MANAGEMENT INFORMATION SYSTEM
FOR SYSTEMS INTEGRATION BUSINESS

PAYONG HOIKEAW

MASTER OF SCIENCE

IN ADVANCED INFORMATION TECHNOLOGY

MAE FAH LUANG UNIVERSITY

2007

MANAGEMENT INFORMATION SYSTEM
FOR SYSTEMS INTEGRATION BUSINESS

PAYONG HOIKEAW

AN INDEPENDENT STUDY SUBMITTED TO
MAE FAH LUANG UNIVERSITY IN PARITIAL FULFILLMENT OF
THE REQUIREMENT FOR THE DEGREE OF
MASTER OF COMPUTER SCIENCE
IN ADVANCED INFORMATION TECHNOLGOY

MAE FAH LUANG UNIVERSITY

2007

MANAGEMENT INFORMATION SYSTEM

FOR SYSTEMS INTEGRATION BUSINESS

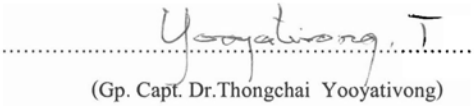
PAYONG HOIKEAW

THIS INDEPENDENT STUDY HAS BEEN APPROVED
TO BE A PARTIAL FUFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN ADVANCED INFORMATION TECHNOLGOY

EXAMINING COMMITTEE

.....CHAIRPERSON

(Asst. Prof. Gp. Capt. Dr.Sanlayut Sawangwan)

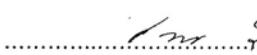


.....MEMBER

(Gp. Capt. Dr.Thongchai Yooyativong)

.....MEMBER

(Lecturer Piyasak Jeatrakul)



.....MEMBER

(Lecturer Vittayasak Rujivarakul)

ACKNOWLEDGEMENT

I would like to express my sincere gratitude and deep appreciation to my advisors, Dr.Thongchai Yooyativong and co-advisor, Mr.Piyasak Jeatrakul for their valuable advice, supervision, guidance, encouragement and recommendation.

Moreover, I would like to thank the staff from Ideal Systems (Thailand) Co., Ltd. for their co-operation and generous assistant.

I wish to thank all of my MFLU friends, who gave me some suggestion and their great cooperation. I also wish to thank Mr.Phanuwat Sribangpoon for his technical problem's assistant.

Last of all, I wish to acknowledge the generosity of my parents and my family who encourage and understanding throughout the period of my study.

Payong Hoikeaw

Independent Study Title Management Information System for Systems Integration Business

Author Mr. Payong Hoikeaw

Degree Master of Science (Advanced Information Technology)

Supervisory Committee Gp.Capt.Dr.Thongchai Yooyatiwong Chairperson

Lecturer Teanjit Sutthaluang Member

Lecturer Piyasak Jeatrakul Member

ABSTRACT

Medium sized business is lack of properties to compete with Large and Small sized business in term of efficiency and agility, respectively. In order to increase business efficiency and stay competitive, information is one important strategy to implement in organization. This study aims to study, analyze system, design and develop a system which suitable for Medium sized business. Thus Management Information System for Systems Integration Business is developed to increase business performance and agility.

Management Information System for Systems Integration Business is consists of two sub system. The first subsystem is Sales System which performs price gathering, quotation offer to customer, handover, billing, collection and warranty services. The second one is Executive Report to provide reports for planning controlling and decision support.

The Web-based Application system was developed on Microsoft Windows XP Professional and base on three tier architecture. Oracle 10g Express edition was used as Relational Database Management System and Oracle developer suite 10g was an application development tool.

Keyword : Management Information System / Systems Integration Business

CONTENTS

CONTENTS (Cont.)

LIST OF TABLES

LIST OF FIGURES

Page

FIGURES

LIST OF FIGURES (Count.)

CHAPTER I

INTRODUCITON

Nowadays, information system plays more and more important role in business world. In order to have maximum benefit from information system, the system itself needs to design to support and suit for business activities.

1.1 Background information

Business's size is significant important that how to make business strategy. There are advantages and disadvantages of different sized. Generally, Small sized business has limitation to compete with large size of business in economy of scale, efficiency, Technology and financial. However, Small sized business has better in economy of speed, focus strategy and niche market. Medium sized whereas position of business in the middle between small and large sized of business. As medium sized, itself has less efficiency to compare with large sized while has less flexibility to compare with small sized.

Ideal Systems (Thailand) Co., Ltd is a medium sized Broadcasting System Integrator company. System integrators bought about by broadcaster shedding internal expertise. They have played a key role in the broadcast sales chain bridging the gap between manufactures and end users. The roles are clearly defined with manufacturers providing "black boxes" and system integrator supplying the complete working system. The system integrator would take the position of prime contractor, with end users relying on them to ensure that the complete system worked. They provide all the project management and engineering services taking total project responsibility and control from physical wiring until completing of project. It's essential to understand the complexities that today's broadcast infrastructure requires. Ability to comprehend and evaluate the requirements of each project allows system integrator to apply expertise in workflow efficiency, centralized operations and distribution.

The company provides a wide range of services to customer from consulting on their initial concept through to maintaining equipment and software in their facility. There are variety solutions to customer such as MPEG and IP network system, News systems, Automation system, Streaming system, Traffic monitoring system, Pay TV solution, Base band solution, Post production solution and Professional service. The main strategy is to satisfy customer needs in competitive market.

Business is base on job order. Generally, business activities include gathering customer requirement, design system, get offer from suppliers, quote price to customer, purchasing product from suppliers, integrated system and finally handover solution to customer.

Currently there is no information system to manage business operation. Business transaction is base on paper form and simple spreadsheet, which has resulted in delay, redundancy and lots of paper works.

Information system is one mechanism that can help business to enhance productivity, efficiency and provide information to support decision making to have better capability. In order to increase efficiency, effectiveness, productivity and support business future growth, information system is needed to implement in business.

1.2 Objectives

1. To design workflow and standardize documentation of related activities
2. To develop information system to support operational level and management level

    2.1 Sales system which start from give quotation to customer, integrated products for customer, invoice, collection and customer warranty

    2.2 Report of operational and Decision making system to improve business's flexibility, agility and efficiency

1.3 Scope

This project is base on Ideal Systems (Thailand) Co., Ltd and development of information system is consists of business function as follow.

1. Sales System

1.1 Quotation

1.2 Hanover / Warranty of Customer

1.3 Invoice

1.4 Billing and Collection

2. Executive report

2.1 Summary of sales data by customer

2.2 Summary of sales data by product

2.3 Summary of sales data by category

2.4 Report for decision maker

2.4.1 Rate and weight (Order / Project selection)

Method

1. System analysis

1.1 Gathering requirement of Management Information System from management and user level

1.2 Study business environment and business operation, by interview, observation and documentation

1.3 Analyst weakness and strength and limitation of present system

1.4 Identify needed of an organization

2. System Design

2.1 Design of flow of data

2.2 Design relational database

2.3 Screen Design

2.4 Report Design

3. Project proposal approved

4. Development

5. Testing and maintaining the system

6. Manual procedure

7. Installing and evaluation the system

1.4 Expected benefits

1. Information system that suitable with activities of business which help to speed up business operation
2. Reliable and accuracy of information which needed for business
3. Minimize time consuming of each process
4. Decrease human error and increase efficiency
5. Reduce redundancy data
6. Sharing data across an organization
7. Efficiency internal control
8. Executives get necessary information in timely fashion to manage, planning and make decision
9. The system can support future business expansion

CHAPTER II

FEASIBILITY STUDY

Information System for Systems Integration Business is important to solve existing system of Ideal Systems (Thailand) Co., Ltd. In order to achieve goal, related project of others need to review by developer. All theory, which is associates to the development of project need to be consider. Clear define of requirement is essential. Concrete knowledge and methodology is must ready before process of development is started.

2.1 Problem Statement

As a medium sized system integrator and there are no information system. Business transaction is base on paper form and simple spreadsheet. There are limitation to handle business transaction and not well perform in term of sharing information, security and consistency. Whereas, process to access and retrieve information is lot of times consuming. This situation resulted inefficient and frustration for business which need accuracy information in timely manner.

Nowadays, Company works on many different projects in same time, so difficulties to run business is essential. There are often confusing of plenty of inconsistency data and difficult to track or compare with others. Those occurrences have damaged competitive advantage and business opportunities.

There are several existing problems as follow

1. Quotation, Incase the company offers product that used to quote customer. Historical price offered need to be referenced in order to have accuracy price and avoid time consuming to get price from suppliers. Previous quotations are paper base, so there are times delay to search old information wherever from spread sheet or paper.

2. Pricing calculation is often made mistake because there are excel base, so some formula is not copy to cell that user want, finally total price is incorrect.

3. Project handover to customer need lot of time to process a collection of detail of each product such as serial number and model of each product.

4. Customer warranty. Generally company provides 1 year warranty while company also get 1 year service form supplier. There are time gap between received product from supplier and install plus handover product to customer. There are no system of keep serial number of each products so, times consuming can not be avoid to check status of each product whether is under company term of service or under service period of supplier.

5. Project / Order selection. In some period of time there will be several project or order where company capacity can not handle all of order in same time. There are has no proper method to evaluate the most potential project or order selection.

6. Management level gets information which is not reliable and not in time so there are difficulties to make analysis which lead to better decision.

2.2 Related research and project

2.2.1 Information System

Data items refer to an elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific meaning, Data items can be numeric, alphanumeric, figures, sounds, or images. A database consists of stored data items organized for retrieval.

Information is data that have been organized so that they have meaning and value to the recipient. The recipient interprets the meaning and draws conclusions and implications. Data processed by an application program represent a more specific use and a higher value added than simple retrieval from a database. Such an application can be an inventory management system, a university online registration system, or an Internet-based stock buying and selling system.

System is a scientific method of inquiry, that is, observation, the formulation of an idea, the testing of that idea, and the application of the results. The scientific method of problem solving is systems analysis in its broadest sense. Data are facts and figures. However, data have no value until they are compiled into a system and can provide information for decision making.

Information system is an organized set of components for collections, transmitting, storing, and processing data in order to deliver information for action. In business firms and other

organizations, this information is necessary for both operation and management. Most information systems in today's organizations are built around the information technologies of computers and telecommunication which called "computer-based information system".

Information systems transform data, the raw facts, into information that adds to our knowledge. Quality information needs to possess several attributes. Notable, it has to be timely, complete, concise, relevant, accurate, precise, and presented in an appropriate form. Decision makers need bother the internal information about their organization and the external information about it environment.

An information system is a specific type of system in general, A system is a set of component (sub system) that operate together or achieve certain objectives. The quality of the system may be evaluated in term of its effectiveness and efficiency. Effectiveness measures the extent to which the system meets its objectives. Efficiency is a measure of resources consumed to produce given outputs. If we consider an organization as a larger system, then its information systems assist management by providing feedback on the firm's performance.

Information System is an organized combination of people, hardware, software, communications networks, and data resources that collects, transform and disseminates information in an organization.

Type of Information system

Transaction Processing Systems

Transaction processing Systems (TPS) support the operations of a firm by processing its business transactions. A transaction is an element activity conducted during business operation. A TPS makes an appropriate record of the transaction in the database and produces documents relating to the transaction. TPS may also produce detailed report on transactions. TPS may work either in batch mode, processing accumulated transaction at a single time later on, or in on-line mode, processing incoming transactions immediately. Today, most TPS work in on-line mode.

Management reporting systems

The objective of management reporting system (MRS) is to provide information to managers. Managers receive performance reports within their specific areas of responsibility. Generally, these reports provide internal information rather than spanning corporate boundaries. They report on the past and the present, rather than projecting the future. MRS have acquired a reputation for producing highly voluminous reports that require time to pore over. Since many reports today are

produced in electronic form, rather than as printouts, they are somewhat easier to navigate selectively. To prevent information overload, managers may resort to demand or exception reports. Demand reports are requested when needed. Exception reports are produced only when pre established “out-of-bounds” conditions occur and contain only the information regarding these conditions. MRS may produce reports either directly form database collected by transaction processing system or from specially created extracts from such databases.

Decision support systems.

All information system support decision making, however indirectly. Decision support systems (DSS) are the type of information systems expressly developed to support the decision making process. These systems facilitate a dialog between the user, who is considering alternative problem solutions, and the system that provides built- in models and access to databases. The DSS databases are often extracts from the general database of the organization or from external database. Unlike management reporting systems, decision support systems are able to help make decisions whose solution procedure cannot be completely programmed into a computer. To do so, some of the dependencies between factors and their consequences are expressed by computerized models, and some judgments are supplied by the manager interacting with the system. The analytical capabilities expressed in DSS models are the reason for the existence of these systems.

Executive information system

Executive information systems (EIS) provide direct support for top managers by making a variety of internal and external information readily available in a highly summarized and convenient form. Characteristically, senior managers employ a great variety of informal sources of information. Formal, computerized information systems are able to provide only limited assistance. This assistance is important, however, as the chief executive officer, senior and executive vice presidents, and the board of directors monitor the performance of their company, assess the business environment, and develop strategic directions for the company’s future. In particular, theses executives need a great diversity of external information in order to compare their company’s performance to its competition.

Office information systems

The main objective of office information systems (OIS) is to facilitate communication between the members of an organization and between the organization and its environment. OIS help manage documents represented in an electronic format and handle messages such as electronic mail (E-mail), facsimile (fax), and voice mail. Other type of OIS facilitates teleconferencing and electronic

meetings by enabling meeting participants to be dispersed in space and, if desired, in time since the contributions of conference member can be stored in computer memory. Increasingly, OIS use the facilities of the Internet for communication and access to information.

Characteristics of useful information

1.Accurate : Accurate information is error free, in some cases, inaccurate information is generated because inaccurate data is fed in to transformation process.

2.Relevant : Relevant information is important to decision maker.

3.Timely : Timely information is delivered when it is needed.

4.Complete : Complete information contains all of the important fact.

5.Simple : Information should be simple, not over complex. Sophisticated and detailed information may not be needed. In fact, too much information and cause information overload, where a decision maker has too much information and is unable to determine what is really imports.

6.Economical : Information should be relatively economical to produce. Decision makers must always balance the values of information with the cost of producing it.

7.Flexible : Flexible information can be used for a variety of purposes.

8.Reliable : Reliable information can be depended on, in many case, the reliability of the information depended on the reliability of the data collection method, in other instances, reliability depends on the source of the information.

9.Verifiable : Information should be verifiable.

10.Secure : Information should be secure from access by unauthorized users.

11.Accessible : Information should be easily accessible by authorized users to be obtained in right format and at the right time to meet the needs.

2.2.2 Database

Database is a collection of data stored in a standardized format, designed to be shared by multiple users. A database management system (DBMS) is software that defines a database, stores the data, supports a query language, produces reports, and creates data entry screen.

Relational database model

E.F. Codd (1970) originated the relational approach to database management in a series of research papers published in the early 1970, His suggestion that database could be designed using well-established concepts found in the relational mathematics has provided the impetus for

widespread research and innovation into numerous areas, including database languages, query subsystems, database semantics, locking and recovery, and inferential subsystem

Data base transaction

Database transaction is a discrete unit of work that must be completely processed or not processed at all. The completion processed confirm by commit, while not complete processed confirm by rollback or not commit.

Benefits of database

1. Program-data independence
2. Minimal data redundancy
3. Improved data consistency
4. Improved data sharing
5. Increased productivity of application development
6. Enforcement of standards
7. Improved data quality
8. Improved data accessibility and responsiveness
9. Reduced program maintenance
10. Improved decision support

SQL

SQL (Structure Query Language) is a standard interactive and programming language for getting information from and updating a database.

In 1986, the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) published an SQL standard, called SQL-86. ANSI published an extended standard for SQL, SQL-89, in 1989. The next version of the standard was SQL-92 standard, followed by SQL:1999, the most recent version is SQL:2003.

Web-Based Application

Web-based application is an application in which all or some parts are downloaded from the web each time it is run. Typically refers to use of web browsers and Java applets. Web pages increasingly resemble the interactive behavior of local applications. Retrieving a web page may cause the execution of code in the web server as well as code in the HTML page brought into the user's machine. Clicking an icon on a web page may cause a Java applet to be downloaded and executed in the user's machine.

Client/Server architecture

A client/server architecture divides networked computing units into two major categories, clients and servers, all of which are connected by local are networks and possibly by private wide area networks. A client is a computer such as a PC or workstation attached to a network, which is used to access shared network resource. A server is a machine that is attached to this same network and provides clients with these services. Examples of servers are a database server that provides a large storage capacity and a communication server that provides connection to another network, to commercial databases, or to a powerful processor. In some client/server systems there are additional computing units, referred to as middleware.

The purpose of client/server architecture is to maximize the use of computer resources. Client/server architecture provides a way for different computing devices to work together, each doing the job for which it is best suit.

Multi-tier Architecture

Multi-tier Architecture is a Client/Server architecture in which an application is executed by more than one distinct software agent. The most widespread use of "multi-tier architecture" refers to three-tier architecture. Three tier architecture is consists of Presentation tier, Application tier and Data tier.

2.2.3 Decision Support System (DSS)

DSS mean an interactive, flexible, and adaptable Computer-Based Information System, specially developed for supporting the solution of a non structured management problem for improved decision making.

2.2.3.1 Level of management decision making

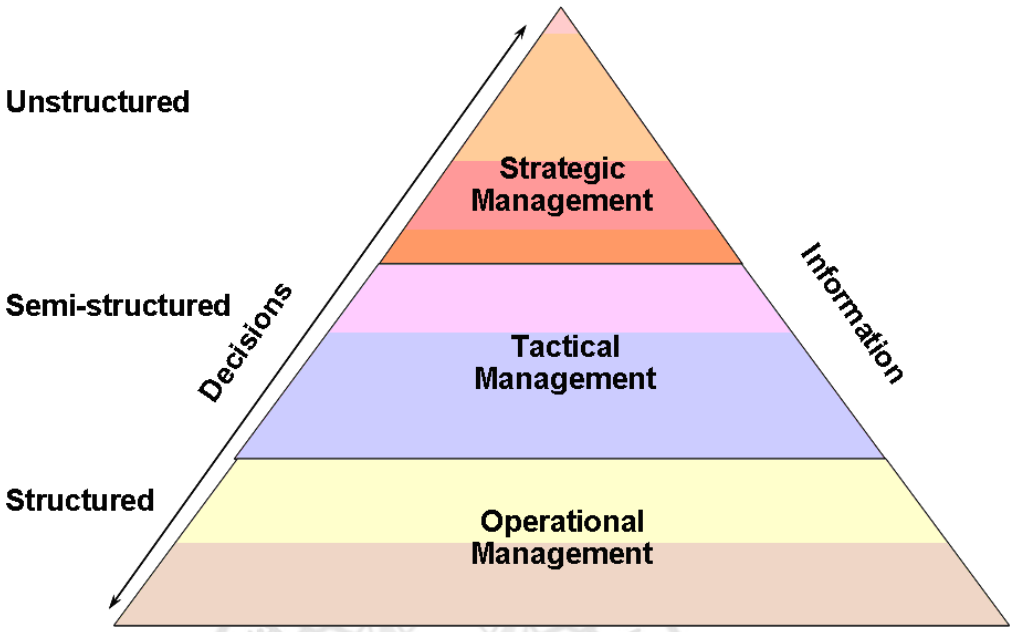
There are 3 level of business decision characteristic which shown in figure 2.1.

1. Operational management level. This level, task performed by supervisors of smaller work units concerned with planning and control of short-term (typically, a week to six months) budgets and schedules.

2. Tactical management level. Task performed by middle managers (for example, department heads or plant managers) responsible for acquisition and allocation of resources for projects according to tactical plans, set out for one or two years.

3. Strategic Management level. Task carried out by top corporate executives and corporate boards responsible for develop business goals, strategies, policy and objective as part of

strategic planning process. Monitoring performance of the organization and predict overall directions of economics and business competitive environment for the firm.



Source: adapt from Irwin/McGrow-Hill : The Mcgrow-Hill company (2002)

Figure 2.1 Business Decision Characteristics

Type of Decisions

1. Unstructured decisions whereas non routine and the decision maker must provide judgment, evaluation and insights into problem definition. There are no agreed procedure for making the decision.

2. Semistructured decisions whereas the part problem has a clear-cut answer provided by an accepted procedure.

3. Structured decisions whereas the decisions are repetitive, routine, and have a define procedure for handling the problem.

2.2.3.2 The decision making process

There are three phases of decision making: Intelligence, design and choice. Those process is shown in figure 2.2.

The Intelligence phase

Intelligence entails scanning the environment, either intermittently or continuously. It includes several activities aimed at identifying problem situations or opportunities.

Finding the problems. The intelligence phase begins with the identification or organizational goals and objectives. Problems arise out of dissatisfaction with the way things are going. Such dissatisfaction is the result of a difference between what we desire and what is (or is not) happening.

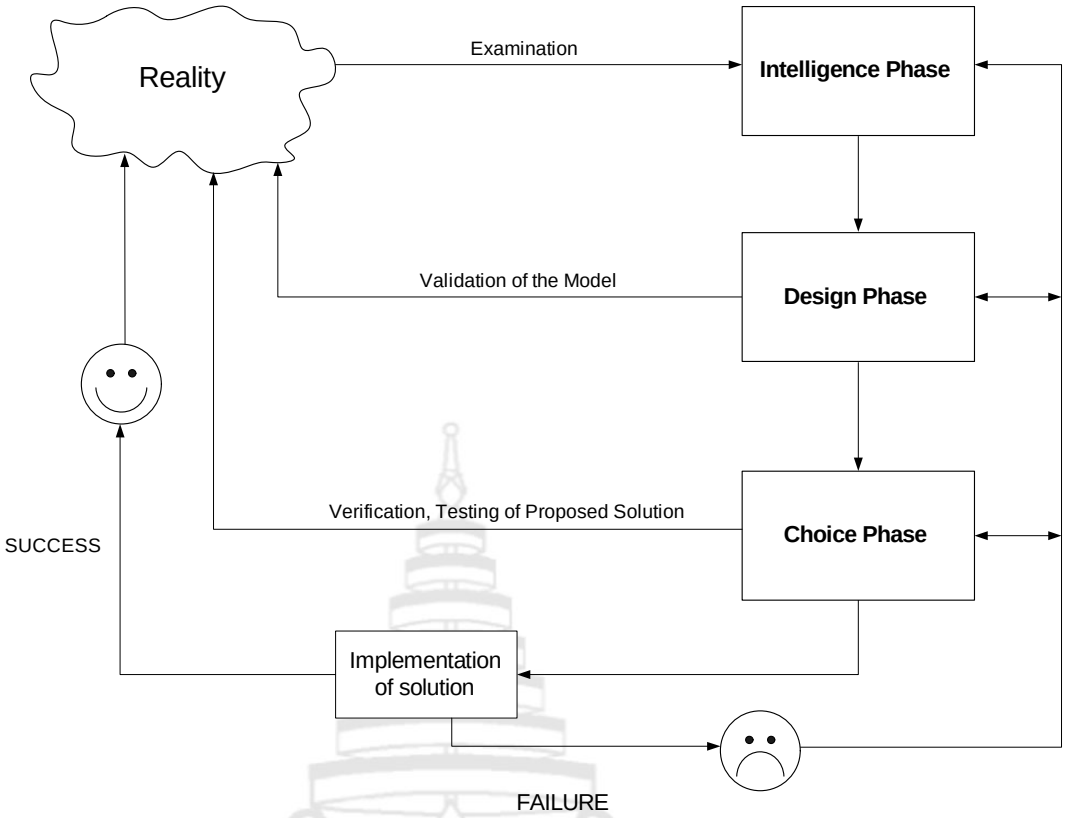
The classification. This activity is the conceptualization of a problem in an attempt to classify it in to a definable category. An important classification is according to the degree of structuredness evident in the problem.

The Design phase

The design phase involves inventing, developing, and analyzing possible course of action. This includes activities such as understanding the problem generating solutions, and testing solutions for feasibility. Also in this phase, a model of the problem situations is constructed, tested, and validated.

The Choice phase

The boundary between the design and the choice phases is not clear because certain activities may be performed both during the design and the choice phases. The choice phase includes search, evaluation, and finding an appropriate solution to the model.



Adapt from : Information technology for management transforming organizations in the digital economy, 4th edition. P. 547 Efraim Turban, Ephraim Mclean, James Wetherbe

Figure 2.2 The decision making process

2.2.3.3 Model

A model is a simplified representation or abstraction of reality. It is usually simplified because reality it too complex to copy exactly and because much of the complexity is actually irrelevant to the specific problem.

2.2.3.3.1 Elimination by aspect model

It is easy to eliminate some alternatives. A process that many of us use to pare down the list of options has been labeled elimination by aspects.

2.2.3.3.2 Rate and weight model

The simplest decision rule that allows high scores on one attribute to compensate for lower scores on other attributes uses rating and weightings. Ratings are scores for alternatives for the separate attributes. Weightings are desirability scores for the attributes themselves. The process is outlined as follow :

1. Rate the alternatives on each attribute :

   r_{ij} = rating of alternative i on attribute j

2. Weight the relative importance of each attribute :

   w_j = weight of attribute j

3. Score the alternative using the sum of the weights multiplied by the rates :

   $v_i = w_1 r_{i1} + w_2 r_{i2} \text{----} + w_m r_{im}$

$$v_i = \sum_{j=1}^{n} (r_{ij} w_j)$$

Where alternatives are ranked according to:

v_i = value assigned to alternative i

2.2.3.4 Rating alternatives

There are many different types of quantities. One major type are those that can be objectively measured, such as quantities and price. Another is subjective measure that generally have their own specific scale, such as a students may be graded on a scale of A, B, C, D. Sometimes there is neither an objective measure nor an appropriate scale for subjective measure. In such cases it is appropriate to rate alternatives by direct preference measurement.

There are 2 common ways in which the decision maker may define 0 to100.

1. Predefined range

Setup upper and lower limits for the attributes such that no alternatives would ever be considered that had an attribute rating outside these limits

2. Range Defined by alternative

If the set of alternative to be considered is complete, find the worst and best alternatives with respect to the attribute and give them rating of 0 to 100, respectively.

2.2.3.5 Weighting attributes

The weights associated with the attributes indicate their important in decision. Weights are often obtained in practice simply by asking the decision maker to assign numbers for each attribute on the basis of its importance.

Using information system

The real test of the value of an information system is how it can be used. Ideally, an information system should be simple to use and non technical this is, one should not have to be a computer expert to use the system.

Limitation of information systems

Although information systems play a vital role in modern organization, they are not without their limitations. In particular, information has limitations as follow.

1. Information systems are expensive and difficult to develop and implement.
2. Information systems are not suitable for all tasks or problem.
3. Managers sometimes rely too much on information systems.
4. Information provided to managers may not be accurate, timely, complete, or relevant as it first appears to be.
5. Managers may have unrealistic expectations of what information system can do.
6. The information system may be subject to sabotage, computer viruses, or downtime.

2.2.4 Related project

There have been several projects related to this are.

A Design and Development of a Tourist Business Information System was developed in 2001 by Ms. Umapong Boonhnug in this system an application was built using Oracle version 8.1.5 as Relational Database Management while Delphi programming version 5 is use as tool. The information system was designed and developed to facilitate the process for related person in tourist business.

The Development of Purchasing and Inventory Information System for Enkei Thai Co., Ltd was developed in 2002 by Mr. Chatchai Phengwichai use MS Access 97 and MS SQL Server 7 as tool. It provide feature to store and control purchasing and inventory information.

The Developing of Information System Leasing Business was developed in 2003 by Mr. Soontorn Lancharoen in this system, an application was built using SQL Server as Relational Database Management System and Visual Basic is used as a development tool. It provided feature to store and manage transaction in Leasing business.

The Development of Web-Based Decision Support System for Hotels Reservation was developed in 2001 by Mr.Thirayut Limnophakun uses a Web interface with Microsoft Visual Basic as the program language. Microsoft Access was used as the Database Management System. It provided

features to store information of hotel in Bangkok and surrounding provinces of Prathum thani, Nonthaburi and Samut prakarn. The system can show optimal hotels, which are ranked by score assumptions and their general information.

2.3 Requirement specifications for the new system

Hardware and software requirement

Server

Hardware

CPU	Intel Pentium IV 3.0 GHz
RAM	1 GB DDR BUS 400 MHz
Hard disk	200 GB Serial ATA100

Software

Database	Oracle 10g Express Edition
Operating System	Windows Server 2003

Client

Hardware

CPU	Intel Pentium IV 1.7 MHz
RAM	256 DDR
Hard disk	80 GB ATA100

Software

Database	Oracle 10g Express Edition
Operating System	Windows XP Professional

Oracle 10g Express Edition is chosen because of this version is available free for public to use and develop application on this version, however there are limitations to use as follow.

1. Express Edition is limited to a single instance on any server;
2. Express Edition may be installed on a multiple CPU server, but may only be executed on one processor in any server.
3. Express Edition may only be used to support up to 4GB of user data (not including Express Edition system data).

4. Express Edition may use up to 1GB RAM of available memory.

Oracle database is effective, flexible and has good reputation in market. Oracle developer tool is design for Oracle product, so better control and increase speed of development process.

2.4 Implementation techniques

Technology to develop system

Hardware

CPU	Intel Pentium IV 1.7 GHz
RAM	512 MB
Hard disk	80 GB

Software

Database	Oracle 10g Express Edition
Operating System	Windows XP Professional
Tools	Oracle Developer Suite 10g
	Toad Data Modeler
	Microsoft office 2003

2.5 Deliverables

At the end of development, this project is delivered CD containing source code, user manual documentation.

2.6 Implementation plan

System implementation involves those activities associated with ensuring that the system is fully functional and operational, as well as those activities associated with turning over control of the system to the end users.

Process of system implementation is divides into 3 categories of activities: (1) application testing, (2) user acceptance testing, and (3) system installation.

2.6.1 Application testing

2.6.2 User evaluation testing

2.6.3 System Installation. At this stage, there are 3 task (1) system conversion, (2) final documentation, and (3) end user training.

1. System conversion. For this project, the parallel conversion is used. Old systems and new systems run simultaneously until the end users and project coordinators are fully satisfied that the new system is functioning correctly and the old system is no logger necessary. The parallel run is expected not more than 1 month period.

2. Final documentation. The purpose of this stage is intended to provide the end users and system administrators with information they need to successfully operate the system. User documentation is to provide the end user with a detailed and highly organized description of how to interact with the system in the many scenarios and activities that may be possible. System documentation details the design specification, the internals of the system, as built program code, and the functionality of all application. It is intended to assist and support the personnel responsible for maintaining the system.

3. End user training. Provide detailed content to end-user training is coverage of what the new system can do and how various functions and modules for system can and should be used.

CHAPTER III

ANALYSIS AND DESIGN

System analysis and design is a structured process that is employed in the development of information systems. Within this process are contained activities that include the identification of business problem that the proposed solution in the form of an information system. Design and implementation of proposed solution to achieve to desired and stated goals of the organization. Information systems are complex, constantly changing and expensive to create and maintain. However, a well-design system can generate enormous benefits to organization.

3.1 Analysis of the existing system

Ideal Systems (Thailand) Co., Ltd. is a medium size broadcasting system integrator's company. Business activity is a middle man between manufactory and end users. Company's customers are TV stations, Telecom operators and Post production studios. Business is base on job order. Generally, business activities include gathering customer requirement, design system, get offer from suppliers, quote price to customer, purchasing product from suppliers, integrated system and finally, hand over solution to customer.

The process of business start form gathering customer requirement then design system for customer. Then, compare to product on hand to see cost of the system. If there are no price lists, suppliers are requested to quote price of product or equipment. After get quoted, others expense and integration cost will be added. Finally, quotation is sends out to customer or get into bidding process.

Process after customer satisfied the quotation or bidding is won. After, contract is active. Installation schedule is plan and lead time of product from supplier is confirmed. Purchasing is order product according to the planed. Installation and integration is work to complete project. After the installation is done, commissioning process and training course are followed. Then, the project is handover to customer. Finally, billing and collection process is come at last.

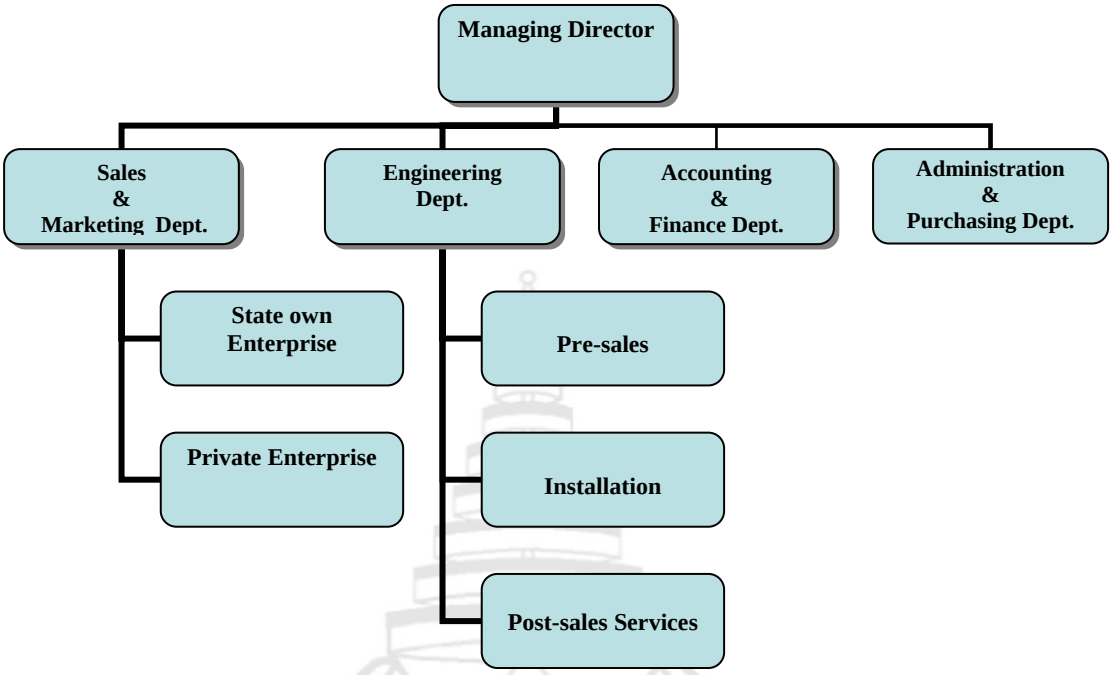


Figure 3.1 Organization Structure

There are 4 departments which has different functions as shown in figure 3.1.

Sales and Marketing Department is responsible to co-ordinate and make good relationship with customer.

Engineering Department has to provide technical assistant to sales. Do installation solution for customer. Lastly, take care of customer service function.

Accounting & Finance Department is responsible for Accounting transaction, financial statement, receipt and payment.

Administration & Purchasing Department is responsible for getting quote from suppliers and confirms delivery date & payment condition, if it purchased.

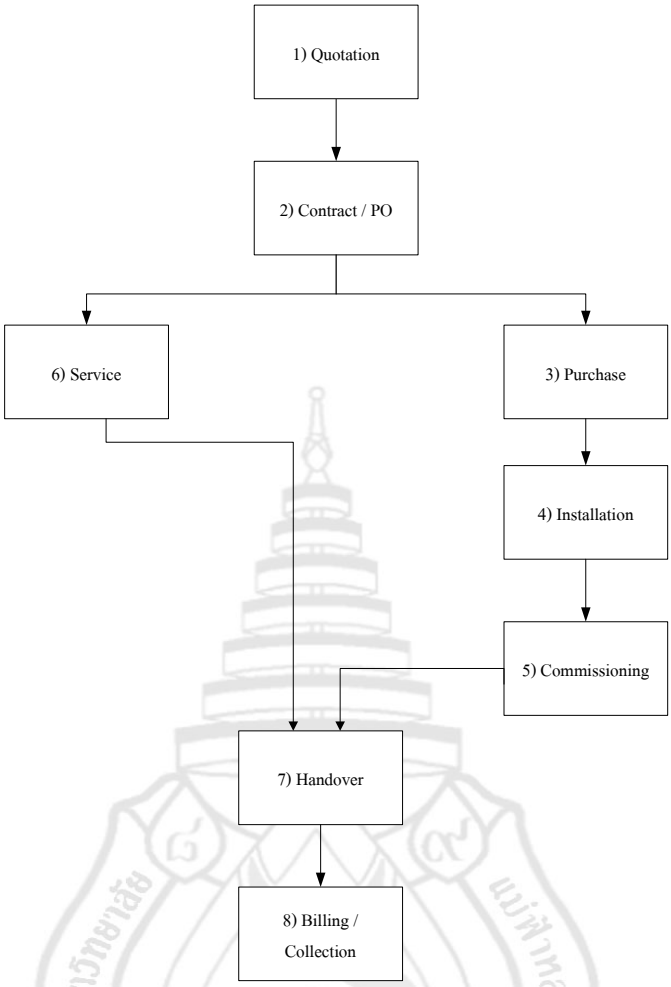


Figure 3.2 Business Process

3.1.1 Business Process

Business process in figure 3.2 is shown summary of activities in company. Detail of each activity has details as follow.

1. Quotation

Sales meet regularly with existing and new customer and discuss impending work and assist with refining ideas and concepts turning them into actual plans, including staffing requirements, technical requirements, proposed premises and overall budget. After sales get requirement concepts from customer, Pre-sales from engineering department is perform a complete system design starting with a concept design, and iteratively refining the details with the customer, including floor layouts and use of space in a premises, rack layouts, technical furniture design, system schematics, wiring list. In the same time, Purchasing need to get quotation from suppliers. The price

in quotation is added others cost such as import duty, freight, insurance etc. Finally, final price will be given to customer by sales.

2. Purchase order / Contract

Customer satisfied proposal and quotation then they had decided to buy, purchase order to send to sales. For some case, which generally high values, contract is sign by both parties.

3. Purchasing

After Purchase order or contract from customer is active, real purchasing process is started. Majority of equipment which includes hardware and software are purchased from foreign country. Regularly, equipments are shipped by air cargo. Purchaser need to align installation schedule with delivery schedule in order to have effective cash management.

4. Installation

Installation team is install product at customer site. Working with builder and architect to obtain a clean site with cable runs, power, ground, air-conditioner and any other services required for the system. Installing racks, equipment and manage the on-site wiring cable.

5. Commissioning

After installation process in finished, all product need to test which call “commissioning” to make sure that integrated system is working. At project completion, trained engineers commission each individual piece of equipment. Then, commission the complete installation, which includes extensive system testing. The commission process is performed with the customer’s engineer staff and management in order to train them on the system and to obtain signoffs.

6. Services

Software support services

All software is sold with software support agreements. Post-sales engineer provide on-site support, on-site training and take customer through initial stages ensuring the go to air smoothly. If a customer develops an issue an initiates support, progressing their issues to complete resolution. This is allows the customer to continue with broadcasting while the post-sales service manage with suppliers and progress the issue to resolution.

Maintenance

On-site maintenance service for all hardware products supplied. Post-sales engineering support to ensure the system that company supply continue to functions as designed.

7. Handover

The handover process is needs to gather product detail and serial number to use as reference of all products.

8. Billing / Collection

After handover products to customer, invoice is raised by Accounting department and gives to customer as billing, then customer confirm due date. Finally, payment is makes by customer.

3.2 User requirement analysis

From analysis existing system found that no information system is use for operation, just only paper work with simple spreadsheet. Data is not share to different department. User requirement contribute to design new system.

1. The system can record and store important data for business operation which customer data, product data, product price, quotation data, customer purchase order, handover and warranty data, sale data, collection data and purchase of equipment data.
2. The system can provide of searching and inquiring.
3. The system can printout standard form such as quotation, handover details, Invoice, Tax Invoice / Receipt.
4. The system can provide ad hoc request for customer status detail from quotation, purchase order, handover /warranty and collections.
5. The system can calculate cost of products which help to set up selling price.
6. The system can provide summary report which easy to understand for executive.
7. The system can provide suggestion to executive that the order from customer is potential important to business or not.

3.3 System design

From business operation analysis, the development of Management Information System for Systems Integration Business is started to develop.

Detail of system

The project of Management Information System for System Integration Business consists of 2 sub system.

1. Sales System
    1.1 Quotation
    1.2 Handover / Warranty of Customer
    1.3 Invoice
    1.4 Billing and Collection
2. Executive Report
    2.1 Summary Sales data by customer
    2.2 Summary Sales data by product
    2.3 Summary Sales data by category
    2.4 Report for decision maker
        2.4.1 Rate and weight (Order / Project selection)

3.3.1 Data Flow Diagram

Data Flow Diagram represents flow of information in system. Each diagram has more details in subsystem diagram.

Context diagram of Management Information System is shown in figure 3.3 while data flow diagram of Sales and Executive Report is in figure 3.4

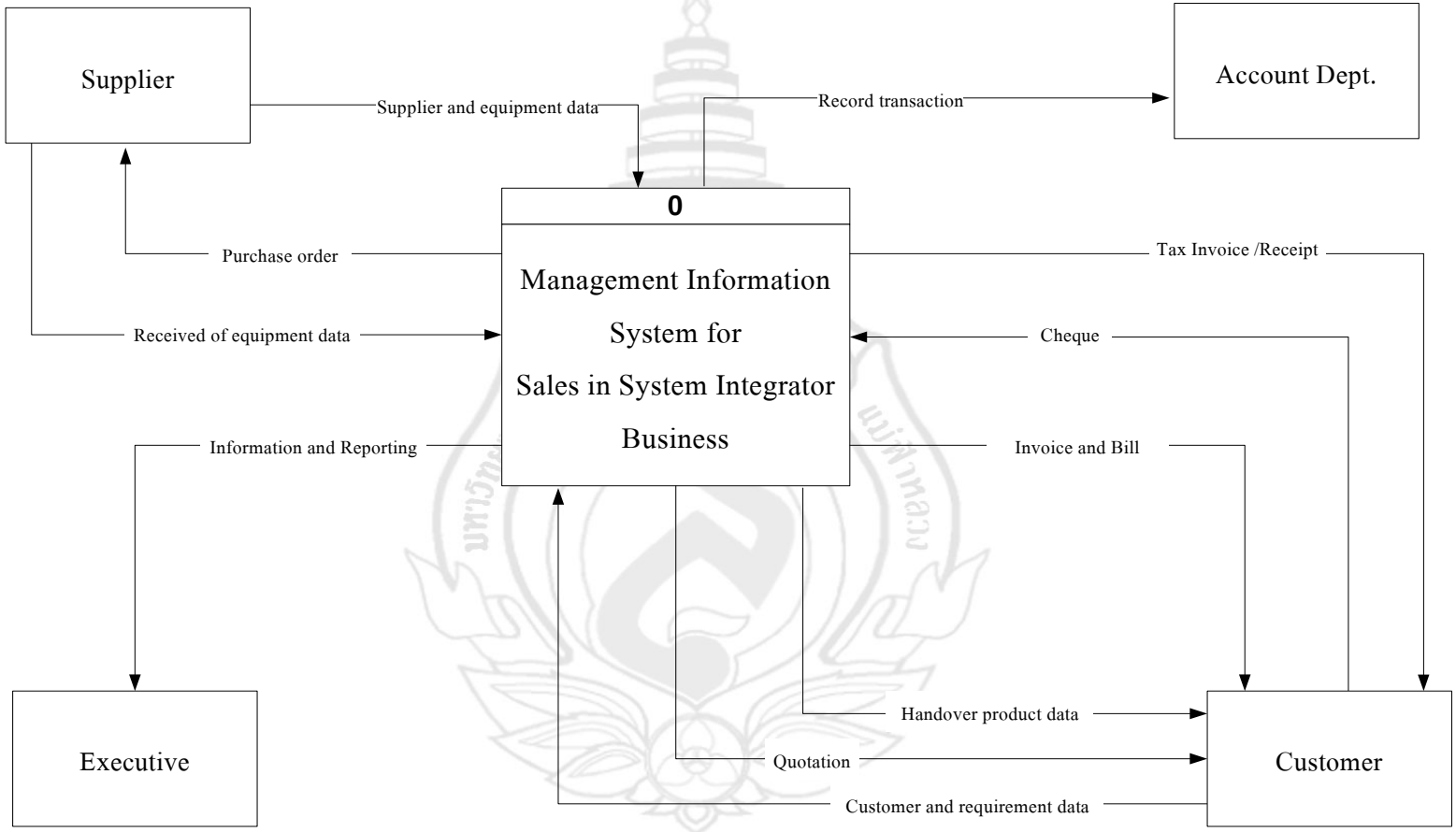


Figure 3.3 Context Diagram : Management Information System

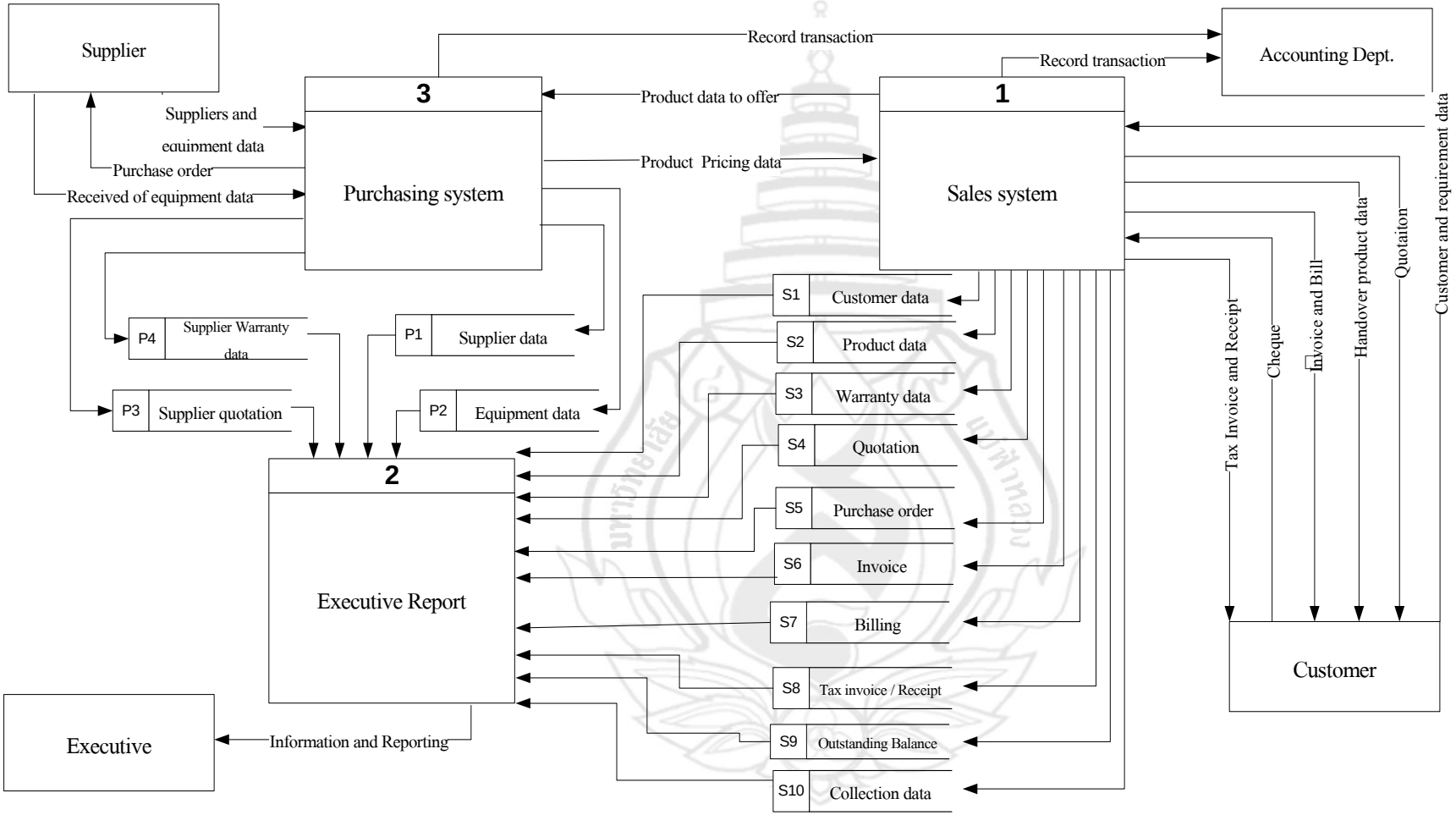


Figure 3.4 DFD Level 1 : Sales and Executive report

Detail of the System

1. Sales System

Sales system which shows in figures 3.5 is cover sales activities. The system consist of subsystems of 1.1 Quotation 1.2 Handover and warranty 1.3 Invoice 1.4 Billing and Collection. Those activities have details which provide in Data Flow Diagram of sales system and subsystems.

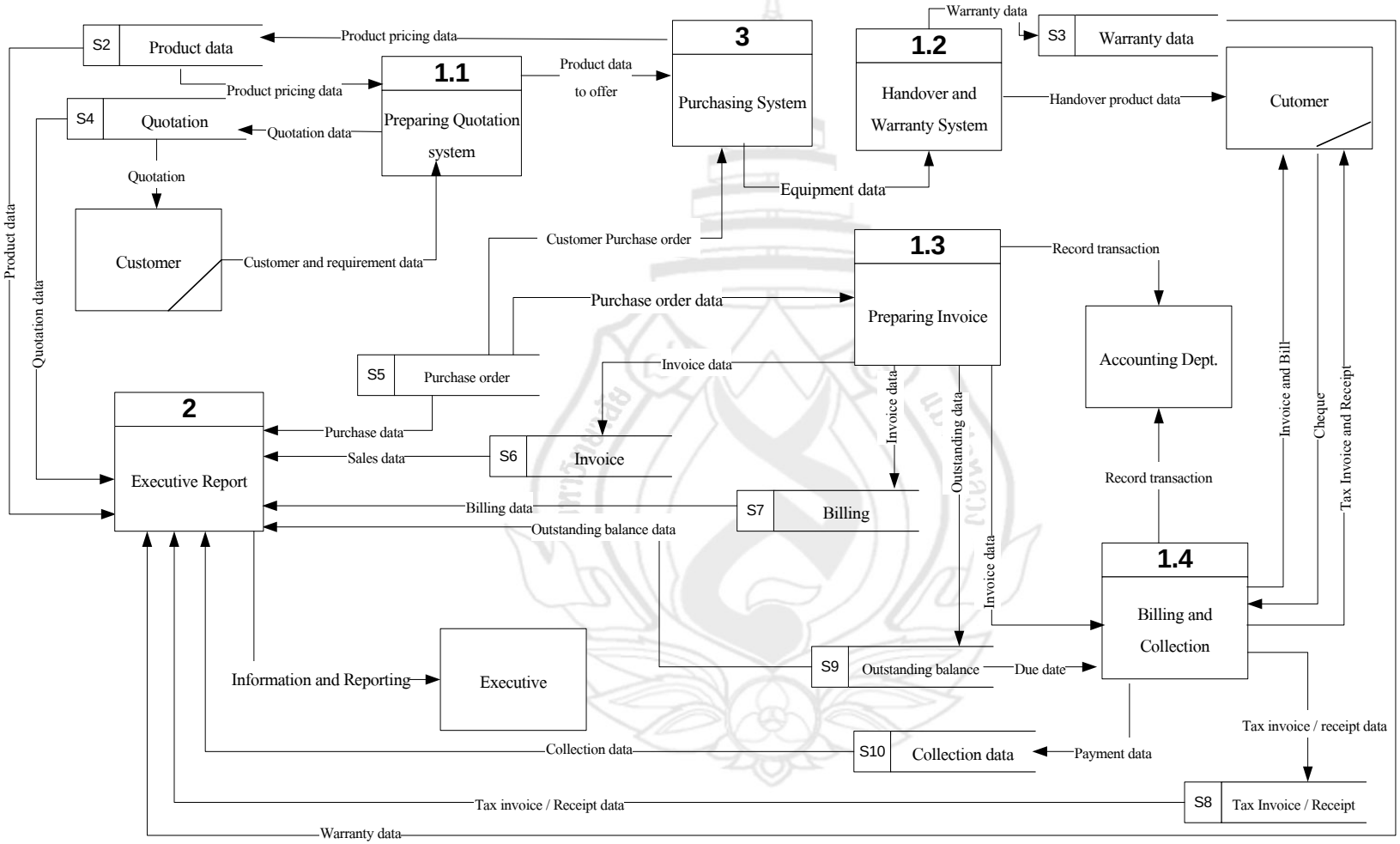


Figure 3.5 DFD Level 1 : Sales System

1.1 Quotation system

Data flow diagram of Quotation System is shown in figure 3.6. The quotation system is cover checking customer data and customer history transaction. Checking product price or sending product data to purchase system to get price. At the end quotation is sent to customer.

Input

Customer data

Customer requirement

Process

System is checking customer data and customer purchase order in the past

System is record customer data in case of new customer

System is retrieve product data incase customer used to order then it can used

System is record product data incase of new product

Purchase system is giving product price

System record quotation

Printout quotation for customer

Output

Customer data

Customer purchase order (history transaction)

Product data in quotation

Quotation

Quotation Report

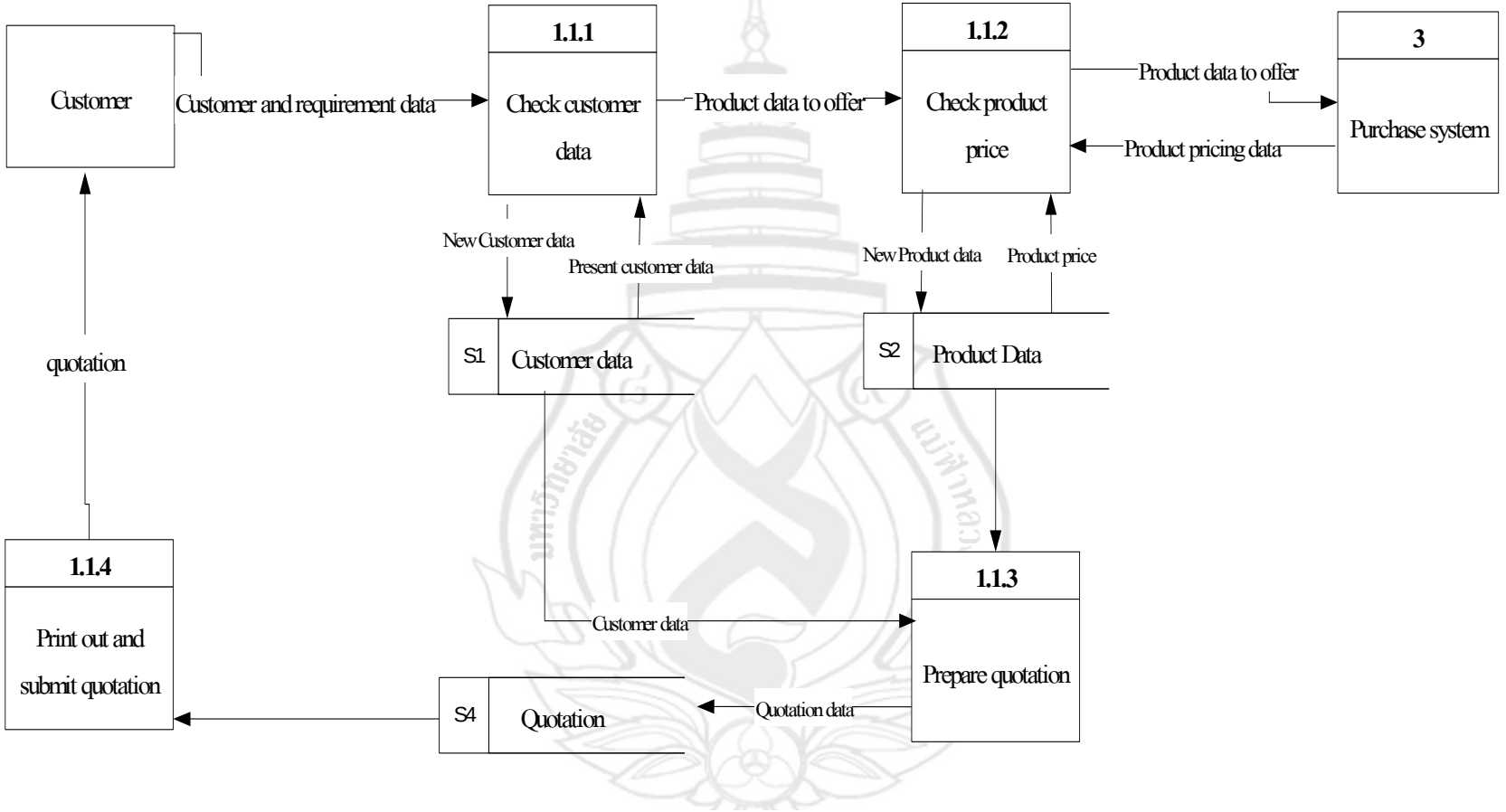


Figure 3.6 DFD Level 3 : Quotation System

1.2 Handover and Warranty System

Data flow diagram of Handover and Warranty System in figure 3.7 is cover process of gathering equipment serial number and updating into system.

Input

Product data from purchase system Process

Gathering equipment serial number

Product data with serial number

Hand over and warranty data

Process

System is record serial number of product

Printout handover list for customer

Output

Product data with Serial number

Handover list for customer

Handover report

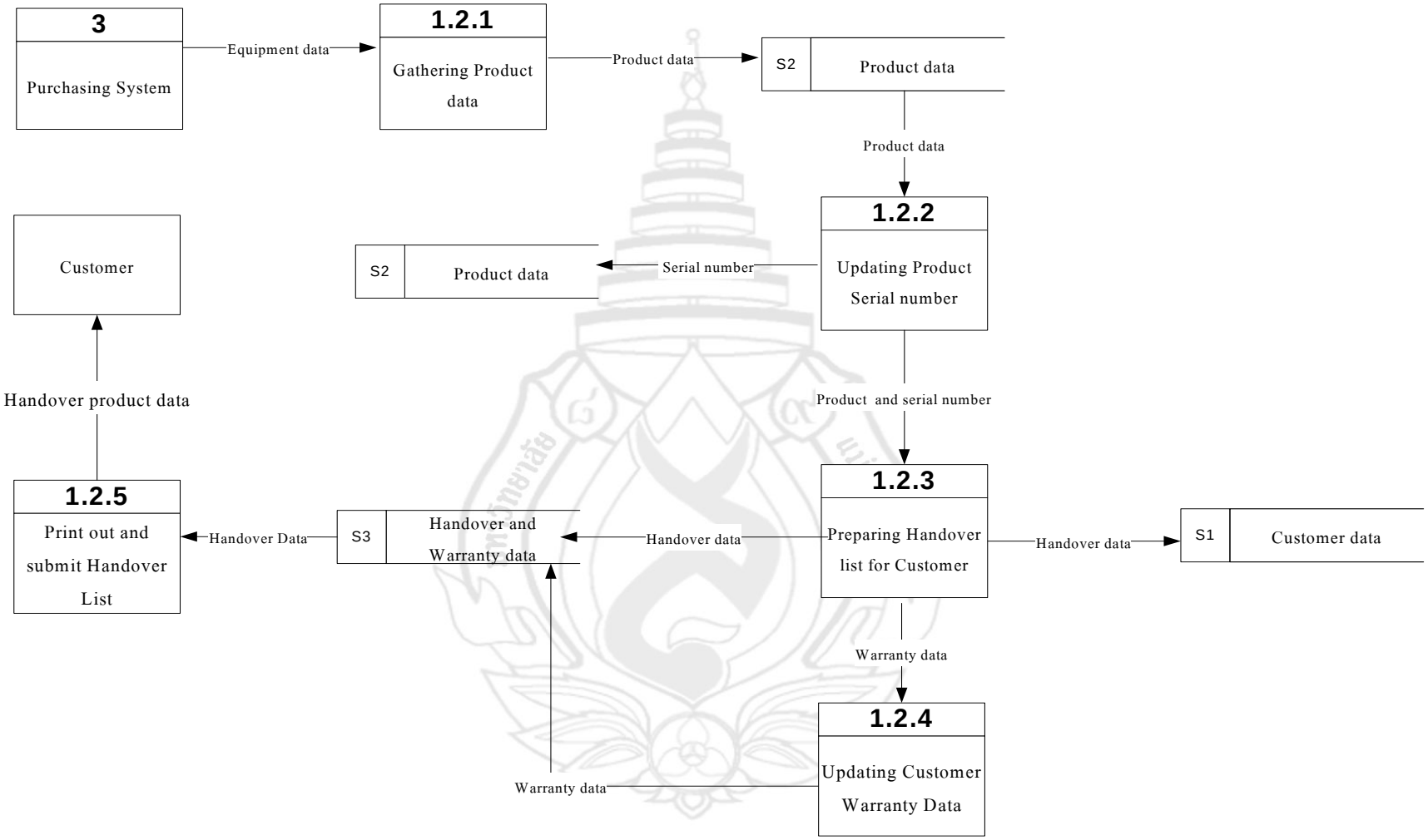


Figure 3.7 DFD Level 3 : 1.2 Handover and Warranty

1.3 Invoice System

Data flow diagram of Invoice System in figure 3.8 is cover process of preparing Invoice and Billing to customer.

Input

Customer purchase order

Handover data

Process

Preparing Invoice

Record Invoice transaction

Printout Invoice for customer

Update customer outstanding balance

Output

Invoice

Sales report

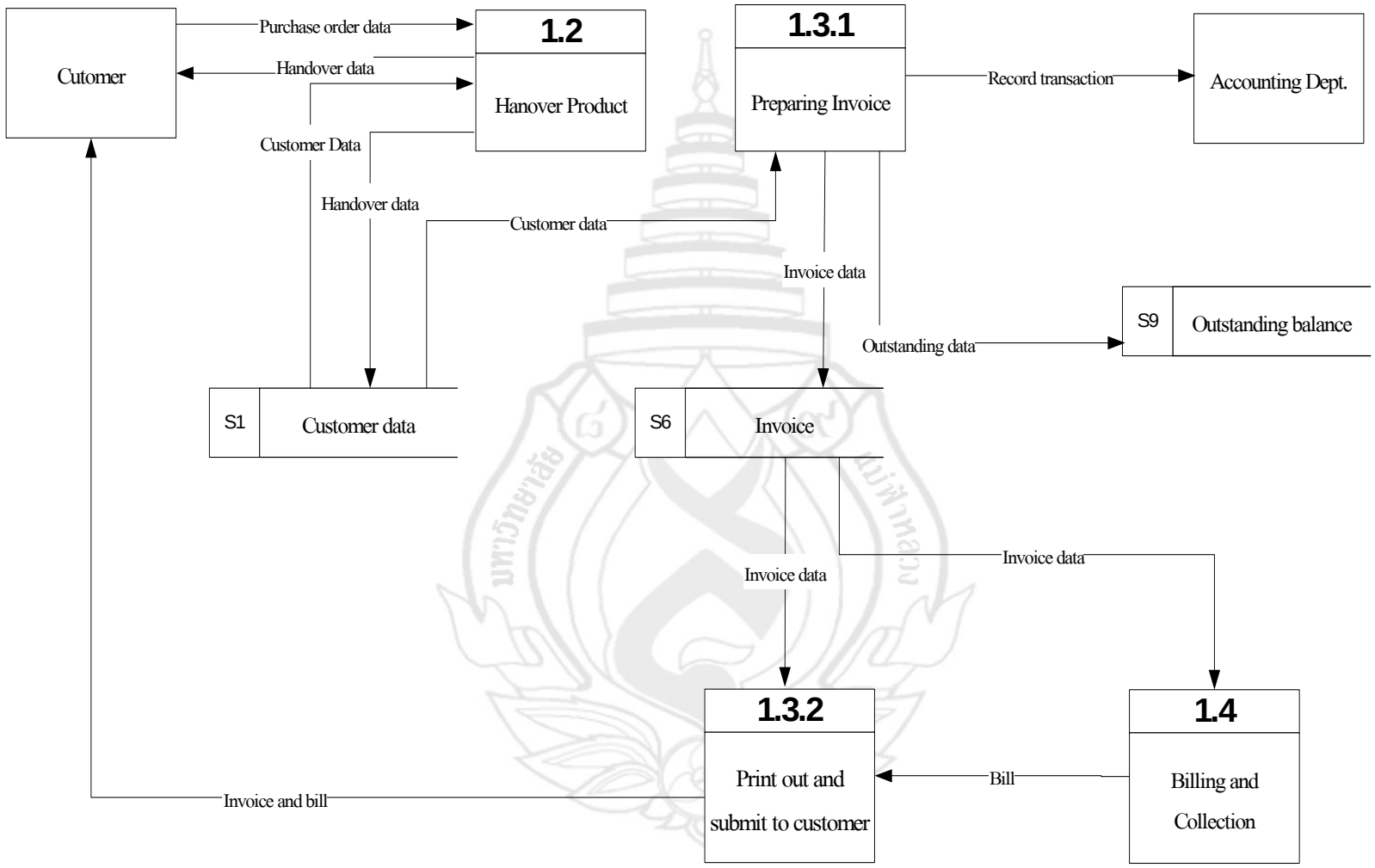


Figure 3.8 DFD Level 3 : 1.3 Invoice System

1.4 Billing and Collection System

Data flow diagram of Billing System in figure 3.9 is cover process issued billing, received cheque from customer and preparing Tax invoice/Receipt for customer.

Input

Invoice data

Process

Preparing bill

Record billing data

Printout bill to customer

Received cheque from customer

Update billing status

Preparing Tax invoice / Receipt

Update customer data

Output

Bill

Outstanding balance

Tax Invoice / Receipt

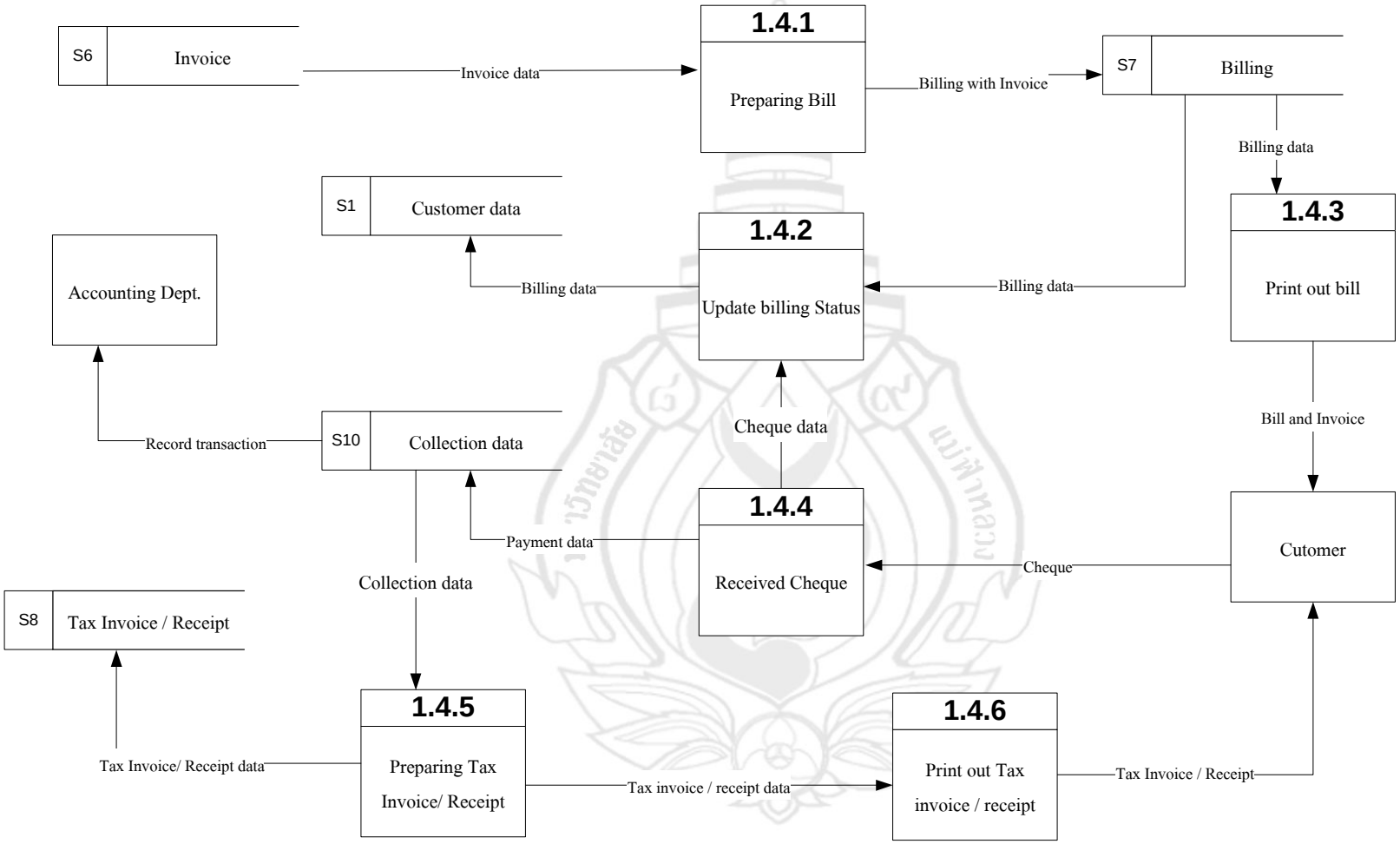


Figure 3.9 DFD Level 3 : 1.4 Billing and Collection

2. Executive Report System

Data flow diagram of Executive Report System in figure 3.10 is cover executive report activities. The system consists of sub systems of 2.1 Sales by product 2.2 Sales by category 2.3 Sales by customer.

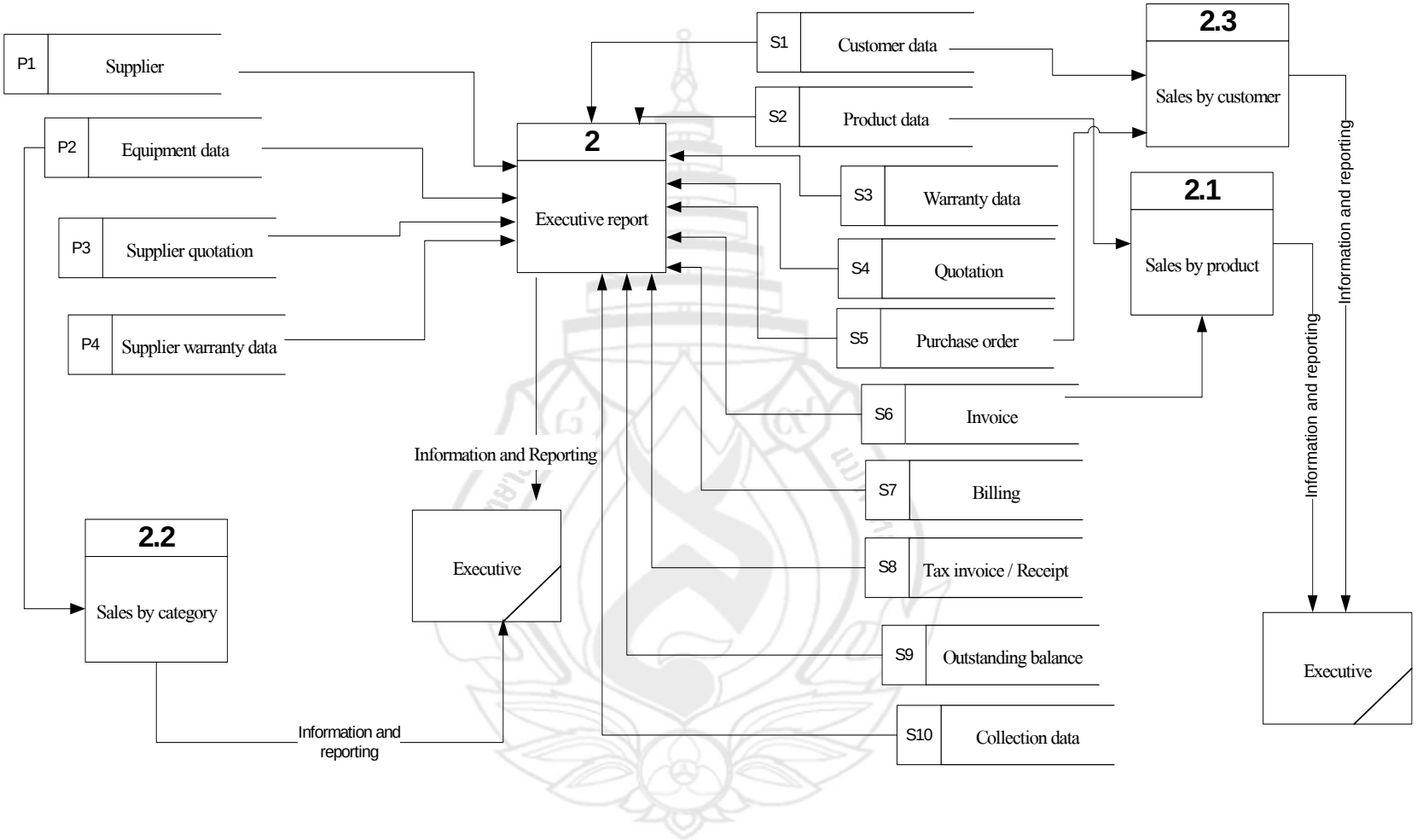


Figure 3.10 DFD Level 2 : Executive Report System

2.4 Report for Decision maker

Context Diagram of the DSS system in figure 3.11 is provides entire view of the system which consists of 2 parts.

User: input their criteria to find suitable order / project and received outcome.

1. Administrator: add, update and delete the data of each order / project.

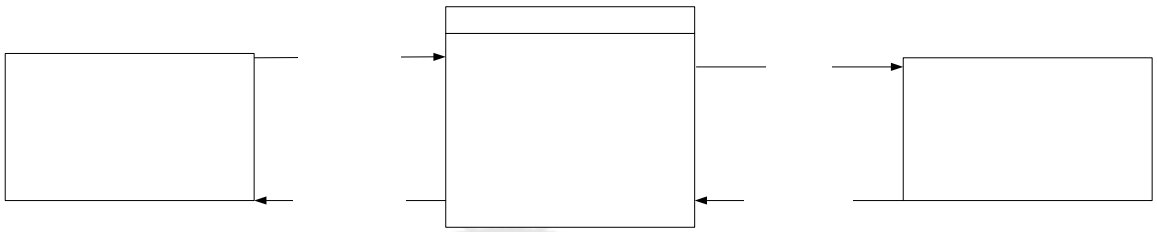


Figure 3.11 Context Diagram of the Report for Decision maker

Data flow diagram of Report for decision maker in figure 3.12 is provides details of system which consist of 10 factors.

User

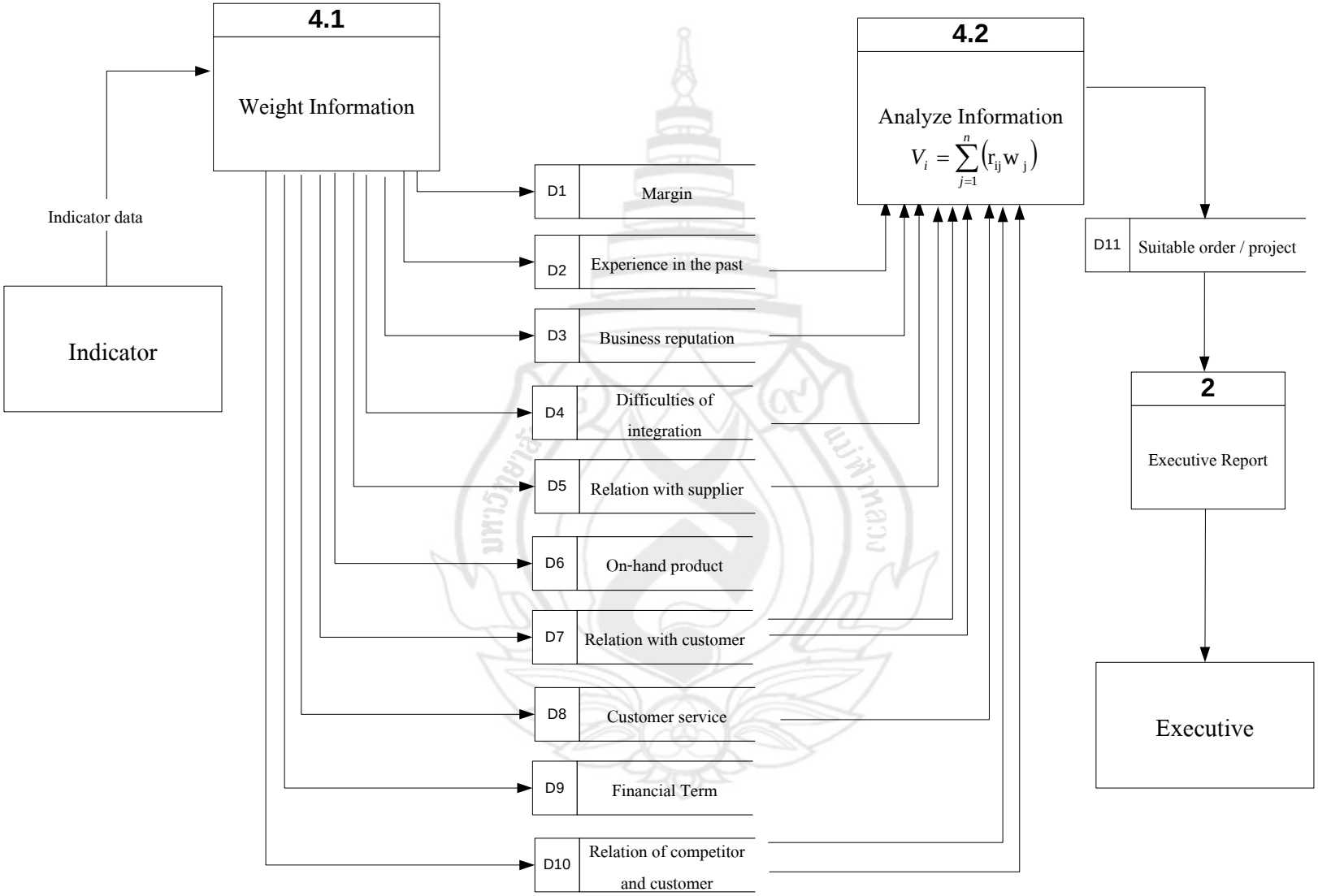


Figure 3.12 DFD Level 1 : Report for Decision Maker

3.3.2 Model base of the system

The decision support system is giving information which is suitable for executive need and the alternative. The highest score is the best alternative. The Rate and Weight Decision Rules is having the following variables as below.

$$V_{project} = ((W_{margin*} R_{margin}) + K_{margin}) + ((W_{experi*} R_{experi}) + K_{experi}) +$$
$$((W_{rep*} R_{rep}) + K_{rep}) + ((W_{diff*} R_{diff}) + K_{diff}) +$$
$$((W_{diff*} R_{diff}) + K_{diff}) + ((W_{rsupp*} R_{rsupp}) + K_{rsupp}) +$$
$$((W_{ponhand*} R_{ponhand}) + K_{ponhand}) + ((W_{rcust*} R_{rcust}) + K_{rcust}) +$$
$$((W_{service*} R_{service}) + K_{service}) + ((W_{fin*} R_{fin}) + K_{fin}) +$$
$$((W_{comcust*} R_{comcust}) + K_{comcust})$$

$V_{project}$ = Total score of each project

W_{margin} = Weight of margin factor (by user)

W_{experi} = Weight of experience in the past factor (by user)

W_{rep} = Weight of business reputation factor (by user)

W_{diff} = Weight of difficulty of integration factor (by user)

W_{rsupp} = Weight of relation with supplier factor (by user)

$W_{ponhand}$ = Weight of product on hand factor (by user)

W_{rcust} = Weight of relation with customer factor (by user)

$W_{service}$ = Weight of customer service factor (by user)

W_{fin} = Weight of finance term factor (by user)

$W_{comcust}$ = Weight of relation of competitor with customer factor (by user)

R_{margin} = Rate of margin factor

R_{experi} = Rate of experience in the past factor

R_{rep} = Rate of business reputation factor

R_{diff} = Rate of difficulty of integration factor

R_{rsupp} = Rate of relation with supplier factor

$R_{ponhand}$ = Rate of product on hand factor

R_{rcust} = Rate of relation with customer factor

$R_{service}$ = Rate of customer service factor

R_{fin} = Rate of finance term factor

$R_{comcust}$ = Rate of relation of competitor with customer factor

K_{margin} = Weight of margin factor (by Executive)

K_{experi} = Weight of experience in the past factor (by Executive)

K_{rep} = Weight of business reputation factor (by Executive)

K_{diff} = Weight of difficulty of integration factor (by Executive)

K_{rsupp} = Weight of relation with supplier factor (by Executive)

$K_{ponhand}$ = Weight of product on hand factor (by Executive)

K_{rcust} = Weight of relation with customer factor (by Executive)

$K_{service}$ = Weight of customer service factor (by Executive)

K_{fin} = Weight of finance term factor (by Executive)

$K_{comcust}$ = Weight of relationship of competitor & customer factor (by Executive)

3.3.2.1 Calculation of order / Project selection

1. Calculation of margin's point

The process of calculating margin's point

$$((W_{margin*} R_{margin}) + K_{margin})$$

1.1 Calculation of R_{margin} on user input. User can choose the suitable margin range by adding number in front of choices that they want as follows.

No. 1 for 0 Point

No. 2 for 1 Point

No. 3 for 2 Point

No. 4 for 3 Point

No. 5 for 4 Point

No. 6 for 5 Point

2. Calculation of experience' s point

The process of calculating experience's point

$$((W_{experi*} R_{experi}) + K_{experi})$$

2.1 Calculation of R_{experi} on user input. User can choose the suitable experience range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

3. Calculation of business reputation' s point

The process of calculating business reputation's point

$$((W_{rep*} R_{rep}) + K_{rep})$$

3.1 Calculation of R_{rep} on user input. User can choose the suitable business reputation range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

4. Calculation of difficulty of integration' s point

The process of calculating difficulty of integration's point

$$((W_{diff*} R_{diff}) + K_{diff})$$

4.1 Calculation of R_{diff} on user input. User can choose the suitable difficulty of integration range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

5. Calculation of relation with supplier' s point

The process of calculating relation with supplier's point

$$((W_{rsupp*} R_{rsupp}) + K_{rsupp})$$

5.1 Calculation of R_{rsupp} on user input. User can choose the suitable relation with supplier range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

6. Calculation of on-hand product' s point

The process of calculating on-hand product's point

$$((W_{ponhand*} R_{ponhand}) + K_{ponhand})$$

6.1 Calculation of $R_{ponhand}$ on user input. User can choose the suitable on-hand product range by adding number in front of choices that they want as follows.

No. 1 for 0 Point

No. 2 for 1 Point

No. 3 for 2 Point

No. 4 for 3 Point

No. 5 for 4 Point

No. 6 for 5 Point

7. Calculation of relation with customer' s point

The process of calculating relation with customer's point

$$((W_{rcust*} R_{rcust}) + K_{rcust})$$

7.1 Calculation of R_{rcust} on user input. User can choose the suitable relation with customer range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

8. Calculation of customer service' s point

The process of calculating customer service's point

$$((W_{service*} R_{service}) + K_{service})$$

8.1 Calculation of $R_{service}$ on user input. User can choose the suitable customer service range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

9. Calculation of financial term' s point

The process of calculating financial resource's point

$$((W_{fin*} R_{fin}) + K_{fin})$$

9.1 Calculation of R_{fin} on user input. User can choose the suitable financial term range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

10. Calculation of relationship of competitor and customer' s point

The process of calculating relationship of competitor and customer's point

$$((W_{comcust} * R_{comcust}) + K_{comcust})$$

10.1 Calculation of $R_{comcust}$ on user input. User can choose the suitable relationship of competitor and customer range by adding number in front of choices that they want as follows.

No. 1 for 1 Point

No. 2 for 2 Point

No. 3 for 3 Point

No. 4 for 4 Point

No. 5 for 5 Point

3.3.3 Database Design

Database design is process to transform the logical data and process models which created during analysis and design phase into functional physical databases and software application. The database model of this project is shown in figure 3.13. Details of each table are describes on this following.

1. Quotation table

Quotation table is designed to keep Quotation ID, VAT, Quote date, Net Amount, Delivery date, Pay Condition Status and discount. Customer ID and Project ID are foreign key from table Customer and Project respectively

2. Quote Item table

Quote Item is designed to keep Sequence, Quantity and Unit Price. Quotation ID and Product ID are foreign key form table Quotation and Product respectively

3. Customer table

Customer table is designed to keep Customer ID, Customer name, Address, Ship to, Telephone, Fax, Contact and Email

4. Product table

Product table is design to keep Product ID, Unit Price, Description and model. Unit of material and Category ID are foreign key form table Unit of Material and Category respectively.

5. Unit of Material table

Unit of Material is design to keep Unit of Material ID and Description.

6. Category table

Category is designed to keep Category ID and Description

7. Purchase Order table

Purchase Order table is design to keep Purchase Order ID, Customer PO, Purchase Order Date and Status. Quotation ID is foreign key from Quotation table.

8. Invoice table

Invoice table is design to keep Invoice ID, Invoice date, Due date, Tax Invoice date, Warranty term, Active date, Received amount, Withholding tax amount and status. Purchase Order ID and Settle ID are foreign key form table Purchase Order and Settlement respectively.

9. Settlement table

Settlement is design to keep Settle ID, Settle date, Collection date and status

10. Supplier table

Supplier is design to keep Supplier ID, Supplier name, Address, Country, Telephone, Fax, Contact, Email, Credit date

11. Supplier Quotation table

Supplier is design to keep Supplier Quotation ID, VAT, Currency rate, Quotation date, Amount, Pay condition, Discount and Status. Project ID, Supplier ID, and Currency ID are foreign key from table Project, Supplier and Currency respectively.

12. Project table

Project is design to keep Project ID, Description and Status.

13. Currency table

Currency is design to keep Currency ID, Currency description, Currency short description and Default rate.

14. Supplier Quotation Item table

Supplier Quotation Item is design to keep Sequence, Quantity, Unit price, Others cost and Markup. Supplier Quotation ID and Equipment ID are foreign from table Supplier Quotation and Equipment respectively.

15. Equipment table

Equipment is design to keep Equipment ID and Description.

16. Equipment Item table

Equipment Item is design to keep Sequence, Serial number, Warranty term and active date. Equipment ID and Purchase Order Equipment are foreign key from table Equipment and Purchase Order Equipment respectively.

17. Purchase Order Equipment table

Purchase Equipment is design to keep Purchase Order Equipment ID, Date and Amount. Supplier Quotation ID and Product ID are foreign key from table Supplier Quotation and Product.

18. Factor Decision table

Factor Decision is design to keep Factor Decision ID, Factor description and K. Score.

19. Factor Value table

Factor Value is design to keep Sequence, Factor Value and Factor Score. Factor Description ID is foreign key form table Factor Decision factor.

20. Score table

Score is design to keep W. Score and R. Score. Project ID and Factor Decision ID are foreign key from table Project and Factor Decision respectively

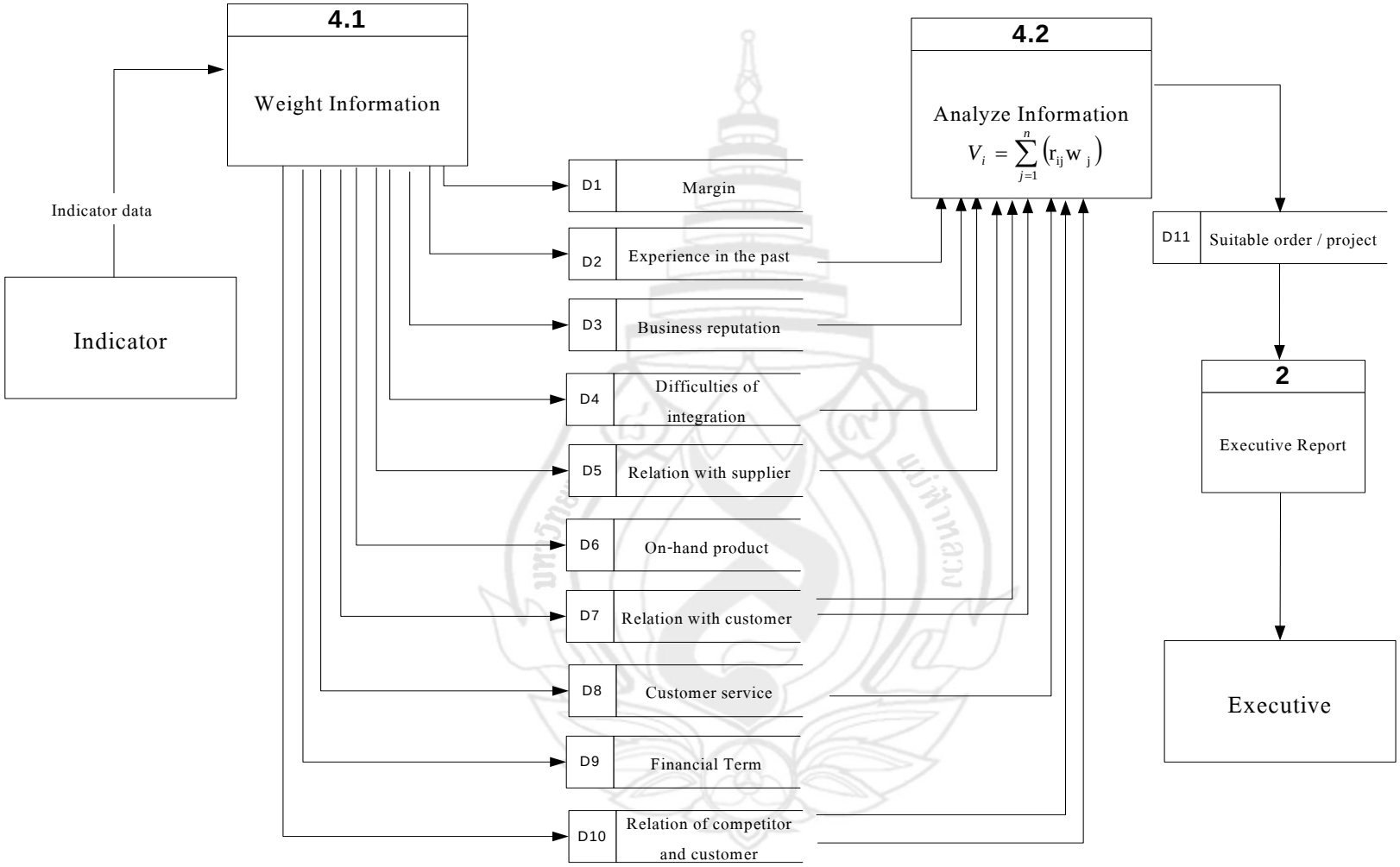


Figure 3.13 Entity Relationship Diagram

3.3.4 Interface Design

Interface design is base on graphic user interface environment. The system allows user to select and execute commands by pointing at and clicking graphical buttons or icons located on the screen or menu bar. All of interface design has to follow menu structure in figure 3.14.

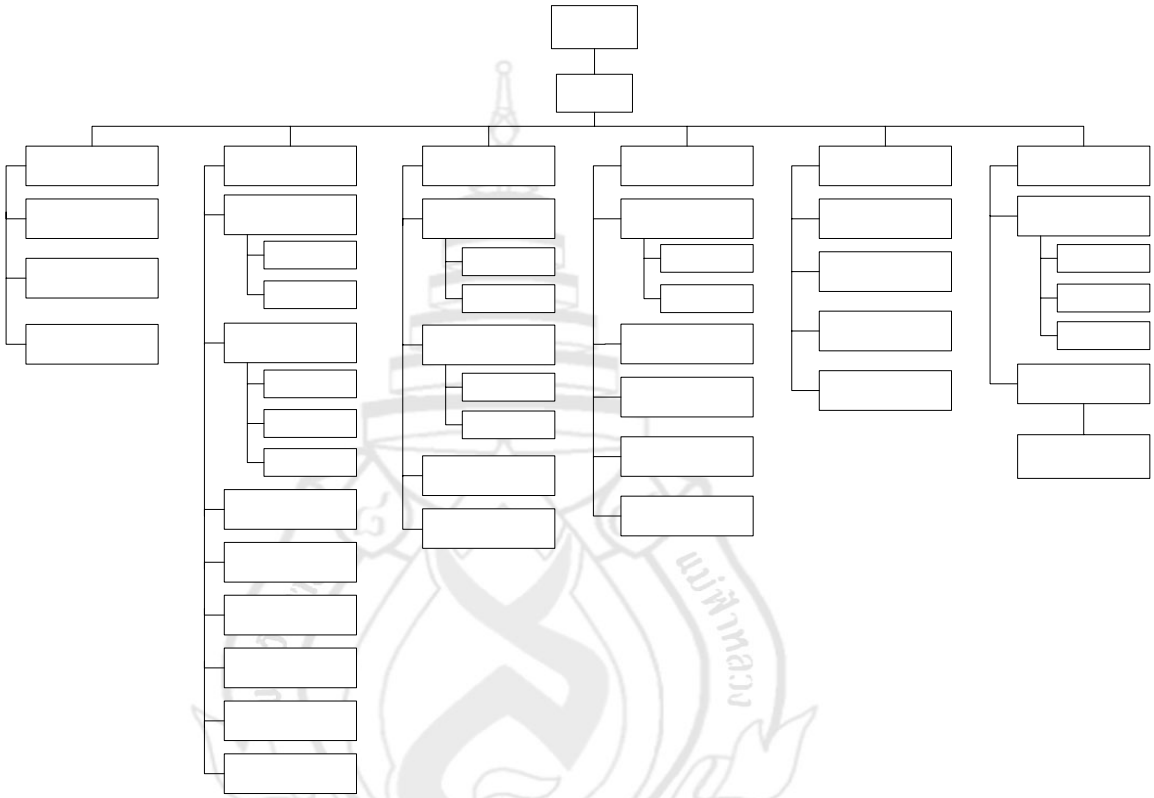


Figure 3.14 Menu Structure

3.3.4.1 Input Design

Design of Management Information System for Systems Integration Business is focus on screen-based form that allows end users to enter the necessary information in the blanks provided so that all data are captured ore retrieved in a logical, easy to read manner. The forms include understandable field headings and titles and logically organized to facilitate entry of data captured. Sample in figure 3.15 shows input screen of Supplier information.

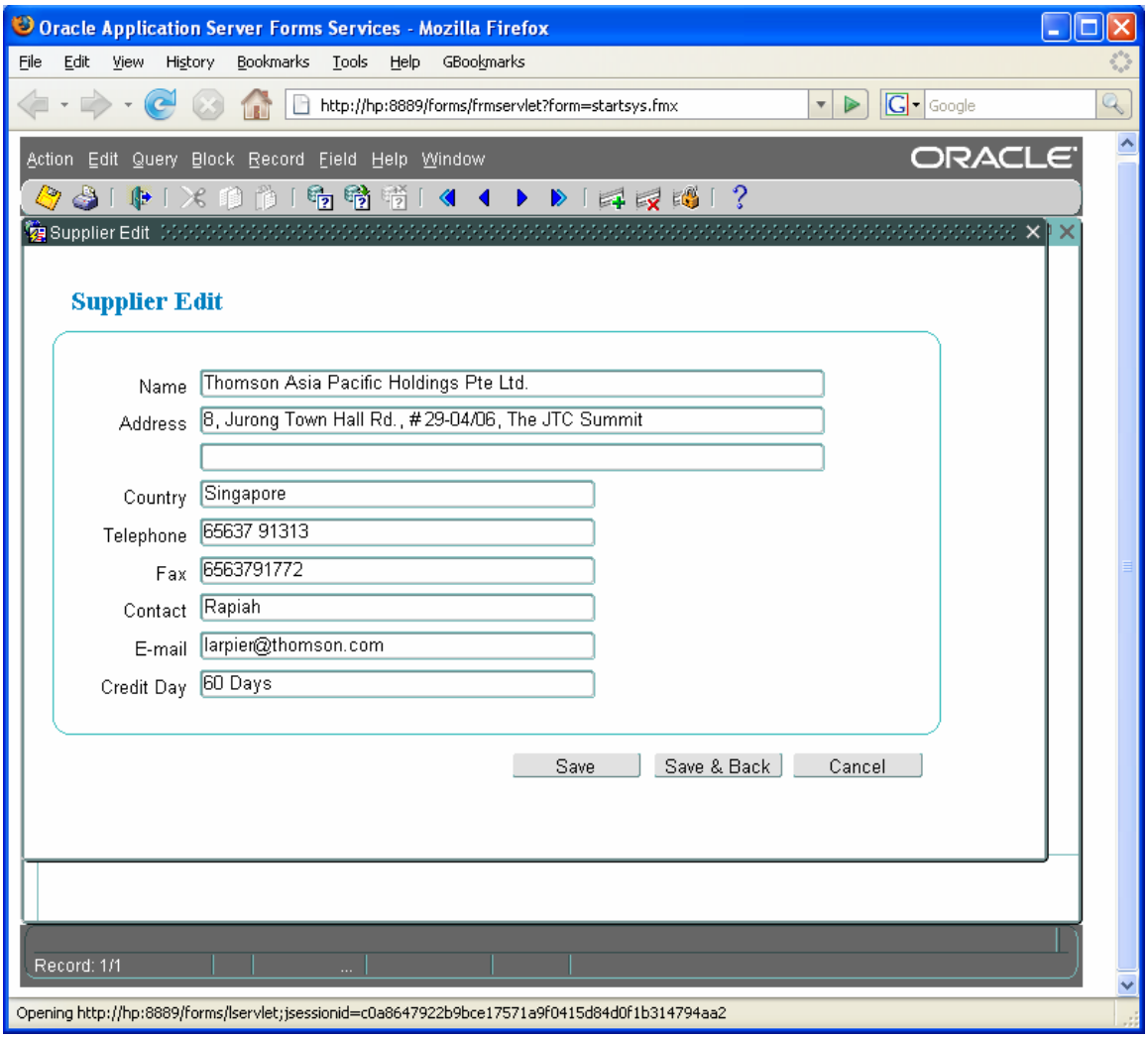


Figure 3.15 Supplier data input screen

3.3.4.2 Output Design

Output design is to create output that presents the desired information to the end user in an understandable and usable fashion requiring the least effort on the part of the end user to obtain it. Output of the systems can be display both on screen and in printout in hard copy format. Supplier Report in figure 3.16 is sample of output design.

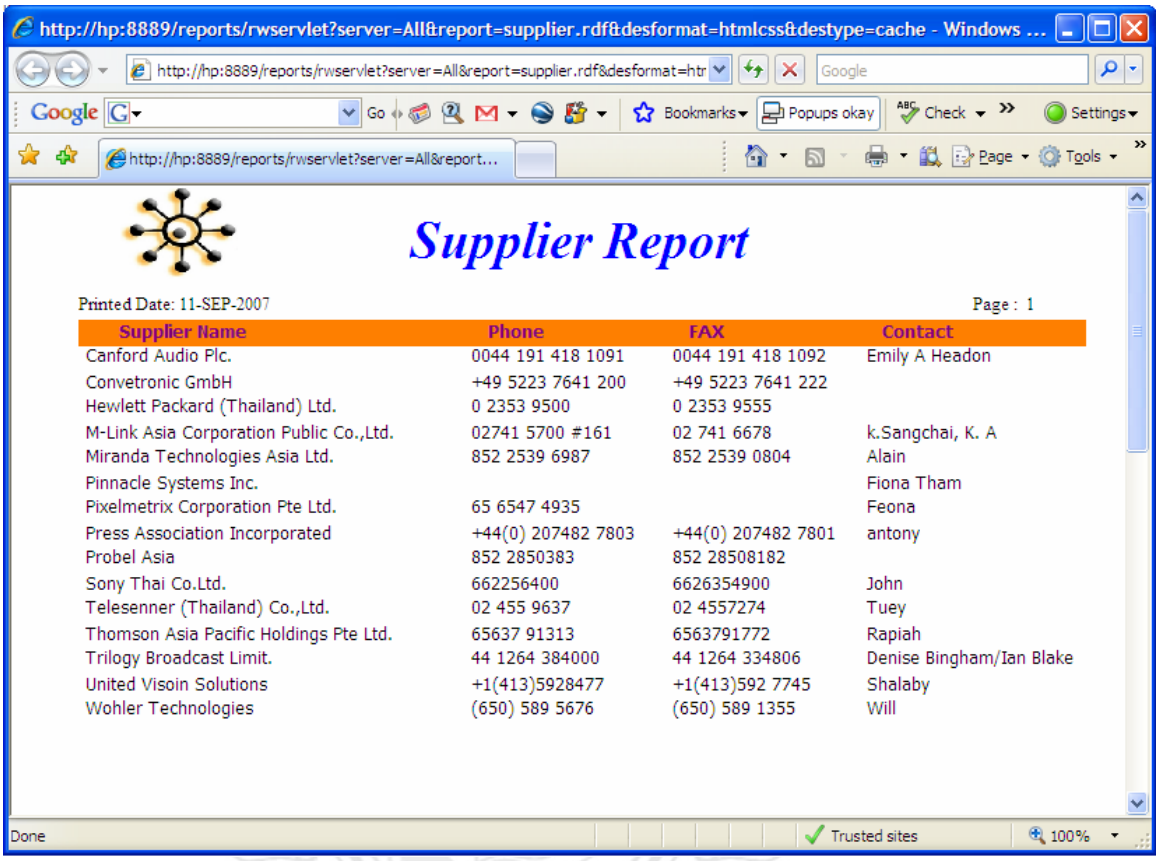


Figure 3.16 Supplier Report

3.3.4.3 Menu Design

Menu bar approach, where categories of command set are listed horizontally across the top of screen and sub categories of the command set are displayed as vertical pull-down menu when a particular category is selected. Sample menu bar shows in figure 3.17 while standard toolbar is in figure 3.18

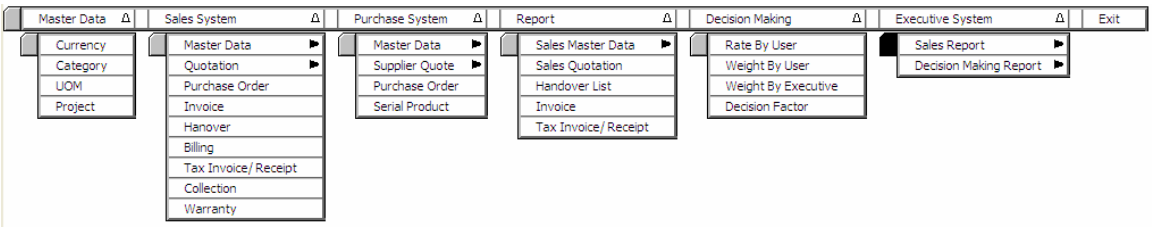


Figure 3.17 Menu bar

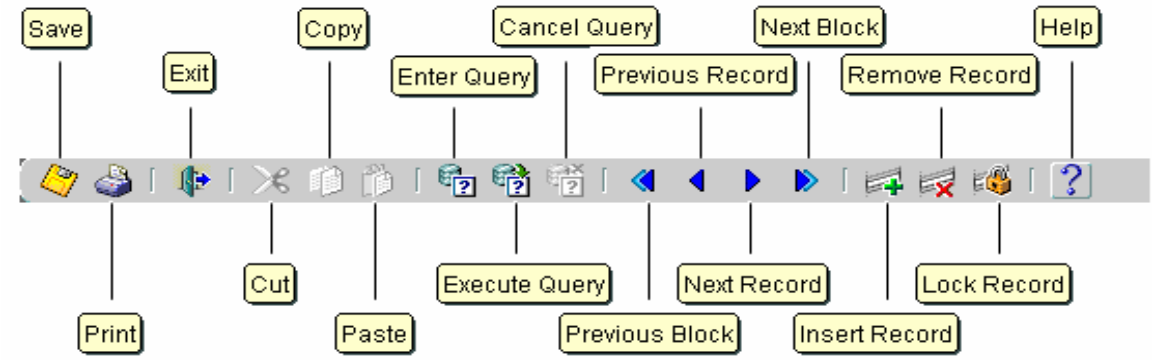


Figure 3.18 Standard toolbar

3.3.4.4 Security Control Design

The security is design by classify group of user in to 3 group as show in Table 3.1. Each user has different right to access to system. Only System administrator can access all menu function. Others user can access only in their responsible function only. The user is accessed to the system by using user name and password from System Administrator, who is fully control the system. Sample of logon Screen is in figure 3.19.

	Group of user	Right in system
1	System Administrator	All function in system
2	Sales	Sales system
3	Manager	Executive system

Table 3.1 User group

Figure 3.19 Logon Screen

Incase of input wrong password user can not access to the system. Sample of the event is shown in figure 3.20 while case of successful logon is shown in figure 3.21.

Figure 3.20 Message screen show that user input wrong user or password

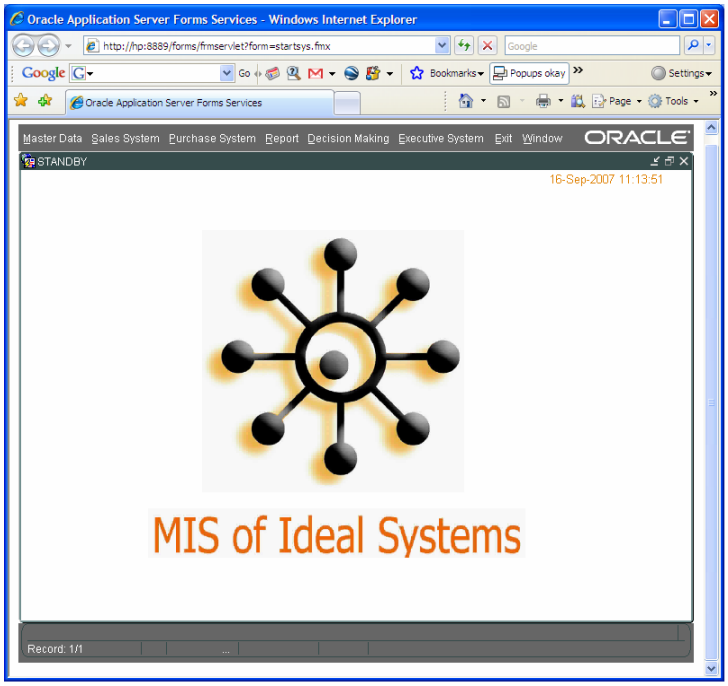


Figure 3.21 Screen is login by System Administrator

Each group of user has different authorize to access menu of system. The figure 3.22 shows active menu which can access by sales.

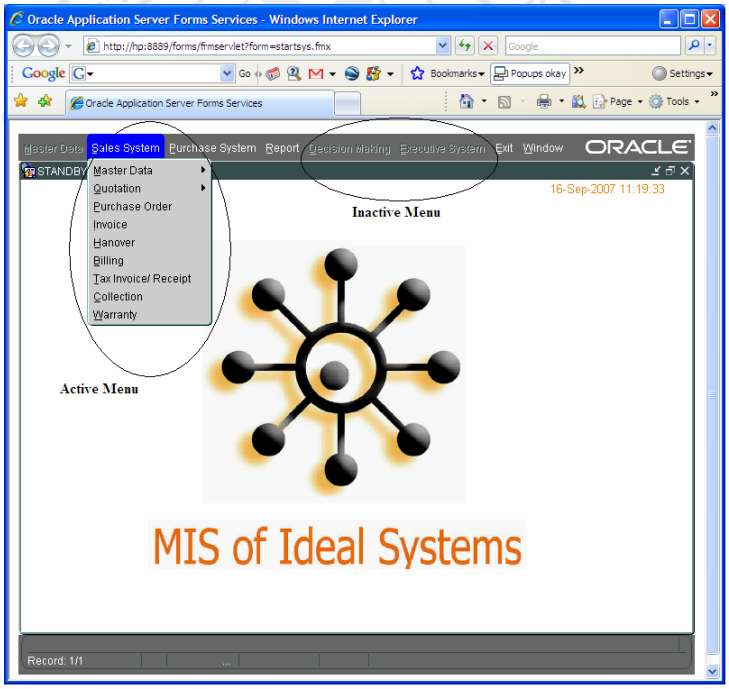


Figure 3.22 Active Menu function Screen which can access by Sales

3.3.5 Report Design

Report Design is focus to presents the desired information to user in an understandable and usable. Before get report, user has to input parameter such as start date and end date. The sample of report parameter is shown in figure 3.23. After input the parameter, then click submit Query button. Finally, report is retrieve on screen. The sample of report is shown in figure 3.24

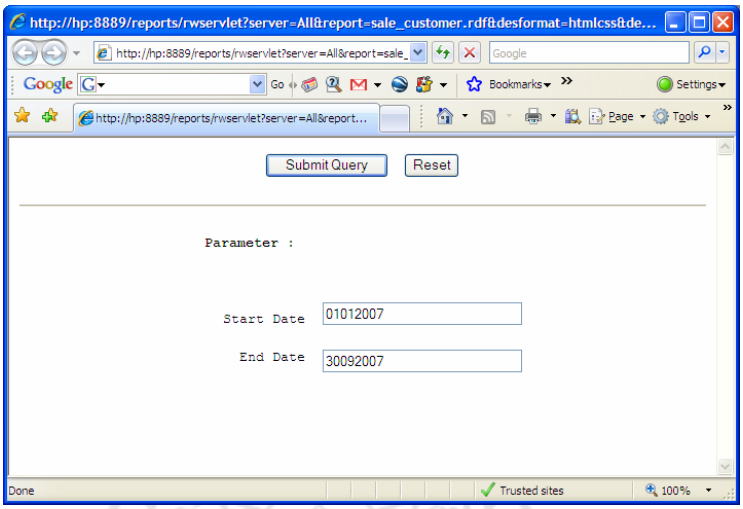


Figure 3.23 Parameter of Report

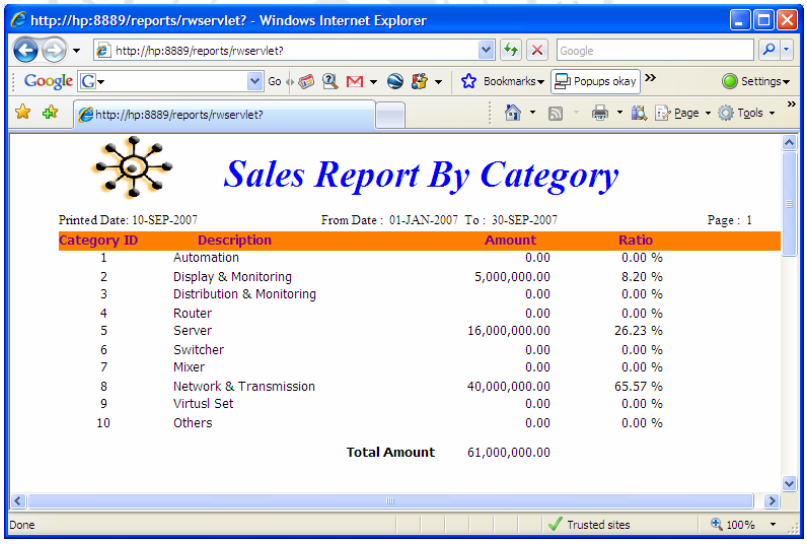


Figure 3.24 Sample of Report

CHAPTER IV

SYSTEM FUNCITONALITY

From business operation analysis, the development of Management Information System for Systems Integration Business is started. The system functionality is developed meet user's requirement.

4.1 System Architecture

The system is Web-Based Application which consists of Presentation tier, Application tier and Data tier. The Application is accessed via browser from client over Internet or intranet network. The presentation tier converts and display application data in to HTML or XML. Application tier keep business rule and logic. Data tier provides data storage and data access mechanisms to an application.

Figure 4.1 Three-tier Architecture

The project of Management Information System for Systems Integration Business consists of 2 sub system.

1. Sales system
    - 1.1 Quotation
    - 1.2 Hanover / Warranty of Customer
    - 1.3 Invoice
    - 1.4 Billing and Collection

1.5

2. Executive report

2.1 Summary of sales data by customer

2.2 Summary of sales data by product

2.3 Summary of sales data by category

2.4 Report for decision maker

2.4.1 Rate and weight (Order / Project selection)

4.2 Test Plan

Test Plan to used to identify the different types of testing and the methods and criteria for performing the test activities For each level of testing, prepare a test plan and the appropriates set of deliverables.

4.2.1 Objective

This test plan for Management Information System for Systems Integration Business supports following objectives.

Define the activities required to prepare for and conduction user evaluation testing

Define deliverables and responsible user

To get feed back from user

4.2.2 Scope

The application is tested by 6 users from of Ideal Systems (Thailand) Co., Ltd.

Data entry

The system should allow sales, executive and admin to input information from PC running Microsoft windows XP operating system. The system will be menu driven and will provide error message to help user various options. Forms which need to input data are as follow.

Master data

Currency

Category

UOM

Project

Sales System

Master data

Quotation

Purchase order

Invoice

Handover

Billing

Tax Invoice/Receipt

Collection

Warranty

Purchase System

Master data

Supplier quotation

Purchase order

Serial Product

Decision Making

Rate by user

Weight by user

Weight by executive

Report

The system will allows to print 4 types of report. These reports are.

Sales by customer report

Sales by product report

Sales by category report

Decision making report

Security

Each user has user ID and Password to login the system. The system will require the users to change password every 30 days.

4.2.3 Environment requirements

Server

Hardware

CPU	Intel Pentium IV 3.0 GHz
RAM	1 GB DDR BUS 400 MHz
Hard disk	200 GB Serial ATA100

Software

Database	Oracle 10g Express Edition
Operating System	Windows Server 2003

Clients

Hardware

CPU	Intel Pentium IV 1.7 MHz
RAM	256 DDR
Hard disk	80 GB ATA100

Software

Database	Oracle 10g Express Edition
Operating System	Windows XP Professional

4.2.4 Test Schedule

System Familiarization	16 July 2007 - 20 July 2007
System Test	23 July 2007 - 27 June 2007
User evaluation Test	31 July 2007 - 3 August 2007

4.2.5 Functions to be tested

The following is a list of functions that will be test:

- Security features
- Find
- Edit
- Query
- Previous Record
- Next Record
- Exit
- Save
- Print

4.2.6 Document

The following documentation will be available at the end of the test phase.

- Test Plan
- Test Case
- Final Test Summary Report

4.3 Test Results

This system was tested by 6 employees from Ideal System (Thailand) Co., Ltd. Each user tested the system by using the questionnaires and the result is shown in figure 4.1

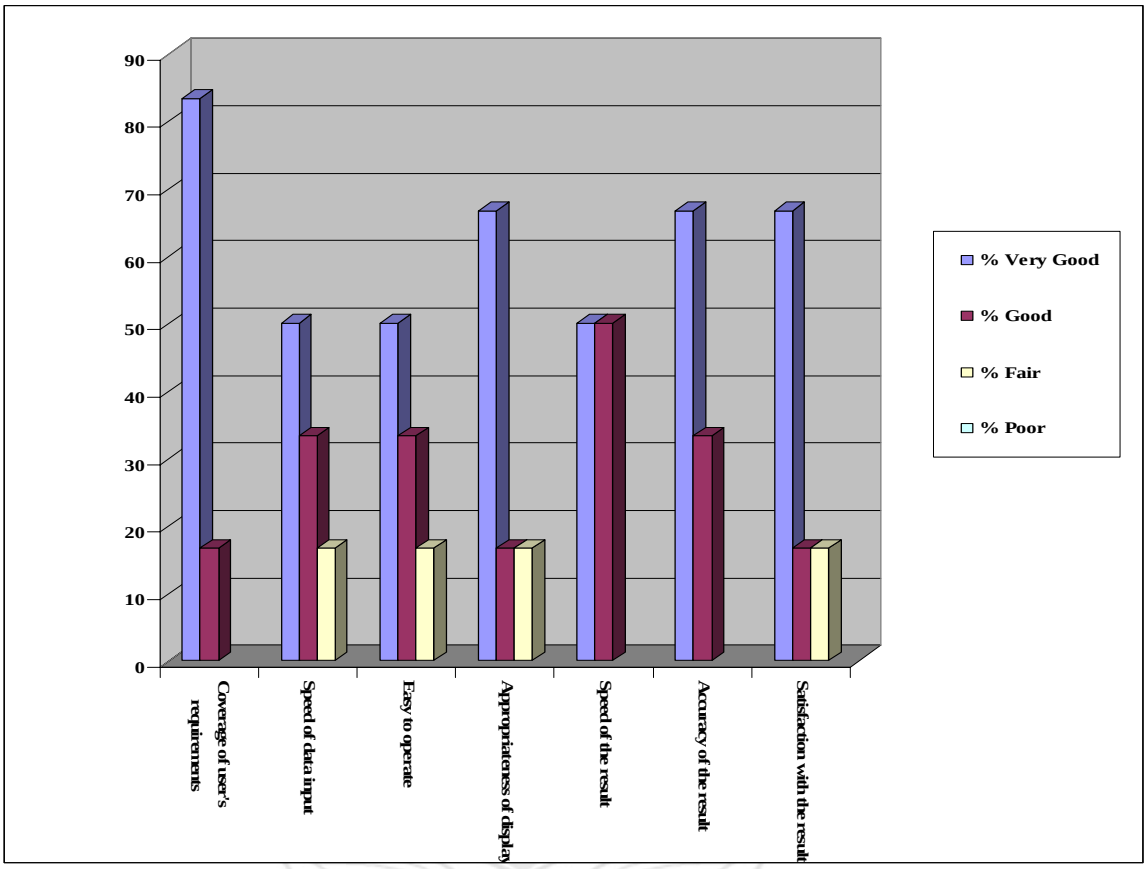


Figure 4.2 Result of the questionnaires

Six persons evaluated the applications. They had different position in company. 2 Persons are Executive, 1 person is Manager and 3 persons are staff level.

The result of users evaluated as follow.

1. Input and user interface

   Coverage of user's requirement: 83.33% at very good level

   Speed of data input: 50% at very good level

   Easy to operate: 50% at very good level

   Appropriateness of display: 66.67% at very good level

2. Result

Speed of the result: 50.00% at very good level

Accuracy of the result: 83.33% at very good level

Satisfaction with the result: 66.67% at a very good level

From the test result, It is seen most of user are satisfied with this system. The system can meet user's requirements to support business activities at a very good level.

However, some users suggested that the system should cover more function than only sales system, which was cover in this study.

CHAPTER V

SUMMARY AND SUGGESTIONS

This project has developed Management Information System for Systems Integration Business base on requirement of Ideal Systems (Thailand) Co., Ltd. The whole process of development had faced problems. In order to complete the project, problem needs to cope by developer. The all process of problem solving is in this chapter.

5.1 Project Summary

Management Information System for Systems Integration Business has been developed. Before the project start, objectives and scope of work is needs to be cleared. After that, process of gathering requirement which need to have several methods such as interview, observation and documentation. In order to get exactly what user wants to have, all information need to analyze. Then, Data Flow Diagram which represent flow of data in system need to complete.

Relational database is chosen to handle the requirement. Oracle Database10g Express Edition is used as relational database and Oracle Developer Suite 10g is used as tool for the project. Web-based Application on multi tiers base on Client/Server network architecture, which is can access from more than concurrency 1 user is suit with user requirement. Window XP Professional is used as operating system for clients, while Window Server 2003 is installed for server side.

Graphic users interface design for easy to operate the system. Then, design of report from the system need to support demand of user.

The most critical task is Database design which simply calls Entity Relationship Diagram which shows relationship of each entity in the system. In this stage consumes lot of times.

The outcome of project is Management Information Systems for Systems Integration business. The systems consist of two subsystems. The first subsystem is Sales system. The system is start from gathering price from supplier and calculate price to offer to customer. After give quotation to customer,

then the offer become to purchase order from customer. When supplier is deliver material or equipment, all of serial number is input to the system to control warranty of product. After process of integration and installation for customer is done, system is do process of invoicing and handover. Last process of sales system is collection from customer. The second subsystem is Executive Report. This system provides report which give summary view of business activities. Report from system, executive can do controlling and monitoring business. Especially, the system can suggest the executive to make decision to process order or project which is give more potential benefit to business in each period of time.

Finally, The Management Information Systems for Systems Integration business systems can help organization to enhance business productivity, efficiency, minimize redundancy data and error data. Increasing information accuracy of operational and management level. Moreover, management level can get information whenever is needed to make business decision.

5.2 Problem encountered and solutions

The process of development the system faced several problems as following.

1. In process of design E-R diagram, there were often found that relation of each entity need to be changed in order to meet requirement. Changing process is needed to do via SQL statements, which result of long process to fix it. “Toad data Modeler” program is used to solve the problem. The program tool has feature to draw entity relation diagram and transform it to SQL statement without need to type SQL statement line by line. Free version is available for free is used for this project.

2. Relational database which first designed was not use properly and not good as required so, several corrections are needed including changing tested data in each table. The correction process is lots of time consuming by. The problem is solving by program “Toad for Oracle”. The program tools has feature to added, changed, removed, exported and imported, data in database. Those function in the program tools had help to correction smoothly. However, “Toad for Oracle” is expensive tools in market, so 30 days trial version is used for this project.

3. Lack of information for Oracle Developer. Oracle website provides lots of information, however is difficult and takes time to looking for what developer wants to have. There are not many text books also. The problem is solved by get information from web board such as narisa.com, pantip.com and exzilla.net.

5.3 Suggestions for further development

Base on this study, there are other areas that should be further develop in order to increase its benefits. The followings are some of the important areas recommended for further development.

1. The accounting and finance module should be added to the system.
2. Purchasing module should be added to the system.
3. Human resource module should be added to the system.
4. Data warehouse and data mining which are useful to maximize use of exiting data base system and support executive to make business decision.

REFERENCES

Griffin, Ricky W. (2005). **Management**. 8th Edition. U.S.A.: Houghton Mifflin.

Haag, Stephen. ; Cummings, Maeve. and McCubbrey, Donald J. (2005). **Management Information for the Information age**. 5th ed. Singapore: McGraw-Hill.

Marakas, George M. (2006). **Analysis & Design : An active Approach**. 2nd ed. New York : McGraw-Hill.

O'Brien, James A. (2004). **Management Information Systems: managing information technology in the business enterprise**. 6th ed. New Delhi : Tata McGraw-Hill.

Post, Geral V. (2005). **Database Management System : Designing and Building Business Applicatio.** 3rd ed. New York : McGraw-Hill.

Silberschatz, Abraham. ; Korth, Henry F. and Sudarshan, S. (2006). **Database System Concept**. 5th ed. U.S.A. : McGraw-Hill.

Turban, Efraim. ; Aronson, Jay E. and Liang, Ting-Peng. (2005). **Decision Support Systems and Intelligent Systems**. 7th ed. U.S.A. : Person Prentice Hall.

Turban, Efraim. & McLean, Ephraim. & Wetherbe, James. (2002). **Information technology for management : transforming business in the digital economy**. U.S.A. : Von Hoffmann.

Zwass, Vladimir. (1997). **Foundations of Information Systems**. Singapore. : McGraw-Hill.

บรรศักดิ์ เกิดชัญฤทธิ์. (2550). **พัฒนา Web Applications ด้วย Oracle Developer Suite 10g**. กรุงเทพฯ : จรัลสนิทวงศ์การพิมพ์.

ศุภชัย จิวะรังสินี และ ขจรศักดิ์ สังข์เจริญ. (2549). **ระบบฐานข้อมูล Oracle Database 10g.** กรุงเทพ : TrainLyst.

ฮอฟเฟอร์, เจฟฟรีย์ เอ. จอร์ด ; โจอี้ เอฟ. วาลาชิค และ โจเซฟ เอส. (2004). **การวิเคราะห์และออกแบบระบบ : Modern Systems Analysis & Design.** แปลโดย จิติมา วงศ์วุฒิวัฒน์, นิตยา วงศ์ภินันท์วัฒนา และ ปัญจราศี ปุณณชัยยะ. กรุงเทพฯ : เพียร์สัน เอ็ดดูเคชั่น อินโดไชน่า.

Appendix

Appendix A

Data Dictionary

1. Customer Data

No	Name	Description	Type	Key
1	CUST_ID	Customer Identification	NUMBER(4)	PK
2	CUST_NAME	Customer Name	VARCHAR2(100)	
3	ADDRESS	Address	VARCHAR2(200)	
4	SHIP_TO	Shipping Address	VARCHAR2(200)	
5	TELEPHONE	Telephone Number	VARCHAR2(100)	
6	FAX	Facsimile Number	VARCHAR2(100)	
7	CONTACT	Contact Name	VARCHAR2(100)	
8	EMAIL	Email	VARCHAR2(100)	

2. Product Data

No	Name	Description	Type	Key
1	PROD_ID	Product Identification	NUMBER(8)	PK
2	UOM	Unit of Material	NUMBER(2)	FK
3	CAT_ID	Category Identification	NUMBER(3)	FK
4	DESCRIPTION	Description	VARCHAR2(200)	
5	MODEL	Model	VARCHAR2(200)	
6	UNIT_PRICE	Unit Price	NUMBER(12,2)	

3. Category Data

No	Name	Description	Type	Key
1	CAT_ID	Category Identification	NUMBER(2)	PK
2	DESCRIPTION	Description	VARCHAR2(100)	

4. Unit of Material Data

No	Name	Description	Type	Key
1	UOM	Unit of Material	NUMBER(2)	PK
2	DESCRIPTION	Description	VARCHAR2(30)	

5. Project Data

No	Name	Description	Type	Key
1	PROJ_ID	Project Identification	NUMBER(4)	PK
2	DESCRIPTION	Description	VARCHAR2(100)	
3	STATUS	Description	VARCHAR2(100)	

6. Quotation Data

No	Name	Description	Type	Key
1	QUOT_ID	Quotation Identification	NUMBER(6)	PK
2	CUST_ID	Customer Identification	NUMBER(4)	FK
3	PROJ_ID	Number	NUMBER(4)	FK
4	VAT	Value Added Tax	NUMBER(4,2)	
5	QUOT_DATE	Quotation Date	DATE	
6	NET_AMOUNT	Net Amount	NUMBER(12,2)	
7	DELIVERY_DATE	Delivery Date	VARCHAR2(100)	
8	PAY_CONDITION	Payment Condition	VARCHAR2(100)	
9	DISCOUNT	Discount	NUMBER(4,2)	
10	STATUS	Status	VARCHAR2(10)	

7. Quote Item Data

No	Name	Description	Type	Key
1	QUOT_ID	Quotation Identification	NUMBER(6)	PK,FK
2	SEQ	Sequence	NUMBER(4)	PK
3	PROD_ID	Product Identification	NUMBER(8)	FK
4	QUANTIY	Quantity	NUMBER(12,2)	
5	UNIT_PRICE	Unit Price	NUMBER(12,2)	

8. Purchase Order Data

No	Name	Description	Type	Key
1	PO_ID	Purchase Order ID.	NUMBER(6)	PK
2	QUOTE_ID	Quotation Identification	NUMBER(6)	FK
3	CUST_PO	Customer purchase order	VARCHAR2(100)	
4	PO_DATE	Purchase Order No. date	DATE	
5	STATUS	Status	VARCHAR(10)	

9. Settlement Data

No	Name	Description	Type	Key
1	SETTLE_ID	Settlement Identification	NUMBER(5)	PK
2	SETTLE_DATE	Settlement date	DATE	
3	COL_DATE	Collection Date	DATE	
4	STATUS	Status	VARCHAR2(10)	

10. Invoice Data

No	Name	Description	Type	Key
1	INV_ID	Invoice Identification	NUMBER(5)	PK
2	PO_ID	Customer PO Identification	NUMBER(6)	FK
3	SETTLE_ID	Settlement Identification	NUMBER(5)	FK
4	INV_DATW	Invoice Date	DATE	
5	DUE_DATE	Due date	VARCHAR2(100)	
6	TAX_DATE	Tax Invoice Date	DATE	
7	WARRAN_TERM	Warranty Term	NUMBER(3)	
8	ACTIVE_DATE	Active Date	DATE	
9	RECEIVE_AMT	Receive Amount	NUMBER(12,2)	
10	WT_AMT	Withholding Tax	NUMBER(10,2)	
11	STATUS	Status	VARCHAR2(10)	

11. Supplier Data

No	Name	Description	Type	Key
1	SUPL_ID	Supplier Identification	NUMBER(4)	PK
2	SUPL_NAME	Supplier Name	VARCHAR2(100)	
3	ADDRESS	Address	VARCHAR2(200)	
4	COUNTRY	Country	VARCHAR2(100)	
5	TELEPHONE	Telephone Number	VARCHAR2(100)	
6	FAX	Facsimile Number	VARCHAR2(100)	
7	CONTACT	Contact Name	VARCHAR2(100)	
8	EMAIL	Email	VARCHAR2(100)	
9	CREDIT_DAY	Credit day	NUMBER(3)	

12. Currency Data

No	Name	Description	Type	Key
1	CURR_ID	Currency Identification	NUMBER (3)	PK
5	CURR_DESC	Currency Description	VARCHAR2(30)	
6	CURR_SHOR_DESC	Currency Short Des.	VARCHAR2(10)	
4	DEFAULT_RATE	Default Rate	NUMBER(10,5)	

13. Purchase Order of Equipment Data

No	Name	Description	Type	Key
1	PO_EQ_ID	PO. Equipment ID.	NUMBER(6)	PK
2	S_QUOT_ID	Quotation Identification	NUMBER(6)	FK
3	PROD_ID	Product Identification	NUMBER(8)	FK
4	PO_EQ_DATE	Date of Equipment PO	VARCHAR2(200)	
5	AMOUNT	Amount	NUMBER(12,2)	

14. Supplier Quotation Data

No	Name	Description	Type	Key
1	S_QUOT_ID	Quotation Identification	NUMBER(6)	PK
2	PROJ_ID	Project Identification	NUMBER(4)	FK
3	SUPL_ID	Supplier Identification	NUMBER(4)	FK
4	CURR_ID	Currency Identification	NUMBER (3)	FK
5	VAT	Value Added Tax	NUMBER(6)	
6	CURR_RATE	Currency Rate	NUMBER(10,2)	
7	S_QUOT_DATE	Quotation Date	DATE	
8	AMOUNT	Net Amount	NUMBER(12,2)	
9	DELIVERY_DAY	Delivery Day	VARCHAR2(100)	
10	PAY_CONDITION	Payment Condition	VARCHAR2(100)	
11	DISCOUNT	Discount	NUMBER(2,2)	
12	STATUS	Status of Transaction	VARCHAR2(10)	

15. Supplier Quote Item Data

No	Name	Description	Type	Key
1	S_QUOT_ID	Quotation Identification	NUMBER(6)	PK,FK
2	SEQ	Sequence	NUMBER(4)	PK
3	EQ_ID	Equipment Identification	NUMBER(8)	FK
4	QUANTIY	Quantity	NUMBER(12,2)	
5	UNIT_PRICE	Unit Price	NUMBER(12,2)	
6	OTER_COST	Other Cost	NUMBER(12,2)	
7	MARKUP	Markup Price	NUMBER(6,2)	

16. Equipment Data

No	Name	Description	Type	Key
1	EQ_ID	Equipment Identification	NUMBER(8)	PK
2	DESCRIPTION	Description	VARCHAR2(100)	

17. Equipment Item Data

No	Name	Description	Type	Key
1	EQ_ID	Equipment Identification	NUMBER(8)	PK
2	SEQ	Sequence	NUMBER(4)	PK
3	PO_EQ_ID	PO. Equipment ID.	NUMBER(6)	FK
4	SERIAL_NO	Serial Number	VARCHAR2(200)	
5	WARRAN_TERM	Warranty Term	NUMBER(3)	
6	ACTIVE_DATE	Active Date	DATE	

18. Score Data

No	Name	Description	Type	Key
1	PROJ_ID	Project Identification	NUMBER(4)	PK,FK
2	FACTOR_DEC_ID	Factor Decision ID.	NUMBER(3)	PK,FK
3	W_SCORE	Weight Score	NUMBER(1)	
4	R_SCORE	Rate Value	NUMBER(1)	

27. Factor Decision Data

No	Name	Description	Type	Key
1	FACTOR_DEC_ID	Factor Decision ID.	NUMBER(3)	PK
2	FACTOR_DESC	Factor Description	VARCHAR2(100)	
3	K_SCORE	Weight Score : Executive	NUMBER(1)	

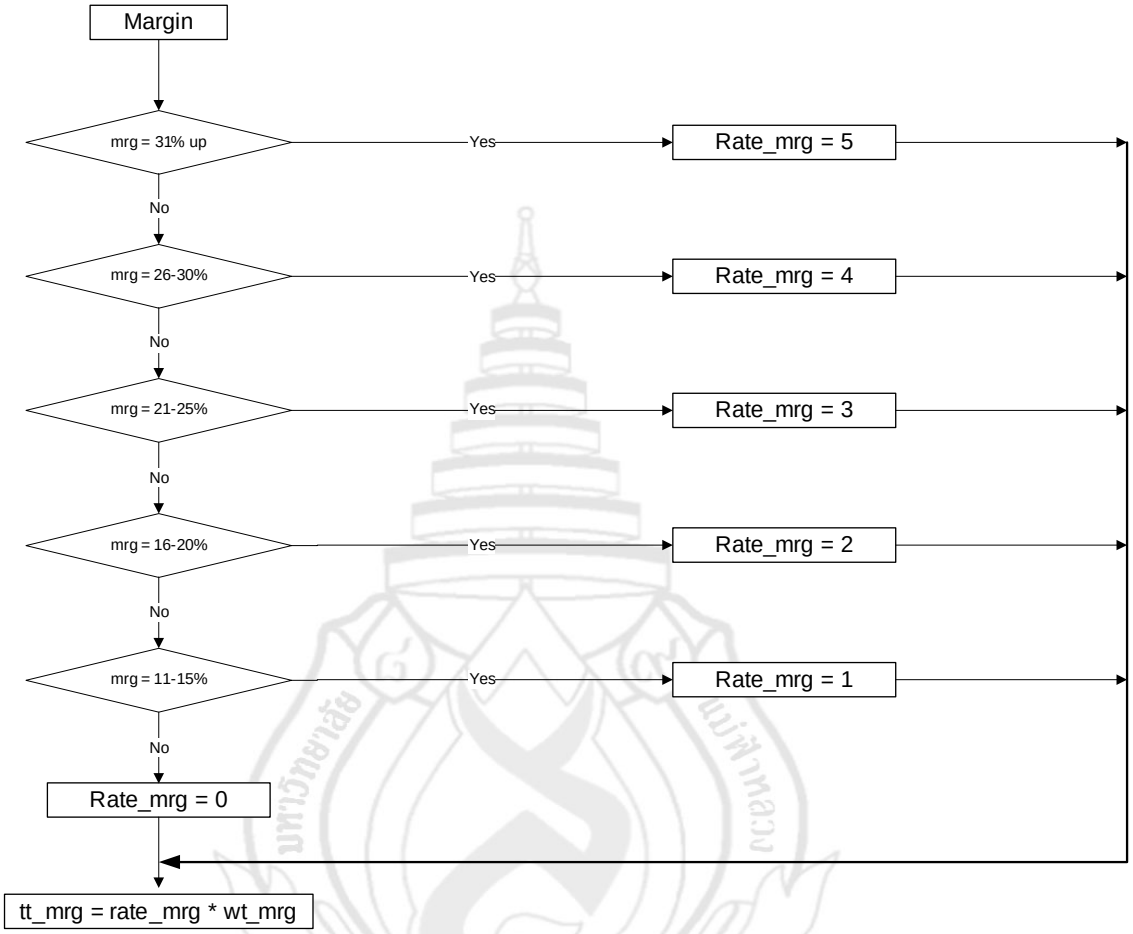
20. Factor Value

No	Name	Description	Type	Key
1	FACTOR_DEC_ID	Factor Decision ID.	NUMBER(3)	PK, FK
2	SEQ	Sequence	NUMBER(3)	PK
3	FACTOR_VALUE	Factor Value	VARCHAR2(100)	
4	FACTOR_SCORE	Factor Score	NUMBER(1)	

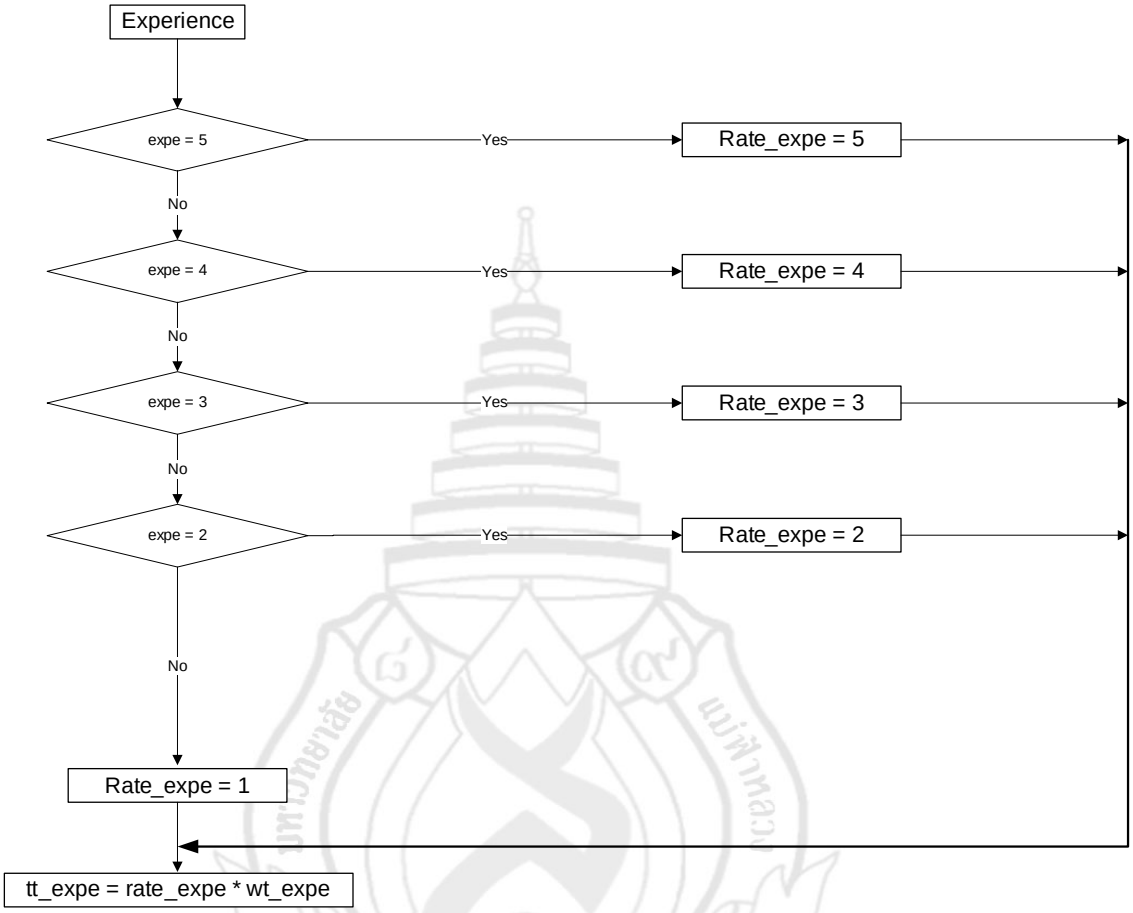
Appendix B

Decision Tree Diagram

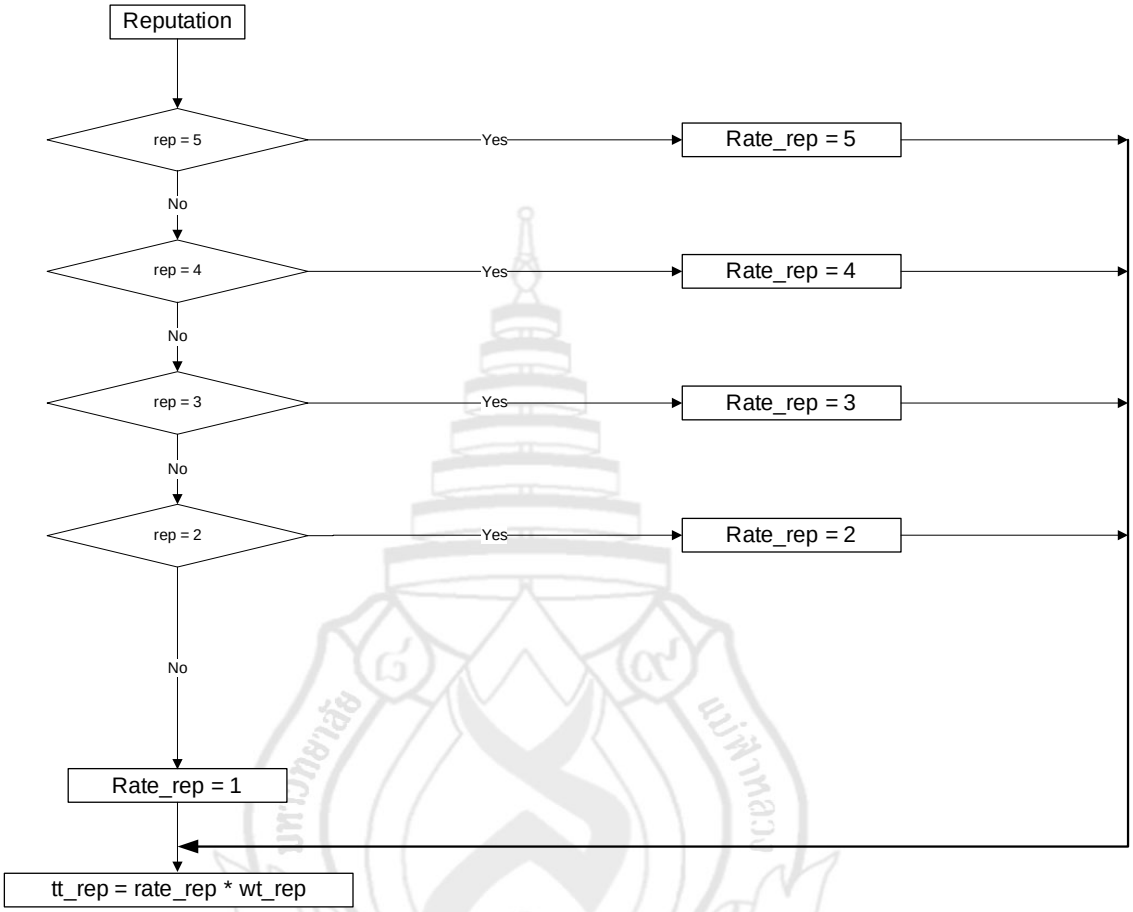
1. Decision tree diagram for margin of model base



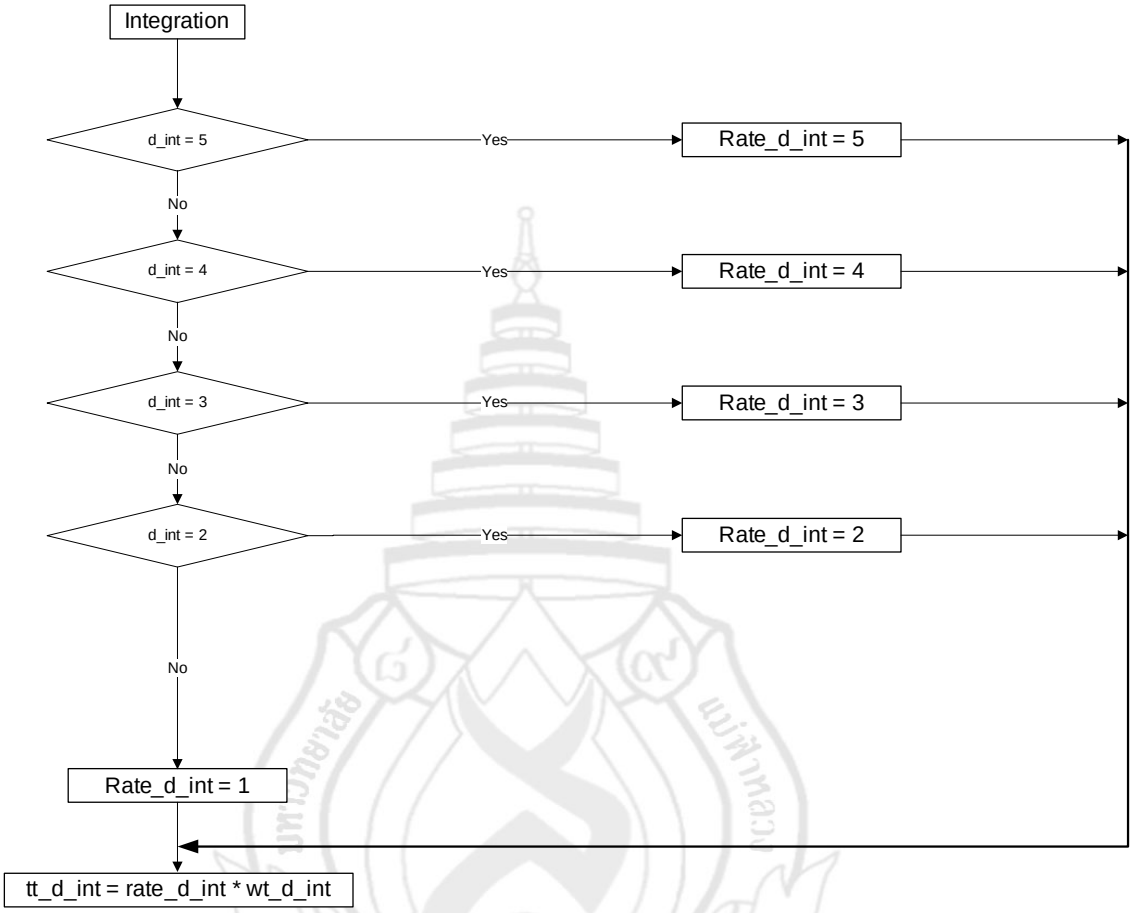
2. Decision tree diagram for experience in the past model base



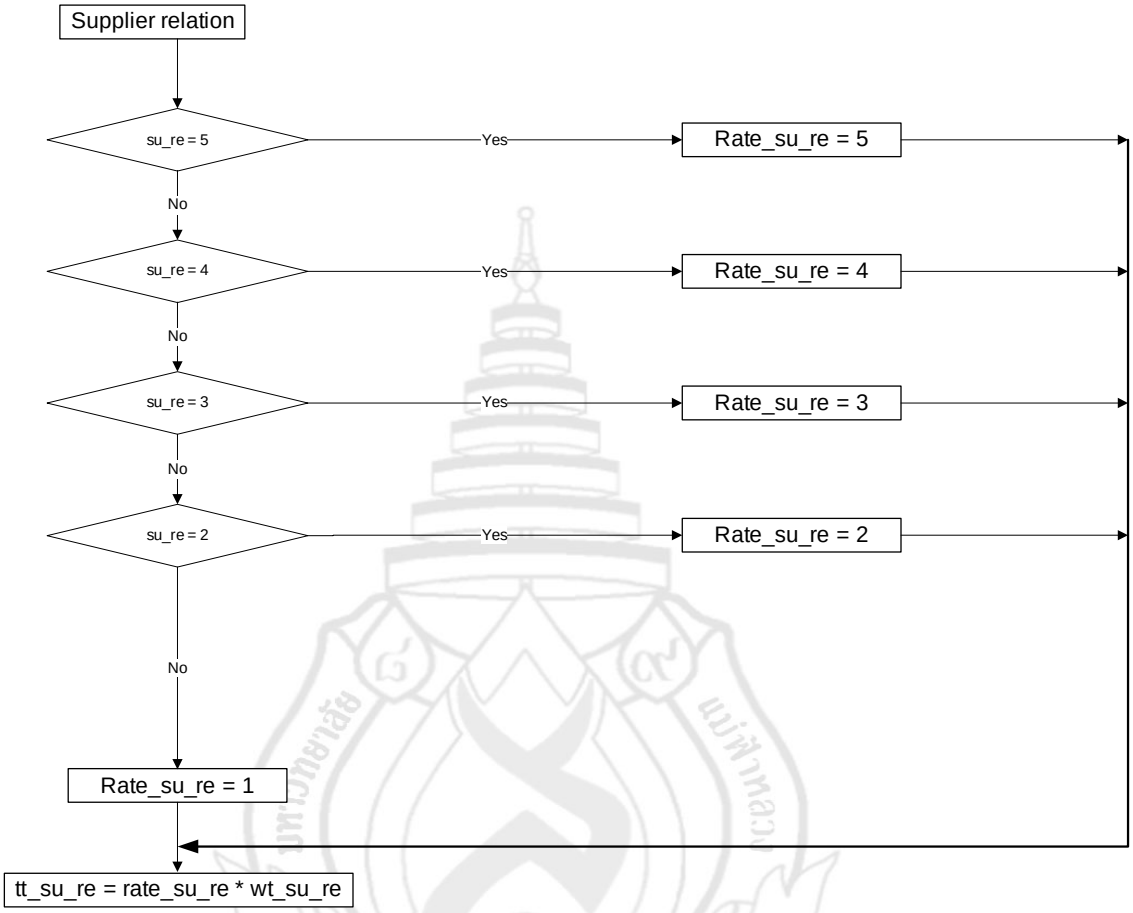
3. Decision tree diagram for business reputation model base



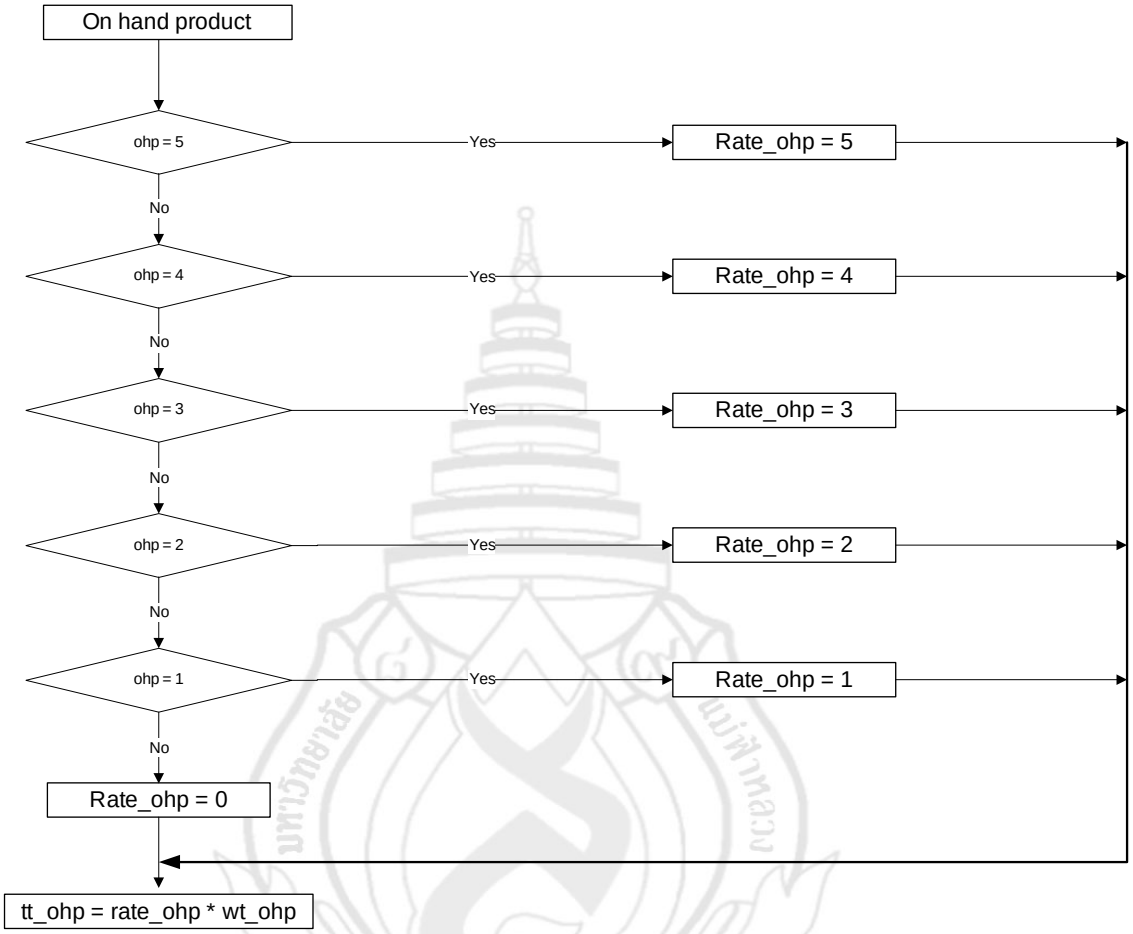
4. Decision tree diagram for difficult of integration model base



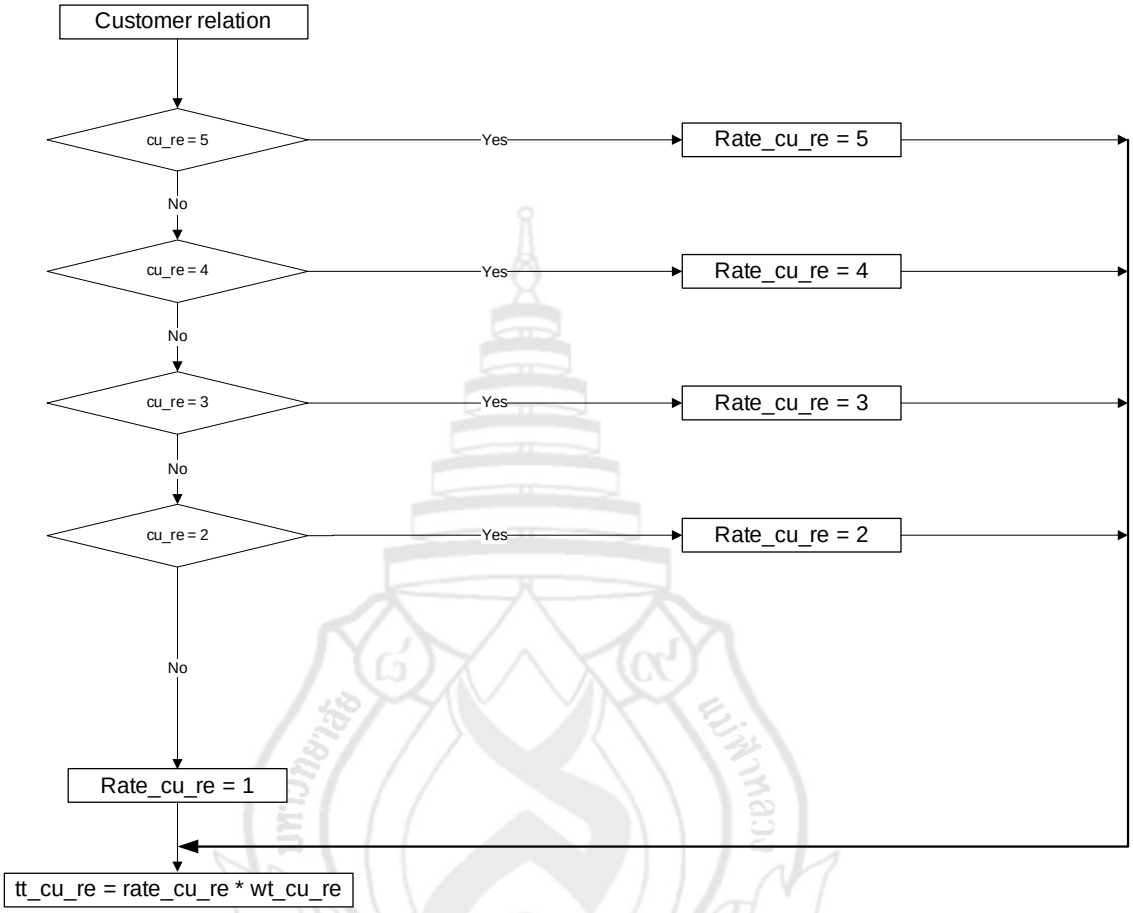
5. Decision tree diagram for relation with supplier model base



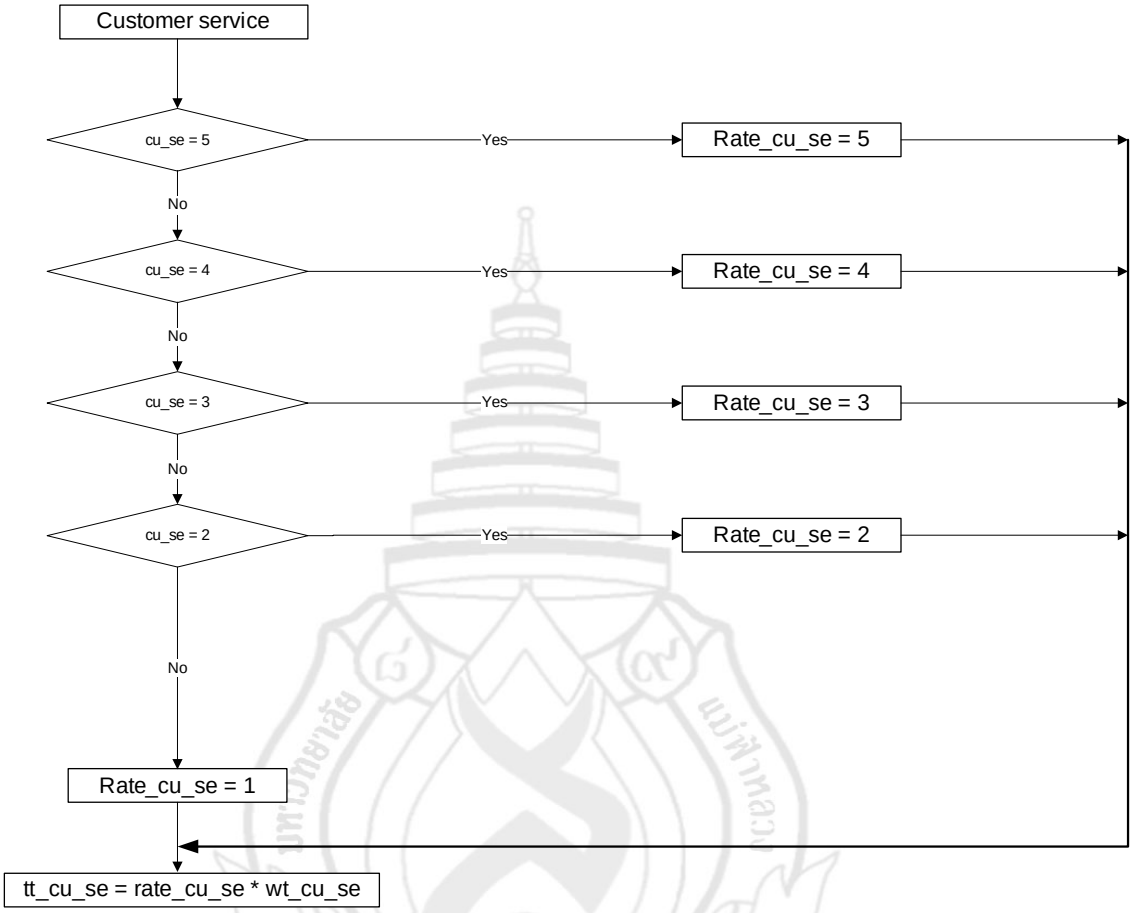
6. Decision tree diagram for on-hand product model base



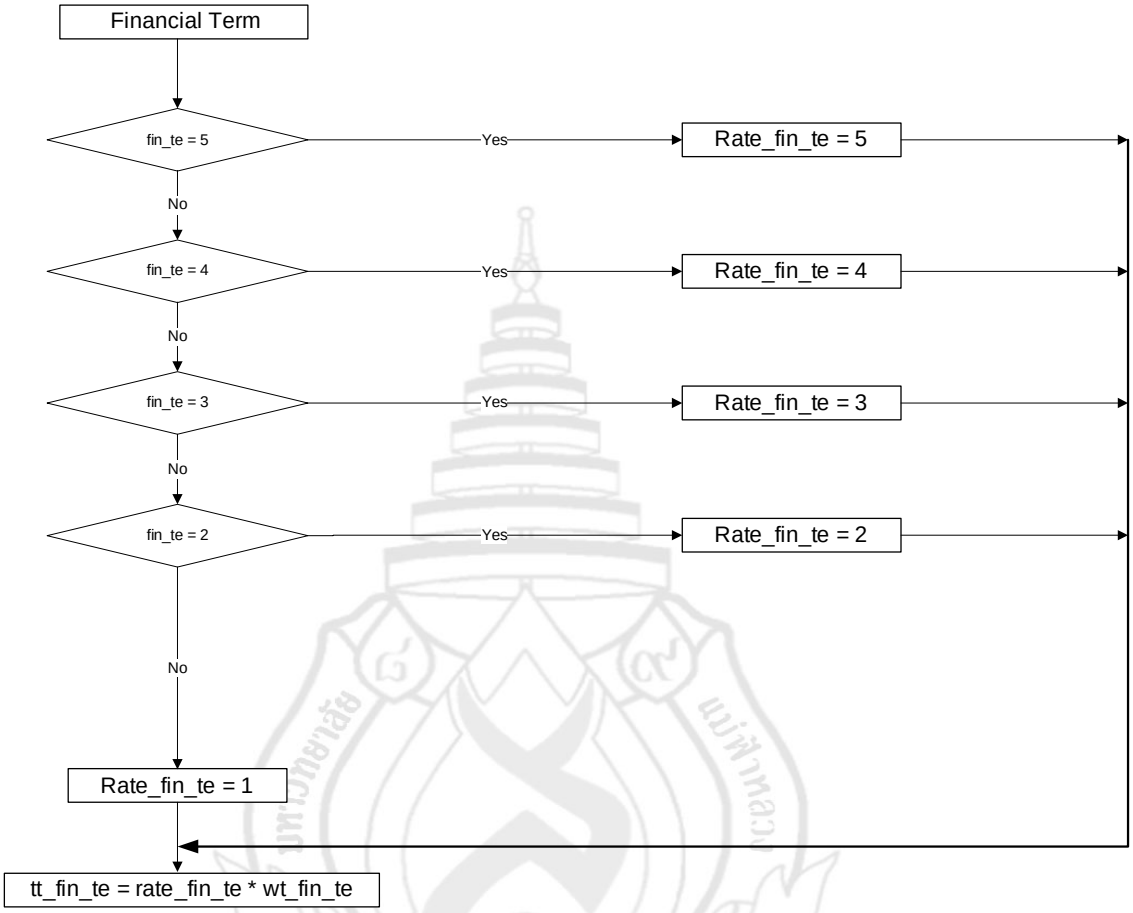
7. Decision tree diagram for relation with customer model base



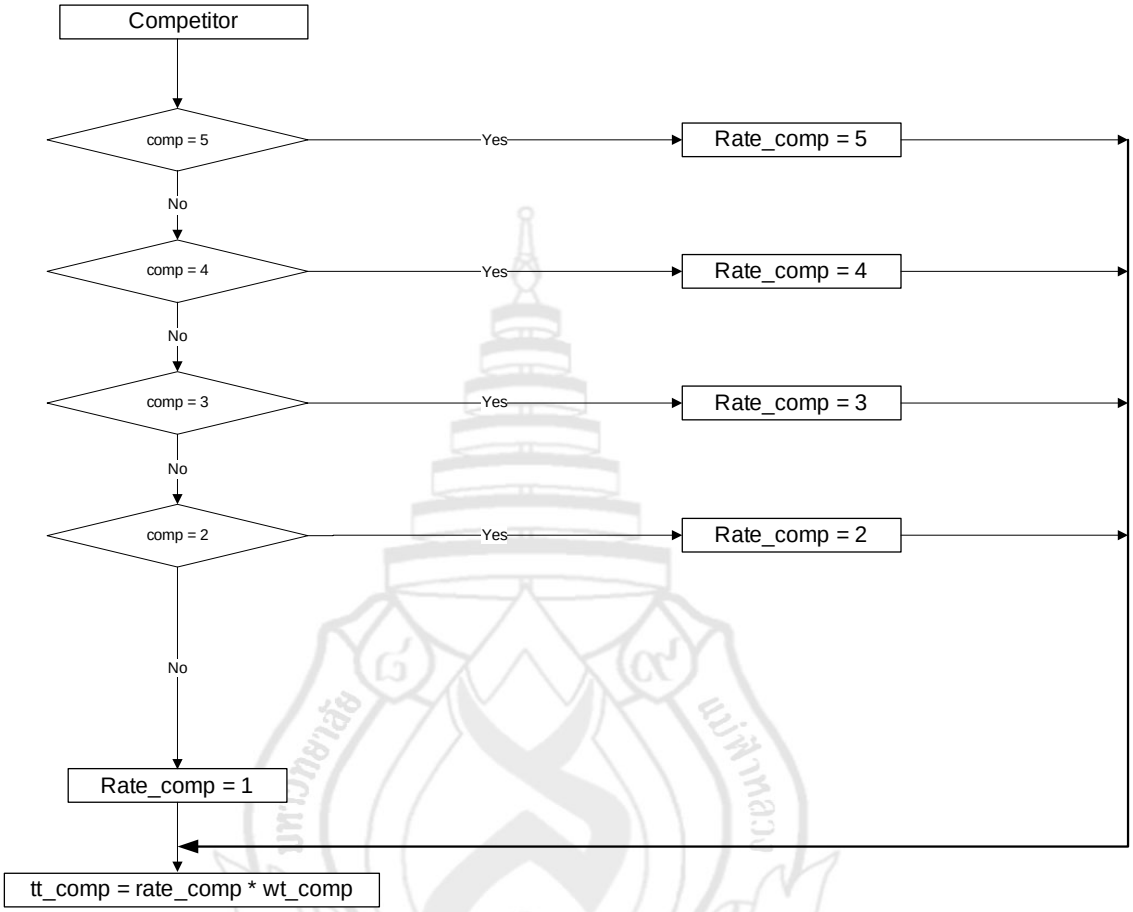
8. Decision tree diagram for customer service model base



9. Decision tree diagram for financial term model base



10. Decision tree diagram for relationship of competitor & Customer model base



Appendix C

Questionnaire

Section 1 : Personal data

1. Sex ☐ Male ☐ Female

2. Age……..

3. Position ……..

4. Education……..

Section 2 : User opinion

Question	Very Good	Good	Fair	Poor
1. Input and user Interface Coverage of user's requirements Speed of data input Easy to operate Appropriateness of display				
2. Result Speed of the result Accuracy of the result Satisfaction with the result				

Comment and suggestion……..……

…….

…….

…….

…….

……..

……..…….

Appendix D

Program Installation

Oracle 10g Express Edition installation

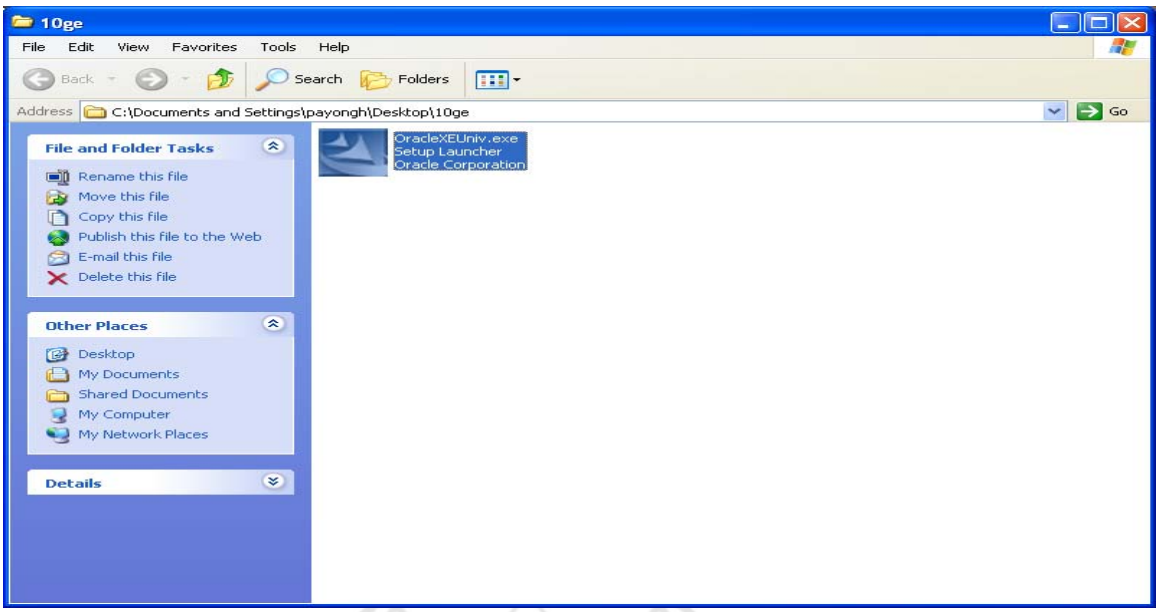


Figure D.1 Executable file

Double click at OracleXEUniv.exe to start install Oracle10 Express Edition

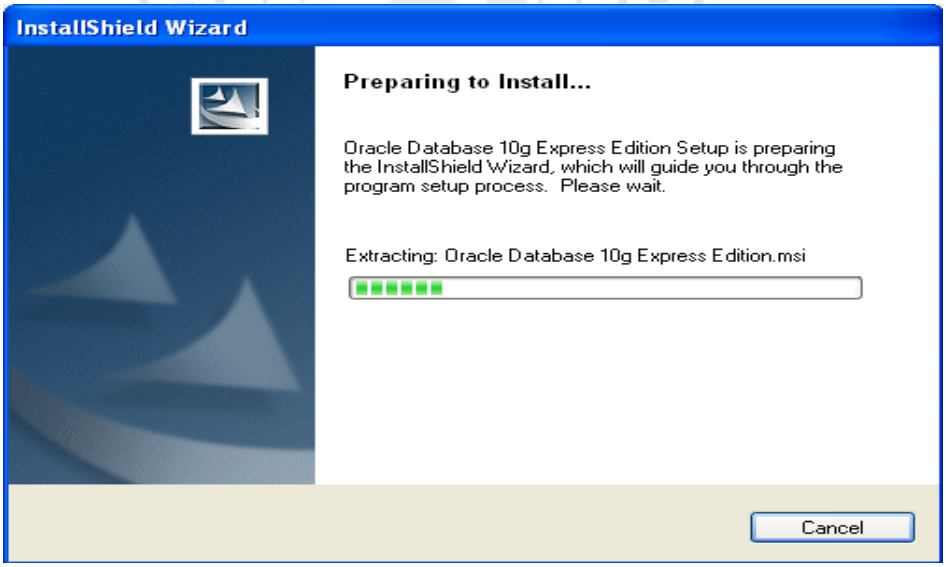


Figure D.2 Preparing to install

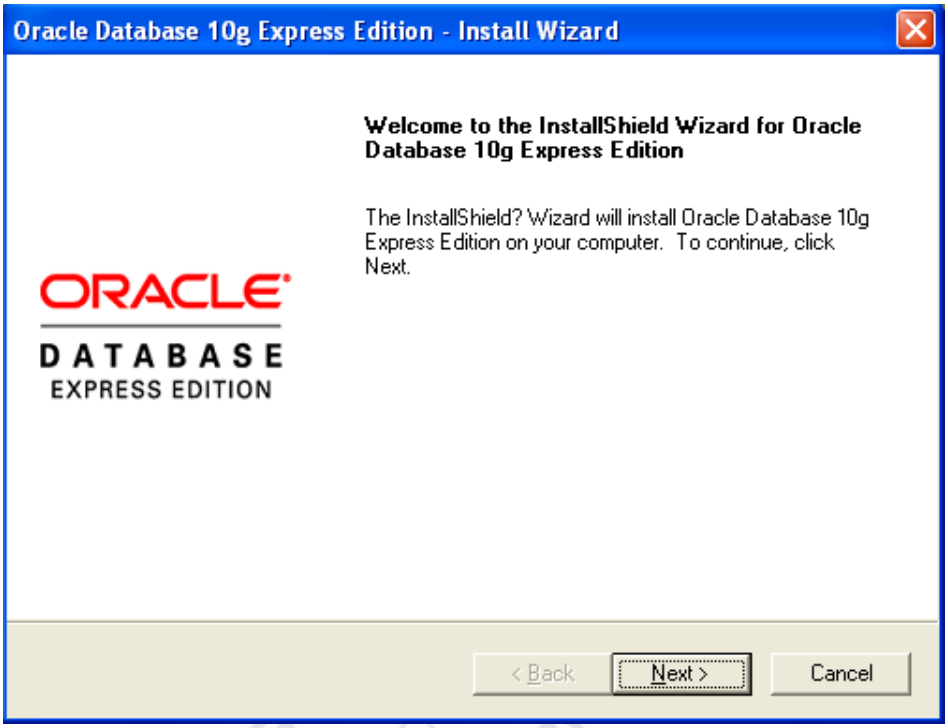


Figure D.3 Ready to install Oracle 10g Express Edition

Click next to process installation

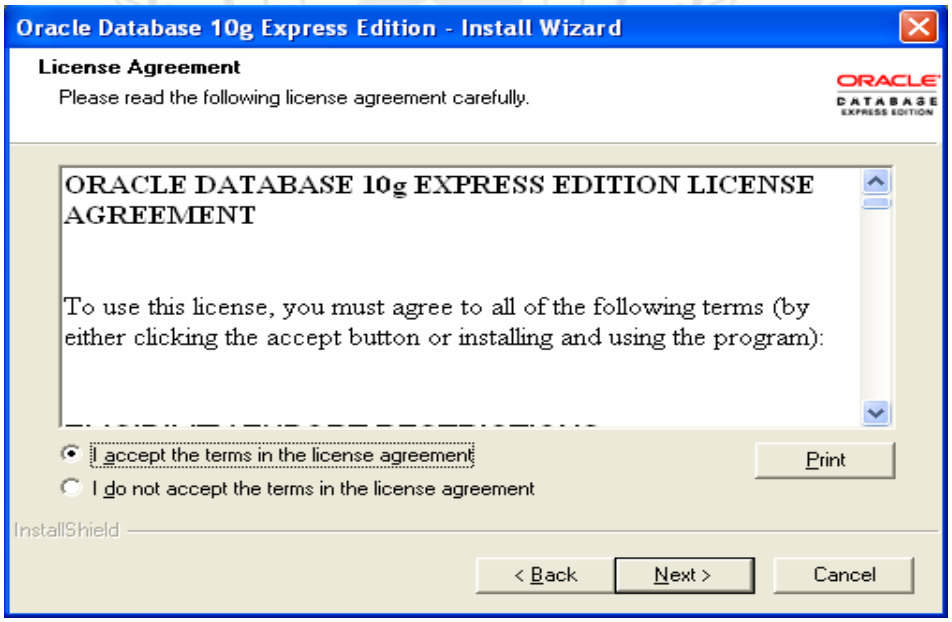


Figure D.4 License agreement

Choose “ I accept the terms in the license agreement” and click next

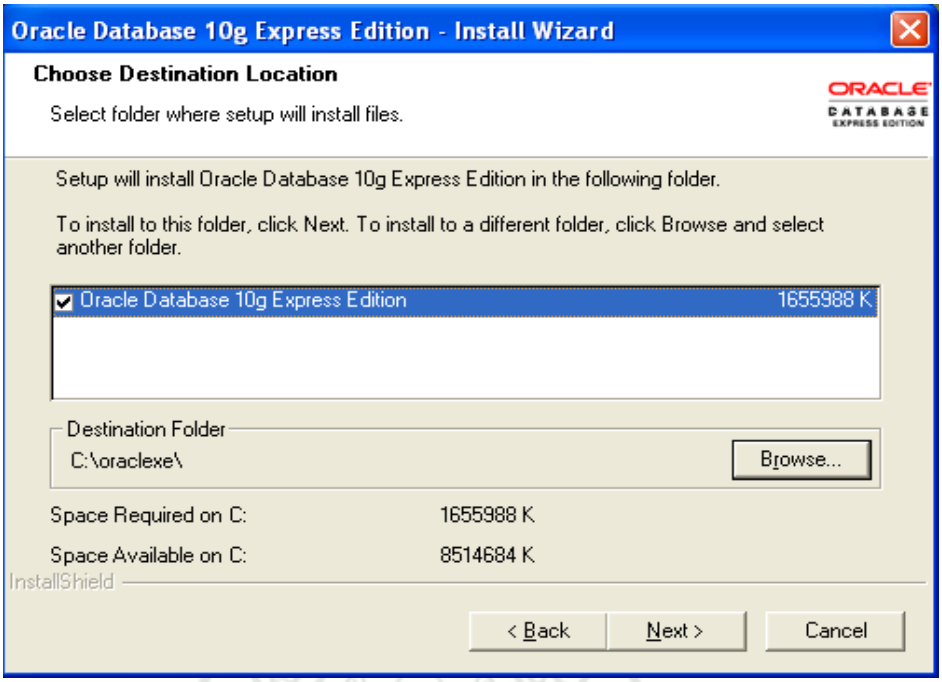


Figure D.5 Choose destination location

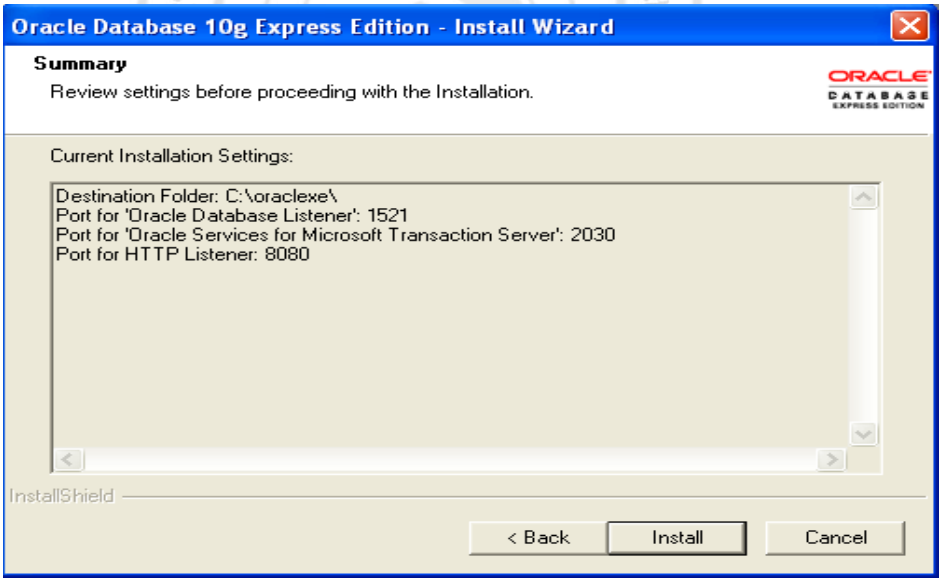


Figure D.6 Current installation setting

Click next to process

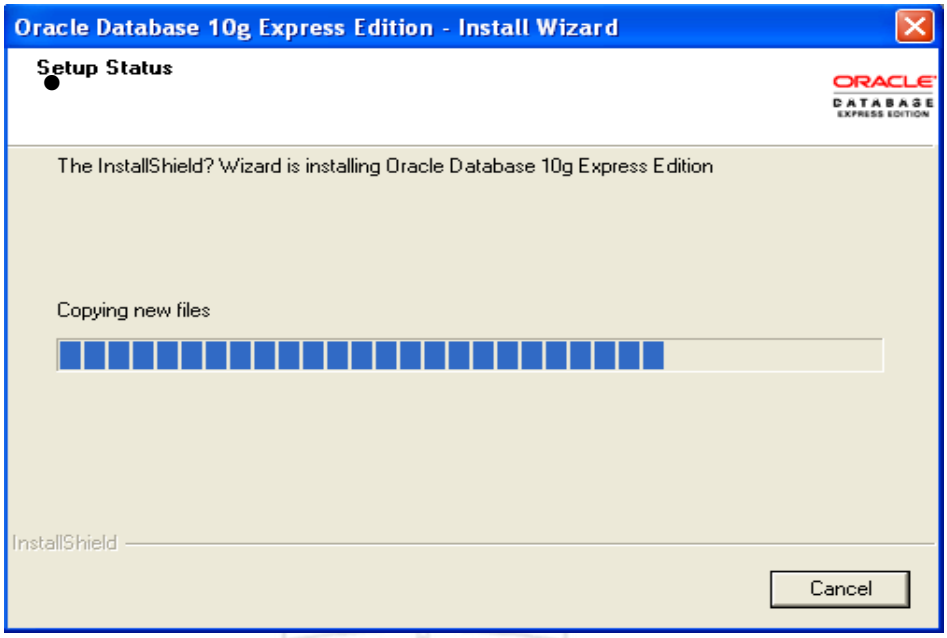


Figure D.7 Copy new files

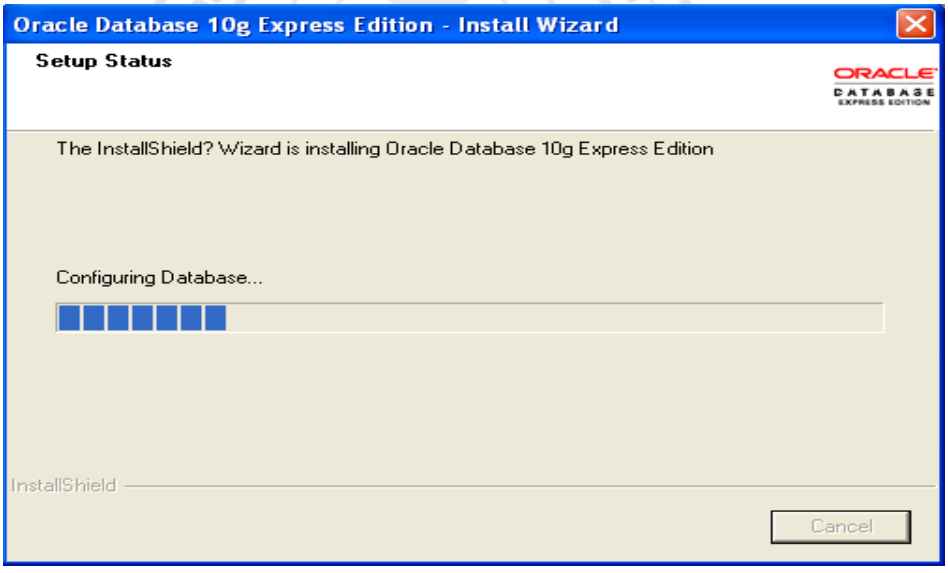


Figure D.8 Configure database

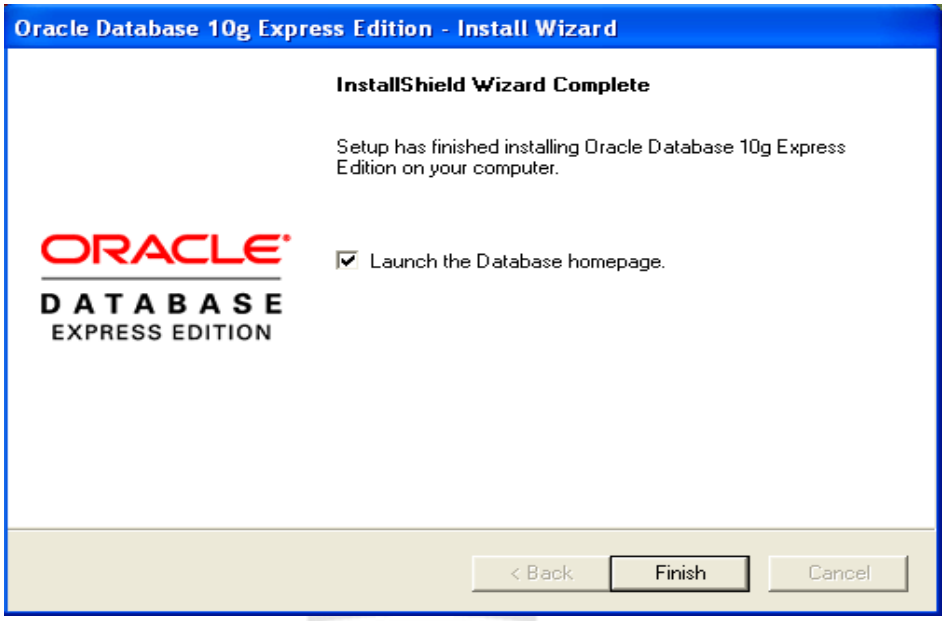


Figure D.9 Oracle 10 Express Edition Installation is completed

Oracle Developer Suite 10g installation

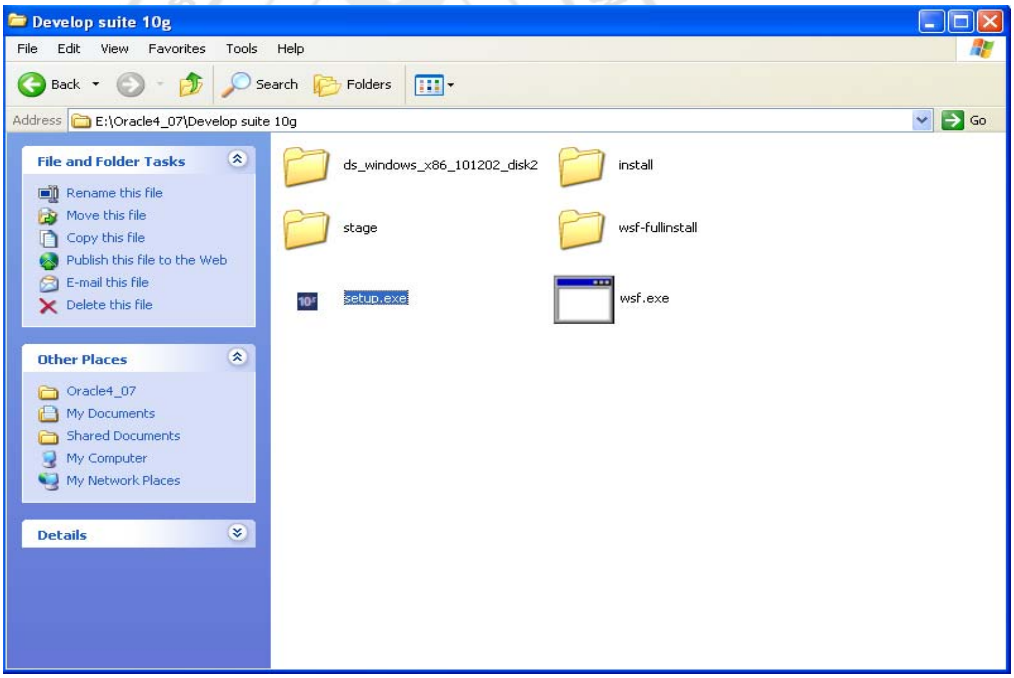


Figure D.10 Executable file

Double click at setup.exe to start install oracle developer suite. The Oracle Developer Suite 10g is needed to install because the Application Server function is embed with this suite.

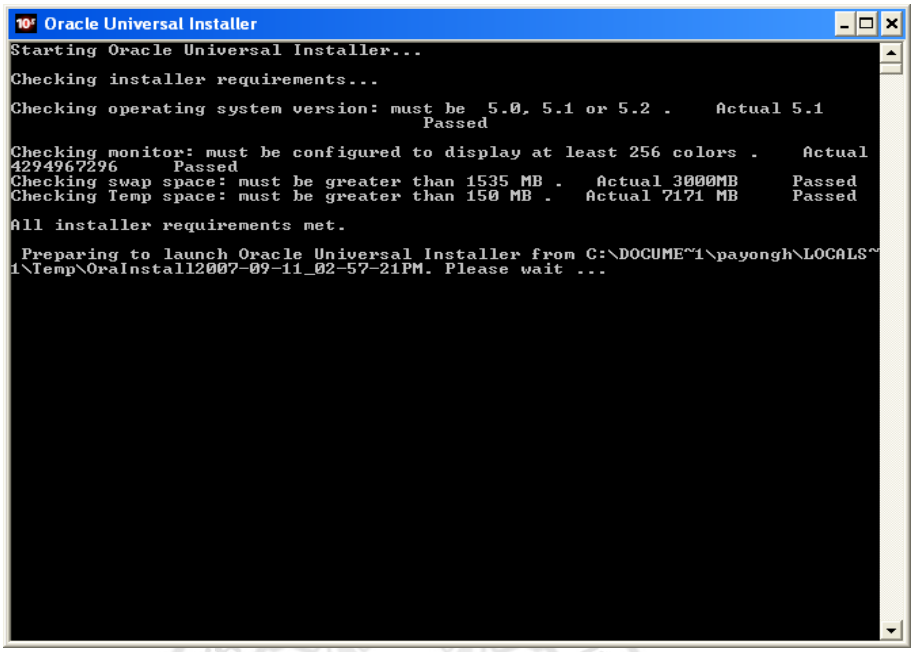


Figure D.11 Checking installer requirement

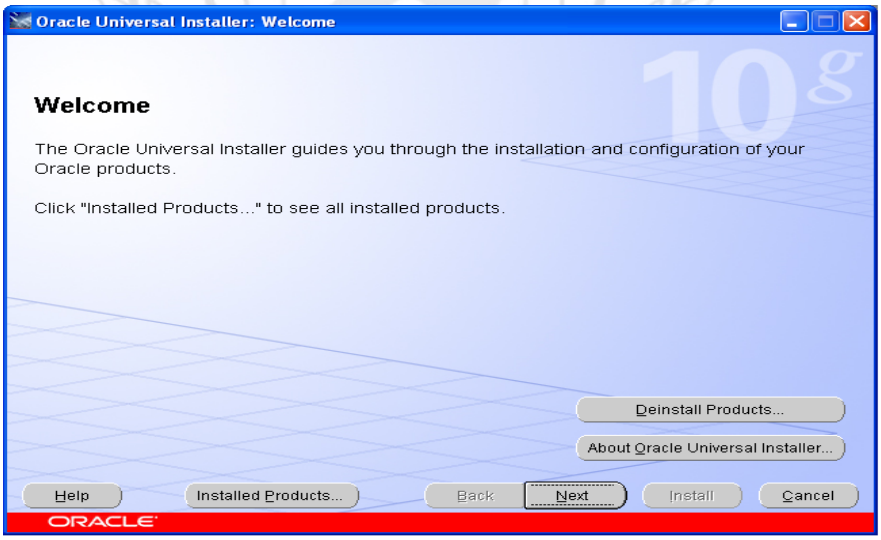


Figure D.12 Ready to install Oracle Developer Suite 10g

Click next to process installation

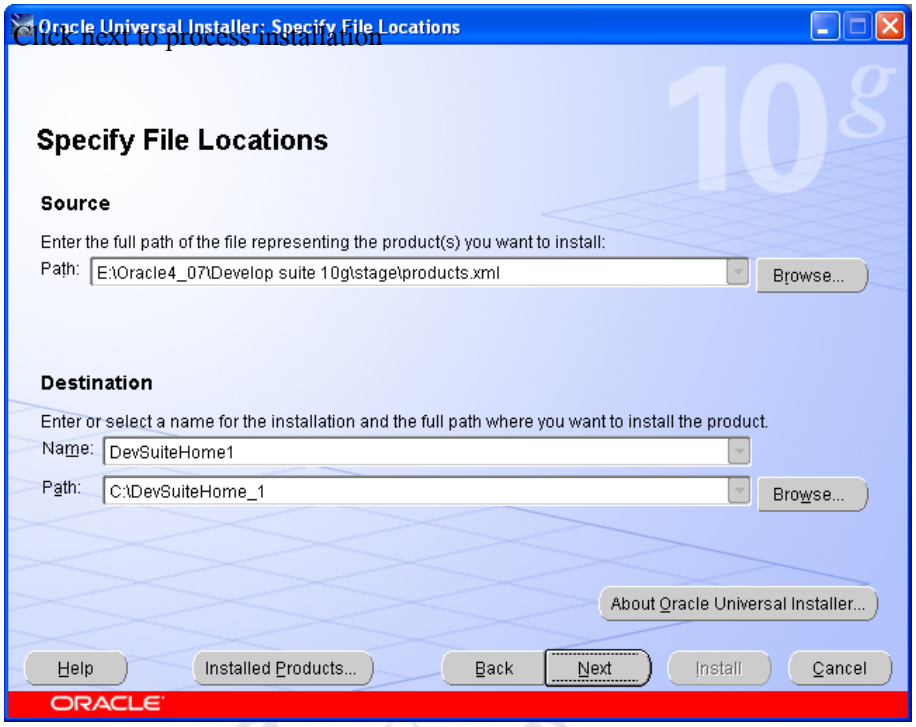


Figure D.13 Specify file locations

After input source and destination of file then click next

Figure D.14 Selection installation type

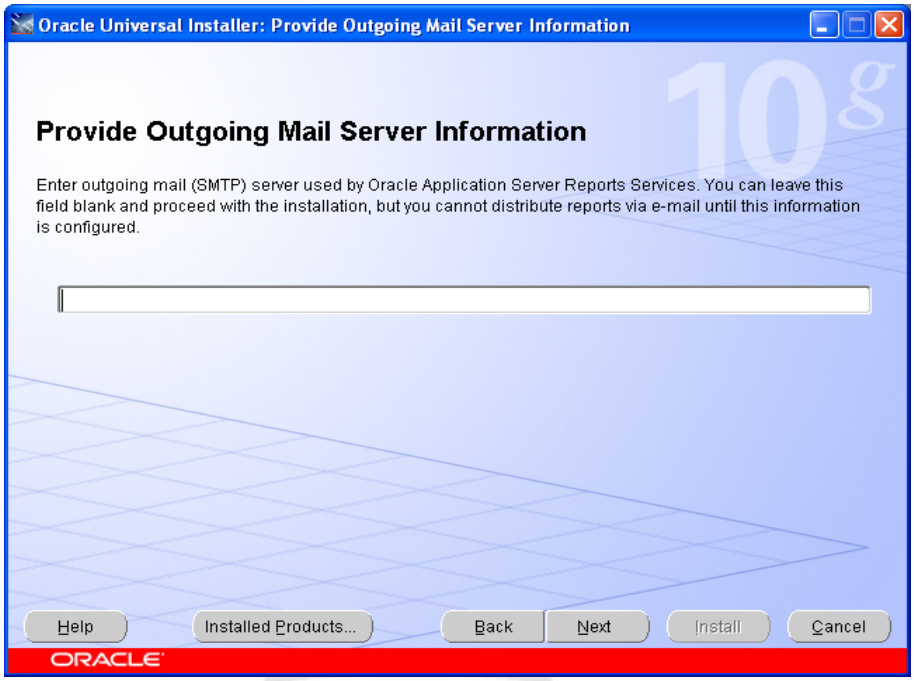


Figure D.15 Outgoing mail server information

Click next after input outgoing mail server information

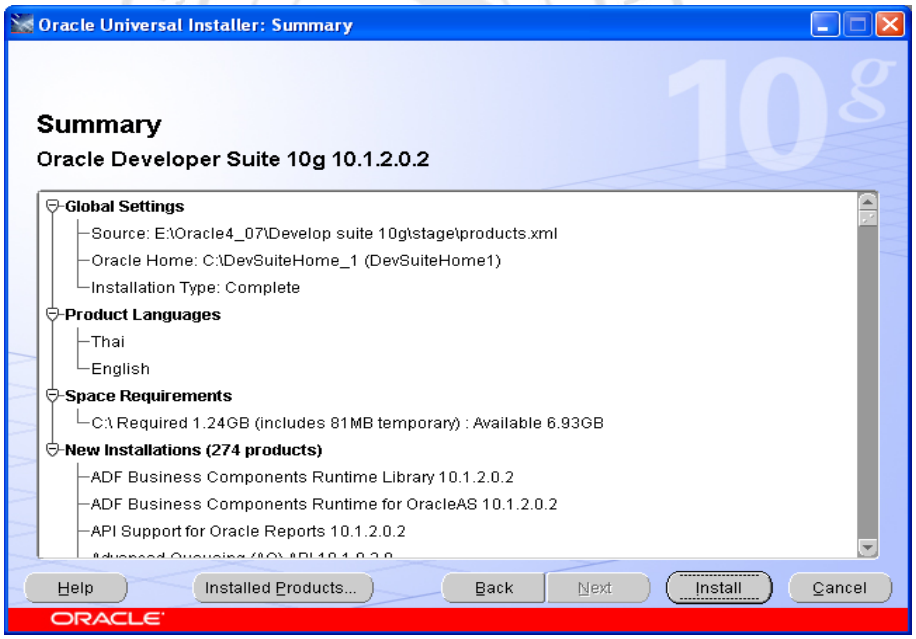


Figure D.16 Summary of software configuration

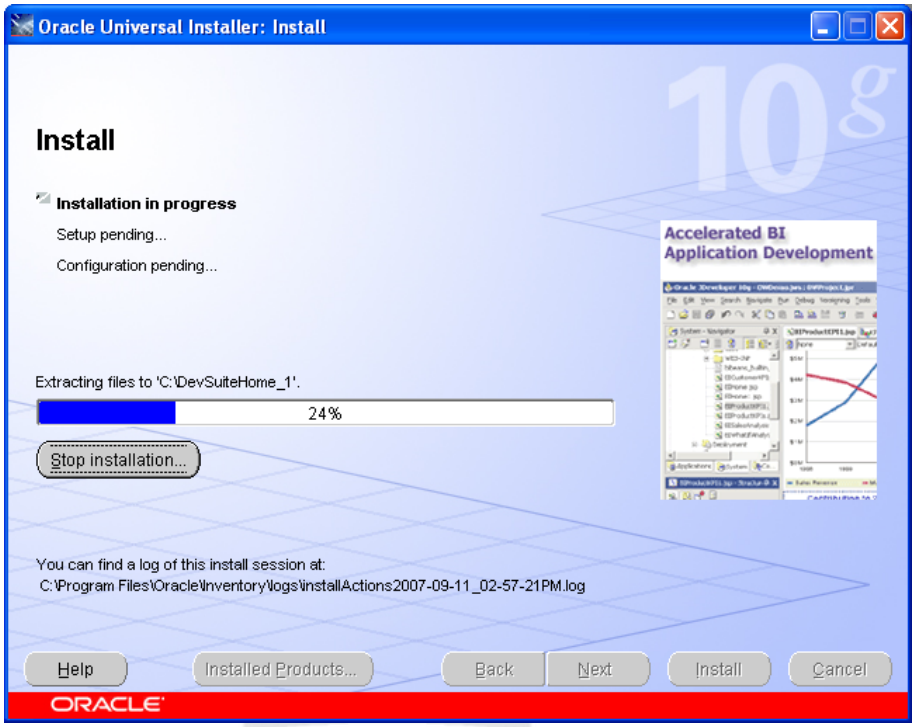


Figure D.17 Installation process

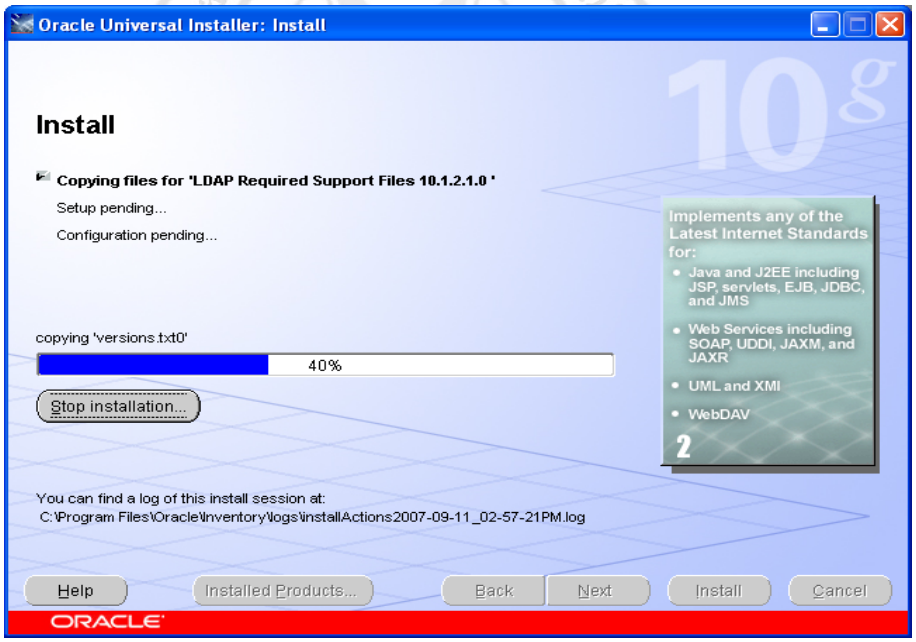


Figure D.18 Installation process

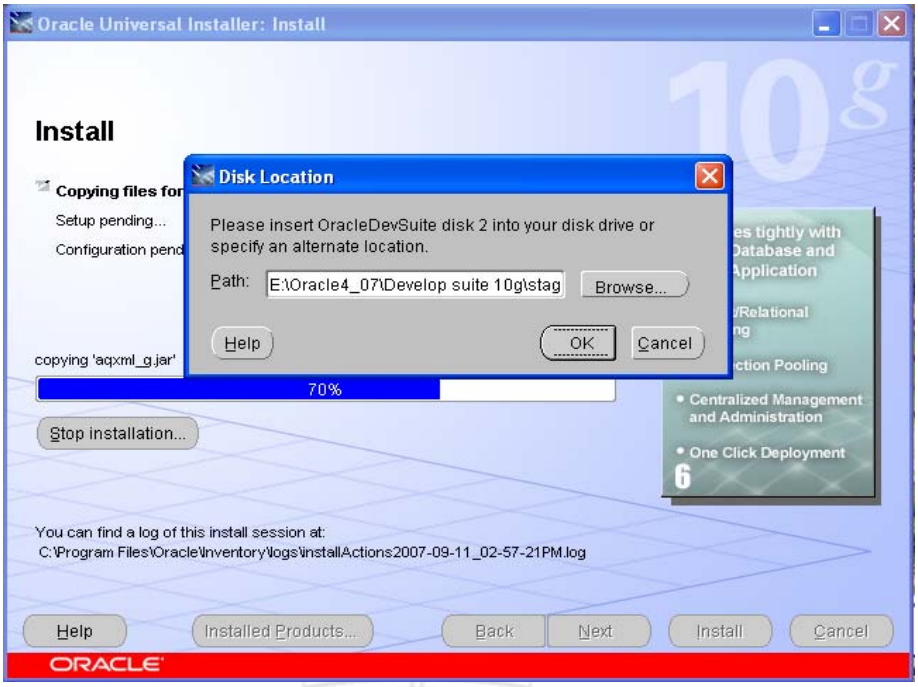


Figure D.19 Specify location of second source disk

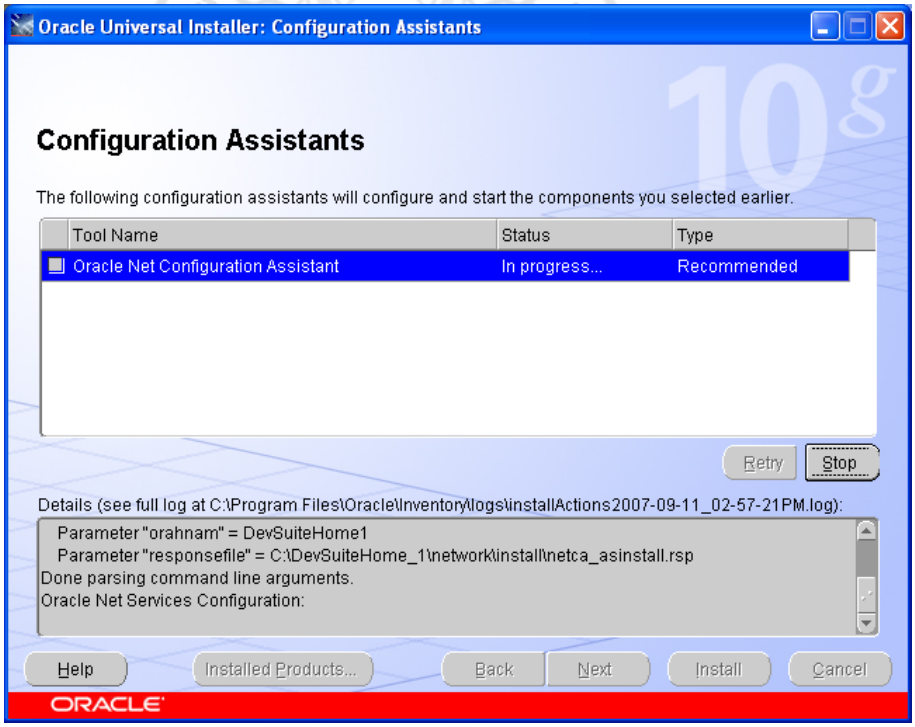


Figure D.20 Summary of Configuration

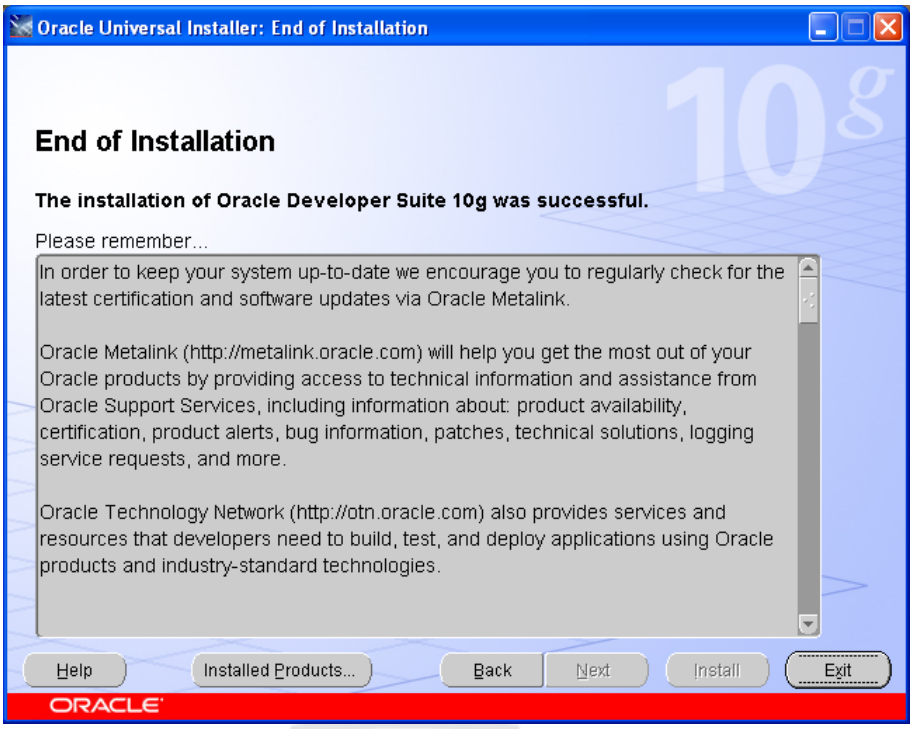


Figure D.21 End of installation

After complete the installation, the Oracle 10g Express edition and Oracle Developer suite 10g are ready to use.

Appendix E

Manual

Introduction

General System Specification

Management information system for sales in system integrator business is developed for support sales system in broadcasting system integrator business. Also, it is including information preparation for executive to make business decision. The systems consist of 2 subsystem, sales system and executive report.

This manual is describes working process and define by user roles. The role is defined as follow.

1. Sales system is targeting user group of staff in Marketing Department. The job roles is cover preparing of master data, quotation, customer purchase order, handover solutions completion, invoice, billing, tax invoice / receipt and including reports to support business operation.

2. Executive system is targeting user group of executive, manager or supervisor which has responsible to control business operation. The job roles is cover, find transaction in sales system to control and get report from sales system. Also, including report for executive which summarized and analysis over all data in sales system. The aim of system is to improve business decision.

3. Administrator user which can access to all menu of the system including user data and master data management.

System Requirement

Management Information System for Sales in System Integrator business is used client/server architecture which support multi concurrent users and have requirement for hardware and software as follow.

Server

Hardware

CPU	Intel Pentium IV 3.0 GHz
RAM	1 GB DDR BUS 400 MHz

Hard disk	200 GB Serial ATA100
Software	
Database	Oracle 10g Express Edition
Operating System	Windows Server 2003
Client	
Hardware	
CPU	Intel Pentium IV 1.7 MHz
RAM	256 DDR
Hard disk	80 GB ATA100
Software	
Database	Oracle 10g Express Edition
Operating System	Windows XP Professional

Logon to the System

To start using Management Information System for Sales in System Integrator has method as follow.

1. Click at shortcut  in computer screen to lunch Internet Explorer program, which already come with windows operating system. Go to URL http://hp:8889/forms/frmservlet?form=startsys.fmx as picture no D.1

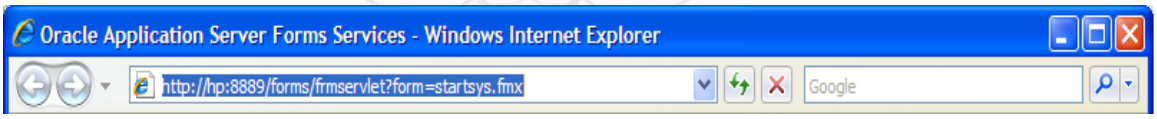


Figure E.1 URL address in Internet explorer

2. The system is shown login screen as picture no E.2 to received user name and password, which is given by system administrator, to logon to assign screen.

Figure E.2 Log on screen

3. User input user name and password and click Log On button to confirm input data.

Figure E.3 Input User name and password

4. Incase of user input incorrect user name or password. There will be notified message to user. User needs to input the correct user name and password, then can access to the system.

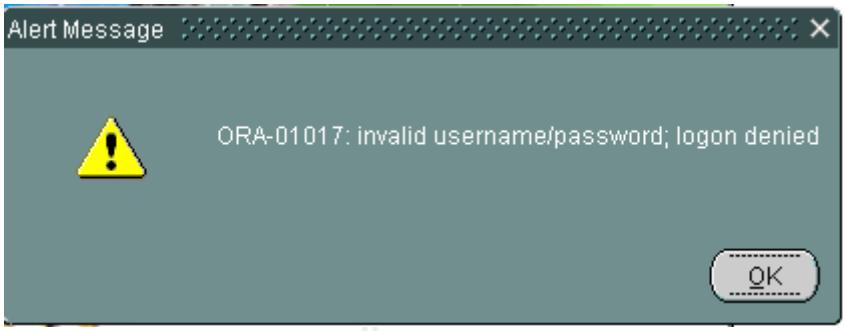


Figure E.4 Notified messages of wrong user name and password

5. When user input correct user name and password. There will be a well come into the system.

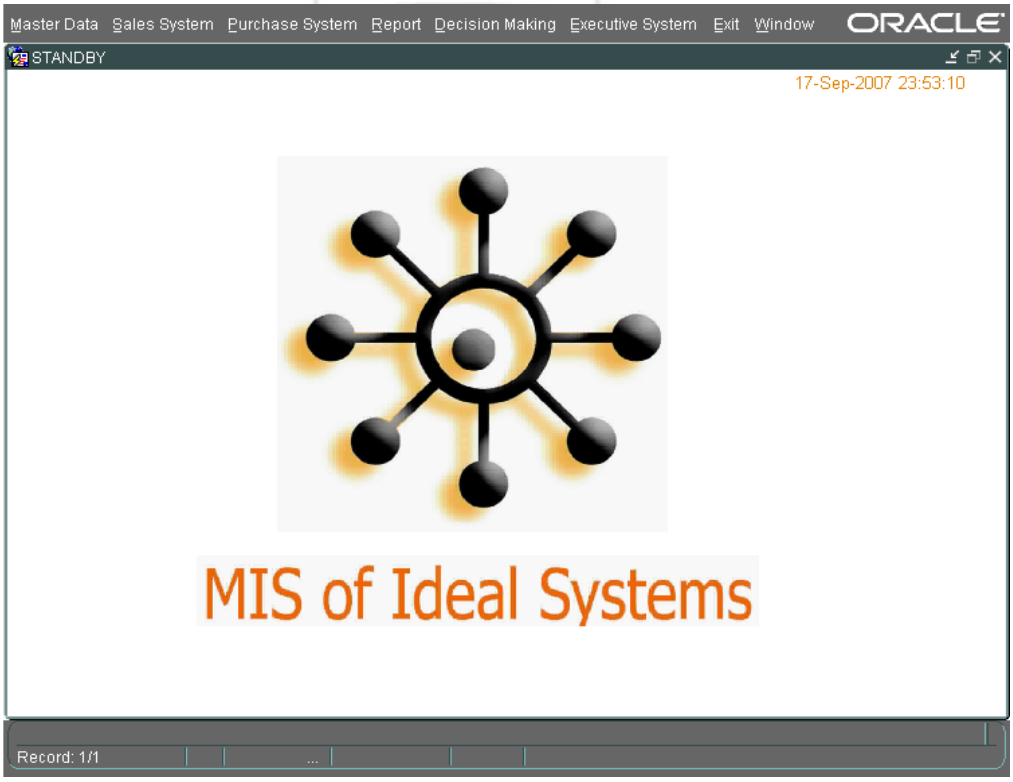


Figure E.5 Main system

Exit from the System

In case of user is at the main menu, then exit from the system by click at “Exit” or  Button

Figure E6 Exit menu

In case of user is at other screen which use stand toolbar, then exit from the system by point at toolbar and click at  Or  on the right hand of screen.

Toolbar

Management Information System for Sales in System Integrator business use standard toolbar for form and report which define each function as follow.

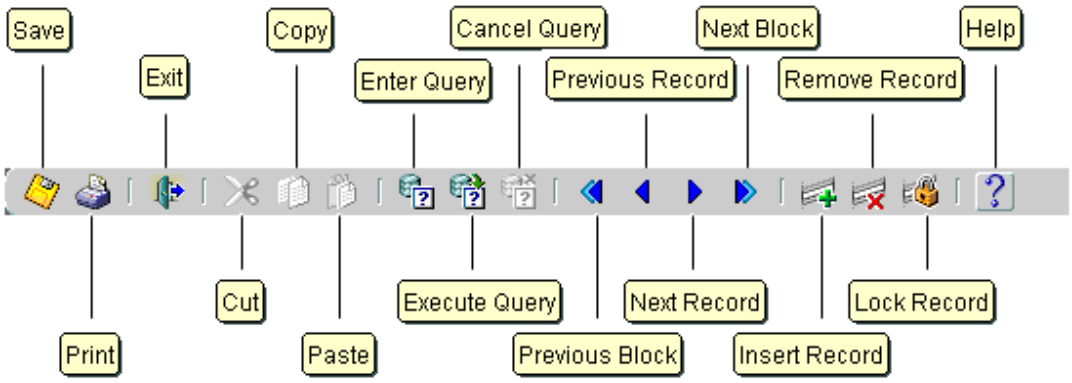


Figure E.7 Standard toolbar

Toolbar

Save	Record data into system
Print	Print out
Exit	Exit from screen
Cut	Cut chosen data
Copy	Copy data
Paste	Paste copied or cut data

Enter Query	Specify condition to retrieve data
Execute Query	Instruct system to process query
Cancel Query	Cancel data query
Previous Block	Move working screen back to previous block
Previous Record	Move working data to previous record
Next Record	Move working data to next record
Next Block	Move working screen back to next block
Insert Record	Insert set of data
Remove Record	Delete set of data
Lock Record	Lock set of data
Help	Show properties of field

Menu of System

1. Master data

Use to input and edit master data of the system. Master data are currency, Category, UOM and project

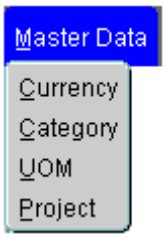


Figure E.8 Master data menu

2. Sales System

Use to input and edit data as follow. Customer master data, Product master data, Quotation, Purchase Order, Hanover, Invoice, Billing, Tax Invoice/Receipt, Collection, Warranty

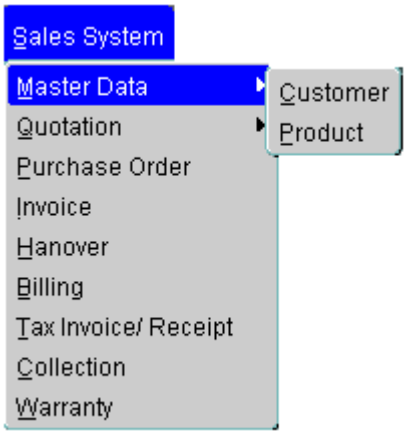


Figure E.9 Sales system menu

3. Purchase System

Use to input and edit data as follow. Supplier master data, Equipment master data, Supplier Quotation, Purchase Order and Serial Product

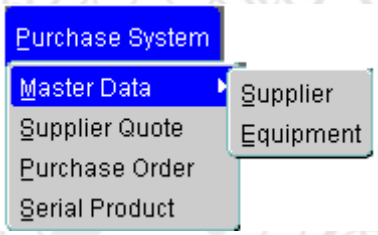


Figure E.10 Purchase system menu

4. Report System

Use to see report of Supplier master data, Equipment master data, Sales Quotation, Sales Purchase Order, Handover list and Tax Invoice/ Receipt

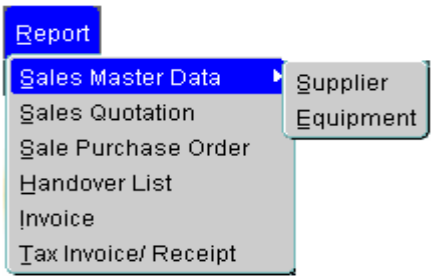


Figure E.11 Report menu

5. Decision Making System

Use to input and edit data of Rate by user, Weight by user, Weight by executive and Decision factor.

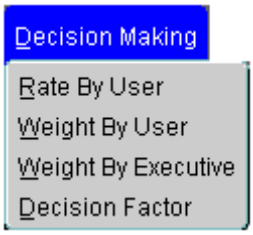


Figure E.12 Decision Making menu

6. Executive System

Use to see report of sales and decision making report

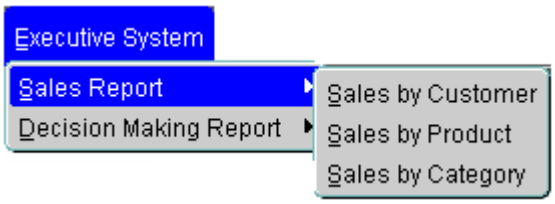


Figure E.13 Executive system menu

7. Exit from system 

Master data

Process to input Currency master data

To add new currency need to do as follow

1. System generates new currency code automatically by added from last number. The Currency code consists of 3 digits number.

2. Input data as required by system

Currency Name	Not more than 30 characters
Short Name	Not more than 3 Characters
Exchange Rate	In Baht currency

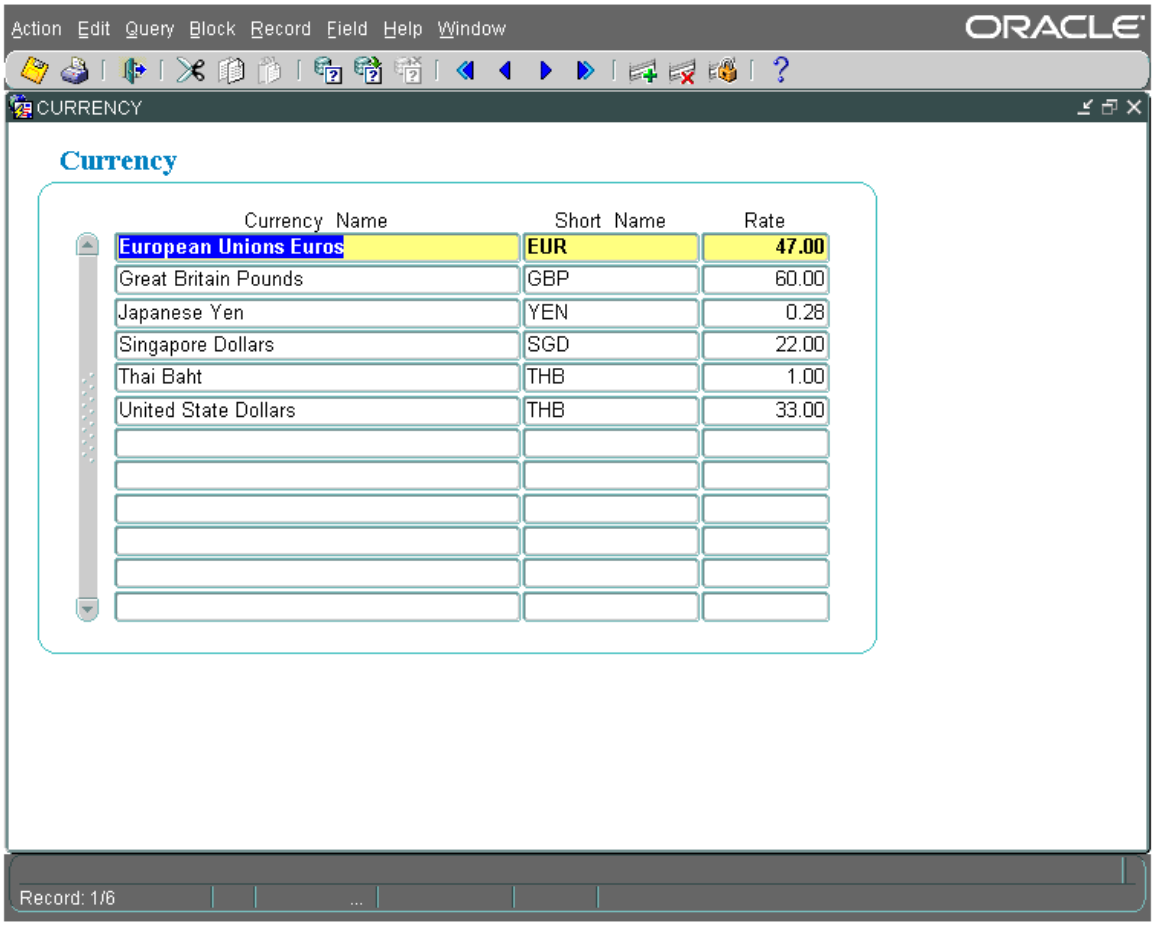


Figure E.14 Currency master data

3. Record data by click 
4. Exit from system by click 

Process to edit exiting Currency master data

1. Move cursor to existing data by click 
2. Edit data and record by click 

Process to input Category master data

To add new category need to do as follow

1. System generates new Category code automatically by added from last number
2. Input data as required by system

Category Name

3. Record data by click 
4. Exist from system by click 

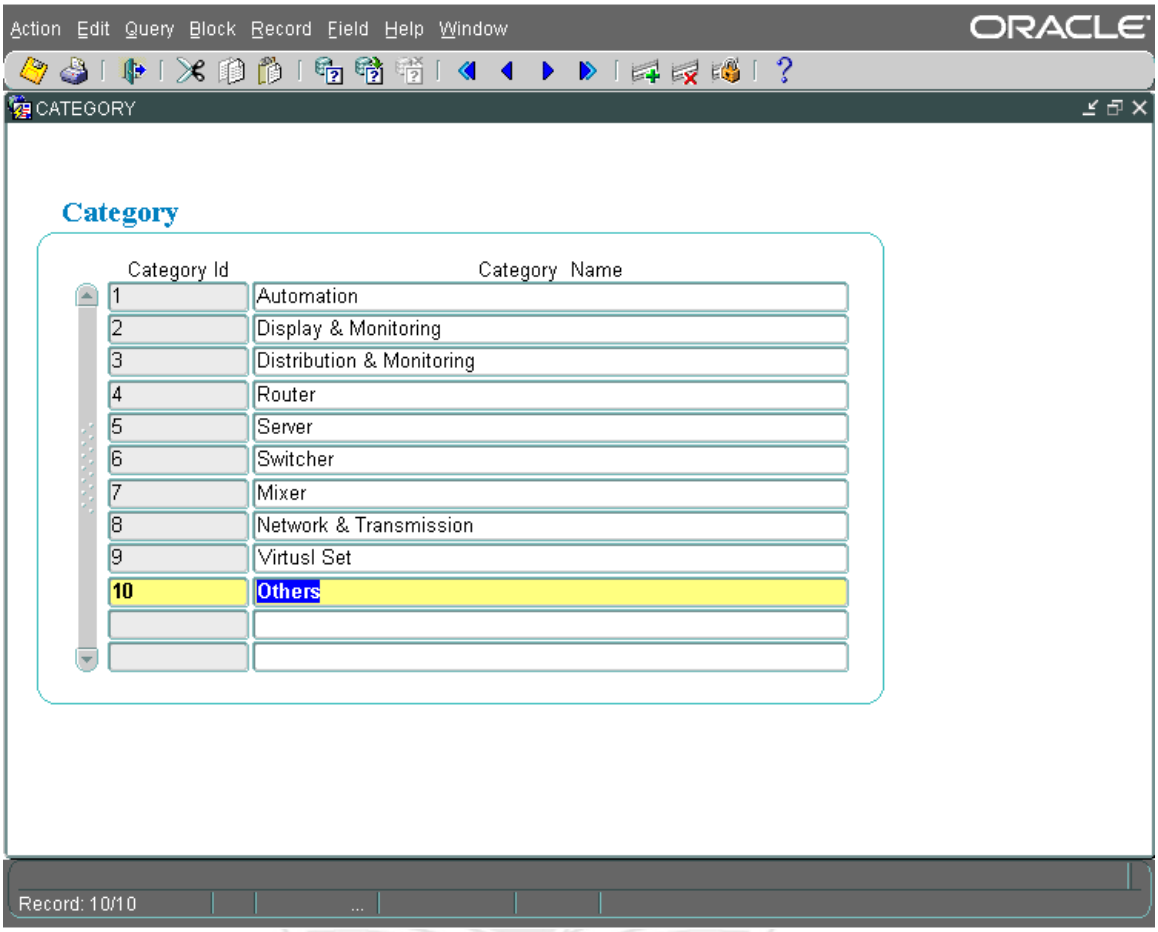


Figure E.15 Category master data

Process to edit exiting Category master data

1. Move cursor to existing data by click 
2. Edit data and record by click 

Process to input Unit of material (UOM) master data

To add new UOM need to do as follow

1. System generates new UOM code automatically by added from last number

2. Input data as required by system

UOM description	Not more than 30 characters

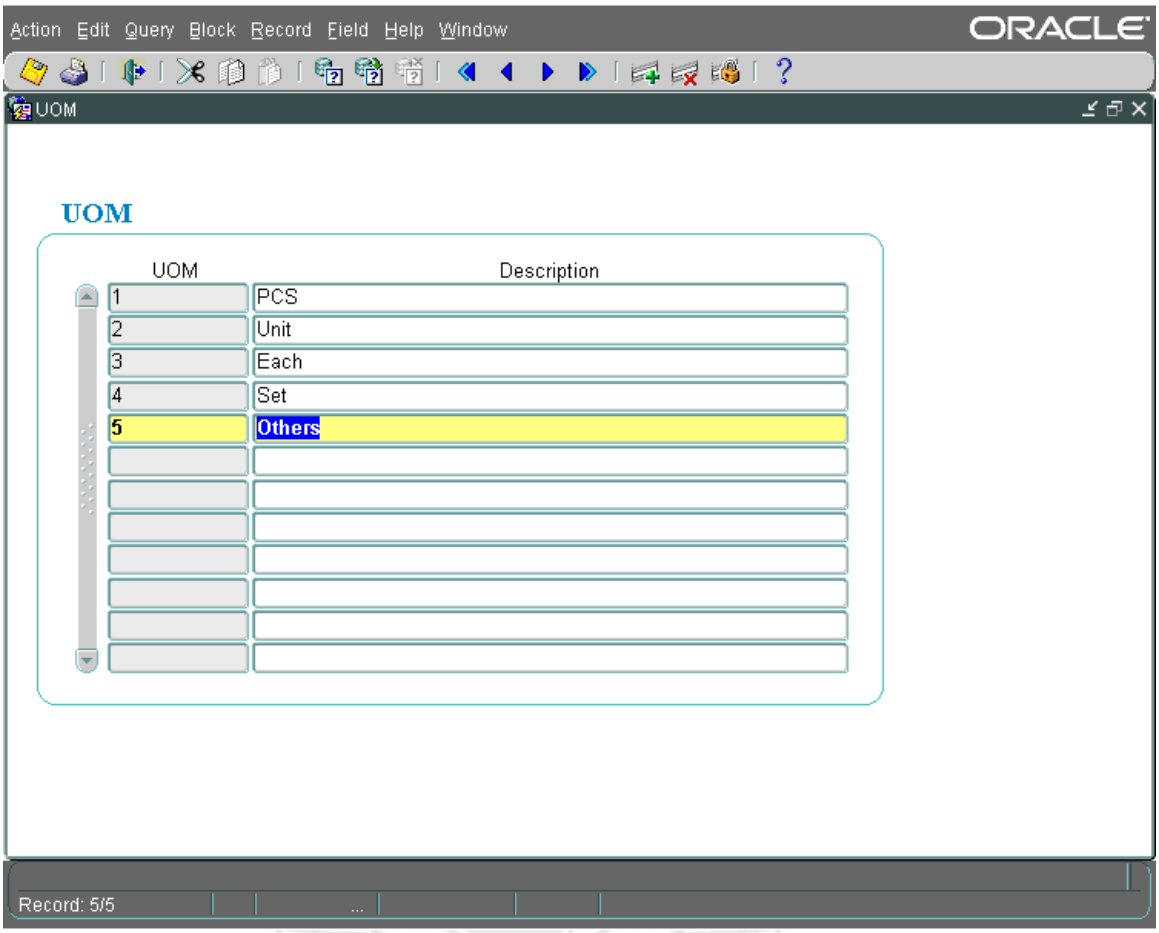


Figure E.16 Unit of Material master data

3. Record data by click 
4. Exit from system by click 

Process to edit exiting Category master data

1. Move cursor to existing data by click 
2. Edit data and record by click 

Process to input Project master data

To add new Project need to do as follow

1. System generates new project code automatically by added from last number
2. Input data as required by system

   Project name Not more than 100 characters

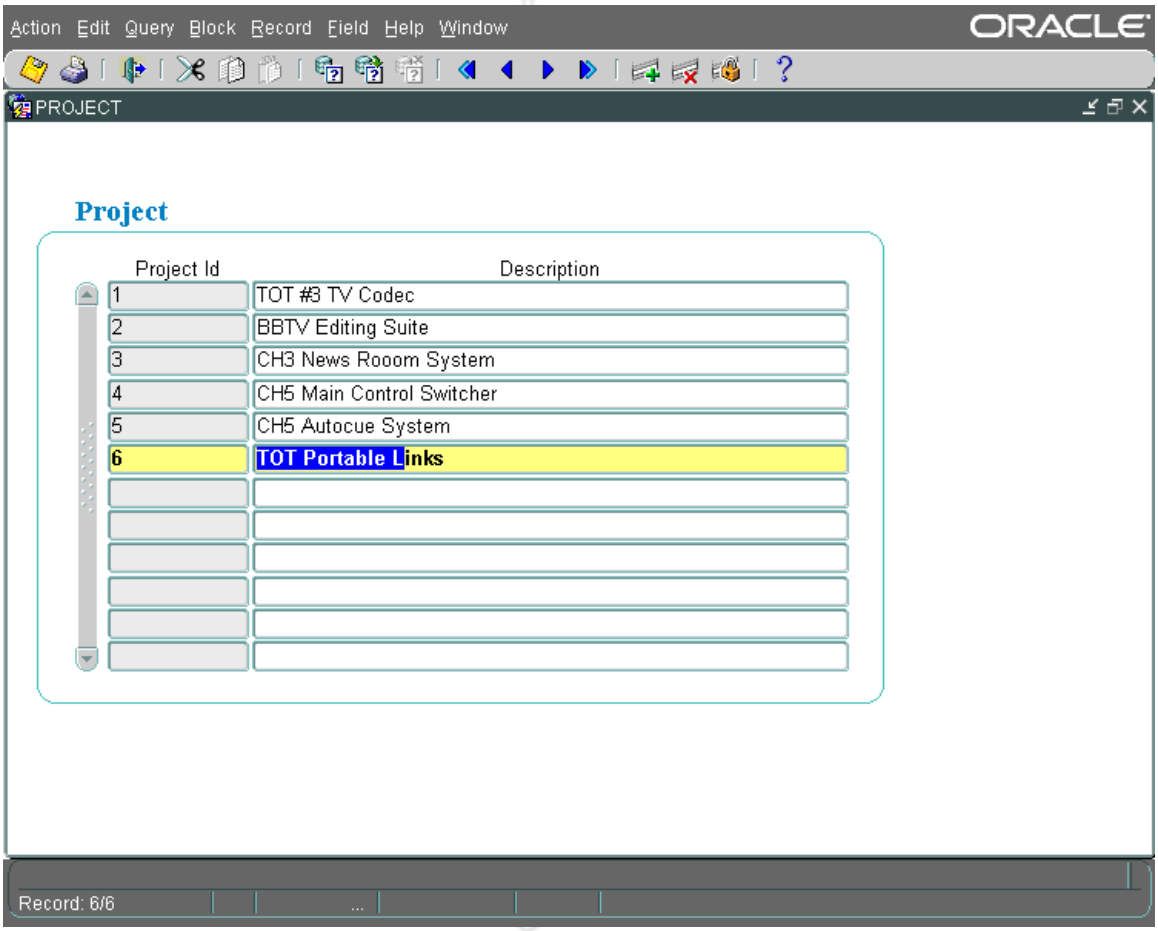


Figure E.17 Project input data

3. Record data by click 
4. Exist from system by click 

Process to edit exiting Category master data

1. Move cursor to existing data by click 
2. Edit data and record by click 

Sales System

Process to input customer master data

To add new customer data need to do as follow

1. System generates new Customer code automatically by added from last number. The Customer code consists of 4 digits number.
2. Input data as require by system

Name	Not more than 100 characters
Address	Not more than 200 characters
Ship to	Not more than 200 characters
Telephone	Not more than 100 characters
Fax	Not more than 100 characters
Contact	Not more than 100 characters
Email	Not more than 100 characters

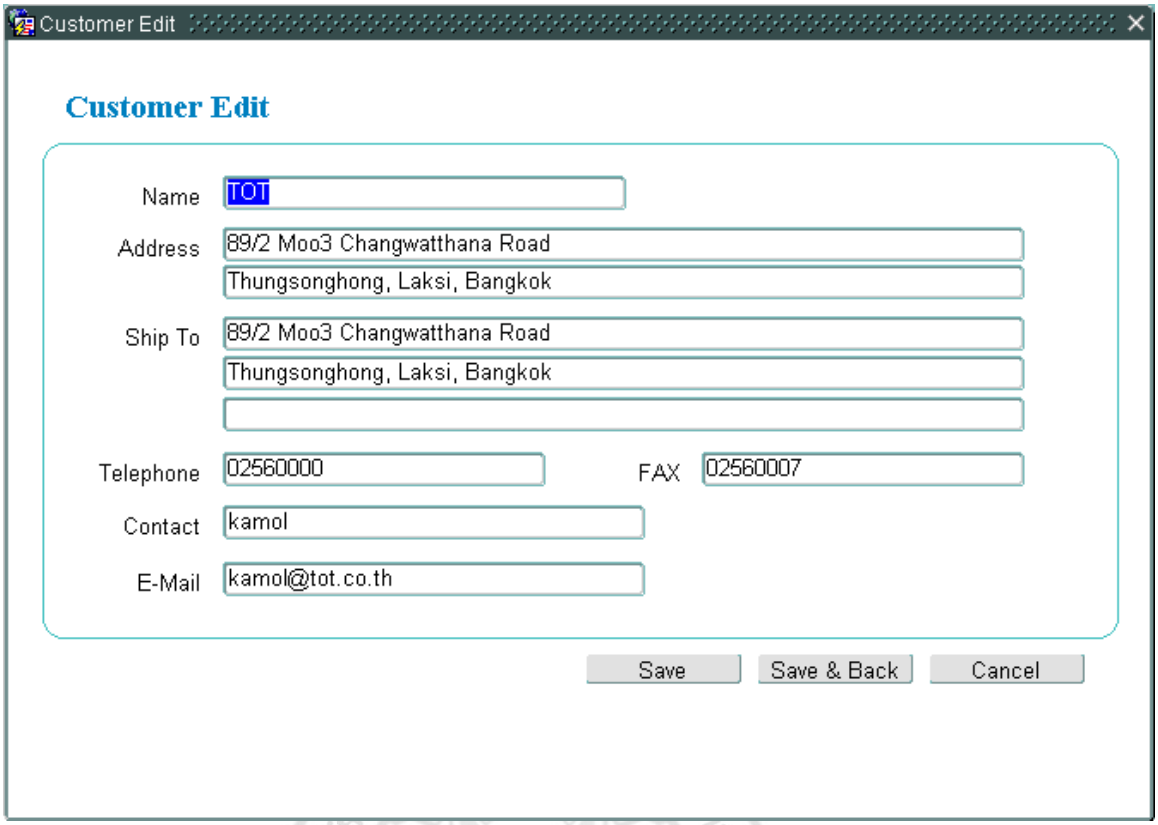


Figure E.18 Customer edit data

3. Record data by click Save or Save & Back in case to go back to pervious screen

4. Exist from system by click

Process to edit exiting customer master data

1. Move cursor to existing data by click

2. Click ... on cursor line to display existing and edit data, then click to record Data

Process to input product master data

To add new product data need to do as follow

1. System generates new Product code automatically by added from last number

2. Input data as required by system

Product description	Not more than 200 characters
Unit of material	Not more than 2 digits number
Category	Not more than 2 digits number
Model	Not more than 200 characters
Unit price	Not more than 12 digits number

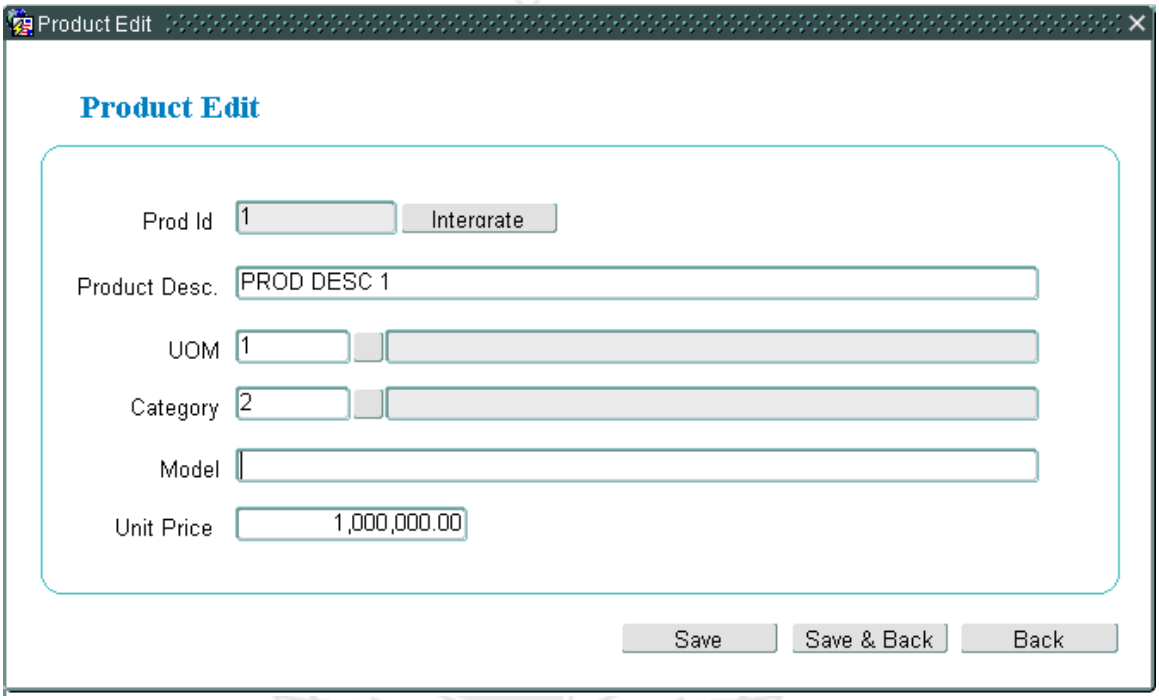


Figure E.19 Product edit data

3. Record data by click Save or Save & Back in case to go back to previous screen

4. Exist form system by click 

Process to edit exiting product master data

1. Move cursor to existing data by click 
2. Click … on cursor line to display existing and edit data, then click  to record data

Process to input Quotation data

To add new quotation data need to do as follow

1. System generates new Quotation code automatically by added from last number
2. Input data as required by system

Project code	Not more than 4 digits number
Customer code	Not more than 4 digits number
Quote Date	Default current date
	Date format DD/MM/YYYY
Delivery Date	Not more than 100 characters
Discount	Not more than 2 digits number
VAT	Default = 7%
	Not more than 2 digits number
Pay condition	Not more than 100 characters
Product code	Not more than 8 digits number
Quantity	Not more than 12 digits number

3. Record transaction by click 
4. Exit from system by click 

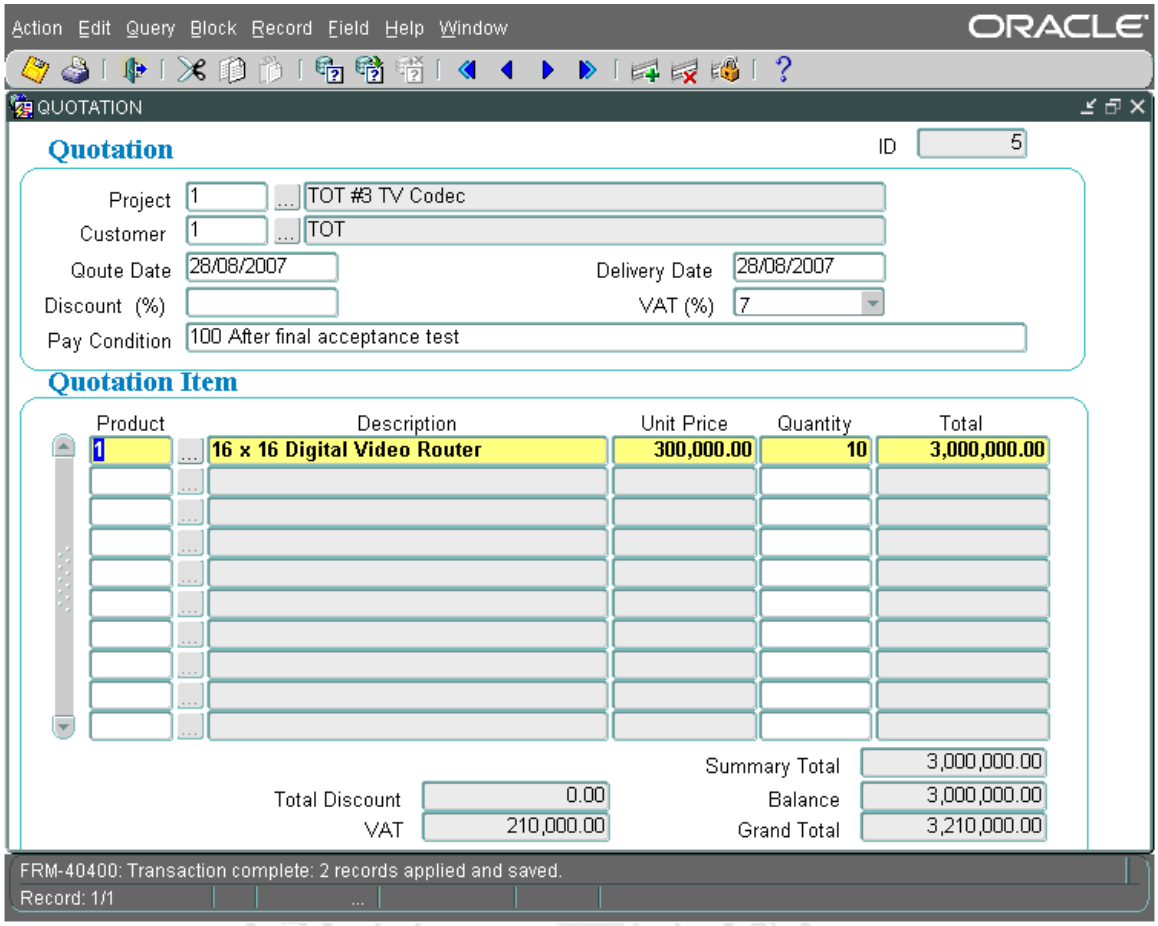


Figure E.20 Quotation

Process to edit quotation data

1. Move cursor to existing data by click 
2. Edit existing data, then click 

Process to input Purchase Order data

To add new quotation data need to do as follow

1. System generates new Purchase order code automatically by added from last number
2. Input data as require by system

Quotation Code	Not more than 6 digits number

Date	Default current date Date format DD/MM/YYYY

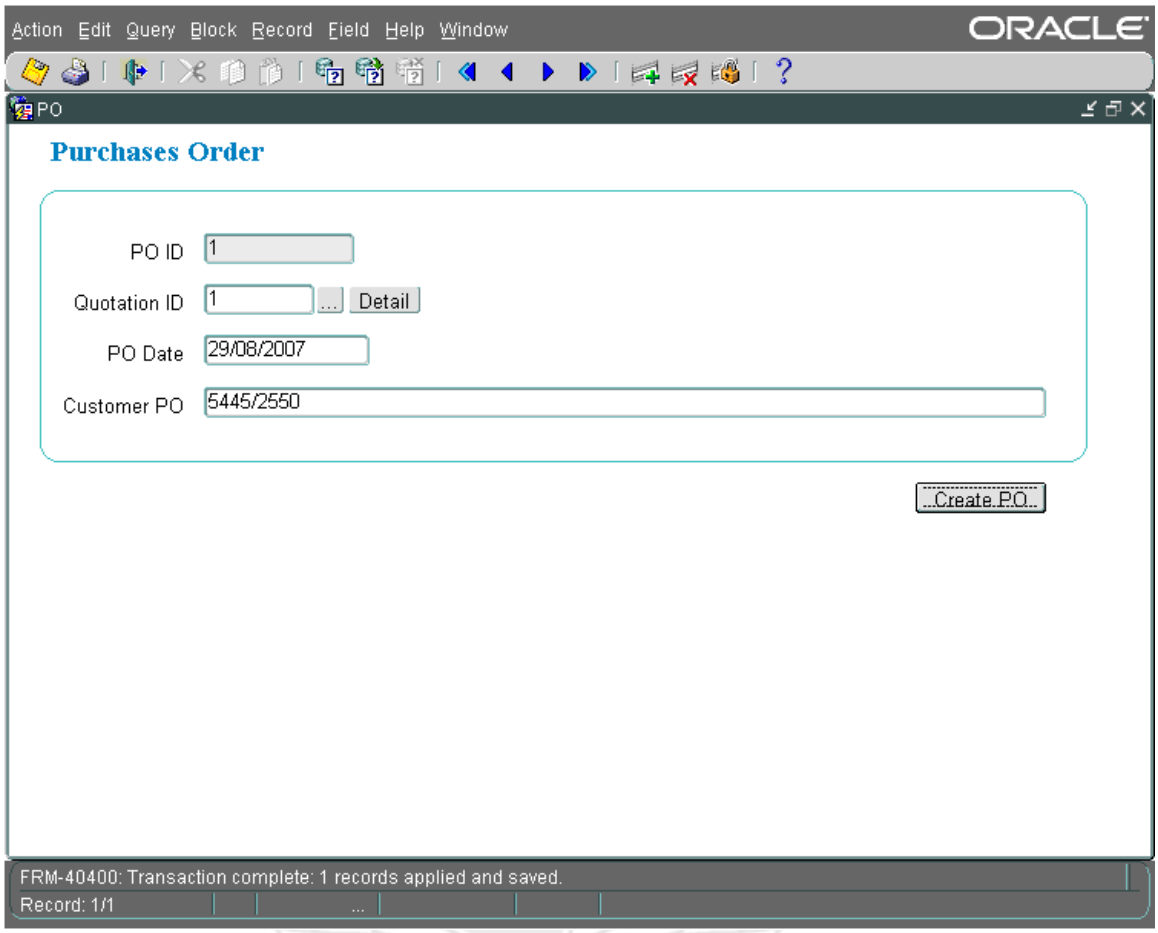


Figure E.21 Purchase order

3. Click ..Create P.O.. to create purchase order and record transaction
4. Exit from system by click

Process to input Invoice data

To add new Invoice data need to do as follow

1. System generates new Invoice code automatically by added from last number
2. Input data as require by system

Purchase Order Code	Not more than 6 digits number
Invoice Date	Default current date
	Date format DD/MM/YYYY
Due Date	Default current date + 30 days
	Date format DD/MM/YYYY
Customer PO	Not more than 100 characters

3. Click ...Create Invoice... to create Invoice and record transaction
4. Exit form system by click

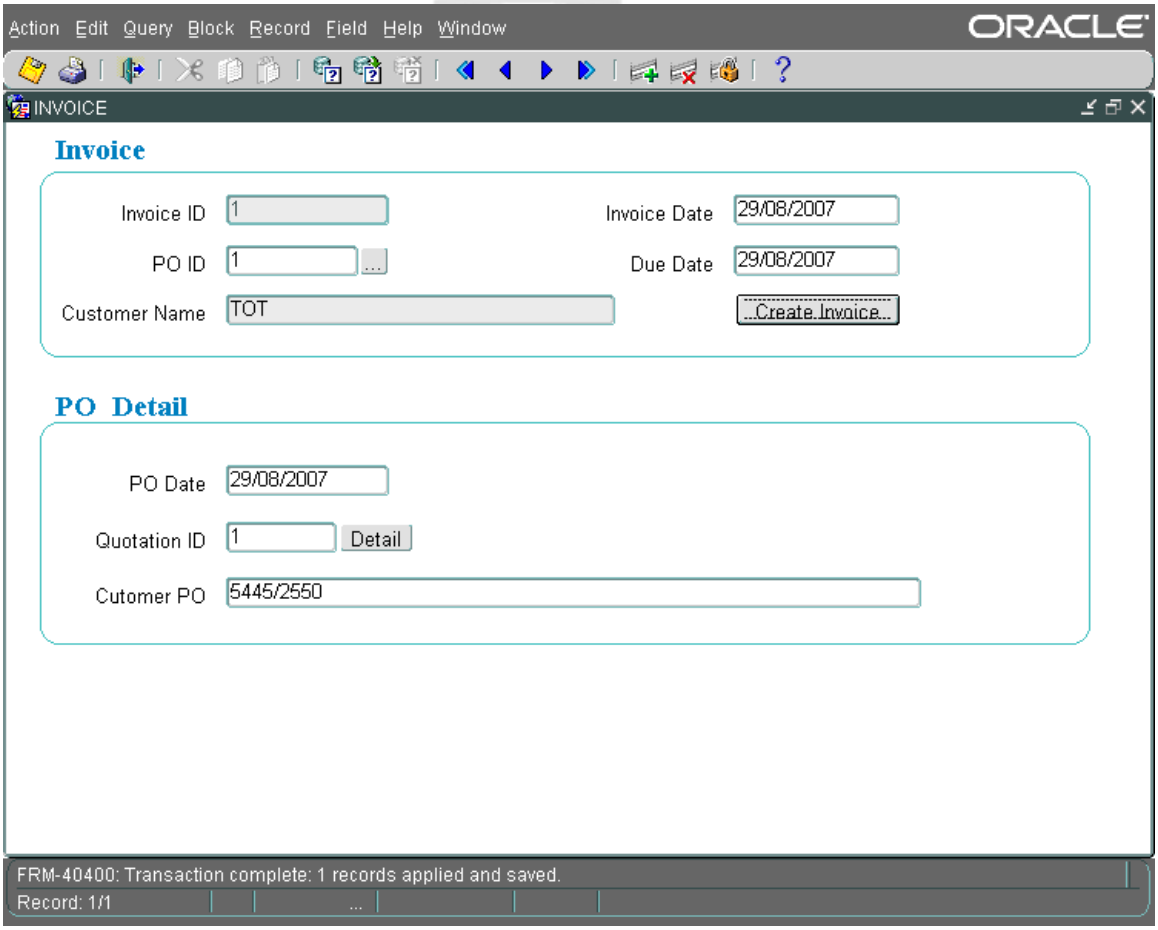


Figure E.22 Invoice create

Process to input Handover data

To add new handover data need to do as follow

1. Input data as required by system

Input invoice code	Not more than 5 digits number
Warranty term	Not more than 3 digits number
Active date	Date format DD/MM/YYYY

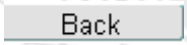
2. Record transaction by click 
3. Exit form system by click 

Process to input Billing data

To add new billing data need to do as follow

1. System display customer which has invoice
2. Click  to display invoice of each customer
3. Click  to settle invoice or click  to display detail of invoice
4. Click  to create settlement and go to settle screen
5. Input data as required by system

Settle Date	Default current date
	Format DD/MM/YYYY

6. Click  to go to previous screen
7. Exit from system by click 

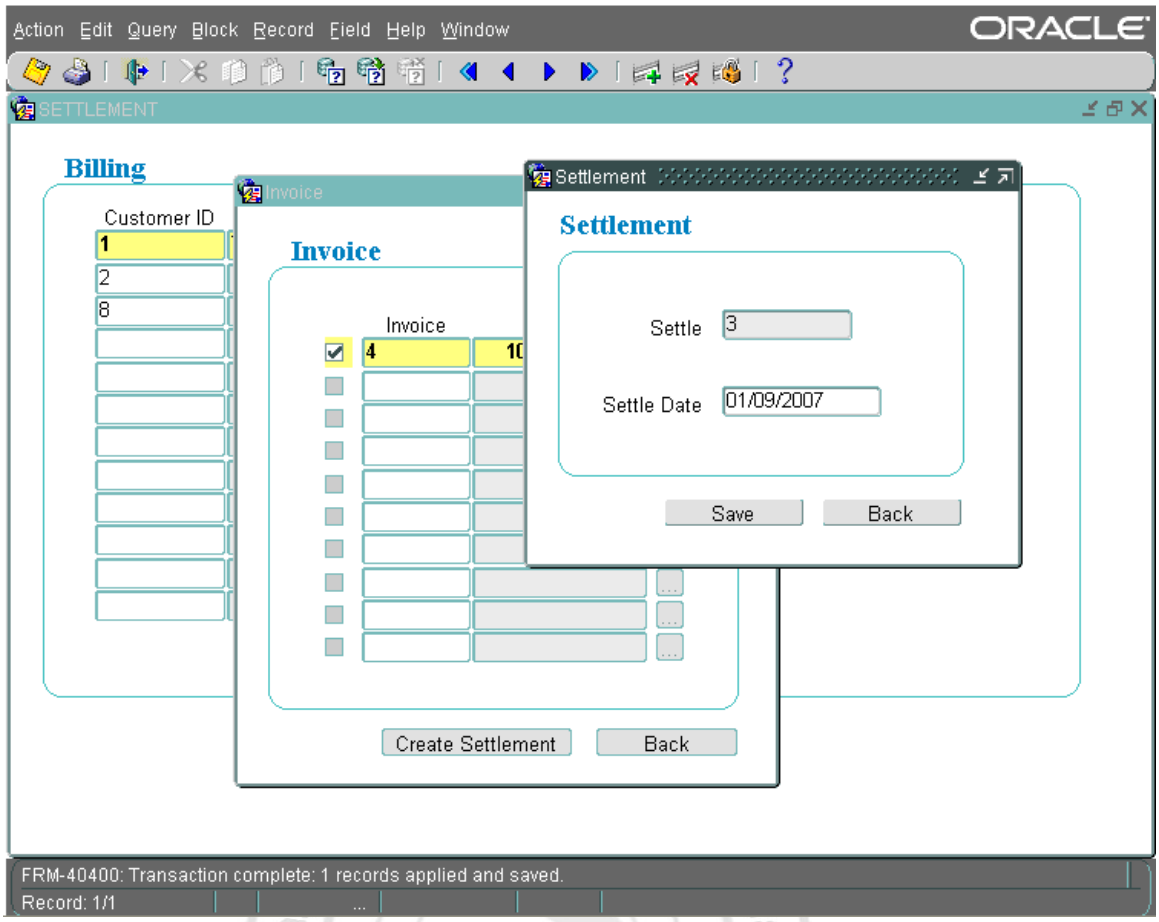


Figure E.23 Settlement

Process to input Tax Invoice/Receipt data

To add new Tax Invoice/ Receipt data need to do as follow

1. Input data as required by system

Invoice code	Not more than 5 digits number
Tax Invoice date	Default current date
	Date format DD/MM/YYYY

2. Record transaction by click 
3. Exit from system by click 

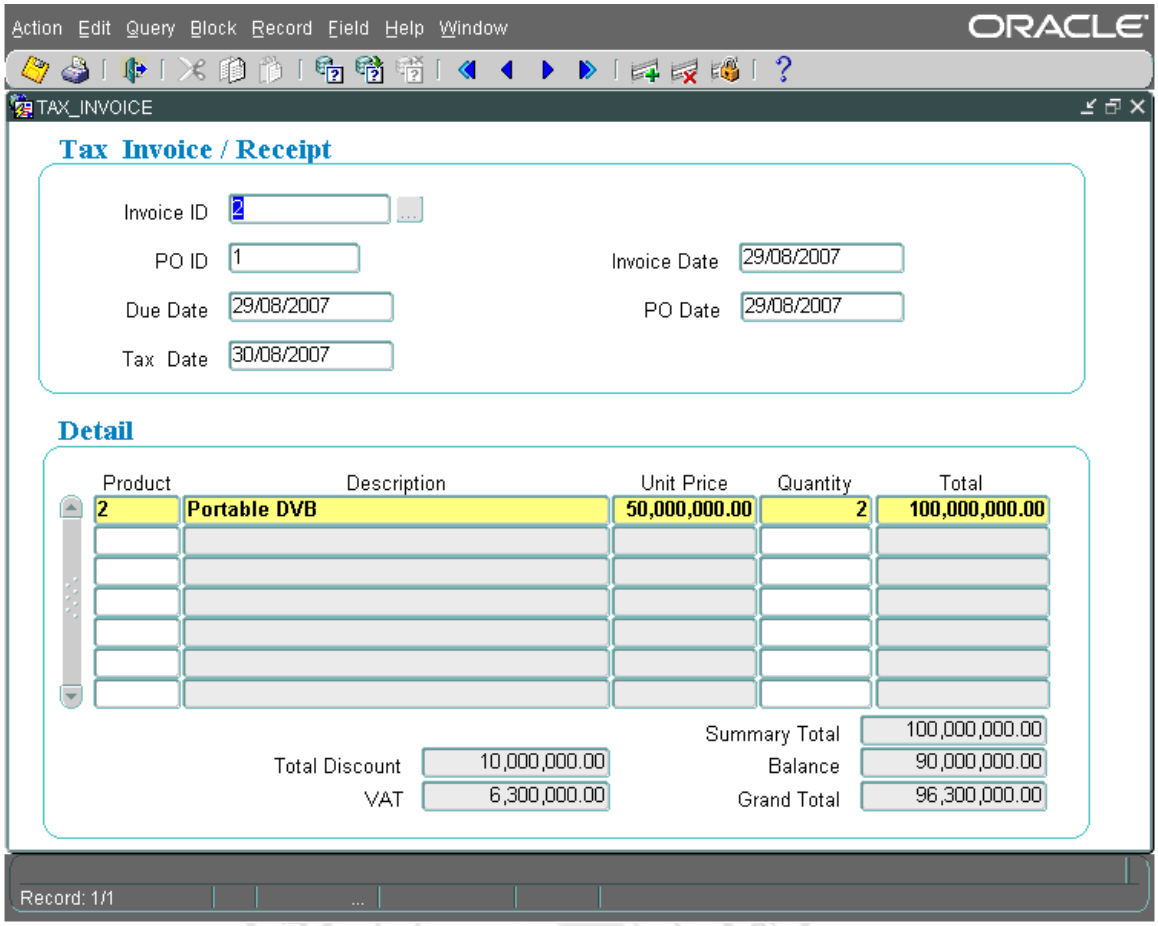


Figure E.24 Tax Invoice/ Receipt

Process to input Collection data

To add new Collection data need to do as follow

1. Input data as required by system

Settle ID	Not more than 5 digits number
Collection date	Default current date
	Format date DD/MM/YYYY
Receipt amount	Not more than 12 digits number
Withholding Tax	Not more than 8 digits number

2. Click Create Collection to create collection and record transaction
3. Exit from system by click

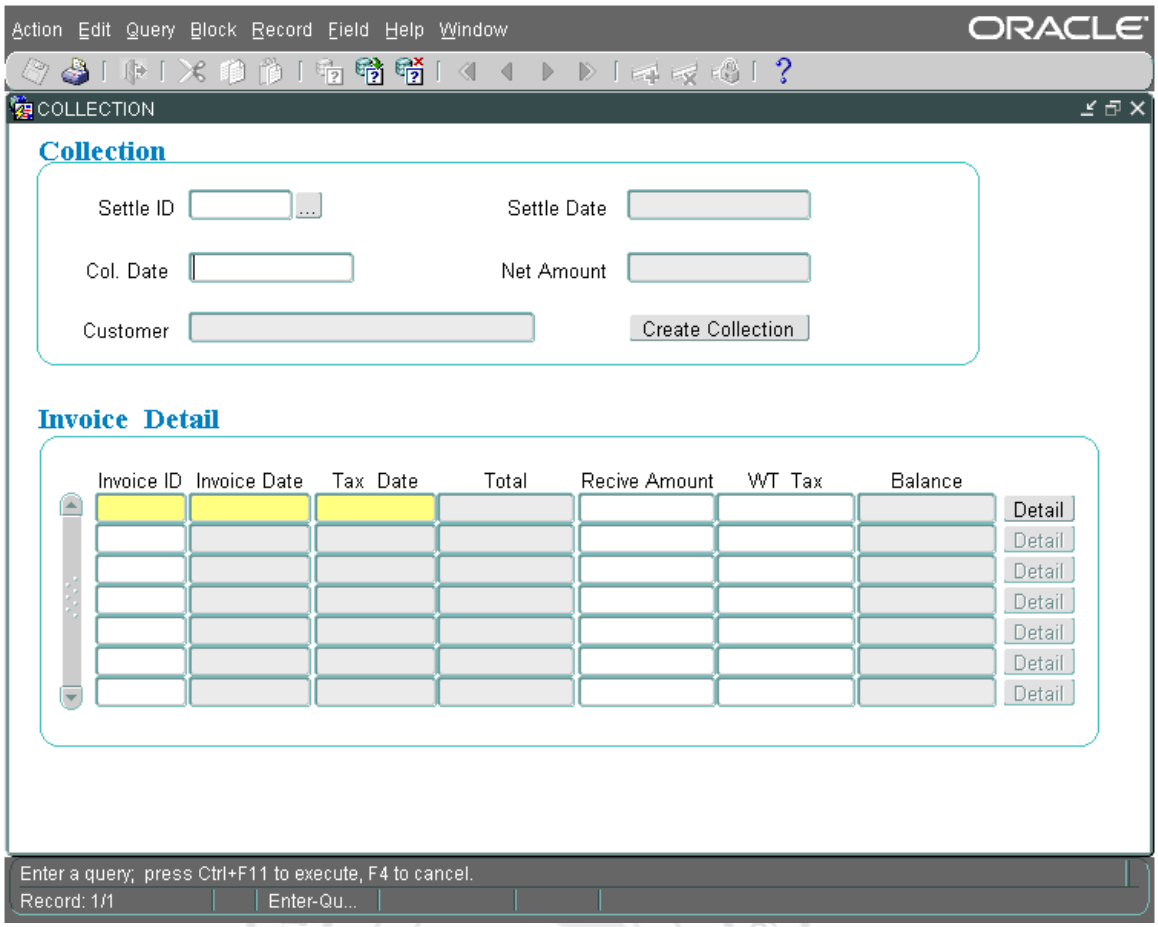


Figure E.25 Collection

Process to input Warranty data

To add new Warranty data need to do as follow

1. Input data as required by system

   Serial number Not more than 200 characters

2. Click Search to search warranty information

3. Exit from system by click

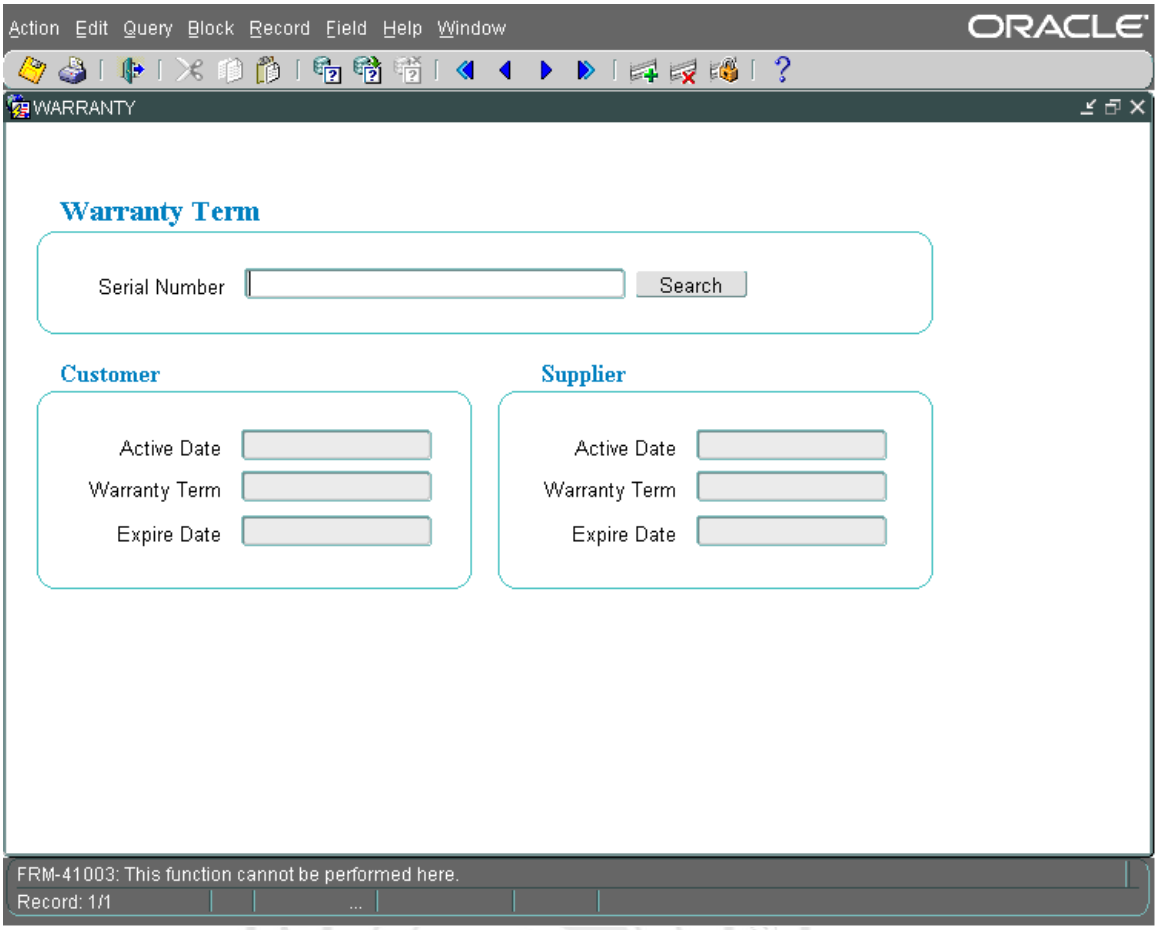


Figure E.26 Warranty

Process to input Supplier master data

To add new Supplier master need to do as follow

1. System generates new code automatically by added from last number
2. Input data as required by system

Name	Not more than 100 characters
Address	Not more than 200 characters
Country	Not more than 100 characters
Telephone	Not more than 100 characters
Fax	Not more than 100 characters
Contact	Not more than 100 characters

Email	Not more than 100 characters
Credit day	Not more than 3 digits number

3. Click Save to record data or click Save & Back to record data and go back to previous screen

4. Exist form system by click

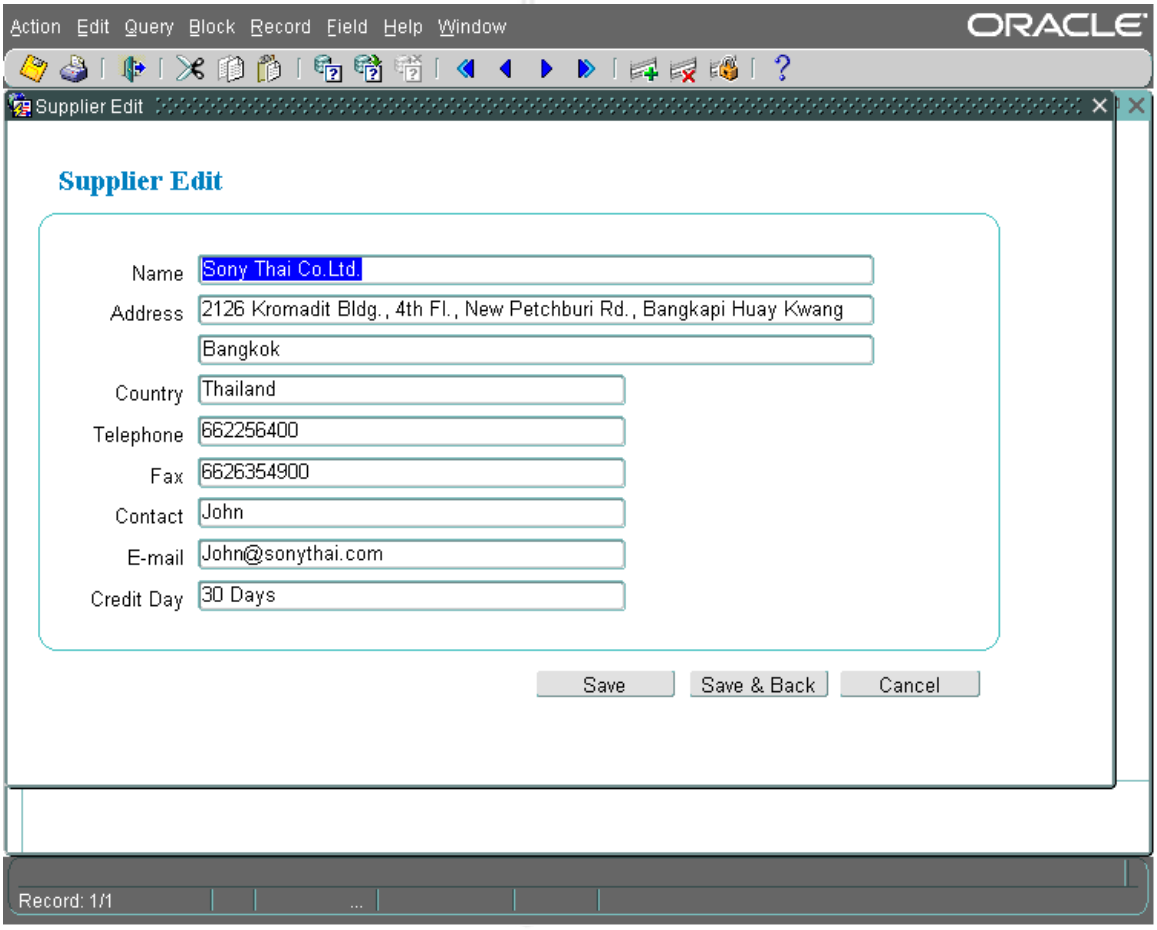


Figure E.27 Supplier edit data

Process to edit exiting supplier master data

1. Move cursor to exiting data by click
2. Click on cursor line to display existing and edit data, than
3. Move cursor to existing data by click

4. Click ... on cursor line to display existing and edit data, then click Save to record data or click Save & Back to record data and go back to previous screen

Process to input Equipment master data

To add new Equipment master need to do as follow

1. System generates new Equipment code automatically by added from last number
2. Input data as required by system

   Description Not more than 100 characters

3. Record data by click
4. Exist from system by click

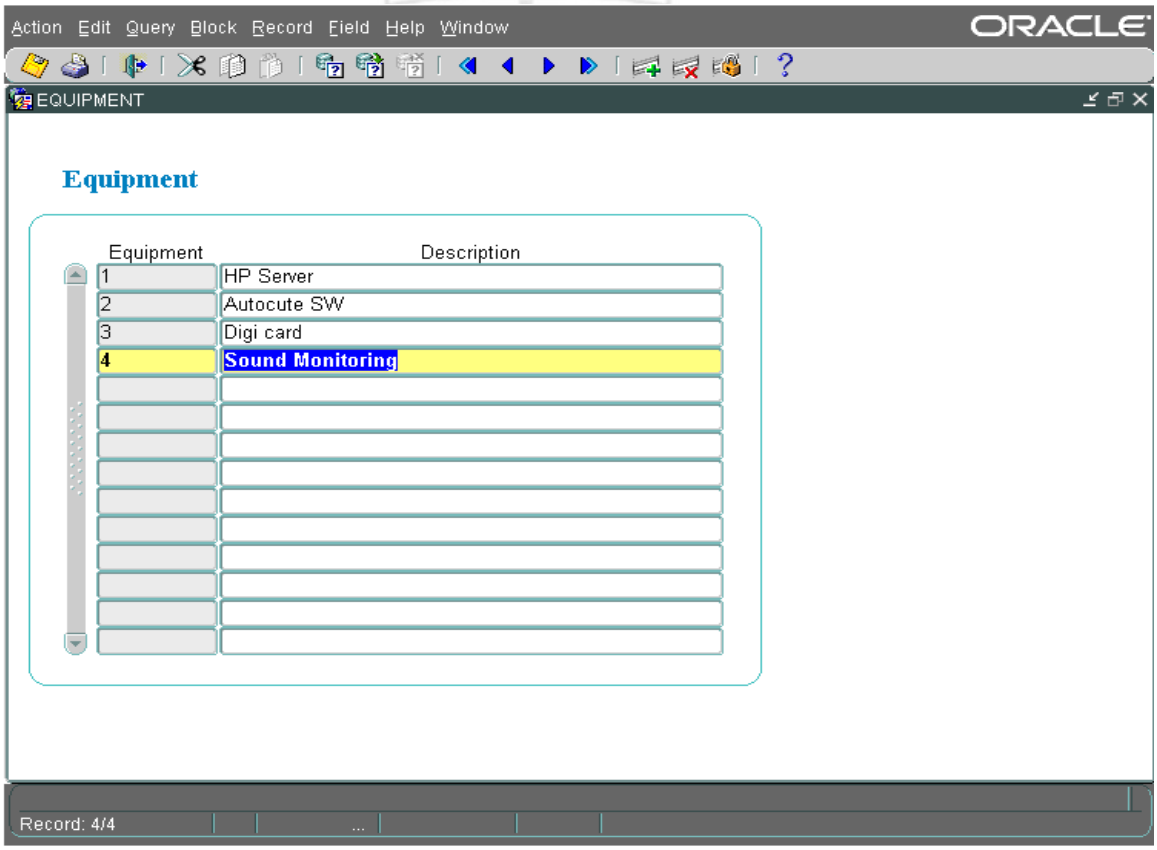


Figure E.28 Equipment

Process to edit exiting Equipment master data

1. Move cursor to existing data by click 
2. Edit data and record by click 
3.

Process to input Supplier Quotation data

To add new Supplier Quotation need to do as follow

1. System generates new Supplier quotation code automatically by added from last number. The Supplier quotation consists of 6 digits number.
2. Input data as required by system

Project Code	Not more than 4 digits number
Supplier Code	Not more than 6 digits number
Quote Date	Default current date
	Date format DD/MM/YYYY
Discount	Not more than 2 digits number
VAT	Default = 7%
	Not more than 2 digits number
Delivery Days	Not more than 100 characters
Currency	Default =1 Thai Baht
	Not more than 3 digits number
Exchange Rate	Default =1
	Not more than 10 digits number
Pay Condition	Not more than 100 characters
Equipment Code	Not more than 8 digits number
Unit Price	Not more than 12 digits number
Quantity	Not more than 12 digits number
Other Cost	Not more than 12 digits number
Markup	Not more than 4 digits number

3. Record transaction by click 

4. Exit system by click 

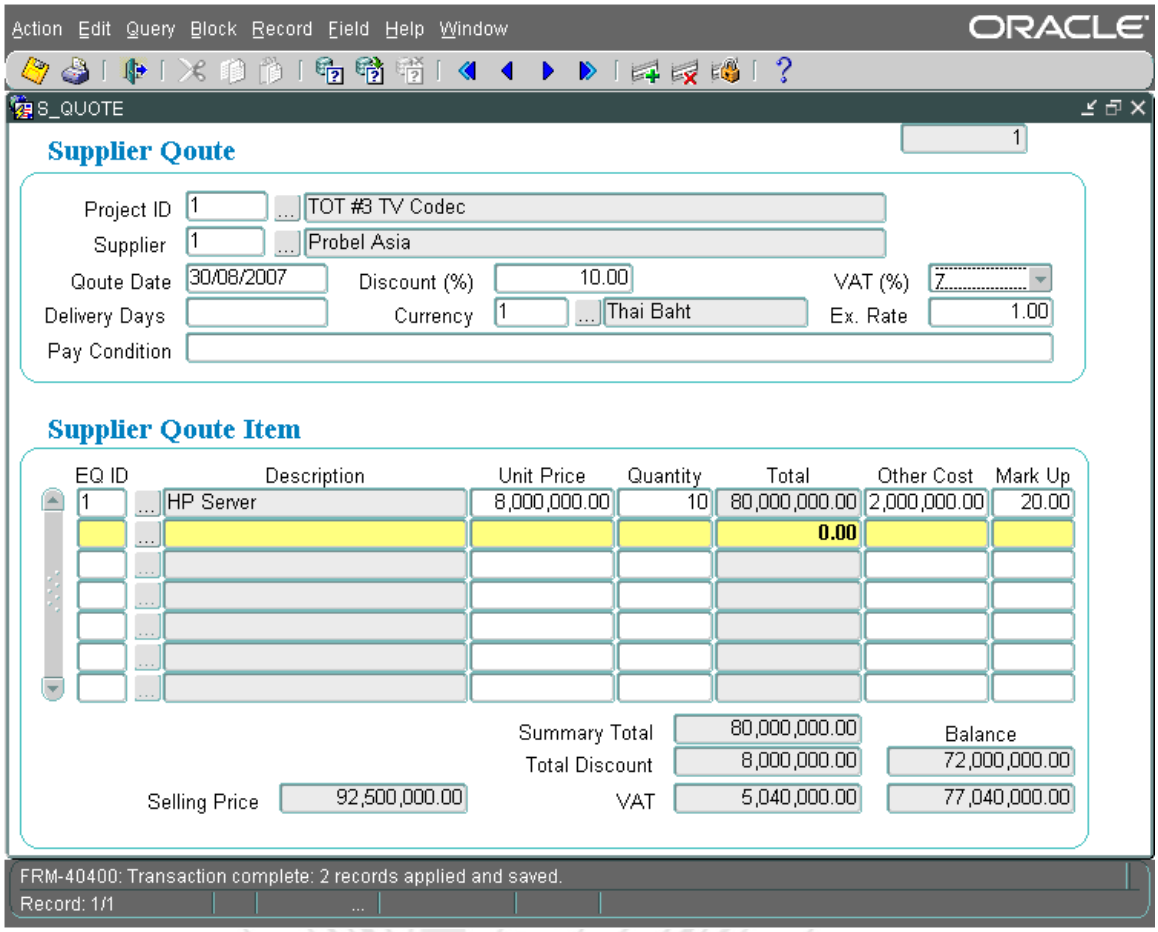


Figure E.29 Supplier quotation

Process to input Supplier purchase order data (PO_EQ)

To add new Supplier Purchase order data need to do as follow

1. System generates new Supplier purchase order code automatically by added from last number

2. Input data as required by system

S. Quotation Code	Not more than 6 digits number
Purchase Order date	Default current date
	Date format DD/MM/YYYY

3. Click Create PO EQ to create and record supplier purchase order transaction
4. Exit from system by click

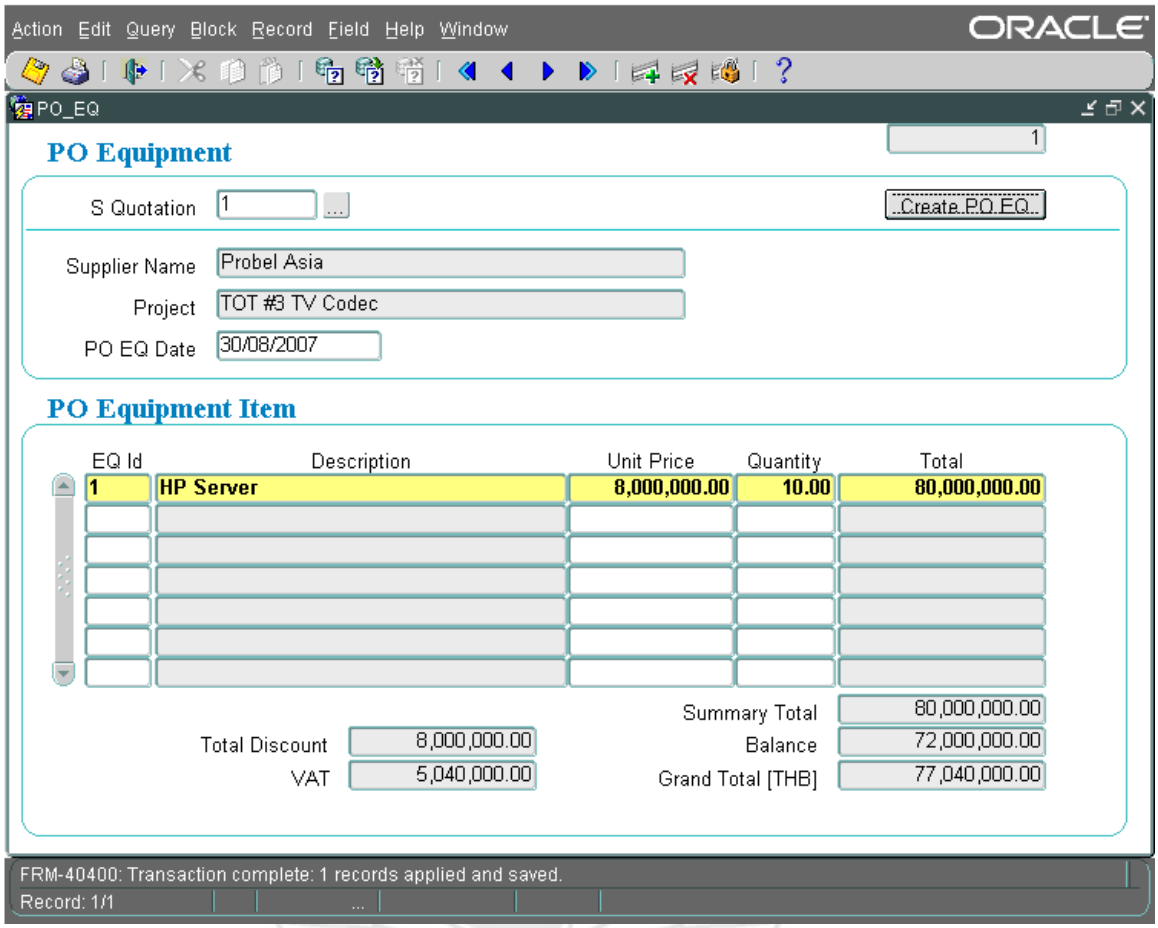


Figure E.30 Purchase order equipment

Process to input Serial number of Equipment data

To add new Serial number of Equipment data need to do as follow

1. Input data as required by system

PO EQ ID	Not more than 8 digits number
Serial Number	Not more than 200 characters

2. Record data by click
3. Exit from system by click

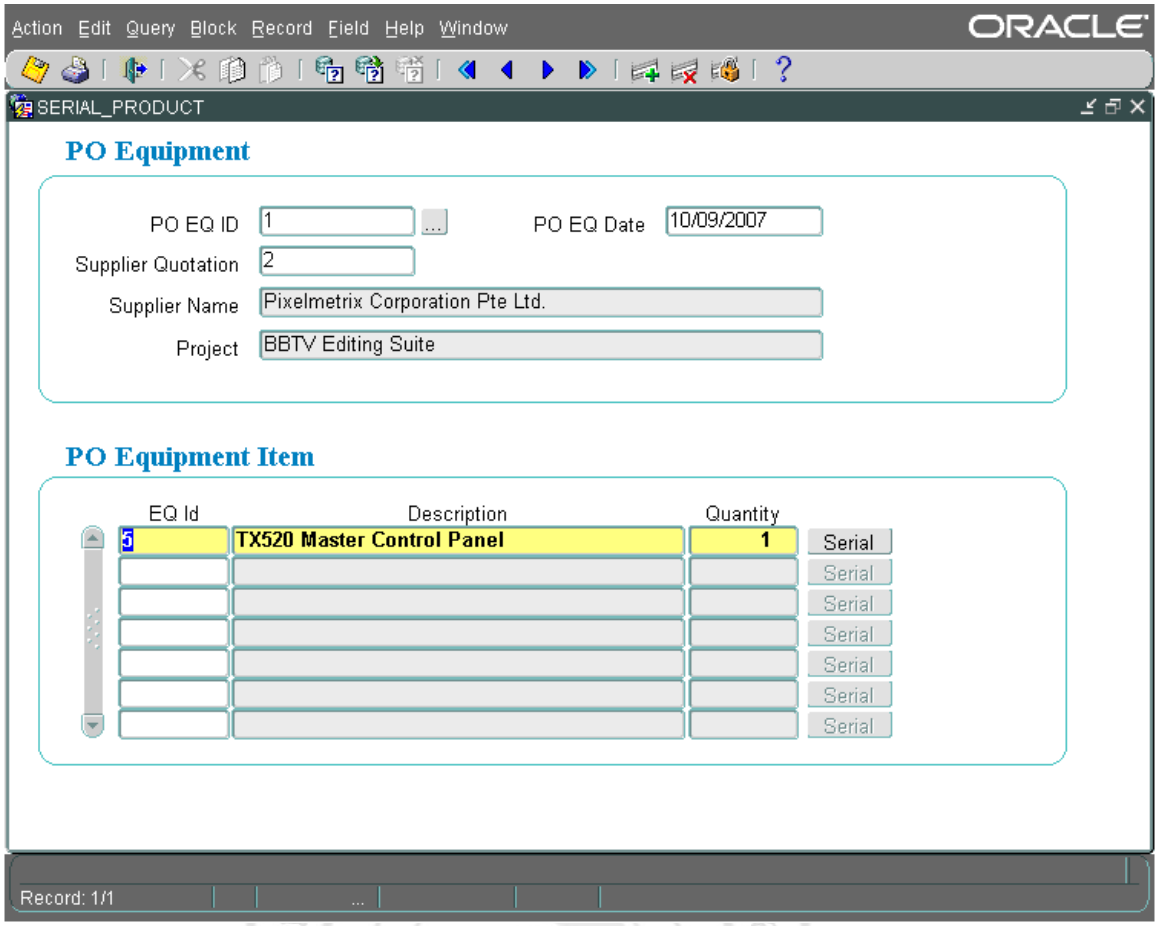


Figure E.31 Serial number of product

Decision making and Executive Systems

Input decision factor data

1. Topic of decision factor. The system generates topic code automatically by process from last identification number. The topic code is consists of 3 digits number.

2. Input data which require by the system.

Topic name		Not more than 100 characters
Detail		Not more than 100 characters
Score	Score number each detail	Not more than 1 digit number

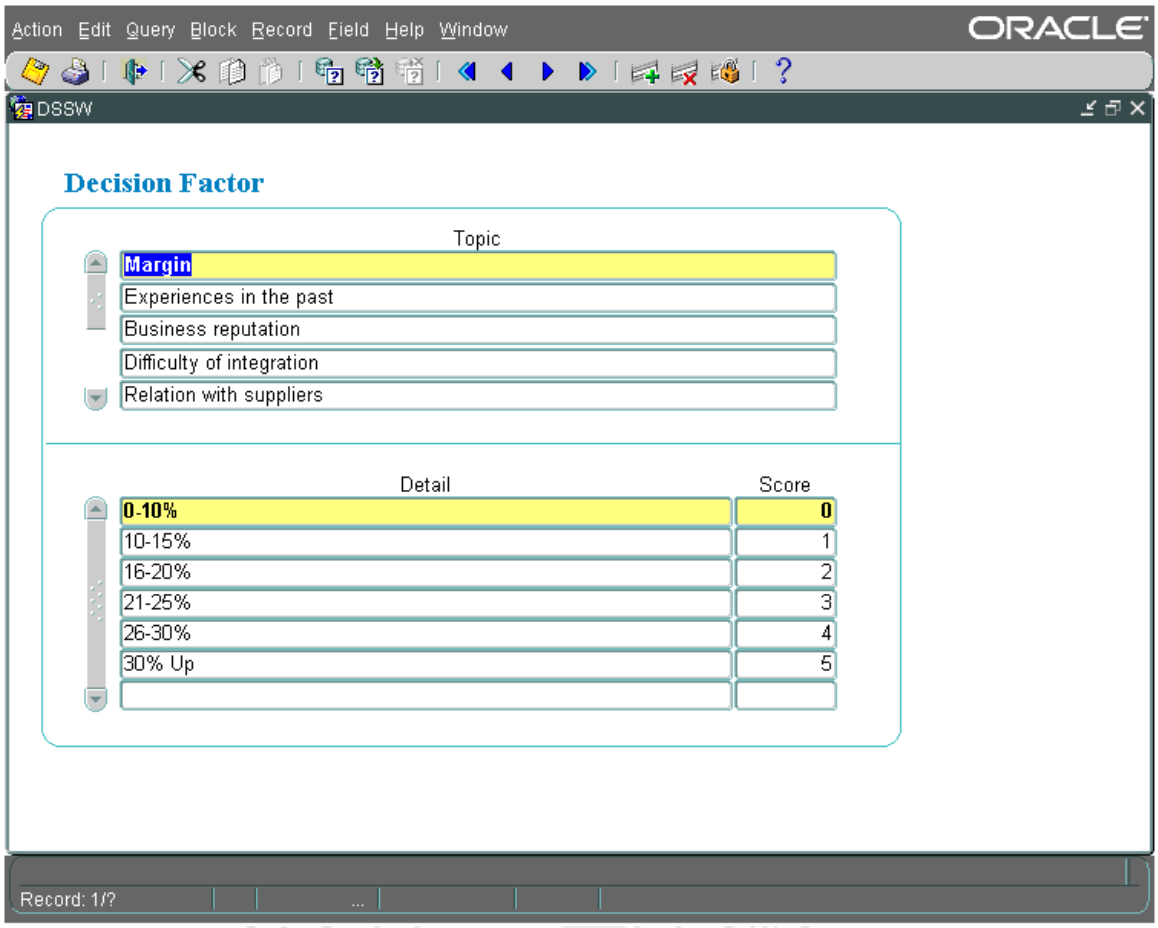


Figure E.32 Decision factor input

3. Record data by click 
4. Exist the system by click 

Change existing decision factor data

1. Retrieve existing data by click at  to inquire data.
2. Click  to see next existing data
3. Change data in yellow tab
4. After change date then click  to record

Input information of weight by executive

1. In put K. Score in to the column in to every topic
2. Record data by click 
3. Exist the system by click 

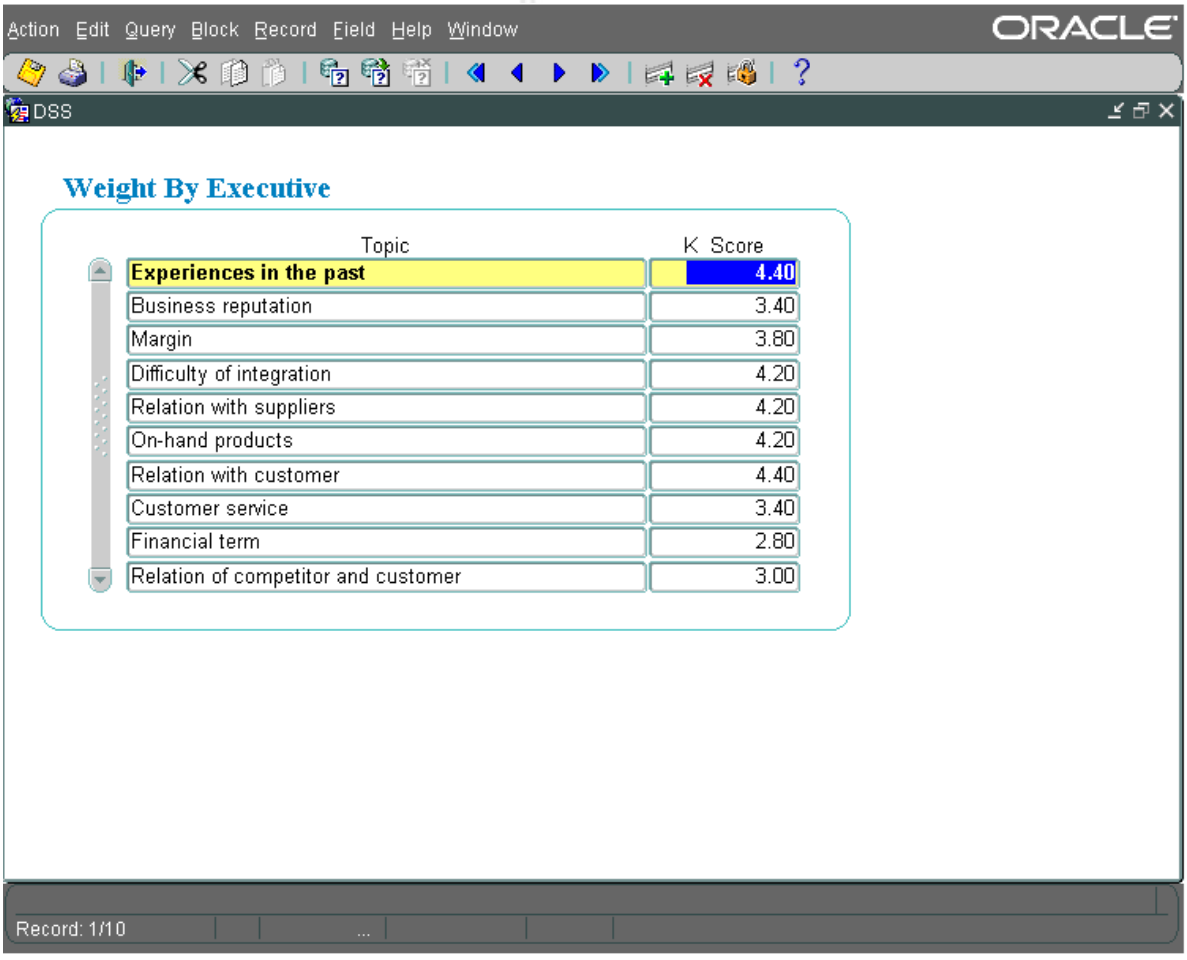
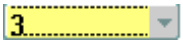


Figure E.33 Weight by executive

Input information of weight by user

1. Choose project by click
2. Input W. Score for every topic by choose number from 
3. Record data by click 

4. Exist the system by click 

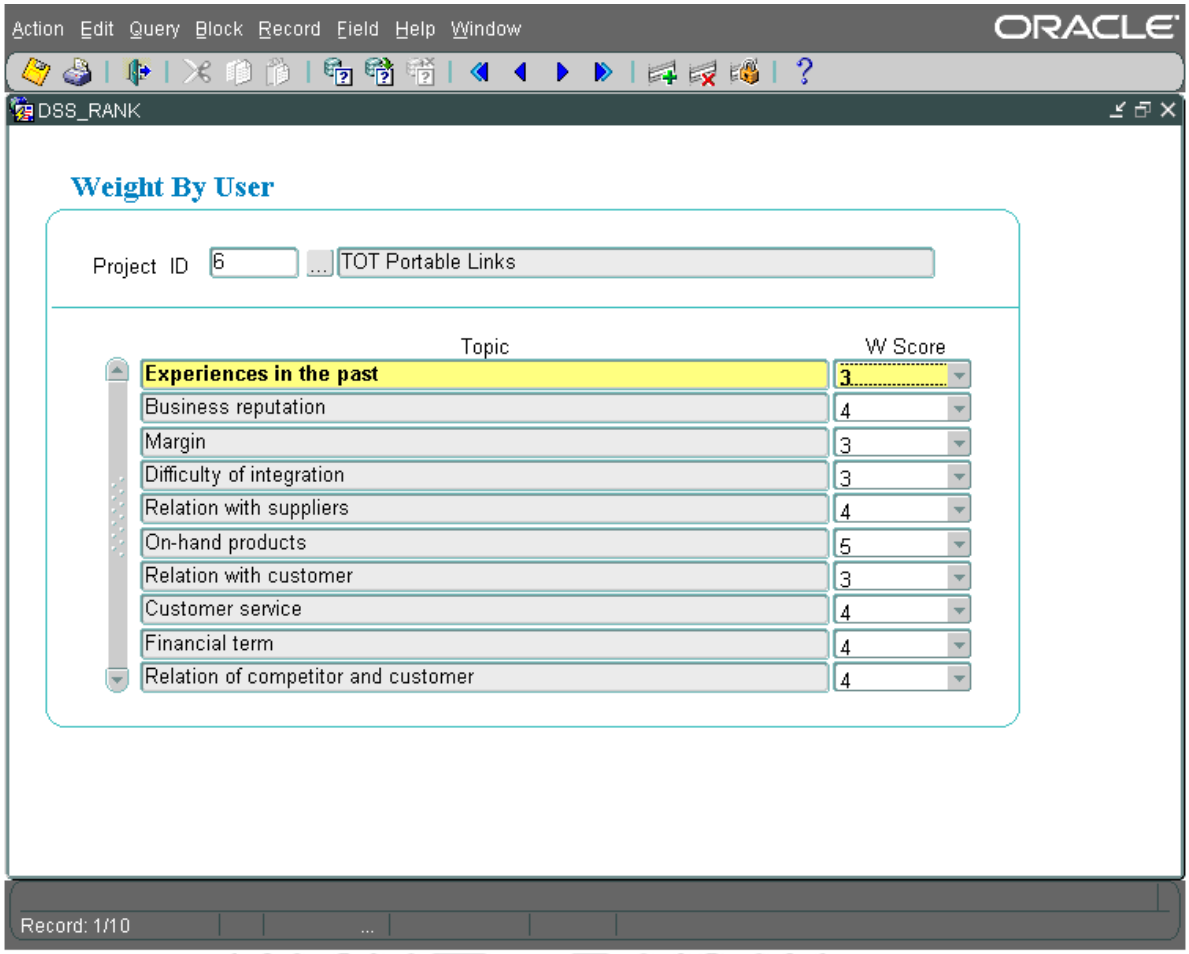


Figure E.34 Weight by user

Change existing weight by user data

1. Retrieve existing data by click at  to inquire data.
2. Click  to see next existing data
3. Change data in yellow tab
4. After change date then click  to record

Input information of rate by user

1. Choose project by click ...
2. Input R. Score for every topic by choose description 3 Indirect
3. Record data by click
4. Exist the system by click

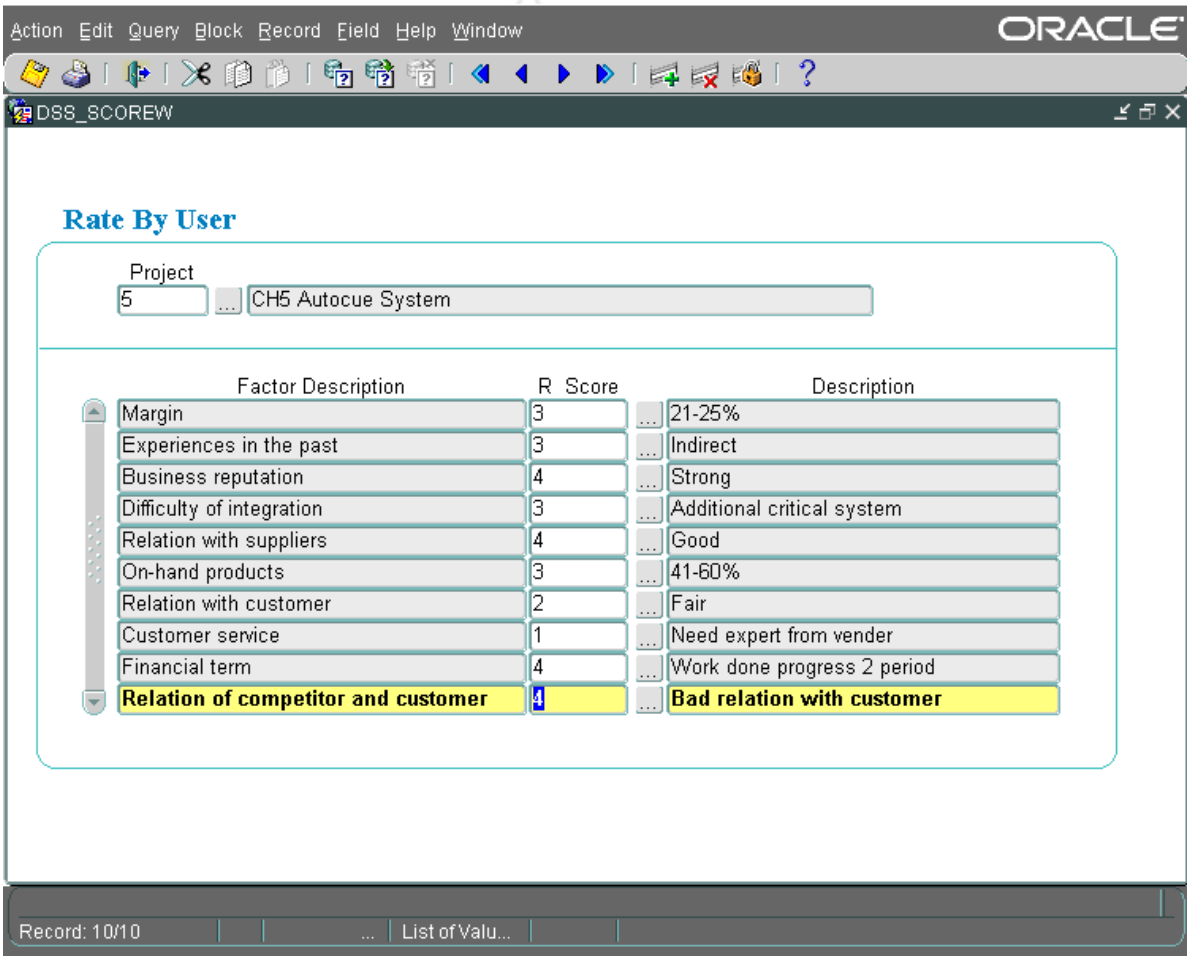


Figure E.35 Rate by user

Change existing rate by user data

5. Retrieve existing data by click at to inquire data.
6. Click to see next existing data

7. Change data in yellow tab
8. After change date then click  to record

Sample of Report

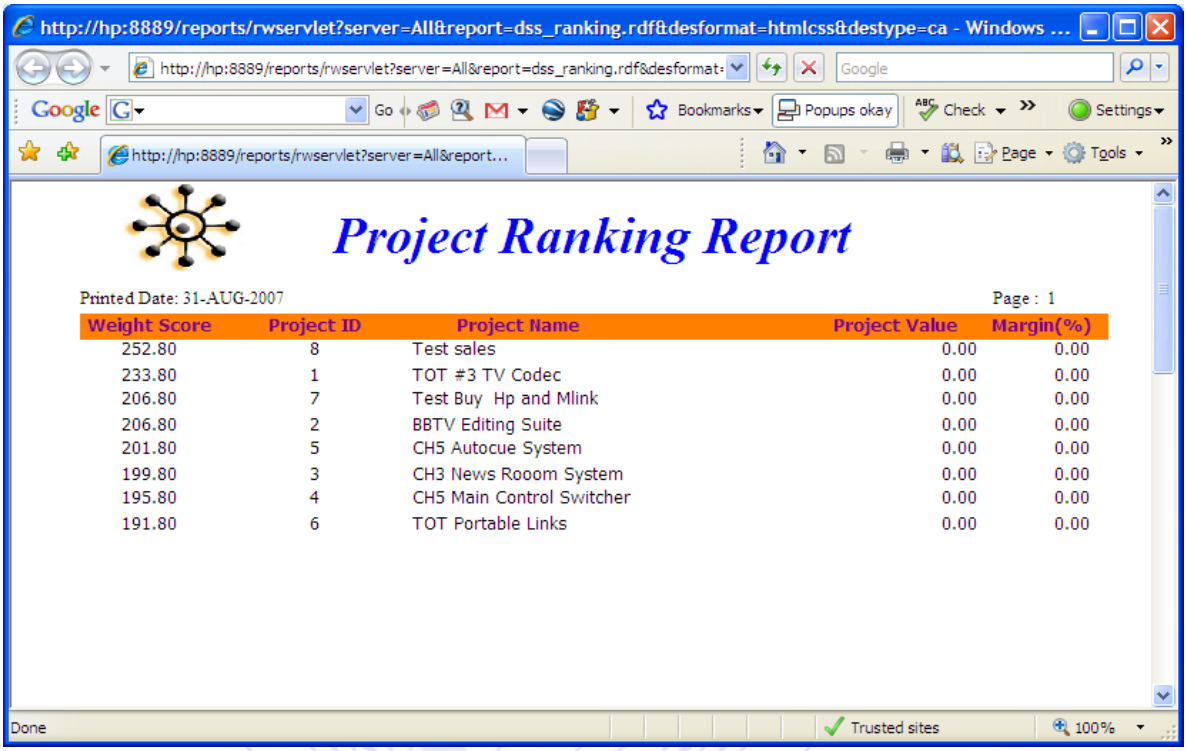


Figure E.36 Sample of Project ranking report

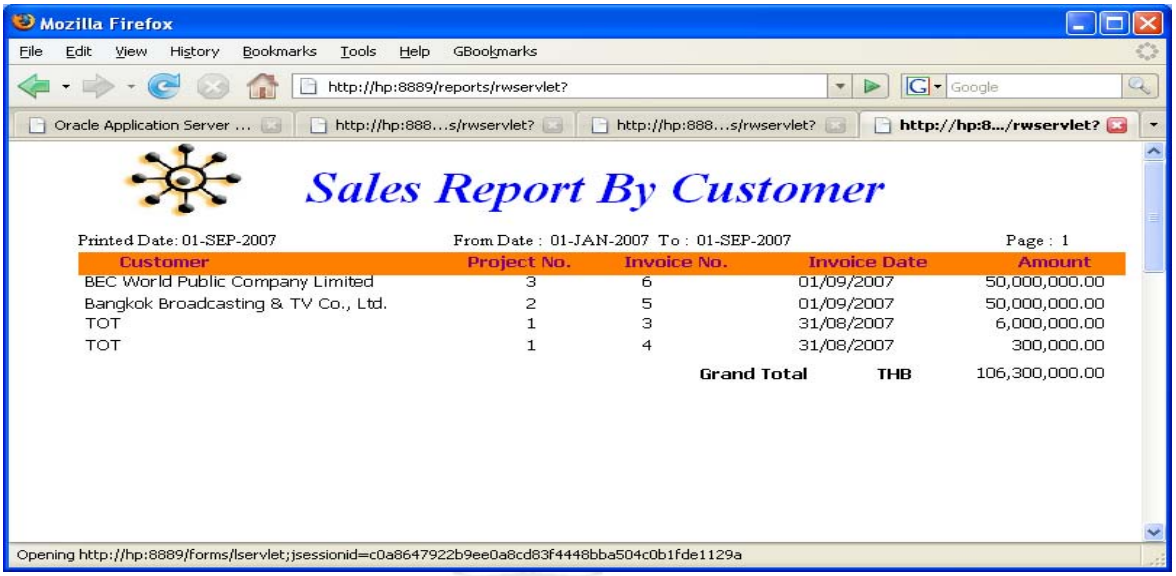


Figure E.37 Sample of Sales report by Customer

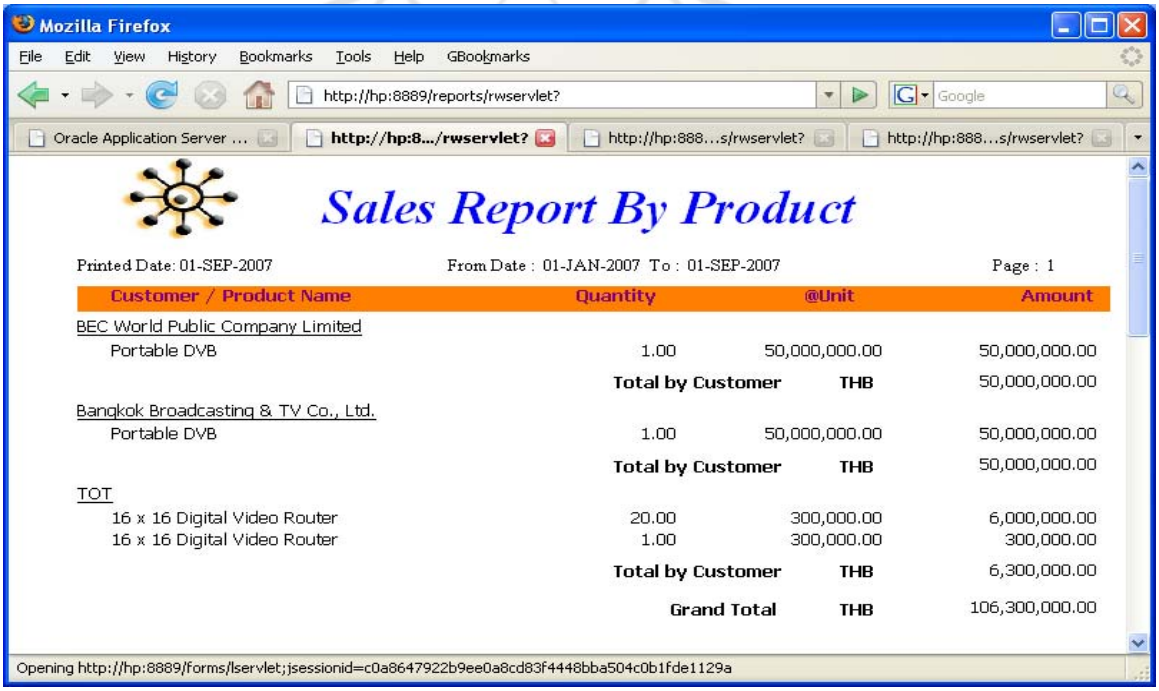


Figure E.38 Sample of Sales report by Product

CURRUCULUM VITAE

NAME	Mr. Payong Hoikeaw
DATE OF BIRTH	14 January 1973
EDUCATION BACKGROUD	
BACHELOR DEGREE	Bachelor of Business Administration, Burapha University 1995
WORK EXPERIENCE	2005- Present : Assistant Accounting Manager Ideal Systems (Thailand) Co., Ltd.