Recruitment Information System for JB Recruitment Company

by

Ms. Araya Sutthisopa-arporn

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
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Project Title	Recruitment Information System for JB Recruitment Company
Name	Ms. Araya Sutthisopa-arporn
Project Advisor	Air Marshal Dr. Chulit Meesajjee
Academic Year	August 4, 2001

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:

AM Chulit Meesajjee

(Air Marshal Dr. Chulit Meesajjee)
Dean and Advisor

(Prof.Dr. Srisakdi Charmonman)
Chairman

(Asst.Prof.Dr. Vichit Avatchanakorn)
Member

(Assoc.Prof. Somchai Thayarnyong)
MUA Representative

August 4, 2001

ABSTRACT

JB Recruitment Company is a service provider for job seekers and the companies who want to recruit qualified candidates to work for them. Recruitment Information System plays a major role in JB Recruitment Company. The existing procedure for recruitment system is based on the manual system which causes many problems since most data are stored in paper form. It requires many administrative staffs to maintain the system, and they have to face with the complexity of the procedure, especially the process of matching the qualified candidates and vacancies.

This project concerns with the developing of the new recruitment information system to replace the old system. The project covers the analysis, design and implementation of computerized recruitment information system for JB Recruitment Company. The project uses the structure analysis and design techniques to analyze and design the system, which comprises of data flow diagram, data dictionary, and database system design.

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I. INTRODUCTION

1.1 Background of the Project

Since many companies are trying to reduce the cost in order to survive in business, Recruitment system is one of the systems that require a lot of money to hire the right persons for the organizations.

Normally, Recruitment System starts from advertising through media, collecting application forms, interviewing, and evaluating until hiring qualified candidates. Therefore, many companies try to reduce this recruitment process which requires a lot of money, manpower, time and other resources by hiring a Recruitment Company to handle in selecting outstanding persons.

JB Recruitment Company is one of Recruitment Companies that provide Recruitment service to employers.

To satisfy both job seekers and employers, JB Recruitment Company aims to develop a computerized system. This computerized system helps JB Recruitment Company to serve both parties faster than before. It also helps JB Recruitment Company to save many resources such as time, money, manpower, etc.

In addition, the computerized system also supports JB Recruitment Company by providing database system which keeps useful records in order to keep track and evaluate the trend of business.

1.2 Objectives of the Project

The objectives of the Recruitment Information System are as follows:

(1) To analyze the existing system and design the computerized system for doing more effective and efficient job.

(2) To improve customers database system.

(3) To reduce time for searching required positions and qualified candidates.

(4) To reduce other processing time such as billing, filing, etc.

(5) To reduce labor cost.

(6) To reduce paper-based cost.

1.3 Scope of the Project

This Recruitment Information System covers the jobs as follows:

(1) Job seekers record their information in the electronic application forms which are stored in Recruitment database system. The system prints out resume in brief to the Job seekers.

(2) The employers who want to recruit any vacancies ask Marketing officer who is responsible for this kind of customers to fill the electronic form of position requirement.

(3) The Recruitment Information System automatically matches the vacancies and qualified candidates.

(4) Marketing officers who take responsibility for contacting Job seekers contact the qualified one by issuing an interview notification.

(5) After the employers agree to hire the qualified candidate, the employers must fill an acceptance form which is a contract for payment to JB Recruitment Company.

(6) The acceptance form will be sent to the Accounting & Financing Department for billing and payment. The billing & payment report which is issued by the Accounting & Financing Department will be transferred to the system in order to keep and update the record.

1.4 Deliverables

The deliverables for the project on the Recruitment Information System for JB Recruitment Company are as follows:

(1) A software package written in Microsoft Visual Basic for Windows will show user-interface screens. Microsoft Access for Windows will be used for database management.

(2) System Data Flow

(3) Process Specifications

(4) Specification of computer hardware and network

(5) Screen layouts and system menu for user interfaces

(6) Entities Relationship

(7) Cost/Benefit comparison

(8) Security and control configure

(9) Data Dictionary

(10) Report layouts

(a) Resume of Job Seekers

(b) Qualified Candidate List

(c) Interview Appointment Letter

(d) Interview Appointment Schedule

(11) Conclusions and Recommendations

1.5 Project Plan

This project plan will be divided into 3 phases as follows:

Phase 1: Analysis of the Existing System

For this phase, system analyst will discuss with the users to define the objectives and scopes of the project, study and identify the problems of the existing system, develop Context and Data Flow diagrams, and analyze cost and benefit for both the existing and the new computerized systems.

Phase 2: Analysis and Design of the Proposed system

System analyst will analyze and design report, database, network and program according to users' requirement.

Phase 3: Implementation of the Proposed system

After designing, coding and testing stages are used in order to test the proposed system, then hardware and software installation is introduced. The last stage is conversion which means the stage of shifting from the existing system to the proposed one.

The project plan for JB Recruitment Company is shown in Figure 1.1.

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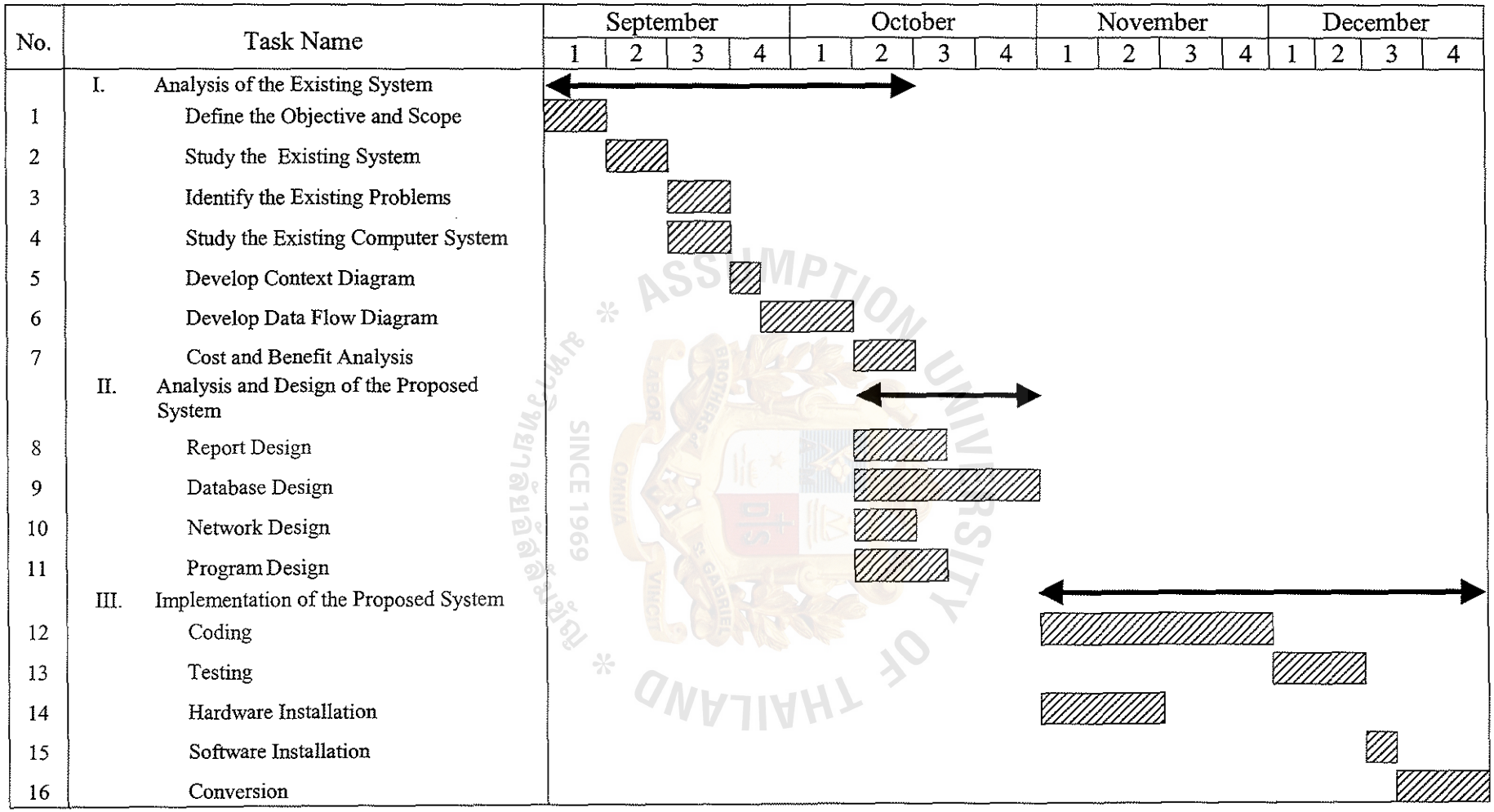

Figure 1.1. Project Plan of Recruitment Information System for JB Recruitment Company.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

JB Recruitment Company is a Recruitment Company established in January 2001. It is located on Wireless Rd. The main purpose of this company is to provide service for both Job seekers and Employers to have a good opportunity to get suitable persons and positions.

It provides free service for Job seekers who are unemployed or want to change the job. But it charges the service fee from the companies who want to look for the suitable candidates to work for them. The service charge will be calculated at 10% of the salary of acceptance candidate for a year.

2.2 Existing Business Functions

JB Recruitment Company has 3 major departments in running business as follows:

(1) Human Resource Department

Human Resource Department is responsible for all human resources of the company. The main duties of this department are training, evaluating performance of each employee, updating employees' information, etc.

(2) Accounting & Financing Department

Accounting & Financing Department is responsible for general accounting, billing, payrolls of the employees. This department also supports the management team by providing financial reports which are useful for decision making.

(3) Marketing Department

Since there are 2 kinds of customers that the company has to serve, Marketing Department is consisted of 2 teams:

(a) Job Hunter Team:

Job Hunter Team is responsible for all the information of job seekers such as updating some records, or adding some records, etc. This team is also the key person who contacts job seekers whenever there are some suitable vacancies.

(b) Job Provider Team:

Job Provider Team is responsible for providing services to employers. Necessary information of the employers will be recorded and updated by this team. This team is also the person who is the key contact person whenever the employers have any vacancies.

In addition, both Job Hunter Team and Job Provider Team have to work together in order to match the qualified job seekers to the suitable positions.

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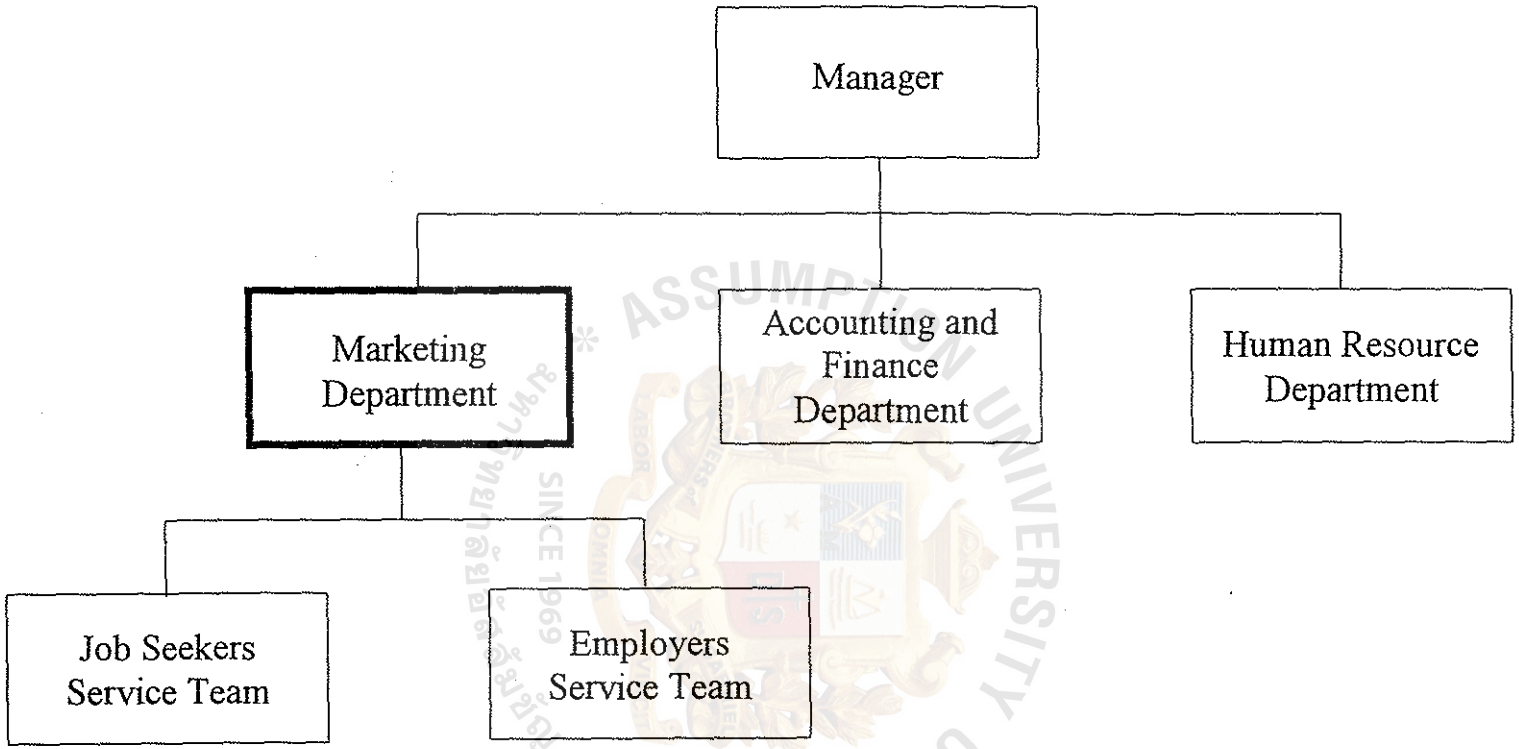

Figure 2.1. Organization Chart of JB Recruitment Company.

2.3 The Existing Procedures

The existing system is a manual system based on paper work. All information of the employers will be filed in many files according to companies' name. Whenever there are some new vacancies, Marketing Department, Job Hunter and Job Provider Team, will check the information of job seekers which is filed in many files according to positions.

After selecting some qualified candidates, Job Hunter Team will contact job seekers and make appointment for interviewing. Job Provider Team sends information of potential candidates to employers in order to make a final decision. Employers will fill out acceptance form if qualified candidates sign the hiring contracts. Acceptance form will be sent to Accounting & Financing Department for billing to employers.

Since all the above process is paper-based and in a manual system, it can lead to human error problems such as recording wrong information, mismatching of the job seekers and vacancies, etc. This manual system also leads to the wasting of resources such as paper, employees, money and time.

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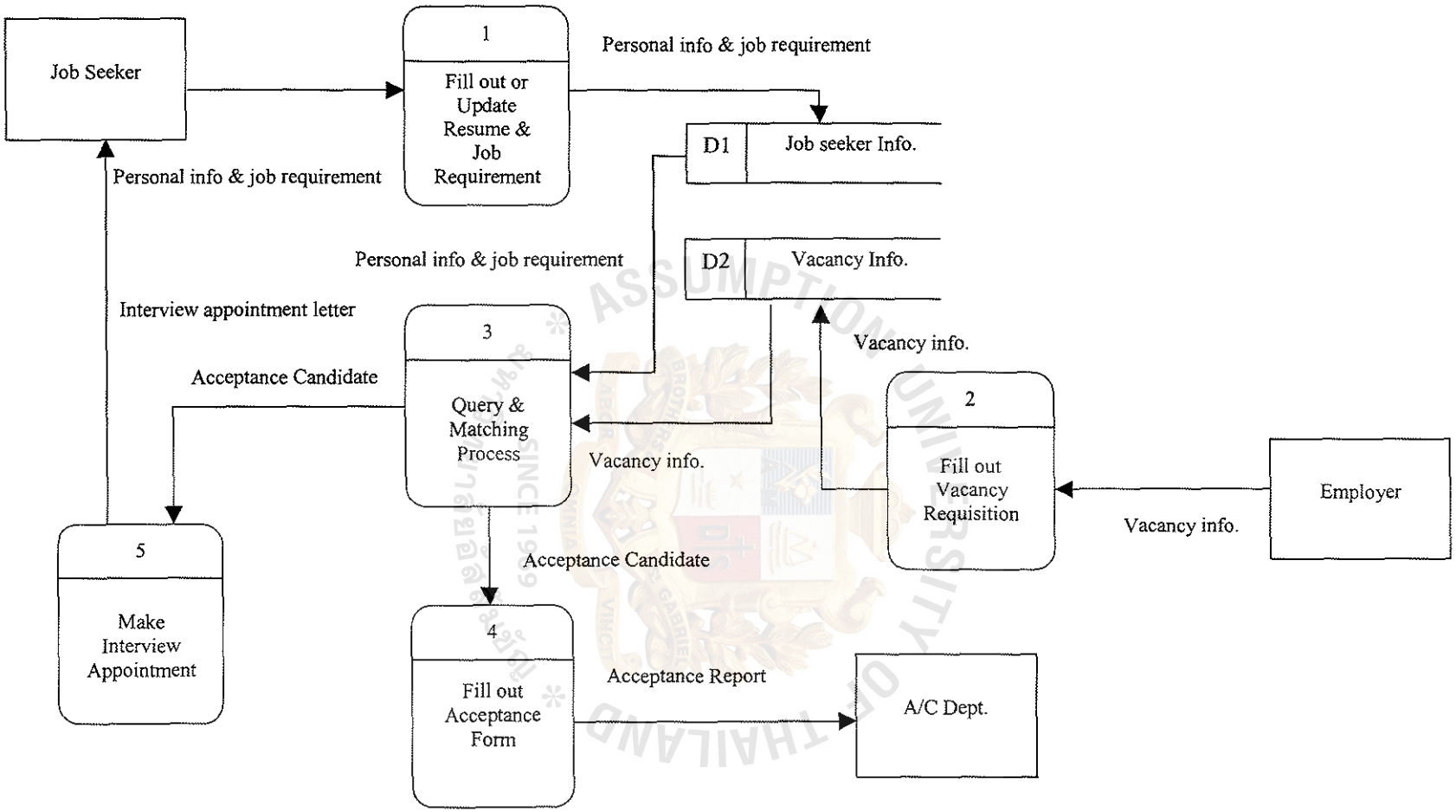

Figure 2.2. The Existing Process for JB Recruitment Company.

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2.4 Current Problems and Areas of Improvement

2.4.1 Current Problems

(1) Slow in process

The manual system is based on paper work that can lead to several problems. Qualified candidates searching is the process that takes time if manual system is used.

(2) Loss of data

Since the manual system is based on paper work, some data can be easily destroyed.

(3) Security and control

Since there is not any security and control system, some unauthorized persons can easily access a document which is confidential through the unlocked cabinet.

(4) Data redundancy

Some information has to be copied to many paper document files. This causes problems when updating or changing some information.

(5) Data inaccuracy

Some information filled in the paper based application form is not clear. This causes problems in further process. Some qualified candidates may miss the chance to get the suitable jobs.

2.4.2 Areas of Improvement

The areas for improvements of the existing system can be summarized as follows:

(1) Friendly user interface is introduced in order to support the system to work effectively and efficiently.

(2) Relational Database is recommended in order to be easy for updating, or changing any information. In addition, it can prevent data redundancy.

(3) Security and control system must be developed in order to protect the confidential information from unauthorized persons.

(4) Reduce processing time by using computerized system.

(5) The technology and system for this new system must be widely accepted including hardware and software.

(6) The system must be designed for further expansion.

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III. THE PROPOSED SYSTEM

3.1 System Specification (User Requirement)

According to the previous chapter, JB Recruitment Company requires an effective Recruitment Information System in order to work more effectively.

In order to achieve the target, the new proposed Recruitment Information System should have the components as follows:

3.1.1 Business Requirement

(1) To retrieve and access information easier and faster

(2) To eliminate human errors

(3) To reduce processing time

(4) To update information easier and faster

(5) To print report and letter faster

3.1.2 Input Requirement

(1) Job Seeker information contains all Job seeker details such as Job Seek ID, Job Seeker name, Address, Contact No., etc. Simply enter Job Seek ID, and all information will be shown.

(2) Company information contains all company details such as Company name, Address, etc. Simply enter Company ID or Company name, all information will be shown such as Company name, Address, Vacancy, etc.

3.1.3 Process Requirement

(1) Entering Job Seeker information

(a) Receive electronic application form from Job Seeker

(b) If Job Seeker has not been member (no log-in name), create new Job Seeker (record)

(c) Update information when requested

(d) Print Resume when entering Job Seeker information is finished

(2) Entering Company information

(a) Receive electronic application form from Company

(b) If Job Seeker has not been member (no log-in name), create new Company (record)

(c) Update information when requested

(3) Query and Matching Process

(a) Search and Match Job Seeker information and Company vacancy requirement.

(4) Make interview appointment

(a) Create Interview schedule

(b) Create Interview Appointment Letter

3.1.4 Report Requirement (shown in Appendix A)

(1) Resume

Resume contains information of Job Seeker such as Job Seeker name, address, contact no., education, required division, etc.

(2) Qualified Candidates List

Qualified Candidates List is sent to company. This report contains the name list of potential candidates, and resume in brief.

(3) Interview Schedule

Interview Schedule contains the number of potential candidates and their name, time and place for interviewing.

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(4) Interview Appointment Letter

Interview Appointment Letter is sent to potential candidates in order to inform them about time and place of interviewing.

3.2 System Design

(1) Data Flow Diagrams (DFDs)

To understand the movement and flow of the data through the system, Data Flow Diagrams or DFDs are shown in Appendix B. Data Flow Diagrams are the structured analysis and designed tools for the analyst to understand the system and subsystem visually as a set of interrelated data flows.

The logical data flow will present the flow of the requirement and the data type used in developing the program to support the new system. By using Data Flow Diagrams, the analyst can design the file to cover the requirements of the users and support the report design of the system.

The details of system analysis and design of Recruitment Information System have been presented in the form of graphical presentation, which includes:

(a) Decomposition Diagram (see Appendix B)

(b) Context Data Flow Diagram (see Appendix B)

(c) Level 0 and Level 1 of processes of Data Flow Diagram (see Appendix B)

(2) Entity Relationship Diagram (ERD)

Data modeling is a technique for organizing and documenting a system's data. Data modeling is sometimes called database modeling because a data model is usually implemented as a database.

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In addition to database shown in ERD data modeling, the relationship among database is also shown in ERD.

The ERD of the new system is shown in Appendix C as follows:

(a) A context level of entity relationship diagram

(b) A key-based attributed relationship diagram

(c) A fully attributed relationship diagram

(3) Application Architecture

Application Architecture defines the technologies used in the new system in terms of its network, data, process and interface components.

(a) Network Architecture

Distributed Data, sometimes called two-tiered client/server, this architecture places the information system's stored data on a server and the business logic and user interfaces on the clients. A local area network (LAN) is used to connect the clients and the server.

LAN is a set of client computers connected to one or more server computers through cable over relatively short distances.

In addition, the server will be configured to support the Internet meaning they can interact with other systems including external source, Job seekers or employers, in the future.

(b) Data Architecture

JB Recruitment Company decides to use the relational database model as the model for the data architecture.

Relational database stores data in a tabular form. Each table has relationship among the tables, which is easy for updating or changing any information.

The data stores will be hosted at the central server using the database management system (DBMS) called Microsoft Access.

(c) Interface Architecture

Users will interact with the system via Windows standard graphical user interfaces (GUIs) which is more user friendly.

The new system uses online processing provided for a conversational dialogue between user and computer. By using online processing, it can reduce the response time and quickly identify error or correct data.

(d) Process Architecture

Since two-tiered client/server is chosen for network architecture, the Software Development Environment (SDEs) for two-tiered client/server is also chosen for the new system. The SDEs two-tiered client/server consists of a client-based programming language with built-in SQL connectivity to server database engine.

(4) Screen Design

For the user interface design, user-friendliness is a major concern. Interfaces must be easily understood and used. Standard interface components such as bullets, checkboxes, textboxes, etc., are preferable for the users. Furthermore, the user interface should

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Table 3.3. The Hardware Specification for Each PC Workstation (4 Units).

Hardware	Specification
CPU	Celeron 700 MHz
Hard Disk	10 GB
RAM	64 MB
CD-ROM	50 X
Floppy Disk	1.44 MB
Display Monitor	15" Monitor
UPS	600 VA
LAN Card	Ethernet 10/100
Hub	8 ports 10 Mpbs
Printer	HP Laser 5L
Total Price	170,000 baht

Table 3.4. The Software Specification for the PC Workstation.

Software	Specification
Operating System	Microsoft Windows 98 2nd Thai Edition
Application System	Microsoft Office 97
Total price	40,000 baht

There are 4 PC Workstations and 1 server connected with 2 printers for Marketing Department which is shown in hardware configuration. (Figure 3.1)

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provide user alert of exception so that the users are aware of the errors and can correct them right away.

(5) Report Design

Report design presents the information to the users and customers. There are 4 reports that are shown in Appendix A for the new system.

3.3 Hardware and Software Requirement

The hardware and Software requirement of the proposed system are shown as follows:

Table 3.1. The Hardware Specification for Computer Server.

Hardware	Specification
CPU	Pentium III 1GHz
Hard Disk	20 GB
RAM	256 MB
CD-ROM	50X
Modem	56 kps
Floppy Disk	1.44 MB
Display Monitor	17" Monitor
UPS	1000 VA
Total Price	100,000 baht

Table 3.2. The Software Specification for the Computer Server.

Software	Specification
Operating System	Microsoft Windows NT Server 4.0
Application System	Microsoft Access 97
Total price	40,000 baht

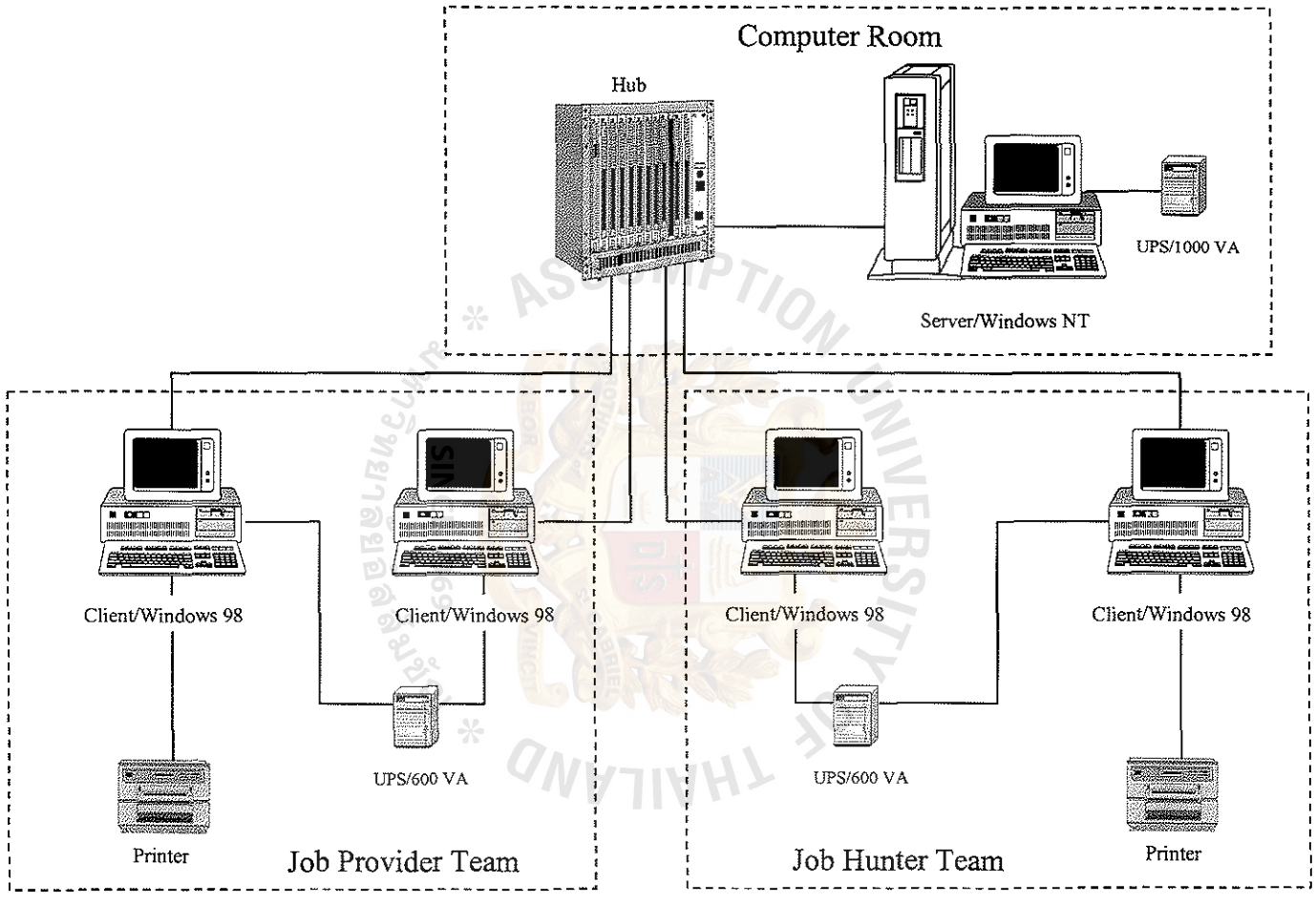

Figure 3.1. The Hardware Configuration of Recruitment Information System.

3.4 Security and Control

Since all the information is contained in the computerized system, it can lead to the loss of information which is difficult to recover. Then, control system should be introduced to the proposed system.

The security control helps to reduce the risks associated with the unauthorized use of computer resource intentional or unintentional destruction of computer resource.

The following security and control methods are proposed for Recruitment Information System for JB Recruitment Company.

(1) Authorization

The information of Job seeker and company is confidential. The level of authorized person should be set in order to make sure that person accessing the system has a legal right to the requested information.

(2) Electricity control

Preventing the loss of information during a power failure, UPS can solve this problem.

(3) Rights for accessing the database

The log-in name and password will be registered for all Job seekers and companies. Then, the database for these 2 groups of customer can be only updated by specific customers.

(4) Back up control

The new systems also back up the data from the database for accidental damage. The system will use warm site back up that can immediately restore the data.

3.5 Cost and Benefit Analysis

The followings are the cost and benefit of the new system.

Table 3.5. Manual System Cost Analysis, Baht.

Cost Items		Years				
		1	2	3	4	5
Fixed Cost:						
Typewriter	2 units @ 2,500	1,000	1,000	1,000	1,000	1,000
Fax	2 units @ 7,500	3,000	3,000	3,000	3,000	3,000
Calculator	6 units @ 1,000	1,200	1,200	1,200	1,200	1,200
Copy machine	1 unit @ 25,000	5,000	5,000	5,000	5,000	5,000
Total Fixed Cost		10,200	10,200	10,200	10,200	10,200
Operating Cost:						
Salary Cost:						
Marketing Manager	1 person @ 20,000	20,000	22,000	24,200	26,620	29,282
Marketing Clerks	6 persons @ 12,000	72,000	79,200	87,120	95,832	105,415
Total monthly Salary Cost		92,000	101,200	111,320	122,452	134,697
Total Annual Salary Cost		1,104,000	1,214,400	1,335,840	1,469,424	1,616,366
Office Supplies & Miscellaneous Cost:						
Stationery	Per Annum	18,000	19,800	21,780	23,958	26,354
Paper	Per Annum	70,000	77,000	84,700	93,170	102,487
Utility	Per Annum	36,000	39,600	43,560	47,916	52,708
Miscellaneous	Per Annum	12,000	13,200	14,520	15,972	17,569
Total Annual Office Supplies & Miscellaneous Cost		136,000	149,600	164,560	181,016	199,118
Total Annual Operating Cost		1,240,000	1,364,000	1,500,400	1,650,440	1,815,484
Total Manual System Cost		1,250,200	1,374,200	1,510,600	1,660,640	1,825,684

* Operating Cost will be increased by 10% every year.

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

Year	Total Manual Cost	Accumulated Manual Cost
1	1,250,200	1,250,200
2	1,374,200	2,624,400
3	1,510,600	4,135,000
4	1,660,640	5,795,640
5	1,825,684	7,621,324
Total	7,621,324	-

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Table 3.7. Computerized System Cost Analysis, Baht.

Cost Items		Years				
		1	2	3	4	5
Fixed Cost:						
Hardware Cost:						
Computer Server Cost		20,000	20,000	20,000	20,000	20,000
4 Workstations+2 Printer		34,000	34,000	34,000	34,000	34,000
Hub		1,000	1,000	1,000	1,000	1,000
1 UPS, 1000 VA		4,000	4,000	4,000	4,000	4,000
2 UPS, 600 VA		1,200	1,200	1,200	1,200	1,200
Total Hardware Cost		60,200	60,200	60,200	60,200	60,200
Maintenance Cost:						
Maintenance Cost		-	-	8,000	8,800	9,680
Total Maintenance cost		-	-	8,000	8,800	9,680
Software Cost:						
Computer Server & Client Cost		16,000	16,000	16,000	16,000	16,000
Network Cost		15,000	15,000	15,000	15,000	15,000
Total Software cost		31,000	31,000	31,000	31,000	31,000
Implementation Cost:						
Basic Training Cost	25,000/student	125,000	-	-	-	-
Advanced Training Cost	35,000/student	175,000	-	-	-	-
Set up Cost		70,000	-	-	-	-
Total Implementation Cost		370,000	-	-	-	-
Office Equipment Cost:						
Calculator	3 units @ 1,000	3,000	-	-	-	-
Copy Machine	1 unit @ 25,000	25,000	-	-	-	-
Fax	2 units @ 7,500	15,000	-	-	-	-
Total Office Equipment Cost		43,000	-	-	-	-
Total Fixed cost		504,200	91,200	99,200	100,000	100,880
Operating Cost:						
People-Ware & Staff cost:						
Marketing Manager	1 person @ 20,000	20,000	22,000	24,200	26,620	29,282
Marketing Clerks	3 persons @ 12,000	36,000	39,600	43,560	47,916	52,708
Computer Support	1 person @ 18,000	18,000	19,800	21,780	23,958	26,354
Total Monthly Salary		74,000	81,400	89,540	98,494	108,343
Total Annual Salary		888,000	976,800	1,074,480	1,181,928	1,300,121
Office Supplies & Miscellaneous Cost:						
Stationery	Per Annum	15,000	16,500	18,150	19,965	21,962
Paper	Per Annum	35,000	38,500	42,350	46,585	51,244
Utility	Per Annum	72,000	79,200	87,120	95,832	105,415
Miscellaneous	Per Annum	12,000	13,200	14,520	15,972	17,569
Total Annual Office Supplies & Miscellaneous Cost		134,000	147,400	162,140	178,354	196,189
Total Operating Cost		1,022,000	1,124,200	1,236,620	1,360,282	1,496,310
Total Computerized System Cost		1,526,200	1,215,400	1,335,820	1,460,282	1,597,190

* Operating Cost & Maintenance cost will be increased by 10% every year.

Table 3.8. Five Years Accumulated Computerized System Cost, Baht.

Year	Total Computerized System Cost	Accumulated Computerized SystemCost
1	1,526,200	1,526,200
2	1,215,400	2,741,600
3	1,335,820	4,077,420
4	1,460,282	5,537,702
5	1,890,153	7,427,855
Total	7,427,855	-

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3.5.1 Payback Analysis

System development costs are incurred long before benefits begin to accrue, so it will take some time for the benefits to overtake the costs. This period of time is called the "Payback Period". Payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs. The after taxes payback period is calculated as follows:

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

Where P = Payback Period

I = Initial or Capital expenditure

R = Annual saving realized by investment

T = Corporate tax rate in percent (30%)

The payback period of the proposed system can be calculated as follows:

I = 1,597,190 Baht

R = 1,010,880 Baht

$$P = \frac{1,597,190}{(1-0.3)\ 1,010,880}$$

= 2.2 years

The payback period of the proposed system is 2.2 years.

3.5.2 Net Present Value (NPV)

Net Present Value is a sophisticated capital budgeting technique, which is calculated by subtracting the project's initial investment from the present value of cash inflows discounted at a rate to the firm's cost of capital. The basic formula of NPV is as follows:

$$NPV = \frac{R}{(1+k)^1} + \ldots\ldots\ldots + \frac{R}{(1+k)^n} - PV$$

where NPV = Net Present Value

PV = Cost of the new system = 1,597,190

R = Annual Cash inflows (saving)

N = Number of years the saving is available

K = Annual rate of interest = 12%

NPV for 5 years of the proposal system can be calculated as follows:

$$NPV = \left[\frac{445,000}{(1+0.12)^1} + \frac{957,500}{(1+0.12)^2} + \frac{1,462,750}{(1+0.12)^3} + \frac{2,155,025}{(1+0.12)^4} + \frac{2,838,528}{(1+0.12)^5} \right] - 1,597,190$$

$$= 3,584,841 \text{ baht}$$

3.5.3 Decision Criteria

NPV is positive it means the investment is quite good, if it is negative it means the investment is bad. From the proposed system, NPV for 5 years is equal to 3,590,041 baht. In addition, the payback period does not exceed 3 years which is a good investment. Thus, this project should be invested.

Table 3.9. The Comparison of the System Costs, Baht.

Year	Accumulated Manual Cost	Accumulated Computerized Cost
1	1,250,200	1,526,200
2	2,624,400	2,741,600
3	4,135,000	4,077,420
4	5,795,640	5,537,702
5	7,621,324	7,427,855

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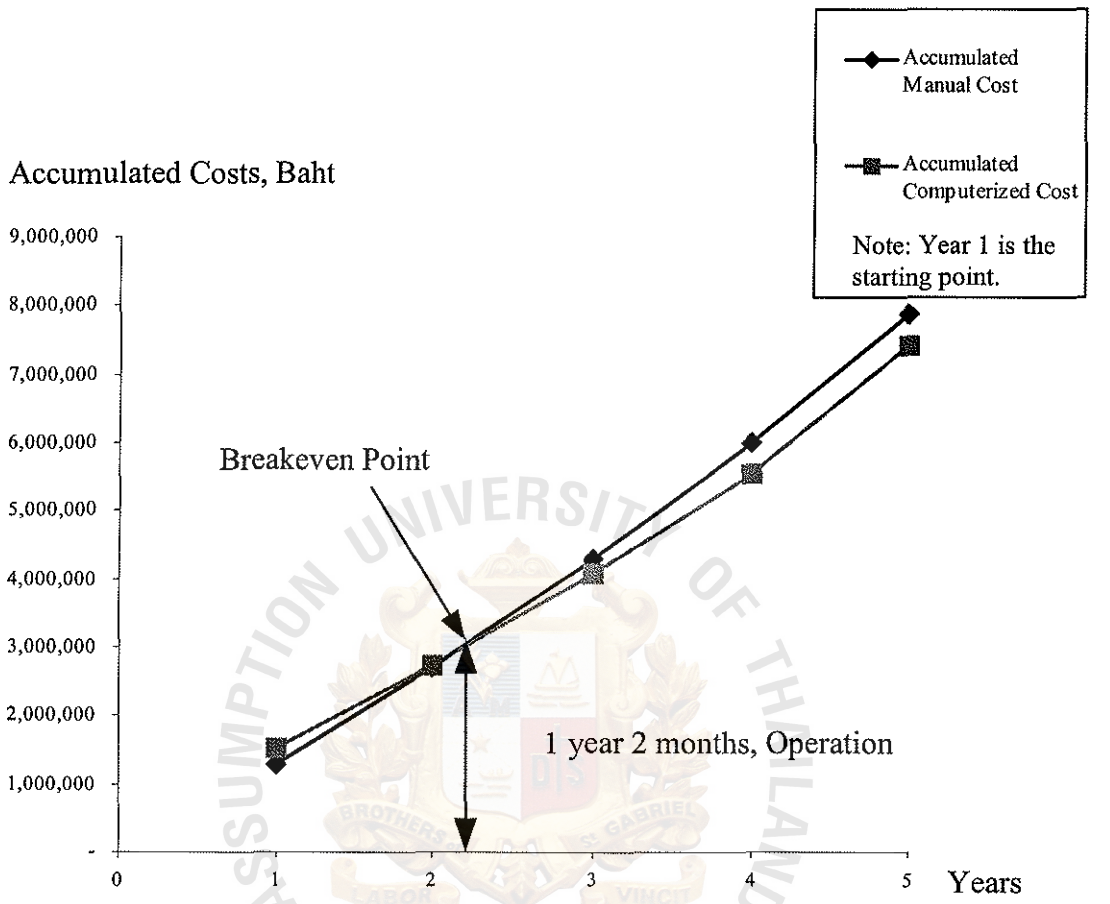

Figure 3.2. The Graph Shows the Comparison of Both System Costs.

Table 3.10. Payback Analysis for the Proposed System, Baht.

Cash Items	Years					
	0	1	2	3	4	5
Development Cost	-1,597,190	-	-	-	-	-
Operation & Maintenance cost	0	-725,000	-797,500	-877,250	-964,975	-1,061,473
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to PV)	-1,597,190	-647,425	-635,608	-624,602	-613,724	-601,855
Cumulative time-adjusted costs over lifetime	-1,597,190	-2,244,615	-2,880,223	-3,504,825	-4,118,549	-4,720,404
Benefits derived from operation of new system	0	1,170,000	1,755,000	2,340,000	3,120,000	3,900,000
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (adjusted to PV)	0	1,044,810	1,398,735	1,666,080	1,984,320	2,211,300
Cumulative time-adjusted benefits over lifetime	0	1,044,810	2,443,545	4,109,625	6,093,945	8,305,245
Cumulative lifetime time-adjusted cost + benefits	-1,597,190	-1,199,805	-436,678	604,800	1,975,396	3,584,841

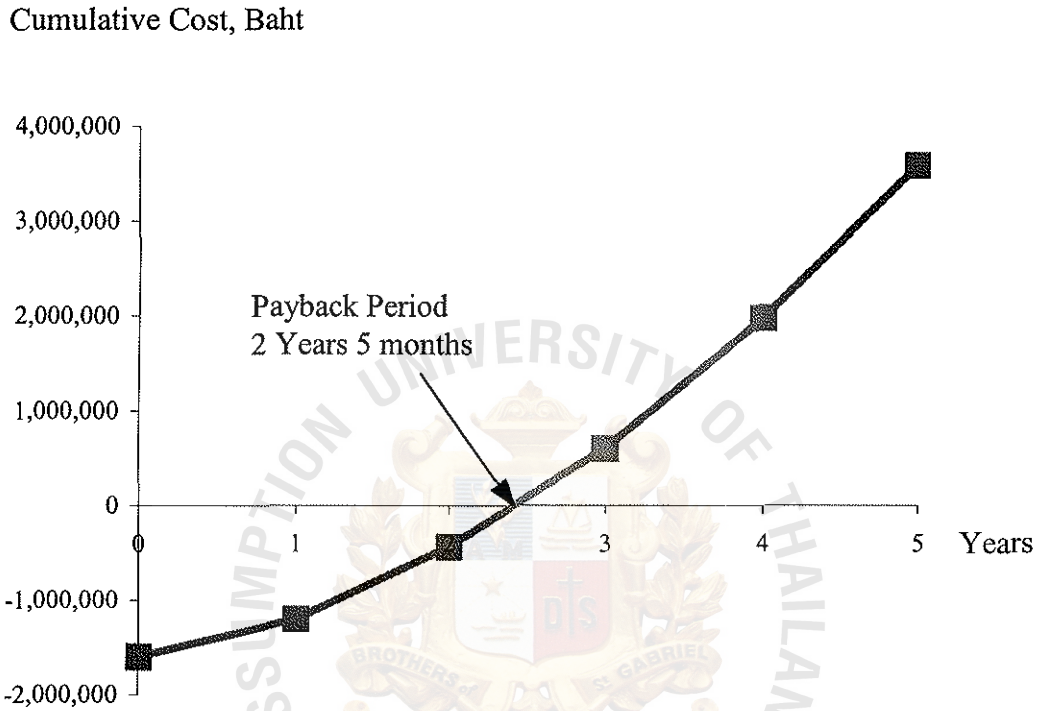

Figure 3.3. Payback Analysis.

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IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Project Implementation is to assure that the new system can work properly and provide the objectives of the project in day-to-day operation. The old and new systems will be used together in the first stage. After the officers are familiar with the new system, the old system will be terminated.

Since the old system is a manual system based on paper work, the officers may not be familiar with the computerized system. Training course is required for the first stage. Then, the officers can understand how to work in the new computerized system.

4.2 Testing

A system acceptance test is a final system test performed by end-users using real data over an extended time period. It is an extensive test that addresses three levels of acceptance testing: Verification testing which runs the system in a simulated environment using simulated data, Validation testing which runs the system in a live environment using real data (beta testing), Audit testing which certifies that the system is free of errors and is ready to be placed into the operation.

Before system testing, stub testing and unit testing are implemented. Stub testing is the test performed on individual modules.

Unit or program testing is a test whereby all the modules that have been coded and stub tested are tested as an integrated unit.

System testing is a test that ensures that application programs written in isolation work properly when they are integrated into the total system.

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The areas of testing are as follows:

(1) Hardware testing

(2) Network testing

(3) Database testing

(4) Software testing

(5) Security and control testing

4.3 Conversion

Parallel conversion is used for the conversion stage. For Parallel conversion, both the old and new systems are operated for some time period. This is done to ensure that all major problems in the new system have been solved before the old system is discarded. This strategy minimized the risk of major flaws in the new system causing irreparable harm to the business.

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V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Nowadays, the need for accurate information and quick response are very important. Many companies have to work as fast as possible in order to take competitive advantage in the market.

The computerized system is a way to help the process in the organization to work faster. Many companies start to use the computerized system instead of the manual system which emphasizes on manpower. In the manual system, it can cause many errors such as human errors, longer response time, waste resources, etc. In contrast, the companies can reduce the response time, human error and the use of resources by using the computerized system.

In Recruitment Information System, the computerized system helps the company to work effectively. It also provides more benefits and flexibility to the company.

Table 5.1 shows the time spent on each process of the computerized system compared to the manual existing system.

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Table 5.1. Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Matching Process	3 hrs.	3 mins.
Typing Interview Appointment Letters (per person)	30 mins.	30 secs.
Typing Resume (per person)	30 mins.	30 secs.
Typing Qualified Candidate List	15 mins.	30 secs.
Typing Interview Schedule	15 mins.	30 secs.
Total	4 hrs. 30 mins.	5 mins.

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(1) Matching Process: The officers have to manually search the suitable jobs according to the requirement of the Job seekers. It takes too much time to find out the suitable job one by one. On the other hand, the computerized system will automatically search and query the requirement and vacancy. Then, it uses less time for this process.

(2) Typing Interview Appointment Letter: For the existing system, the officers have to use a typewriter in order to type the Interview Appointment Letter to the potential candidates. For the proposed system, the letter form is set in the first stage. Name, date and place of interviewing will be automatically changed according to the database.

(3) Typing Resume: For the existing system, the officers have to use a typewriter for typing resume to the Job seeker in order to confirm their information. For the proposed system, the resume will be printed according to the application form that the Job seekers fill out.

(4) Typing Qualified Candidate List: After getting the name of the qualified candidate, the officers have to use a typewriter to type the name list to the company. For the proposed system, the qualified candidate list will be automatically printed out after matching process.

(5) Typing Interview Schedule: For the existing system, the officers have to use a typewriter to type the schedule for the company. But for the proposed system, the system will print out the Interview schedule automatically after the appointment process.

5.2 Recommendations

After implementing the proposed system, it will satisfy the users since it does not only eliminate some problems that occur by the existing system, but also provides the effective and efficient routine work in the Recruitment system.

In order to be successful in implementing the proposed system, some factors must be improved as follows:

(1) Training course for the officers should be provided in order to make them understand the system.

(2) The computer support should be hired in order to take care of all the computers in the company and solve some problems which the users can not solve by themselves.

This proposed system is the first step in converting to the computerized system. In the future, the company looks forward to implementing the computerized system on the internet where everyone can access to the company from anywhere. Therefore, the proposed system should be developed in the near future.

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APPENDIX A

REPORT DESIGN

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18 June 2001

To: Ms. Chantima Sriyanukul

Subject: Interview Appointment

Since you are the member of JB Recruitment Company, our company would like to inform that you are the qualified candidate whom our company invite to the incoming job interview as the schedule below:

Company Name: Sin Siam Co., Ltd.

Place: Sin Siam Co., Ltd.
Samutprakarn.

Time: July 2,2001, 10:00 am.

Tel: 02-3987755

We also enclosed the map to the company for you.

Have a great chance to get a good job.

Best regards,

Chareon Chaichana

(Marketing Manager)

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Figure A.1. Interview Appointment Letter.

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18 June 2001

To: Human Resource Department, Sin Siam Co., Ltd.

Subject: Qualified Candidates List

As you are the member of JB Recruiment Company and you requested for the persons who will work as an Administrative officer since 7 June 2001.

Here are the name lists of the potential candidates for you.

No.	Name
1	Ms. Chantima Sriyanukul
2	Ms. Sirilad Yoomankong
3	Mr. Narid Aranyamai
4	Ms. Ladda Taweelarp

According to the list above, please send us your available time to make an appointment eith the potential candidates.

Best regards,

Chareon Chaichana

(Marketing Manager)

Figure A.2. Qualified Candidate List.

18 June 2001

To: Human Resource Department, Sin Siam Co., Ltd.

Subject: Interview Schedule

According to the time table that you sent me, the interview schedule will be as below:

No.	Name	Date	Time
1	Ms. Chantima Sriyanukul	July 2, 2001	10:00 am.
2	Ms. Sirilad Yoomankong	July 2, 2001	11:00 am.
3	Mr. Narid Aranyamai	July 3, 2001	10:00 am.
4	Ms. Ladda Taweelarp	July 3, 2001	11:00 am.

Best regards,

Chareon Chaichana

(Marketing Manager)

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Figure A.3. Interview Schedule.

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Personal Information

Name : Ms. Chantima Sriyanukul

Birthdate : 15 August 1975 Age : 26

Address : 4049 Sukhumwit 103, Bangna, Bangna, Bangkok 10260

Tel : 02-3934457

Email : Chantimas@hotmail.com

Education : Bachelor Degree of Business Administration

Job Requirement:

Division : Marketing or related field

Area : Bangkok, Samutprakarn

Salary : 12,000 baht

Addition Information:

Language : English

Driving : Car

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Figure A.4. Personal Information.

APPENDIX B

DATA FLOW DIAGRAM DESIGN

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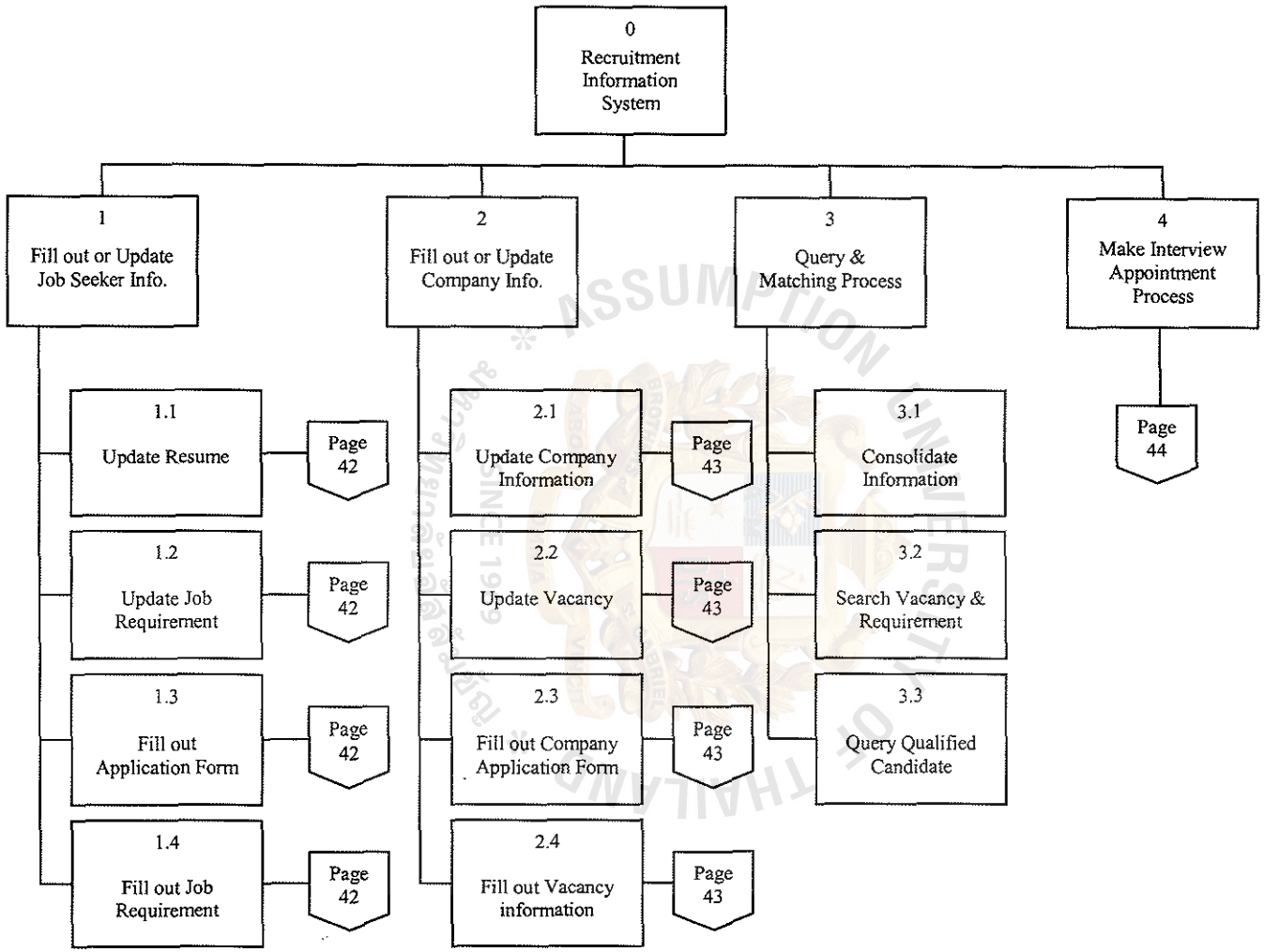

Figure B.1. A Composition Diagram of Recruitment Information System.

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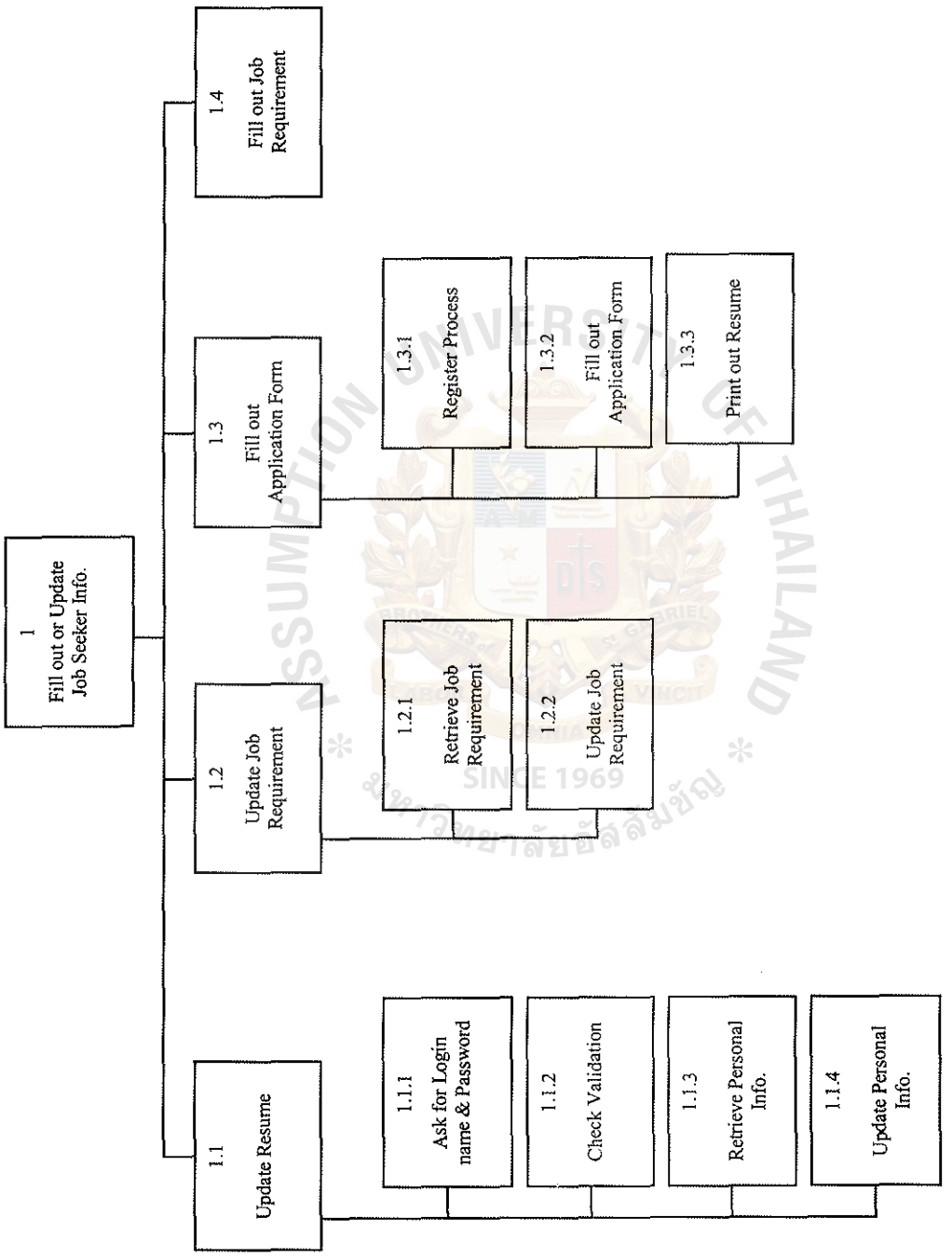

Figure B.2. A Composition Diagram of Recruitment Information System (Continued).

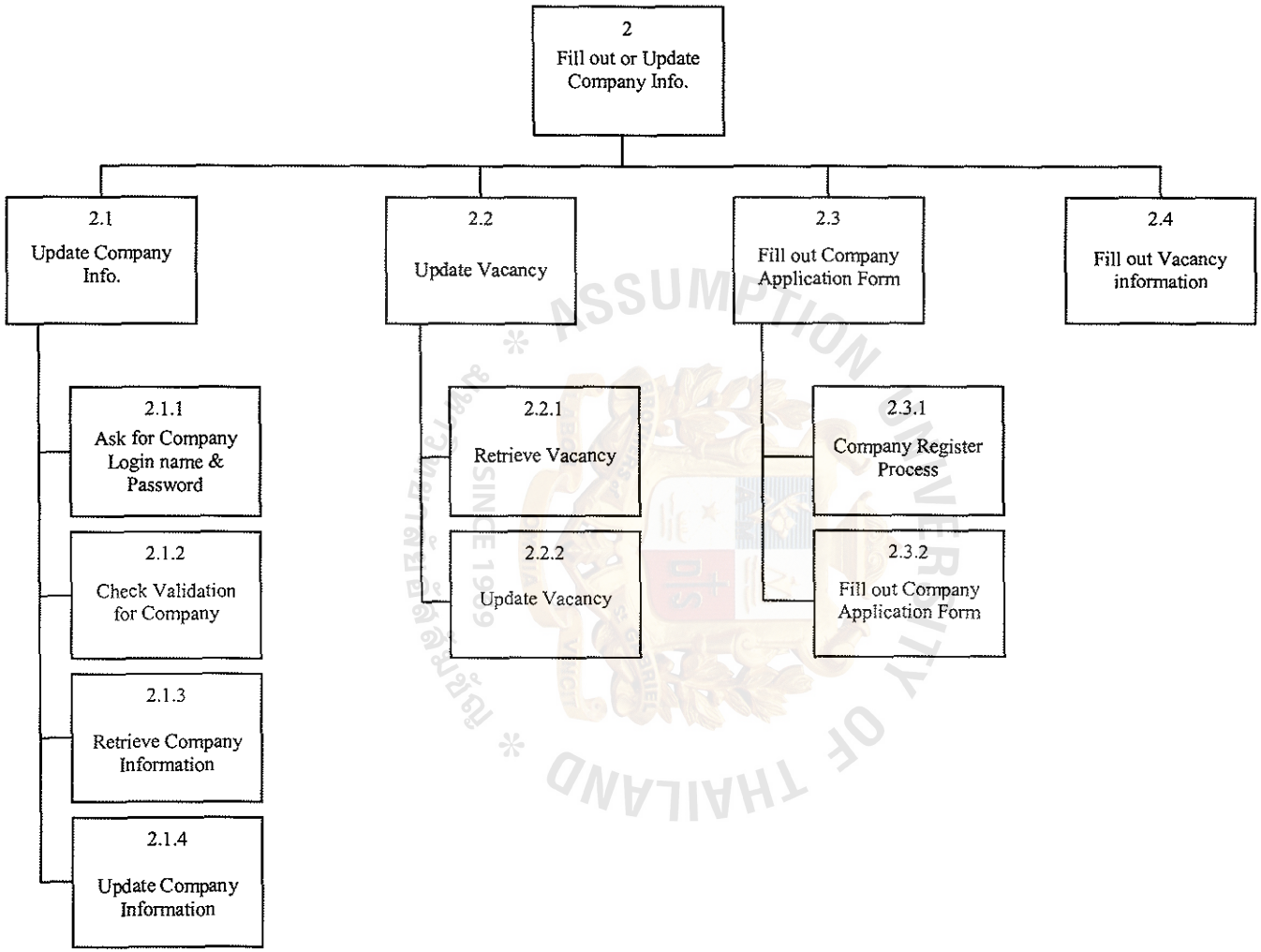

Figure B.3. A Composition Diagram of Recruitment Information System (Continued).

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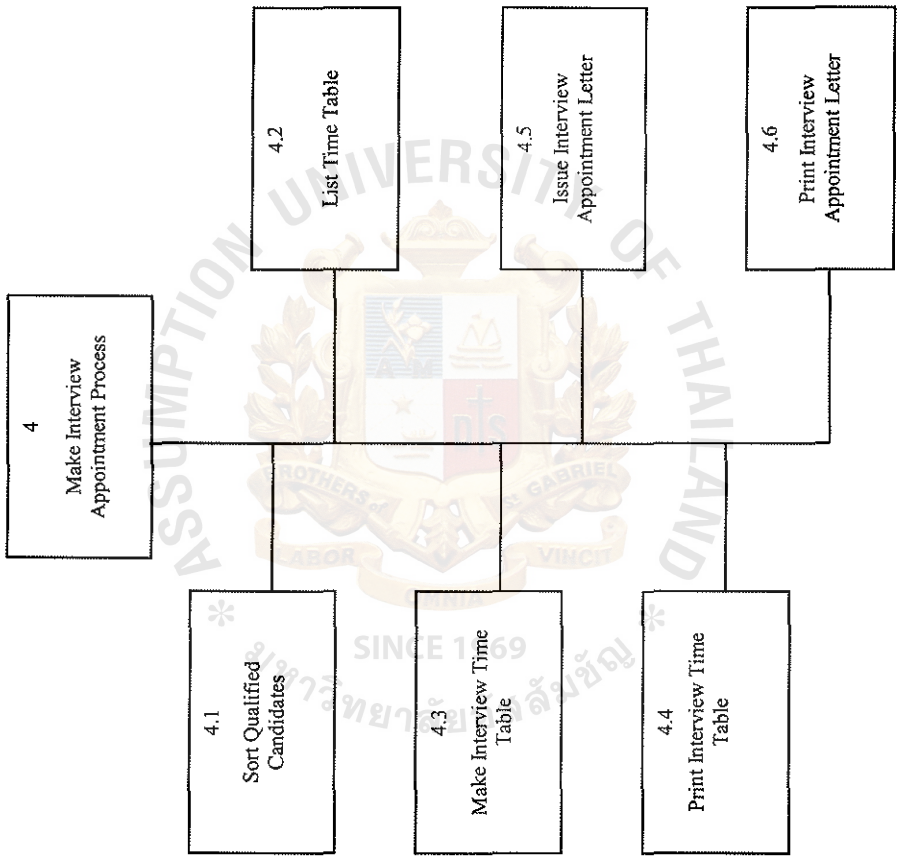

Figure B.4. A Composition Diagram of Recruitment Information System (Continued).

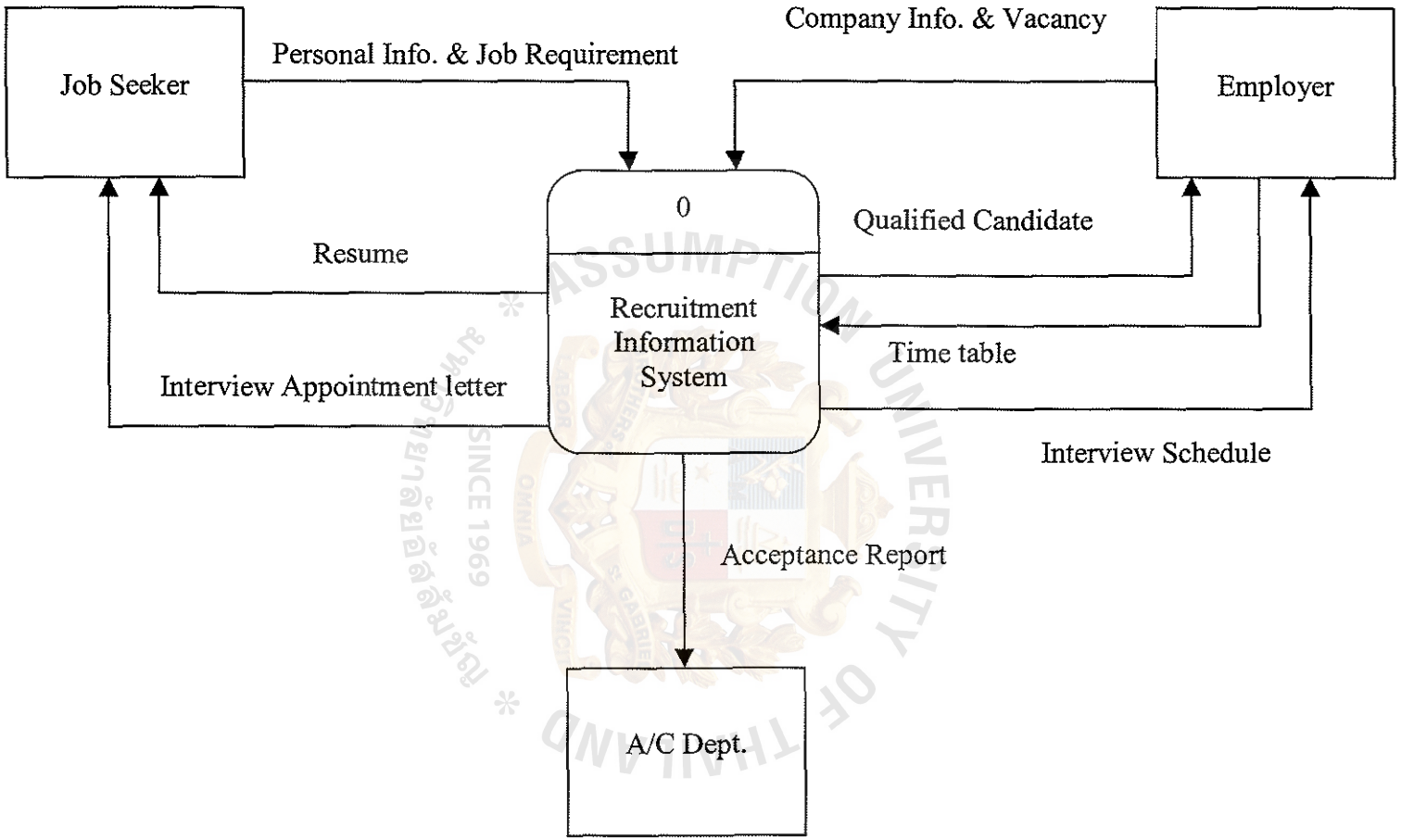

Figure B.5. Data Flow Diagram Context Level of JB Recruitment Company.

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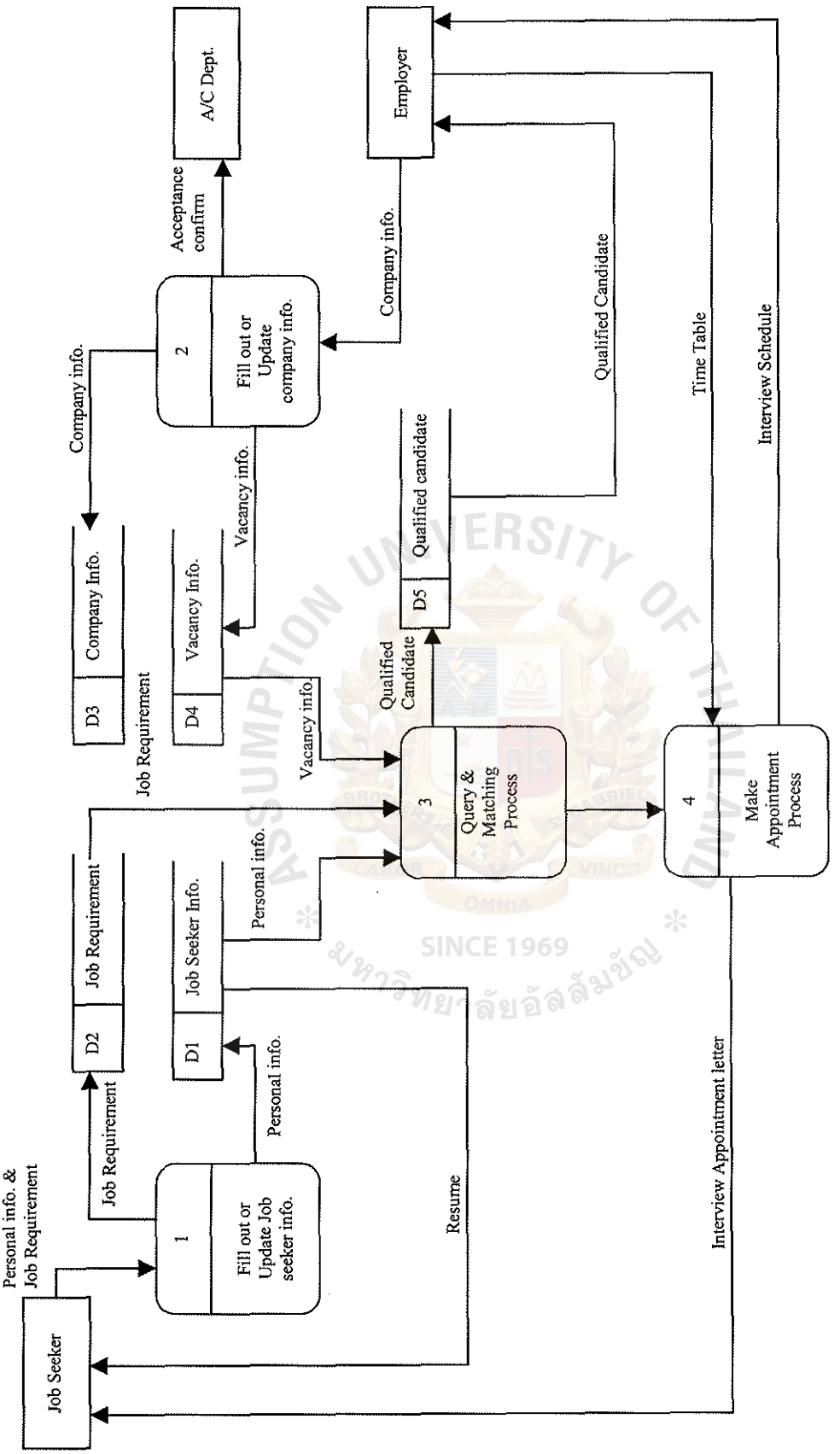

Figure B.6. Data Flow Diagram Level 0 of JB Recruitment Company.

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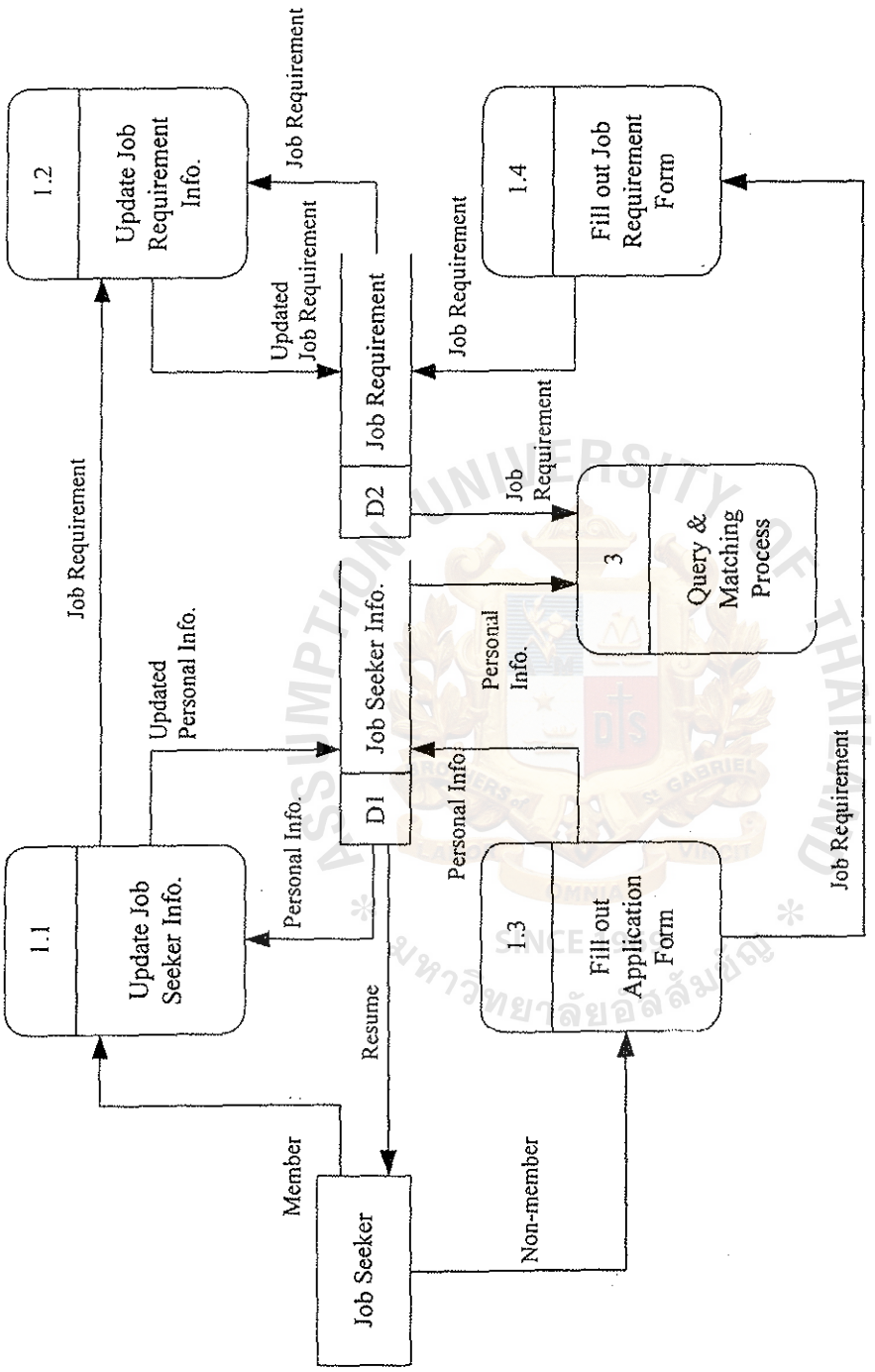

Figure B.7. Data Flow Diagram Level 1 Process 1 – Fill out or Update Job Seeker Info.

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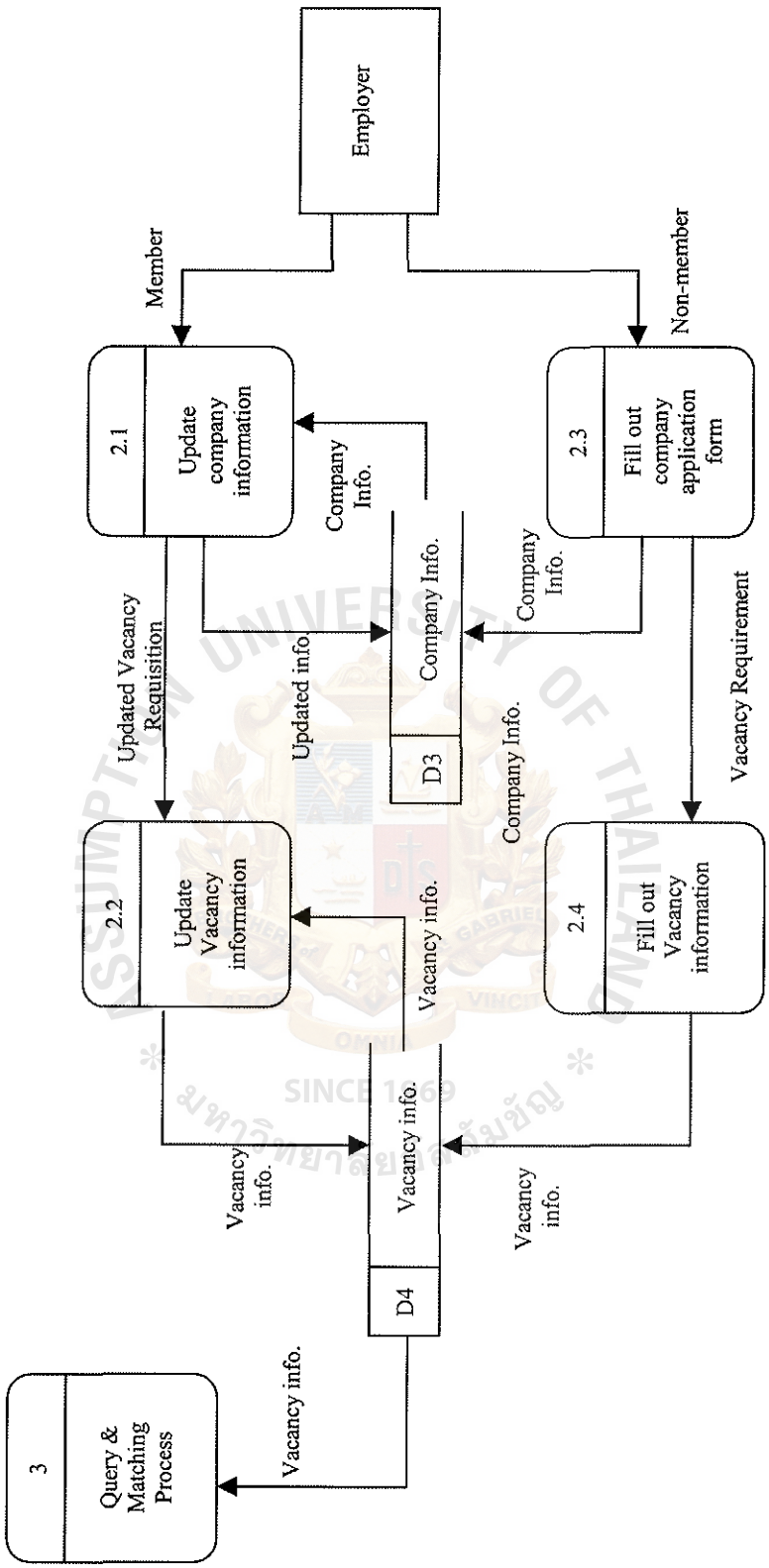

Figure B.8. Data Flow Diagram Level 1 Process 2 – Fill out or Update Company Info.

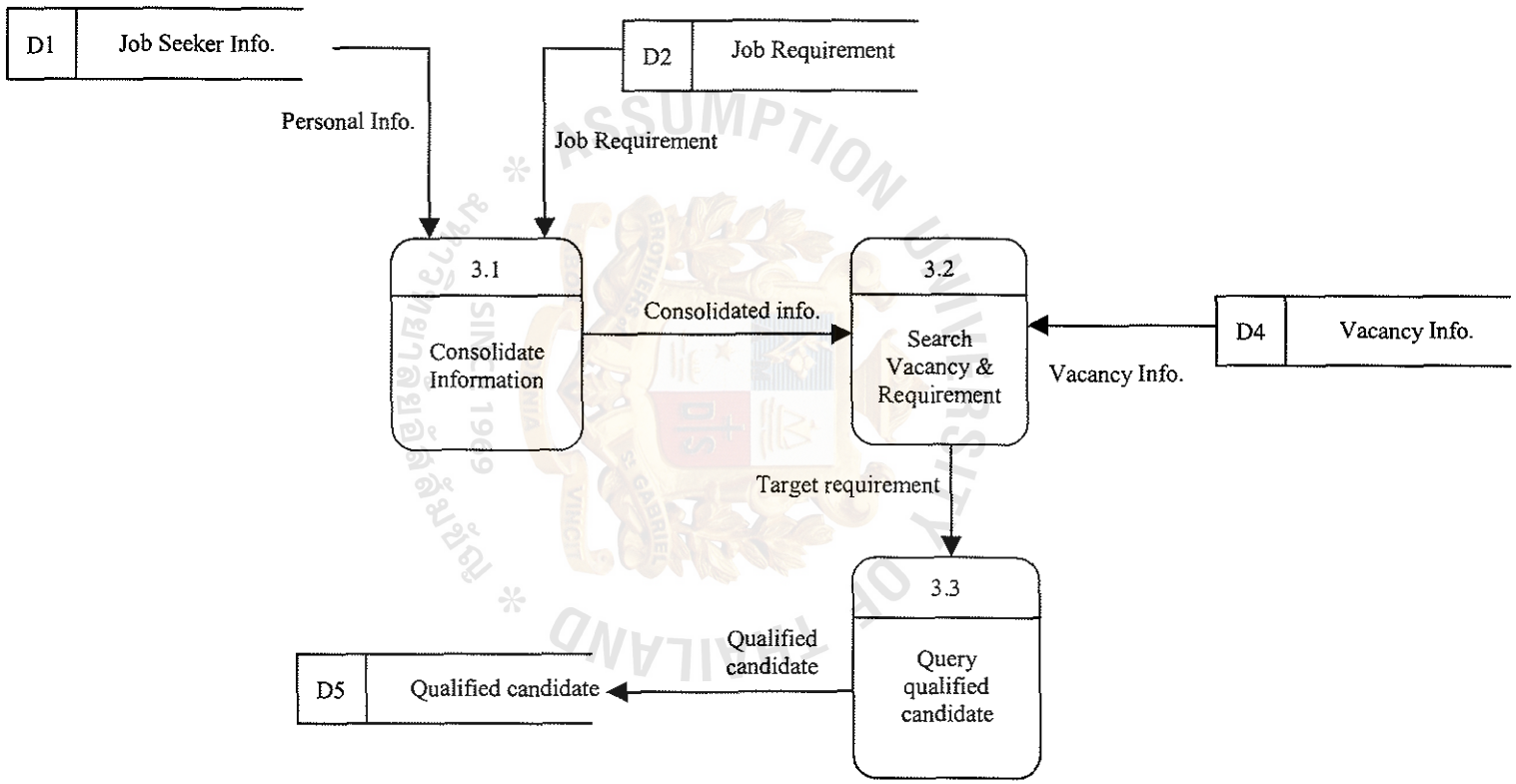

Figure B.9. Data Flow Diagram Level 1 Process 3 – Query & Matching Process.

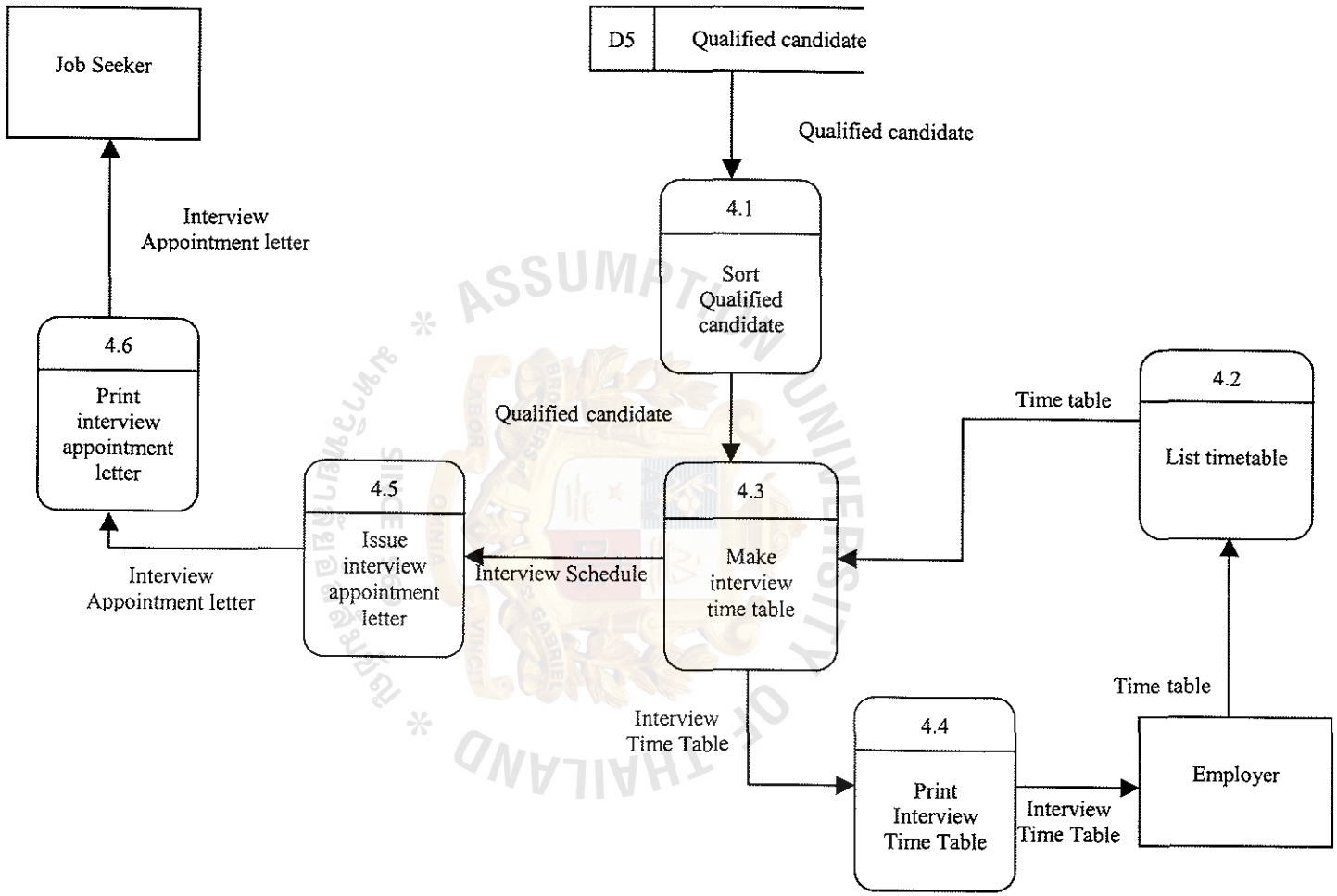

Figure B.10. Data Flow Diagram Level 1 Process 4 – Make Appointment Process.

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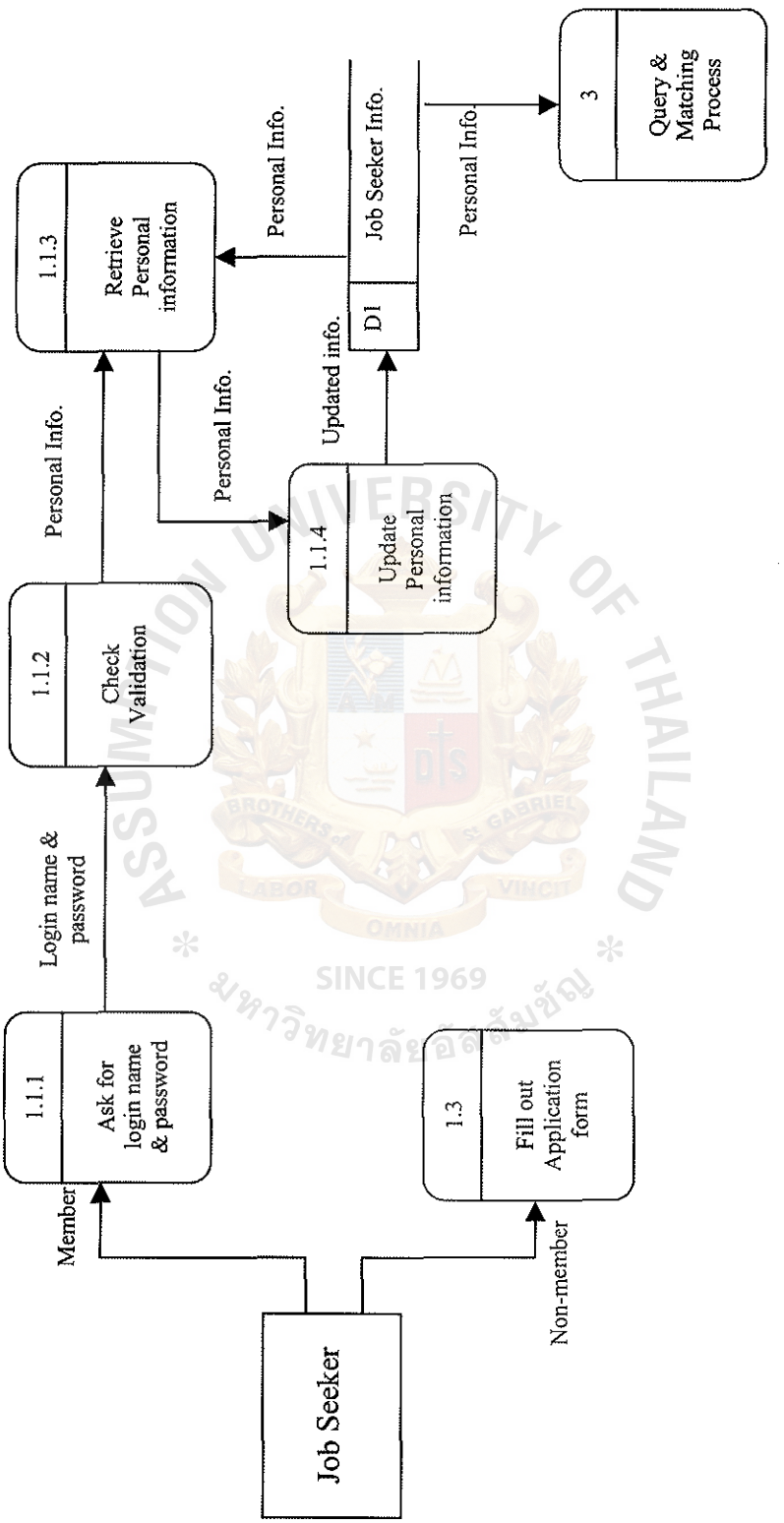

Figure B.11. Data Flow Diagram Level 2 Process 1.1 – Update Job Seeker Info.

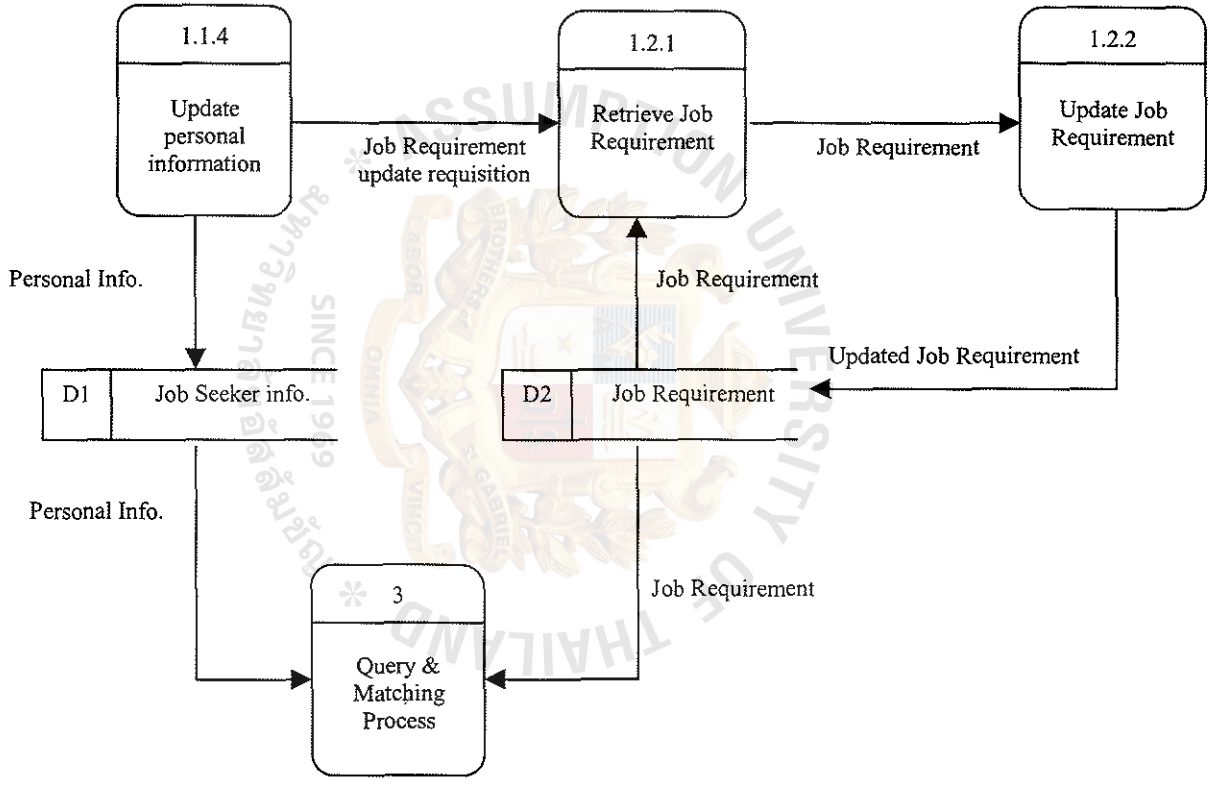

Figure B.12. Data Flow Diagram Level 2 Process 1.2 – Update Job Requirement Info.

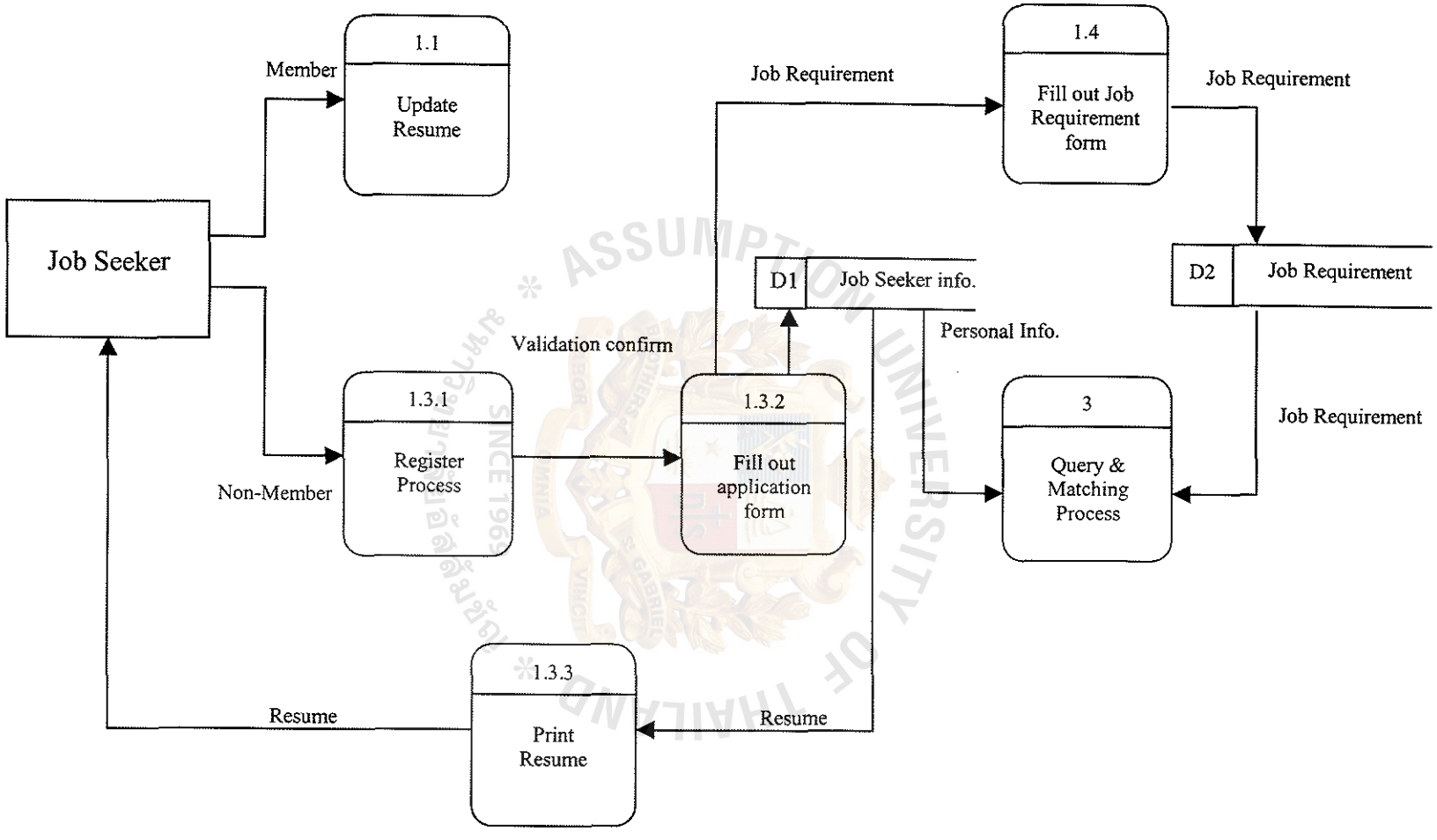

Figure B.13. Data Flow Diagram Level 2 Process 1.3 – Fill out Application Form.

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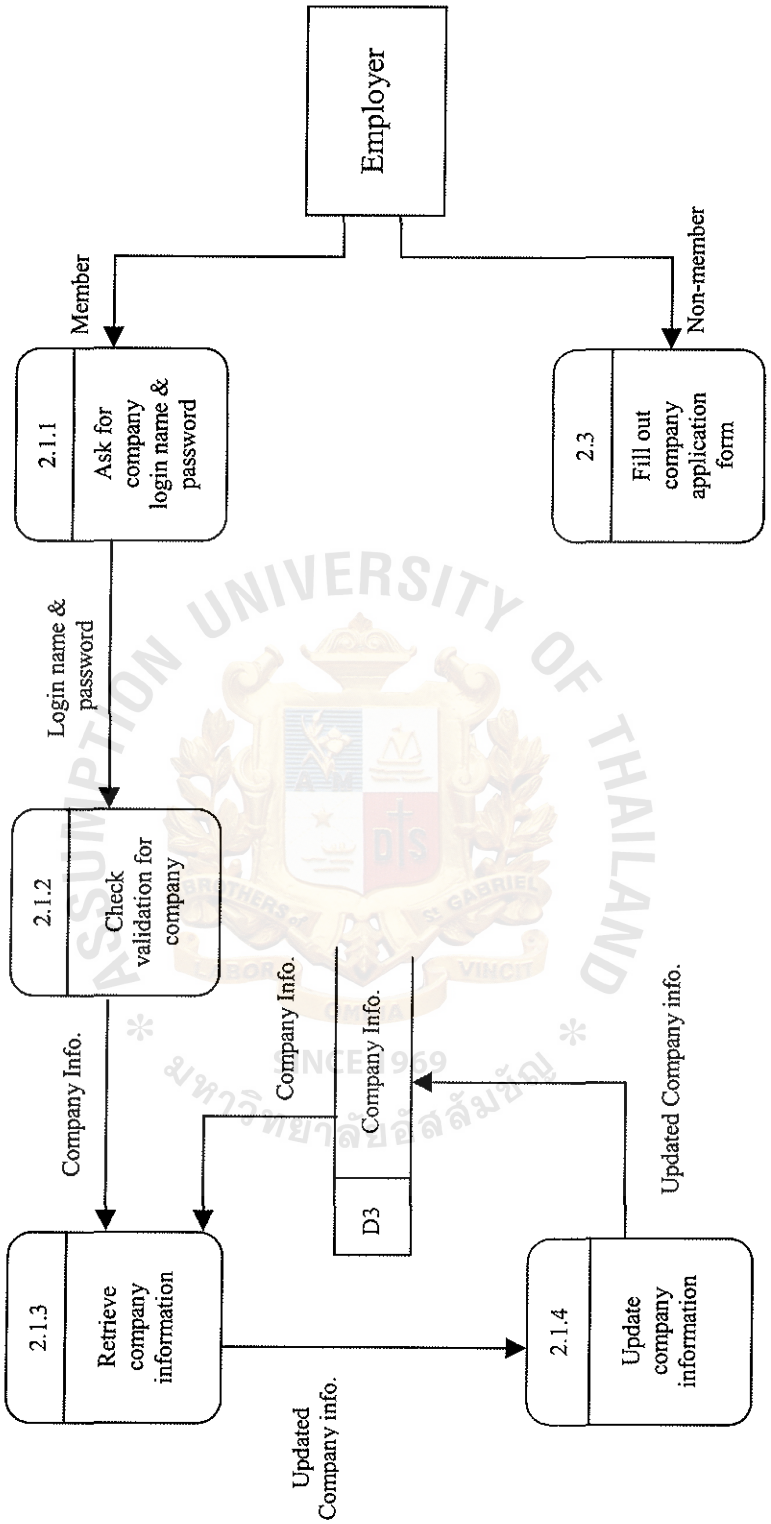

Figure B.14. Data Flow Diagram Level 2 Process 2.1 – Update Company Info.

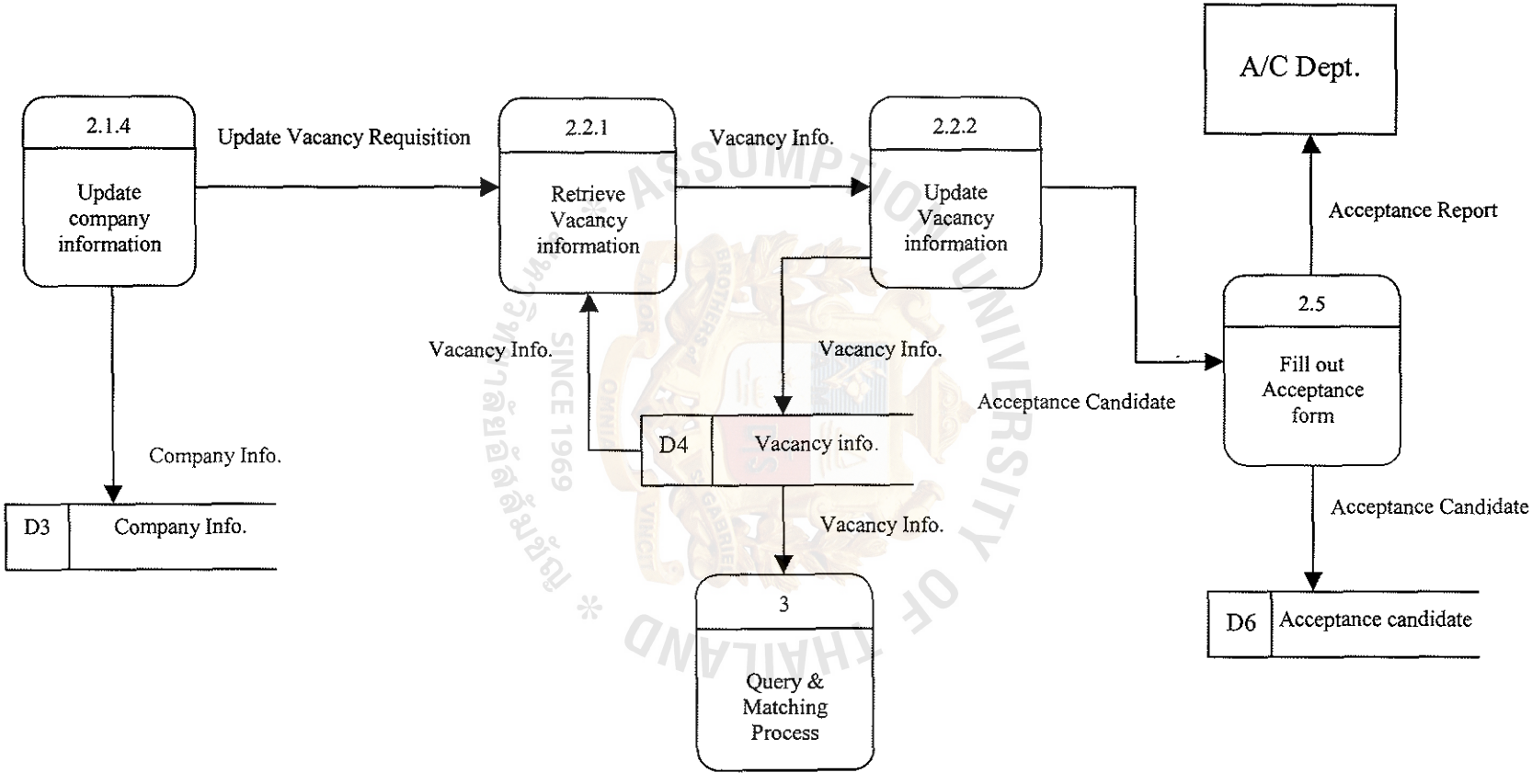

Figure B.15. Data Flow Diagram Level 2 Process 2.2 – Update Vacancy Info.

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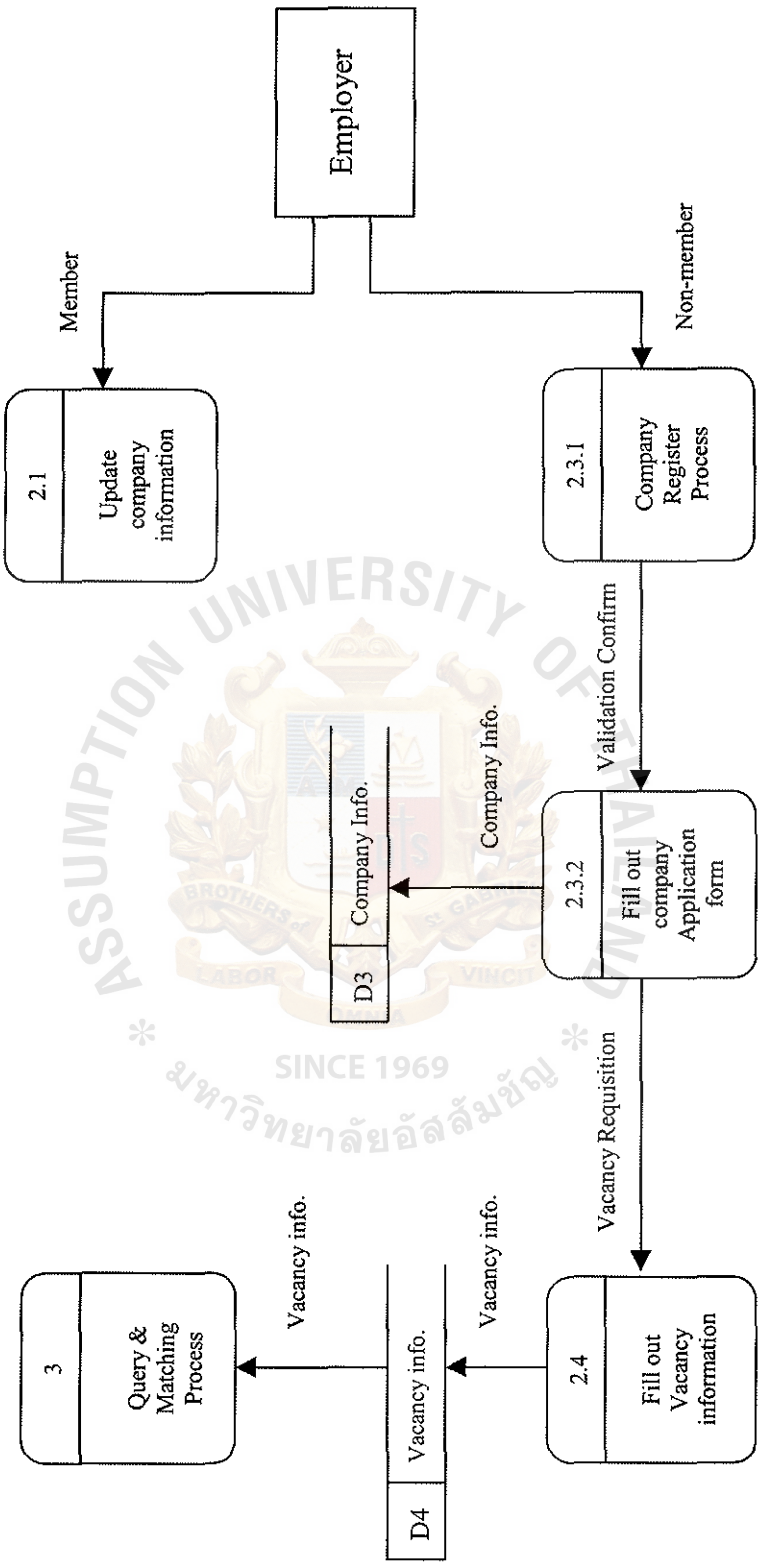

Figure B.16. Data Flow Diagram Level 2 Process 2.3 – Fill out Company Application Form.

APPENDIX C

ENTITY RELATIONSHIP

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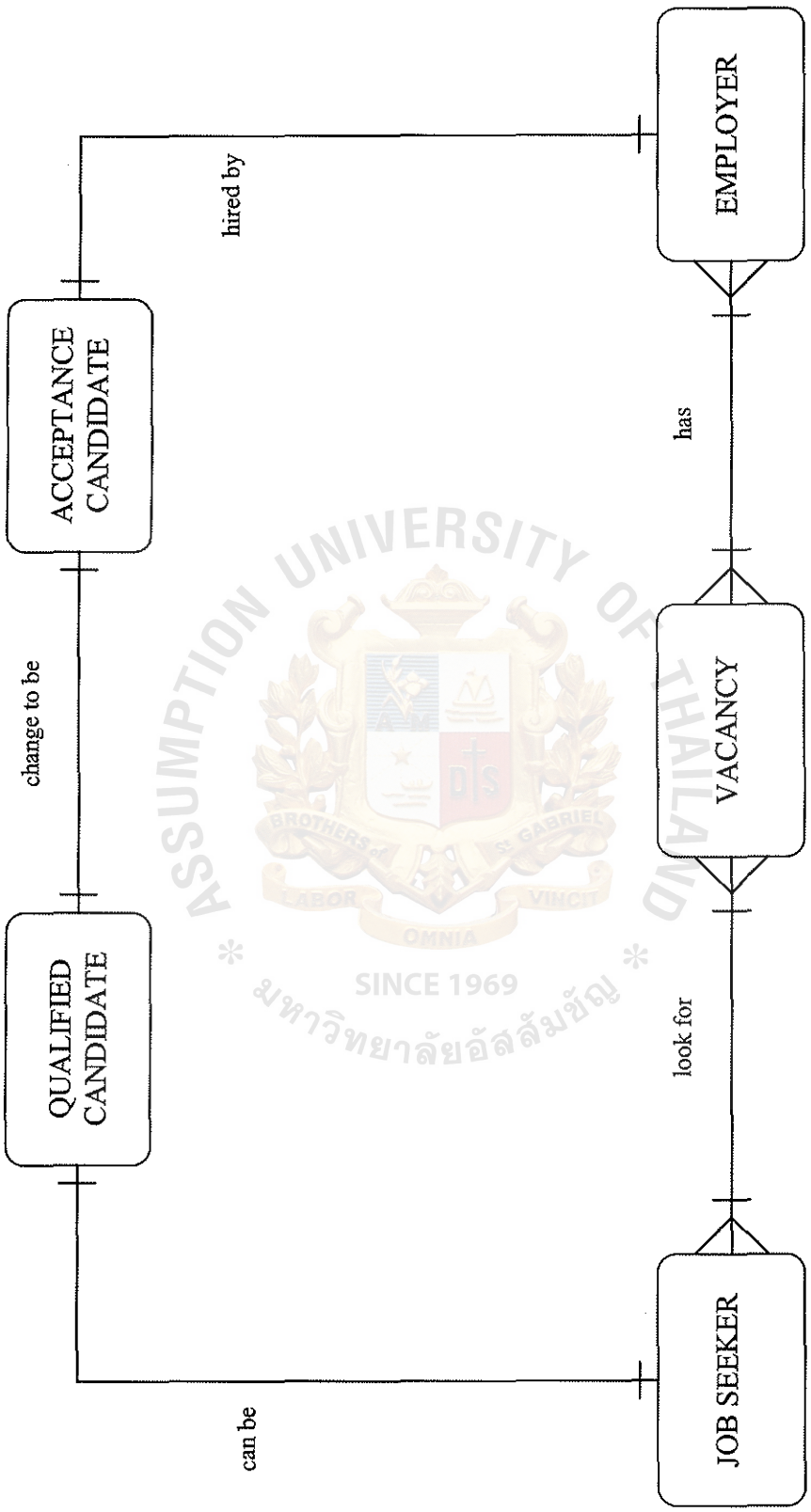

Figure C.1. Context Data Model of Recruitment Information System.

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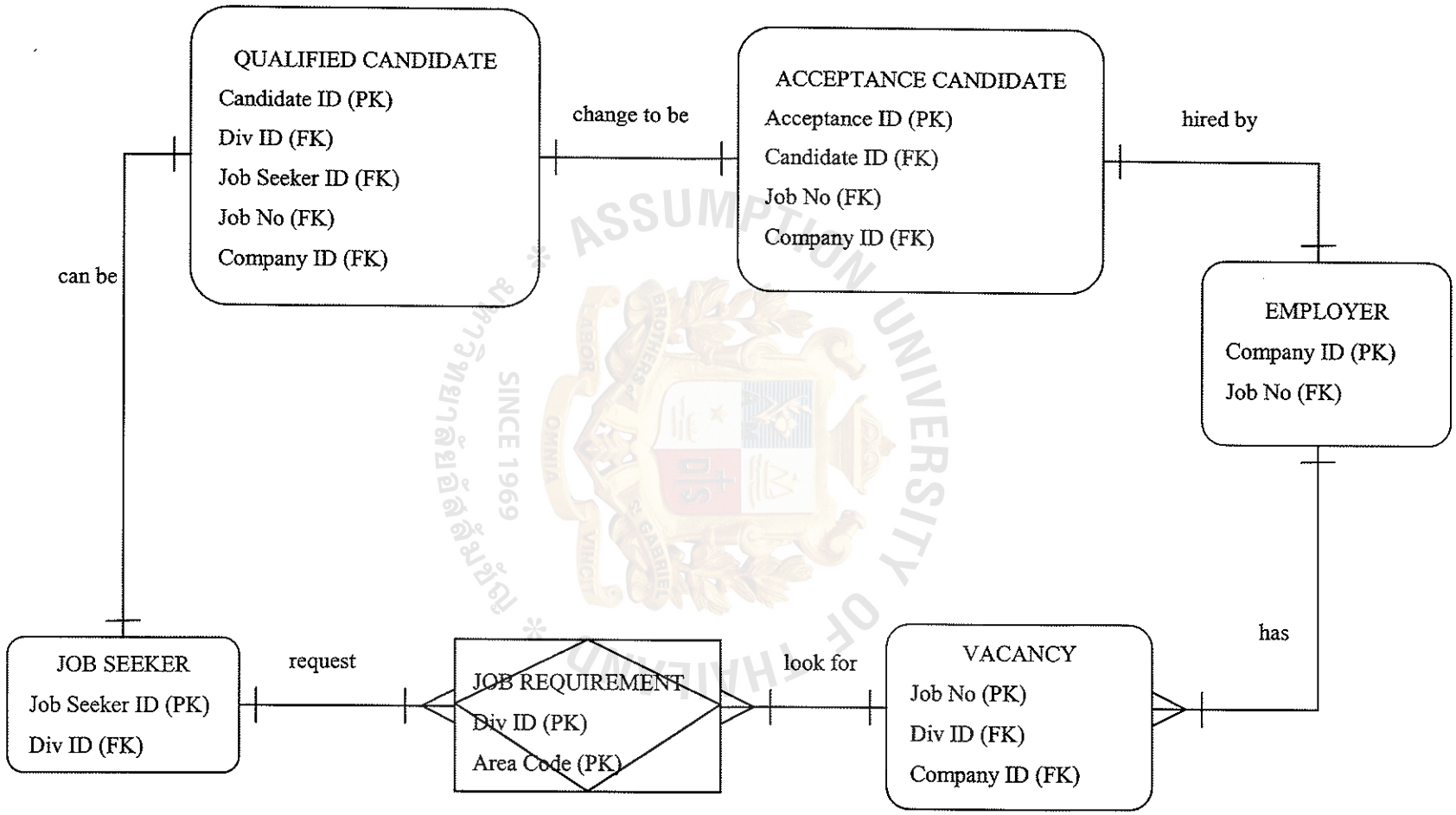

Figure C.2. Key-based Data Model of Recruitment Information System.

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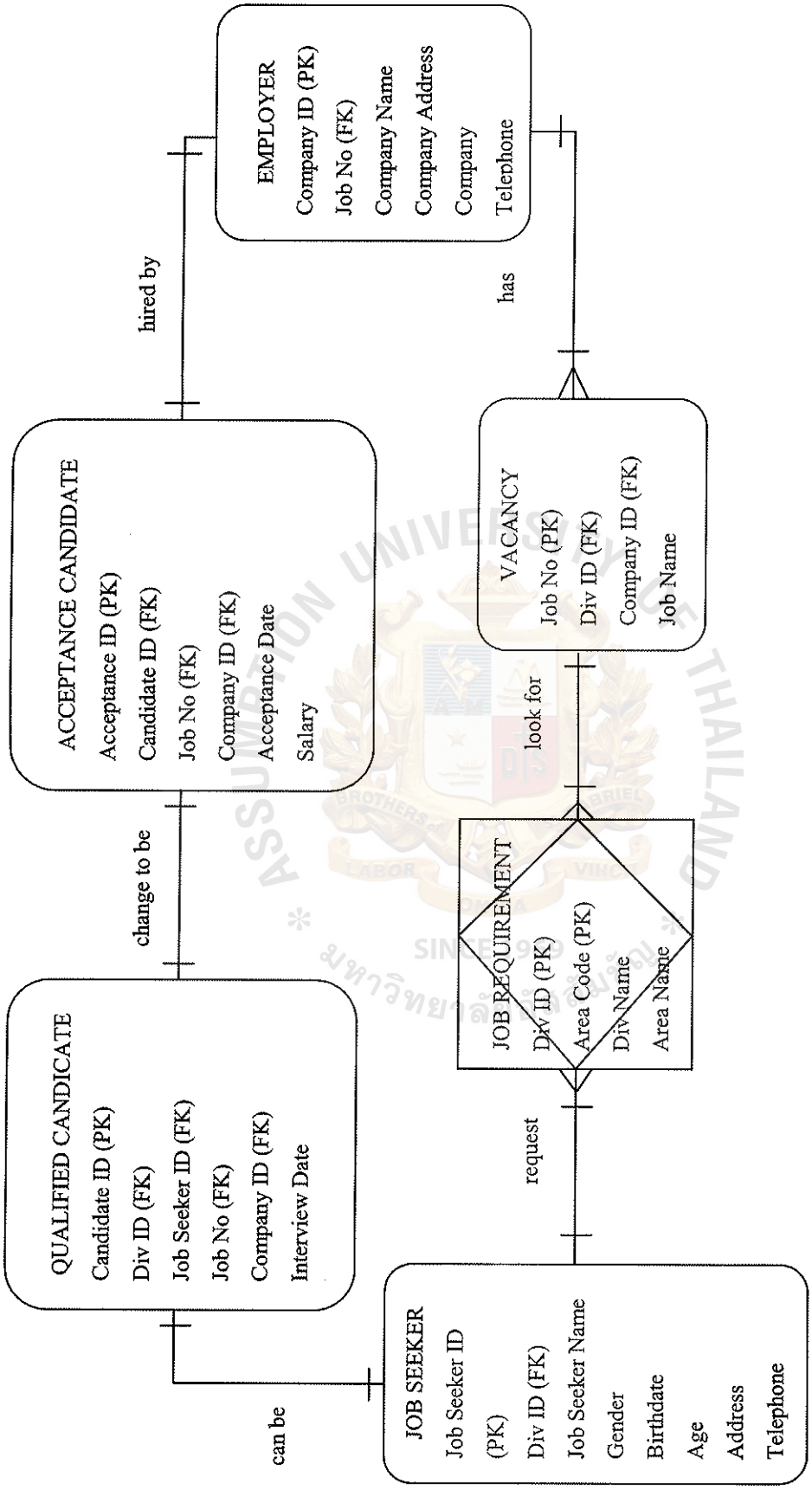

Figure C.3. Fully Attributed Data Model of Recruitment Information System.

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APPENDIX D

STRUCTURE CHART

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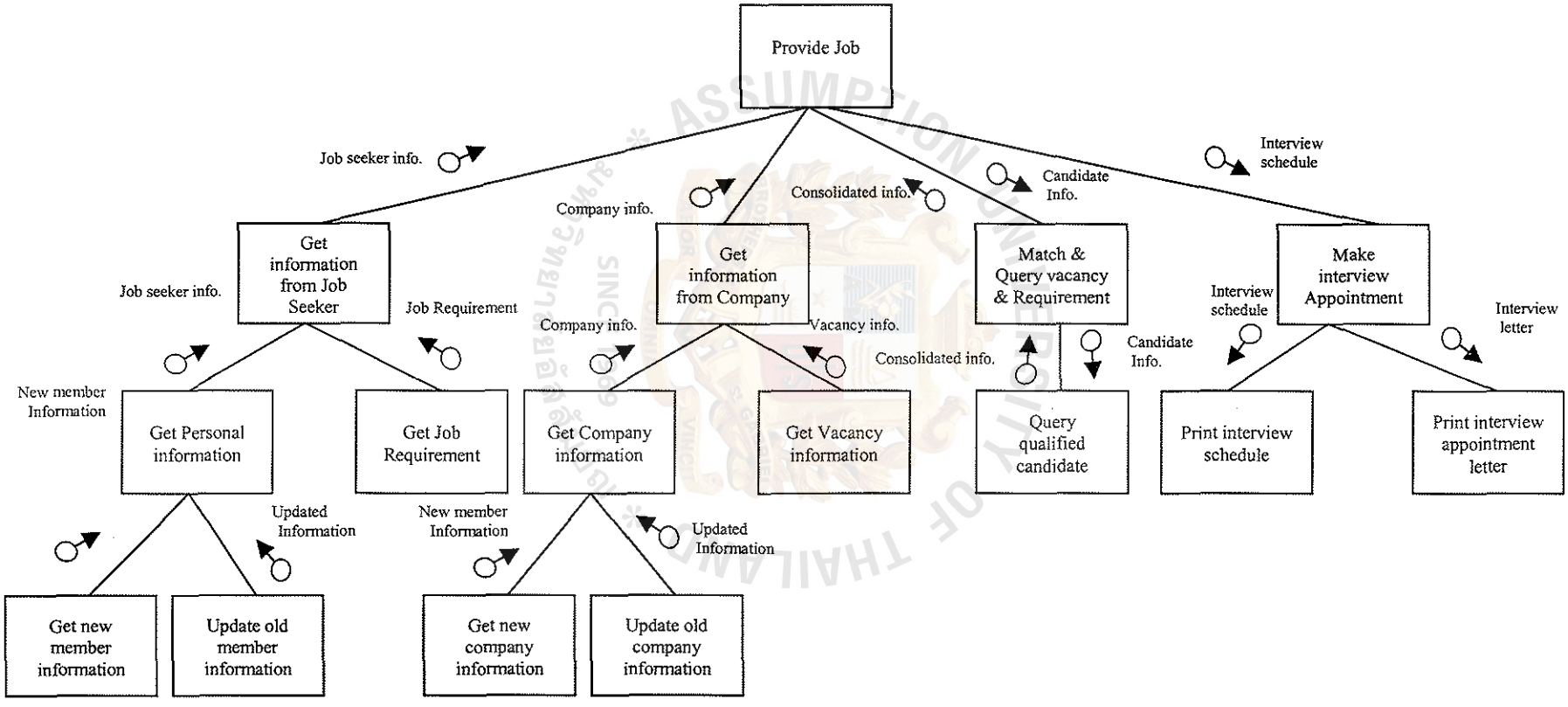

Figure D.1. Structure Chart for JB Recruitment Company.

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APPENDIX E

INTERFACE DESIGN

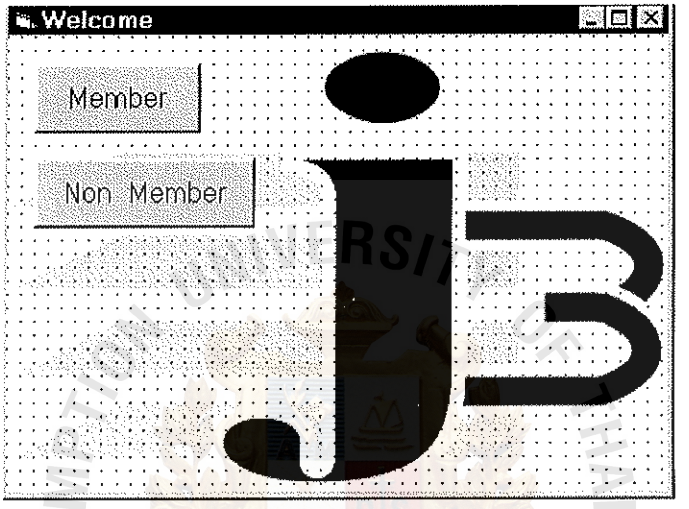

Figure E.1. Welcome Screen.

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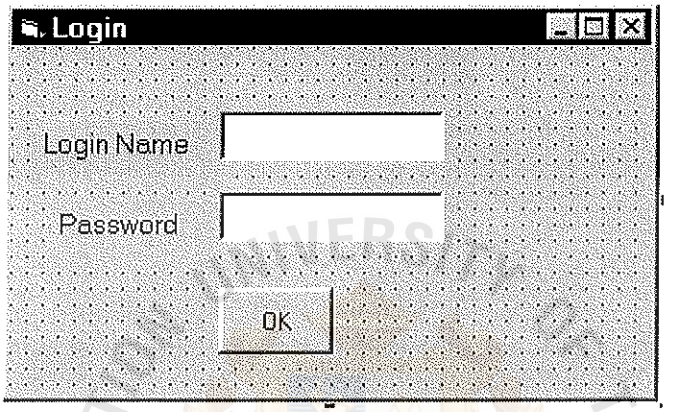

Figure E.2. Login Screen.

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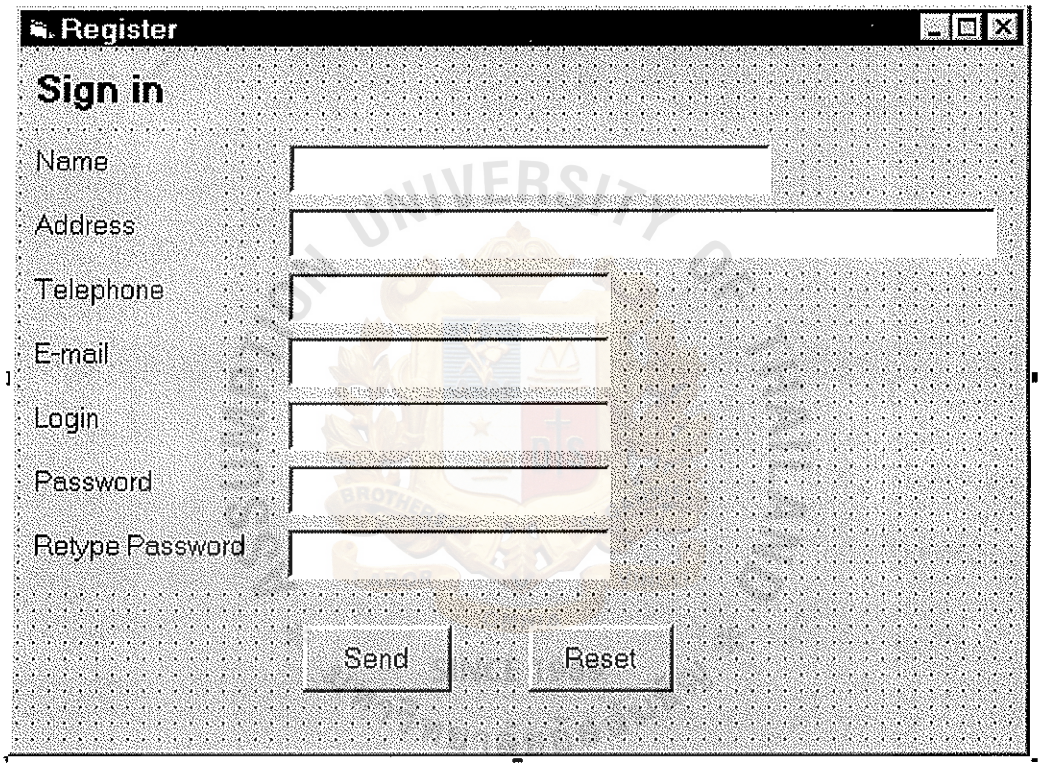

Figure E.3. Sing in Screen for Job Seeker.

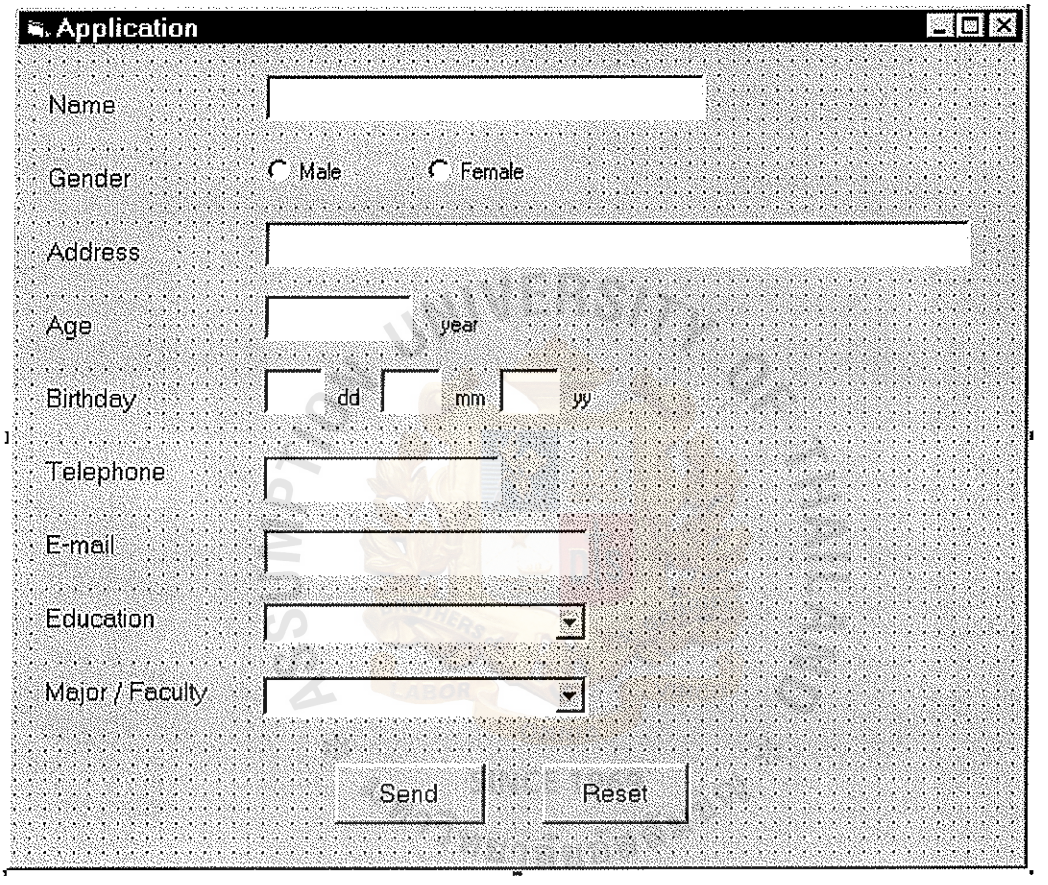

Figure E.4. Application Form for Job Seeker.

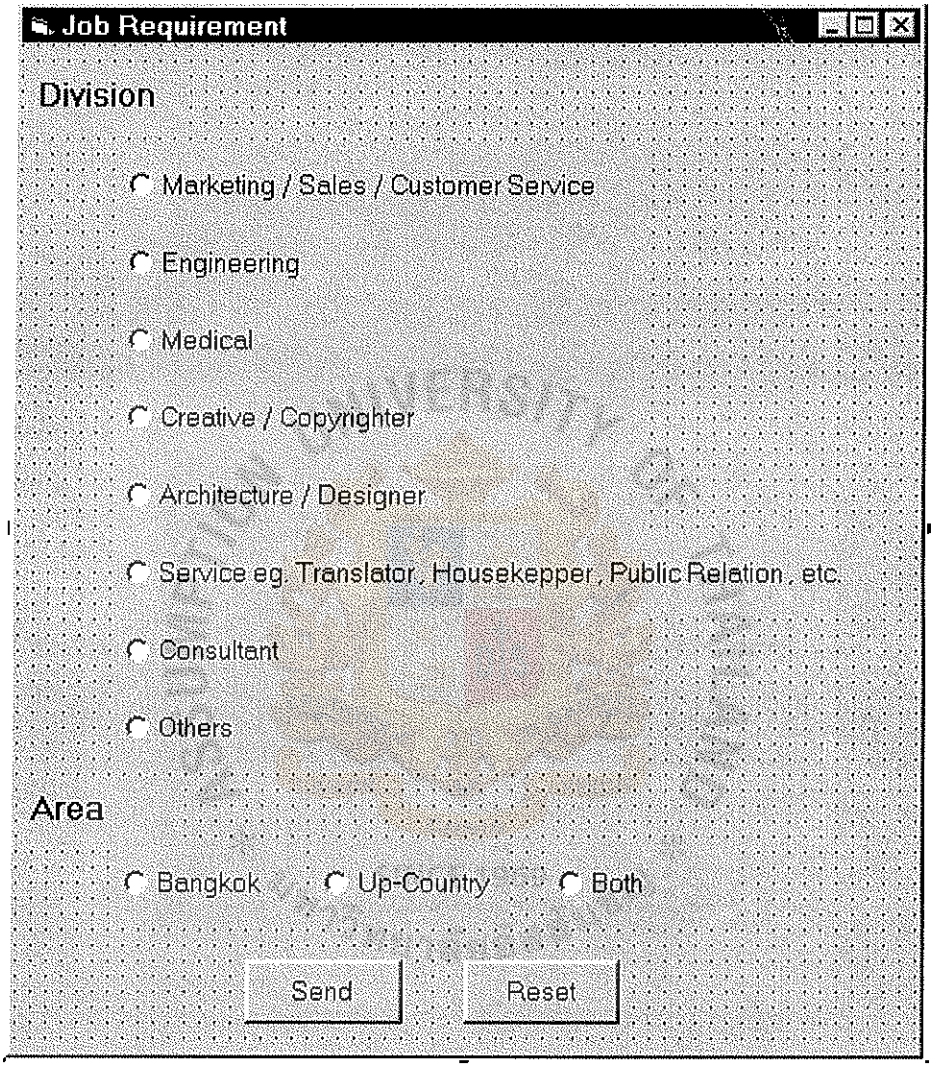

Figure E.5. Job Requirement Form Input Screen for Job Seeker.

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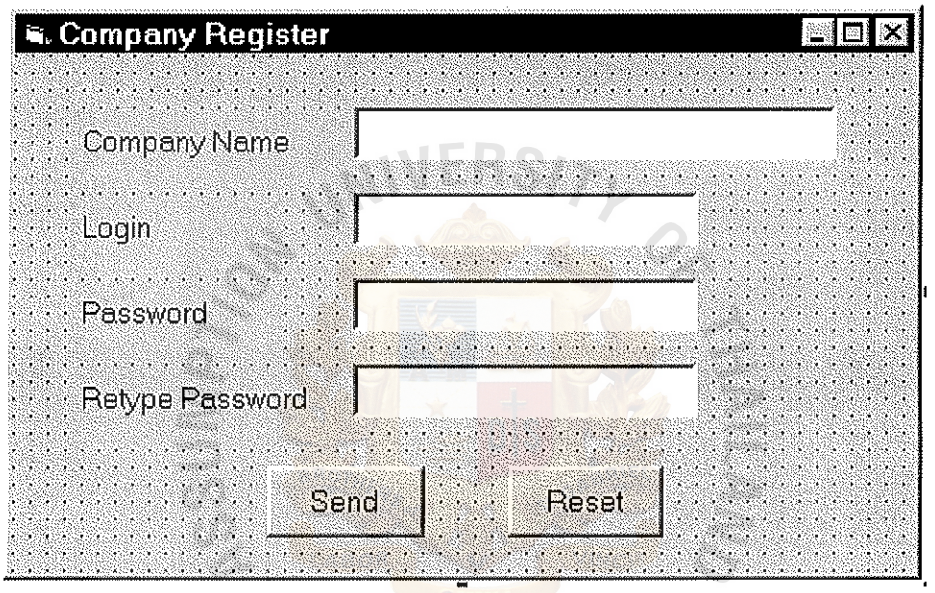

Figure E.6. Register Input Screen for Company.

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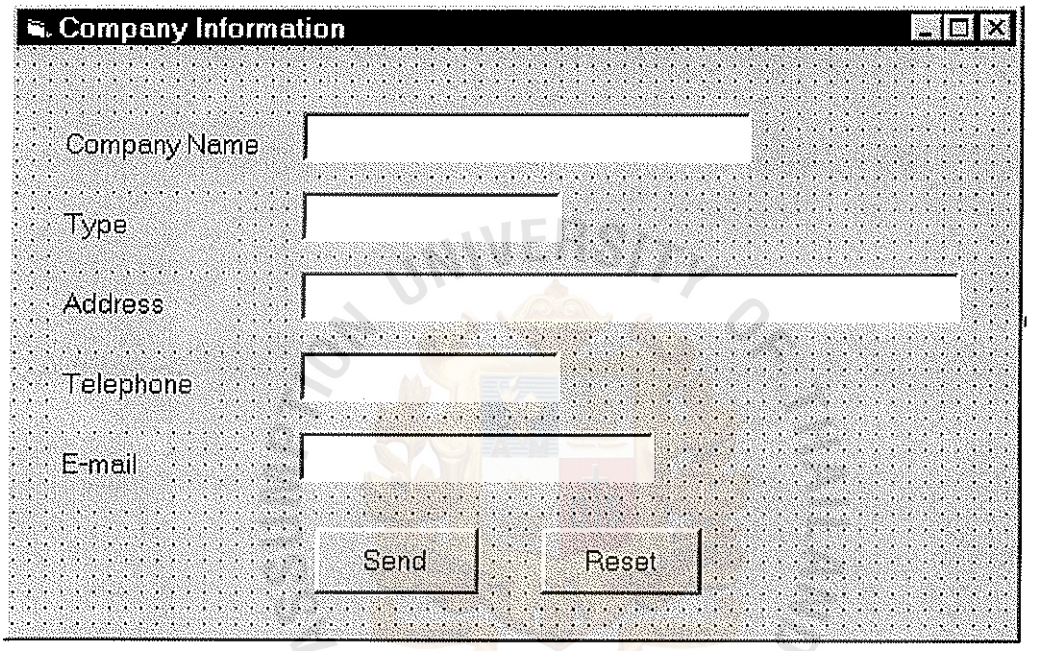

Figure E.7. Sign in Screen for Company.

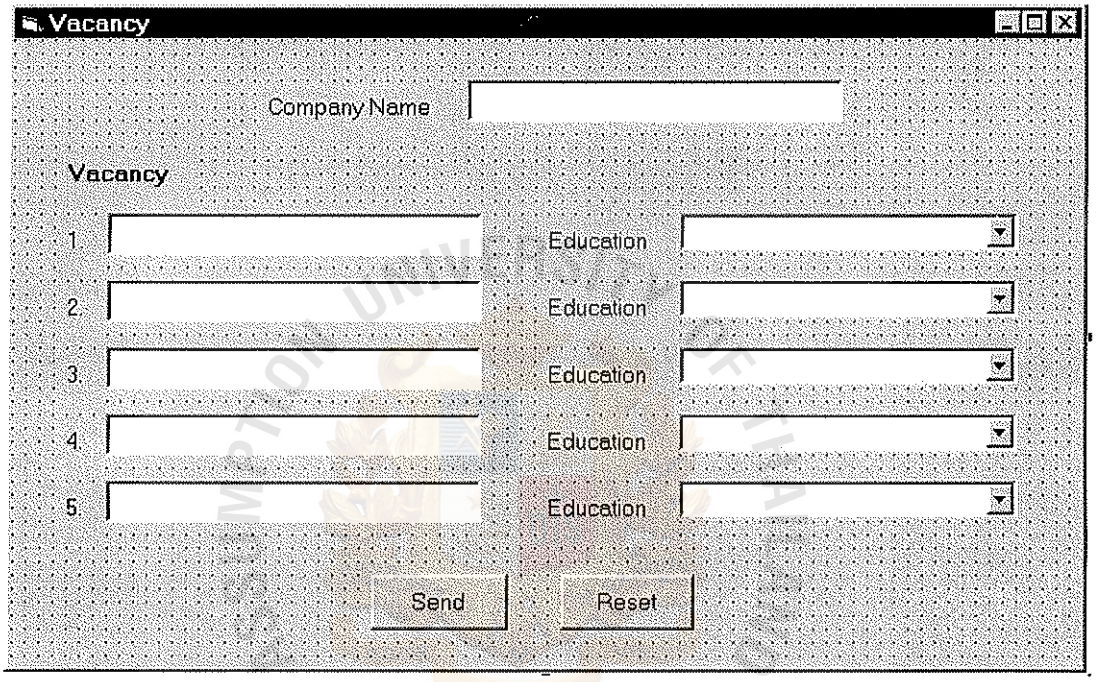

Figure E.8. Vacancy Information Input Screen for Company.

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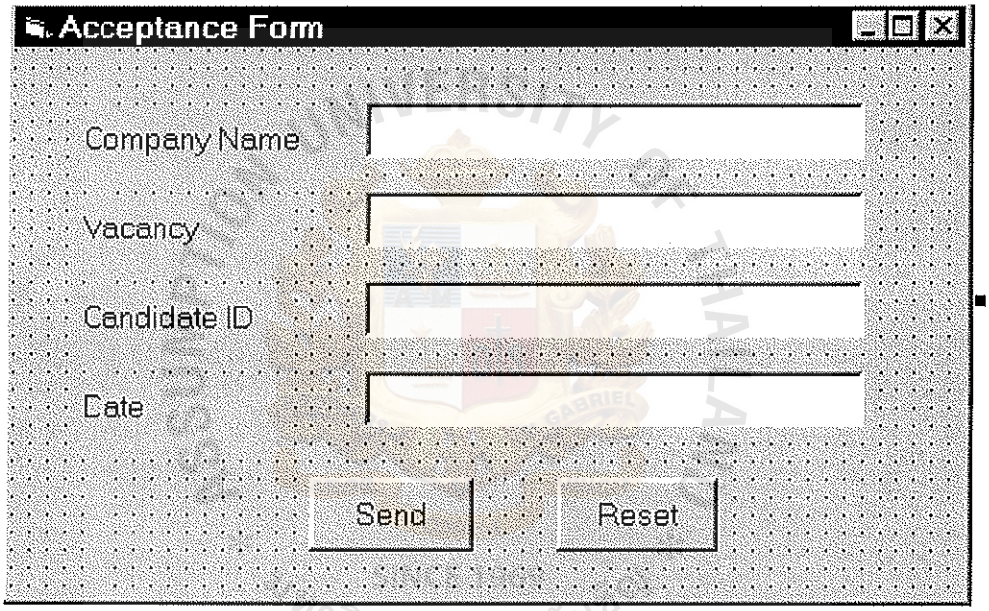

Figure E.9. Acceptance Form for Company.

APPENDIX F

PROCESS SPECIFICATION

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PROCESS SPECIFICATION

Table F.1. Process Specification of Process 1.1.1.

Items	Descriptions
Process Name:	Ask for login name and password
Data In:	Login name and password
Data Out:	Login name and password
Process:	Accept login name and password
Attachment:	Marketing Department

Table F.2. Process Specification of Process 1.1.2.

Items	Descriptions
Process Name:	Check validation
Data In:	Login name and password
Data Out:	Validation confirm
Process:	Check validation of login name and password
Attachment:	Marketing Department

Table F.3. Process Specification of Process 1.1.3.

Items	Descriptions
Process Name:	Retrieve Personal Information
Data In:	Validation confirm Personal Information
Data Out:	Personal Information
Process:	Show personal information of Job seekers who login to the system
Attachment:	Marketing Department Job Seeker file store D1

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Table F.4. Process Specification of Process 1.1.4.

Items	Descriptions
Process Name:	Update Personal Information
Data In:	Personal information
Data Out:	Update personal information
Process:	Update personal information whenever there is some change.
Attachment:	Marketing Department Job Seeker file store D1

Table F.5. Process Specification of Process 1.2.1.

Items	Descriptions
Process Name:	Retrieve Job Requirement
Data In:	Job Requirement Update Requisition
Data Out:	Job Requirement
Process:	Show Job Requirement to Job seeker
Attachment:	Marketing Department Job Requirement file store D2

Table F.6. Process Specification of Process 1.2.2.

Items	Descriptions
Process Name:	Update Job Requirement
Data In:	Job Requirement
Data Out:	Update Job Requirement
Process:	Update Job Requirement information whenever there is some change.
Attachment:	Marketing Department Job Requirement file store D2

Table F.7. Process Specification of Process 1.3.1.

Items	Descriptions
Process Name:	Register Process
Data In:	Personal information Login name Password
Data Out:	Validation confirm
Process:	Register non-member Job Seekers
Attachment:	Marketing Department

Table F.8. Process Specification of Process 1.3.2.

Items	Descriptions
Process Name:	Fill out Application Form
Data In:	Personal information
Data Out:	Personal information
Process:	Accept personal information from new Job Seekers.
Attachment:	Marketing Department Job Seeker file store D1

Table F.9. Process Specification of Process 1.3.3.

Items	Descriptions
Process Name:	Print resume
Data In:	Personal information
Data Out:	Personal information
Process:	Retrieve personal information from database and print out the resume
Attachment:	Job Seeker Job Seeker file store D1

Table F.10. Process Specification of Process 1.4.

Items	Descriptions
Process Name:	Fill out Job Requirement Form
Data In:	Job Requirement
Data Out:	Job Requirement
Process:	Accept Job Requirement from new Job seekers.
Attachment:	Marketing Department Job Requirement file store D2

Table F.11. Process Specification of Process 2.1.1.

Items	Descriptions
Process Name:	Ask for company login name and password
Data In:	Login name Password
Data Out:	Login name & Password
Process:	Accept login name and password
Attachment:	Marketing Department

Table F.12. Process Specification of Process 2.1.2.

Items	Descriptions
Process Name:	Check Validation for company
Data In:	Login name Password
Data Out:	Validation Confirm
Process:	Check validation of login name and password of company
Attachment:	Marketing Department

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Table F.13. Process Specification of Process 2.1.3.

Items	Descriptions
Process Name:	Retrieve company information
Data In:	Company information Validation confirm
Data Out:	Company information
Process:	Show company information
Attachment:	Marketing Department Company file store D3

Table F.14. Process Specification of Process 2.1.4.

Items	Descriptions
Process Name:	Update Company information
Data In:	Company information
Data Out:	Updated company information
Process:	Update company information whenever there is some change.
Attachment:	Marketing Department Company file store D3

Table F.15. Process Specification of Process 2.2.1.

Items	Descriptions
Process Name:	Retrieve Vacancy
Data In:	Update vacancy requisition
Data Out:	Vacancy information
Process:	Show vacancy information
Attachment:	Marketing Department Vacancy file store D4

Table F.16. Process Specification of Process 2.2.2.

Items	Descriptions
Process Name:	Update Vacancy
Data In:	New vacancy information
Data Out:	Updated vacancy information
Process:	Update vacancy information whenever there is some change.
Attachment:	Marketing Department Vacancy file store D4

Table F.17. Process Specification of Process 2.3.1.

Items	Descriptions
Process Name:	Company Register Process
Data In:	Company information Login name Password
Data Out:	Validation confirm
Process:	Accept application information, login name and password from the company.
Attachment:	Marketing Department

Table F.18. Process Specification of Process 2.3.2.

Items	Descriptions
Process Name:	Fill out company application form
Data In:	Company information
Data Out:	Company information
Process:	Accept company information
Attachment:	Marketing Department Company file store D3

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Table F.19. Process Specification of Process 2.4.

Items	Descriptions
Process Name:	Fill out vacancy
Data In:	Vacancy requisition
Data Out:	Vacancy information
Process:	Accept vacancy information from the company
Attachment:	Marketing Department Vacancy file store D4

Table F.20. Process Specification of Process 2.5.

Items	Descriptions
Process Name:	Fill out acceptance form
Data In:	Acceptance candidate information
Data Out:	Acceptance report
Process:	Accept the information of the company which agree to hire the qualified candidate
Attachment:	Accounting Department

Table F.21. Process Specification of Process 3.1.

Items	Descriptions
Process Name:	Consolidate information
Data In:	Job seeker information Job requirement information
Data Out:	Job seeker information & Job requirement information
Process:	Consolidate job seeker information and job requirement information
Attachment:	Job Seeker file store D1 Job Requirement file store D2

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Table F.22. Process Specification of Process 3.2.

Items	Descriptions
Process Name:	Search vacancy and Consolidated information process
Data In:	Job seeker information Job requirement information Vacancy information
Data Out:	Target requirement
Process:	Map the same job seeker information, job requirement information and vacancy information
Attachment:	Vacancy file store D4

Table F.23. Process Specification of Process 3.3.

Items	Descriptions
Process Name:	Query qualified candidates
Data In:	Target requirement
Data Out:	Qualified candidates
Process:	Query the qualified candidates who the job requirement and vacancy are the same
Attachment:	Qualified candidate file store D5 Process 4

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Table F.24. Process Specification of Process 4.1.

Items	Descriptions
Process Name:	Sort qualified candidate
Data In:	Qualified candidate
Data Out:	Qualified candidate list
Process:	Sort qualified candidate and put into table
Attachment:	Qualified candidate file store D5

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Table F.25. Process Specification of Process 4.2.

Items	Descriptions
Process Name:	List time table
Data In:	Time table from company
Data Out:	Time table list
Process:	Sort the available time of the company for interviewing
Attachment:	Employer

Table F.26. Process Specification of Process 4.3.

Items	Descriptions
Process Name:	Make interview time table
Data In:	Qualified candidate List time table
Data Out:	Interview time table
Process:	Map the qualified candidate to the available time in order to make appointment for interviewing
Attachment:	Marketing Department

Table F.27. Process Specification of Process 4.4.

Items	Descriptions
Process Name:	Print interview time table
Data In:	Interview time table
Data Out:	Interview time table
Process:	Print the interview time table into the hard copy form
Attachment:	Employer

Table F.28. Process Specification of Process 4.5.

Items	Descriptions
Process Name:	Issue interview appointment letter
Data In:	Interview time table
Data Out:	Interview appointment letter
Process:	Use the interview time table as a database and form the interview appointment letter
Attachment:	Marketing Department

Table F.29. Process Specification of Process 4.6.

Items	Descriptions
Process Name:	Print interview appointment letter
Data In:	Interview appointment letter
Data Out:	Interview appointment letter
Process:	Print interview appointment letter in the form of hard copy
Attachment:	Job Seeker

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APPENDIX G

DATA DICTIONARY

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DATA DICTIONARY

Table G.1. Data Dictionary of Job Seeker Entity.

Field Name	Meaning
Job Seeker ID	Identify the citizen ID of Job seeker
Name	Name of Job seeker
Address	Job seeker's address
Telephone	Job seeker's telephone number
E-mail address	Job seeker's email address
Gender	Gender of Job seeker
Age	Age of Job seeker
Birthdate	Date of birth of Job seeker
Education	The highest education of Job seeker
Div ID	Identify the division of work

Table G.2. Data Dictionary of Qualify Candidate Entity.

Field Name	Meaning
Candidate ID	Identify the number of qualified candidate
Job seeker ID	Identify the citizen ID of Job seeker
Div ID	Identify the division of work
Interview Date	Date of Interviewing
Company ID	Identify the number of company
Job No	Identify the number of job which is matched to the requirement of Job seeker

Table G.3. Data Dictionary of Acceptance Candidate Entity.

Field Name	Meaning
Acceptance ID	Identify the number of agreement of the acceptance candidate
Candidate ID	Identify the number of qualified candidate
Company ID	Identify the number of company
Job No	Identify the number of job
Acceptance Date	Day of acceptance the candidate
Salary	Start salary for the acceptance candidate

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Table G.4. Data Dictionary of Employer Entity.

Field Name	Meaning
Company ID	Identify the number of company
Job No	Identify the number of job
Company Name	Name of company
Company Address	Address of company
Company Telephone	Telephone number of company
Company Email	Email address of company

Table G.5. Data Dictionary of Vacancy Entity.

Field Name	Meaning
Job No	Identify the number of job
Job Name	Title of position
Div ID	Identify the division of work
Company ID	Identify the number of company

Table G.6. Data Dictionary of Job Requirement Entity.

Field Name	Meaning
Div ID	Identify the division of work
Div Name	Name of Division
Area Code	Identify working area
Area Name	Name of Area

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