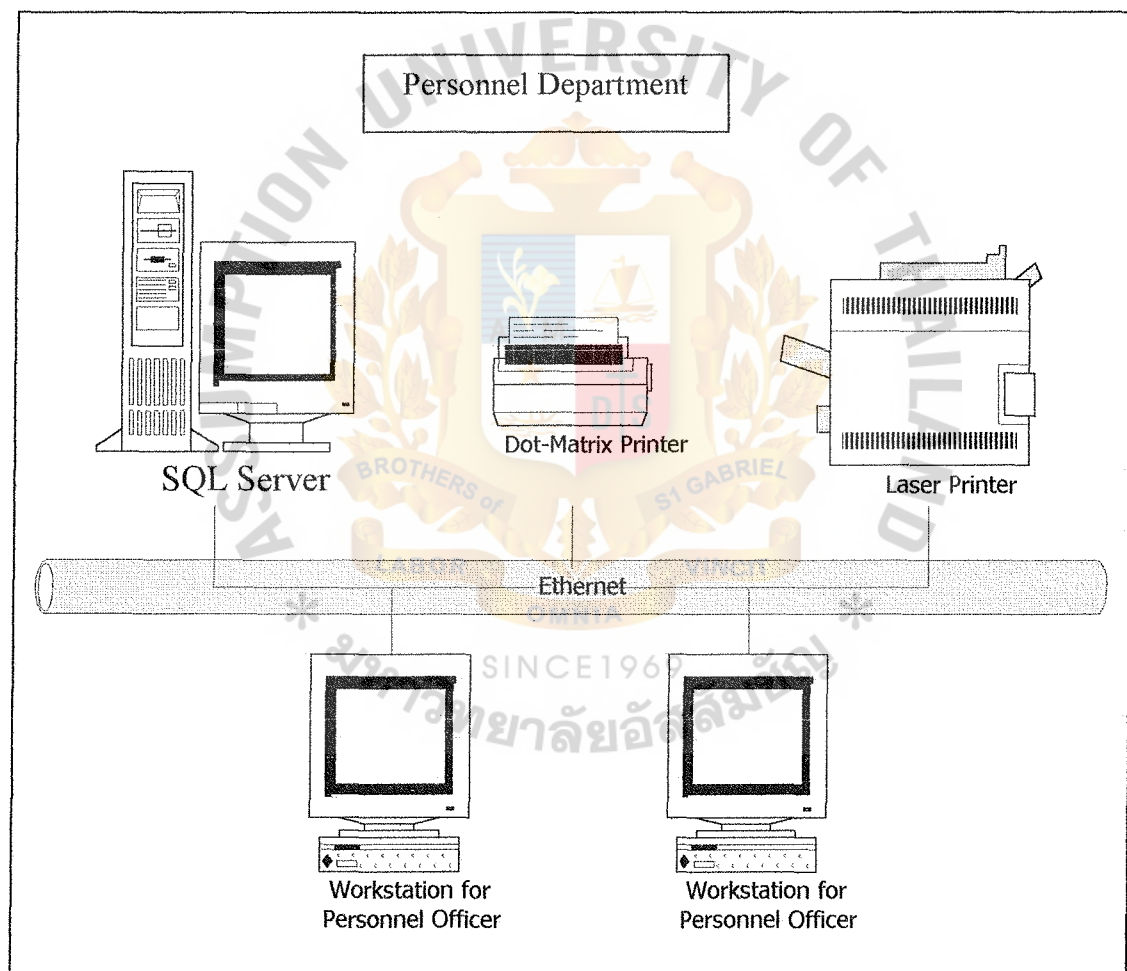


Figure 3.4. Network Configuration.

### 3.6 Security and Controls

Security and controls are divided into three types as follows:

#### (1) Operational Security

This type of security protects hardware and software from either intentional or inadvertent threats. Operational security also can be classified into three types as follows:

##### (a) Password security

Before entering the system, the user has to enter his/her login name and password. The login name is set by the computer to monitor at that time, who uses the computer. Furthermore, it also can control the authority of each user to read, update and delete information in the system by the login name. Users have to change their password every 2-3 months.

##### (b) Hardware security

The computer should be turned off after using. It should have UPS to protect the computer problem due to electronic problems.

##### (c) Software security

It always keeps the system software in an appropriate place in order to use in an emergency case. The computer should always audit the system to make sure it is works correctly.

#### (2) Data security

The company should backup its information everyday in the evening to ensure that the system has recovery when the system has some problems.

### (3) User security

Users have to know the basic knowledge of computer and they should be trained to deal with the common problems. Users need to help to protect the system from viruses, unauthorized users, etc.



### 3.7 Cost and Benefit Analysis

#### (1) Costs of Manual System

Table 3.5. Manual System Cost Analysis, Baht.

Cost items		Years				
		1	2	3	4	5
<u>Fixed Cost</u>						
Typewriter	1 unit @ 8,000	8,000.00	—	—	—	—
Calculator	10 units @ 2,000	20,000.00	—	—	—	—
Total Fixed Cost		28,000.00	—	—	—	—
<u>Operating Cost</u>						
<u>Salary Cost:</u>						
Personnel Manager	1 person @ 20,000	240,000.00	264,000.00	290,400.00	319,440.00	351,384.00
<u>Staff:</u>						
Senior officer	2 persons @ 15,000	360,000.00	396,000.00	435,600.00	479,160.00	527,076.00
Junior officer	2 persons @ 9,000	216,000.00	237,600.00	261,360.00	287,496.00	316,245.60
General officer	1 person @ 8,000	96,000.00	105,600.00	116,160.00	127,776.00	140,553.60
Total Annual Salary Cost		912,000.00	1,003,200.00	1,103,520.00	1,213,872.00	1,335,259.20
<u>Office Supplies &amp; Miscellaneous Cost:</u>						
Stationary	Per Annual	3,000.00	3,300.00	3,630.00	3,993.00	4,392.30
Paper	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Utility	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Miscellaneous	Per Annual	3,000.00	3,300.00	3,630.00	3,993.00	4,392.30
Total Annual Office Supplies & Miscellaneous Cost		16,000.00	17,600.00	19,360.00	21,296.00	23,425.60
Total Annual Operating Cost		928,000.00	1,020,800.00	1,122,880.00	1,235,168.00	1,358,684.80
Total Manual System Cost		956,000.00	1,020,800.00	1,122,880.00	1,235,168.00	1,358,684.80

Table 3.6. Five Years Accumulated Manual System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	956,000.00	956,000.00
2	1,020,800.00	1,976,800.00
3	1,122,880.00	3,099,680.00
4	1,235,168.00	4,334,848.00
5	1,358,684.80	5,693,532.80
Total	5,693,532.80	-



(2) Costs of Computerized System

Table 3.7. Computerized System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
<b>Fixed Cost</b>					
Hardware Cost:					
Computer Server Cost	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00
Workstation Cost	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00
Total Hardware Cost	45,000.00	45,000.00	45,000.00	45,000.00	45,000.00
Maintenance Cost:					
Maintenance Cost	—	10,000.00	10,000.00	10,000.00	10,000.00
Total Maintenance Cost	—	10,000.00	10,000.00	10,000.00	10,000.00
Software Cost:					
Computer Server Cost	—	—	—	—	—
Network Cost	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00
Total Software Cost	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00
Implementation Cost:					
Advanced Training Cost	25,000.00	—	—	—	—
Basic Training Cost	25,000.00	—	—	—	—
Set up Cost	25,000.00	—	—	—	—
Total Implementation Cost	75,000.00	—	—	—	—
Office Equipment Cost:					
Calculator 6 Units @ 2,000	12,000.00	—	—	—	—
Total Office Equipment Cost	12,000.00	—	—	—	—
<b>Total Fixed Cost</b>	<b>157,000.00</b>	<b>80,000.00</b>	<b>80,000.00</b>	<b>80,000.00</b>	<b>80,000.00</b>
<b>Operating Cost</b>					
People-Ware Cost:					
Personnel Manager 1 person @ 22,000	264,000.00	290,400.00	319,440.00	351,384.00	386,522.40
Staff:					
Senior Officer 1 person @ 16,000	192,000.00	211,200.00	232,320.00	255,552.00	281,107.20
Junior Clerk 1 person @ 10,000	120,000.00	132,000.00	145,200.00	159,720.00	175,692.00
General Officer 1 person @ 9,000	108,000.00	118,800.00	130,680.00	143,748.00	158,122.80
Total Annual Salary Cost	684,000.00	752,400.00	827,640.00	910,404.00	1,001,444.40
Office Supplies & Miscellaneous Cost:					
Stationary 2,000 per month	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Paper 4,000 per month	48,000.00	52,800.00	58,080.00	63,888.00	70,276.80
Utility 4,000 per month	48,000.00	52,800.00	58,080.00	63,888.00	70,276.80
Miscellaneous 2,000 per month	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Annual Office Supplies & Miscellaneous Cost	144,000.00	158,400.00	174,240.00	191,664.00	210,830.40
<b>Total Operating Cost</b>	<b>828,000.00</b>	<b>910,800.00</b>	<b>1,001,880.00</b>	<b>1,102,068.00</b>	<b>1,212,274.80</b>
<b>Total Computerized System Cost</b>	<b>985,000.00</b>	<b>990,800.00</b>	<b>1,081,880.00</b>	<b>1,182,068.00</b>	<b>1,292,274.80</b>

Table 3.8. Five Years Accumulated Computerized Cost, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	985,000.00	985,000.00
2	990,800.00	1,975,800.00
3	1,081,880.00	3,057,680.00
4	1,182,068.00	4,239,748.00
5	1,292,274.80	5,532,022.80
Total	5,532,022.80	-

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

Table 3.9. The Comparison of the System Costs, Baht

Year	Accumulated Manual Cost	Accumulated Computerized Cost
1	956,000.00	985,000.00
2	1,976,800.00	1,975,800.00
3	3,099,680.00	3,057,680.00
4	4,334,848.00	4,239,748.00
5	5,693,532.80	5,532,022.80

From above table, the cumulative cost of the proposed system and the existing system can be shown in term of break-even point as shown in Figure 3.5.

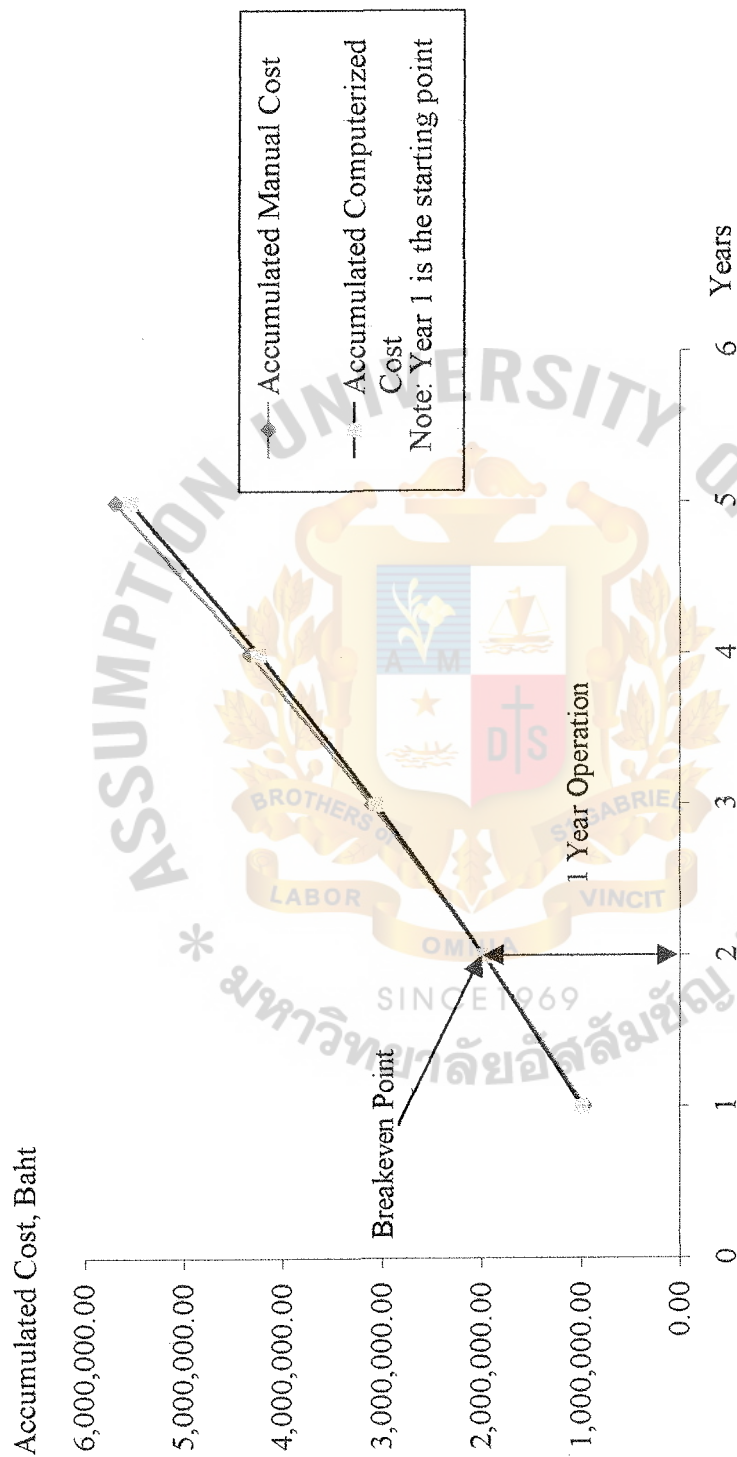


Figure 3.5. The Comparison of the System Cost.

From the above figure, it shows the cumulative cost of the proposed system and the existing system in terms of break even point. In the first year, the cumulative cost of the proposed system is higher than the existing system but the difference of these two systems is decreasing. In the second year, the cumulative cost of these two systems is equal at the break-even point. For introducing the proposed system, it has to concern cost-benefit analysis, payback period, break-even point, etc.

According to Tables 3.5 and 3.7, the cost for computerized system is decreasing until lower than the cost of manual system and it can eliminate unnecessary costs. The break-even point is in the second years, the period is reasonable to introduce the new proposed system because it can improve the performance of the system and productivity.

#### (4) Benefit Analysis

Table 3.10. Tangible Benefits, Baht.

Tangible Benefits	Price
Reduction of 1 Senior Officer	180,000
Reduction of 1 Junior Officer	108,000
Reduction of Paperwork	70,000
Reduction of Asset Loss	45,000
Fewer Processing Errors	-
Increased Throughput	-
Decreased Response Time	-
Elimination of Job Steps	-
Total Tangible Benefits (First Year)	403,000

Table 3.11. Intangible Benefits.

Intangible Benefits	Cannot Estimate
Improved Employee Morale	-
Better Decision Making	-
Better Planning Information	-
Others	-

### 3.8 Payback Analysis

The payback analysis technique is a popular method for determining if and when an investment will pay for itself. Because systems development costs are incurred long before benefits begin to accrue, it will take some time period for the benefits to overtake the costs. After implementation, it will incur additional operating expenses that must be recovered. Payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs. This period of time is called the payback period. The payback period to install new system is calculated by using the basic format after tax payback of:

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

Where

$$I = \text{Investment or capital expenditure}$$

$$T = \text{Tax rate (12\%)}$$

$$R = \text{Annual Saving by investment}$$

$$\text{Payback period (Year)} = \frac{985,000}{((1-0.12)(403,000))}$$

$$= 2.77 \text{ years}$$

Payback analysis for client-server system alternative will be shown in Table 3.12 and Figure 3.6 as follows:



Table 3.12. Payback Analysis for Client-Server System Alternative, Baht.

Cash Items:	Year 0	Year 1	Year 2	Year 3	Year 4
Development cost:	-985,000.00	0.00	0.00	0.00	0.00
Operation and maintenance cost:	0.00	-303,800.00	-334,180.00	-367,598.00	-404,357.80
Discount factors for 12%:	1.00	0.89	0.80	0.71	0.64
Time-adjust costs (adjusted to present value):	-985,000.00	-270,382.00	-267,344.00	-260,994.58	-258,788.99
Cumulative time-adjusted costs over lifetime:	-985,000.00	-1,255,382.00	-1,522,726.00	-1,783,720.58	-2,042,509.57
Benefit derived from operation of new system:	0.00	403,000.00	1,130,000.00	1,350,000.00	1,500,000.00
Discount factors for 12%:	1.00	0.89	0.80	0.71	0.64
Time-adjust benefits (adjusted to present value):	0.00	358,670.00	904,000.00	958,500.00	960,000.00
Cumulative time-adjusted benefits over lifetime:	0.00	358,670.00	1,262,670.00	2,221,170.00	3,181,170.00
Cumulative lifetime time-adjusted costs + benefits:	-985,000.00	-896,712.00	-260,056.00	437,449.42	1,138,660.43

# Payback Analysis

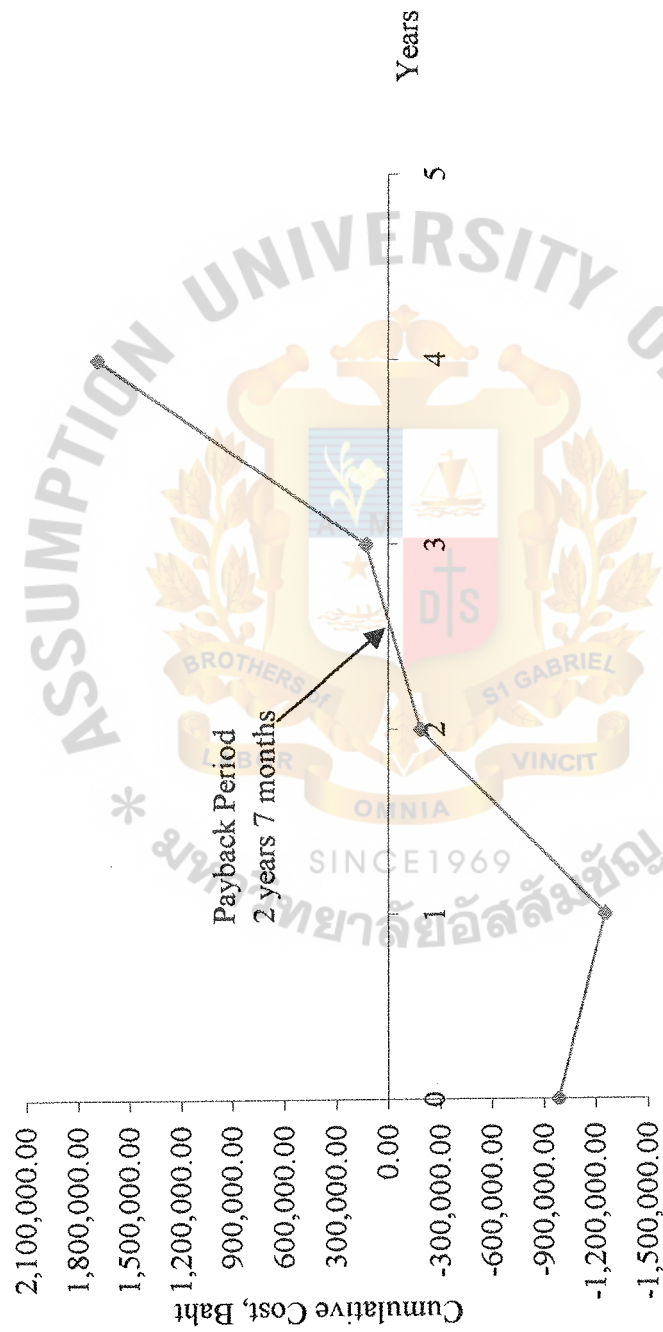


Figure 3.6. Payback Period.

## **IV. PROJECT IMPLEMENTATION**

### **4.1 Overview of Project Implementation**

System Implementation is the planned and orderly conversion from a current existing system to the new proposed information system. The final design should be evaluated first to make sure that the new proposed system can meet the desired goals and objectives, and then the other remaining processes will be performed. The processes of the System Implementation are:

- (1) Program coding
- (2) Testing
- (3) Install the system
- (4) Conversion
- (5) Training
- (6) Documentation

### **4.2 Program Coding**

At first, system design will choose the programming language that is suitable to the system. Coding is a process of writing instructions that the computer can execute directly. For this project, Microsoft Access 97 is used as application software. It is easy to write and use, so system users can understand and use it in a short period. Software prototypes are useful when user is not sure of what they want.

### **4.3 Testing**

The quality of the computerized system depends on system reliability and maintainability. System testing is a critical process for system development. The system must ensure that there will be no errors. The proposed system will be tested before implementation. There are many methods of testing as follows:

(a) Unit Testing

The unit testing is conducted first on each module, independently of one another, to locate errors. The errors in coding and logic that are contained within the modules are initially avoided.

(b) System Testing

The system testing involves the whole system obtained by integrating all modules. With this system testing, all modules are integrated and tested. It is used to find discrepancies between the system objectives, current specifications and system documentation.

(c) Peak Load Testing

This testing is used to determine whether the system will handle the volume of activities when the system is at the peak of its processing demand.

(d) Performance Time Testing

This testing determines the length of time used by the system to process transaction data.

(e) Procedure Testing

This testing determines the clarity of documentation in operation that has users do exactly what the manual system required.

(f) Storage Testing

This testing determines the capacity of the system to store transaction data on a disk or in other files. All users do this testing at the same time to verify the system. They are able to access the server and operating transactions such as retrieving, updating data, inquiry and reports. The

system is tested whether it can handle high volume of activities at the satisfaction level.

**(g) Human Factor Testing**

This testing is to test how the user will use the system when processing the data or preparing the reports.

**(h) Backup/Recovery Testing**

In this testing, the backup of files is tested in a situation when it was destroyed inadvertently. This plan includes testing the restart of the system in case of computer failure. The basic goal is to make sure that files can be recovered and restart the system in case of disaster.

**4.4 Install the System**

In installation of the system, at first, computer site preparation must proceed the installation of the new system. Next, identify who should operate the new system in order to prepare the terminal and printer wiring. Procedure of installation should be written and assigned to persons who respond to handle it. Finally, Hardware, system, utility and application program should be installed at the site preparation.

**4.5 Conversion**

In this step, the personnel information system will be changed from manual system into computerized system. The development teams and users get together to prepare the current information, forms, and people for entering the information current file into database. After conversion, the system should run parallel due to ability to ensure the complete operation between the current system and new system.

**4.6 Training**

It is an important part of project implementation. The quality of the new system depends on how much ability users have to use it effectively and efficiently. Training



courses should explain how to use the system and how to operate the equipment. The overview of system operation and procedures should be included in the training and how to handle the basic problems of the system, including training of data handling activities such as adding data, editing data, formulating inquiries and deleting record, etc.

#### **4.7 Documentation**

Documentation is necessary for communication of program characteristics to other persons than the programmer. Documentation about the program specification, database design, file layout and user manual will be prepared.



## V. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

Human resource management is the major function of an organization. It has to attract, develop and maintain an organization's labor force and these functions are handled by Personnel Department, including employee records.

In the existing personnel information system of Maximus Aviation Co., Ltd., it has a manual procedure. It is quite inefficient; decision making cannot be done efficiently when the information is not up-to-date. It is difficult to get all work done by the existing system. Overall processing system is delayed because of the weakness of the existing system. Most processes are prepared repetitively. Some of the valuable documents are lost during the process. The filing system is not good enough. The workload of personnel department is very high at the end of each month. It causes the poor performance of personnel department. Therefore, the new proposed system is introduced to be a computerized system.

The new system is designed and implemented to replace the manual operations in the area of the Personnel Department. The manual operations take high cost and get unsatisfactory productivity. The computerized system is expected to improve the efficiency while reducing operation costs. Computerization will help reduce work force normally required by the manual operation. The computer can reduce the number of officers, paper cost, utility cost, equipment cost, etc.

After analyzing the system cost between the existing cumulative system cost and the proposed cumulative system cost, the breakeven point of these two systems is about in the second year for the benefit to overtake the cost.

In the new proposed system, it increases the efficiency for all operations and also meets user requirements. The new system is an online system running Windows NT Server. Users can share information at the same time. The information of proposed system will be more accurate and up-to-date, therefore, top managers can get reports timely and accurately for their decision making.

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

Process	Existing System	Proposed System
Job Description Process	40 Mins.	20 Mins.
Recruitment and Employee Selection Process	1.5 Hrs.	1 Hr.
Employee Record Process	40 Mins.	20 Mins.
Employee Training and Developing Process	3 Hrs.	1.5 Hrs.
Employee Medical Treatment Process	40 Mins.	25 Mins.
Performing Payroll Activities Process	1 Hr.	40 Mins.
Generating the Report Process	30 Mins.	20 Mins.
Total	8 Hours	4 Hours 35 Mins.

From above table, it shows the degree of achievement between the proposed system and the existing system. Time used for each process is reduces after introducing a new proposed system. In the new proposed system, it increase the efficiency for all operations, users can share information at the same time.

In job description process, personnel officers can retrieve the existing job description in the job description file in the computer that can reduce time used in finding information.

In recruitment and employee selection process, personnel officers can reduce the time used by finding the qualified applicants in the applicant file, including interview scheduling, required report, etc.

In employee record process, personnel officers can reduce the time used by retrieving, adding, updating and deleting the specific employee directly in the employee file.

In employee training and developing process, personnel officers can reduce the time used by using information effectively. In this process, employee information, training information and trainee information are used. Personnel officers have to arrange the schedule for training course effectively.

In employee medical treatment process, personnel officers can reduce the time used by recording all information in medical treatment in medical treatment file. Personnel officers can retrieve the desired information directly.

In performing payroll activity process, personnel officers can reduce the time used by calculating work time, over time easily, including leave information and holiday information. Employees can record their time-in and time-out directly at the personnel department.

In generating the report process, personnel officers can reduce the time used by retrieving the desired information in the files in the computer such as employee information, trainee information, salary information, medical treatment information, etc.

## **5.2 Recommendations**

In order to make the computerized system more beneficial in the future, it is recommended that it should be further developed into another application and integrated with this proposed system. The integrated personnel information system can reduce redundant and inconsistent information for the decision making. Further enhancement of the system is recommended to make full use of the information technology. There are many computer and information technologies that can be used to improve the performance of employee. The internet is the largest sources of information, if the

company connects to the internet it can increase the knowledge and vision of their employees.

From the study of the personnel system of Maximus Aviation Co., Ltd., the problem of the existing system is not only on the manual system itself, but also the people. To prevent the same problem occurring in the new system, employee training is an important factor. The user needs to know their duty, authorization, and responsibility. The job description for each user needs to be specified. When all of these factors are clear to the user, it will help to reduce the errors and problems.







## APPENDIX A

### CONTEXT DIAGRAMS

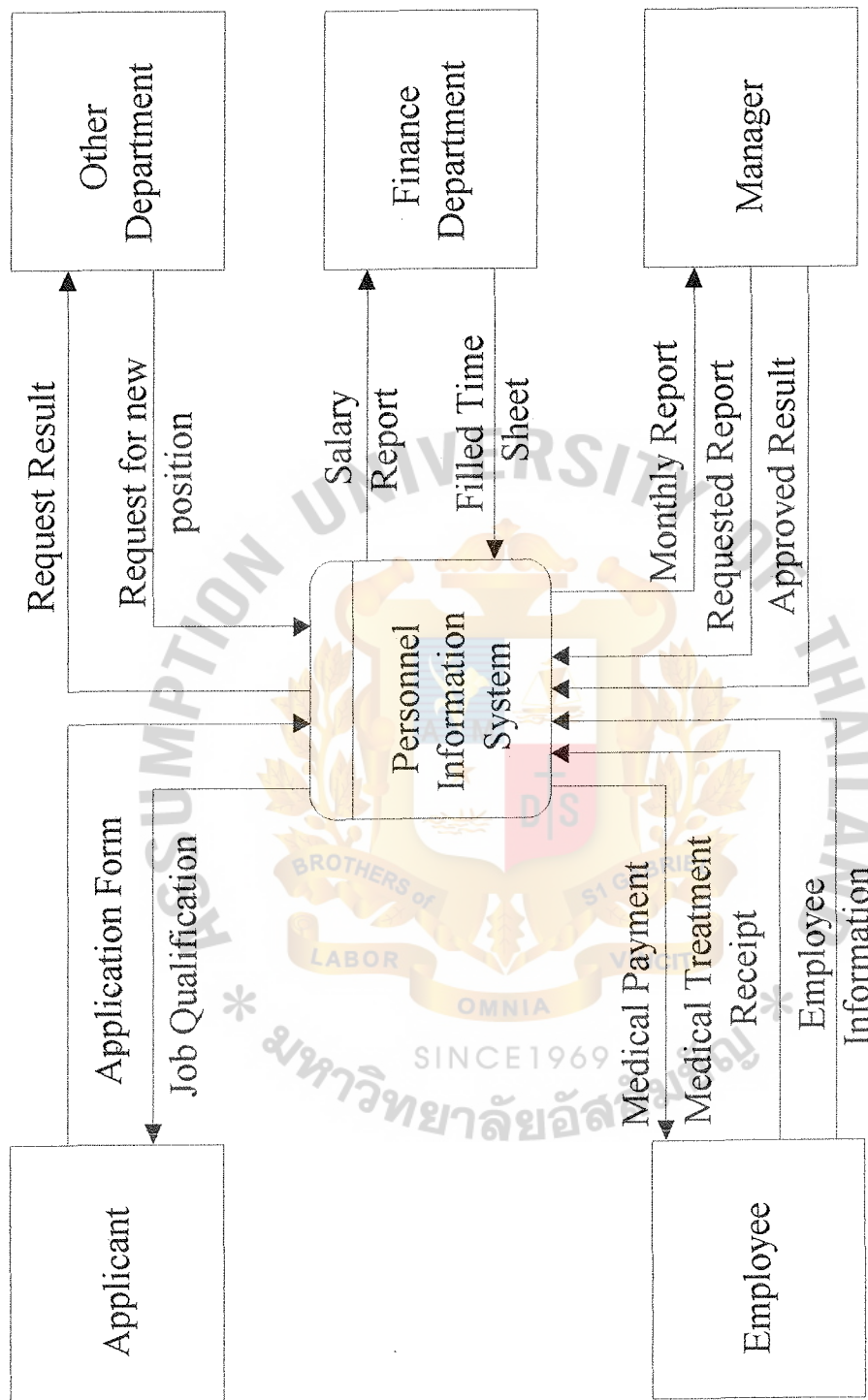


Figure A.1. Context Diagram of the Existing System.

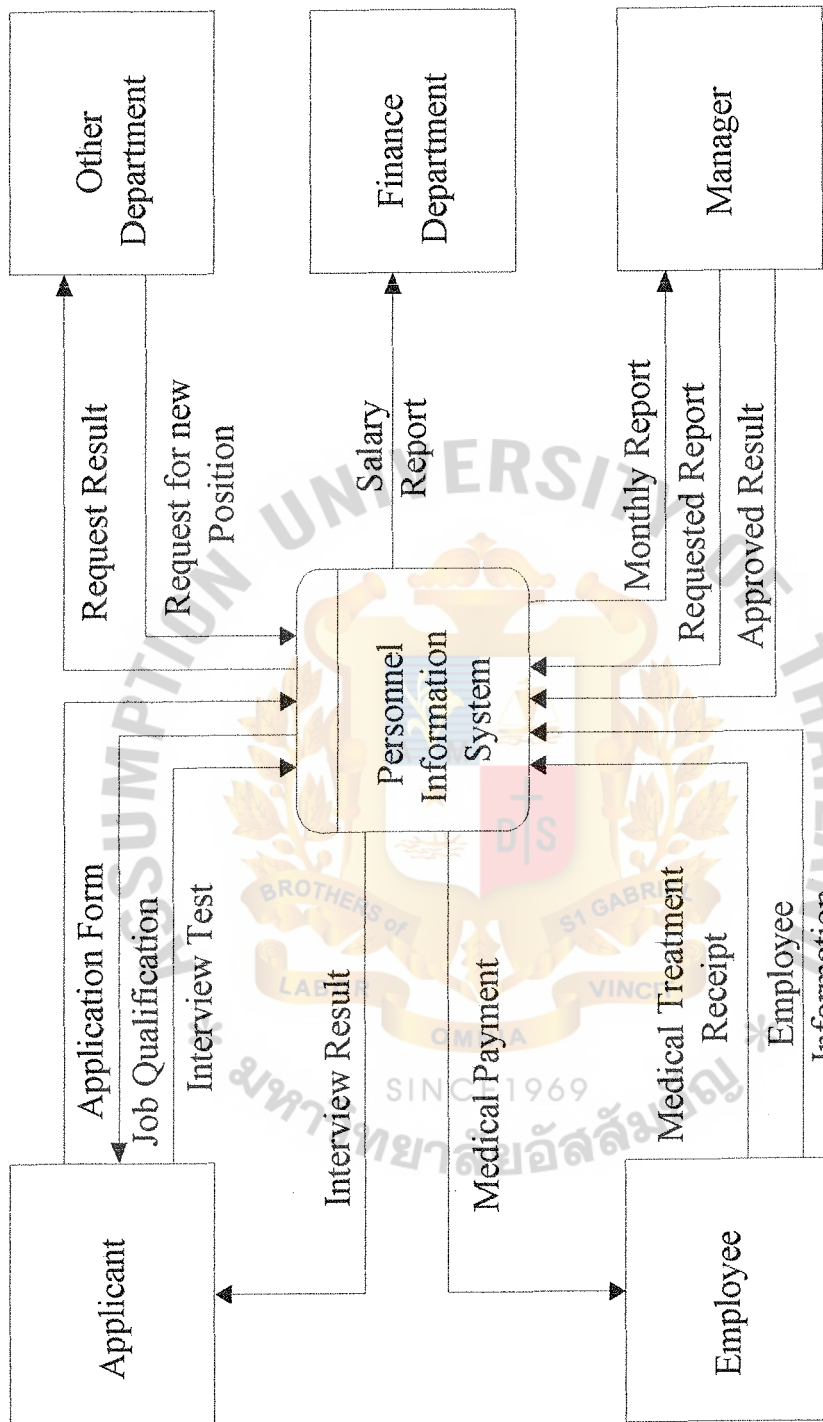
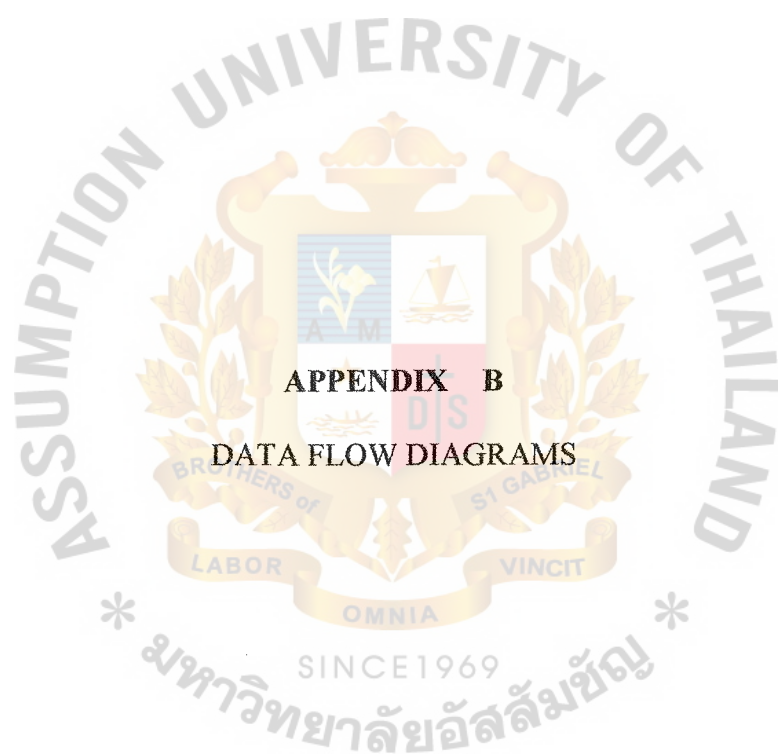


Figure A.2. Context Diagram of the Proposed System.



## APPENDIX B

### DATA FLOW DIAGRAMS





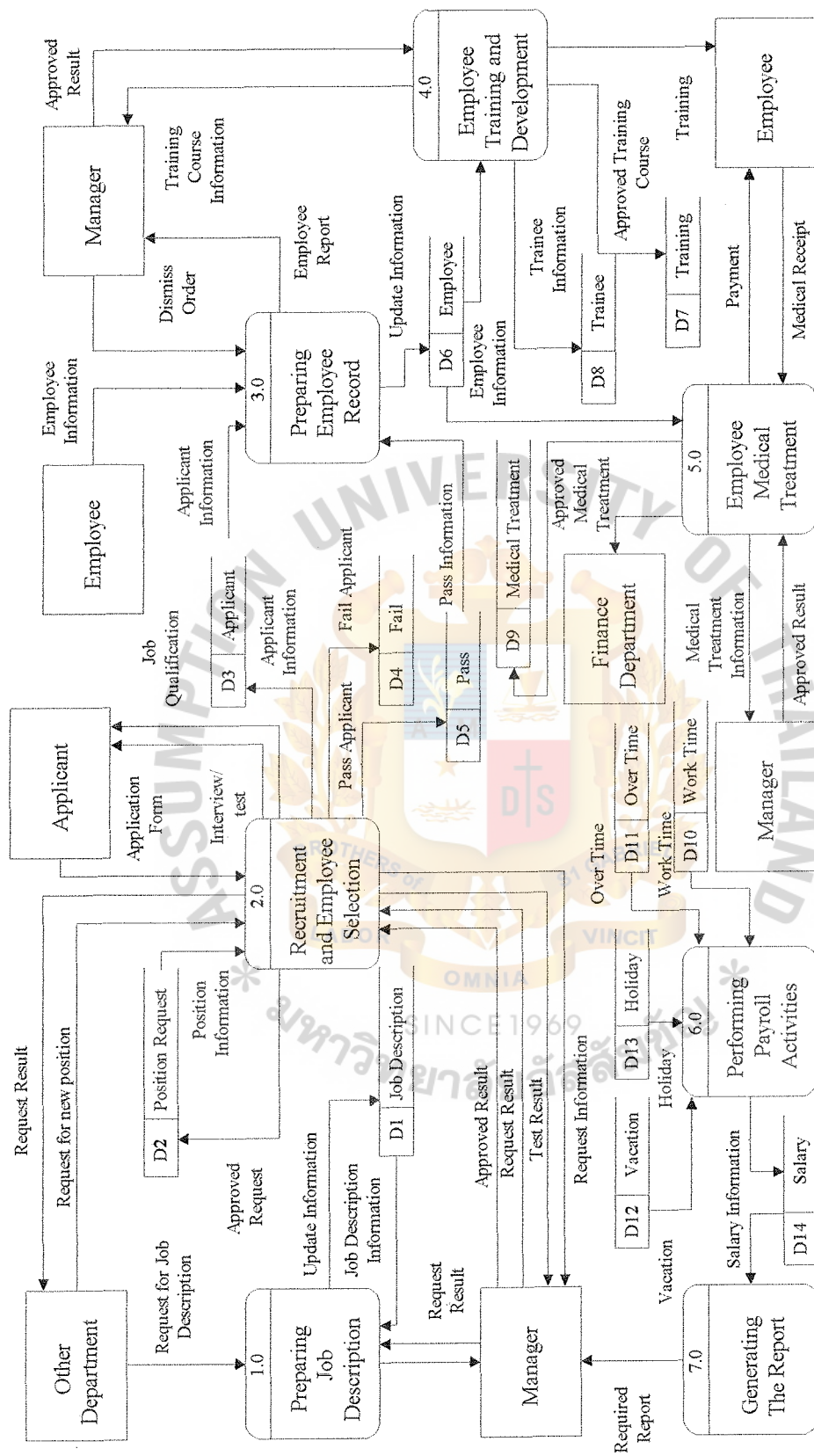


Figure B.2. Data Flow Diagram Level 0 of the Proposed System.

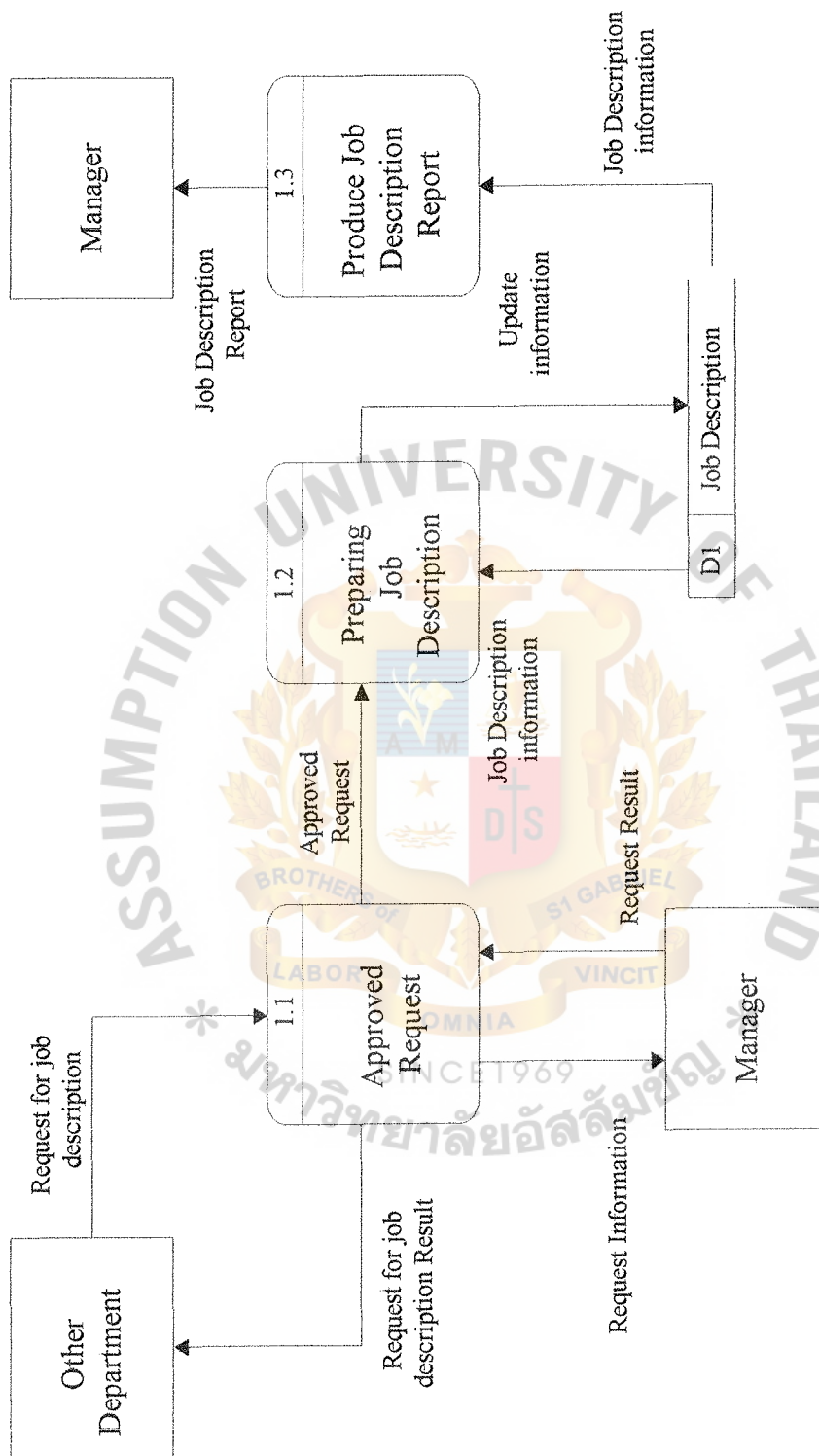


Figure B.3. Data Flow Diagram Level 1 for Process 1 of the Proposed System.

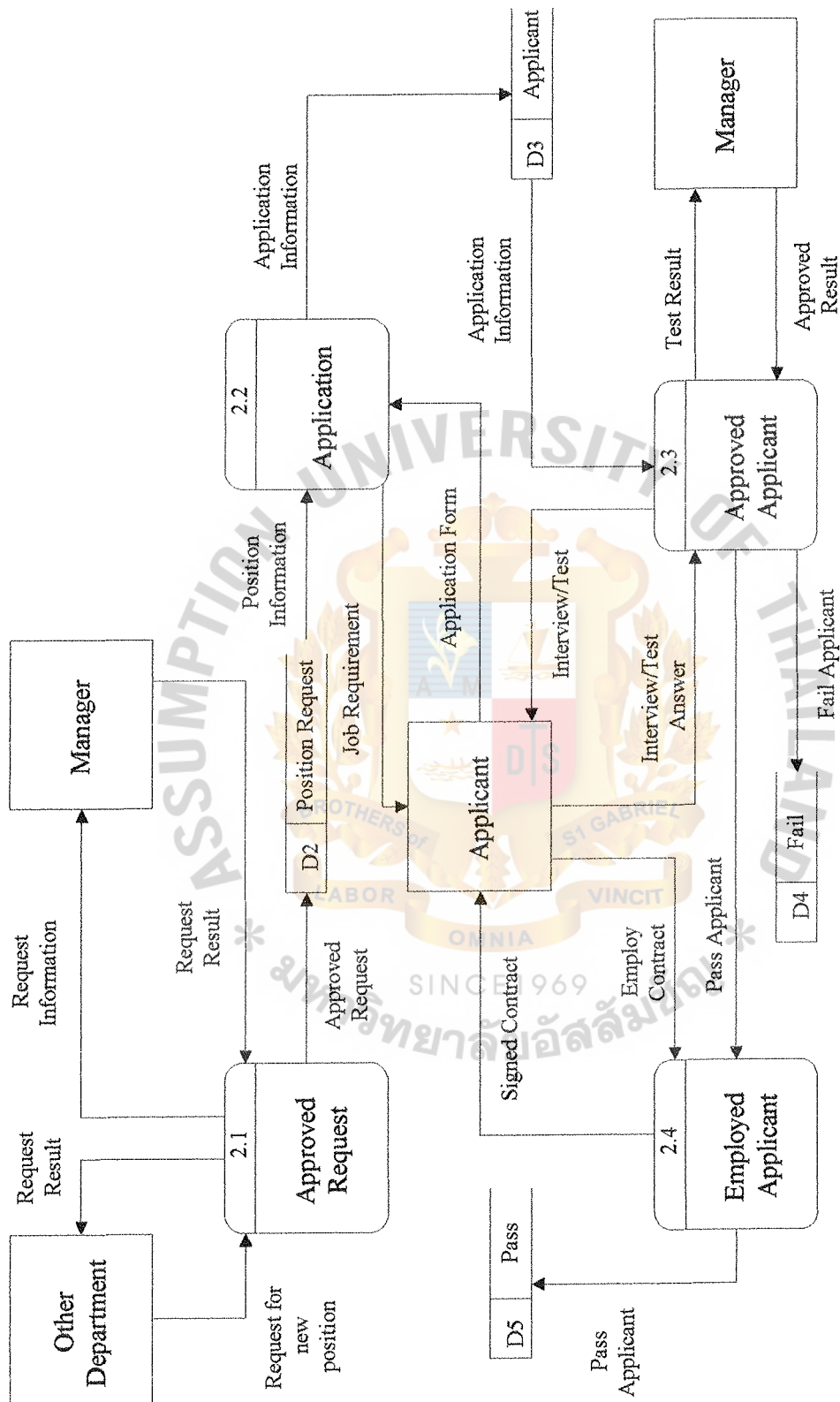


Figure B.4. Data Flow Diagram Level 1 for Process 2 of the Proposed System.

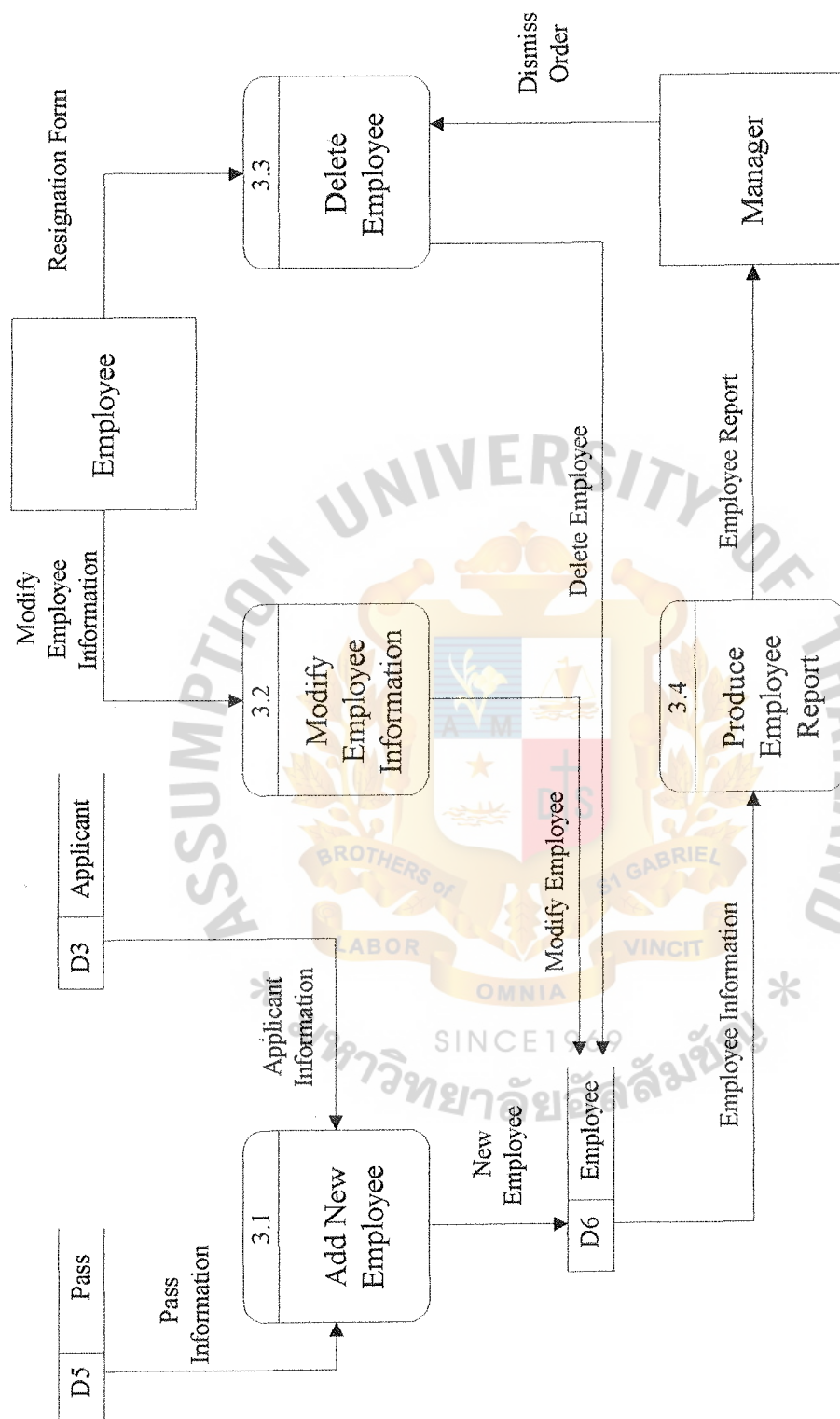


Figure B.5. Data Flow Diagram Level 1 for Process 3 of the Proposed System.

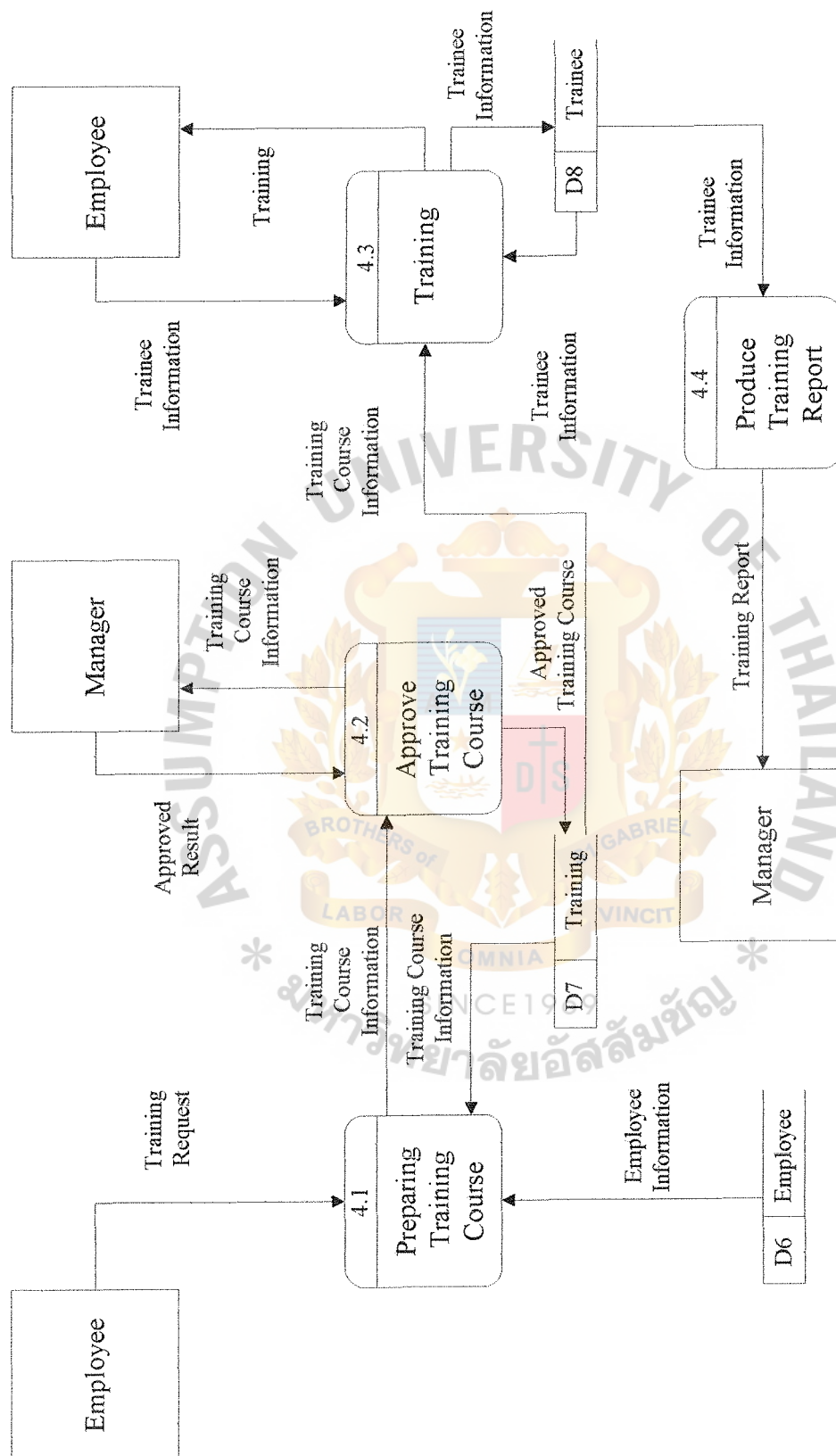


Figure B.6. Data Flow Diagram Level 1 for Process 4 of the Proposed System.



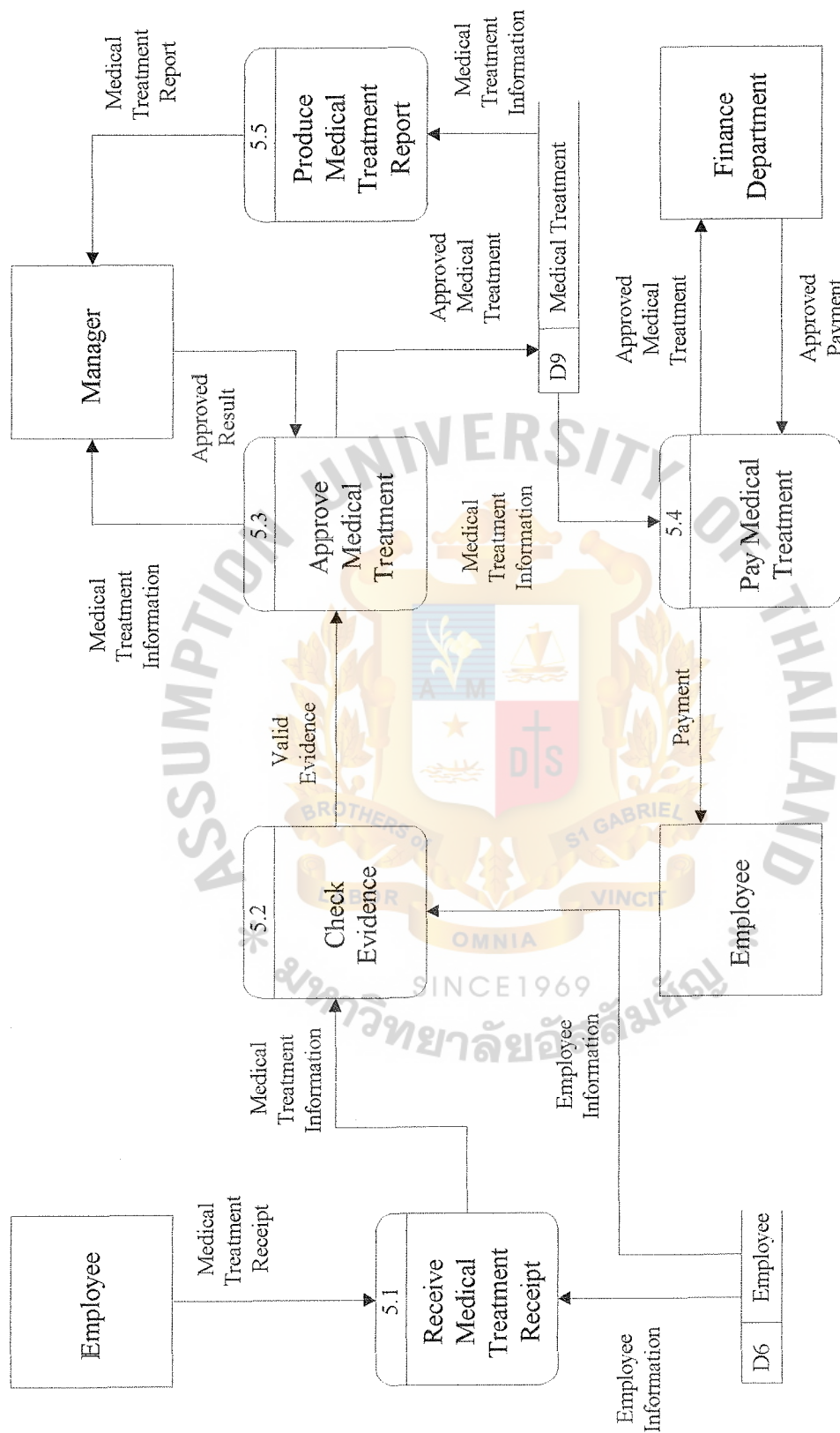


Figure B.7. Data Flow Diagram Level 1 for Process 5 of the Proposed System.

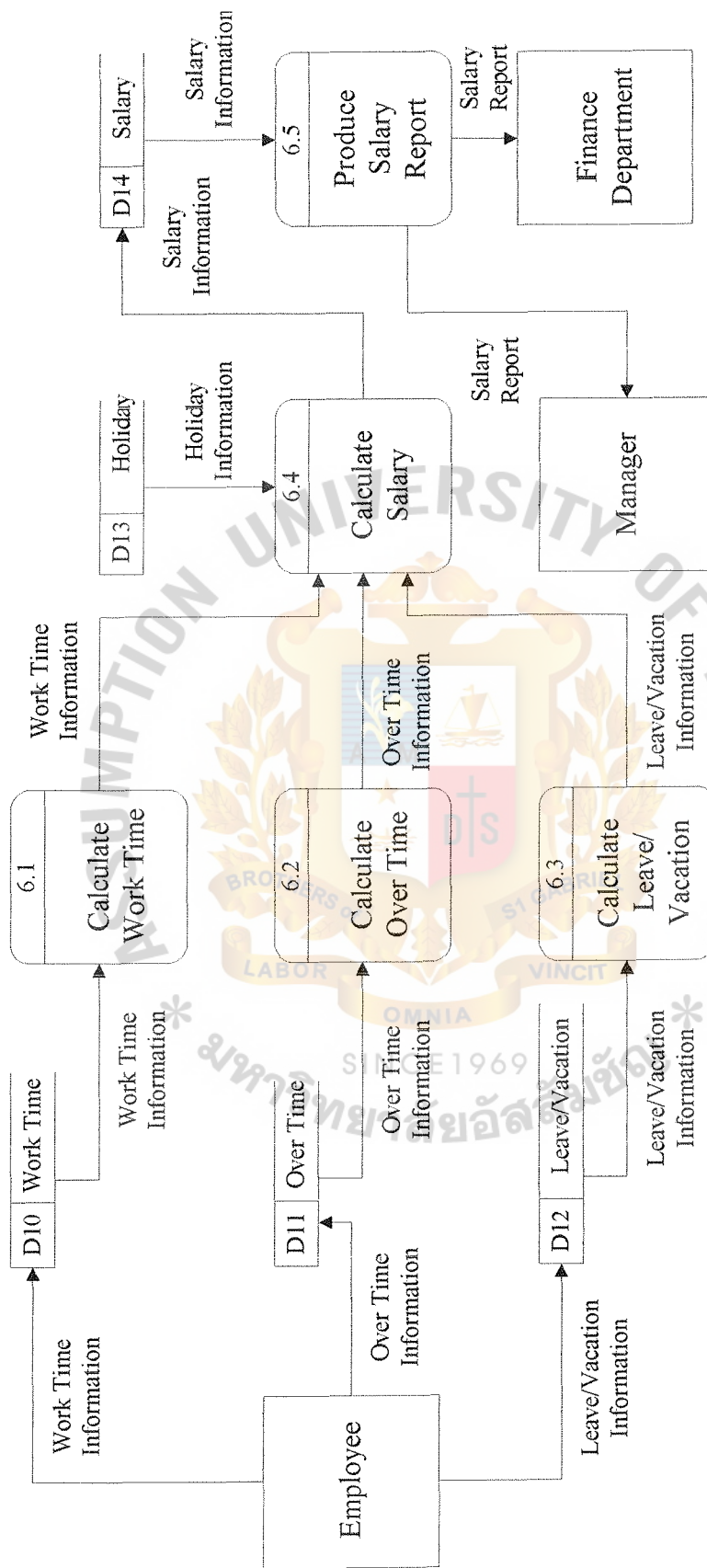


Figure B.8. Data Flow Diagram Level 1 for Process 6 of the Proposed System.

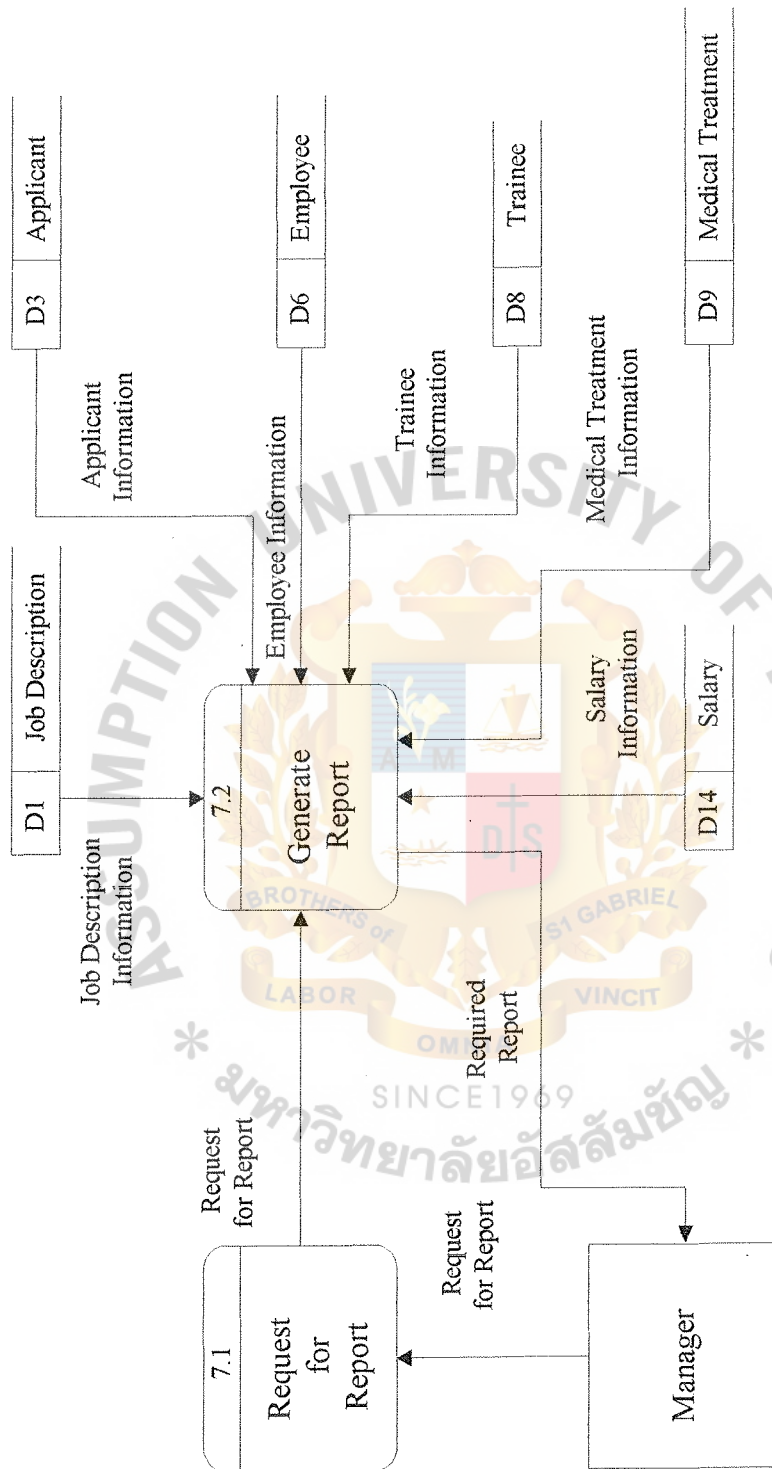


Figure B.9. Data Flow Diagram Level 1 for Process 7 of the Proposed System.



APPENDIX C  
USER INTERFACE DESIGN



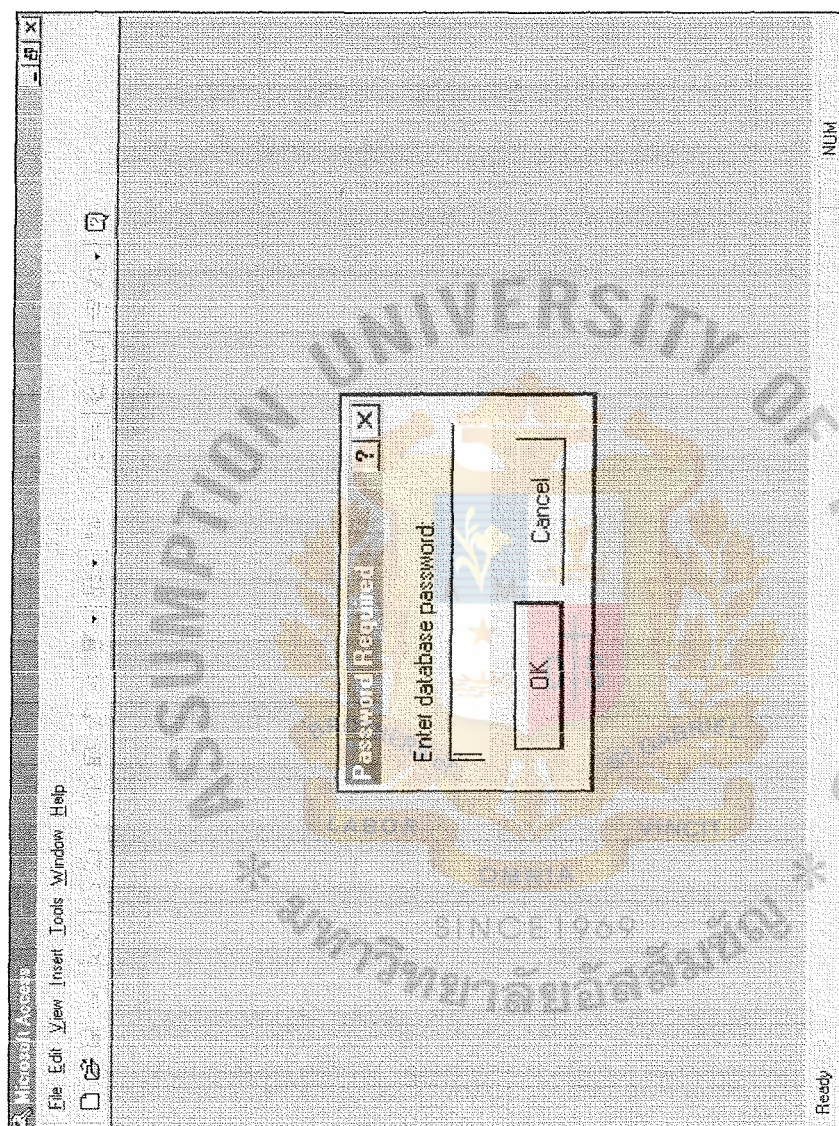


Figure C.1. Input Screen for Password Required (Security Control).



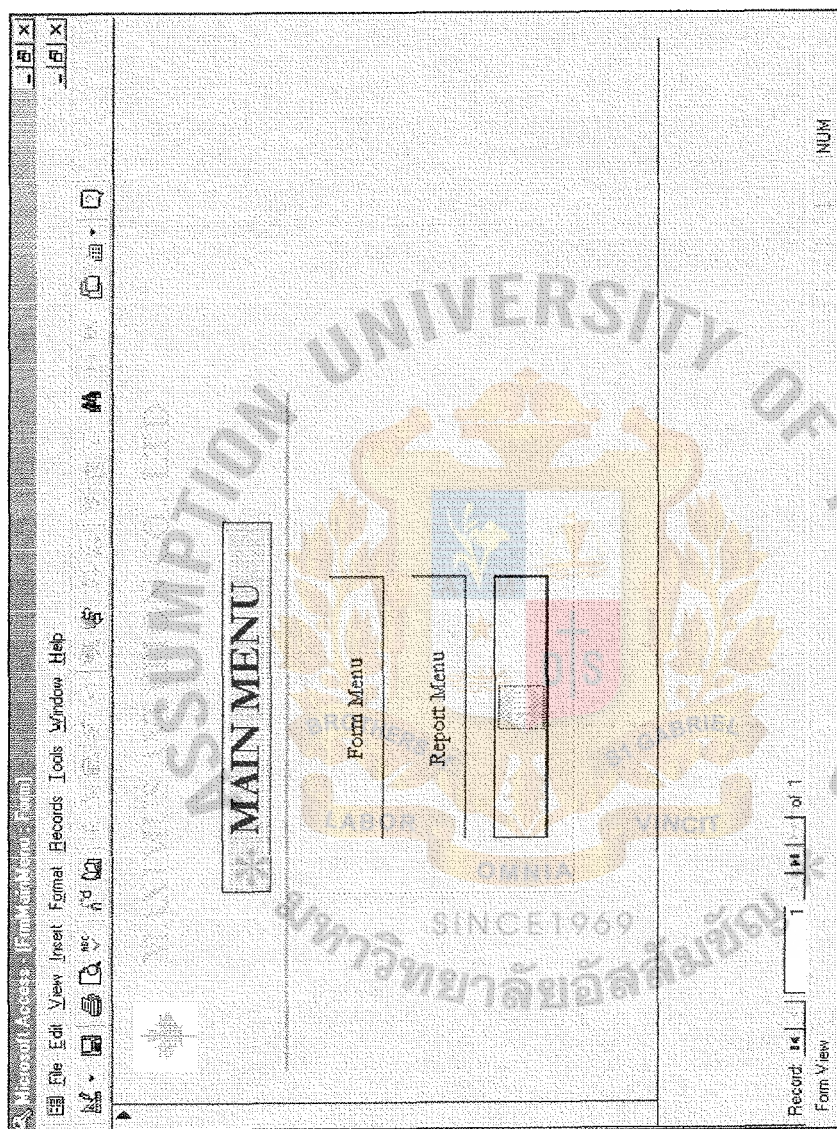


Figure C.2. Main Menu for Personnel Information System.

Microsoft Access - [Personnel Information System] [Form Menu]

File Edit View Insert Format Records Tools Window Help

FORM MENU

Applicant	Experience	Medical Treatment
Department	Holiday	Over Time
Education	Leave	Position
Employee	Manager	Salary
Training	Work Time	
		Main Menu

Record 1 of 1  
Form View

NUM

Figure C.3. Form Menu for Personnel Information System.



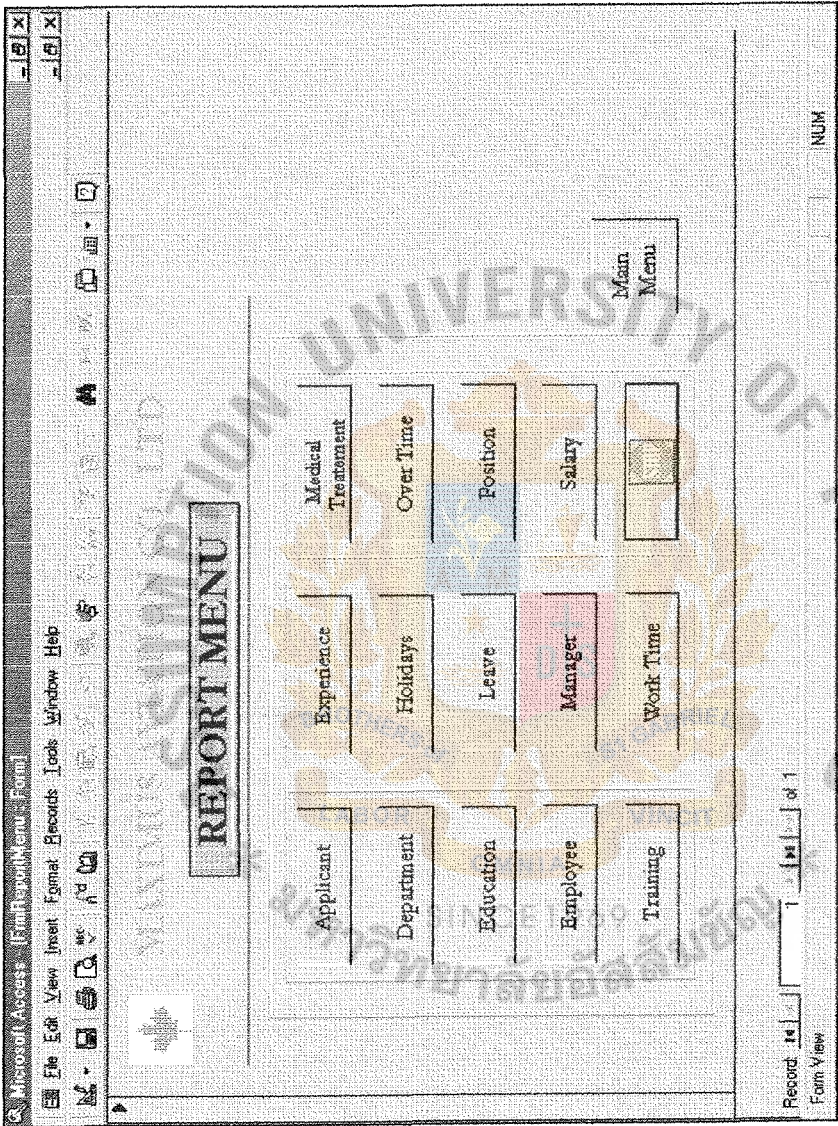


Figure C.4. Report Menu for Personnel Information System.

Microsoft Access - T11Applicant1

File Edit View Insert Format Records Tools Window Help

Record: 14 of 14  
Applicant ID number

Application ID	0	Home Telephone	5781293	Add Record
Employee ID	0	Mobile Number		Delete Record
First Name	niripath	Pager		Find Record
Last Name	nirumith	E-Mail	niripath@usa.net	Form Menu
Birthday	5 January 1976	Submitted Date	2 January 2000	
Age	25			
Personal ID	230235225412			
Gender	male			
Address	72/31 phahonyothin road			
Province	Bangkok			
Zip Code	10260			

NUM

Figure C.5. Input Screen for Applicant Table.



Microsoft Access - HbDepartment

File Edit View Insert Format Records Tools Window Help

Record: 1 of 7  
Department ID number

Department ID:   
Employee ID:   
Department Name:   
Manager ID:

Add Record  
Delete Record  
Find Record  
Form Menu

NUM

Figure C.6. Input Screen for Department Table.



Microsoft Access - HbEducation

File Edit View Insert Format Records Tools Window Help

Record: 14 of 13

Education ID number

Education ID: 1

Employee ID: 2

Education Name: Rankhamhang University

Degree: Law

Year in: 1986

Year out: 1992

Grade: 1

NUM

ASSUMPTION UNIVERSITY OF THAILAND

SINCE 1969

วิทยาลัยอัสสัมชัญ

ADD RECORD

DELETE RECORD

FIND RECORD

FORM MENU

Figure C.7. Input Screen for Education Table.

Microsoft Access - tblEmployee

File Edit View Insert Format Records Tools Window Help

Employee ID: 11

First Name: Mani

Last Name: Thirithonmasak

Birthdate: 16 January 1978

Age: 23

Personal ID: 3109532633241

Gender: Male

Address: 32/10 Rama IV Road

Province: Bangkok

Zip Code: 10110

Home Telephone: 2594084

Mobile Number:

Pager:

E-mail: mani@brevok.com

Tax ID: 3220122233

Social ID: 1247733220

Record: 11 of 14

Employee ID

Position ID: 8

Department ID: 3

Hired Date: 7 November 1998

Manager ID: 3

Photo

Add Record

Delete Record

Find Record

Form Menu

NUM

Figure C.8. Input Screen for Employee Table.



Microsoft Access - The Database

File Edit View Insert Format Records Tools Window Help

Record: 1 of 9  
Experience ID number

NUM

Experience ID	1	Add Record
Employee ID		Delete Record
Organization Name	Canadian Airline	Find Record
Position	General Manager	Form Menu
Year in	1970	
Year out	1982	
Manager Name		
Memo		

Figure C.9. Input Screen for Experience Table.

Microsoft Access - Holiday

File Edit View Insert Format Records Tools Window Help

Holiday ID:   
 Holiday Name:   
 Date:   
 Memo:

Record:  of 15  
 Holiday ID number

NUM

Figure C.10. Input Screen for Holiday Table.

ASSUMPTION UNIVERSITY OF THAILAND			
<b>Leave ID</b>	<input type="text"/>	<b>Add Record</b>	
<b>Employee ID</b>	<input type="text"/>	<b>Delete Record</b>	
<b>Leave date</b>	<input type="text"/>	<b>Find Record</b>	
<b>Submit date</b>	<input type="text"/>	<b>Form Menu</b>	
<b>Approve date</b>	<input type="text"/>		
<b>Total leave limit</b>	<input type="text"/>		

Record: 14 of 7  
Leave ID number

Figure C.11. Input Screen for Leave Table.



Microsoft Access - [tblManager1]

File Edit View Insert Format Records Tools Window Help

Manager ID:

Employee ID:

Manager Name:

Department ID:

Position ID:

Buttons: Add Record, Delete Record, Find Record, Form Menu

Record: 14 of 7

Manager ID Number

NUM

Figure C.12. Input Screen for Manager Table.

Microsoft Access - HM Medical Treatment

File Edit View Insert Format Records Tools Window Help

Medical Treatment ID:  Submit date:  Add Record

Employee ID:  Approve date:  Delete Record

Date:  Payment date:  Find Record

Hospital Name:  Form Menu

Receipt Number:

Amount:

Memo:

Record:  of 2

Medical Treatment ID number

NUM

Figure C.13. Input Screen for Medical Treatment Table.



Microsoft Access - InputScreen.mdb

File Edit View Insert Format Records Tools Window Help

Standard toolbar: New, Open, Save, Print, Undo, Redo, Find, etc.

Database window: InputScreen.mdb

Form: InputScreen

Over Time ID: 1

Employee ID: 2

Date: 2 January 2001

Over Time 1: 0

Over Time 2: 0

Over Time 3: 0

Buttons: Add Record, Delete Record, Find Record, Form Menu

Record: 1 of 1

Over Time ID number

NUM

Figure C.14. Input Screen for Over Time Table.

Microsoft Access - HUP Position

File Edit View Insert Format Records Tools Window Help

Position ID  
Employee ID  
Position Name  
Department ID  
Job Description

General Manager  
1

1

Record: 1 of 7  
Position ID number

NUM

ASSUMPTION UNIVERSITY OF THAILAND

SINCE 1969

มหาวิทยาลัยอัสสัมชัญ

OMNIS

POS

Form Menu

Add Record  
Delete Record  
Find Record

Figure C.15. Input Screen for Position Table.

Microsoft Access - HLSAdmin

File Edit View Insert Format Records Tools Window Help

Salary ID Work Time ID Over Time ID Leave ID Holiday ID Date Salary Amount Employee ID

Add Record Delete Record Find Record Form Menu

Record 14 of 1

Salary ID number

Figure C.16. Input Screen for Salary Table.



Microsoft Access: [Database Name]

File Edit View Insert Format Records Tools Window Help

Record: 1 of 6  
Training ID number

Training ID	1	Add Record
Employee ID	3	Delete Record
Training Name	Agent Seminar	Find Record
Training Begin Date	5 January 2001	Form Menu
Training End Date	6 January 2001	
Instructor	Mr. Robert Cobb	
Place	Novotel Lotus	
Memo		

NUM

Figure C.17. Input Screen for Training Table.

Microsoft Access - [tblWork time]

File Edit View Insert Format Records Tools Window Help

Work Time ID  
Employee ID  
Date  
Time-in  
Time-out

1  
2 January 2001  
0630  
1700

Add Record  
Delete Record  
Find Record  
Form Menu

Record: 1 of 12  
Work Time ID number

NUM

Figure C.18. Input Screen for Work Time Table.

## MAXIMUS AVIATION CO., LTD.

### Applicant Report

ID	First Name	Last Name	Address	Province	Zip Code	Telephone	E-mail
1	nithipath	nilsumrith	72/31 phahonyothin road	Bangkok	10260	5781293	Nithipath@usa.net
2	adisorn	ratanakovit	385 Sukhumvit Road	Bangkok	10110	3900036	Adisorn@hotmail.com
3	alisara	kositapant	61/188 rama 9 Road huaykwang	bangkok	10320	2451202	Alisara@yahoo.com
4	ampika	chanviriyawut	2411 Ladprao 67/2 Bangkokpi	Bangkok	10310	5305382	Ampika@hotmail.com
5	anop	Boonthaveeparh	9/48 Soi Ramkhumhang 158	Bangkok	10240	9171908	Aun@hotmail.com

Figure C.19. Output Screen for Application Report.





## MAXIMUS AVIATION CO., LTD.

### Department Report

Department ID	Department Name	Manager ID
1	General Department	1
2	Marketing Department	2
3	Sales Department	3
4	Accounting Department	4
5	Finance Department	5
6	Commercial Department	6
7	Public Relation Department	7

Figure C.20. Output Screen for Department Report.

# MAXIMUS AVIATION CO., LTD.

## Education Report

Education ID	Employee ID	Education Name	Degree	Year in	Year out
3	2	Ramkhamhaeng University	Law	1986	1992
4	3	Assumption University	BBA	1990	1994
5	4	Bangkok University	Accounting	1984	1988
6	5	Bangkok University	Finance	1989	1993
7	6	Chulalongkorn University	BBA	1990	1994
8	7	Chiang Mai University	Humanity	1984	1988
9	8	Thammasat University	BBA	1992	1996
10	9	UTCC University	BBA	1991	1995

Figure C.21. Output Screen for Education Report.



# MAXIMUS AVIATION CO., LTD.

## Employee Report

ID	Name	Address	Province	Zip Code	Mobile	E-mail
1	Bernard	18 Regent Mansion	Bangkok	10260	01-8524123	bak@bravox.com
2	Surachet	156 Sukhumvit Road	Bangkok	10110	01-6266654	joe@bravox.com
3	Thanakorn	95/25 Ladprao soi 125	Bangkok	10230	01-6445064	korn@bravox.com
4	Roongnipa	9 Rama IV Road Klongtoey	Bangkok	10110	01-8532521	mue@bravox.com
5	Veera	12 Sathorn Road	Bangkok	10120	01-6422533	veera@bravox.com

Figure C.22. Output Screen for Employee Report.



## MAXIMUS AVIATION CO., LTD.

### Holiday Report

Holiday ID	Holiday Name	Date	Memo
1	New Year	1 January 2001	
2	Chinese New Year	24 January 2001	
3	Makhabucha Day	8 February 2001	
4	Chakree Day	6 April 2001	
5	Songkran Day	13 April 2001	
6	Songkran Day	14 April 2001	
7	May Day	1 May 2001	
8	Chathamongkol Day	5 May 2001	
9	Visakhabucha Day	7 May 2001	
10	Phuchmongkol Day	16 May 2001	
11	Arsarahabucha Day	5 July 2001	
12	Mother Day	13 August 2001	Substitute
13	Piyamaharach Day	23 October 2001	
14	Father Day	5 December 2001	
15	Ratathammanoon Day	10 December 2001	

Figure C.23. Output Screen for Holiday Report.



## MAXIMUS AVIATION CO., LTD.

### Manager Report

Manager ID	Employee ID	Manager Name	Department ID	Position ID
1	1	Bernard A. Keller	1	1
2	2	Surachet Timsakul	2	2
3	3	Thanakorn Tringwan	3	3
4	4	Roongnipa Vanichpakorn	4	4
5	5	Veera Vanich	5	5
6	6	Somporn Kabvoon	6	6
7	7	Thanavadee Rakthai	7	7

Figure C.24. Output Screen for Manager Report.



## APPENDIX D

### DATABASE DESIGN



## DATABASE DESIGN

### 1. Applicant

Table D.1. Applicant Table.

Field Name	Type	Size
A_ID	Number	3
AF_Name	Character	40
AL_Name	Character	50
Abth_Date	Date	20
A_Age	Number	2
A_Personal ID	Number	13
A_Gender	Character	6
A_Address	Character	50
A_Province	Character	20
A_Zip	Number	5
A_Tel Home	Number	10
A_Mobile	Number	10
A_Pager	Number	10
A_Email	Character	30
A_SubmitDate	Date	20
E_ID	Number	3

### 2. Department

Table D.2. Department Table.

Field Name	Type	Size
D_ID	Number	3
D_Name	Character	40
M_ID	Number	3
E_ID	Number	3

### 3. Education

Table D.3. Education Table.

Field Name	Type	Size
Edu ID	Number	3
Education Name	Character	40
Degree	Character	20
Year in	Number	4
Year out	Number	4
Grade	Number	1
E ID	Number	3

### 4. Employee

Table D.4. Employee Table.

Field Name	Type	Size
E ID	Number	3
EF Name	Character	40
EL Name	Character	50
Ebth Date	Date	20
E Age	Number	2
E Personal ID	Number	13
E Gender	Character	6
E Address	Character	50
E Province	Character	20
E Zip	Number	5
E Tel Home	Number	10
E Mobile	Number	10
E Pager	Number	10
E Email	Character	30
E TaxID	Number	10
E SocialID	Number	10
P ID	Number	3
D ID	Number	3
E HireDate	Date	20
M ID	Number	3
E Photo	OLE Object	-

5. Experience

Table D.5. Experience Table.

Field Name	Type	Size
EX_ID	Number	3
Organization	Character	20
Position	Character	20
Year in	Number	4
Year out	Number	4
Manager Name	Character	30
Memo	Memo	50
E_ID	Number	3

6. Holiday

Table D.6. Holiday Table.

Field Name	Type	Size
H_ID	Number	3
H_Name	Character	40
Date	Date	20
Memo	Memo	50

7. Leave

Table D.7. Leave Table.

Field Name	Type	Size
L_ID	Number	3
Leave Date	Date	20
Submit Date	Date	20
Approve Date	Date	20
Total Leave Limit	Number	2
E_ID	Number	3

8. Manager

Table D.8. Manager Table.

Field Name	Type	Size
M_ID	Number	3
M_Name	Character	40
E_ID	Number	3
D_ID	Number	3
P_ID	Number	3

9. Medical Treatment

Table D.9. Medical Treatment Table.

Field Name	Type	Size
MT_ID	Number	3
Date	Date	20
Hospital	Character	20
Receipt No.	Number	10
Amount	Number	5
Memo	Memo	50
E_ID	Number	3
Submit Date	Date	20
Approved Date	Date	20
Payment Date	Date	20

10. Over Time

Table D.10. Over Time Table.

Field Name	Type	Size
OT_ID	Number	3
Date	Date	20
E_ID	Number	3
OT1	Number	3
OT2	Number	3
OT3	Number	3



## 11. Position

Table D.11. Position Table.

Field Name	Type	Size
P_ID	Number	3
P_Name	Character	40
Job Description	Character	50
E_ID	Number	3
D_ID	Number	3

## 12. Salary

Table D.12. Salary Table.

Field Name	Type	Size
S_ID	Number	3
WT_ID	Number	3
OT_ID	Number	3
L_ID	Number	3
H_ID	Number	3
Date	Date	20
S_Amount	Number	5
E_ID	Number	3

## 13. Training

Table D.13. Training Table.

Field Name	Type	Size
T_ID	Number	3
T_Name	Character	40
T_Begin	Date	20
T_End	Date	20
Instructor	Character	40
Place	Character	40
Memo	Character	50
E_ID	Number	3

14. Work Time

Table D.14. Work Time Table.

Field Name	Type	Size
WT_ID	Number	3
Date	Date	20
Time-in	Time	5
Time-out	Time	5
E_ID	Number	3





APPENDIX E

DATA DICTIONARY

## DATA DICTIONARY

Table E.1. Data Dictionary of Personnel Information System Database.

Field Name	Meaning
A_ID	Applicant ID Number
AF_Name	Applicant First Name
AL_Name	Applicant Last Name
Abth_Date	Applicant Birthday
A_Age	Applicant Age
A_Personal ID	Applicant Personal ID Number
A_Gender	Applicant Gender
A_Address	Applicant Address
A_Province	Applicant Province
A_Zip	Applicant Zip Code
A_Tel_Home	Applicant Telephone Number
A_Mobile	Applicant Mobile Phone Number
A_Pager	Applicant Pager Number
A_Email	Applicant E-mail Address
A_SubmitDate	Applicant Form Submit Date
D_ID	Department ID Number
D_Name	Department Name
Edu_ID	Education ID Number
Degree	Employee Education Level
Year in	Year that employee start to educate
Year out	Year that employee graduate
Grade	Average Education Result
E_ID	Employee ID Number
EF_Name	Employee First Name
EL_Name	Employee Last Name
Ebth_Date	Employee Birthday
E_Age	Employee Age
E_Personal ID	Employee Personal ID Number
E_Gender	Employee Gender
E_Address	Employee Address
E_Province	Employee Province
E_Zip	Employee Zip Code
E_Tel_Home	Employee Telephone Number
E_Mobile	Employee Mobile Phone Number
E_Pager	Employee Pager Number
E_Email	Employee E-mail Address
E_TaxID	Employee Tax ID Number
E_SocialID	Employee Social Security ID Number
E_HireDate	Date that start to hire employee
E_Photo	Employee Photograph
EX_ID	Experience ID Number



Table E.1. Data Dictionary of Personnel Information System Database (Continued).

Field Name	Meaning
Organization	Previous Organization Name
Position	Position in the old organization
Manager Name	Manager Name of the old organization
Memo	Memo
H_ID	Holiday ID Number
H_Name	Holiday Name
Date	Holiday Date
L_ID	Leave ID Number
Leave Date	Leave Date
Submit Date	Leave Form Submit Date
Approve Date	Leave Form Approved Date
Total Leave	Total amount of Leave day for specific employee
Limit	
M_ID	Manager ID Number
M_Name	Manager Name
MT_ID	Medical Treatment ID Number
Hospital	Hospital Name
Amount	Total amount of Medical Treatment Fee
Payment Date	Date that finance department pay to employee for Medical Treatment reimbursement
OT_ID	Over Time ID Number
OT1	Over Time Type 1 (After 1700 of normal working day)
OT2	Over Time Type 2 (Time during 0830-1700 on holiday or weekend)
OT3	Over Time Type 3 (Time after 1700 on holiday or weekend)
P_ID	Position ID Number
P_Name	Position Name
Job Description	Job Description of specific position
S_ID	Salary ID Number
S_Amount	Total amount of Salary in each month for specific employee
T_ID	Training ID Number
T_Name	Training Topic
T_Begin	Training course starting date
T_End	Training course ending date
Instructor	Instructor name of specific training course
Place	Place of Training course
WT_ID	Work Time ID Number
Time-in	Employee Time-in in each day
Time-out	Employee Time-out in each day



**APPENDIX F**  
**PROCESS SPECIFICATION**

## PROCESS SPECIFICATION

Process 1.0. Preparing Job Description

Table F.1. Process Specification of Process 1.1.

Process Name:	Approved Request
Data In:	Request for Job Description Request Result
Data Out:	Request for Job Description Result Request Information Approved Result
Process:	(1) Receive the request for Job Description from other Department (2) Send request information to get approved from the manager (3) Send approved result to next process
Attachment:	(1) Other Department (2) Manager

Table F.2. Process Specification of Process 1.2.

Process Name:	Preparing Job Description
Data In:	Approved Request Job Description Information
Data Out:	Update Information
Process:	(1) Get approved request from the process 1.1. (2) Check the existing Job Description file (3) For the existing job description, update job Description information (4) For new job description, add job description Information
Attachment:	(1) Data Store D1

Table F.3. Process Specification of Process 1.3.

Process Name:	Produce Job Description Report
Data In:	Job Description Information
Data Out:	Job Description Report
Process:	(1) Get job description information from job description file (2) Produce job description for the manager
Attachment:	(1) Data Store D1 (2) Manager

Process 2.0. Recruitment and Employee Selection

Table F.4. Process Specification of Process 2.1.

Process Name:	Approved Request
Data In:	Request for New Position Request Result
Data Out:	Request Information Approved Request
Process:	(1) Receive the request for new position from other Department (2) Send request information to get approved from the manager (3) Send approved result to store in Data Store D2
Attachment:	(1) Other Department (2) Manager (3) Data Store D2



Table F.5. Process Specification of Process 2.2.

Process Name:	Application
Data In:	Position Information Application Form
Data Out:	Application Information Job Requirement
Process:	(1) Get information about position request from position request file (2) Advertise about job requirements to applicants (3) Receive application form from applicants (4) Store applicants information in Data Store D3
Attachment:	(1) Data Store D2 (2) Applicant (3) Data Store D3

Table F.6. Process Specification of Process 2.3.

Process Name:	Approved Applicant
Data In:	Application Information Approved Result Interview/Test Answer
Data Out:	Interview/Test Test Result Fail Applicant Pass Applicant
Process:	(1) Get information about application information applicant file (2) Interview and Test with expected applicants (3) Get interview and test answer from applicants (4) Send Test Result to the manager (5) Manager send approved result back (6) Store fail applicant in the Data Store D4 (7) Send pass applicant to next process
Attachment:	(1) Data Store D3 (2) Applicant (3) Data Store D4 (4) Manager

Table F.7. Process Specification of Process 2.4.

Process Name:	Employed Applicant
Data In:	Employ Contract Pass Applicant
Data Out:	Pass Applicant Signed Contract
Process:	(1) Get pass applicant information from the previous process (2) Pass applicant sign a employed contract (3) Send signed contract to pass applicant Store pass application information in Data Store D5
Attachment:	(1) Data Store D4 (2) Applicant (3) Data Store D5

### Process 3.0. Preparing Employee Record

Table F.8. Process Specification of Process 3.1.

Process Name:	Add New Employee
Data In:	Pass Information Applicant Information
Data Out:	New Employee
Process:	(1) Get pass applicant information from pass applicant file (2) Get applicant information from applicant file (3) Add new employee record in Data Store D6
Attachment:	(1) Data Store D3 (2) Data Store D5 (3) Data Store D6

Table F.9. Process Specification of Process 3.2.

Process Name:	Modify Employee Information
Data In:	Modify Employee Information
Data Out:	Modify Employee
Process:	(1) Get modify employee information from Employee (2) Modify employee information in Data Store D6
Attachment:	(1) Employee (2) Data Store D6

Table F.10. Process Specification of Process 3.3.

Process Name:	Delete Employee
Data In:	Resignation Form Dismiss Order
Data Out:	Delete Employee
Process:	(1) Get resignation form from employee (2) Or, receive dismiss order from the manager (3) Delete employee record from Data Store D6
Attachment:	(1) Data Store D6 (2) Employee (3) Manager

Table F.11. Process Specification of Process 3.4.

Process Name:	Produce Employee Report
Data In:	Employee Information
Data Out:	Employee Report
Process:	(1) Get employee information from Data Store D6 (2) Produce employee report (3) Submit the report to the manager
Attachment:	(1) Data Store D6 (2) Manager

## St. Gabriel's Library

### Process 4.0. Employee Training and Development

Table F.12. Process Specification of Process 4.1.

Process Name:	Preparing Training Course
Data In:	Training Request Training Course Information Employee Information
Data Out:	Training Course Information
Process:	(1) Get training request from employee (2) Or, get training course information from Data Store D7 (3) Preparing training course information (4) Send training course information to next process
Attachment:	(1) Employee (2) Data Store D6 (3) Data Store D7

Table F.13. Process Specification of Process 4.2.

Process Name:	Approve Training Course
Data In:	Training Course Information Approved Result
Data Out:	Training Course Information Approved Training course
Process:	(1) Get training course information from the Previous process (2) Send training course information to manager for Approval (3) Get approved result from the manager (4) Store approved training course in Data Store D7
Attachment:	(1) Data Store D7 (2) Manager



Table F.14. Process Specification of Process 4.3.

Process Name:	Training
Data In:	Training Course Information Trainee Information
Data Out:	Training Trainee Information
Process:	(1) Get training course information from the Previous process (2) Get trainee information from employee (3) Training to employee (4) Store trainee and training information in Data Store D8
Attachment:	(1) Data Store D7 (2) Employee (3) Data Store D8

Table F.15. Process Specification of Process 4.4.

Process Name:	Produce Training Report
Data In:	Trainee Information
Data Out:	Training Report
Process:	(1) Get trainee and training information from Data Store D8 (2) Produce training report (3) Submit the report to the manager
Attachment:	(1) Data Store D8 (3) Manager

Process 5.0. Employee Medical Treatment

Table F.16. Process Specification of Process 5.1.

Process Name:	Receive Medical Treatment Receipt
Data In:	Medical Treatment Receipt Employee Information
Data Out:	Medical Treatment Information
Process:	(1) Get medical treatment receipt from employee (2) Get employee information from Data Store D6 (3) Send medical treatment information to next Process
Attachment:	(1) Data Store D6 (2) Employee

Table F.17. Process Specification of Process 5.2.

Process Name:	Check Evidence
Data In:	Medical Treatment Information Employee Information
Data Out:	Valid Evidence
Process:	(1) Get medical treatment information from the Previous process (2) Get employee information from Data Store D6 (3) Check Evidence received from employee (4) For valid evidence will send to next process
Attachment:	(1) Data Store D6

Table F.18. Process Specification of Process 5.3.

Process Name:	Approved Medical Treatment
Data In:	Valid Evidence Approved Result
Data Out:	Medical Treatment Information Approved Medical Treatment
Process:	(1) Receive valid evidence information from the Previous process (2) Send medical treatment information to the Manager for approval (3) Get approved result from the manager (4) Store approved medical treatment in Data Store D9
Attachment:	(1) Data Store D9 (2) Manager

Table F.19. Process Specification of Process 5.4.

Process Name:	Pay Medical Treatment
Data In:	Medical Treatment Information Approved Payment
Data Out:	Approved Medical Treatment Payment
Process:	(1) Get medical treatment information from Data Store D9 (2) Send approved medical treatment to Finance Department for payment approval (3) Finance Department send approved payment Back to the process (4) Pay medical treatment to employee
Attachment:	(1) Data Store D9 (2) Finance Department (3) Employee

Table F.20. Process Specification of Process 5.5.

Process Name:	Produce Medical Treatment Report
Data In:	Medical Treatment Information
Data Out:	Medical Treatment Report
Process:	(1) Get medical treatment information from Data Store D9 (2) Produce medical treatment report (3) Submit the report to the manager
Attachment:	(3) Data Store D9 (4) Manager

Process 6.0. Performing Payroll Activities

Table F.21. Process Specification of Process 6.1.

Process Name:	Calculate Work Time
Data In:	Work Time Information
Data Out:	Work Time Information
Process:	(1) Get work time information from Data Store D10 (2) Calculate work time (3) Send work time information to the next process
Attachment:	(1) Data Store D10

Table F.22. Process Specification of Process 6.2.

Process Name:	Calculate Over Time
Data In:	Over Time Information
Data Out:	Over Time Information
Process:	(1) Employee send over time form to the manager For approval (2) Manager send approved result back to employee (3) Get over time information from Data Store D11 (4) Calculate over time (5) Send over time information to the next process
Attachment:	(1) Data Store D11



Table F.23. Process Specification of Process 6.3.

Process Name:	Calculate Leave/Vacation
Data In:	Leave/Vacation Information
Data Out:	Leave/Vacation Information
Process:	(1) Employee send leave/vacation form to the Manager for approval (2) Manager send approved result back to employee (3) Get leave/vacation information from Data Store D12 (4) Calculate leave/vacation (5) Send leave/vacation information to the next Process
Attachment:	(1) Data Store D12

Table F.24. Process Specification of Process 6.4.

Process Name:	Calculate Salary
Data In:	Work Time Information Over Time Information Leave/Vacation Information Holiday Information
Data Out:	Salary Information
Process:	(1) Get work time information (2) Get over time information (1) Get leave/vacation information (2) Get holiday information from Data Store D13 (3) Calculate Salary (6) Store salary information in Data Store D14
Attachment:	(1) Data Store D13 (2) Data Store D14

Table F.25. Process Specification of Process 6.5.

Process Name:	Produce Salary Report
Data In:	Salary Information
Data Out:	Salary Report
Process:	(1) Get salary information from Data Store D14 (2) Produce salary report (3) Submit the report to Finance Department (4) Submit the report to the manager
Attachment:	(1) Data Store D14 (2) Finance Department (3) Manager

Process 7.0. Generating the Report

Table F.26. Process Specification of Process 7.1.

Process Name:	Request for Report
Data In:	Request for Report
Data Out:	Request for Report
Process:	(1) Get request for the report from the manager (2) Send that request to the next process
Attachment:	(1) Manager

Table F.27. Process Specification of Process 7.2.

Process Name:	Generate Report
Data In:	Request for Report Job Description Information Applicant Information Employee Information Trainee Information Medical Treatment Information Salary Information
Data Out:	Required Report
Process:	<ol style="list-style-type: none"> <li>(1) Get Request for Report from the previous process</li> <li>(2) Get Job Description Information from Data Store D1</li> <li>(3) Get Applicant Information from Data Store D3</li> <li>(4) Get Employee Information from Data Store D6</li> <li>(5) Get Trainee Information from Data Store D8</li> <li>(6) Get Medical Treatment information from Data Store D9</li> <li>(7) Get Salary information from Data Store D14</li> <li>(8) Produce required report</li> <li>(9) Submit that report to the manager</li> </ol>
Attachment:	<ol style="list-style-type: none"> <li>(1) Data Store D1</li> <li>(2) Data Store D3</li> <li>(3) Data Store D6</li> <li>(4) Data Store D8</li> <li>(5) Data Store D9</li> <li>(6) Data Store D14</li> <li>(7) Manager</li> </ol>





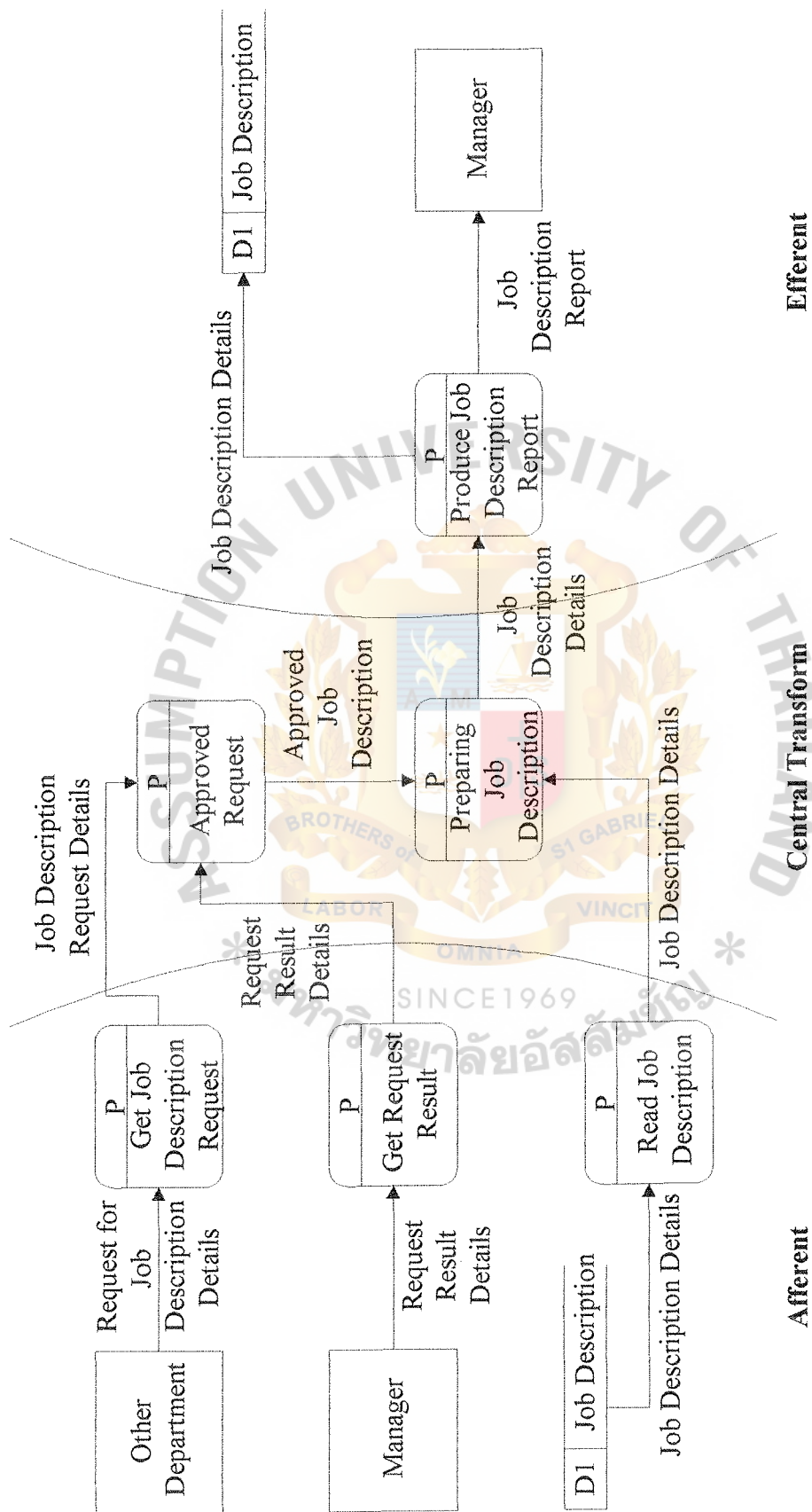


Figure G.1. Data Flow Diagram of Job Description Process from Transform Analysis.

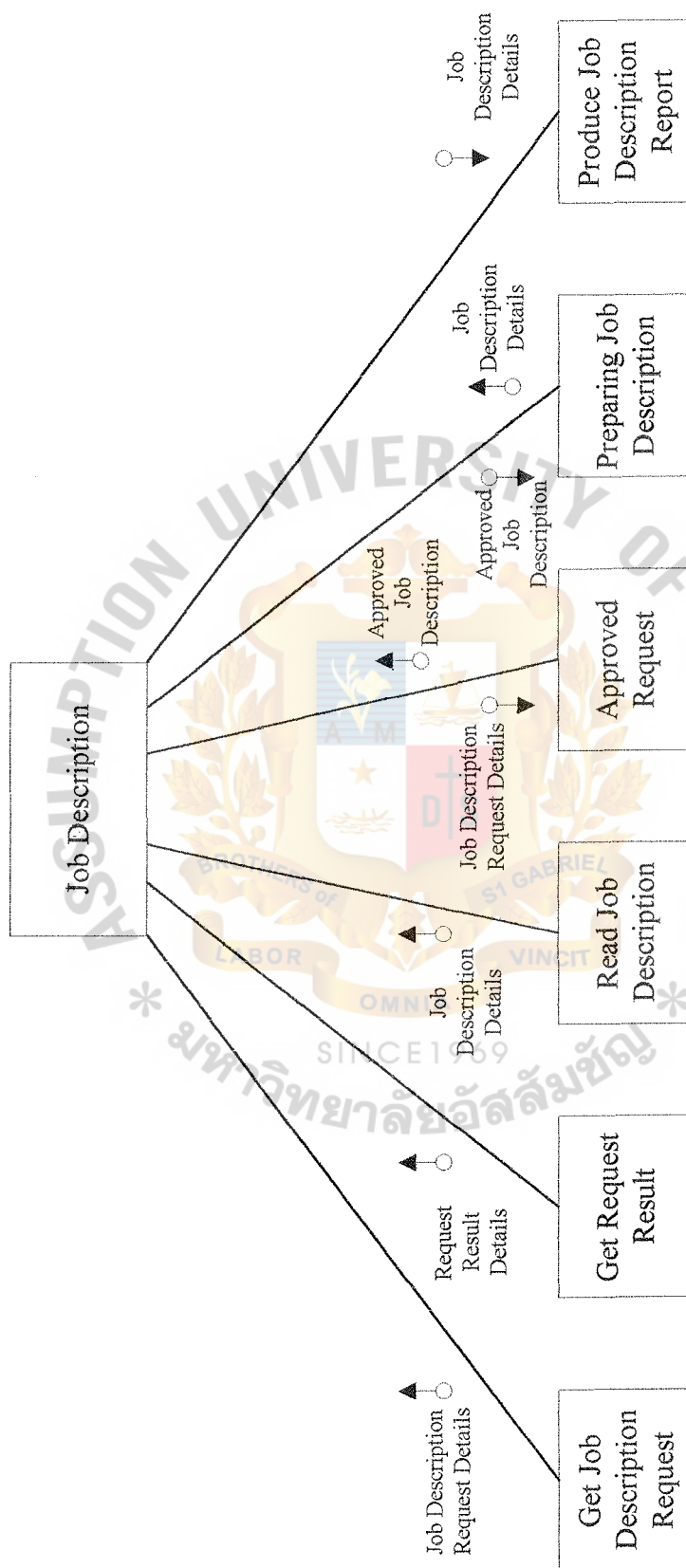


Figure G.2. Structure Chart of Job Description Process from Transform Analysis.

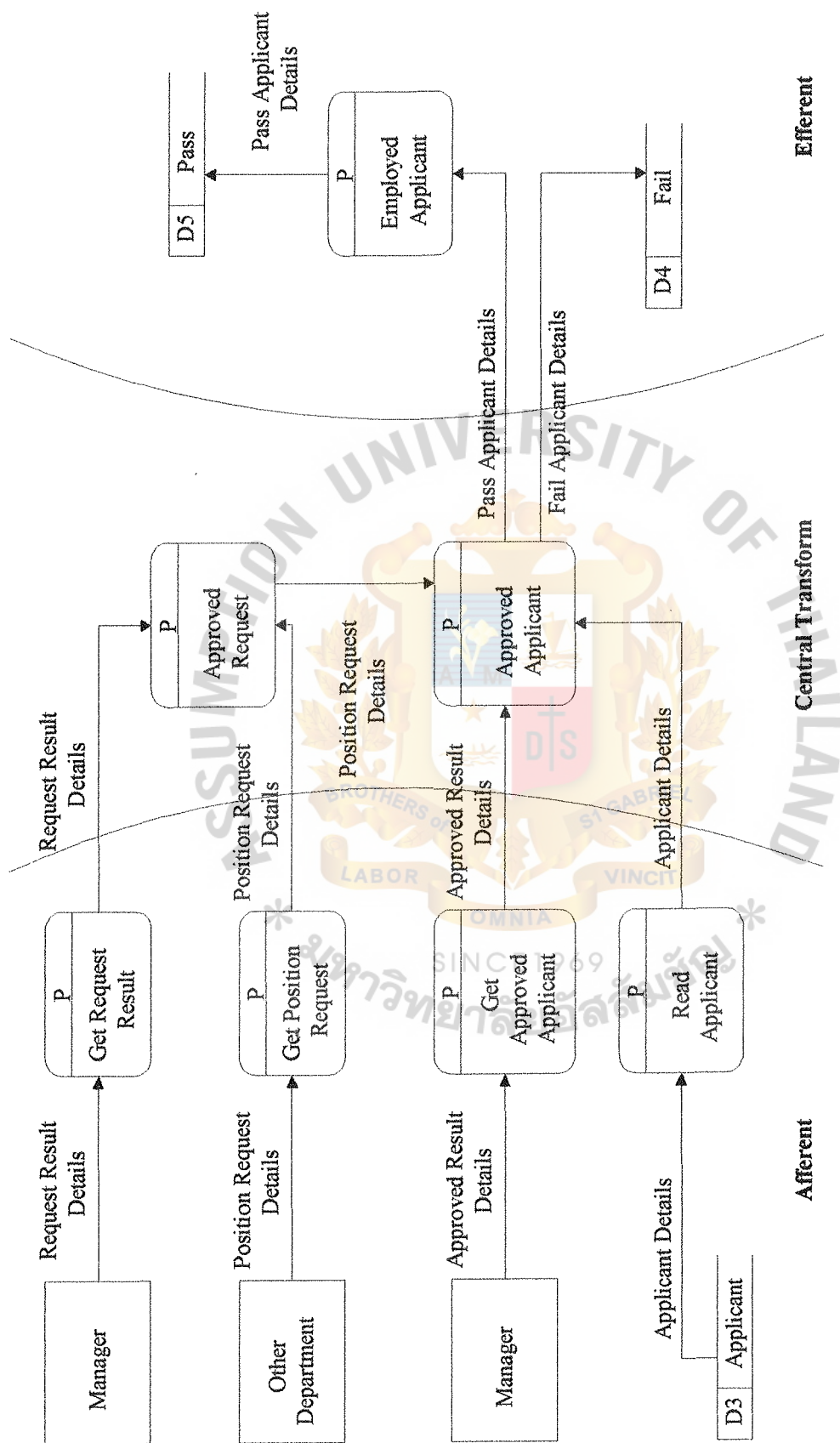


Figure G.3. Data Flow Diagram of Recruitment and Employee Selection Process from Transform Analysis.

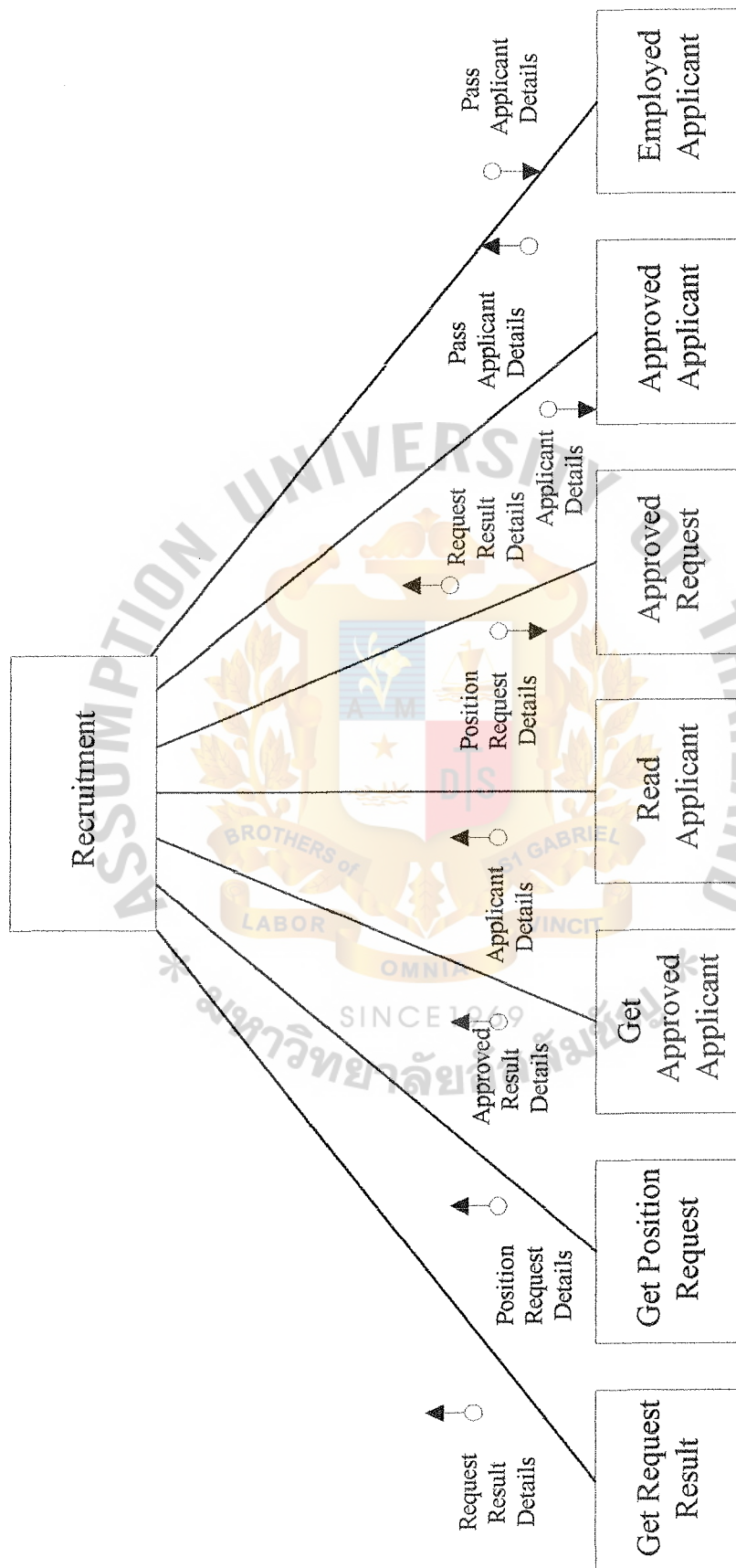


Figure G.4. Structure Chart of Recruitment and Employee Selection Process from Transform Analysis.



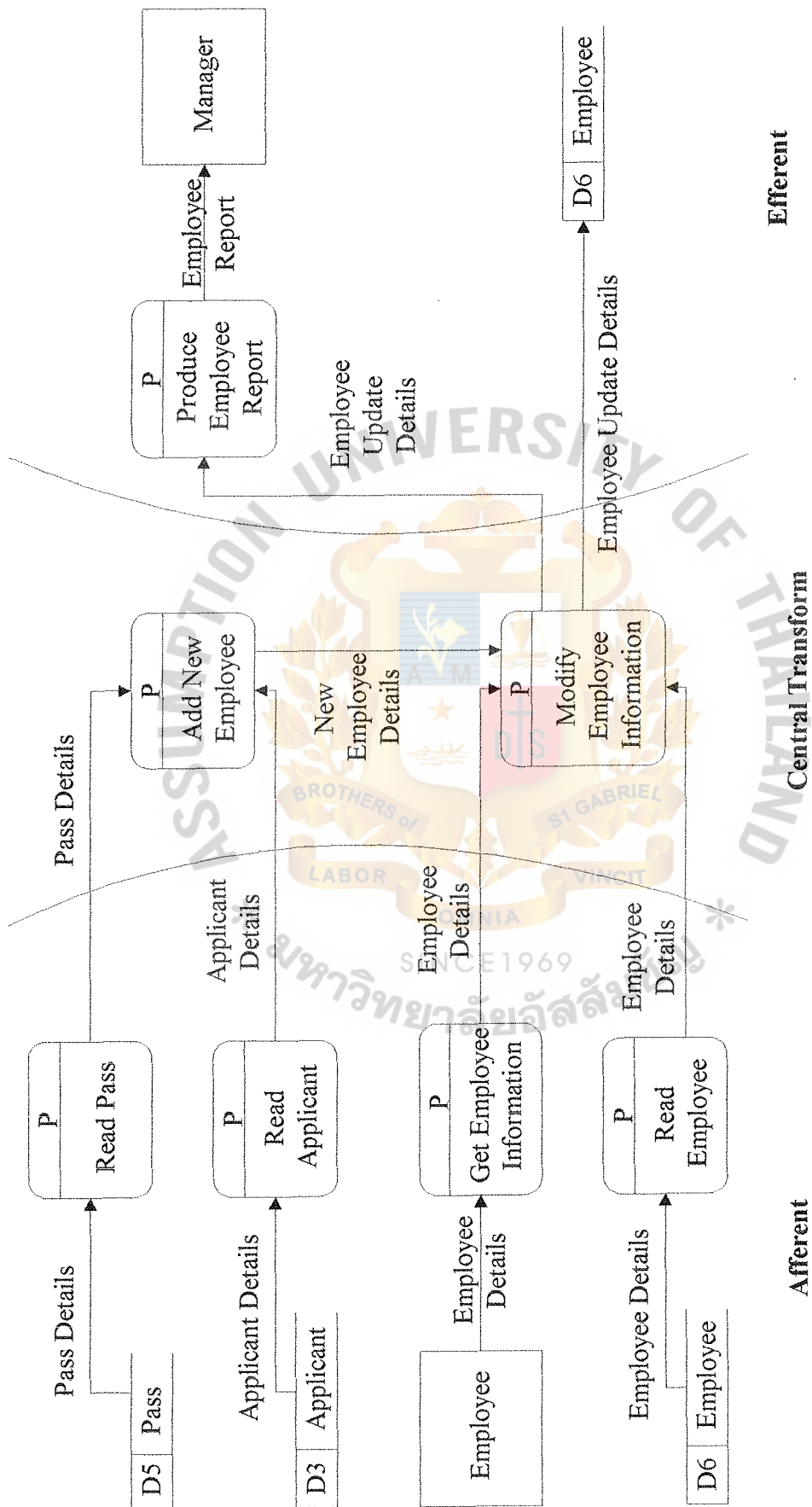


Figure G.5. Data Flow Diagram of Employee Record Process from Transform Analysis.

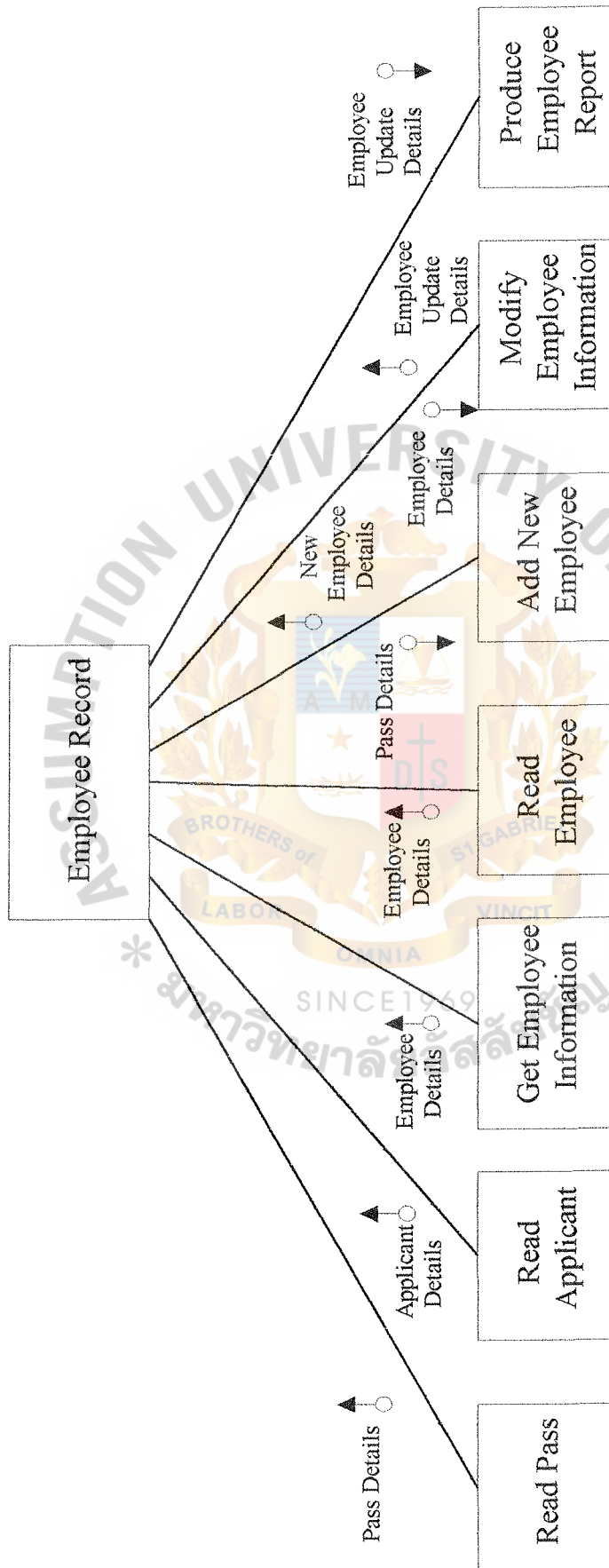


Figure G.6. Structure Chart of Employee Record Process from Transform Analysis.

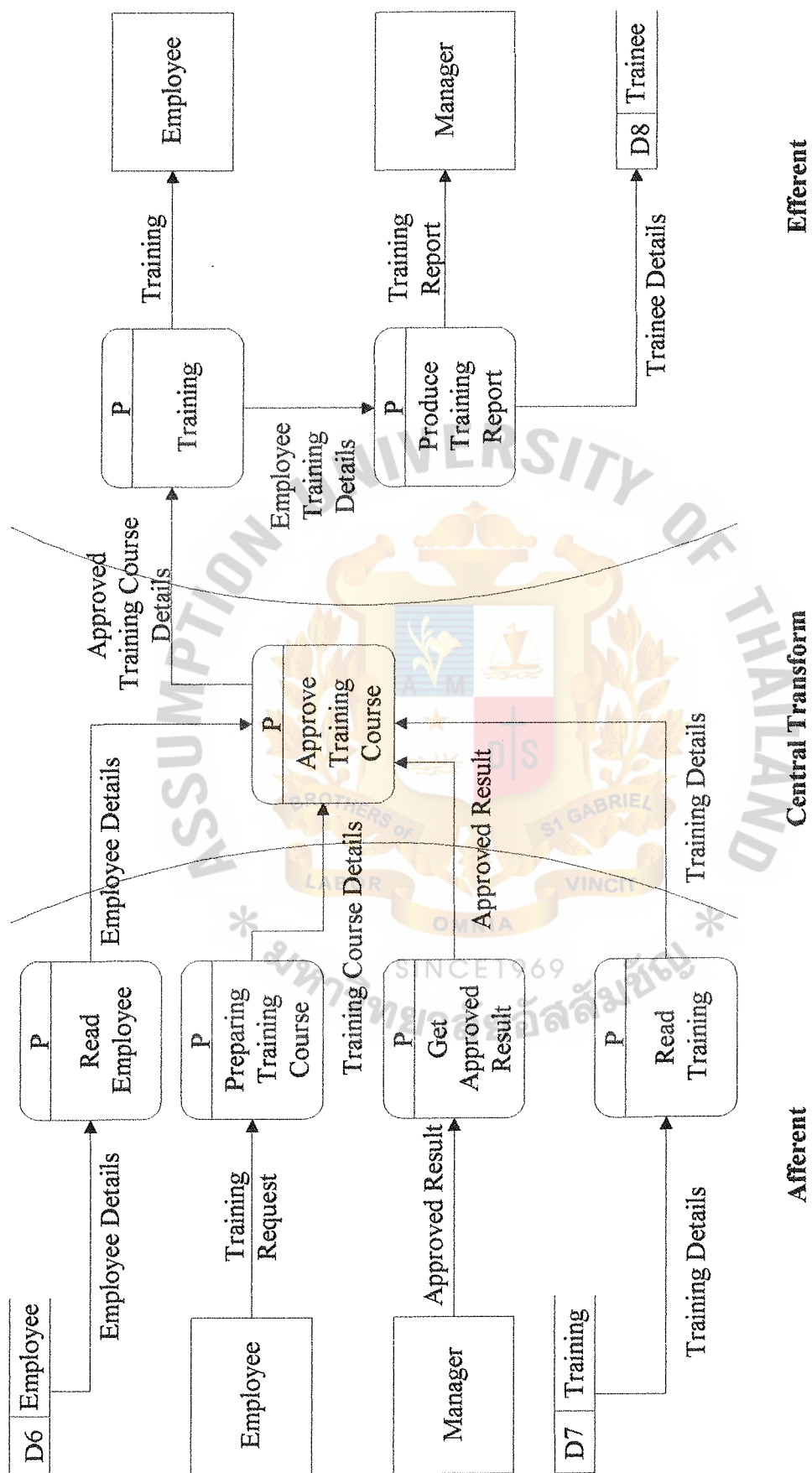


Figure G.7. Data Flow Diagram of Employee Training and Developing Process from Transform Analysis.

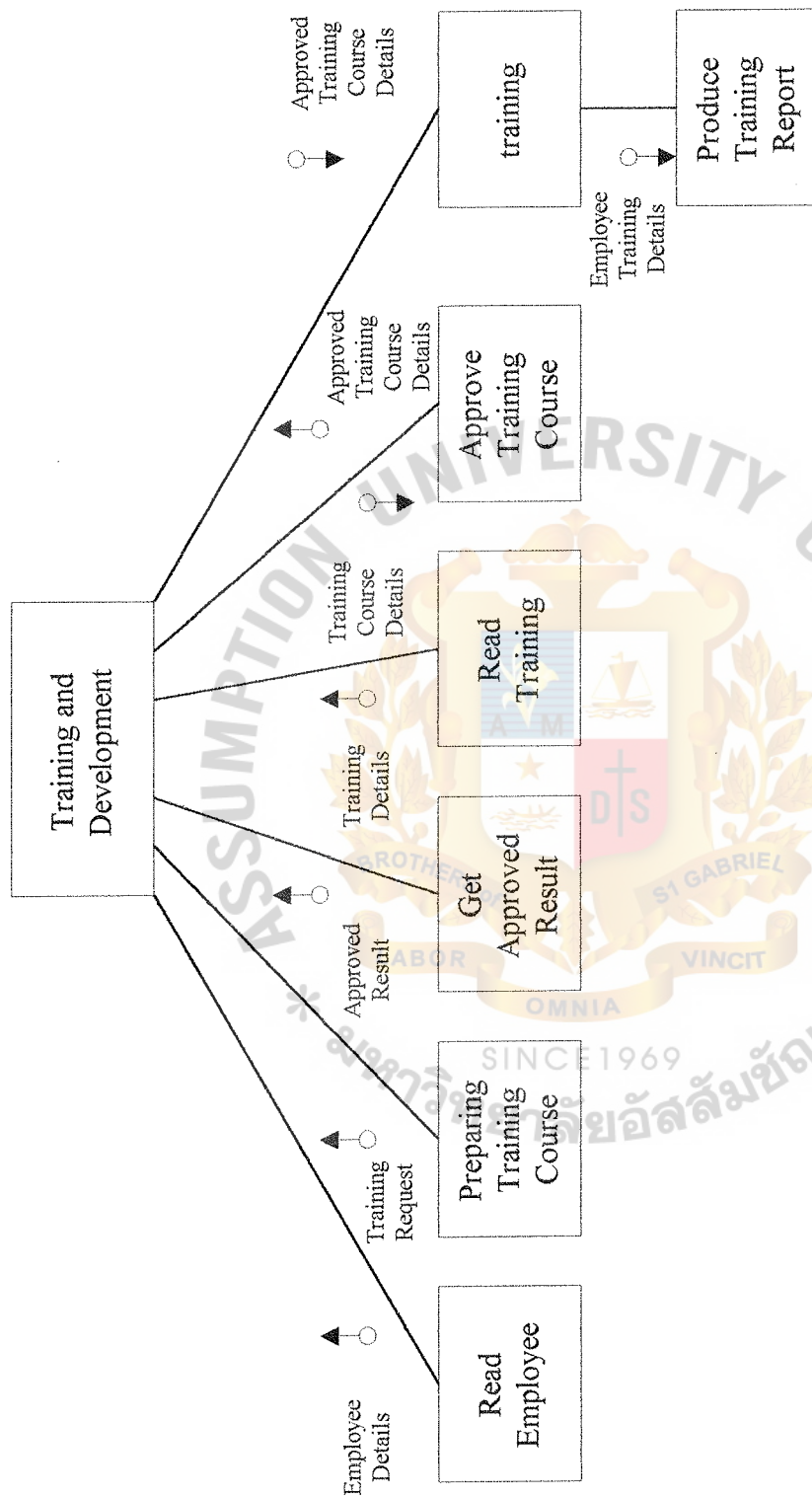


Figure G.8. Structure Chart of Employee Training and Developing Process from Transform Analysis.

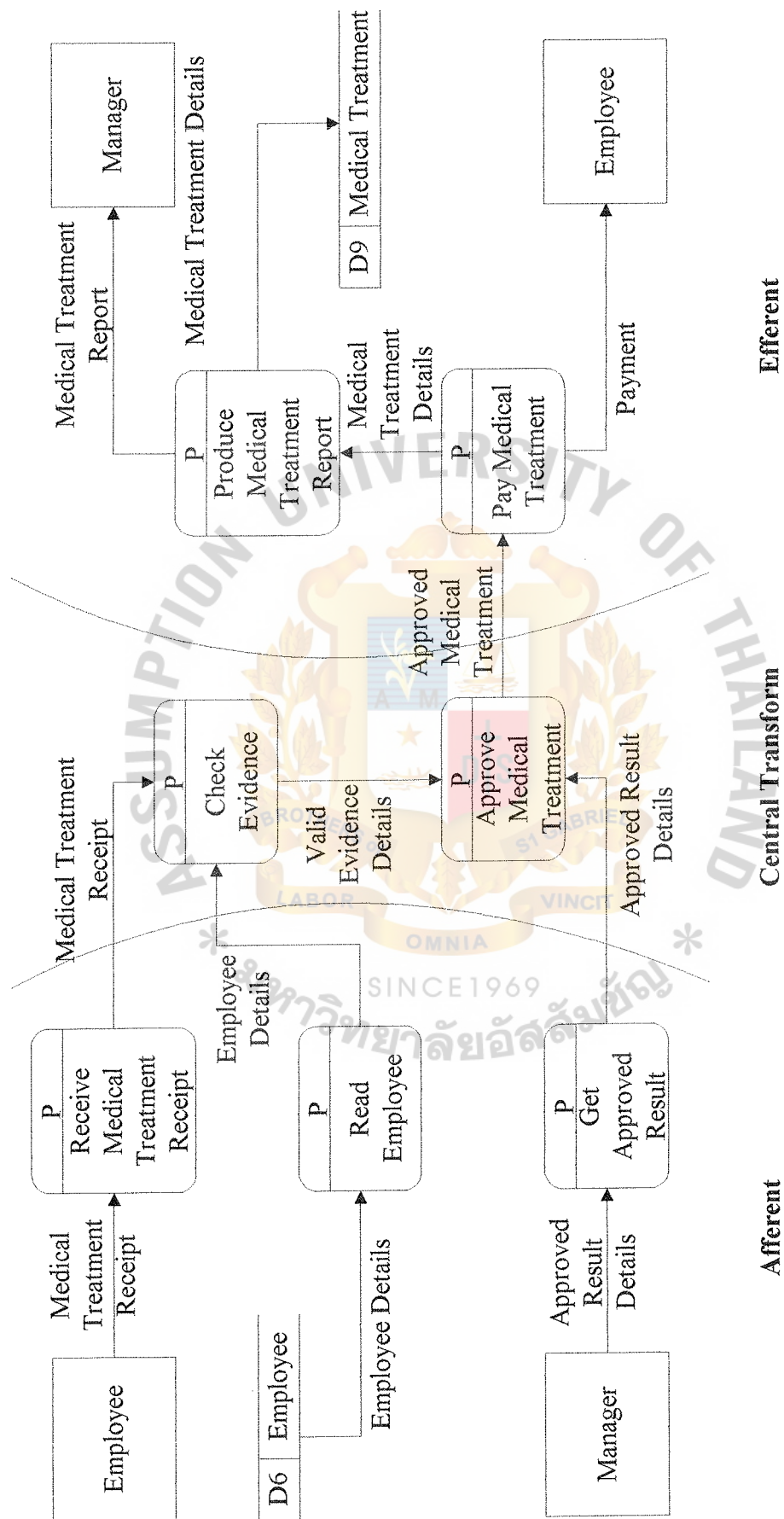


Figure G.9. Data Flow Diagram of Medical Treatment Process from Transform Analysis.



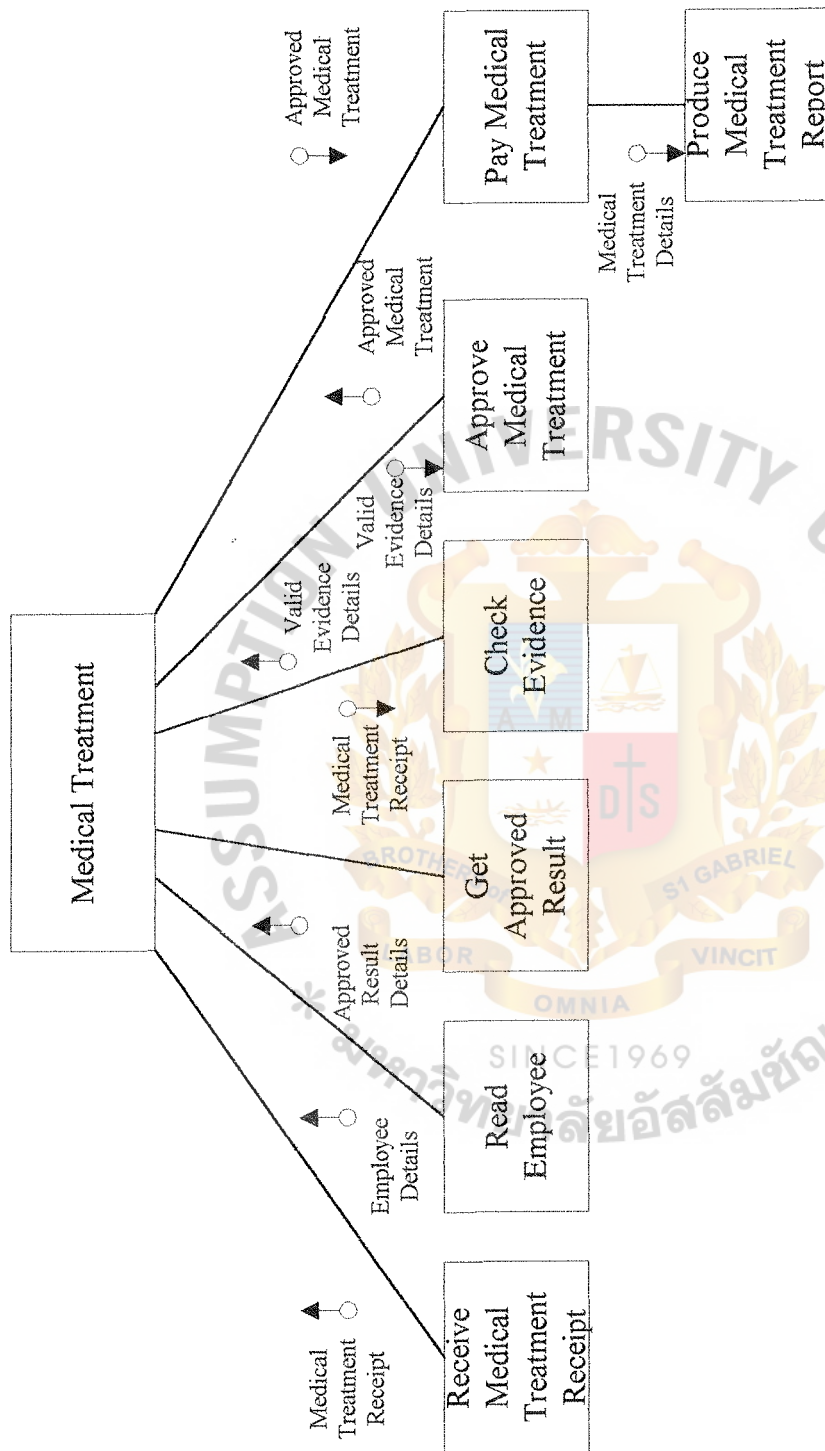


Figure G.10. Structure Chart of Medical Treatment Process from Transform Analysis.

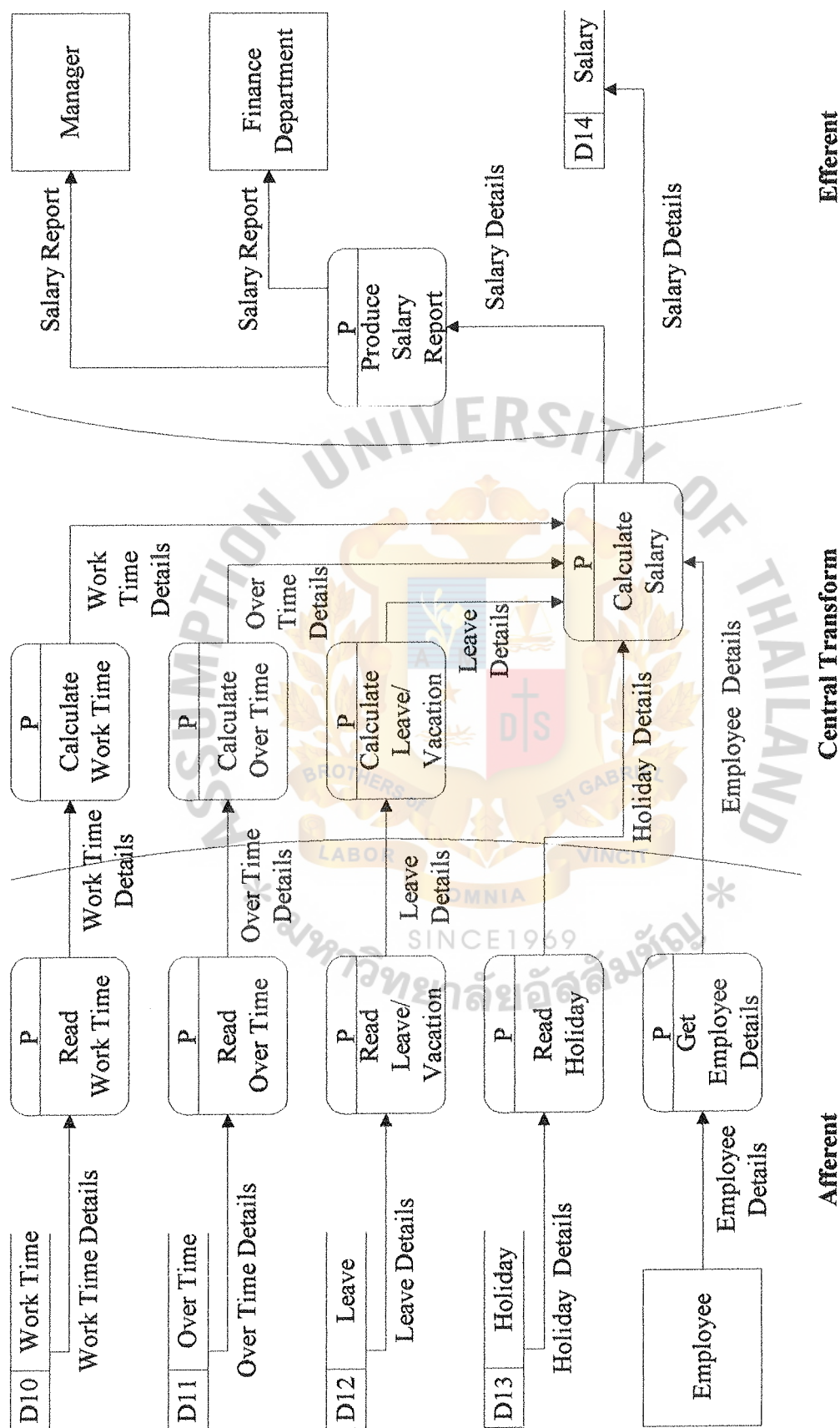


Figure G.11. Data Flow Diagram of Performing Payroll Activities Process from Transform Analysis.

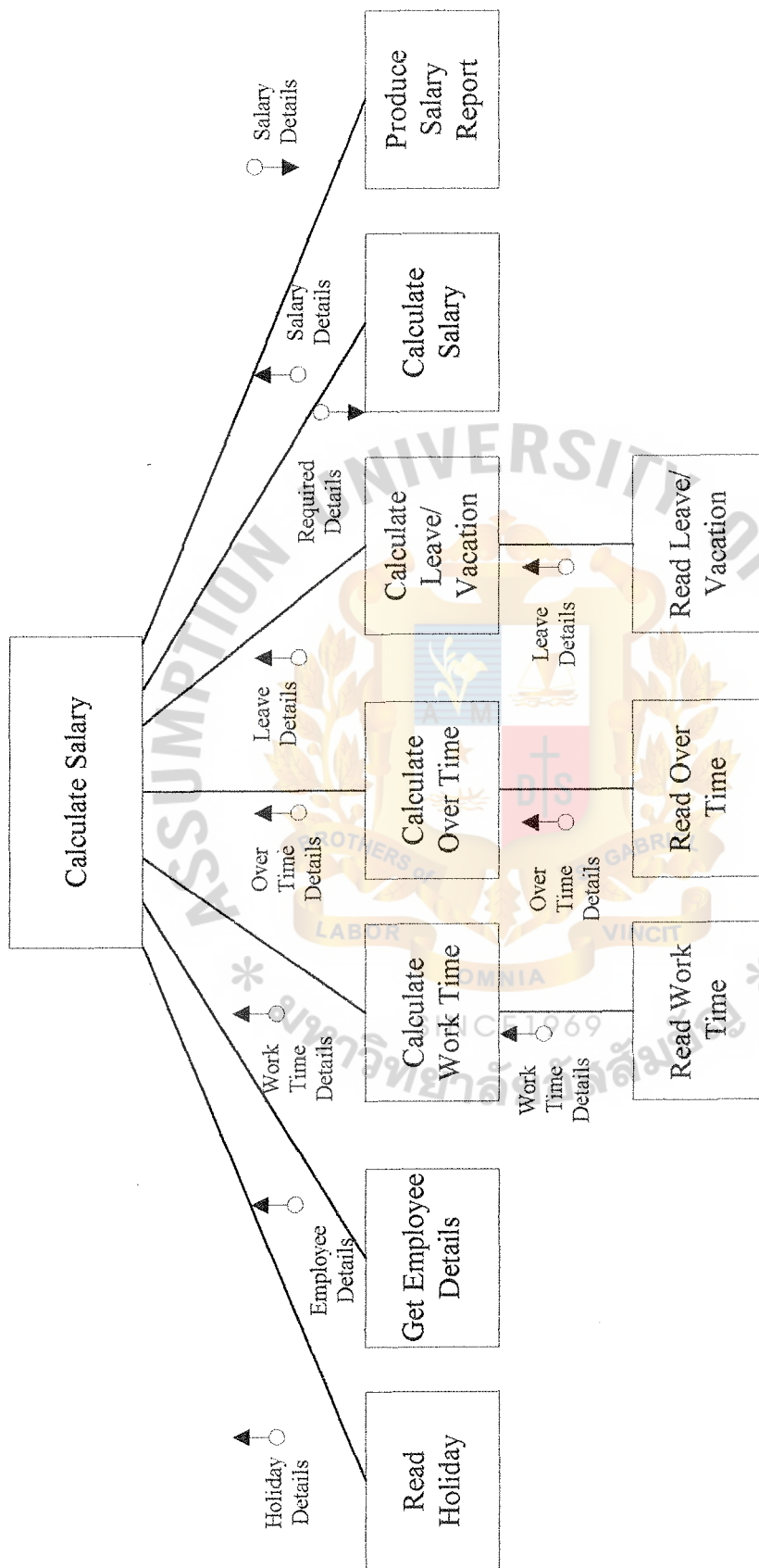


Figure G.12. Structure Chart of Performing Payroll Activities Process from Transform Analysis.

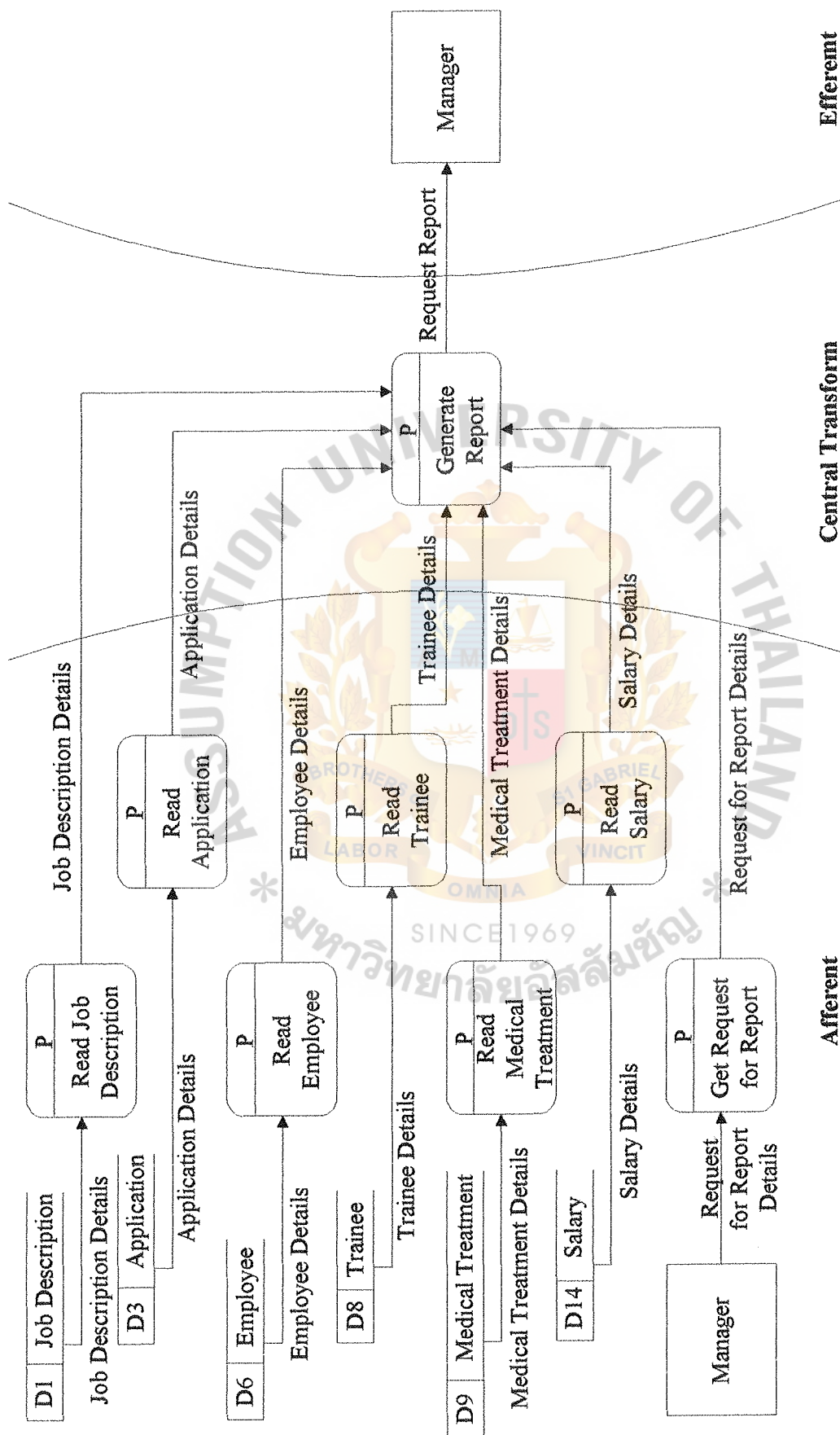


Figure G.13. Data Flow Diagram of Generating the Report Process from Transform Analysis.

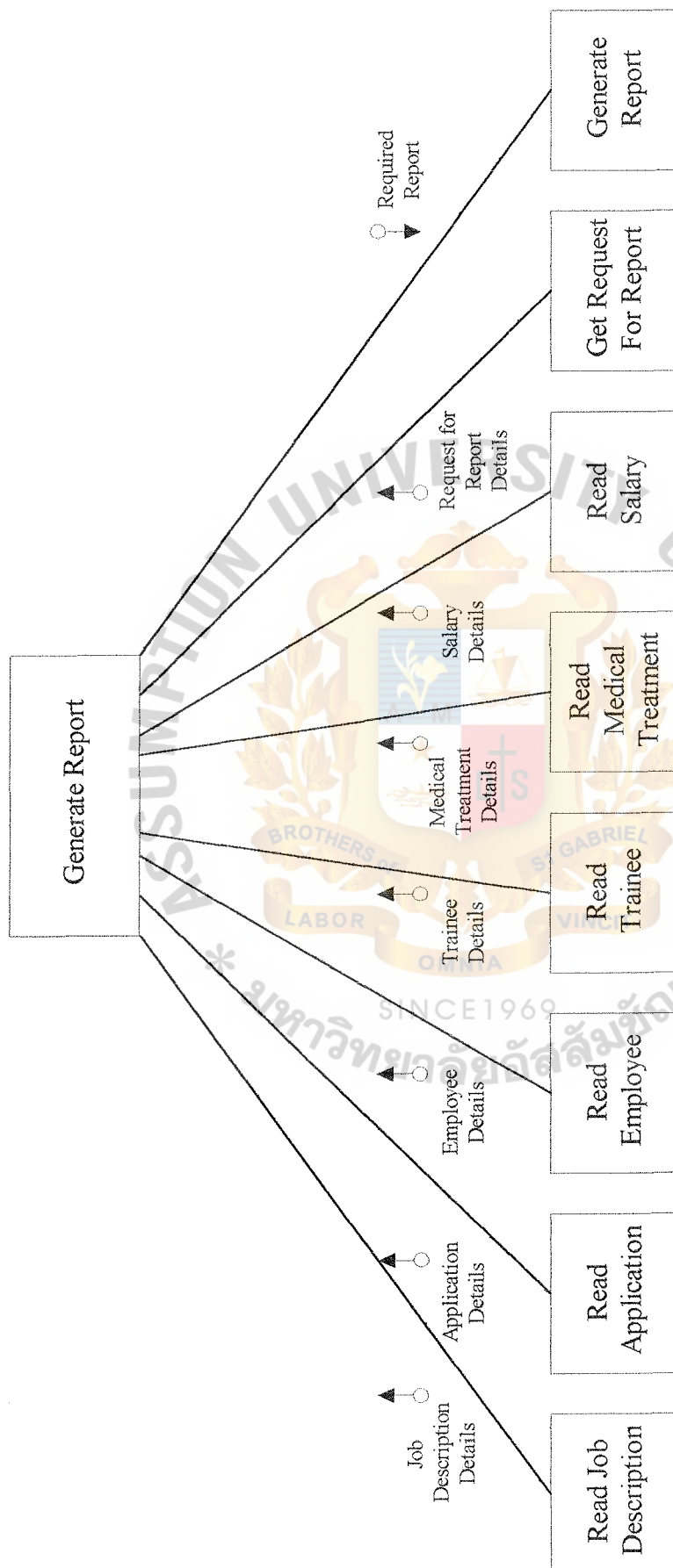


Figure G.14. Structure Chart of Generating the Report Process from Transform Analysis.



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