PROJECT MANAGEMENT INFORMATION SYSTEM FOR EBT LIMITED

by

Mr. Suppachai Iawpakdeekul

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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Project Title   Project Management Information System for EBT Limited

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Academic Year   March 2000

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

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ABSTRACT

This project will cover a study, analysis, design and development of Project Management Information System (PMIS) for EBT Limited which covers all three main parts: managing time, money and man. The main objective is to be able to produce management reports in time required by top management for decision making.

At present, PMIS is done by manual system (no formal work flow) which causes many problems: task and data redundancy, high operating cost, time consuming in making report, unreliable and inaccurate information all of which need to be improved. The existing hardware system used is Local Area Network (LAN). The operating system is Window NT 4.0 which does not need to be improved. This system is managed by experienced teamwork which are trained to manage, control and maintain system. The operating cost of the existing system is 394,800 Baht per year.

The proposed system will change all process of work (re-engineering) by using computer system to produce necessary information in a systematic way. The proposed system will be run on the existing LAN, using Visual Basic 6.0 as software and managed by current people ware. The cost of proposed system is 375,560.00 Baht per year. By comparing both systems, the breakeven point is eleven months which is more economic to invest in the proposed system. The system analyst and operator will be joined together to test the proposed system with sample data on the existing hardware.

The result of testing and evaluation of proposed system shows that this system can produce the valuable report in time as top management requires (average five minutes per report). The proposed system will be the prototype for manual Product and Service Information System to be developed to be used to eliminate many manual problems.

ACKNOWLEDGEMENTS

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1.1 Background of the Project

The Management Information System (MIS) is the most important system that is needed in decision making among alternative courses of action. MIS is the system that provides people with either data or information relating to an organization's operations. MIS supports the activities of employees, owners, customers, and other key people in the organization's environment either by efficiently processing data to assist with the transaction work load or by effectively supplying information to authorized people in a timely manner. This project development focuses on Project Information System that is required in managing money, time and man for the various activities of the project. As a result of fast growing organization, the executives and management team need information for making decision, managing fund, managing man and managing time for various activities of the project. The old style of working (manually and nonsytematic) cannot work effectively and efficiently. In order to meet those objectives, those people must have the needed information in timely manner, thus the Management Information System is needed to be developed.

1.2 Objectives of the Project

The objectives of Project Management Information System for Elsag Bailey (Thailand) Ltd. are as follows:

(1)   to study the existing system and identify the problems of the existing system

(2)   to analyze the problems and determine the information requirement

(3)   to design the computer base information system

(4)   to speed up the process of working when people doing the same tasks

(5)   to provide the capacity to process a greater amount of activities

(6)   to provide the faster information retrieval

(7)   to be able to track the cost of labor, goods and to determine how much the actual cost is when compared with expectations

(8)   to use computing capability to process data at lower cost than existing manual system

(9)   to provide the greater accuracy and to improve accuracy and better security

(10) to provide the better and faster report to management for decision making

1.3   Scope of the Project

This part will cover most parts of the project management information system for Elsag Bailey (Thailand) Ltd. which can be categorized into:

(1)   Project Entry

(2)   Project Progress

(3)   Project Staff Assignment

(4)   Project Finance

(5)   Project Report

1.4   Project Plan

This project plan is represented in Gantt Chart as the following:

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Activities	October				November				December			
	1	2	3	4	1	2	3	4	1	2	3	4
System Analysis	██	██										
Problems definition and solution identification												
Develop Data Flow Diagram of existing system												
Identify the contents of the existing data stores												
Detail Analysis and Design			██	██	██	██	██	██				
Develop the Context Diagram												
Develop the Data Flow Diagram of the new system												
Develop E-R Diagram												
Map E-R Diagram to Table of Database												
Develop Functional Dependencies												
Create File Layout												
Identify the Data Dictionary												
Identify the Process Specification												
Design the Input Layout												
Design the Screen Layout												
Design the Report Layout												
Implementation									██	██	██	
Programming, Debugging, Testing												
Training												
Data Conversion												
Documentation												

Figure 1.1. Project Plan.

II. EXISTING SYSTEM

2.1 Background of the Organization

Elsag Bailey Process Automation is the world leader in supplying enterprise management systems from instrumentation and controls through to management information networks for the electric utility, pulp and paper, oil and gas, chemical and pharmaceutical, petrochemical, and water and waste industries, as well as other process industries. With sales and service offices and agents located around the world, Elsag Bailey needs the special requirements of our clients in a local context. With diverse engineering, application, and process experience to support the field, Bailey provides a comprehensive system integration service from the earliest engineering design stages through project management to the final testing, and commissioning of systems. Elsag Bailey (Thailand) Ltd. is a joint venture of Elsag Bailey and Loxley Public Co.,Ltd. Complimenting Elsag Bailey world leader position in process automation, Loxley is a premier trading and engineering Thai company which focuses on information technology, industries products as well as infrastructure projects.

Elsag Bailey (Thailand) currently employs 40 people comprising mainly of professional engineers. This staff brought with them extensive experience in engineering, testing and commission of many Bailey Distributed Control Systems installed in Thailand in the past few years. The combined experience contained within the company is in excess of 100 man-years. In addition to this local staff, the company also has 45 domestic business units around the world with access to more than 15,000 employees of other Elsag Bailey Process Automation units with specialization in various applications world-wide. Also available locally is many Loxley information technologists including software programmers, network engineers and telecom engineers.

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Elsag Bailey equipment has been installed in many locations throughout Thailand, ranging from small industrial plants to very large complete modern plants control such as Electricity Generating Authority of Thailand's Mae Moh Power Plants and National Petrochemical Public Co.,Ltd. at Olefin complex. In total, more than 50 modern Bailey control systems have been installed in Thailand in the past decade.

In 1980, Bailey introduced NETWORK 90, one of the world's first DCS. NETWORK 90 utilize modular components which are "distributed" at various points in the process being controlled. This highly flexible design has been a key element in the expansion of Bailey's business from its earlier focus on the electric utility industry to providing controls for numerous other process industries. The use of modular system components permits easy expansion or upgrading of a system through the addition of new or enhanced components. All of Bailey's technology has been developed since the introduction of NETWORK 90. It is compatible with the original NETWORK 90 architecture, and this "backward compatibility" is a cornerstone of Bailey's engineering philosophy. Throughout the 1980's, Bailey added many new features to the NETWORK 90 system while introducing numerous instrumentation devices utilizing "smart" digital instrument technology. In 1988, Bailey introduced the INFI 90 OPEN system which combines the enhanced capability of NETWORK 90 with the ability to integrate within the control system other business and automation and management information systems. Since 1988, Elsag Bailey has continued to improve its INFI 90 OPEN system to meet the needs of its customers. INFI 90 OPEN enhancement includes faster communications, superior operator information presentation, broader system control capable of increasingly complex applications, higher system reliability and availability and higher level advanced control schemes and diagnostics. INFI 90 OPEN is the heart of Bailey's Strategic Enterprise Management system. It provides a platform for enterprise

automation that combines a tradition of forward and backward compatibility with new capability for critical Open Systems Interface, including:

(1)   Power client/server computing capabilities

(2)   Global database management with single tag data entry

(3)   Open System Manager communications interface supporting standard Ethernet-based protocol such as TCP/IP

(4)   Powerful Application Programming Interface (API) for simplified integration of external applications

(5)   Asynchronous Transfer Mode (ATM) telecommunications capability for enterprise-wide connectivity.

Elsag Bailey (Thailand) Ltd. is set up solely to serve process control customers. We provide services from the early conceptual stages of a project to see that all aspects of the control system are well managed. Bailey's Project Managers offer a common, knowledgeable interface to all of Bailey's services. The Project Manager of Bailey staff provides the background support that makes an engineering job a success. This includes material management and expediting, CAD drawings, project scheduling, and so on. Engineering work is undertaken by a staff specially trained to work Bailey products. This ensures that the Project Manager is able to provide a system which needs the constraints of our clients' projects. Factory test facilities throughly test systems before they are shipped to customers. Bailey's stringent in-house quality control policy ensures that our customers receive reliable products. Elsag Bailey (Thailand) Ltd. services include:- project management/planning- systems engineering- detailed engineering- system configuration- commissioning- training- maintenance services and on-going support.
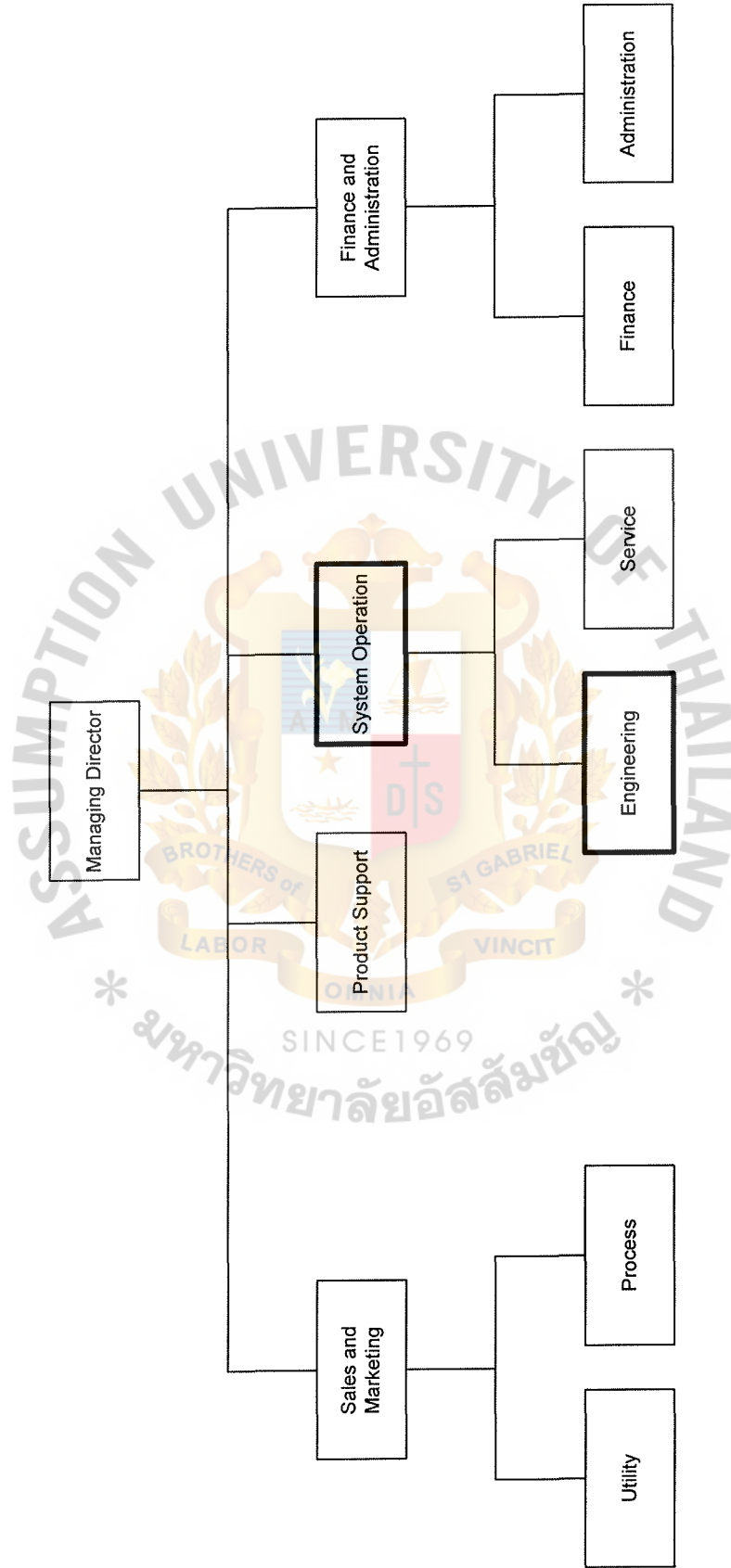
Figure 2.1.   Organization Chart.

2.2 Existing Functions

At present, all information system works informally, manually system. When the management team wants to know information about project, they will ask the person who is responsible for that task and they will reply the management team in wording. If the management team wants the information in more formal form, that person will go back and take some period of time to collect data and make the report in informal format. This report usually is not made in standard format and that makes the person who reads them confused, thus they find it difficult to understand and analyze them for decision making.

2.3 Current Problems and Areas of Improvement

The problems of the existing system can be summarized as following:

(1) All information system is done manually which causes the delay of working and decision making

(2) The required report cannot be produced in time whenever management team require

(3) There is no standard format of report which makes information useless

(4) There is no filing system which causes difficulty in finding the needed information later

(5) The information is usually not accurate or up-to-date enough to be used in decision making

(6) It takes more time and cost to gather information to make report

(7) The confidential information is not secured

2.4 Existing Computer System

2.4.1 Hardware Specification

The existing computer system of Elsag Bailey (Thailand) Limited is Local Area Network (LAN) comprised of the following hardware:

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(1) 1 x HP NetServer LC3

(2) 1 x IBM PC Server 320

(3) 3 x 3COM hub

(4) 1 x Cisco 2500 router

(5) 37 x IBM PC 340

(6) 10 x Notebooks

(7) 2 x HP4v Laser Printer

(8) 1 x HP1600 Color Printer

(9) 5 x HP6p Laser Printer

The hardware configuration will be shown in Figure 2.2

2.4.2 Software Specification

The existing servers' operating system is Window NT 4. There also is a lot of application software i.e. Microsoft Office 95, Microsoft Visual Basic 6.0, Microsoft FoxPro 6.0, Microsoft Visual C++ 6.0, and so on. For the client' operating system is Window 95.

2.4.3 People ware

More than half of the staffs of Elsag Bailey (Thailand) Limited is Engineer, Programmer and Technician who has more experience and has been trained in managing, controlling, maintaining, programming the existing hardware and software.
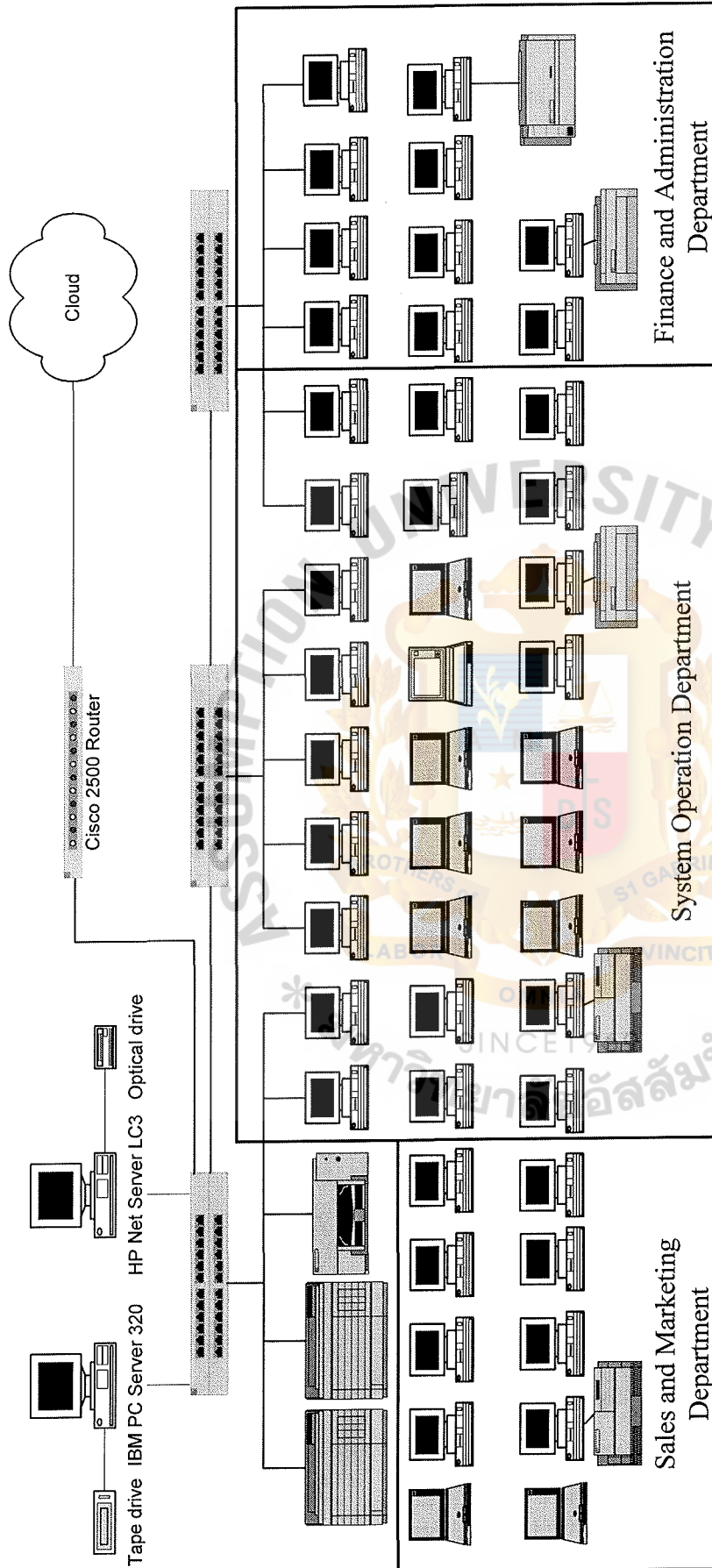
Figure 2.2. Hardware Configuration.

Note: The Project Management Information System will be installed on IBMPC Server 320

III. PROPOSED SYSTEM

3.1 System Specification

The system specification that user requires is the system which has the characteristic as follows:

(1) The system that is able to assist management to manage and monitor the various project.

(2) The system that users are able to access required information easily.

(3) The system that users are able to retrieve required information faster.

(4) The system that users are able to generate the understandable report.

(5) The system that is easy to manage and control.

(6) The system that is easy to use.

(7) The system that is more powerful and more reliable than manual system.

3.2 Proposed Function

3.2.1 Context Diagram and Data flow Diagram

Context Diagram is the top-level diagram that contains a single process, but it plays a very important role in studying the management information system. It determines the boundaries of the system. It means that anything that is not inside the process identified in the context diagram will not be part of the system.

Data flow Diagram (DFD) shows the flow of data into the system and between processes and data stores. In preparing the model, we emphasize what occurs, not how it is accomplished. Thus, the focus is on logical, rather than physical aspects of the system.

The Context Diagram and Data flow Diagram will be shown in appendix A. which comprise of:

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(1)   Create new project process

(2)   Assign task process

(3)   Record progress task

(4)   Record financial information process

(5)   Produce management report process

(6)   Add new customer process

(7)   Add new staff process

(8)   Add new supplier process

(9)   Add new contractor process

(10) Add new contract process

3.2.2 Proposed Database

The proposed database system is designed by using the Entity-Relationship Diagram. It is a graphical modeling tool for showing relationships which is a popular high-level conceptual data model. This model and its variations are frequently used for the conceptual design of database applications and many database design tools employ its concepts.

(1)   Entity relationship diagram (ER diagram)

ER diagram is a high-level conceptual data model which is the group of concepts that help us specify the structure of a database and a set of associated operations for specifying retrievals and updates on the database.

The ER diagram will be shown in Appendix B.

(2)   Mapped and normalization tables

Mapped Tables are the process of mapping from the Entity Relationship Diagram (E-R) to tables of database (relation).

The Mapping Table will be shown in Appendix C.

Normalization is a process developed in conjunction with the relational data model. It is based on concepts of dependencies among attributes and it enforces a set of rules governing the structure of data meanings.

Normalization Table will be shown in Appendix C. All tables are in the fifth normal form. They pass all five normal forms after they are mapped from the Entity Relationship Diagram.

(3) Function Dependencies

The function dependencies denoted by X$\rightarrow$Y, between two sets of attributes X and Y that are subsets of R specifies a constraint on the possible tuples that can form a relation instance r of R.

The function dependencies will be shown in Appendix D.

(4) Table Properties

Table Properties will show the format of each table or file.

The Table Properties will be shown in Appendix E.

3.2.3 Data Dictionary

The data dictionary stores descriptions of data items and structures, as well as, system processes. It intended to be used by analysts, who retrieve the details and descriptions it stores, and during system design, when information as data length, alternate names and data use in specific processes must be available. The data dictionary also stores validation information to guide the analysts in specifying controls for the system's acceptance of data.

Dictionary systems are important for five reasons:

(1) to manage the detail in large system

(2) to communicate a common meaning for all system elements

(3) to document the feature of the system

(4) to facilitate analysis of the details in order to evaluate characteristics and determine where system changes should be made

(5) to locate errors and omissions in the system.

Data Dictionary will be shown in Appendix F.

3.2.4 Process Specification

The process specification are created for primitive processes on a data flow diagrams as well as for some higher-level processes that explode to a child diagram. These specifications explain the decision making logic and formulas that will transform process input data into output. Each derived element must have process logic to show how it is placed from the base elements or other previously created derived elements that are input to the primitive process.

The three goals of producing process specifications are:

(1) to reduce the ambiguity of the process. This compels the analyst to learn details about how the process works.

(2) to obtain a precise description of what is accomplished, which is usually included in a packet of specifications for the programmer.

(3) to validate the system design. This includes ensuring that a process has all the input data flow necessary for producing the output.

The Process Specification will be shown in Appendix G.

3.2.5 Source Document

The source document is the form on which data are initially captured.

The Source Document will be shown in Appendix H.

3.2.6 User Interface Design

The User Interface is the common boundary between the user and the computer

system application: the point where the computer and the individual interact. The user interface may cause the frequency of mistakes and errors when the user of the system enters data or instructions.

The purpose of the Interface:

(1) tell the system what action to take

(2) facilitate use of the system

(3) avoid user errors.

The User Interface Design will be shown in Appendix I.

3.2.7 Output Reports

The Output is applied to any information produced by an information system, whether printed or displayed. When we design computer output, we

(1) identify the specific output that is needed to meet the information requirements

(2) select methods for presenting information

(3) create document, report, or other formats that contain information produced by the system.

The reports which can be produced by this system are listed below:

(1) Project Background Report

(2) Project Master List Report

(3) Project Performance List Report

(4) Project Summary Report

(5) Task Plan Report

(6) Task Progress Report

(7) Unstarted Tasks Report

(8) Task in Progress Report

(9)   Completed Task Report

(10) Detailed Task Report

(11) Who Does What Report

(12) Who Does What When Report

(13) Estimated Project Revenue Report

(14) Estimated Project Cost Report

(15) Detailed Expenditure List

(16) Budget Report

(17) Cash Flow Report

(18) Customer List Report

(19) Customer Contact List Report

(20) Contractor List Report

(21) Contractor Contact List Report

(22) Supplier List Report

(23) Supplier Contact List Report

(24) Supplier Work List Report

(25) Supplier Detail Work Report

(26) Contractor Work List Report

(27) Contractor Detailed Work Report

(28) Employee List Report

Some important output reports that are listed above are shown in Appendix J.

3.3   Hardware, Software and People ware Specification

3.3.1 Hardware Specification

The project management information system will be installed to operate with the

existing local area network of Elsag Bailey (Thailand) Limited which is suitable for

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PMIS and it is not necessary to invest in order to change or to upgrade the existing hardware.

The Hardware configuration is shown in Figure 2.2.

3.3.2 System Software Specification

The followings are the software requirement of Project Management Information System that is available on existing platform:

(1) Microsoft window NT or Microsoft window 98

(2) Microsoft Visual Basic 6.0

3.3.3 People ware

The proposed Project Management Information System (PMIS) will be operated by the current people ware of Elsag Bailey (Thailand) Limited who has been trained and experienced in managing, controlling, maintaining the hardware and software.

3.4 Security and Control

Security refers to the protection of computer-based resources such as hardware, software, data, procedures and people against alteration, destruction, or unauthorized use.

The major types of management information system security problems are:

(1) Human Carelessness

    (a) keying or inputting error

    (b) computer operator error

    (c) program damaged during development or use

    (d) misplaced file or volume

    (e) physical damage of I/O media

(2) Computer Crime

    (a) system sabotage

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(b) espionage

(c) sensitive data changed in an unauthorized way

(d) program or data copied and used for unauthorized purposes

(3) Natural or Political Disasters

(a) earthquakes, fire, flood or wind damage

(b) rioting or war

(4) Hardware and Software Failures

(a) equipment malfunctions

(b) power outages

(c) damage caused by undetected virus

(d) data damaged by hardware or software failures

(e) undetected data transmission errors

The way to make the quality of security is to high focus on:

(1) Physical Security

Physical security refers to securing the computer facility, its equipment, and software through physical means. These can include controlling access to the computer room via machine-readable badges or human sign-in/sign-out, using closed circuit television cameras to monitor computer areas and back up data frequently and storing backups in a fireproof, waterproof area.

(2) Logical Security

Logical security refers to logical controls within software itself. The logical controls familiar to most users are passwords.

(3) Behavioral Security

The behavior that organization members internalize is also critical to

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the success of security efforts. Security can begin with screening employees who will eventually have access to computers, data and information in order to ensure that their interests are consistent with the organization's interest and that they fully understand the importance of carrying through in security procedures. Policies regarding security must be written, distributed and updated so that employees are fully aware of expectations and responsibilities.

3.5 Cost and Benefit Analysis

3.5.1 Costs

To consider the financial aspects of the new system that is to be implemented, cost comparison should be made between the existing system and the new system.

There are three main categories of the system cost:

(1) Annual operation cost: these are the recurring costs which operate the system on a monthly or yearly basis depending on the nature of the business. It means the cost of software and hardware maintenance and consumable is taken in consideration. The annual operation costs of manual and new systems are shown in Table 3.1 and Table 3.2 respectively.

(2) Investment cost: these are non-recurring capital outlays to develop or acquire new equipment's and technology i.e. new hardware and software and other items which necessitate overall cost of the proposed system. The investment cost for proposed system is shown in Table 3.2.

(3) Implementation cost: these are basically the cost incurred to install the proposed system and are one-time cost outlays. So it includes the cost of development of system and then the implementation cost of new system. The implementation cost of proposed system is shown in Table 3.2.

Table 3.1.   Annual Operation Cost for Manual System.

Cost Items	Amount (Baht)
Operator (2 men x baht 12,000 per month)	288,000.00
Consumable cost	64,800.00
Office Equipment cost	18,000.00
Utility cost	24,000.00
Total cost	394,800.00

Table 3.2.   Cost of Proposed System.

Cost Items	Amount (Baht)
Operation Cost	
Operator (1 man x baht 12,000 per month)	144,000.00
Consumable cost (reduced by 30%)	45,360.00
Maintenance cost	12,000.00
Utility cost (increased by 30%)	31,200.00
Training cost	12,000.00
Investment Cost	
Hardware Cost	21,000.00
Software Cost	10,000.00
System Development & Implementation Cost	100,000.00
Total cost	375,560.00

3.5.2 Benefit

(1)   Tangible benefits

The proposed system will reduce the operating cost by eliminating the number of staff and manual operation by 150,240 (394,800 – 244,560) Baht/year.

(2)   Intangible benefits

Since this new system is developed to assist management team in management and monitoring the project of the organization, the major benefits of this system are intangible benefits. The intangible benefits will be followed:

(a)   Capacity

Greater Processing Speed – using the computer's inherent ability to calculate, sort and retrieve data and information with greater speed than that of people doing the same tasks is desired

Increase Volume – providing the capacity to process amount of activity

Faster Information Retrieval – locating and retrieving from storage. Conducting complex searches.

(b)   Control

Greater Accuracy and Improved Consistency – carrying out computing steps, including arithmetic, correctly and in the same way each time

Better Security – safeguarding sensitive and important data in a form that is accessible only to authorized personnel.

(c)   Communication

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Enhanced Communication – speeding the flow of information and message between remote locations as well as within offices, including the transmission of documents within offices.

Integration of Business Areas – coordinating business activities taking place in separated areas of organization, through capture and distribution of information.

(d)   Reduce volume of paper to handle

(e)   Save time, cost and eliminate the redundant operation

(f)   Provide information to support management team decision making with effective and efficient information

(g)   Keeping information more systematically

(h)   Better management of the organization's work

3.5.3 Cost Comparison

There are many will-known techniques to compare the costs of the proposed and existing system. They include break-even analysis, pay back period and so on. All the techniques provide straightforward ways to yielding information to decision makers about the worthiness of the proposed system.

(1)   Payback Period

Payback Period is determined to get the number of years required to accumulate earning sufficient to cover the cost of the proposed system.

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

where   P   = Payback period (year)

I   = Investment cost or Capital Expenditure

T   = Tax rate (30%)

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R = Annual saving realized by investment

$$P = \frac{131,000.00}{(1-0.30)150,240}$$

P = 1.25 years

(2) Cost Comparison Table

Cost Comparison Table will compare the cumulative cost of the proposed system and the cumulative cost of the manual system which will be shown in Table 3.3 and 3.4.

(3) Breakeven Point

Breakeven point of PMIS and Manual System is the intersection between the cost of the proposed and existing manual system. At that intersection, it shows the number of years that cost of the proposed system is equal to cost of the existing manual system. Beyond that intersection, the proposed system will be more economical than the existing manual system.

Breakeven Point for the manual and proposed system is about eleven months. This shows that beyond eleven months, the proposed system will be more economical than the manual system.

The data which we need to make the breakeven point graph in Figure 3.1 will be taken from Tables 3.3 and 3.4.

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Table 3.3. Cost Comparison Table, in Baht.

Cost items	1st Month		2nd Month		3rd Month		4th Month		5th Month		6th Month	
	Proposed	Manual	Proposed	Manual	Proposed	Manual	Proposed	Manual	Proposed	Manual	Proposed	Manual
Operation Cost												
Operator Salary	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00
Consumabel cost	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00
Utility cost	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00
Maintenance cost	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00
Depreciation of Office Equipment	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00
Depreciation of Hardware	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00
Depreciation of Software	833.33	0.00	833.33	0.00	833.33	0.00	833.33	0.00	833.33	0.00	833.33	0.00
Development & Implementation Cost												
Development cost	100,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Training cost	12,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cost	133,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00
Cumulative Cost	133,963.33	32,900.00	155,926.67	65,800.00	177,890.00	98,700.00	199,853.33	131,600.00	221,816.67	164,500.00	243,780.00	197,400.00

Table 3.4. Cost Comparison Table, in Baht (continued).

Cost items	7th Month		8th Month		9th Month		10th Month		11th Month		12th Month	
	Proposed	Manual	Proposed	Manual	Proposed	Manual	Proposed	Manual	Proposed	Manual	Proposed	Manual
Operation Cost												
Operator Salary	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00	12,000.00	24,000.00
Consumable cost	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00	3,780.00	5,400.00
Utility cost	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00	2,600.00	2,000.00
Maintenance cost	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00	1,000.00	0.00
Depreciation of office equipment	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00	0.00	1,500.00
Depreciaiton of Hardware	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00	1,750.00	0.00
Depreciaiton of Software	833.33	0.00	833.33	0.00	833.33	0.00	833.33	0.00	833.33	0.00	833.33	0.00
Development & Implementaion cost												
Development cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Training cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Cost	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00	21,963.33	32,900.00
Cumulative Cost	265,743.33	230,300.00	287,706.67	263,200.00	309,670.00	296,100.00	331,633.33	329,000.00	353,596.67	361,900.00	375,560.00	394,800.00

24
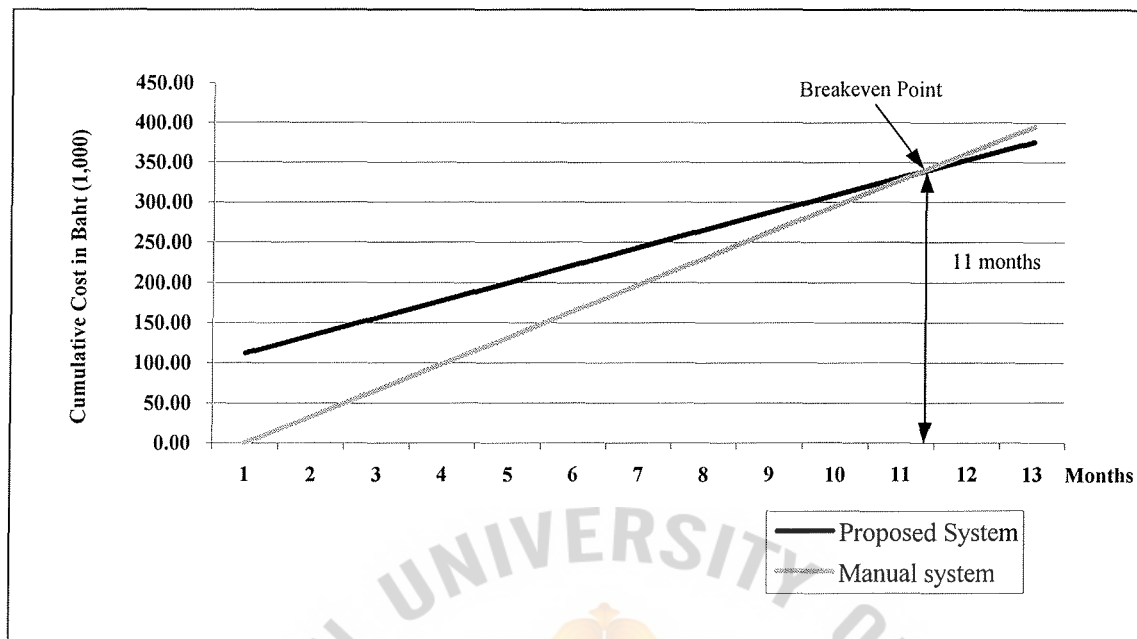
Figure 3.1.   Breakeven Point.

(4)   Performance Comparison

We will compare the performance of the proposed and manual system by comparing the time required to make the reports between the proposed and manual system. For the manual system, the time required of making reports are gathered by interviewing the person who makes the reports. For the proposed computerized system, the report can be produced in time whenever the decision maker wants it. Performance Comparison will be shown in Table 3.5.

Table 3.5. Performance Comparison.

Report Name	Estimated Time Needed to Prepare Report	
	Manual	Proposed
Project Background Report	10 min.-30 min.	5 min.
Project Master List Report	30 min.- 3 hr.	5 min.
Project Performance Report	30 min. - 2 weeks	5 min.
Task Plan Report	30 min. - 3 hr.	5 min.
Task Plan List Report	10 min.-30 min.	5 min.
Task Progress Report	10 min.-30 min.	5 min.
Unstarted Task Report	30 min. - 4 hr.	5 min.
Task in Progress Report	10 min.-30 min.	5 min.
Completed Task Report	10 min.-30 min.	5 min.
Detailed Task Report	10 min.-30 min.	5 min.
Who Does What Report	10 min.-30 min.	5 min.
Who Does What When Report	10 min.-30 min.	5 min.
Estimated Project Revenue Report	30 min.- 3 hr.	5 min.
Estimated Project Expense Report	30 min. - 1 week	5 min.
Expenditure List Report	31 min. - 1 week	5 min.
Budget Report	30 min. - 3 hr.	5 min.
Cash Flow Report	30 min. - 1 week	5 min.
Customer List Report	10 min.-30 min.	5 min.
Customer Contact List Report	10 min.-30 min.	5 min.
Contractor List Report	10 min.-30 min.	5 min.
Contractor Contact List Report	10 min.-30 min.	5 min.
Supplier List Report	10 min.-30 min.	5 min.
Supplier Contact List Report	10 min.-30 min.	5 min.
Supplier Work List Report	30 min. - 3 hr.	5 min.
Supplier Detailed Work Report	30 min. - 3 hr.	5 min.
Contractor Work List Report	30 min. - 3 hr.	5 min.
Contractor Detailed Work Report	30 min. - 3 hr.	5 min.
Staff List Report	10 min.-30 min.	5 min.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

The project implementation consists of the following activities:

4.1.1 Scheduling

To ensure that the system will work by a certain date, we must prepare an implementation timetable. Such timetable shows when certain activities related to implementation must start and finish. There are three scheduling tools that can be used to establish an implementation timetable. Those are critical path methods (CPM), Project evaluation and review technique (PERT) and Gantt Charts. These tools are flexible enough to be used in a wide range of scheduling application.

In this project, we focus on Gantt Charts which are project modeling tools that use a bar chart representing of projects task. The reason that we focus on the Gantt Charts is because they are conceptually much easier to construct and to understand than CPM and PERT.

The Gantt Charts is shown in Figure 1.1.

4.1.2 Programming Coding, Debugging and Testing

Coding is the process of writing instructions that can be run on computer hardware. In this project, we will use Microsoft Visual Basic 6.0 to code the program. Debugging refers to the process of ridding a program of errors called bugs. Program Bugs can be classified into three groups:

(1) A syntax error violates the grammatical rules of a programming language.

(2) Run time error is an error that causes the program to terminate abnormally.

(3) Logic error which does not cause the program to halt but instead lets it continue to produce wrong results.

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Microsoft Visual Basic will automatically alert the syntax error and run time error and warn us to correct this error. But logic error can be uncovered when we test the program that we will discuss next paragraph.

Program Testing is the process used to certify that a program is free of errors. Program testing consists of running a new or modified program which appears to be working correctly, with sample data. In this project the sample data will be used to test the program and this data should be comprehensive enough so that they cover all the conditions the program will encounter in its foreseeable future. In order to make the Project Management Information System Software more reliable, we need to pass the several stages of software testing approach as follows:

(1) Module Testing is the process of testing the individual modules that make up the whole program.

(2) Program Testing is the process after all the individual modules are tested and assessed as working properly. This often ensures that the interfaces between modules work as they should and that these individual modules do not have an adverse effect on one another.

(3) System Testing ensures that all the programs that make up the new system work together. User interfaces, the system's security features, the ability to deal with abnormal processing volumes, and the ability to recover from software failure are tested.

(4) Acceptance Testing evaluates the extent to which the new system meets user requirement under normal operating conditions, this is often the last chance to test and re-think the program before the software is converted from development to operations.

4.1.3 Training

There are two main categories of end-user training approaches:

(1)   Instructor-led method

(2)   Self-Study methods

In this project, the instructor-led method will be used to train the users. This method is the most effective approach because trainees can learn faster and more effectively when they interact with a good instructor. Demonstration will be used with lecture in order to show how the new software works.

4.1.4 Conversion

Conversion is the process of switching from one system to another. At the point of conversion, users should be trained in their new duties, application software for the new system should be available and ready to use. There are four methods for conversion:

(1)   Direct Conversion, the system that is currently being used is replaced, all at once, by new system. This is equivalent to turning the old system off and turning the new system on.

(2)   Parallel Conversion, both the old and the replacement system run together for a period of time. If the new system fails, the old one is available for backup.

(3)   Phased Conversion, the new system is phased in slowly, piece by piece. After one part of the system works well, the next piece is made operational.

(4)   Pilot study conversion is when a new system is tried in a specific area of the organization. If successful there, it is brought into other areas.

In this project, the direct conversion is selected to be the conversion method because the old system is the manual, it is better to turn to the new system at once.

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This conversion will also force users to make the new system work which there are immediate benefits from new method and controls.

4.2   Post Implementation Review

Post Implementation Review is a follow-up evaluation of a system that was implemented. There are three popular methods that will be used as follows:

(1)   Formal Impact Study is a special investigation to evaluate the system and to determine if it is working as expected. This study generally takes place after the system is fully installed and staffs have had enough experience with it to provide useful feedback.

(2)   Regular Audit assures management that the system is processing data efficiently, thus meeting the needs of users and management.

(3)   Performance monitors are software packages that measure how efficiently resources are being used by a computer system. They also show the operations staff what the system is doing at all times. Monitors enable operation personnel to pinpoint critical performance weaknesses early so that these weakness can be corrected before they have a chance to materially degrade system throughput.

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V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In order to develop the Project Management Information System, we follow the System Development Life Cycle (SDLC) which consists of the following activities:

(1) Preliminary investigation

(2) Determination of system requirements

(3) Design of system

(4) Development of software

(5) System testing

(6) Implementation and evaluation

From the current situation of Elsag Bailey (Thailand) Limited, we found that the processing of Project Management Information System is delayed and ineffective because of the weakness of manual system. The filing is also weak, documents are mixed up and is difficult to find as a result from the huge amount of data. The redundancy tasks also occur. All of the above cause high operation cost and are time consuming. The reports generated by this system are not accurate and updated to support the decision making of management team as they want.

After interviewing the staff involving in this manual system, the requirement of the new system (computerized system) is stated. The staff want the system that have more systematic filing system and generating the effective report for management team to make decision making. Then, the Computerized Project Management Information System is developed as described in this paper. With the new system, the data are kept in computerized filing systems which are able to access and retrieve easily and faster. The reliable, up-to-date, and accurate reports are also generated when management

team require.

This system will be installed in existing Local Area Network (as shown in hardware configuration in this paper) which management team can access and retrieve the required information within their department, within their authorized area.

5.2 Recommendations

This Project Management Information System (PMIS) is the first Management Information System (MIS) that Elsag Bailey (Thailand) Limited will develop to implement within his organization. The main purpose of this system is to improve the effectiveness and efficiency of Manual Project Management Information System.

We recommend that this organization should develop the Management Information System for the other manual systems as follows:

(1) Product Management Information System

(2) Service Management Information System

And all the system above should be connected together because they are able to share the same database in order to get rid of the redundancy and provide the efficient and effective management information system for management team to make decision making in the efficient and effective way.

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APPENDIX   A

DATA FLOW DIAGRAMS
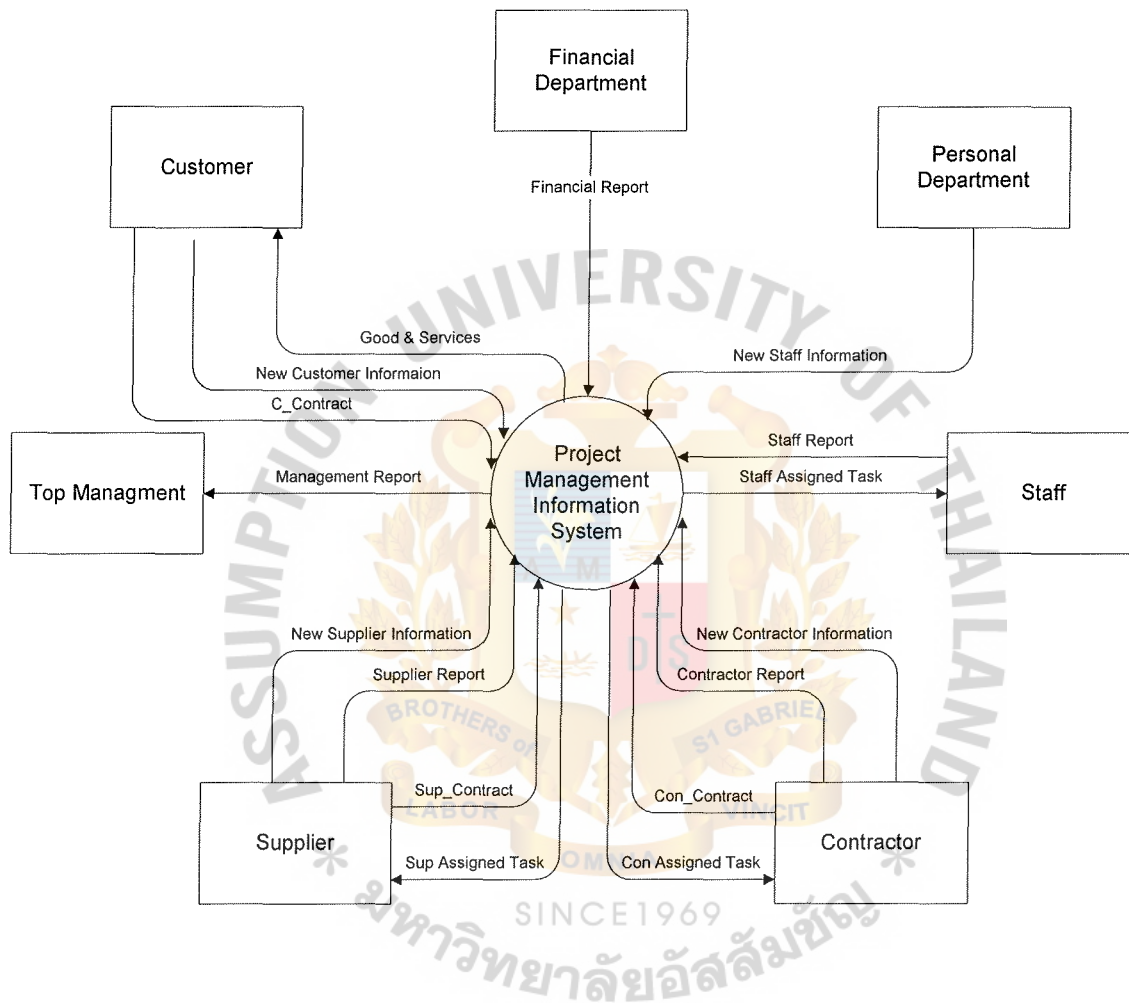
Figure A.1.   Context Diagram of Project Management Information System.

Figure A.2. DFD Level 0 of Project Management Information System.

34
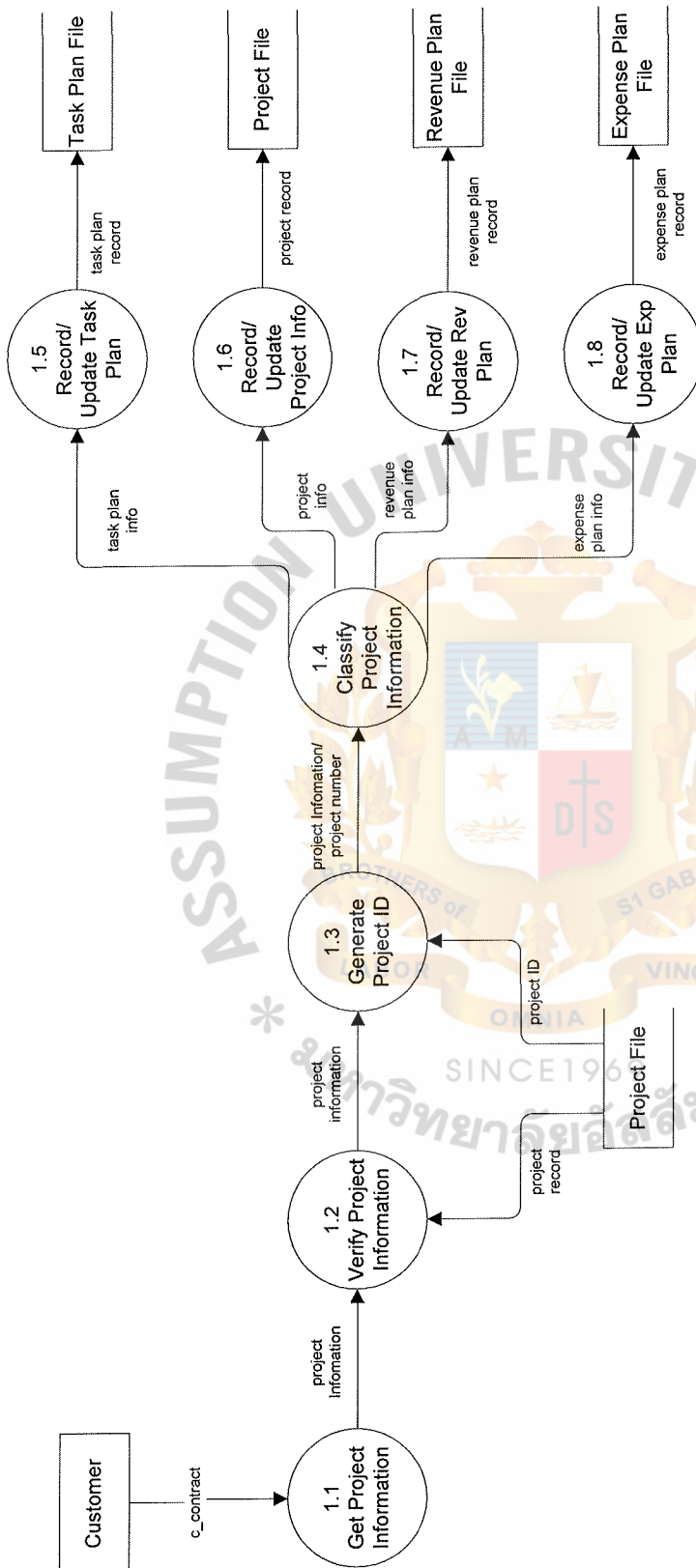
Figure A.3.   DFD Level 1 of Process 1. Create New Project.

35
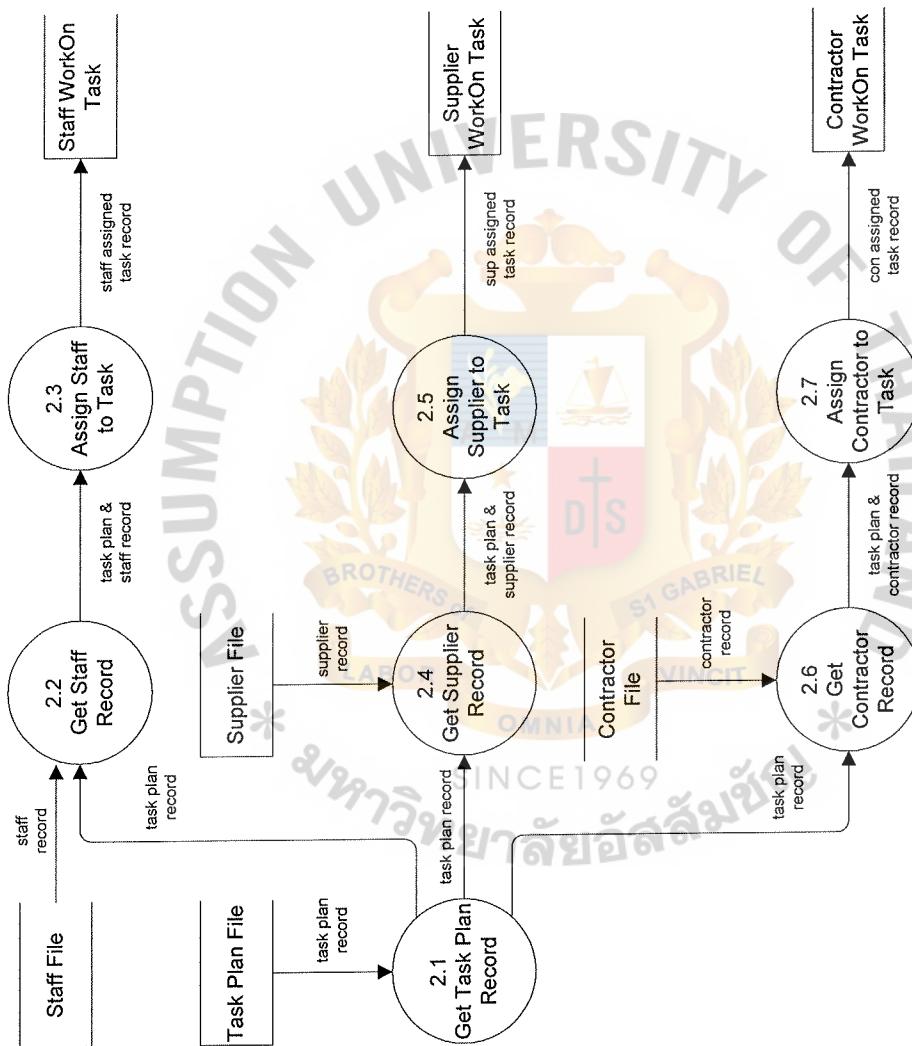
Figure A.4. DFD Level 1. of Process 2. Assign Task.

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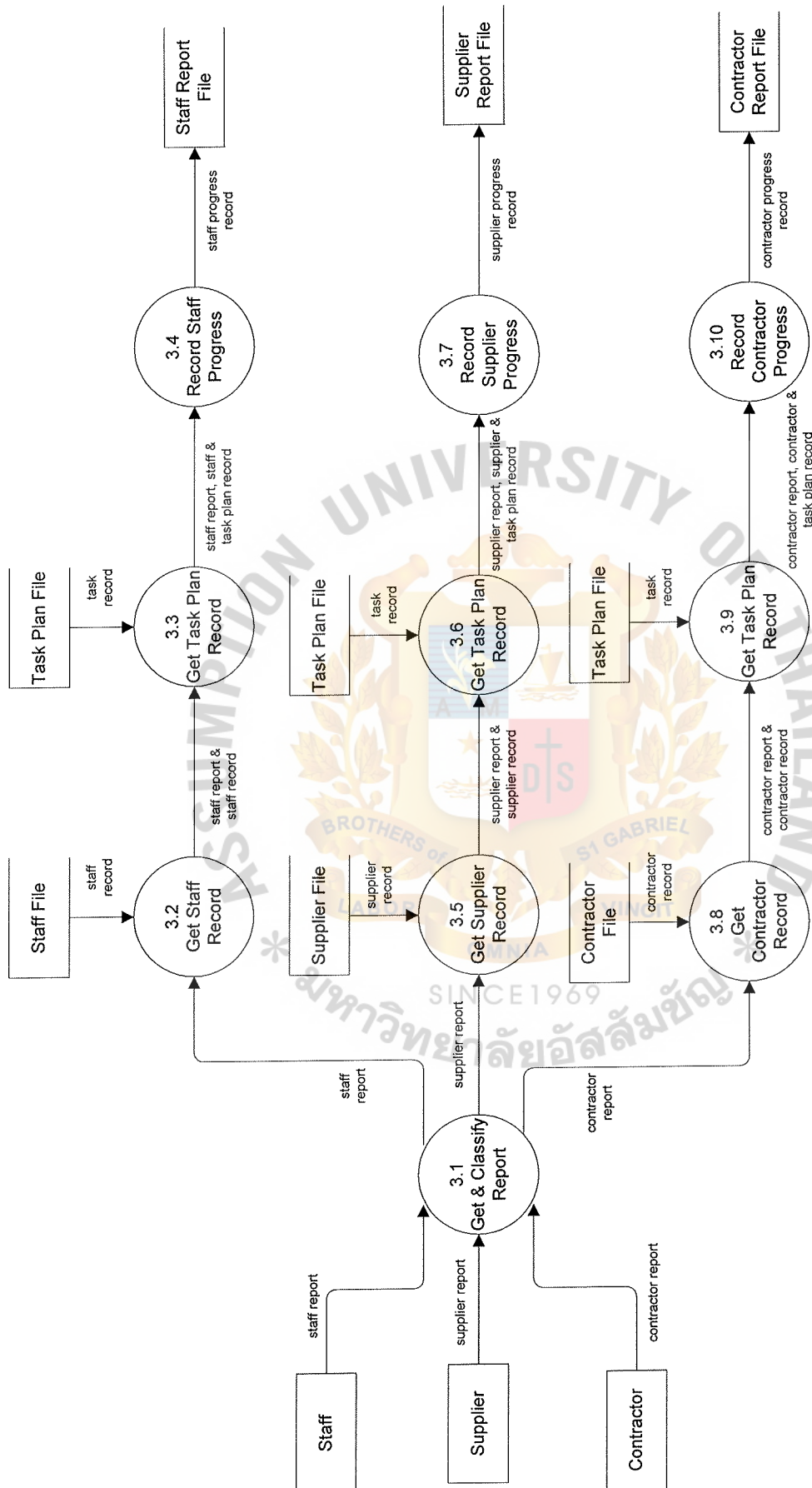
Figure A.5. DFD Level 1 of Process 3 Record Progress Task.
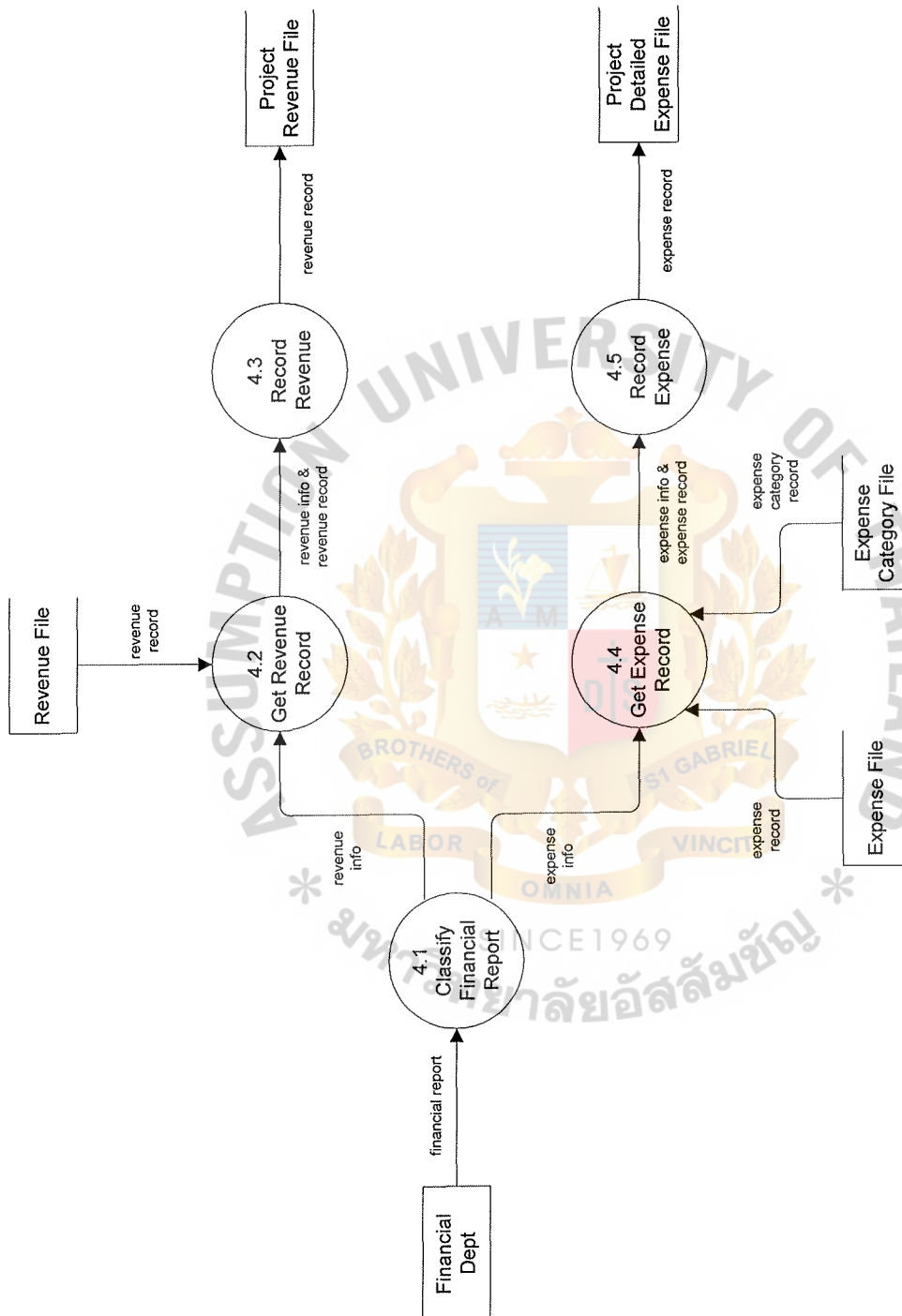
Figure A.6.   DFD Level 1 of Process 4 Record Financial Information.

38
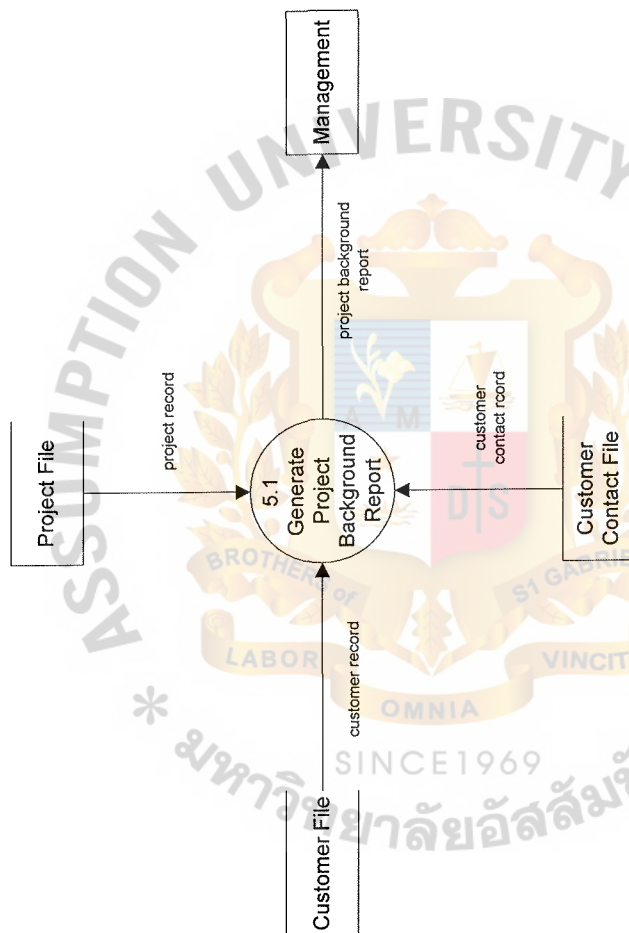
Figure A.7. DFD Level 1 of Process 5 Produce Management Information
(Generate Project Background Report).

39
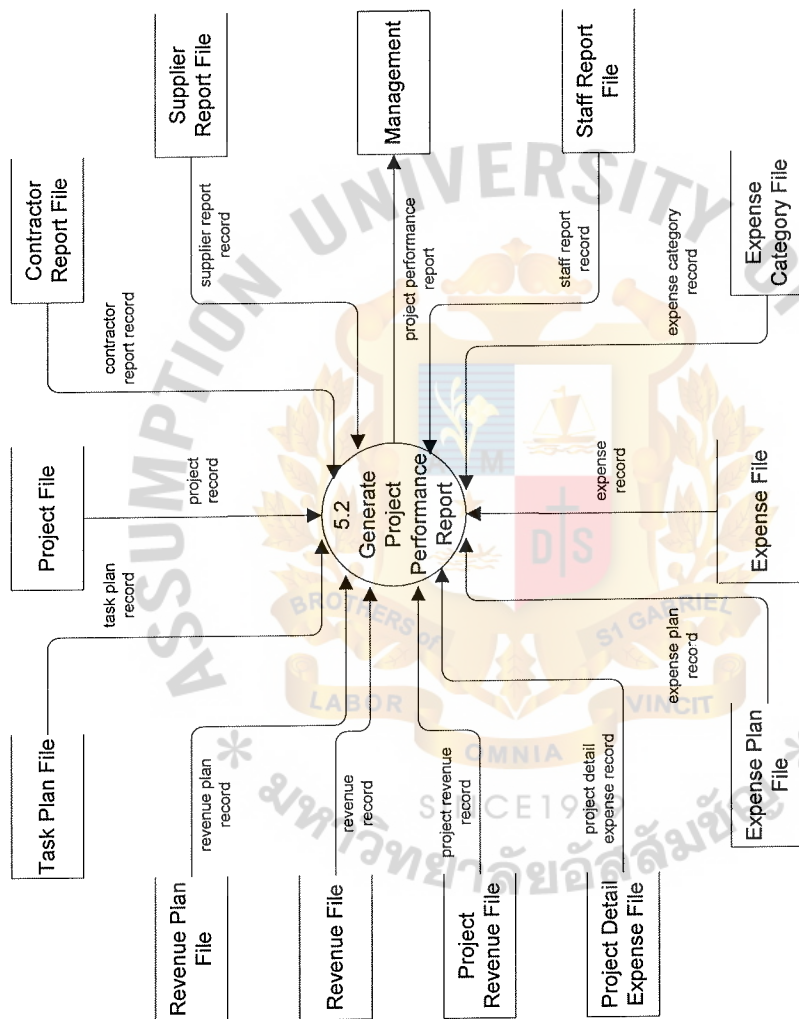
Figure A.8.   DFD Level 1 of Process 5 Produce Management Information
(Generate Project Performance Report).

40
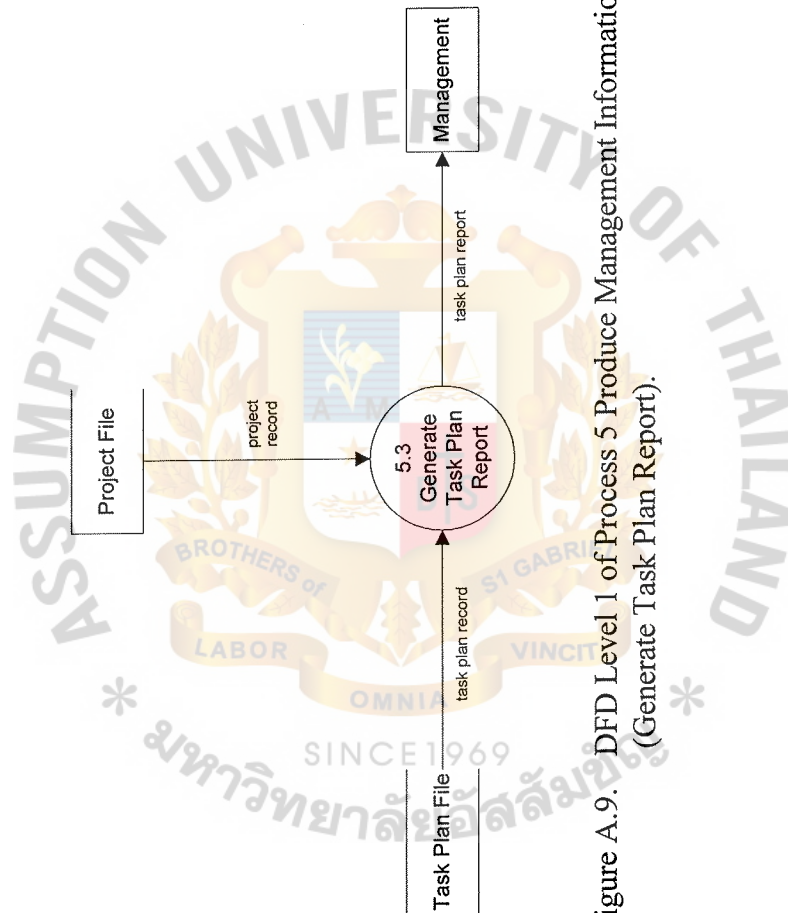
Figure A.9. DFD Level 1 of Process 5 Produce Management Information (Generate Task Plan Report).

41
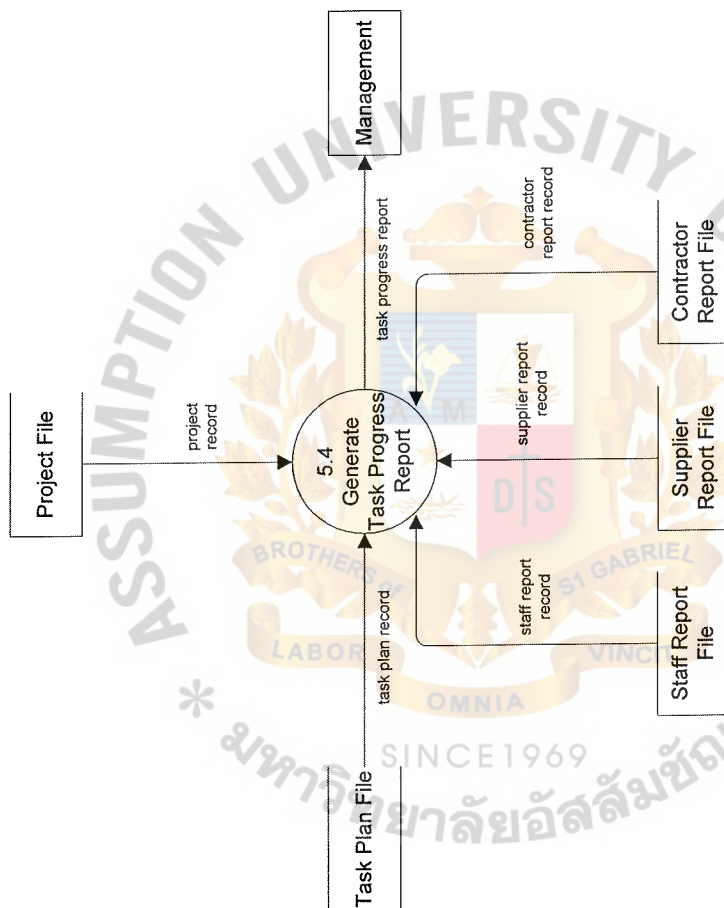
Figure A.10.   DFD Level 1 of Process 5 Produce Management Information
(Generate Task Progress Report).

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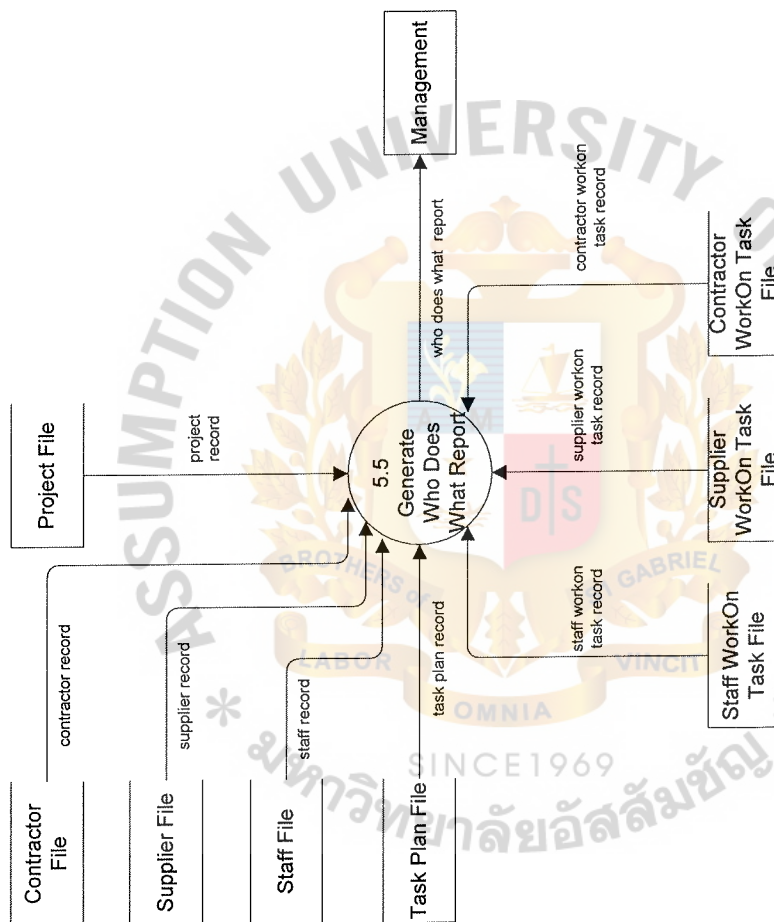
Figure A.11. DFD Level 1 of Process 5 Produce Management Information (Generate Who Does What Report).

43
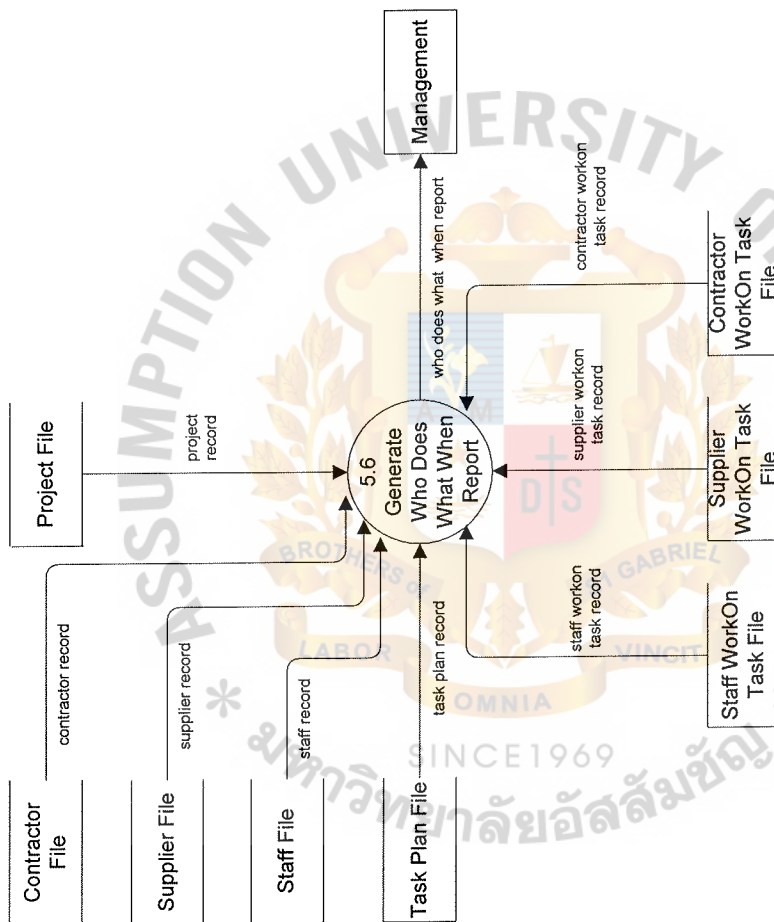
Figure A.12.   DFD Level 1 of Process 5 Produce Management Information
(Generate Who Does What When Report).

44
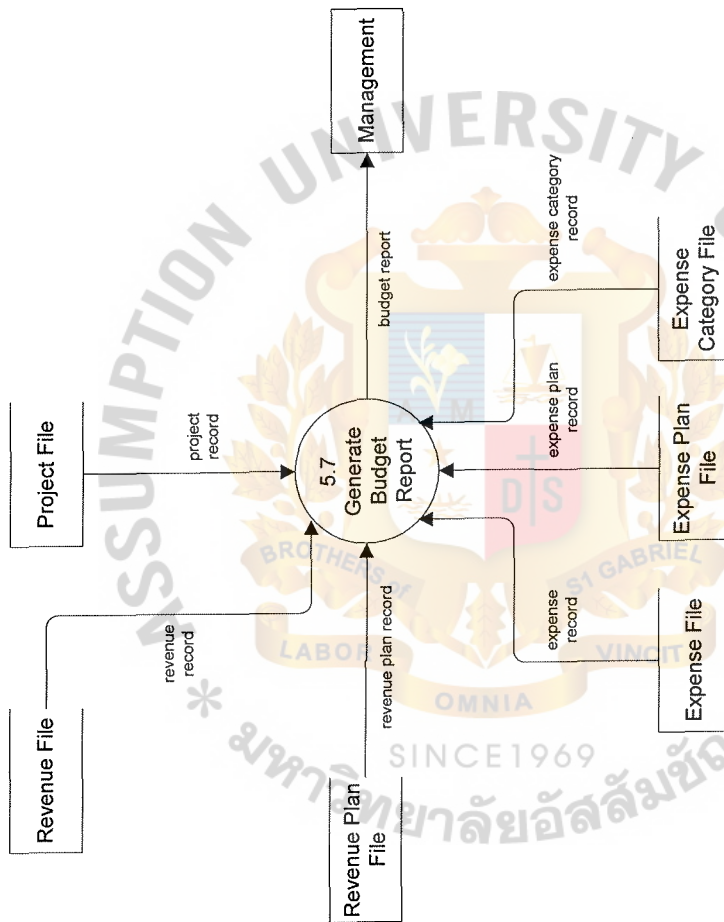
Figure A.13. DFD Level 1 of Process 5 Produce Management Information (Generate Budget Report).

45

Figure A.14.   DFD Level 1 of Process 5 Produce Management Information
(Generate Cash Flow Report).

46
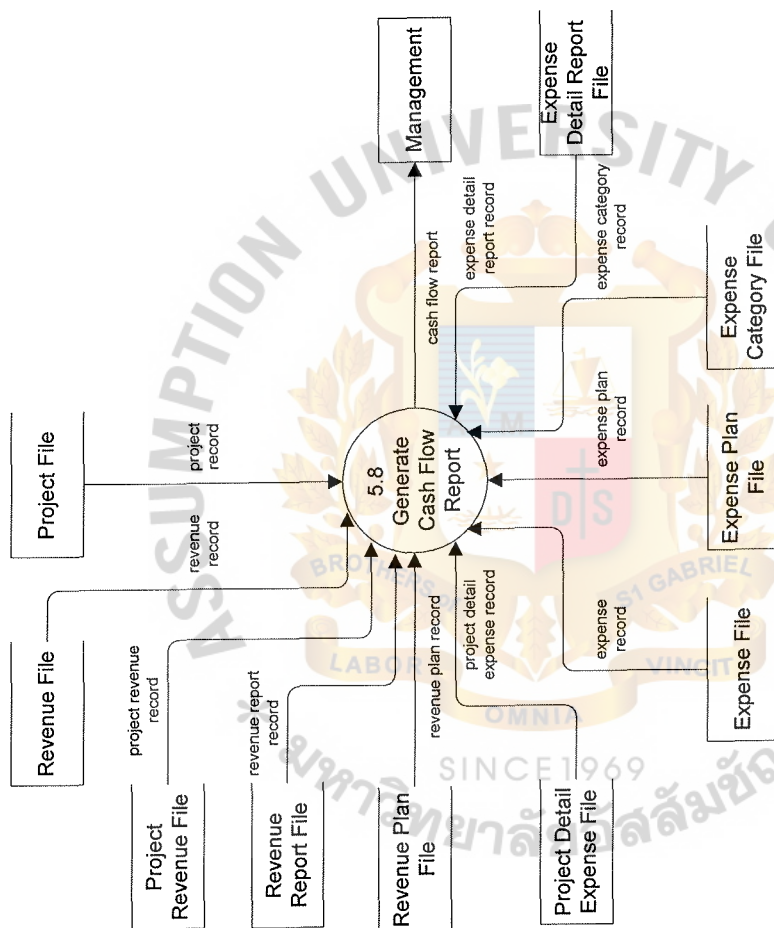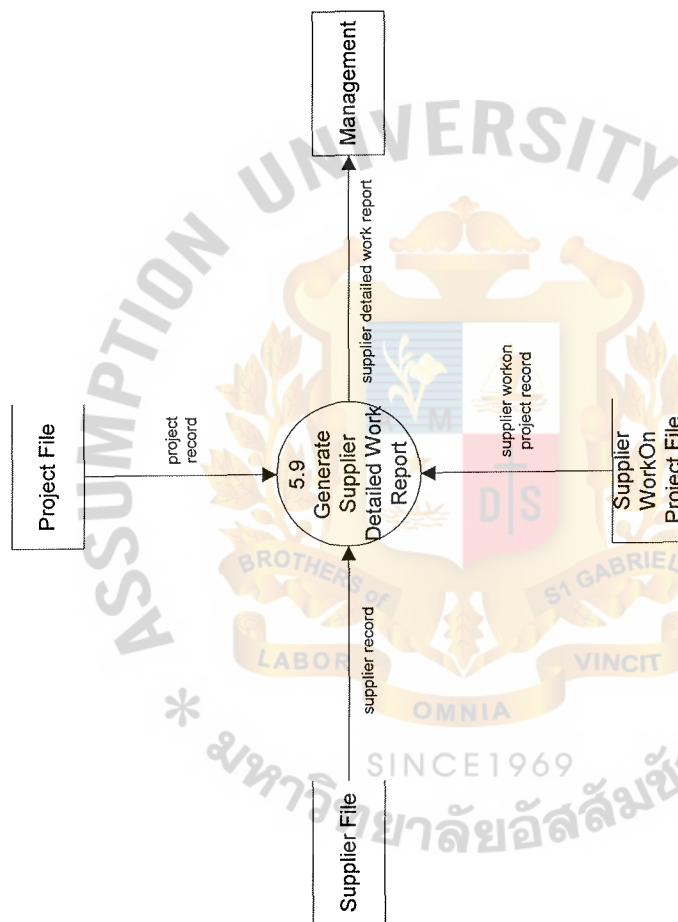
Figure A.15. DFD Level 1 of Process 5 Produce Management Information (Generate Supplier Detailed Work Report).

47
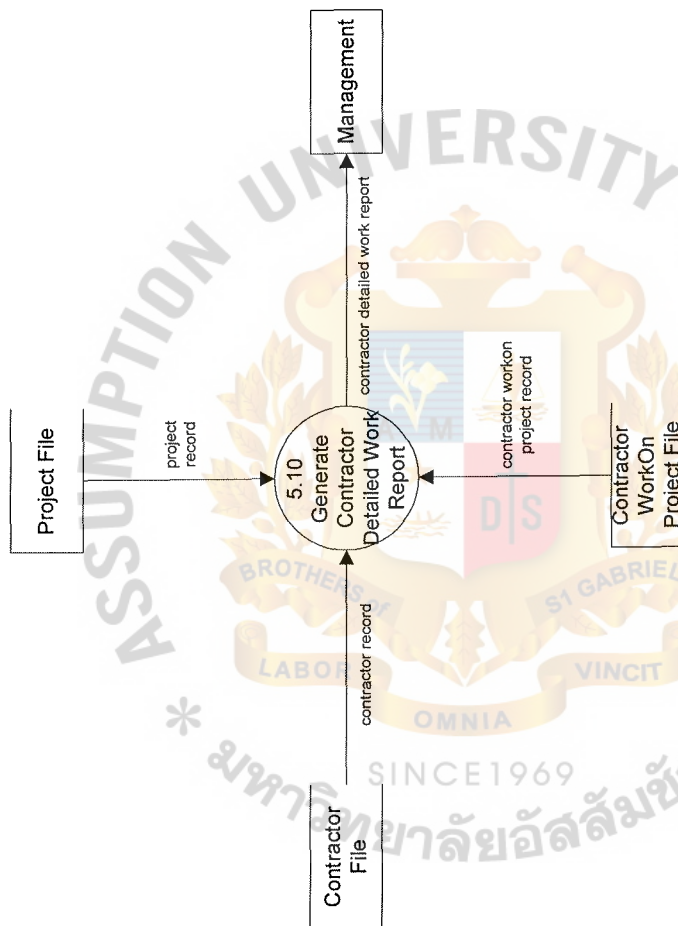
Figure A.16. DFD Level 1 of Process 5 Produce Management Information (Generate Contractor Detailed Work Report).

48
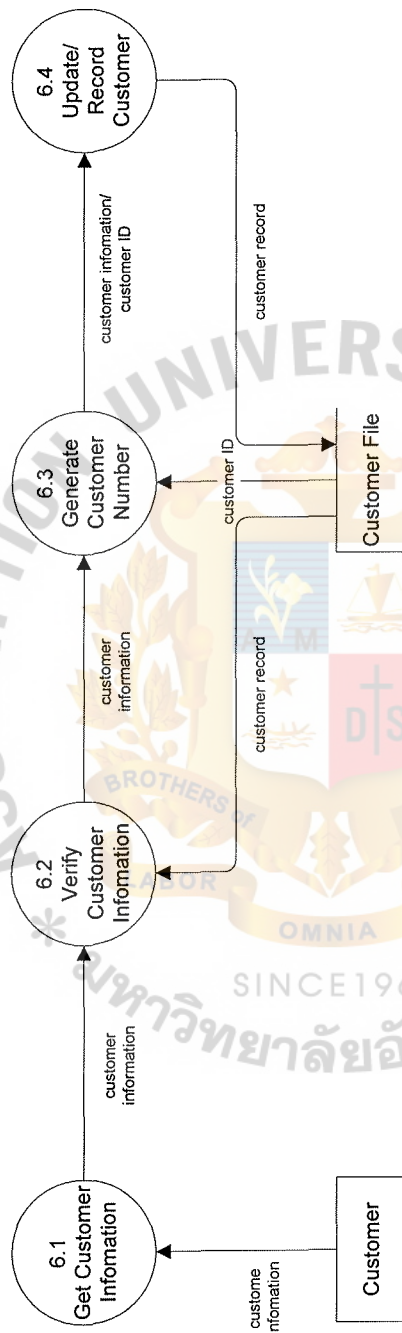
Figure A.17. DFD Level 1 of Process 6 Add New Customer.
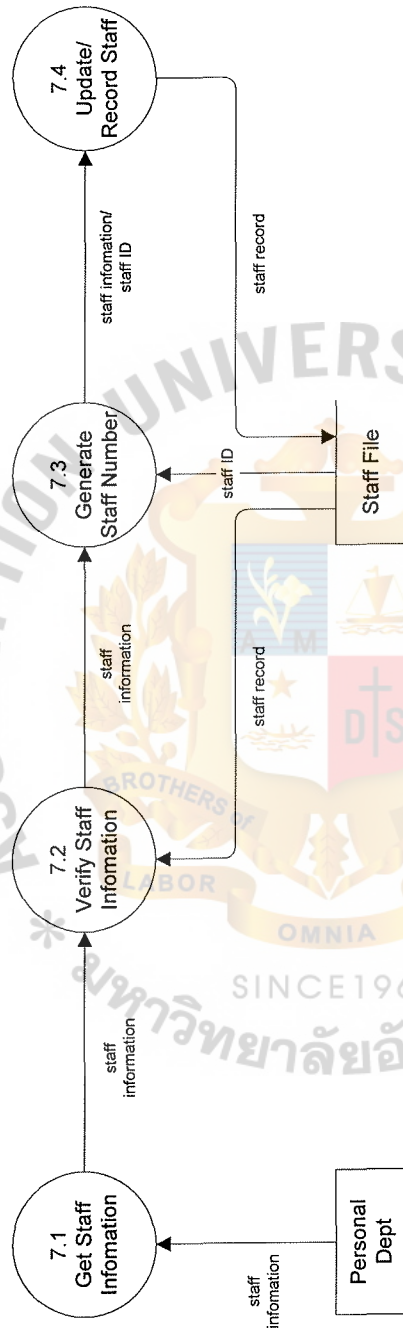
Figure A.18. DFD Level 1 of Process 7 Add New Staff.

50
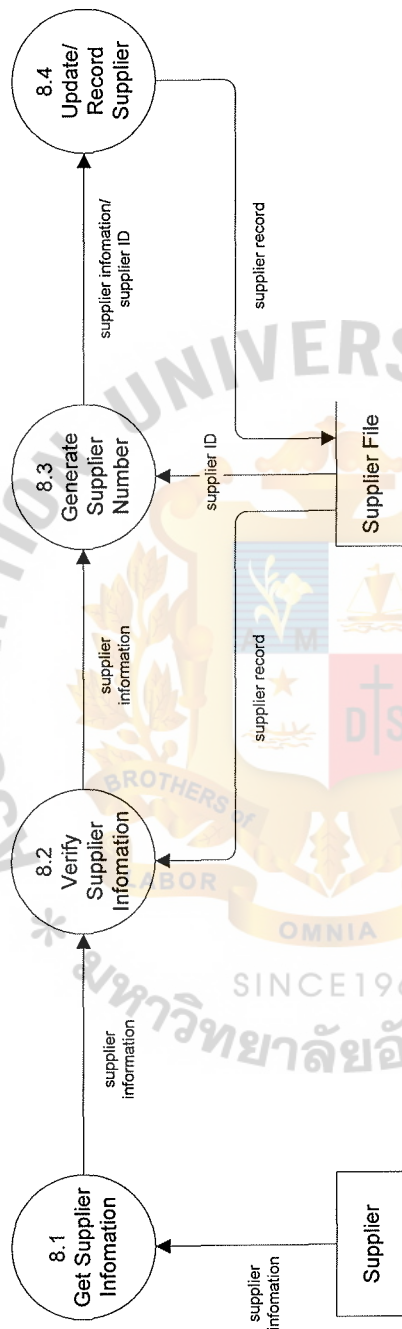
Figure A.19. DFD Level 1 of Process 8 Add New Supplier.

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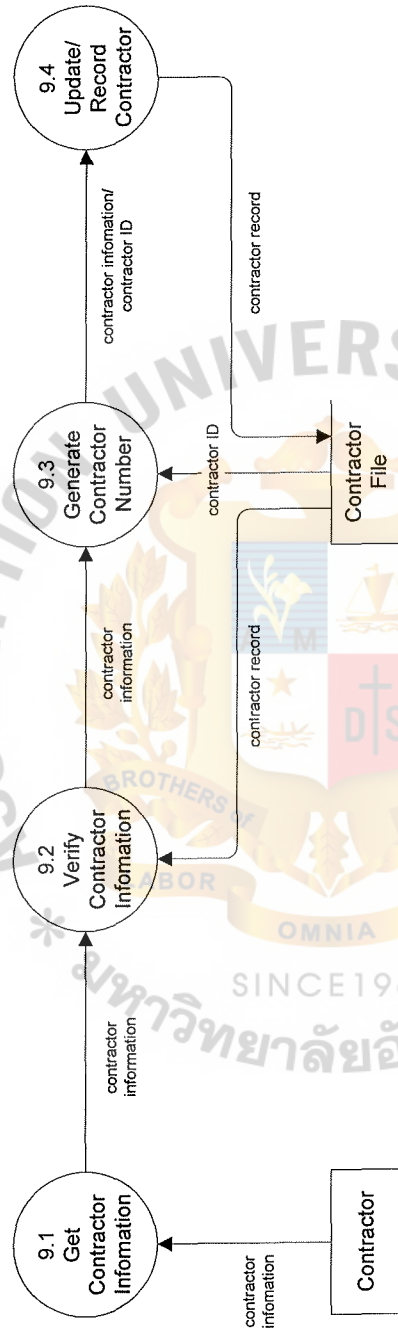
Figure A.20.   DFD Level 1 of Process 9 Add New Contractor.

52
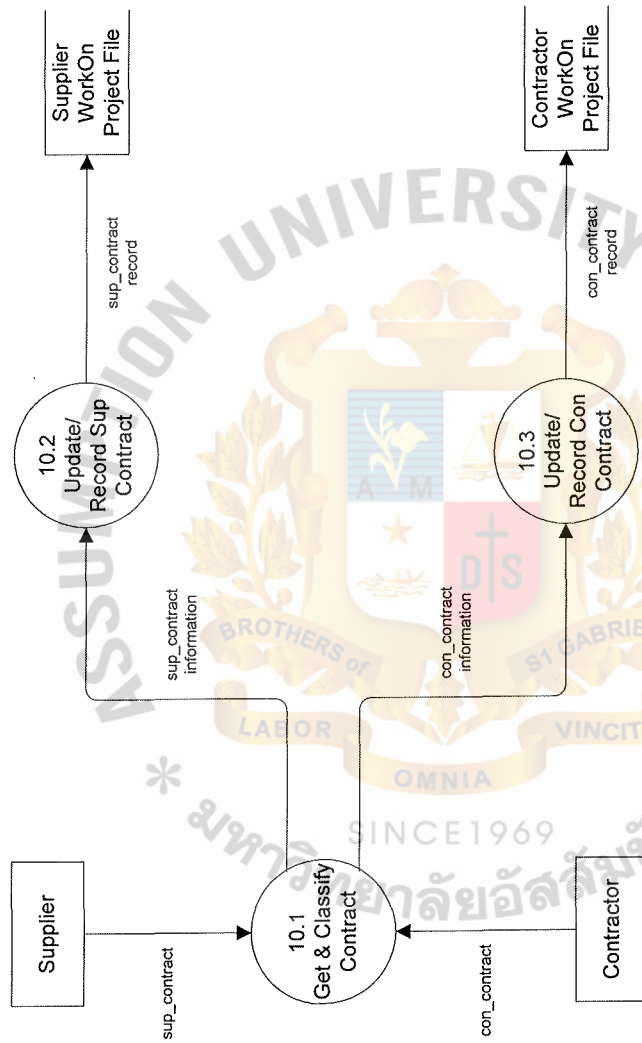
Figure A.21.   DFD Level 1 of Process 10 Add New Contract.

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APPENDIX   B

ENTITY-RELATIONSHIP DIAGRAMS

Figure B.1.   Entity-Relationship Diagram.

54

ATTRIBUTES OF THE ENTITY IN ENTITY-RELATIONSHIP DIAGRAM

1. Project

PrjID	PrjName	PrjSD	PrjFD	PrjCont	PrjDate	PrjValue

Pscope	Remark

2. Customer

CustID	CustName	CustAdd	CustCity	CustPC	CustCoun	Remark

{CuCFN	CuCLN	CuCTit	CuCPN	CuCFN	CuCEM}

3. Supplier

SupID	SupName	SupAdd	SupCity	SupPC	SupCoun	Remark

{SuCFN	SuCLN	SuCTit	SuCPN	SuCFN	SuCEM}

4. Contractor

ConID	ConName	ConAdd	ConCity	ConPC	ConCoun	Remark

{CoCFN	CoCLN	CoCTit	CoCPN	CoCFN	CoCEM}

5. Staff

StID	StFn	StLn	StTitle	StExp	StEdu	StTrain

StDep

6. Task Plan

TkID	TkName	TkSD	TkFD	TkScope	Remark

7. Revenue Plan

RevPlID	RevPlAmt	RevPlMth

55

8. Revenue

RevID	RevDes

9. Revenue Report

RevReID

10. Expense Category

ExpCatID	ExpCatDes

11. Expense

ExpID	ExpDes

12. Expense Plan

ExpPlID	ExpPlAmt	ExpPlMth

13. Expense Detail Report

ExpReID

14. Staff Report

StReID	TactSD	TactFD	Remark

15. Supplier Report

SuSReID	TactSD	TActFD	Remark

16. Contractor Report

CoReID	TActSD	TActFD	Remark

17. Has (Expense Detail Report – Project)

EactAmt	EActDate	Who

56

18.   Has (Revenue Report – Project)

RactAmt	RActDate	CusName

19.   WorkOn (Supplier – Project)

SPValue	SPScope	SPCont	SPDate

20.   WorkOn (Contractor – Project)

CPValue	CPScope	CPCont	CPDate

APPENDIX   C

MAPPED AND NORMALIZED TABLES

MAPPED AND NORMALIZED TABLES

1. Project

PrjID	PrjName	PrjSD	PrjFD	PrjCont	PrjDate	PrjValue

CustID	PScope	Remark

2. Customer

CustID	CustName	CustAdd	CustCity	CustPC	CustCoun	Note

3. Supplier

SupID	SupName	SupAdd	SupCity	SupPC	SupCoun	Note

4. Contractor

ConID	ConName	ConAdd	ConCity	ConPC	ConCoun	Note

5. Staff

StID	StFn	StLn	StTitle	StExp	StEdu	StTrain

StDep

6. Task Plan

TkID	TkName	TkSD	TkFD	TkScope	PrjID

7. Revenue Plan

RevPlID	RevPlAmt	RevPlMth	PrjID	RevID

8. Revenue

RevID	RevDes

9. Revenue Report

RevReID	RevID

10. Expense Category

ExpCatID	ExpCatDes

11. Expense

ExpID	ExpDes	ExpCatID

12. Expense Plan

ExpPlID	ExpPlAmt	ExpPlMth	PrjID	ExpCatID

13. Expense Detail Report

ExpReID	ExpID

14. Staff Report

StReID	TActSD	TactFD	Remark	StID	TkID	PrjID

15. Supplier Report

SuSReID	TActSD	TActFD	Remark	SupID	TkID	PrjID

16. Contractor Report

CoReID	TActSD	TActFD	Remark	ConID	TkID	PrjID

17. Staff WorkOn Task

StID	TkID

18. Staff WorkOn Project

StID	PrjID

APPENDIX   D

FUNCTIONAL DEPENDENCIES

19. Supplier WorkOn Task

SupID	TkID

20. Supplier WorkOn Project

SupID	PrjID	SPScope	SPValue	SPCont	SPDate

21. Contractor WorkOn Task

ConID	TkID

22. Contractor WorkOn Project

ConID	PrjID	CPScope	CPValue	CPCont	CPDate

23. Project Detail Expense

ExpReID	PrjID	EActAmt	EActDate	Who

24. Project Revenue

RevReID	PrjID	RActAmt	RActDate	CusName

25. Customer Contact Name

CustID	CuCFN	CuCLN	CuCTit	CuCPN	CuCFN	CuCEM

26. Supplier Contact Name

SupID	SuCFN	SuCLN	SuCTit	SuCPN	SuCFN	SuCEM

27. Contractor Contact Name

ConID	CoCFN	CoCLN	CoCTit	CoCPN	CoCFN	CoCEM

FUNCTIONAL DEPENDENCIES

1. Project

PrjID	⟶	PrjName
PrjID	⟶	PrjSD
PrjID	⟶	PrjFD
PrjID	⟶	PrjCont
PrjID	⟶	PrjDate
PrjID	⟶	PrjValue
PrjID	⟶	Pscope
PrjID	⟶	Remark
PrjID	⟶	CustID

2. Customer

CustID	⟶	CustName
CustID	⟶	CustAdd
CustID	⟶	CustCity
CustID	⟶	CustPC
CustID	⟶	CustCoun
CustID	⟶	Ramark

3. Supplier

SupID	⟶	SupName
SupID	⟶	SupAdd
SupID	⟶	SupCity
SupID	⟶	SupPC
SupID	⟶	SupCoun
SupID	⟶	Remark

4. Contractor

ConID	⟶	ConName
ConID	⟶	ConAdd
ConID	⟶	ConCity
ConID	⟶	ConPC
ConID	⟶	ConCoun
ConID	⟶	Remark
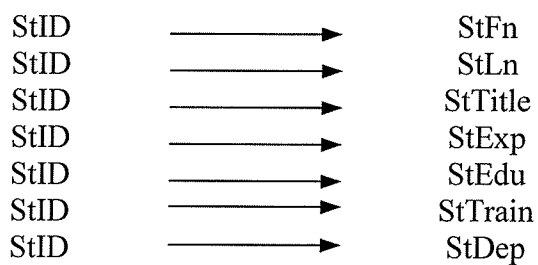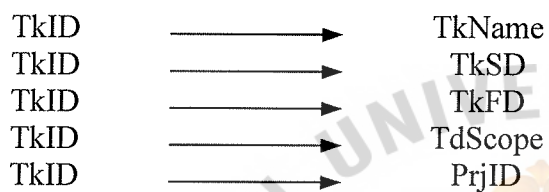
61

5. **Staff**

StID ⟶ StFn
StID ⟶ StLn
StID ⟶ StTitle
StID ⟶ StExp
StID ⟶ StEdu
StID ⟶ StTrain
StID ⟶ StDep

6. **Task Plan**

TkID ⟶ TkName
TkID ⟶ TkSD
TkID ⟶ TkFD
TkID ⟶ TdScope
TkID ⟶ PrjID

7. **Revenue Plan**

RevPlID ⟶ RevPlAmt
RevPlID ⟶ RevPlMth
RevPlID ⟶ PrjID
RevPlID ⟶ RevID

8. **Revenue**

RevID ⟶ ReDes

9. **Revenue Report**

RevReID ⟶ RevID

10. **Expense Category**

ExpCatID ⟶ ExCatDes

11. **Expense**

ExpID ⟶ ExpDes
ExpID ⟶ ExpCatID

12. Expense Plan

ExpPlID	ExpPlAmt
ExpPlID	ExpPlMth
ExpPlID	PrjID
ExpPlID	ExpCatID
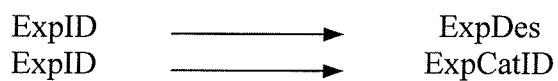
13. Expense Detail Report

ExpReID ⟶ ExpID

14. Staff Report

StReID	TactSD
StReID	TactFD
StReID	Remark
StReID	StID
StReID	TkID
StReID	PrjID

15. Supplier Report

SuSReID	TactSD
SuSReID	TactFD
SuSReID	Remark
SuSReID	SupID
SuSReID	TkID
SuSReID	PrjID

16. Contractor Report

CoReID	TactSD
CoReID	TactFD
CoReID	Remark
CoReID	ConID
CoReID	TkID
CoReID	PrjID

17. Staff WorkOn Task

StID, TkID

18. Staff WorkOn Project

StID, PrjID

19. Supplier WorkOn Task

SupID, TkID

20. Supplier WorkOn Project

SupID, PrjID ⟶ SPScope
SupID, PrjID ⟶ SPValue
SupID, PrjID ⟶ SPCont
SupID, PrjID ⟶ SPDate

21. Contractor WorkOn Task

ConID, TkID

22. Contractor WorkOn Project

ConID, PrjID ⟶ CPScope
ConID, PrjID ⟶ CPValue
ConID, PrjID ⟶ CPCont
ConID, PrjID ⟶ CPDate

23. Project Detail Expense

ExReID, PrjID ⟶ EActAmt
ExReID, PrjID ⟶ EActDate
ExReID, PrjID ⟶ Who

24. Project Revenue

RevReID, PrjID ⟶ RactAmt
RevReID, PrjID ⟶ RactDate
RevReID, PrjID ⟶ CusName

25. Customer Contact Name

CustID, CuCFN, CuCLN, CuCTit, CuCPN, CuCFN, CuCEM

26. Supplier Contact Name

SupID, SuCFN, SuCLN, SuCTit, SuCPN, SuCFN, SuCEM

27. Contractor Contact Name

ConID, CoCFN, CoCLN, CoCTit, CoCPN, CoCFN, CoCEM

APPENDIX   E

TABLE PROPERTIES

TABLE PROPERTIES

Table E.1.   Project File Layout.

FILE LAYOUT				
FILE NAME:		Project		
RECORD LENGTH:		552 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	PrjID	C	8	0
2	PrjName	C	50	0
3	PrjSD	D	8	0
4	PrjFD	D	8	0
5	PrjCont	C	50	0
6	PrjDate	D	8	0
7	PrjValue	N	12	2
8	CustID	C	8	0
9	Pscope	C	200	0
10	Remark	C	200	0

Table E.2.   Customer File Layout.

FILE LAYOUT				
FILE NAME:		Customer		
RECORD LENGTH:		403 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	CustID	C	8	0
2	CustName	C	50	0
3	CustAdd	C	100	0
4	CustCity	C	20	0
5	CustPC	C	5	0
6	CustCoun	C	20	0
7	Remark	C	200	0

Table E.3.   Supplier File Layout.

FILE LAYOUT				
FILE NAME:		Supplier		
RECORD LENGTH:		403 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	SuptID	C	8	0
2	SupName	C	50	0
3	SupAdd	C	100	0
4	SupCity	C	20	0
5	SupPC	C	5	0
6	SupCoun	C	20	0
7	Remark	C	200	0

Table E.4.   Contractor File Layout.

FILE LAYOUT				
FILE NAME:		Contractor		
RECORD LENGTH:		403 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ContID	C	8	0
2	ConName	C	50	0
3	ConAdd	C	100	0
4	ConCity	C	20	0
5	ConPC	C	5	0
6	ConCoun	C	20	0
7	Remark	C	200	0

Table E.5.   Staff File Layout.

FILE LAYOUT				
FILE NAME: Staff				
RECORD LENGTH: 563 bytes				
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	StID	C	8	0
2	StFn	C	20	0
3	StLn	C	20	0
4	StTitle	C	15	0
5	StExp	C	100	0
6	StEdu	C	200	0
7	StTrain	C	200	0
8	StDep	C	20	0

Table E.6.   Task Plan File Layout.

FILE LAYOUT				
FILE NAME: Task Plan				
RECORD LENGTH: 312 bytes				
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	TkID	C	8	0
2	TkName	C	80	0
3	TkSD	D	8	0
4	TkFD	D	8	0
5	TkScope	C	200	0
6	PrjID	C	8	0

Table E.7.   Revenue Plan File Layout.

FILE LAYOUT				
FILE NAME:		Revenue Plan		
RECORD LENGTH:		46 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	RevPlID	C	8	0
2	RevPlAmt	N	12	2
3	RevPlMth	D	10	0
4	PrjID	C	8	0
5	RevID	C	8	0

Table E.8.   Revenue File Layout.

FILE LAYOUT				
FILE NAME:		Revenue		
RECORD LENGTH:		38 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	RevID	C	8	0
2	RevDes	C	30	0

Table E.9.   Revenue Report File Layout.

FILE LAYOUT				
FILE NAME:		Revenue Report		
RECORD LENGTH:		16 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	RevReID	C	8	0
2	RevID	C	8	0

Table E.10.   Expense Category File Layout.

FILE LAYOUT				
FILE NAME:		Expense Category		
RECORD LENGTH:		28 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ExpCatID	C	8	0
2	ExpCatDes	C	20	0

Table E.11.   Expense File Layout.

FILE LAYOUT				
FILE NAME:		Expense		
RECORD LENGTH:		48 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ExpID	C	8	0
2	ExpDes	C	20	0
3	ExpCatID	C	20	0

Table E.12. Expense Plan File Layout.

FILE LAYOUT				
FILE NAME:		Expense Plan		
RECORD LENGTH:		46 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ExpPlID	C	8	0
2	ExpPlAmt	N	12	2
3	ExpPlMth	D	10	0
4	PrjID	C	8	0
5	ExpCatID	C	8	0

Table E.13. Expense Detail Report File Layout.

FILE LAYOUT				
FILE NAME:		Expense Detail Report		
RECORD LENGTH:		16 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ExpReID	C	8	0
2	ExpID	C	8	0

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Table E.14.   Staff Report File Layout.

FILE LAYOUT				
FILE NAME:		Staff Report		
RECORD LENGTH:		248 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	StReID	C	8	0
2	TactSD	D	8	0
3	TactFD	D	8	0
4	Remark	C	200	0
5	StID	C	8	0
6	TkID	C	8	0
7	PrjID	C	8	0

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Table E.15.   Supplier File Layout.

FILE LAYOUT				
FILE NAME:		Supplier Report		
RECORD LENGTH:		248 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	SuSReID	C	8	0
2	TactSD	D	8	0
3	TactFD	D	8	0
4	Remark	C	200	0
5	SupID	C	8	0
6	TkID	C	8	0
7	PrjID	C	8	0

Table E.16.   Contractor Report File Layout.

FILE LAYOUT				
FILE NAME:		Contractor Report		
RECORD LENGTH:		248 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	CoReID	C	8	0
2	TActSD	D	8	0
3	TActFD	D	8	0
4	Remark	C	200	0
5	ConID	C	8	0
6	TkID	C	8	0
7	PrjID	C	8	0

Table E.17.   Staff WorkOn Task File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Staff WorkOn Task 16 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	StID	C	8	0
2	TkID	C	8	0

Table E.18.   Staff WorkOn Project File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Staff WorkOn Project 16 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	StID	C	8	0
2	PrjID	C	8	0

Table E.19.   Supplier WorkOn Task File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Supplier WorkOn Task 16 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	SupID	C	8	0
2	TkID	C	8	0

Table E.20. Supplier WorkOn Project File Layout.

FILE LAYOUT				
FILE NAME:		Supplier WorkOn Project		
RECORD LENGTH:		286 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	SupID	C	8	0
2	PrjID	C	8	0
3	SPScope	C	200	0
4	SPValue	N	12	2
5	SPCont	C	50	0
6	SPDate	D	8	0

Table E.21. Contractor WorkOn Task File Layout.

FILE LAYOUT				
FILE NAME:		Contractor WorkOn Task		
RECORD LENGTH:		16 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ConID	C	8	0
2	TkID	C	8	0

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Table E.22.   Contractor WorkOn Project File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Contractor WorkOn Project 286 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ConID	C	8	0
2	PrjID	C	8	0
3	SPScope	C	200	0
4	CPValue	N	12	2
5	CPCont	C	50	0
6	CPDate	D	8	0

Table E.23.   Project Detail Expense File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Project Detail Expense 86 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ExpReID	C	8	0
2	PrjID	C	8	0
3	EActAmt	N	12	2
4	EActDate	D	8	0
5	Who	C	50	0

Table E.24. Project Revenue File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Project Revenue 86 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	RevReID	C	8	0
2	PrjID	C	8	0
3	RActAmt	N	12	2
4	RactDate	D	8	0
5	CusName	C	50	0

Table E.25. Customer Contact Name File Layout.

FILE LAYOUT				
FILE NAME: RECORD LENGTH:		Customer Contact Name 148 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	CustID	C	8	0
2	CuCFN	C	20	0
3	CuCLN	C	20	0
4	CuCTit	C	20	0
5	CuCPN	C	15	0
6	CuCFN	C	15	0
7	CuCEM	C	50	0

Table E.26.　Supplier Contact Name File Layout.

FILE LAYOUT				
FILE NAME:		Supplier Contact Name		
RECORD LENGTH:		148 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	SupID	C	8	0
2	SuCFN	C	20	0
3	SuCLN	C	20	0
4	SuCTit	C	20	0
5	SuCPN	C	15	0
6	SuCFN	C	15	0
7	SuCEM	C	50	0

Table E.27.　Contractor Contact Name File Layout.

FILE LAYOUT				
FILE NAME:		Contactor Contact Name		
RECORD LENGTH:		148 bytes		
SEQ	FIELD NAME	TYPE	WIDTH	DEC
1	ConID	C	8	0
2	CoCFN	C	20	0
3	CoCLN	C	20	0
4	CoCTit	C	20	0
5	CoCPN	C	15	0
6	CoCFN	C	15	0
7	CCEM	C	50	0

APPENDIX   F

DATA DICTIONARY

DATA DICTIONARY

A

Accumulate Profit = Previous Month Profit + This Month Profit

B

Beginning Balance = Ending Balance of Previous Month

C

Cash Excess = Revenue – Expense

CoCEM = E-mail Address of Contractor Contact Person

CoCFN = First Name of Contractor Contact Person

CoCFN = Fax Number of Contractor Contact Person

CoCLN = Last Name of Contractor Contact Person

CoCPN = Telephone Number of Contractor Contact Person

CoCTit = Title of Contractor Contact Person

ConAdd = Contractor Address

ConCity = Contractor City

ConCoun = Contractor Country

ConID = Contractor Identification Code

ConName = Contractor Name

ConPC = Contractor Postal Code

CoReID = Contractor Report Identification Code

CPCont = Contract Number of Contractor Work On Project

CPDate = Contract Date of Contractor Work On Project

CPScope = Scope of Contractor Work On Project

CuCEM = E-mail Address of Customer Contact Person

CuCFN	=	First Name of Customer Contact Person
CuCFN	=	Fax Number of Customer Contact Person
CuCLN	=	Last Name of Customer Contact Person
CuCPN	=	Telephone Number of Customer Contact Person
CuCTit	=	Title of Customer Contact Person
CustAdd	=	Customer Address
CustCity	=	Customer City
CustCoun	=	Customer Country
CustID	=	Customer Identification Code
CustName	=	Customer Name
CustPC	=	Customer Postal Code

D

Duration	=	Finish Date – Start Date

E

EactAmt	=	Actual Amount of Expense
EactDate	=	Date of Actual Expense
Ending Balance	=	Beginning Balance + Cash Excess
Estimated Net Profit	=	Estimated Revenue – Estimated Expense
ExpCatDes	=	Description of Expense Category
ExpCatID	=	Expense Category Identification Code
ExpDes	=	Description of Expense
Expense Variance	=	Actual Expense – Estimated Expense
ExpID	=	Expense Identification Code
ExpPlAmt	=	Expense Plan Amount
ExpPlID	=	Expense Plan Identification Code

ExpPlMth	=	Expense Plan Month
ExpReID	=	Expense Report Identification Code
F		
Finish Date Variance	=	Actual Finish Date – Estimated Finish Date
N		
Net Profit	=	Actual Revenue – Actual Expense
Net Profit (%)	=	Net Profit / Actual Revenue
P		
PrjCont	=	Project Contract Number
PrjDate	=	Date of Project
PrjFD	=	Project Finish Date
PrjID	=	Project Identification Code
PrjName	=	Project Name
PrjSD	=	Project Start Date
PrjValue	=	Value of Project
Pscope	=	Scope of Project
R		
RactAmt	=	Actual Amount of Revenue
RactDate	=	Date of Actual Revenue
RevDes	=	Description of Revenue
Revenue Variance	=	Actual Revenue – Estimated Revenue
RevID	=	Revenue Identification Code
RevPlAmt	=	Revenue Plan Amount
RevPlID	=	Revenue Plan Identification Code
RevPlMth	=	Revenue Plan Month

RevReID	=	Revenue Report Identification Code

S

SPCont	=	Contract Number of Supplier Work On Project
SPDate	=	Contract Date of Supplier Work On Project
SPScope	=	Scope of Supplier Work On Project
SPValue	=	Value of Supplier Work On Project
Start Date Variance	=	Actual Start Date – Estimated Start Date
StDep	=	Staff Department
StEdu	=	Staff Education
StExp	=	Staff Experience
StFn	=	Staff First Name
StID	=	Staff Identification Code
StLn	=	Staff Last Name
StReID	=	Staff Report Identification Code
StTitle	=	Staff Title
StTrain	=	Staff Training
SuCEM	=	E-mail Address of Supplier Contact Person
SuCFN	=	First Name of Supplier Contact Person
SuCFN	=	Fax Number of Supplier Contact Person
SuCLN	=	Last Name of Supplier Contact Person
SuCPN	=	Telephone Number of Supplier Contact Person
SuCTit	=	Title of Supplier Contact Person
SupAdd	=	Supplier Address
SupCity	=	Supplier City
SupCoun	=	Supplier Country

SupID	= Supplier Identification Code
SupName	= Supplier Name
SupPC	= Supplier Postal Code
SusReID	= Supplier Report Identification Code

T

TactFD	= Task Actual Finish Date
TactSD	= Task Actual Start Date
TkFD	= Task Finish Date
TkID	= Task Identification Code
TkName	= Task Name
TkScope	= Scope of Task
TkSD	= Task Start Date
Total Expenses	= Foreign Material + Local Material + Foreign Travelling + Local Travelling + Contractor + Allowance + Entertain + Miscellaneous

W

Who	= Staff, Contractor or Supplier

APPENDIX   G

PROCESS SPECIFICATIONS

PROCESS NAME   :   Generate Project ID

PROCESS NUMBER :   1.3

DESCRIPTION   :

- Receive project information from process 1.2

- If new project
    Read project with last project ID
    Next project ID = project ID + 1
  End if

- Send project information and project ID to process 1.4

INPUT   :

- Project information

OUTPUT   :

- Project information
- Project ID

PROCESS NAME   :   Classify Project Information
PROCESS NUMBER :   1.4

DESCRIPTION   :

- Receive the project information and project ID from process 1.3

- Classify project information

- Send task plan information to process 1.5

- Send project information to process 1.6

- Send revenue plan information to process 1.7

- Send expense plan information to process 1.8

INPUT   :

- Project Information
- Project ID

OUTPUT   :

- Task Plan Information
- Project Information
- Revenue Plan Information
- Expense Plan information

PROCESS NAME   :   Record / Update Task Plan
PROCESS NUMBER :   1.5

DESCRIPTION   :

    - Receive task plan information from process 1.4

    - If project found
        Update task plan information
    Else
        Record task plan information to task plan file
    End if

INPUT   :

    - Task Plan Information

OUTPUT   :

    - Task Plan Record

PROCESS NAME   :   Record / Update Project Information
PROCESS NUMBER :   1.6

DESCRIPTION   :

    - Receive project information from process 1.4

    - If project found
        Update project information
    Else
        Record project information to project file
    End if

INPUT   :

    - Project Information

OUTPUT   :

    - Project Record

PROCESS NAME   :   Record / Update Rev Plan
PROCESS NUMBER: 1.7

DESCRIPTION   :

    - Receive revenue plan information from process 1.4

    - If project found
          Update revenue plan information
    Else
          Record revenue plan information to revenue plan file
    End if

INPUT   :

    - Revenue Plan Information

OUTPUT   :

    - Revenue Plan Record

PROCESS NAME   :   Record / Update Expense Plan
PROCESS NUMBER: 1.8

DESCRIPTION   :

    - Receive expense plan information from process 1.4

    - If project found
          Update expense plan information
    Else
          Record expense plan information to expense plan file
    End if

INPUT   :

    - Expense Plan Information

OUTPUT   :

    - Expense Plan Record

PROCESS NAME   :   Get Task Plan Record
PROCESS NUMBER :   2.1

DESCRIPTION   :

    - Input project ID to task plan file

    - Get task plan record from task plan file

    - Send task plan record to process 2.2

    - Send task plan record to process 2.4

    - Send task plan record to process 2.6

INPUT   :

    - Project ID

OUTPUT   :

    - Task Plan Record

PROCESS NAME   :   Get Staff Record
PROCESS NUMBER :   2.2

DESCRIPTION   :

    - Receive task plan record from process 2.1

    - Input staff ID to staff file

    - Get staff record from staff file

    - Send task plan record and staff record to process 2.3

INPUT   :

    - Staff ID
    - Task Plan Record

OUTPUT   :

    - Staff Record
    - Task Plan Record

PROCESS NAME   :   Assign Staff to Task
PROCESS NUMBER :   2.3

DESCRIPTION   :

    - Receive task plan record and staff record from process 2.2

    - Assign staff to task

    - Record staff assigned task record to staff workon task file

INPUT   :

    - Task Plan Record
    - Staff Record

OUTPUT   :

    - Staff Assigned Task Record

PROCESS NAME   :   Get Supplier Record
PROCESS NUMBER :   2.4

DESCRIPTION   :

    - Receive task plan record from process 2.1

    - Input supplier ID to supplier file

    - Get supplier record from supplier file

    - Send task plan record and supplier record to process 2.5

INPUT   :

    - Supplier ID
    - Task Plan Record

OUTPUT   :

    - Supplier Record
    - Task Plan Record

PROCESS NAME   :   Assign Supplier to Task
PROCESS NUMBER :   2.5

DESCRIPTION   :

- Receive task plan record and supplier record from process 2.4

- Assign supplier to task

- Record supplier assigned task record to supplier workon task file

INPUT   :

- Supplier Record
- Task Plan Record

OUTPUT   :

- Supplier Assigned Task Record

PROCESS NAME   :   Get Contractor Record
PROCESS NUMBER :   2.6

DESCRIPTION   :

- Receive task plan record from process 2.1

- Input contractor ID to contractor file

- Get contractor record from contractor file

- Send task plan record and contractor record to process 2.7

INPUT   :

- Contractor ID
- Task Plan Record

OUTPUT   :

- Contractor Record
- Task Plan Record

```
PROCESS NAME      :      Assign Contractor to Task
PROCESS NUMBER :      2.7

DESCRIPTION       :

        -  Receive task plan record and contractor record from process 2.6

        -  Assign contractor to task

        -  Record contractor assigned task record to contractor workon task file

INPUT             :

        -  Contractor Record
        -  Task Plan Record

OUTPUT            :

        -  Contractor Assigned Task Record
```

PROCESS NAME   :   Get & Classify Report
PROCESS NUMBER :   3.1

DESCRIPTION   :

- Get staff report from staff

- Get supplier report from supplier

- Get contractor report from contractor

- Classify report

- Send staff report to process 3.2

- Send supplier report to process 3.5

- Send contractor report to process 3.8

INPUT   :

- Staff Report
- Contractor Report
- Supplier Report

OUTPUT   :

- Staff Report
- Contractor Report
- Supplier Report

PROCESS NAME   :   Get Staff Record
PROCESS NUMBER: 3.2

DESCRIPTION   :

   - Receive staff report from process 3.1

   - Input staff ID to staff file

   - Get staff record from staff file

   - Send staff report and staff record to process 3.3

INPUT   :

   - Staff Report
   - Staff ID

OUTPUT   :

   - Staff Report
   - Staff Record

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PROCESS NAME   :   Get Task Plan Record
PROCESS NUMBER :   3.3

DESCRIPTION   :

     - Receive staff report and staff record from process 3.3

     - Input task ID to task plan file

     - Get task record from task plan file

     - Send staff report, staff record and task plan record to process 3.4

INPUT   :

     - Staff Report
     - Staff Record
     - Task ID

OUTPUT   :

     - Staff Report
     - Staff Record
     - Task Plan Record

PROCESS NAME   :   Record Staff Progress
PROCESS NUMBER :   3.4

DESCRIPTION   :

     - Receive staff report, staff record and task plan record to process 3.3

     - Record staff progress report to staff report file

INPUT   :

     - Staff Report
     - Staff Record
     - Task Plan Record

OUTPUT   :

     - Staff Progress Record

PROCESS NAME   :   Get Supplier Record
PROCESS NUMBER :   3.5

DESCRIPTION   :

    - Receive supplier report from process 3.1

    - Input supplier ID to supplier file

    - Get supplier record from supplier file

    - Send supplier report and supplier record to process 3.6

INPUT   :

    - Supplier Report
    - Supplier ID

OUTPUT   :

    - Supplier Report
    - Supplier Record

PROCESS NAME   :   Get Task Plan Record
PROCESS NUMBER :   3.6

DESCRIPTION   :

    - Receive supplier report and supplier record from process 3.5

    - Input task ID to task plan file

    - Get task record from task plan file

    - Send supplier report, supplier record and task plan record to process 3.7

INPUT   :

    - Supplier Report
    - Supplier Record
    - Task ID

OUTPUT   :

    - Supplier Report
    - Supplier Record
    - Task Plan Record

PROCESS NAME   :   Record Supplier Progress
PROCESS NUMBER: 3.7

DESCRIPTION   :

- Receive supplier report, supplier record and task plan record to process 3.6

- Record supplier progress report to supplier report file

INPUT   :

- Supplier Report
- Supplier Record
- Task Plan Record

OUTPUT   :

- Supplier Progress Record

PROCESS NAME   :   Get Contractor Record
PROCESS NUMBER: 3.8

DESCRIPTION   :

- Receive contractor report from process 3.1

- Input contractor ID to contractor file

- Get contractor record from contractor file

- Send contractor report and contractor record to process 3.9

INPUT   :

- Contractor Report
- Contractor ID

OUTPUT   :

- Contractor Report
- Contractor Record

PROCESS NAME   :   Get Task Plan Record
PROCESS NUMBER :   3.9

DESCRIPTION   :

- Receive contractor report and contractor record from process 3.8

- Input task ID to task plan file

- Get task record from task plan file

- Send contractor report, contractor record and task plan record to process 3.10

INPUT   :

- Contractor Report
- Contractor Record
- Task ID

OUTPUT   :

- Contractor Report
- Contractor Record
- Task Plan Record

PROCESS NAME   :   Record Contractor Progress
PROCESS NUMBER :   3.10

DESCRIPTION   :

- Receive contractor report, contractor record and task plan record to process 3.9

- Record contractor progress report to contractor report file

INPUT   :

- Contractor Report
- Contractor Record
- Task Plan Record

OUTPUT   :

- Contractor Progress Record

PROCESS NAME   :   Classify Financial Report
PROCESS NUMBER: 4.1

DESCRIPTION   :

- Get financial report from financial department

- Classify financial report

- Send revenue information to process 4.2

- Send expense information to process 4.4

INPUT   :

- Financial Report

OUTPUT   :

- Revenue Information
- Expense Information

PROCESS NAME   :   Get Revenue Record
PROCESS NUMBER: 4.2

DESCRIPTION   :

- Receive revenue information from process 4.1

- Input Revenue ID to revenue file

- Get revenue record from revenue file

- Send revenue information and revenue record to process 4.3

INPUT   :

- Revenue Information
- Revenue ID

OUTPUT   :

- Revenue Information
- Revenue Record

PROCESS NAME   :   Record Revenue
PROCESS NUMBER :   4.3

DESCRIPTION   :

- Receive revenue information and revenue record from process 4.2

- Record revenue record to project revenue file

INPUT   :

- Revenue Information
- Revenue Record

OUTPUT   :

- Revenue Record

PROCESS NAME   :   Get Expense Record

PROCESS NUMBER :   4.4

DESCRIPTION   :

- Receive expense information from process 4.1

- Input expense ID to expense file

- Get expense record from expense file

- Input expense category ID to expense category file

- Get expense category record from expense category file

- Send expense information, expense category record and revenue record to Process 4.5

INPUT   :

- Expense Information
- Expense ID
- Expense Category ID

OUTPUT   :

- Expense Information
- Expense Record
- Expense Category Record

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PROCESS NAME   :   Record Expense
PROCESS NUMBER :   4.5

DESCRIPTION   :

- Receive expense information, expense record and expense category from Process 4.4

- Record expense record to project detailed expense file

INPUT   :

- Expense Information
- Expense Record
- Expense Category Record

OUTPUT   :

- Expense Record

PROCESS NAME   :   Generate Project Background Report
PROCESS NUMBER :   5.1

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get customer record from customer file

- Get customer contact record from customer contact file

- Generate project background report

- Print project background report

- Send project background report to top management

INPUT   :

- Project ID

OUTPUT   :

- Project Background Report

PROCESS NAME   :   Generate Project Performance Report
PROCESS NUMBER :   5.2

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get task plan record from task plan file

- Get revenue plan record from revenue plan file

- Get revenue record from revenue file

- Get project revenue record from project revenue file

- Get project detail expense record from project detail expense file

- Get expense plan record from expense plan file

- Get expense record from expense file

- Get expense category record from expense category file

- Get staff report record from staff report file

- Get supplier report record from supplier report file

- Get contractor report record from contractor report file

- Start Date Variance = Actual Start Date - Estimated Start Date

- Finish Date Variance = Actual Finish Date – Estimated Finish Date

- Revenue Variance = Actual Revenue – Estimated Revenue

- Expense Variance = Actual Expense – Estimated Expense

- Generate Project Performance Report

- Print Project Performance Report

- Send Project Performance Report to Top Management

PROCESS NAME   :   Generate Project Performance Report (Continued)
PROCESS NUMBER :   5.2

INPUT   :

    - Project ID

OUTPUT   :

    - Project Performance Report

PROCESS NAME   :   Generate Task Plan Report
PROCESS NUMBER :   5.3

DESCRIPTION   :

    - Input project ID to project file

    - Get project record from project file

    - Get task plan record from task plan file

    - Generate task plan report

    - Print task plan report

    - Send task plan report to top management

INPUT   :

    - Project ID

OUTPUT   :

    - Task Plan Report

PROCESS NAME   :   Generate Task Progress Report
PROCESS NUMBER: 5.4

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get task plan record from task plan file

- Get staff report record from staff report file

- Get supplier report record from supplier report file

- Get contractor report record from contractor report file

- Duration = Finish Date – Start Date

- Start Date Variance = Actual Start Date – Estimated Start Date

- Finish Date Variance = Actual Finish Date – Estimated Finish Date

- Generate task progress report

- Print task progress report

- Send task progress report to top management

INPUT   :

- Project ID

OUTPUT   :

- Task Progress Report

PROCESS NAME   :   Generate Who Does What Report
PROCESS NUMBER: 5.5

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get task plan record from task plan file

- Get staff workon task record from staff workon task file

- Get contractor workon task record from contractor workon task file

- Get supplier workon task record from supplier workon task file

- Get staff record from staff file

- Get supplier record from supplier file

- Get contractor record from contractor file

- Generate who does what report

- Print who does what report

- Send who does what report to top management

INPUT   :

- Project ID

OUTPUT   :

- Who Does What Report

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PROCESS NAME   :   Generate Who Does What When Report
PROCESS NUMBER :   5.6

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get task plan record from task plan file

- Get staff workon task record from staff workon task file

- Get contractor workon task record from contractor workon task file

- Get supplier workon task record from supplier workon task file

- Get staff record from staff file

- Get supplier record from supplier file

- Get contractor record from contractor file

- Generate who does what when report

- Print who does what when report

- Send who does what when report to top management

INPUT   :

- Project ID

OUTPUT   :

- Who Does What When Report

PROCESS NAME   :   Generate Budget Report
PROCESS NUMBER :   5.7

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get revenue record from revenue file

- Get revenue plan record from revenue plan file

- Get expense record from expense file

- Get expense plan record from expense plan file

- Get expense category record from expense category file

- Total Expense = Foreign Material + Local Material + Foreign Travelling + Local Travelling + Contractor + Allowance + Entertain + Miscellaneous

- Profit = Revenue – Expense

- Accumulate Profit = Previous Month Profit + Current Month Profit

- Generate budget report

- Print budget report

- Send budget report to top management

INPUT   :

- Project ID

OUTPUT   :

- Budget Report

PROCESS NAME   :   Generate Cash Flow Report
PROCESS NUMBER :   5.8

DESCRIPTION   :

- Input project ID to project file

- Get project record from project file

- Get revenue record from revenue file

- Get revenue plan record from revenue plan file

- Get expense record from expense file

- Get expense plan record from expense plan file

- Get expense category record from expense category file

- Get project revenue record from project revenue file

- Get revenue report record from revenue report file

- Get project detail expense record from project detail expense file

- Get expense detail report record from expense detail report file

- Cash Excess = Revenue – Expense

- Beginning Balance = Ending Balance of Previous Month

- Ending Balance = Beginning Balance + Cash Excess

- Generate cash flow report

- Print cash flow report

- Send cash flow report to top management

INPUT   :

- Project ID

OUTPUT   :

- Cash Flow Report

PROCESS NAME   :   Generate Supplier Detailed Work Report
PROCESS NUMBER :   5.9

DESCRIPTION   :

- Input project ID to project file

- Input supplier ID to supplier file

- Get project record from project file

- Get supplier record from supplier file

- Get supplier workon project record from supplier workon project file

- Generate supplier detailed work report

- Print supplier detailed work report

- Send supplier detailed work report to top management

INPUT   :

- Project ID
- Supplier ID

OUTPUT   :

- Supplier Detailed Work Report

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PROCESS NAME   :   Generate Contractor Detailed Work Report
PROCESS NUMBER: 5.10

DESCRIPTION   :

- Input project ID to project file

- Input contractor ID to contractor file

- Get project record from project file

- Get contractor record from contractor file

- Get contractor workon project record from contractor workon project file

- Generate contractor detailed work report

- Print contractor detailed work report

- Send contractor detailed work report to top management

INPUT   :

- Contractor ID
- Project ID

OUTPUT   :

- Contractor Detailed Work Report

PROCESS NAME　　:　　Get Customer Information
PROCESS NUMBER:　　6.1

DESCRIPTION　　:

- Receive customer information from customer

- Send customer information to process 6.2

INPUT　　　　:

- Customer Information

OUTPUT　　　:

- Customer Information

PROCESS NAME　　:　　Verify Customer Information
PROCESS NUMBER:　　6.2

DESCRIPTION　　:

- Receive customer information from process 6.1

- Input customer ID

- If found
　　　Retrieve customer information
　Else
　　　Create new customer ID
　End if

- Send customer information to process 6.3

INPUT　　　　:

- Customer Information
- Customer Record

OUTPUT　　　:

- Customer Information

PROCESS NAME   :   Generate Customer Number
PROCESS NUMBER :   6.3

DESCRIPTION   :

- Receive customer information from process 6.2

- If new customer
      Read customer with last customer ID
      Next customer ID = customer ID + 1
End if

- Send customer information and customer ID to process 6.4

INPUT   :

- Customer Information

OUTPUT   :

- Customer Information
- Customer ID

PROCESS NAME   :   Update / Record Customer
PROCESS NUMBER :   6.4

DESCRIPTION   :

- Receive customer information from process 6.3

- If customer found
      Update customer information
Else
      Record customer information to customer file
End if

INPUT   :

- Customer Information
- Customer ID

OUTPUT   :

- Customer Record

PROCESS NAME   :   Get Staff Information
PROCESS NUMBER: 7.1

DESCRIPTION   :

- Receive staff information from personal department

- Send staff information to process 7.2

INPUT   :

- Staff Information

OUTPUT   :

- Staff Information

PROCESS NAME   :   Verify Staff Information
PROCESS NUMBER: 7.2

DESCRIPTION   :

- Receive staff information from process 7.1

- Input staff ID

- If found
        Retrieve staff information
  Else
        Create new staff ID
  End if

- Send staff information to process 7.3

INPUT   :

- Staff Information
- Staff Record

OUTPUT   :

- Staff Information

PROCESS NAME   :   Generate Staff Number
PROCESS NUMBER :   7.3

DESCRIPTION   :

    - Receive staff information from process 7.2

    - If new staff
        Read staff with last staff ID
        Next staff ID = staff ID + 1
    End if

    - Send staff information and staff ID to process 7.4

INPUT   :

    - Staff Information

OUTPUT   :

    - Staff ID
    - Staff Information

PROCESS NAME   :   Update / Record Staff
PROCESS NUMBER :   7.4

DESCRIPTION   :

    - Receive staff information from process 7.3

    - If staff found
        Update staff information
    Else
        Record staff information to staff file
    End if

INPUT   :

    - Staff Information
    - Staff ID

OUTPUT   :

    - Staff Record

PROCESS NAME   :   Get Supplier Information
PROCESS NUMBER: 8.1

DESCRIPTION   :

    - Receive supplier information from supplier

    - Send supplier information to process 8.2

INPUT   :

    - Supplier Information

OUTPUT   :

    - Supplier Information

PROCESS NAME   :   Verify Supplier Information
PROCESS NUMBER: 8.2

DESCRIPTION   :

    - Receive supplier information from process 8.1

    - Input supplier ID

    - If found
        Retrieve supplier information
    Else
        Create new supplier ID
    End if

    - Send supplier information to process 8.3

INPUT   :

    - Supplier Information
    - Supplier Record

OUTPUT   :

    - Supplier Information

PROCESS NAME   :   Generate Supplier Number
PROCESS NUMBER :   8.3

DESCRIPTION   :

    - Receive supplier information from process 8.2

    - If new supplier
        Read supplier with last supplier ID
        Next supplier ID = supplier ID + 1
    End if

    - Send supplier information and supplier ID to process 8.4

INPUT   :

    - Supplier Information

OUTPUT   :

    - Supplier Information
    - Supplier ID

PROCESS NAME   :   Update / Record Supplier
PROCESS NUMBER :   8.4

DESCRIPTION   :

    - Receive supplier information from process 8.3

    - If supplier found
        Update supplier information
    Else
        Record supplier information to supplier file
    End if

INPUT   :

    - Supplier Information
    - Supplier ID

OUTPUT   :

    - Supplier Record

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PROCESS NAME   :   Get Contractor Information
PROCESS NUMBER: 9.1

DESCRIPTION   :

- Receive contractor information from contractor

- Send contractor information to process 9.2

INPUT   :

- Contractor Information

OUTPUT   :

- Contractor Information

PROCESS NAME   :   Verify Contractor Information
PROCESS NUMBER: 9.2

DESCRIPTION   :

- Receive contractor information from process 9.1

- Input contractor ID

- If found
          Retrieve contractor information
  Else
          Create new contractor ID
  End if

- Send contractor information to process 8.3

INPUT   :

- Contractor Information
- Contractor Record

OUTPUT   :

- Contractor Information

PROCESS NAME   :   Generate Contractor Number
PROCESS NUMBER :   9.3

DESCRIPTION   :

    - Receive contractor information from process 9.2

    - If new contractor
          Read contractor with last contractor ID
          Next contractor ID = contractor ID + 1
    End if

    - Send contractor information and contractor ID to process 9.4

INPUT   :

    - Contractor Information

OUTPUT   :

    - Contractor Information
    - Contractor ID

PROCESS NAME   :   Update / Record Contractor
PROCESS NUMBER :   9.4

DESCRIPTION   :

    - Receive contractor information from process 9.3

    - If contractor found
          Update contractor information
    Else
          Record contractor information to contractor file
    End if

INPUT   :

    - Contractor Information
    - Contractor ID

OUTPUT   :

    - Contractor Record

PROCESS NAME   :   Get & Classify Contract
PROCESS NUMBER: 10.1

DESCRIPTION   :

- Get supplier contract from supplier

- Get contractor contract from contractor

- Classify contract

- Send supplier contract information to process 10.2

- Send contractor contract information to process 10.3

INPUT   :

- Supplier Contract
- Contractor Contract

OUTPUT   :

- Supplier Contract Information
- Contractor Contract Information

PROCESS NAME   :   Update / Record Sup Contract
PROCESS NUMBER: 10.2

DESCRIPTION   :

- Receive supplier contract information from process 10.1

- Input supplier contract ID

- If supplier contract ID found
        Update supplier contract record
    Else
        Record supplier contract record to supplier workon project file
    End if

INPUT   :

- Supplier Contract Information

OUTPUT   :

- Supplier Contract Record

PROCESS NAME : Update / Record Contractor Contract
PROCESS NUMBER : 10.3

DESCRIPTION :

- Receive contractor contract information from process 10.1

- Input contractor contract ID

- If contractor contract ID found
       Update contractor contract record
  Else
       Record contractor contract record to contractor workon project file
  End if

INPUT :

- Contractor Contract Information

OUTPUT :

- Contractor Contract Record

APPENDIX   H

SOURCE DOCUMENTS

Project Name _____

Elsag Bailey (Thailand) Limited
Budget
As _____

Description	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Total
Revenue							
Expense :							
Foreign Material							
Local Material							
Foreign Travelling							
Local Travelling							
Contractor							
Allowance							
Entertain							
Miscellaneous							
Total Expenses							
Profit							
Accumulate Profit							

Figure H.2. Budget.

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Elsag Bailey (Thailand) Limited
Task Plan

Date _____

Project Name _____

Task ID	Task Name	Duration	Start Date	Finish Date

Figure H.3.   Task Plan.

Elasag Bailey (Thailand) Limited
Staff Report

Date : _____

| Staff ID | Staff Name | |
| Project ID | Project Name | |

Task ID	Task Name	
Estimated Start Date	Estimate Finish Date	
Actual Start Date	Actual Finish Date	

| Remark | |

Figure H.4.   Staff Report.

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Elasag Bailey (Thailand) Limited
Supplier Report

Date : _____

Supplier Name	
Project ID	Project Name

Task ID	Task Name	
Estimated Start Date	Estimate Finish Date	
Actual Start Date	Actual Finish Date	

Remark

Figure H.5. Supplier Report.

Elasag Bailey (Thailand) Limited
Contractor Report

Date : _____

Contractor Name

Project ID   Project Name

Task ID   Task Name

Estimated Start Date   Estimate Finish Date

Actual Start Date   Actual Finish Date

Remark

Figure H.6.   Contractor Report.

Elsag Bailey (Thailand) Limited
Revenue Report

Date _____

Project Name	Date	Description	Amount	Customer Name

Figure H.7. Revenue Report.

Elsag Bailey (Thailand) Limited
Expense Report

Date _____

Project Name	Date	Description	Amount	Who

Figure H.8.   Expense Report.

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Elasag Bailey (Thailand) Limited
Supplier Contract

Project ID	
Contract Number	
Supplier Name	
Estimate Start Date	
Contract Value	
Term of Payment	
Scope of Work	
Remark	

Project Name	
Date	
Contact Person	
Estimate Finish Date	

Figure H.9. Supplier Contract.

Elasag Bailey (Thailand) Limited
Contractor Contract

Project ID

Contract Number

Contractor Name

Estimate Start Date

Contract Value

Term of Payment

Scope of Work

Remark

Project Name

Date

Contact Person

Estimate Finish Date

Figure H.10.   Contractor Contract.

Elasag Bailey (Thailand) Limited
Customer Information

Date : _____

| Customer ID | [_____] | Customer Name | [_____] |

Customer Address [_____]

City [_____] Postal Code [_____]

Country [_____]

Contact Person

Name	Position	Tel	Fax	E-mail

Figure H.11. Customer Information.

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Elasag Bailey (Thailand) Limited
Supplier Information

Date : _____

Supplier ID [_____]   Supplier Name [_____]

Supplier Address [_____]

City [_____]   Postal Code [_____]

Country [_____]

Contact Person			
Name	Position	Tel	Fax	E-mail

Figure H.12.   Supplier Information.

Elasag Bailey (Thailand) Limited
Contractor Information

Date :

| Contractor ID | | Contractor Name | |

Contractor Address	
City		Postal Code	
Country	

| Contact Person | Name | Position | Tel | Fax | E-mail |

Figure H.13.   Contractor Information.

Elasag Bailey (Thailand) Limited
Staff Information

Date : _____

Staff ID	

First Name		Last Name	

Title		Department	

Education	

Training	

Experience	

Figure H.14.   Staff Information.

Elasag Bailey (Thailand) Limited
Assign Task to Staff

Date :

Project ID	Project Name
Task ID	Task Name
Estimated Start Date	Estimate Finish Date

Assign to

Scope of Work

Figure H.15.   Assign Task to Staff.

Elasag Bailey (Thailand) Limited
Assign Task to Contractor

Date :

Project ID	Project Name
Task ID	Task Name
Estimated Start Date	Estimate Finish Date

Assign to	
Scope of Work	

Figure H.16.   Assign Task to Contractor.

Elasag Bailey (Thailand) Limited
Assign Task to Supplier

Date :

Project ID	Project Name

Task ID	Task Name

Estimated Start Date	Estimate Finish Date

Assign to

Scope of Work

Figure H.17.   Assign Task to Supplier.

APPENDIX   I

USER INTERFACES
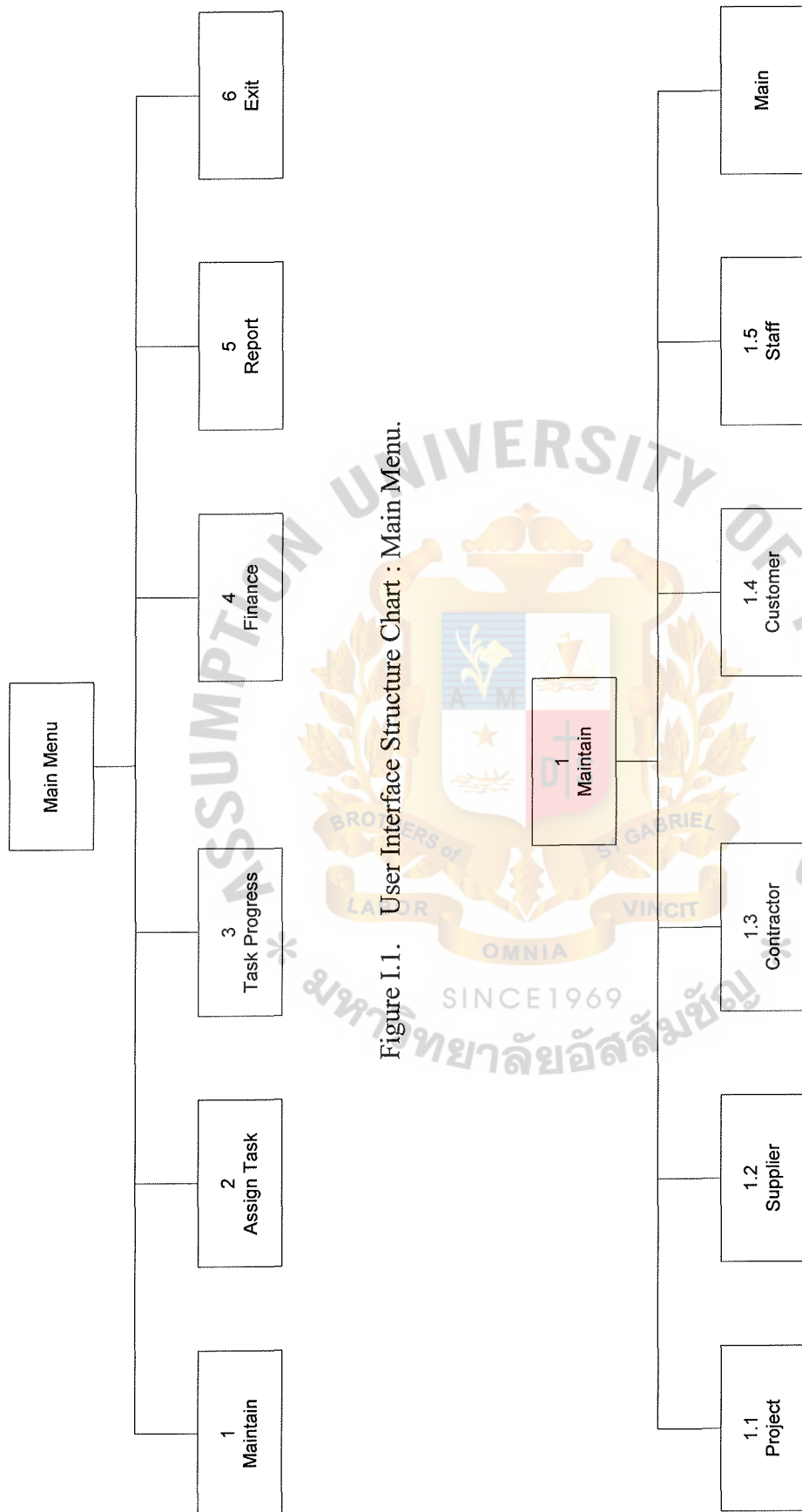
Figure I.1.   User Interface Structure Chart : Main Menu.

Figure I.2.   User Interface Structure Chart : Maintain.

140
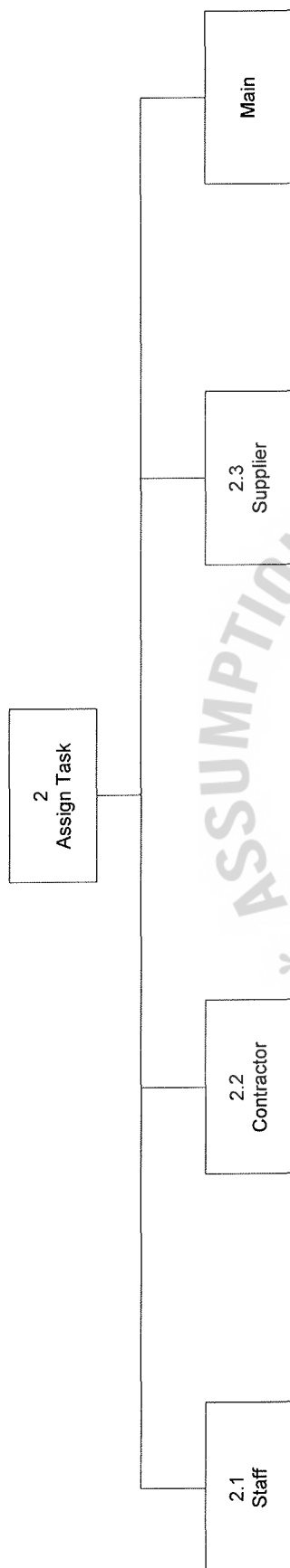
Figure I.3. User Interface Structure Chart : Assign Task.
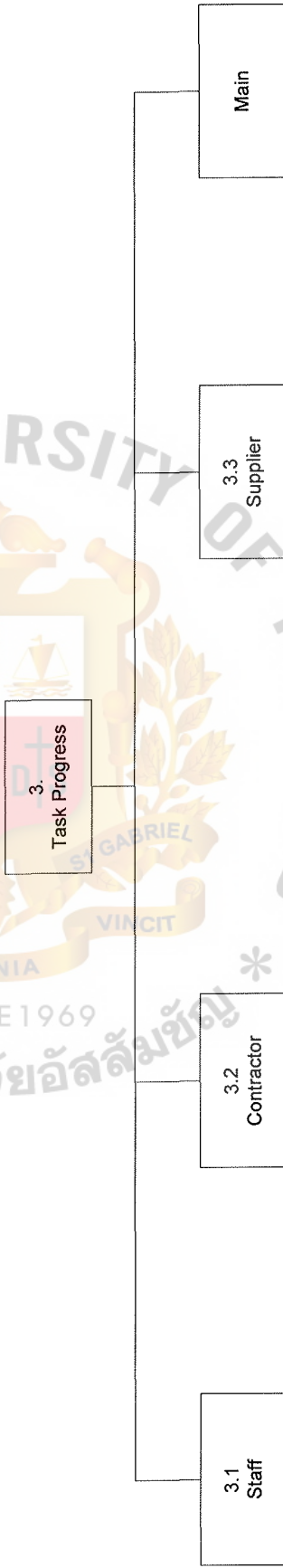
Figure I.4. User Interface Structure Chart : Task Progress.

141
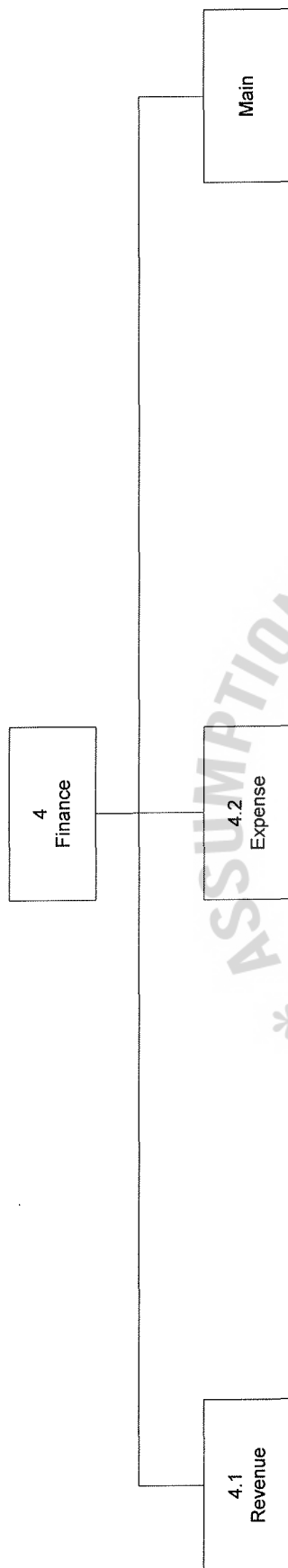
Figure I.5.   User Interface Structure Chart : Finance.

Figure I.6.   User Interface Structure Chart : Report.

142
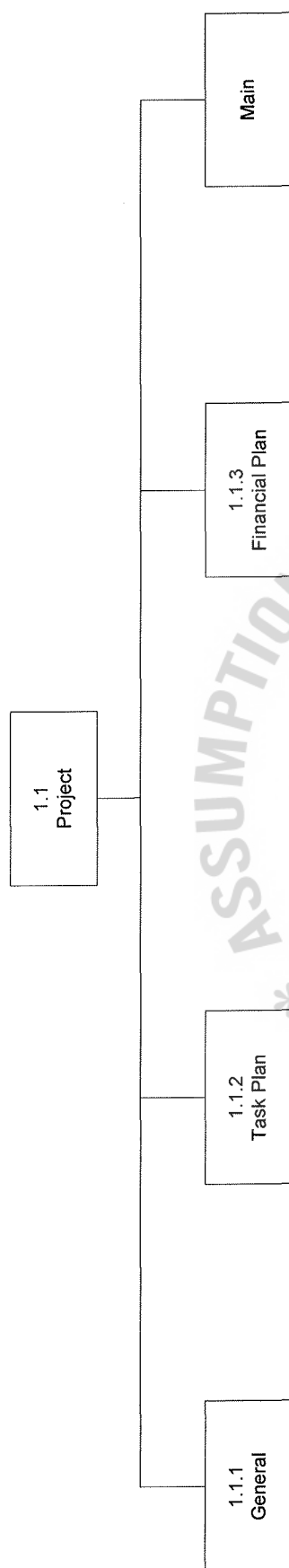
Figure I.7. User Interface Structure Chart : Project.
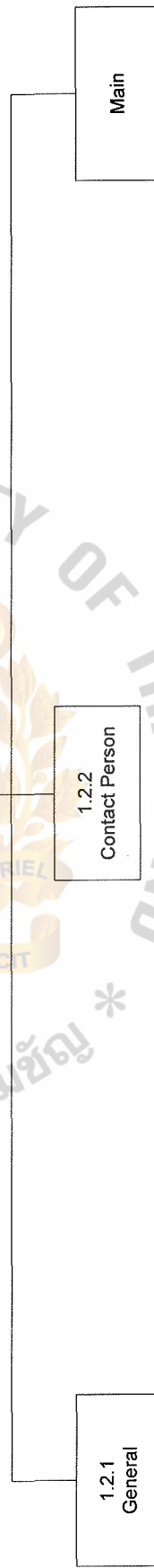
Figure I.8. User Interface Structure Chart : Supplier.

143
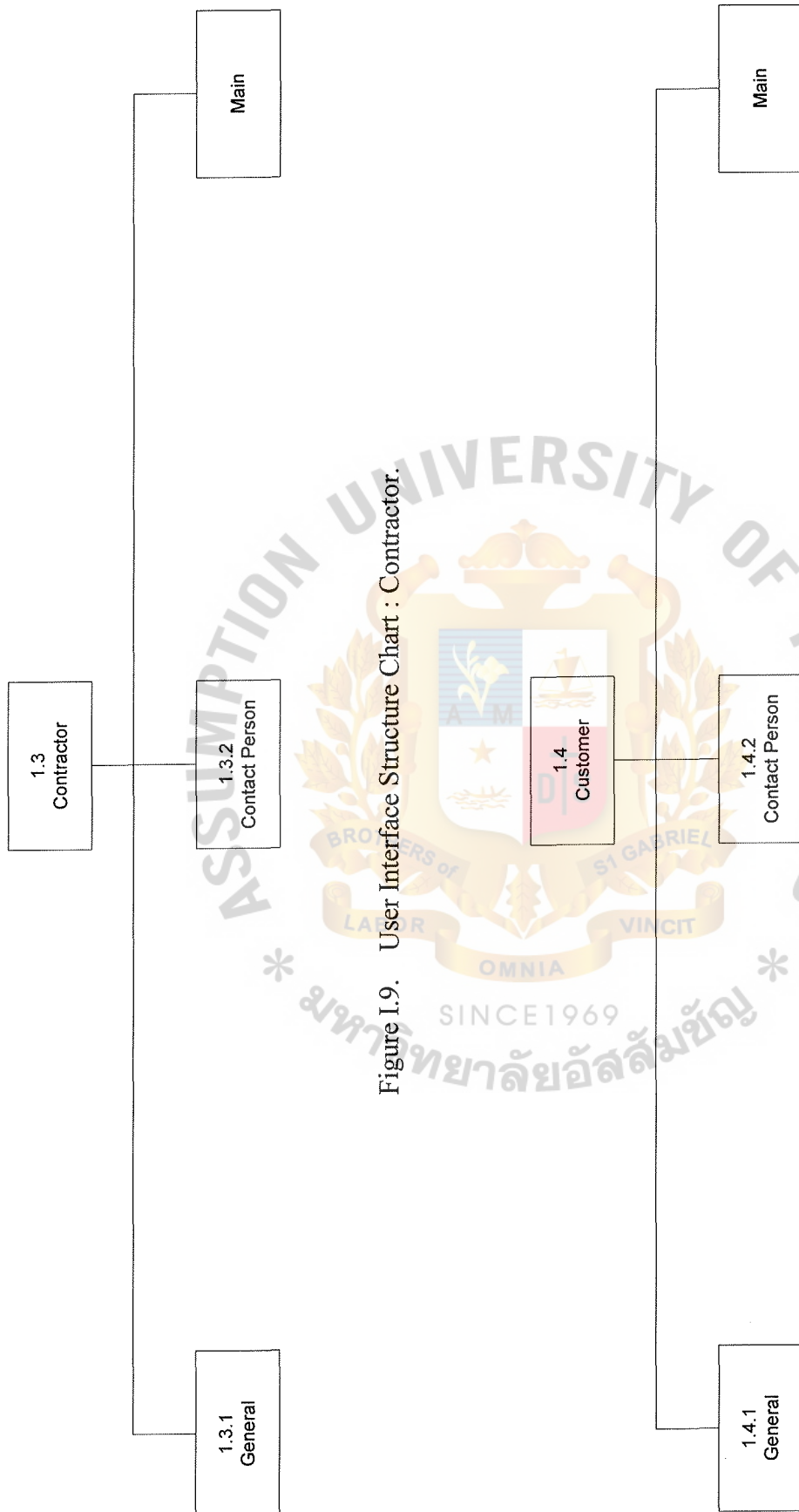
Figure I.9. User Interface Structure Chart : Contractor.

Figure I.10. User Interface Structure Chart : Customer.
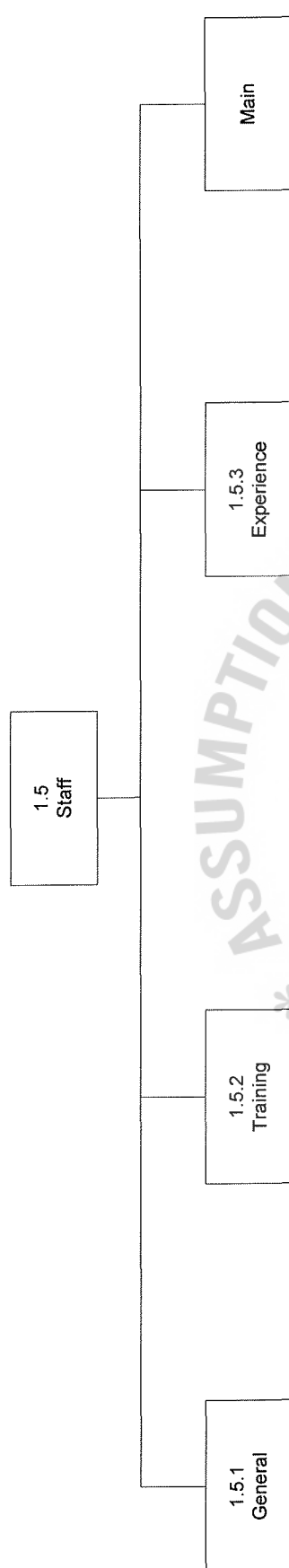
Figure I.11. User Interface Structure Chart : Staff.
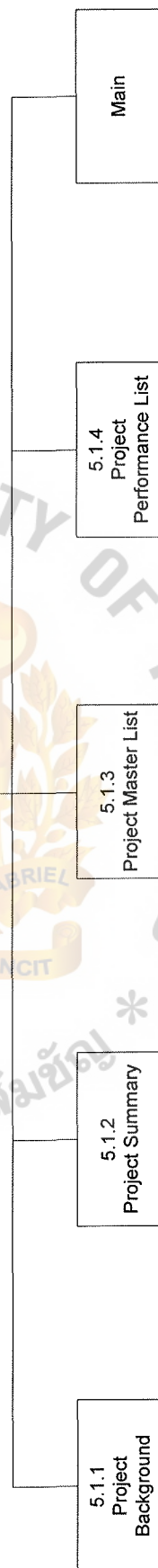
Figure I.12. User Interface Structure Chart : Overview Report.

145
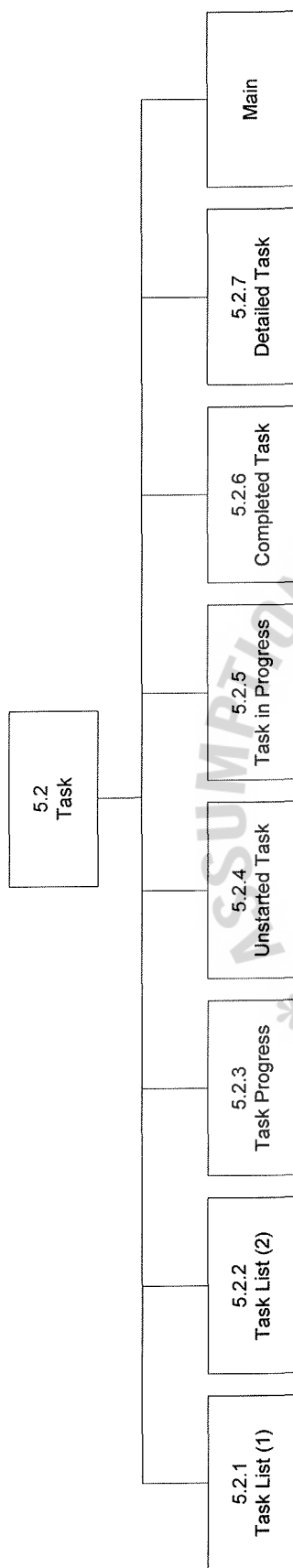
Figure I.13. User Interface Structure Chart : Task Report.
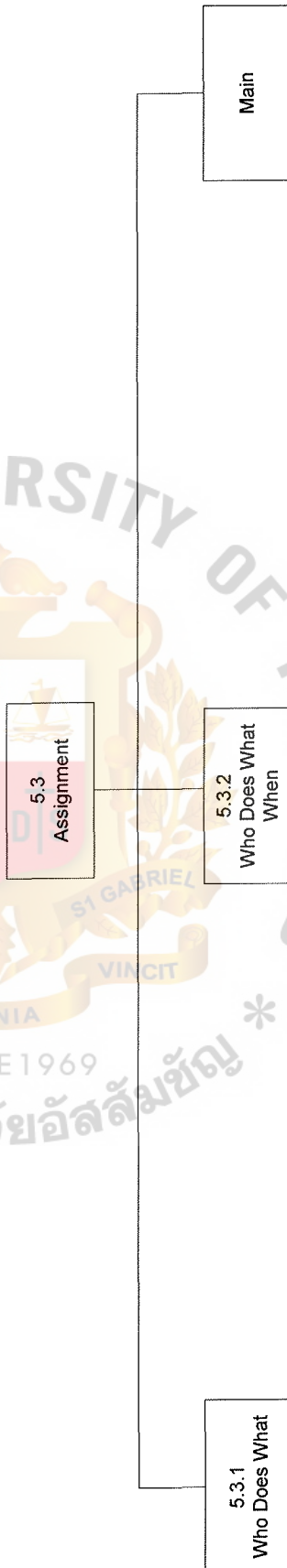
Figure I.14. User Interface Structure Chart : Assignment Report.

146
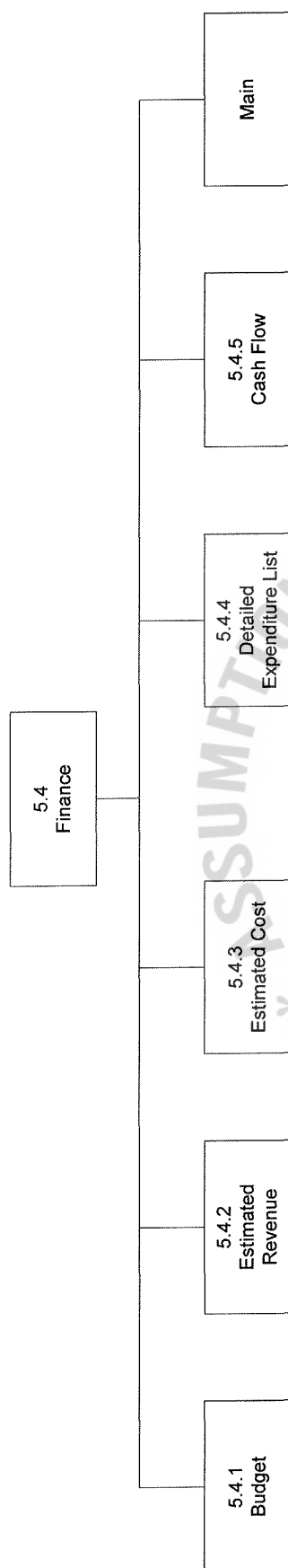
Figure I.15. User Interface Structure Chart : Finance Report.
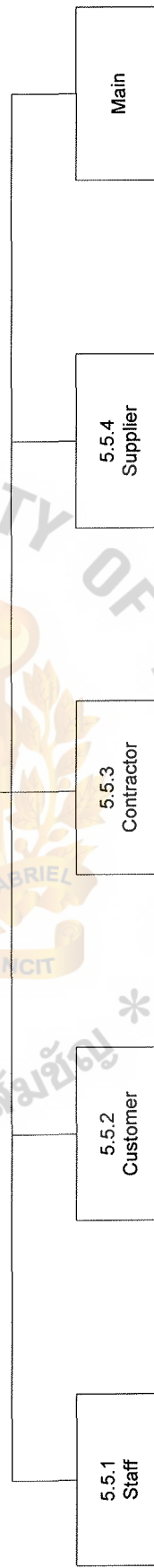
Figure I.16. User Interface Structure Chart : Maintain Report.

147
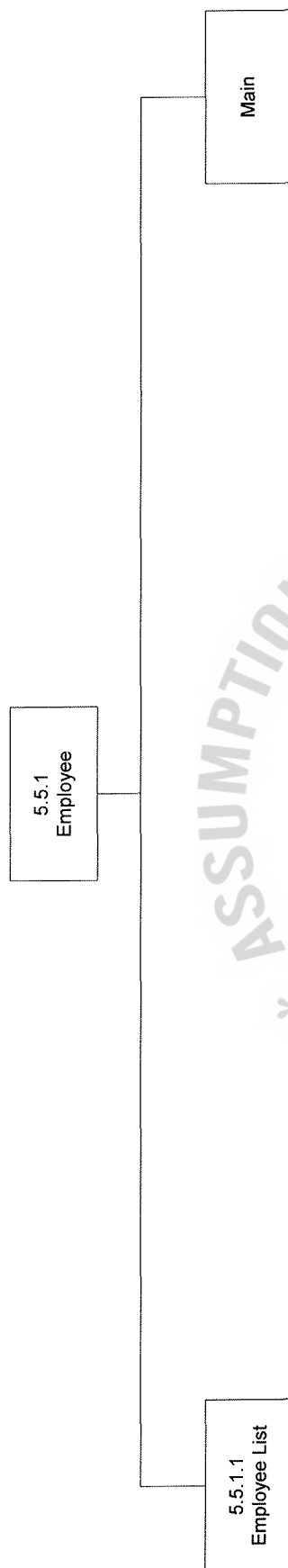
Figure I.17. User Interface Structure Chart : Employee Report.
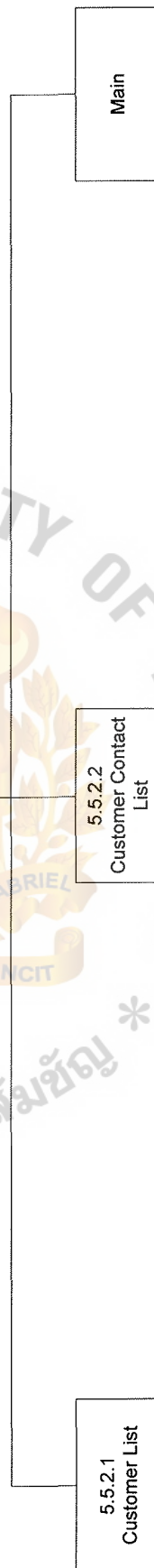
Figure I.18. User Interface Structure Chart : Customer Report.

148
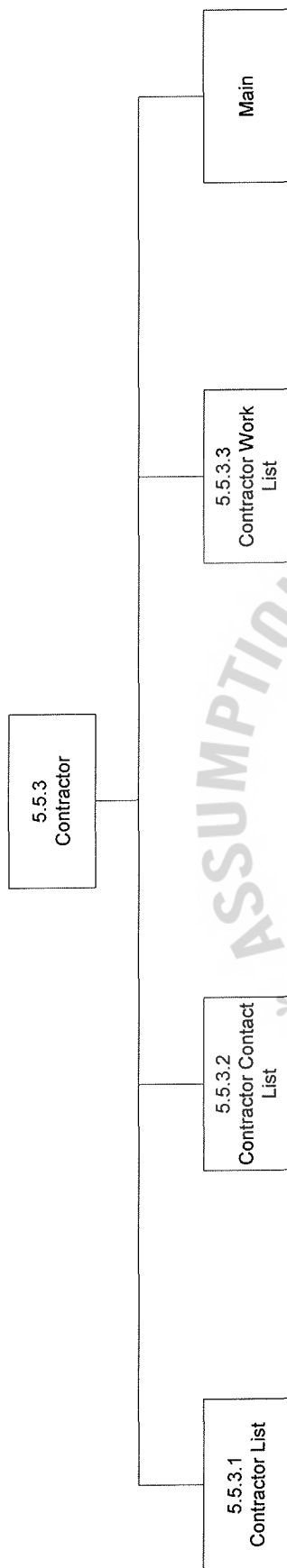
Figure I.19. User Interface Structure Chart : Contractor Report.

Figure I.20. User Interface Structure Chart : Supplier Report.
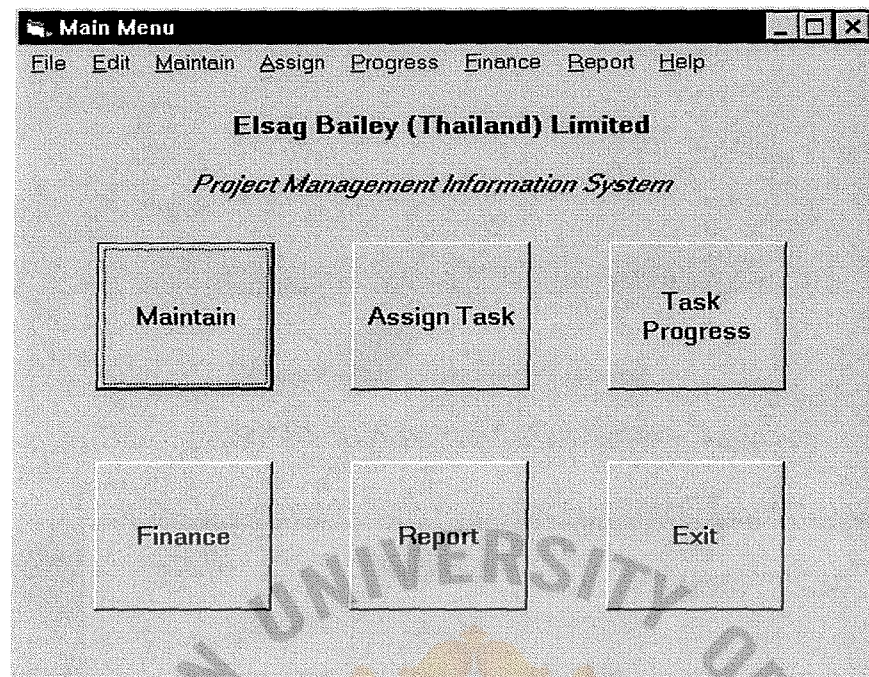
Figure I.21.　User Interface: Main Menu.

Figure I.22.　User Interface: Maintain.

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Figure I.23.   User Interface: Maintain Project.

Figure I.24.   User Interface: Maintain Project (Task Plan).

Figure I.25.   User Interface: Maintain Project (Budget).

Figure I.26.   User Interface: Maintain Supplier (General).

Figure I.27.   User Interface: Maintain Supplier (Contact Person).

Figure I.28.   User Interface: Maintain Supplier (Contract).

Figure I.29.   User Interface: Maintain Contractor (General).

Figure I.30.   User Interface: Maintain Contractor (Contact Person).

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Figure I.31.   User Interface: Maintain Contractor (Contract).

Figure I.32.   User Interface: Maintain Customer (General).

Figure I.33.   User Interface: Maintain Customer (Contact Person).

Figure I.34.   User Interface: Maintain Customer (Contract).

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Figure I.35.   User Interface: Maintain Staff (General).

Figure I.36.   User Interface: Maintain Staff (Training).

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Figure I.37. User Interface: Maintain Staff (Experience).

Figure I.38. User Interface: Assign.

Figure I.39.   User Interface: Assign Task to Staff.

Figure I.40.   User Interface: Assign Task to Contractor.

Figure I.41. User Interface: Assign Task to Supplier.

Figure I.42. User Interface: Task Progress.

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Figure I.43.　User Interface: Staff Progress.

Figure I.44.　User Interface: Contractor Progress.

Figure I.45.   User Interface: Supplier Progress.

Figure I.46.   User Interface: Finance.

Figure I.47.   User Interface: Actual Revenue.

Figure I.48.   User Interface: Actual Expense.

163
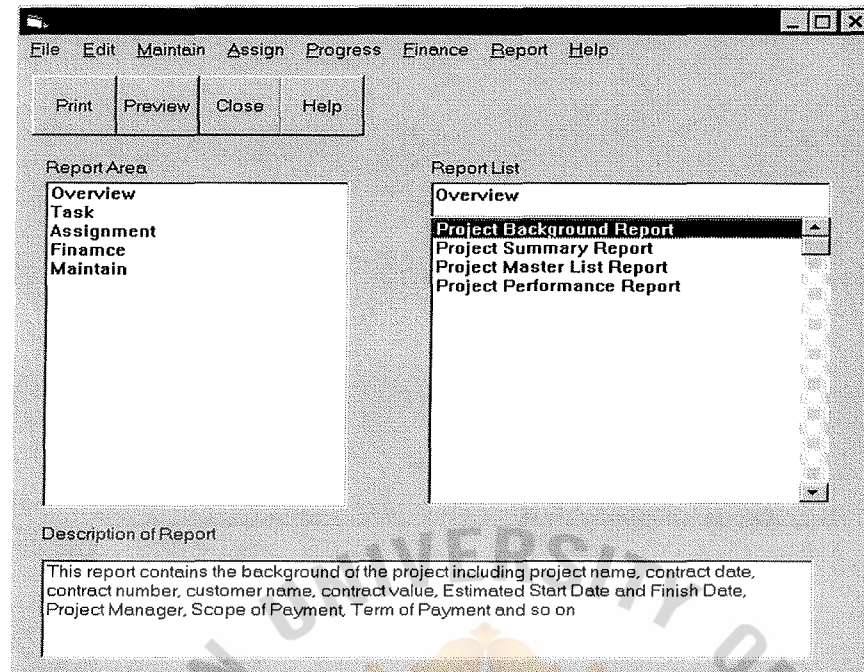
Figure I.49.   User Interface: Report.
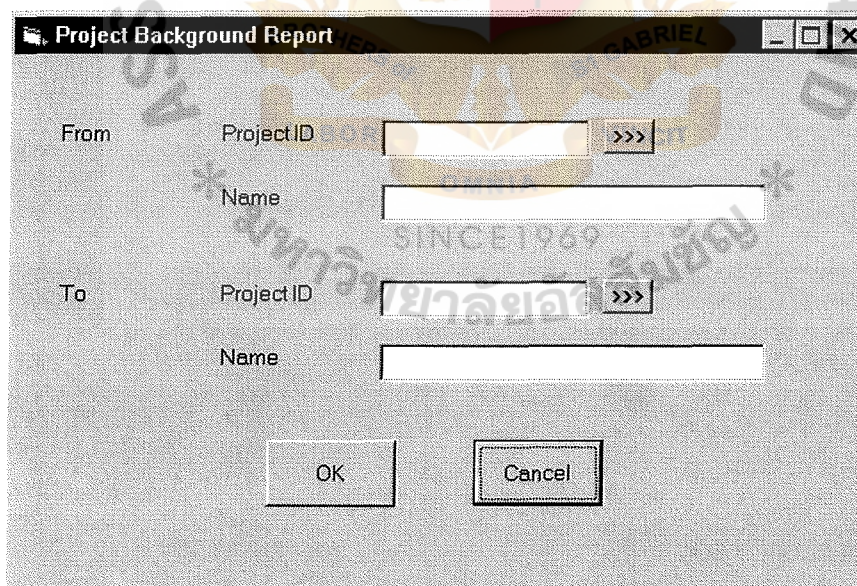
Figure I.50.   User Interface: Project Background Report.
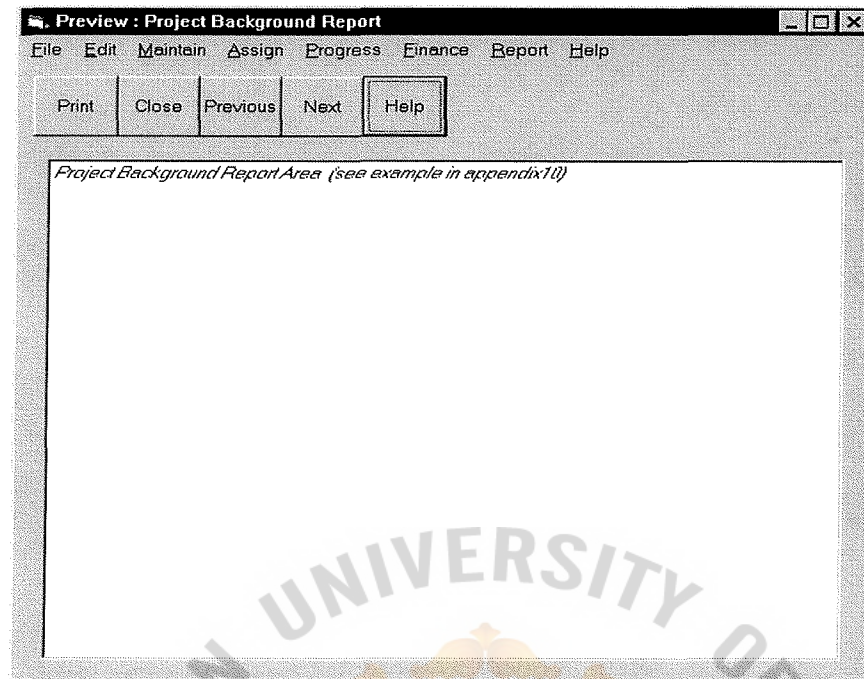
Figure I.51.   User Interface: Preview (Project Background Report).

APPENDIX   J

OUTPUT REPORTS

Elasag Bailey (Thailand) Limited
Project Background

Project ID	Project Name
Contract Number	Date
Customer Name	Contact Person
Estimate Start Date	Estimate Finish Date
Contract Value	Project Manager
Term of Payment	
Scope of Work	
Remark	

Figure J.1.   Project Background Report.

Elsag Bailey (Thailand) Limited

Project Performance List

As _____

Project Name	Start Date			Finish Date			Revenue			Expense		
	Plan	Actual	Variance	Plan	Actual	Variance	Plan	Actual	Variance	Plan	Actual	Variance

Figure J.2.   Project Performance List Report.

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Elsag Bailey (Thailand) Limited

Task Plan

Project Name : _____

June-99

Monday	Tuesday	Wednesday	Thursday	Firday	Saturday	Sunday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Figure J.3.   Task Plan Report.

Elsag Bailey (Thailand) Limited

Task Progress

Project Name _____

Task ID	Task Name	Duration	Start Date				Finish Date		
			Actual	Plan	Variance		Actual	Plan	Variance

Figure J.4.   Task Progress Report.

Elsag Bailey (Thailand) Limited
Who Does What

Project Name _____

Task ID	Task Name	Who	Start Date	Finish Date

Figure J.5.   Who Does What Report.

Elsag Bailey (Thailand) Limited

Who Does What When

Staff Name : _____

June-99

Monday	Tuesday	Wednesday	Thursday	Firday	Saturday	Sunday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Figure J.6.   Who Does What When Report.

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Project Name _____

Elsag Bailey (Thailand) Limited

Budget

As _____

Description	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Total
Revenue							
Expense :							
Foreign Material							
Local Material							
Foreign Travelling							
Local Travelling							
Contractor							
Allowance							
Entertain							
Miscellaneous							
Total Expenses							
Profit							
Accumulate Profit							

Figure J.7. Budget Report.

Elsag Bailey (Thailand) Limited

Cash Flow

As _____

Project Name _____

Description	Jan-99			Feb-99			Year to Date		
	Actual	Plan	Variance	Actual	Plan	Variance	Acutal	Plan	Variance
Revenue									
Expense :									
Foreign Material									
Local Material									
Foreign Travelling									
Local Travelling									
Contractor									
Allowance									
Entertain									
Miscellaneous									
Total Expenses									
Cash Excess (Deficit)									
Beginning Balance									
Ending Balance									

Figure J.8.   Cash Flow Report.

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Elasag Bailey (Thailand) Limited
Supplier Detailed Work

|	
Supplier ID	Supplier Name
Project ID	Project Name
Contract No.	Date
Estimate Start Date	Estimate Finish Date
Contract Value	Responsible by
Term of Payment	
Scope of Work	
Remark	

Figure J.9.   Supplier Detailed Work Report.

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Elasag Bailey (Thailand) Limited
Contractor Detailed Work

| Contractor ID		Contractor Name	
Project ID		Project Name	
Contract No.		Date	
Estimate Start Date		Estimate Finish Date	
Contract Value		Responsible by	
Term of Payment			
Scope of Work			
Remark			

Figure J.10.   Contractor Detailed Work Report.

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