WXES3182
PROJEK ILMIAH TAHAP AKHIR

e-Office
Transaction System

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ABSTRACT

Accounting Information Systems is one of the critical systems in a corporation. This system will support all the critical financial information, which will be needed by the management in order to help them in their decision-making. Traditional accounting, which is manually written with a pen on the paper, has proven to be tedious job. Accountant needs to be very careful in order not to make any mistake while recording the transaction committed by the company.

Therefore, computer-based accounting is being introduced in order to help the accountants manage their accounting set effectively. This new accounting systems has helped to reduce most of the human-error and providing informative reports in a very short time. Web-based accounting systems which will be develop in this project to provide an easy access through the internet for the users to gain their critical financial information.

In this documentation, development issues such as system requirements, methodology and system design will be discussed thoroughly. In the end of this documentation, several pre-develop interface has been shown to provide an easy understanding of how this systems will look like.

e-Office – E-Transaction

CHAPTER 1 :

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.1 Overview

Modern office environment requires the establishment of a technology infrastructure that provides connectivity and the necessary tools to get the job done. Data requirements, having evolved into information requirements, have been further delineated into corporate knowledge requirements.

E-Office is designed to support knowledge workers; individuals for whom the manipulation of information and knowledge is their business. For this version, three modules are develop there are Human Resource Management System (HRMS), E-Transaction and Leave Approval System (LAS). In this project, only one module will be discussed – **e-Transaction**.

1.2 Project Definition

Accounting Information System (AIS) is a crucial element to an organization. As a financial information system, accounting provides critical information to the management of the organization. All of this information should be timely, accurate and reliable for the management in their decisions making.

The establishment of this project is to build system that provides an easy and secure access to the critical information through the online Internet connection. Managers may want an urgent report to make a crucial decision on the organization's activities. By using this system, managers will be able to generate their report in a short time through the Internet or in a Local Area Network (LAN).

1

A system requirement is the fundamental of a system design. Understanding the requirements given by the users will determine the success of this system. In order to determine what is the requirement, various methods have been use to gather the information or requirement needed by the users. This information will be analyzed in the systems and requirements analysis phase. This information will also be used to produce a logical design.

1.3 Relationship among the modules of Electronic Office (E-Office)

- Processing transaction process based on salary information from HRMS

E - Transaction

Payroll

- Basic Salary & Total Benefits
- Calculate salary

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Login

Human Resource Management System

- Calculate Salary Based on Total Leave

Leave Approval System

Leave Info

- Manage Application Leave
- Update Leave Database
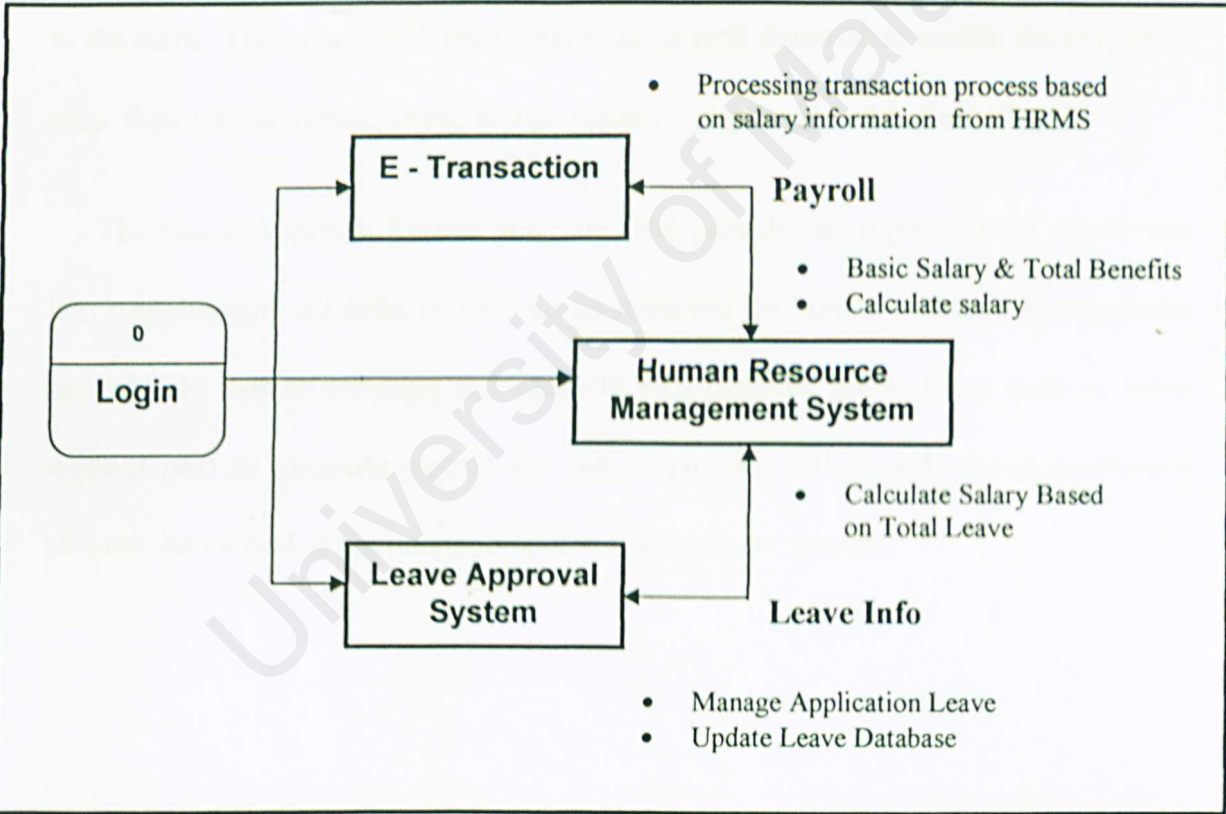
Figure 1-1   Relationship between Modules

Figure above shows the modules connection diagram for this E-Office System. Human Resource Management System is a module in this system and its relating with two other modules; E-Transaction and Leave Approval System. They can share the information and database and also communicate with each other. Only an

2

authorized user allowed to access to the modules in this system. The employees must register their ID and password. After registration, they can access the module based on their department and ability to view their information.

The E-Transaction system will cooperate with Human Resource Management System in handing the employee's payroll matter. They will share the same payroll database. Human Resource Management System will calculate the employee's payroll based on the payroll details such as basic salary and total of various benefits as offered by the company. Based on information payroll from database, E-Transaction will provide and produce amount of salary that the company should pay to the staffs. The system will then update the payroll database to enable the employee view their payroll details in the human resource page every end of month.

The Leave Approval System generates and provides all reports about employees leave application; all information can be retrieved by human resource management system. The human resource management will consider about leave such as leave without paid to calculate payroll for that employees. All records about employees also can be viewed in the human resource management system.

1.4 Project Objectives

1.4.1 Objectives of e-Office

i) **To provide an ease of use, accessibility and user friendly graphical user interface.**

The design of user interface is at user skill level where no command or programming skill is needed to access the system. Users can handle the system very easily as simple as clicking on buttons only. Users do not have to do a lot of typing; data input is decreased to the minimum. Most of the data are retrieved from database.

ii) **To ensure the most reliable and the latest information is distributed in the network.**

This information is distributed electronically and most of it is retrieved from the database. Once the database is updated, all the info in this system, as can be seen in the web page, will also be updated automatically. The latest news can be reached to everyone in the company.

iii) **To reduce manpower**

By shifting from a manual-paper processing to a computerized processing is able to reduce manpower. Authorized employees can easily manage their own tasks provided in this system instead of depending on one specific employee to cope with all human resource tasks.

iv) Cost Effective and Security

With new internet technologies a cost effective and security method to deliver human resources services because it enables employees and administrator easy to access data.

v) User-friendly, attractive and interactive interface

Graphical User Interface (GUI) will boost the user friendliness of the module. The interface will have resemble of those Windows based application to enable user to be more comfortable to look at the interface instead of creating an interface which is odd-looking from the Windows operating system. The interface of the module also has to be similar to those of other modules in the system in order for the user not to get confused and uncomfortable with the change of interface as they 'jump' from module to another.

1.4.2   Objectives of e-Transaction

This module functionality objective focuses on :

i)   Provide the organization with accounting functionality

Basically this module will perform the accounting activities where it helps the user particularly the accountants to input the financial transaction records of the organization. This module has resemblance to Accounting Information System (AIS) currently used by many organizations but the main difference is that this module focuses on real time data where its database automatically updates itself whenever a transaction occurs whereas normal AIS need the user to key in most of the records manually in most common scenarios.

5

ii)   A flexible and dynamic transaction system

This system can be use by different kind of industries whether it is merchandising, manufacturing or a services provider companies.

iii)   Improving the financial management for companies

Automating manual procedures will improve the financial management by reducing errors to less than 1% and increasing the speed and accuracy. Besides have ability to shortening data-processing time by 50%, it is also creating a paperless environment by using the electronically data storage so that the management will be more cost effective.

iv)   Provide data analysis and reporting capability

Besides providing accounting capability, the E-Transaction module also provides analysis features such as data analysis of the transactions records in sales and others. Eventually the outcome of the analysis will be used to generate necessary reports such as the balance sheet, trial balance and other related reports.

1.5 Targeted User

The main purpose of this project is to develop system to cater most of the area in the accounting departments. This system is developing in general basis which have the basic accounting needs to be used in various industries such as manufacturing and merchandising. The main user of this system can be categorized into two groups – the management group and the employees group.

i)   **The Management Group**

This group consists of the managers, the director or the partners of the companies. They will use this system as a source of information to facilitate them in decision making.

ii)   **The Employees Group**

This group is called the common user. They use this system to calculate and record the transactions as they manually record them in the bookkeeping. They are able to generate report for the managers according to the manager's requirements.

1.6 Expected Outcome

This system is expected to:

1.6.1   Facilitate the accounting basic needs of the industries which are records transactions information.

1.6.2   Minimize the time needed to perform daily task by the user.

1.6.3   Minimize the paperwork used in daily transactions.

1.6.4   Provide enough information for the managerial department in decision making.

1.7 Project Scope

E-Transaction or transaction module is a part of E-Financial which is containing 3 sub-modules (include payroll and production module). This project is concentrate on transaction module which is focuses on the accounting transaction

within the organization as well as transactions with external organization. It is a part of organization financial basic component.

This project will be developed on SQL Server as the server site. In addition to the flexibility of accessing the data, this application will be hosted up on the internet. To do this, development of this system will be based on the multi-user applications.

E-Transaction is dedicated to the accounting and non-accounting knowledge users. Information from this system can be used a critical information for decision making by the management of an organization.

The scope of project covers the development of a user friendly accounting module which focus on maximum automation on the activities on accounting which means minimizing he involvement of human resources in generating financial reports. The E-Transaction module can be categorized into 3 main modules which are the:

i)   **Transaction**

Contain detail records of each transactions and information of customers and vendors.

ii)   **Accounting and Financial**

The biggest module consists of 8 sub modules which is performing the basic type of account or transaction.

iii)   **Report Generator**

Providing the generation of accounting report namely the General Ledger, Balance Sheet and Specific Module Reports (for management overall report).

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                        │  E-Transaction  │
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Transaction	Accounting and finance	Reporting
• Invoicing	• Fixed Asset	• General Ledger
• Receipts	• Modal	• Balance Sheet
• Purchasing	• Creditor	• Specific Module Reports
• Payments	• Debtor	
• Clients' Information	• Sales	
• Vendors' Information	• Purchase	
	• Expanses	
	• Others Income	
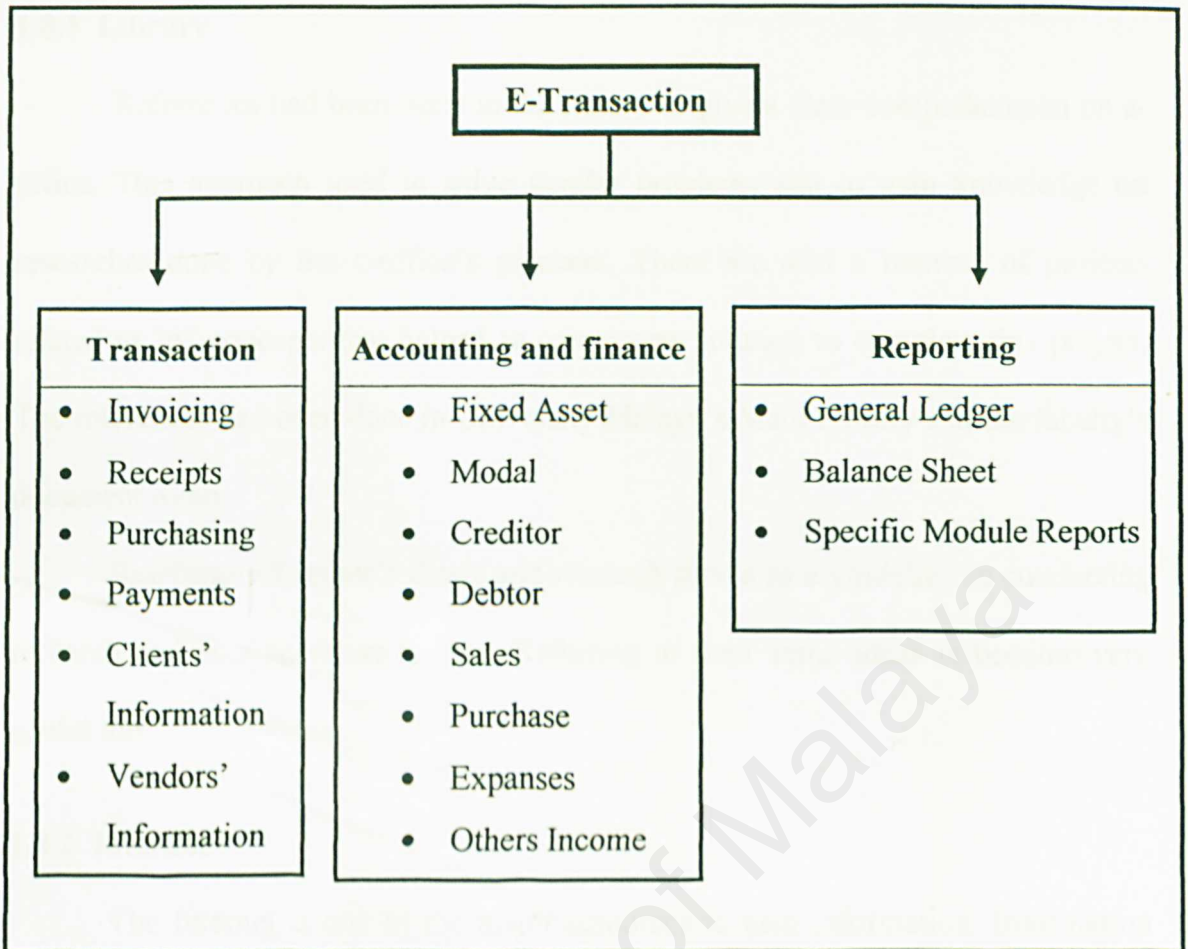
Figure 1-2   Structural Hierarchy of E-Transaction Module

1.8 Research Method

Referring to the method of information gathering, suitable fact finding techniques is essential in order to get the relevant reference documents as well as establishing a high degree understanding towards the project scope and development requirement and at the same time building a strong groundwork in system design.

There are 5 major types of resources referred to carry out the research including the library, the Internet, individuals, personal books or lecture notes and recent software.

1.8.1 Library

References had been done in the library to give a clear comprehension on e-office. This approach used to solve similar problems and to gain knowledge on researches done by the e-office's pioneers. There are also a number of projects related to "e" concepts that helped to create new solution to complete this project. The references had been done in University Malaya's Main Library and the faculty's document room.

Reference of senior's thesis and research serves as a guideline in conducting research and as a literature review. Referring to their some ideas is become very useful too.

1.8.2 Internet

The Internet is one of the major resources to gain information. Information gathered from the Internet includes the information on concepts of ERP, e-business, Accounting Information System, Design Methodologies and Strategies, system evaluation and others. The largest source of information which the information varies from all areas of the system is very helpful.

1.8.3 Individuals

Some individuals had been referred to gain the personal knowledge on their fields of interest. Mostly the knowledge is gained from the lecturers, tutor, friends and there about the concept of e-office, the project development, and some on the account and transaction information.

1.8.4 Personal books and lecture notes

Reference books are the most important source of reference for conducting the research on the system development. The book title varies from the most technical which focus on system design, database to those which emphasis on

business rule such as books on intermediate accounting as well as books on Accounting Information System.

Personal books and lecture notes are referred to review some knowledge that helps on the development of the system. They include the some programming guides and project management knowledge.

1.8.5 Accounting Software

Some of accounting software which is available for reference purpose in the sense of functionality is reviewed. The reviews will explain in the next chapter.

1.9 Project Schedule

In order to organize the development phase of the system, a schedule is essential in order to develop the system in more proper manner where the development phase follows certain time frame allocated. Table 1.1 shows the project schedule for the system while Figure 1-1 is a Gantt chart on the development phase schedule along the intended time frame for each phase of the system. This project was given a duration of 3 months to complete this Phase I. It was started in June 2003 and ended in September 2003. Phase II is shown in Figure 1-2 will be continued on October 2003 until January 2004.

Table 1.1   Project schedule

Activities	Date	
	From	To
Phase I		
Literature review	1/6/2003	10/7/2003
System analysis	1/6/2003	10/7/2003
Methodology	11/7/2003	20/8/2003
System Design	21/8/2003	31/9/2003
Phase II		
System Design, Implementation and Testing	1/10/2003	31/1/2004
Documentation	1/6/2003	31/1/2004

Figure 1-3   Gantt Chart for Phase I of System Development

Activities	June	July	August	September
Literature Review				
System Analysis				
Methodology				
System Design				
Documentation				

Figure 1-4   **Gantt Chart for Phase II of System Development**

Activities	October	November	December	January
System Design, Implementation and Testing				
Documentation				

During the software development process, the workload will break down into 5 parts which is Literature Review, System Analysis, Methodology, System Design and Documentation. According to the schedule, the initial state of the project begins with the literature review and system analysis which include the task of identify the systems need to be develop and gathering the information on the system requirements. This is including functional requirement, non-functional requirement and software and hardware requirement for developing systems.

In system designation, every logical aspect for the system will be defined. This is including the systems architecture design, interfaces design and databases design. Finally, the documentation process will be revised and revised again so that no information on the software development process will be left out.

CHAPTER 2:
LITERATURE RESEARCH AND REVIEW

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2.1 Overview

Before we proceed with the details of the designation of the system, literature review should be done first. Literature review is an important element for a software development process. Through this study, information can be obtained before any decision on designing the system can be made.

2.1.1 Accounting Concepts Review

Accounting is the means of communication process of identifying, measuring, recording and communicating financial information about an economic entity.

2.1.2 Traditional approach

It has more focus on recording financial information to keep accounts which the resources of the business has been used. The traditional approach of accounting focuses on record keeping of historical events and transactions. These records eventually enable the user to work on the financial position of the business and profit or loss that has been made over the financial period.

2.1.3 Conceptual Approach

Accountings has turned itself from merely providing the records of the business performance along the years but now have turned into providing information in order to assist the business in decision making context. Accounting information provided should assist with evaluating the past performance of the business as well as planning the strategy upon predicting on a better performance by the business in the future.

2.1.4 What is E-Transaction?

"E" concept is the use of electronic tools such as computers, software and networks to make job being simpler, more accurate, quicker and cost effective. Recently there is a trend to signify "E" with more than just electronic rather specifically to computerized material. This term would obviously include software but does not strictly specify using a computer or the type of computer.

Information system is a framework by which resources such as computers or peoples are coordinated to convert inputs into outputs in order to achieve the objectives of an enterprise.

Transaction is a piece of business that is done between people such as financial transaction. It is involve the management and implementation of business. The best way to record every transaction activities is through accounting.

Accounting basically is a process of identifying, measuring, recording and communicating the economic events of an organization to interested users of the information.

E-Transaction is an information system which providing relevant functions to record any financial transaction or information for specific users who manage the account of an organization. With the advantages of "E" concept, it makes the process become easier, faster and more efficient.

It means financial transaction information can be send quickly and securely over a network instead of physically delivering it to their accountant. The information is received by the accountant was ready to be processed and it will save time and money. The saving is significant.

E-Transaction allows user to process all their transaction without worrying about posting their books. Users can access to the information and get the output that they need, whenever it is convenient to them. It's simply taking advantage of technology that makes ones financial life easier.
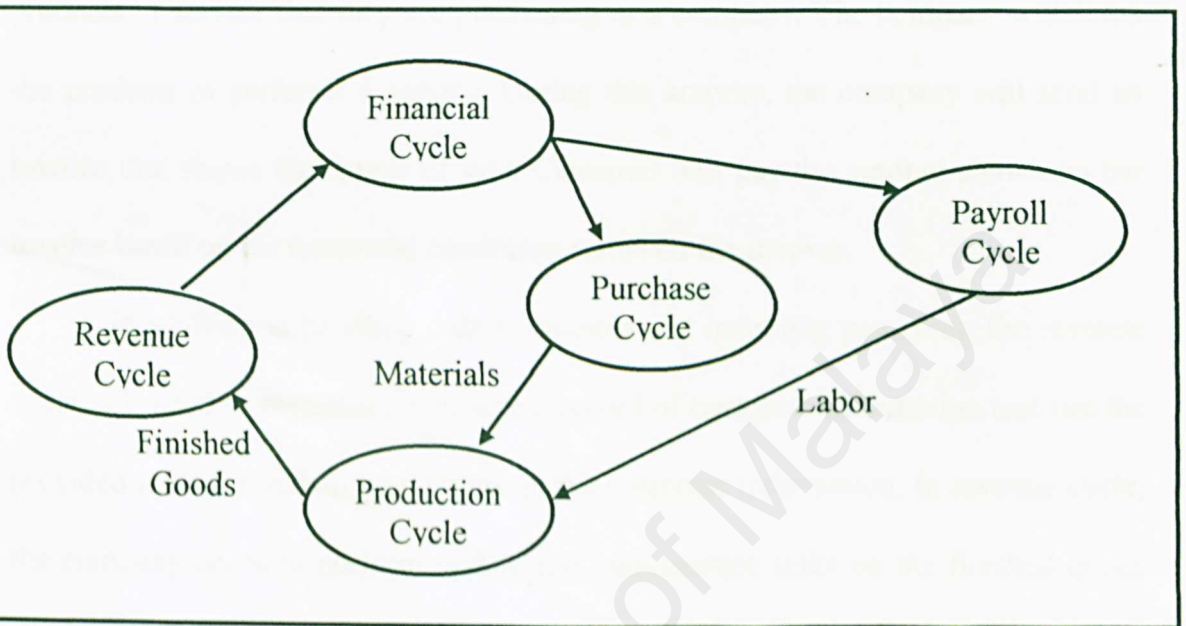
Figure 2-1   Transaction Cycle

Most of accounting information system is organized into a transaction cycles or accounting cycles. Transaction processing takes place simultaneously with the operations of a company. Figure 2-1 is shows a diagram which is commonly used in transactions cycles. It shows how the transactions cycle relates to each others.

A Revenue Cycle is where the company committed their sales transactions. Cash obtained from the sales is brought into the financial cycle. In the Financial Cycle, company will commit all the cash receipts and cash payments activities. Payments will be making to Purchase Cycle and Payroll Cycle. In Purchase Cycle, the cash will be expensed on the resources such as materials or supplies to provide the products or services to its customers. Wages and related labor cost will be paid in the Payroll Cycles. The Production Cycles converts all the material, labor and other acquired resources into finished goods, completing the cycle.

2.1.4.1 Revenue Cycle

Revenue cycle includes those activities involving the sale of goods or services. Whether the company is manufacturer, merchandisers or service businesses, their revenue cycle is the same. For example, customer will place orders for the products or service that they are purchasing to a company. The company will ships the products or performs a service. During this activity, the company will send an invoice that shows the details of sale. Customer will pay the amount shown on the invoice based on the terms and conditions stated on the invoice.

In addition to handling orders, invoices and incoming payments, the revenue cycle will need to maintain a permanent record of customer information and use the provided tools for updating and revising the customer information. In revenue cycle, the company needs to perform update and maintenance tasks on the finished goods inventor information. Finally, the revenue cycle should give the financial accountants the information they need to create ledgers, journals and financial.

2.1.4.2 Purchase Cycle

Purchase cycle include the acquisition of resources (such as goods and services) and the payment for them. In the purchase cycle, the purchasing department will use the materials or purchase requisitions as authorization to place purchase orders. Purchasing agents will try to look for the best prices, terms and delivery dates offered b the approved vendors. Purchasing agents is a skilled negotiator with considerable latitude in making decisions. Whether it is the result of spirited deal making or is generated automatically, the purchase order is sent to the vendor by the purchasing department. After that, the purchasing department will send another copy of purchase order, with quantities omitted, to the receiving department or makes the similar information available electronically.

When the shipment arrived, the receiving departments will complete a receiving report. Accountant must compare the receiving report with the purchase order and the vendor's invoice. If the details on all these documents mach, accountant will issue a check according to the amount.

Then the check will be forwarded to the treasurer with the supporting documentation. This documentation includes purchase order, the receiving report ant the vendor's invoice. This package of documentation is called the voucher. The treasurer will sign the checks and marks the voucher and the supporting documents so they cannot be use to authorize a second payment for the same purchase and send the check to vendor.

The purchase cycle should generate a summary report of the purchase and the cash disbursement activities and the cash disbursement activities for management's use.

2.1.4.3 Payroll Cycle

Payroll cycle includes the payments for the time worked by an employee. Accountants some times consider the payroll cycle is part of the production cycle. In order to distinguish the uniqueness of the payroll cycle, it has been separated from the production cycle as part of the components of the systems.

This cycle should be able to generating an employee information reports and employee earnings report.

2.1.4.4 Production Cycle

The goal of the Production Cycle is to assign costs to cost objects. However, most production cost systems do not allocate cost directly to the ultimate cost object. The nature of the manufacturing will decides which cost accumulation approach a company will use. There are three types of accumulation which is:- (1) Job order cost accumulation, (2) Process cost accumulation, (3) Hybrid cost accumulation.

Companies that produce a variety of products or provide a variety of services are using job order costing systems. This kind of company that makes one or only a few different products that is homogeneous in design and resource use. These companies do essentially the same things the same way every month. Operation costing is a blend of job order and process costing. Company that use operations costing have some costs that flow evenly and regularly into their products or services and other costs. The costs are varying significantly by job, customer or production batch. In production cycle, job cost report should be generated for management's use.

2.1.5 How Does It Work?

A scenario can be illustrated representing a real time event whereas an organization has product marketed as well as sold through either sales booth or store and simultaneously the product is also available via internet with the emergence of e-commerce. Means, electronics versions of office and other forms are required.

The organization through a very secure network will eventually link the booth or stores computer system together with the e-commerce on-line sales system and these system will eventually linked to the back end of the organization.

In this scenario, one would what is actually the backend of the organization. Well the backend of the organization in the context of E-Transaction is actually where the processing of the transaction takes place. An example can describe the occurrence of the events whereas when a potential buyer tends to buy a product be it from the sales store or through the products website, transaction details regarding the product as well as necessary information regarding the buyer such as payment method and others will eventually be sent to the backend of the organization via a secured network line.

At the backend of the organization accounting information system lies the main processing of these data. The information system will capture data and eventually process the information. The information process will eventually trigger other modules to perform their own functions as well as update the database and other information storage devices.

As a summary, we can say that E-Transaction can be described as an Accounting Information System which the difference lies in the ability of the particularly system to interact with other modules of the E-Office System. Modules from the front end with real time data capturing is able to handle communication with other backend system as well as administration modules at the same time. Besides that, the system must also have internet-based collaboration technology to make it easier to achieve the information effectively.

2.1.6 Compare the Traditional (Manual) Accounting System with the Computerized Accounting System

For almost half of the century, bookkeeping is the main method to record all the transactions being carried out by a company. The cost of gathering and storing information were very high. Recordings transaction s manually with pen and paper was a time consuming task. Besides that, manually written transaction might create inconsistence information to the records such as duplicate copy of a data.

Another disadvantage of manually recorded accounting systems is data redundancy. Each of the attributes (such as transaction date, name of the accounts and etc.) of a transaction had to be recorded more than once. By using automated accounting systems, user will only have record certain attributes which is important to the transaction and others redundant attributes will be linked to each of the transactions.

Generating reports is a challenge for an accountant. Through manual accounting systems, a company will have to stop its accounting cycle a month or two in order to close all its account and generate financial statement for the company's accounting period. This is a time consuming activities. Web-based accounting system will help the management to generate all the relevant reports in short time. Besides, user can generate their daily reports no matter where they are. This is because web-based accounting system provides an on-line access to help the user receive an immediate report for a critical decision-making.

2.1.7 Existing Accounting Software Reviews

2.1.7.1 AdaptAccount Reviews

AdaptAccount is stand-alone accounting software. This applies modern software technology to produce reliable application software systems. In overall, AdaptAccount has eleven modules listed below:

- System Manager
- General Ledger
- Accounts Receivable
- Accounts Payable
- Currency Manager
- Inventory
- Sales Orders
- Project / Job Costing
- Bill of Materials
- U.S Payroll

Characteristics of AdaptAccount are:

a) Supplier maintenance. Supplier maintenance supports defining default values to be used when inserting a new Supplier. These defaults are user-specific so a user can change their own defaults whenever they wish without affecting other users.

b) Customer maintenance. Customer maintenance supports defining default values to be used when inserting a new Customer. These defaults are user-specific so a user can change their own defaults whenever they wish without affecting other users.

c) Smart Account lookups. Account lookup shows only those Accounts that are eligible for Accounts Payable. This eliminates potential errors and speeds up browsing the lookup.

d) Flexible Supplier and Transaction views. The View Suppliers and Payables transaction s task supports viewing Suppliers with their aged balances and transactions and transaction details. The default for transactions is to show only those with Active (non-zero) balance is zero. Transaction details can display General Ledger distribution details or cash application details or Check details when applicable. Transactions and details can be displayed or not as you wish.

e) Cash Management reports. Listings of Invoices by Due Date by Supplier shows the details of who should be paid what when and the cash discount available if paid by the discount date. The Cash Requirements report summarizes these by Due Date by On Hold, Not on Hold and in Total.

f) Multi warehouse. Inventory supports any number of warehouses. The system provides On Hand quantity and monetary values by Warehouse. When Sales Orders is installed these values are provided by Warehouse for Sales Orders Allocated and Sales Back Orders. When Purchase Orders is installed these values are provided by Warehouse for Purchase Back Orders.

g) Unlimited Jobs, Costs centers, Projects and Cost Groups. Job Costing supports Estimated and Actual for Costs and Revenues for any number of Cost centers per Job. Projects can summarize any number of Jobs. Cost Groups can summarize any number of Cost centers.

Disadvantages of AdaptAccounts

Although AdaptAccounts provides multiple features to meet user requirements but there is a few disadvantages. Below are two of the disadvantages of AdaptAccounts:

a) AdaptAccounts does not contain any web functionality such as on-line assessment.

b) According to Figure 2-2 and Figure 2-3, the displayed interface seems complicated and cramps.

2.1.7.2 TimeLedger Reviews

Equative is a company which provides applications over the web. TimeLedger is a kind of accounting system services provided by the company. TimeLedger is the simple, easy-to-use time and expense tracking application delivered over the web.

TimeLedger requires no installation and no hardware and thus can be implemented in manner of days, while saving a company thousands in setup and support staff costs. TimeLedger offers functionality such as:

a) Customization

In addition, to TimeLedger's built in flexibility we offer several options for customization:

    i. Customized timesheets and expense reports.

    ii. Custom reports.

iii. Customized data tracking and company configurations.

iv. Custom integration with your Accounting, Project Management, HR and Payroll software.

b) Time Tracking

TimeLedger is the only easy to use online time tracking system that can have your entire organization up and running today.

i. Week View

The Week View is used to make multiple time entries, in a timesheet or spreadsheet style.

- Quickly Enter Time on Commonly Used Items

- Track Time on Customers, Projects, Activities

- Track Billable / Non-Billable Time

ii. Day View

The Day View is best for making entries for a single day or to enter detail.

- Start / Stop Timer

- User Customizable Fields

- Track Time on Customers, Projects, Activities

- Track Billable / Non-Billable Time

iii. Approvals

- Customizable Printable Timesheets

- Route Timesheets for Managerial Approval

- Easily View Status of Timesheets

- Company Definable Timesheet Periods

- Automatic Overdue Timesheet Reminders

c) Expense Tracking

i. Expanse Entry

Rapidly enter expenses in one common system.

- Integrate time and expenses for a complete picture of client / project profitability.

- Assign expenses by customer, project and category.

- Track Reimbursable Expenses.

ii. Expanse Reporting

- Customizable Printable Expense Reports.

- Many different options for summarizing expenses are available.

d) Reports

Years of time and expense tracking experience haven given us the knowledge of what reports really matter to you.

i. Online option for building your own reports with many different options.

ii. Crystal Reports.

iii. Thousands of reports, graphs, charts, etc all online

e) **Palm Pilot**

Mobile workers can track their time, expenses and mileage in the field and synchronize directly with TimeLedger.

i. Time Tracking

- Start / Stop Timer

- Track Time on Customers, Projects, Activities

- Track Billable / Non-Billable Time

ii. Expenses & Mileage Tracking

- Track Expenses by Customer, Project and Activity

- Track Mileage with just a few Taps

f) **Flexibility**

i. Flexible Terminology

- Name items using your organization's own vocabulary.

ii. Flexible Assignment Options

- Assign users only what they need to see.

- Assign Clients and Projects by User

g) **Integration**

i. Import / Export

Easily integrate your data with 3rd party applications

- All data available for export in many common formats.

- Several options for importing your data for easy account setup.

ii. QuickBooks

Use TimeLedger to maximize the effectiveness of QuickBooks.

- Collect time and expense in TimeLedger for export to QuickBooks.

- Synchronize users, jobs, service items between the applications.

- Manage billing, receivables and payroll from QuickBooks.

2.2 Database Review

More organizations are realizing the importance of data as a corporate of data as a corporate asset that must be managed properly. Because of this, the process or methods by which the data are collected, stored and retrieved or disseminated have undergone vast improvements in recent years. This eventually increases the focus on the value of data to the organization particularly those relevant to the management pr decision making process as well as long term strategic planning for the organization.

A database is an integrated collection of data, organized and stored in a manner that facilitates its easy retrieval. The structure of a database should corresponds to the need of the organization and should allow multiple or concurrent access to the database by multiple users and when appropriate for the use of more than one application. The concept of databases organizes data into a logical hierarchy based on the degree of data. This hierarchy consists of 4 elements which are:

- Database

- Files

- Records

- Data Elements

Although the data are organized within a common structure, the sources of the data collected may come from different sources. Data sources may come from different methods such as:

- **Internal data:** Data which originated from the organization itself such as daily transaction within the organization.

- **External data:** Data which is from the external source of the organization such as market research, census data and others.

In a business organization, transaction or interaction between the user and the database requires the existence and assistance of the Database Management System (DBMS).

2.2.1 Database Management System (DBMS)

The database is proceeding by the DBMS which is used by both the user and system developer. Both can access the DBMS directly or indirectly through application program.

A DBMS can be divided into 3 subsystems:

i) **Design Tools Subsystem:** Consists of a set of tools to facilitate the design and the creation of a database and its application. The tools are for creating tables, forms, queries and reports. DBMS also provide programming languages as well as graphical user interface such a macro language embedded in Microsoft Access.

ii) **Run Time Subsystem:** Process the application components which were developed using the design tools of the DBMS. An example is that Microsoft Access has a run time facility that processes the application forms as well as connecting the tables inside the database.

iii) **DBMS Engine:** An intermediary between the Design Tools Subsystem and the Run Time Subsystem. The DBMS receives the request of the 2 components and translates the requests into commands for further processing by the Operating System to read and write data on physical media.

2.2.2   Database Development Process

In order to build an effective database and related applications, development team must thoroughly understand the user requirement model. They must build data models that eventually identifies the data to be stored in the database and defines the relationship between the data.

There are 2 general strategies for developing a database which are:

i) **Top Down Development:** Proceeds from general to specific. Begins with the study of strategic goals of the organization. Then the development team works down towards more detailed description and the models describing the structure of the database.

ii) **Bottom Up Development:** Begin with the need to develop a specific system. The development process will eventually proceed with the team working upwards a more general context.

2.2.3 Evaluation of Current DBMS Products

2.2.3.1 Microsoft SQL Server 7.0

Microsoft SQL Server version 7.0 is a defining release for Microsoft's database products, building on the solid foundation established by SQL Server version 6.5. As the most robust database for the Windows Family, SQL Server is the Relational Database Management System (RDBMS) of choice for a broad spectrum of corporate customers and Independent Software Vendors (ISVs) building business applications. Customer needs and requirements have driven significant product innovations in ease of use, reliability and scalability and data warehousing. Below are design goals for Microsoft SQL Server 7.0. This client/server data-based system consists of the following:

i) **The server.** A collection of data items and supporting objects organized presented to facilitate services such as searching, sorting, recombining, retrieving, updating and analyzing data. The database consists of the physical storage of data and the database services. All data access occurs through the server; the physical data is never directly accessed.

ii) **The client.** A software program that might be used interactively by a person or that could be an automated process. This includes all software that interacts with the server, either requesting data from the databases or sending the data to the database.

iii) **The communication between the client and the server.** The communication between the client and the server is largely dependant on how the client and server are implemented. Both physical and logical levels of communications can be identified.

List below is some of the functionality provided by the SQL Server:

i) Ease of use – SQL Server is a very easy-to-use database platform. It provides a friendly user interface and graphical management tools which can be easily learned.

ii) Multiple client support – SQL Server supports all types of client applications. Tools such as Open Database Connectivity (ODBC) enables development of a custom application created.

iii) Data warehousing – SQL Server provides a way to handle a large quantities of data. This makes SQL Server a good choice for managing data warehouses.

2.2.3.2 Microsoft Access 2000 Review

Microsoft Access 2000 provides the ability to enable user who does not have the programming experience to create databases belong to them. Users were given the capability to create tables, fields and other functionality with the assistance of its wizard feature. This wizard will guide the user to use the functionality step by step. Microsoft Access 2000 also offers form which enables users to key in attributed into the table instead of writing commands in order to do so. Through the Access 2000, users were permitted to enter data into the tables from the use of the form.

Besides, users are permitted to enter data directly into the tables provided in the database. There is another way to enter the data into database. Importing external files which contains the data need to be entering into database is another way of storing the data.

2.3 Programming Language Review

2.3.1 Introduction

Programming language is a tool develops the accounting information system. There are various types of languages such as Visual Basic, Java and etc. In this section, a review has been done on Active Server Pages (ASP) and Java Servlet. This review is conducted to choose the most suitable to be use in developing the system. Others criteria such as development time, familiarity and resource availability should be take into account when choosing the system.

2.3.2 Active Server Pages (ASP)

Active Server Pages (ASP) is a technology to provide the capability for the web user to process application logic and then deliver standard HTML to the client browser. ASP supported HTML, client-side scripting, web controls and server-side processing and connectivity features. ASP script can pass the client-side scripts, such as VBScript and JavaScript, to be executed on the client's browser.

In addition, ASP not only produce dynamic HTML depending on the client request but also provide the capability to tap into existing systems such as databases, document retrieval services, mail servers, groupware servers and other COM-based information servers. With the wide range of functionality, ASP and the Information Internet Server (IIS) act as a medium for porting existing applications to-and building new applications for-the web.

In order to build an application on the web, this application will need to rely on database connectivity. Such connection will facilitated users with the data stored in a different geographical locations. ActiveX Database Objects (ADO) is a collection of objects that enable the application connect to the databases.

2.3.3 Java Servlet

The rise of server of server-side Java applications is one of the latest and most exciting trends in Java Programming. The Java language was originally intended for use in small embedded device. Java Servlet is a key component of Server-Side Java development.

A servlet is a generic server extension – a Java class that can be loaded dynamically to expand functionality of a server. Servlets are commonly used with web servers, where they can take the place of CGI Scripts. A servlet is similar to a proprietary server extension, except that it runs inside a Java Virtual Machine (JVM) on the server (see Figure 2-2). So it is safe and portable. Servlets operate solely within the domain of the server: unlike applets, they do not require support for Java in the web browser.

Unlike CGI and fast CGI, which use multiple process to handle separate programs and / or separate request, servlets are all handled by separate threads within the web server process. This means that servlets are also efficient and scalable. Because servlet run within the web server, they can interact very closely with the server to do things that are not possible with CGI Scripts. Another advantage of servlets is that they are portable: both across operating systems as we are used to with Java and also web servers.
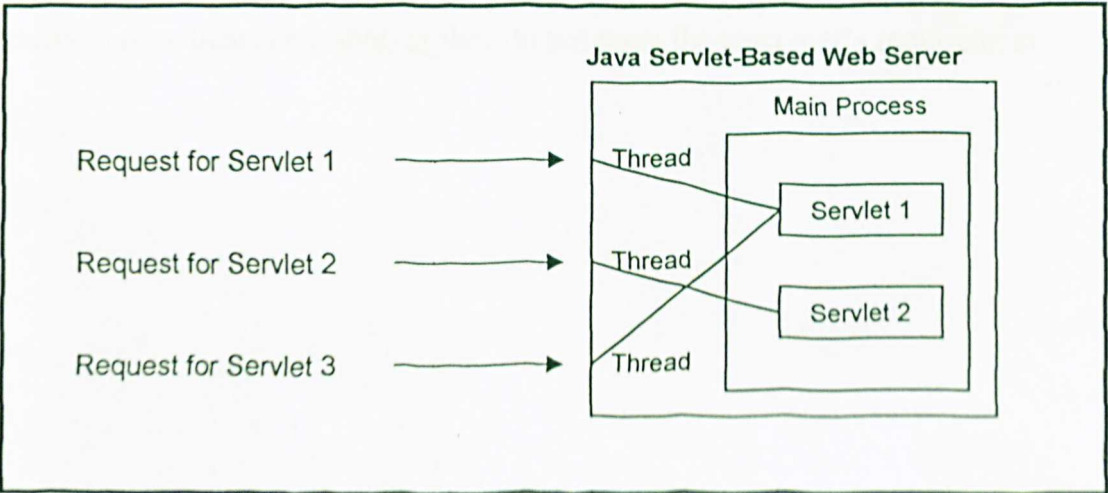

Figure 2-2   Java Servlet Environment

2.4 Methodology Review

In this section, reviews on the methodologies had been conducted. There are 4 methodologies being conducted in this review which are the Waterfall, Prototyping, Waterfall with Prototyping and V Model.

2.4.1 Waterfall Model

The advantages of using waterfall model are:

- It is useful in helping system designer to lay out what he/she needs to do in the project. This model presents a very high level view of what goes on during development.
- It suggest the sequence of events that system designer should expect to encounter.

While the advantage of using this development model is:

- It does not reflect the way code is really developed except for very well understood problems. A system is usually developed with a great deal of iteration.

Conclusion: Inflexible partitioning of the project into these distinct stages. System received sometimes unusable, as they do not meet the customer's requirement.

2.4.2 V Model

The advantages of using V Model are:

- It is useful to ensure that all aspects of the program design have been implemented correctly because the problems are found during verification and validation.

The disadvantage here is:

- It makes more explicit some of the iteration and rework that are hidden in the waterfall depiction.

Conclusion: V model is more to activity and correctness and may need more time to spend off.

2.4.3 Prototyping Model

The superior of the prototyping model is:

- It is an approach where a simple running program will be developed first, modified and changed to suit the objective and target.

Although, the feature that not suitable for the project is:

- It is more suitable for the system, which is needed to be developed and use urgently.

Conclusion: Problem with prototyping model is in planning, costing & estimating a project. Although the project can be developed faster, but it is outside of the system developer' experience.

2.4.4 Waterfall Model with Prototyping

The advantages of using waterfall model with prototyping method compared to other models are:

- Better solution for the problem that occurs on the waterfall model and the prototyping model.

- Validation and verification are enabled. Validation will ensures that the system has implemented all the requirements, so that each system's function can be traced back to a particular requirement in the specification.

Conclusion: It allows developer to manipulate the advantage of other models while minimize the disadvantages.

CHAPTER 3:
METHODOLOGY

CHAPTER 3: METHODOLOGY

3.1 The System Development Methodology

This chapter explains the research approaches taken during the system development. It also discusses the system development life cycle chosen to complete the system.

Systems development methodology is a standard process followed in an organization to conduct all the steps necessary to analyze, design, implement and maintain information systems. In general, a standard systems development methodology is divided into a few major phases which is:

3.1.1 Project identification and selection

This is the first phase of the system development. In this phase, organization's information system needs are identified, analyzed, prioritized and arranged. Organization will determines whether or not resources should be devoted to the development or enhancement of each information system under consideration.

3.1.2 Project initiation and planning

There are two major activities in this phase which is investigation of the system problem or opportunity at hand and the presentation of reasons why the system should or should not be developed by the organization. A critical step at this point is to determine the scope of the proposed system.

3.1.3 Analysis

This is a critical phase and the success of a system is mainly depends on this phase. The main purpose of this phase is to understand the proposed system according to users requirements.(Gordon,1995).

In this phase, organization's procedures and the information systems used to perform organizational task will be studies thoroughly. Analysis has several sub-phases which are requirements determination, organized requirements based on their criticality and plan to acquire any hardware and system software necessary to build and operate the system as proposed.

3.1.4 System design

The design phase is where identified requirements are translated to system representative. Collected information will be used to develop system's logical design. (Kendall, 1998)

System design will map all the description of the requirement solutions into logical design and then physical system specification. Logical design provides a conceptual model of the systems while the physical design will provides the technical specification of the system.

3.1.5 Coding

This is the phase which translation and implementation of system's design representative to programming syntax took place. (Kendall, 1998)

3.1.6   Testing

This is an important phase to ensure the quality of the system that will be developed is satisfying the user's requirements, and efficiently functional. The specification, design and system coding will be reexamined. This is where the verification and validation process will be done. This phase is considered success when the system functions well. (Kendall, 1998)

3.1.7   Implementation

In this implementation phase, physical design will be converted from system specifications to the working system that is tested and put into use.

The developed system will be implemented in hardware and software environment that will be used. The whole system will be tested to ensure the system run without error. (Kendall, 1998)

3.1.8   Maintenance

The final phase is maintenance. This is the final phase of the system development process. In this phase, system will be repaired if an error occurs or the system still be improved to provide more functionality to suit the user's need. The maintenance of the system will be done constantly. Observations and modification will be done currently to ensure the developed system really satisfying. (Kendall, 1998)

3.2 System Development Life Cycle

The waterfall model with prototyping has been chosen as the development process model to complete this system. Discussion on three others models; the waterfall model and the prototyping model, was discussed in last chapter.
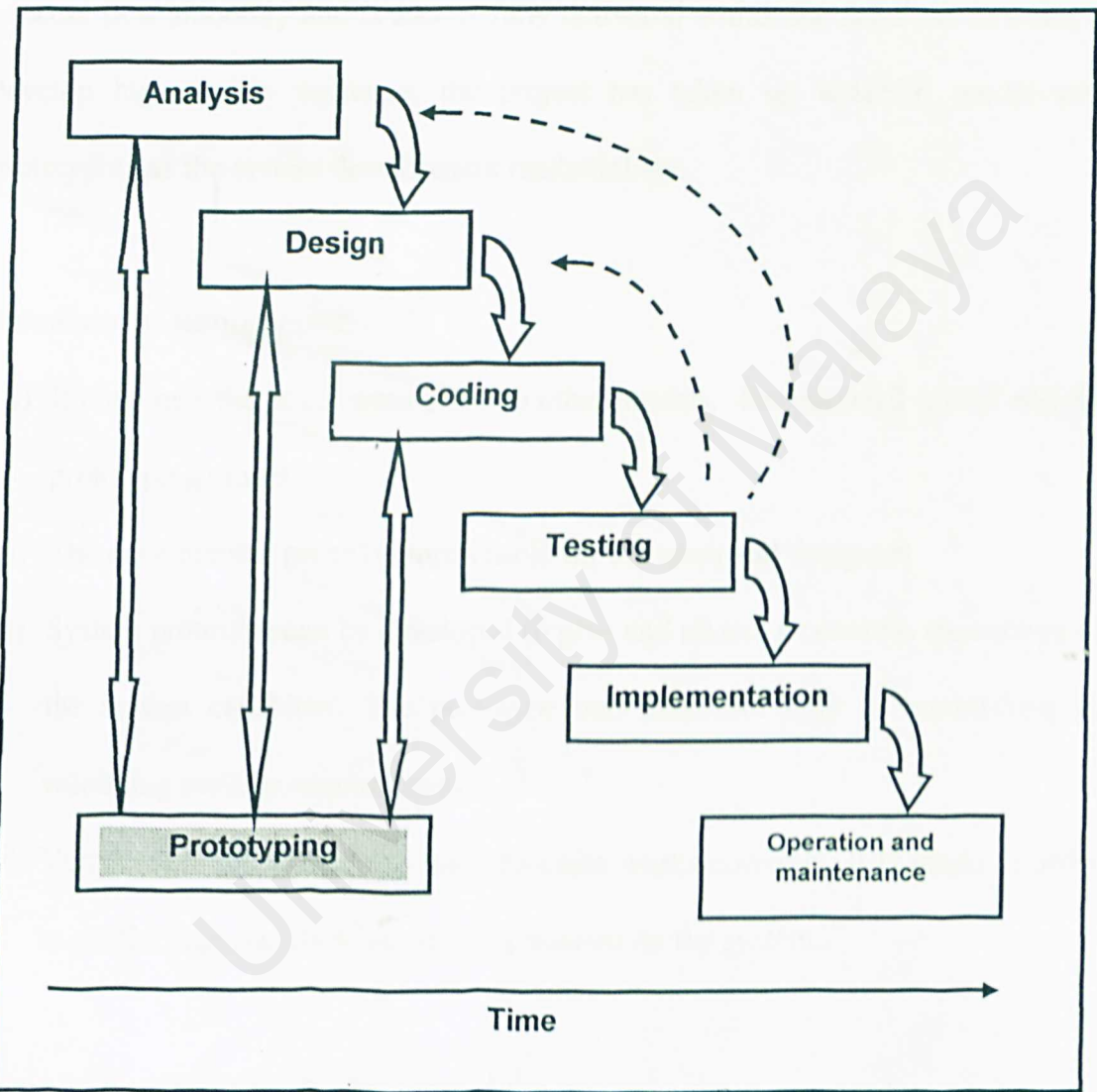

Figure 3-1   Waterfall model with prototyping

3.3 Justification in choosing the waterfall model with prototyping as the system development methodology.

A good software life cycle model is at the rest of all the quality features of the production process. Suitable software life cycle will help to ensure the development process flow smoothly and is successfully delivered within the deadline. In order to develop high quality software, the project has taken up waterfall model with prototyping as the system development methodology.

Below are the justifications:

i) It combines the advantages of some other models, the waterfall model and the prototyping model

ii) The development process more visible for the users and designers.

iii) System prototype can be developed to give end udders a concrete impression of the system capability. The prototype may therefore help in establishing & validating systems requirements.

iv) Verification will ensure that each function works correctly. It is made in order to get the high quality of the implementation on the system.

3.4 Technique Used for Problem Solving

In this section, various techniques will be explained to provide an in-depth knowledge of the system development. Each of the techniques will be use in different phases of the software development process. Table 3-1 will show a list of the techniques used in the software development respectively.

Table 3-1   List of techniques used in the system development

Phases	Techniques
Capturing requirements	1) Interviews with the potential users 2) Brainstorming 3) Observations 4) Analyzing documents
Modeling system processes	1) Data flow diagram (DFD)
Modeling data	1) Entity-Relationship (ER) modeling

3.4.1   Capturing Requirements

All of the software development process begins with the analyzing of the systems requirements. Requirements arise when there is recognition that a problem exists and requires a solution or new software arises. It is important to obtain enough information and choose a suitable analysis method to analyze the requirements.

This is because detecting and repairing an error during the requirements stage is much faster compare to the maintenance stage. In order to gather the information, various techniques has been used such as brainstorming, interviews with stake holders of the systems, observing the entire operation carried out by the firm and reviews on the existing software.

3.4.1.1 Interviews with the potential user

Interview is one of the methods being carried out to gather information from the potential user of the system. Those who attend the interviewed have been divided into two categories which are internal users and external users. Managers

43

and staff of the companies are included in the internal user while others such as supplier and end user are included in the external user. Below is a list of question which used to gain users information.

- What kind of information needed to be stored in the database of the companies?
- What kind of reports needed by the companies?
- What is the layout of the reports?
- Which kind of the interface that most of the user preferred?

3.4.1.2 Brainstorming

Brainstorming is where the discussion on the project takes place. Various parties have been invited into the brainstorming activities such as the supervisor. With the help from the supervisor and the user, various issues have been discussed. Below is some of the issue which is being discussed in the brainstorming activities.

- What kind of functionality for an accounting system to provide?
- What kind of the interfaces should be provided to the users?
- Should the development of this system based on real-time systems?
- From the discussion, quite a number of functionality design being created to satisfy the user's needs.

3.4.1.3 Observation

Observation the accounting activities of an organization are one of the methods to gain useful information. This is because some of the user's information contains doubt and this will make information harder to interpret. To

clarify this kind of information, observation of the operation should be made. Beside, understanding the accounting operations is the key to develop high quality systems.

3.4.1.4 Analyzing Documents

Analyzing documents provide the enhancement of the system requirements. Through this technique, more details about the organizations and the current system used by them can be discovered. In this document, information such as below can be discovered:

- Problem with the existing system.

- Opportunities to meet new needs if only certain information or information processing were available.

- Special information processing circumstances that occur irregularly that may not be identified by any other requirements determination technique.

- Data, rules for processing data and principles by which the organization operates that must be enforced by the information system.

3.4.2 Modeling System Processes

Process modeling involves graphically representing the functions, or processes which capture, manipulate, store and distribute data between a system and its environment and between components within system. Tools such as Data Flow Diagrams (DFD) used to represent the information or the requirements gathered from the user as part of the requirements determination.

3.4.2.1 Data Flow Diagrams (DFD)

Data flow diagrams (DFD) helps to model how the data flow through the accounting information system proposed in this project. It provides us with the understanding of the relationships of the data flows and how data come too be stored at the specific locations. DFD also show the process that change and transform data. Because DFD concentrate on the movement of data between processes, these diagrams are called process models. DFD consists of four symbols.

The symbols are used to represent:

- Entity or environmental elements in which system interfaces
- Processes
- Data flow
- Storage of data

Table 3-2   Symbols of DFD

Symbol	Use	Description
	External Entity	Source or destination of data that is external to the system
	Process	Manual or computer process that changes data. In the following text a circle is used to indicate a process
	Data flow	Data transfer in the direction indicated by the arrow. Each arrow should be labeled to indicate what data is being transferred
	Data store	Manual or computer storage of data

3.4.3   Modeling Data

DFD, which has been explained in the previous section, show how, where and when data are used or changed in the accounting information system, but this technique do not show the definition, structure and relationship within data. Data modeling develops this missing and crucial, piece of the description of an information system.

Data model is the most important part of defining the system requirements. This is because:

i)   The characteristic of data captured during data modeling are crucial in the design of database, programs, user interfaces and printed reports.

ii)   Data rather than processes are the most complex aspects of the systems and hence require a central role in structuring system requirements.

iii)   The characteristics about data (such as length, format and relationships with other data) are reasonably permanent. In contrast, the path of data flow is quite dynamic

In this development, Entity-Relationship (E-R) modeling will be used.

3.4.3.1 Entity-Relationship (E-R) Modeling

Data modeling using the E-R notations explains the characteristics and structure of data independent of how the data may be stored. E-R notations will be used to develop a data model with very broad categories of data. During the definition of the project, a specific E-R model is built to help explain the scope of the system.

During requirements structuring, an E-R model represent conceptual data requirements for the system. Then, after system inputs and outputs are fully described during the logical design, the conceptual E-R data model is refined before it is translated into a logical format (typically a relational data model) from which database definition and physical database design are done.

CHAPTER 4:

SYSTEM ANALYSIS

CHAPTER 4: SYSTEM ANALYSIS

4.1 System Requirement Definition

The E-Transaction proposed in this proposal is to fulfill user's needs. Requirement definition document is a document containing all the user's expectations on the system capabilities. This document is written in terms that the user can understand. In this stage, requirements might be added or reduced depending on the capability of accomplishing the requirements within the deadline. Below is the requirement of the system that was successfully elicited through the requirement capturing process:

4.1.1 This system should be able to stores the clients' and vendors' information.

4.1.2 This system should be able to record transactions being carried out by the company and categorizes to specific type such as asset, modal, sales, expenses or etc.

4.1.3 This system should be able to generate multi-type report in order to satisfy the management's information needs.

4.1.4 This system should be able to make sure only authorized person can achieve some information.

4.2 Functional Requirements

Functional requirement describes the complete external characteristics of the system to be designed which operates in the environment explained in the

requirement document. Below is a list of the functional requirements for the accounting system:

4.2.1 Clients and vendors will be created in the setup module before recording any transactions involving them.

4.2.2 There will be separated module to handle sales and purchases transactions.

4.2.3 Reporting module will facilitate the users to generate reports required by the management.

4.2.4 Security module will be provided to maintain classifications of the organization's data.

4.3 Non-Functional Requirements

Non-Functional Requirements can be described as restrictions or constraints where the system must operate to a certain degree of standard of operation. Listed below are the non-functional requirements of the system:

4.3.1 **Reliability.** System, in which output information with high credibility and accuracy is said to be reliable. A high reliability system will convince user on the capabilities of the system to perform up to their expectations as well as providing error-handling capability.

4.3.2 **Maintainability.** Maintainability refers to the flexibility to change in order to cope or to adapt to a changing environment. Systems with high maintainability will provide an easy way for modifications or corrective

action being taken on the system. Beside, a maintainable system can operate in other platform differ from the original platform.

4.3.3 **User Friendly.** System, in which provide the easiness to learn and to use by the users is said to be user friendly. In order to provide easy learning software to the users, Graphical User Interface (GUI) should be adopted in designing the system's user interface. This is because GUI provides a high understandability to the user through the use of icon and images. A true user friendly interface will have the elements in the interface being ordered in a consistent manner.

4.3.4 **Response Time.** The response time to retrieve the search results must be within a reasonable interval time. Information should be available to users at any point of time.

4.4 Hardware and Software

4.4.1 Hardware Requirements

The hardware configuration based on multi platform capabilities and information system architecture. The servers shall support reliable network communications and protocol. It has the capability to easily upgrade processor performance or to add additional processors, disk storage and communication supports.

To have better performance of this system, the user's computer system should have the following basic requirements as listed below:

- Intel Pentium 133 MHz and above

- 64 MB RAM and above

- 2 GB hard disk with a minimum of 650 MB of free space PS/2 keyboard

4.4.2 Software Requirements

Software solutions are to address data exchange requirements to handle data types. It also has universal extensibility, portable codes and case tools. In order to host and run the full of this E-Office system, the user's computer system must have one major operating system and two supporting software as listed below:

Table 4-1   Software Requirements

Description	Technologies/ Software
Operating System/ Platform	Windows XP Professional
Web server software	Internet Information System 5.0 (IIS)
Server scripting engine	Active Server Pages (ASP)
Database server	Microsoft SQL Server 7.0
Scripting language	VBScript, JavaScript
Web browser	Internet Explorer 5.0
Web development tool	Microsoft Visual Interdev

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Database server	Microsoft SQL Server 7.0
Scripting language	VBScript, JavaScript
Web browser	Internet Explorer 5.0
Web development tool	Microsoft Visual Interdev

CHAPTER 5:

SYSTEM DESIGN

CHAPTER 5: SYSTEM DESIGN

5.1 Overview

Design specification of the transaction information system will be layout in this chapter. For this project, process designing the system will be divided into 3 categories which are:

- System architecture design
- Database design
- User Interface Design

Active Server Pages (ASP) will be used as the programming language to develop the system. For database management system, Microsoft SQL Server 7.0 will be use to handle the database management for this system. The designation of this system will be based on this two development tools.

5.2 Structural Hierarchy of E-Financial – E-Transaction System
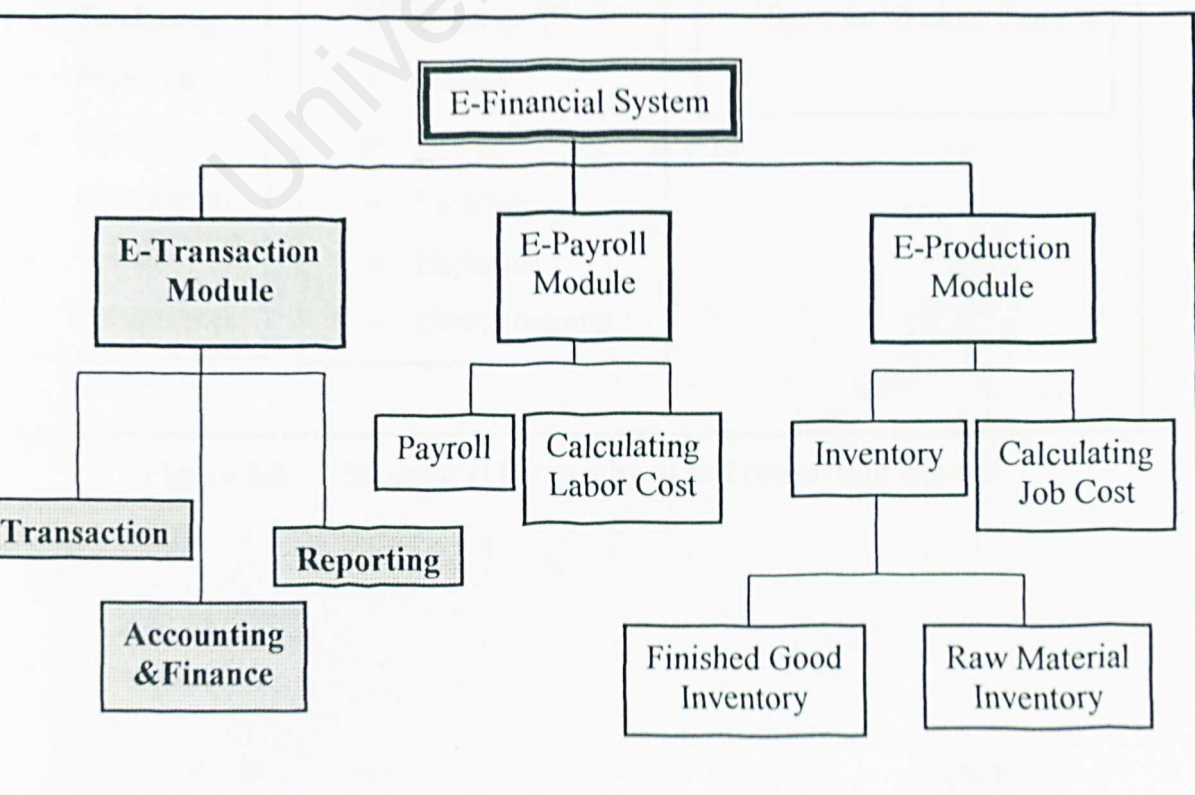

Figure 5-1   Structural Hierarchy of Accounting Information System   53

According to Figure 5-1, E-Transaction is a part of E-Financial. E-Financial is divided into 3 categories such as E-Transaction itself, E-Payroll Module and E-Production Module. Each of the modules has its own functionality to meet the user requirements.

Then E-Transaction is subdivided into sub-module such as Transaction, Accounting & Finance and Reporting. Figure 5-2 below is showing the contents in each module.

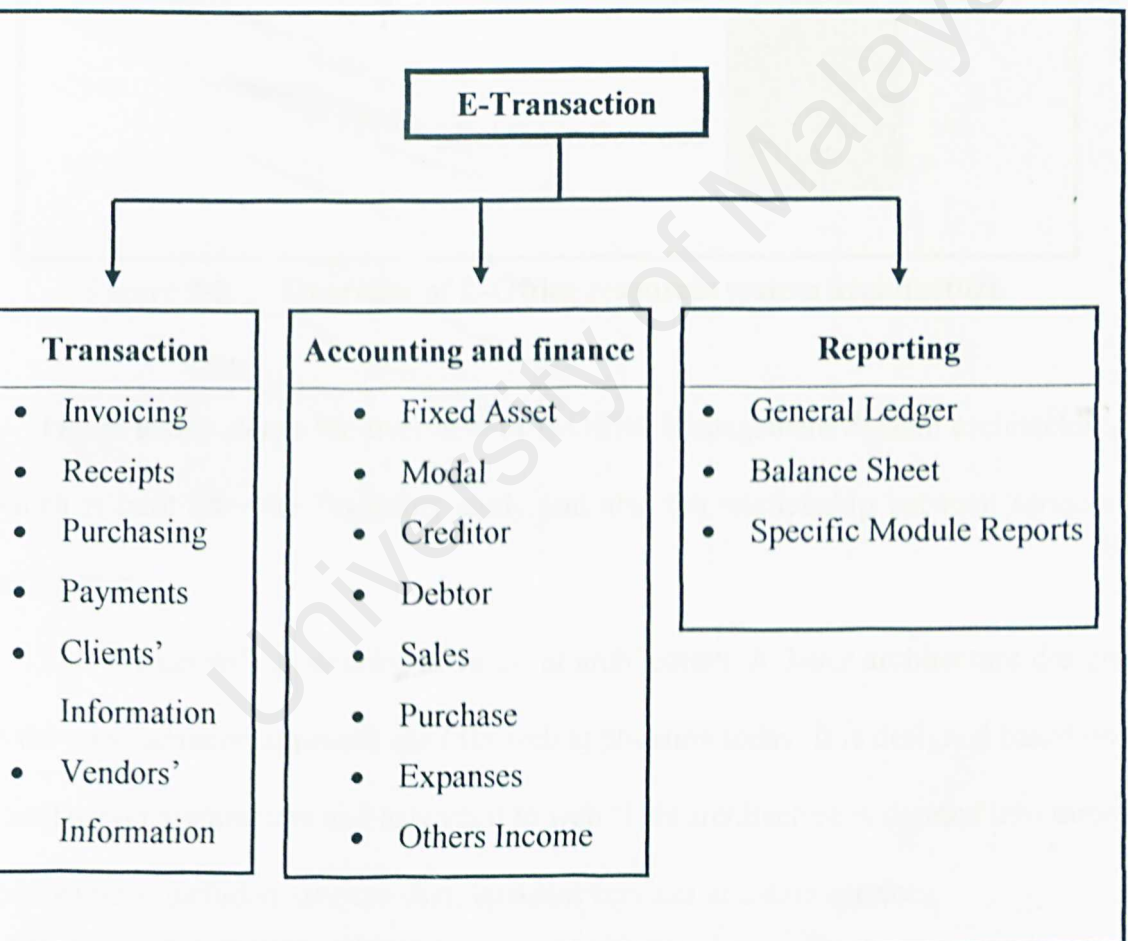| Transaction	Accounting and finance	Reporting
• Invoicing	• Fixed Asset	• General Ledger
• Receipts	• Modal	• Balance Sheet
• Purchasing	• Creditor	• Specific Module Reports
• Payments	• Debtor	
• Clients' Information	• Sales	
• Vendors' Information	• Purchase	
	• Expanses	
	• Others Income	

Figure 5-2   Structural Hierarchy of E-Transaction Module
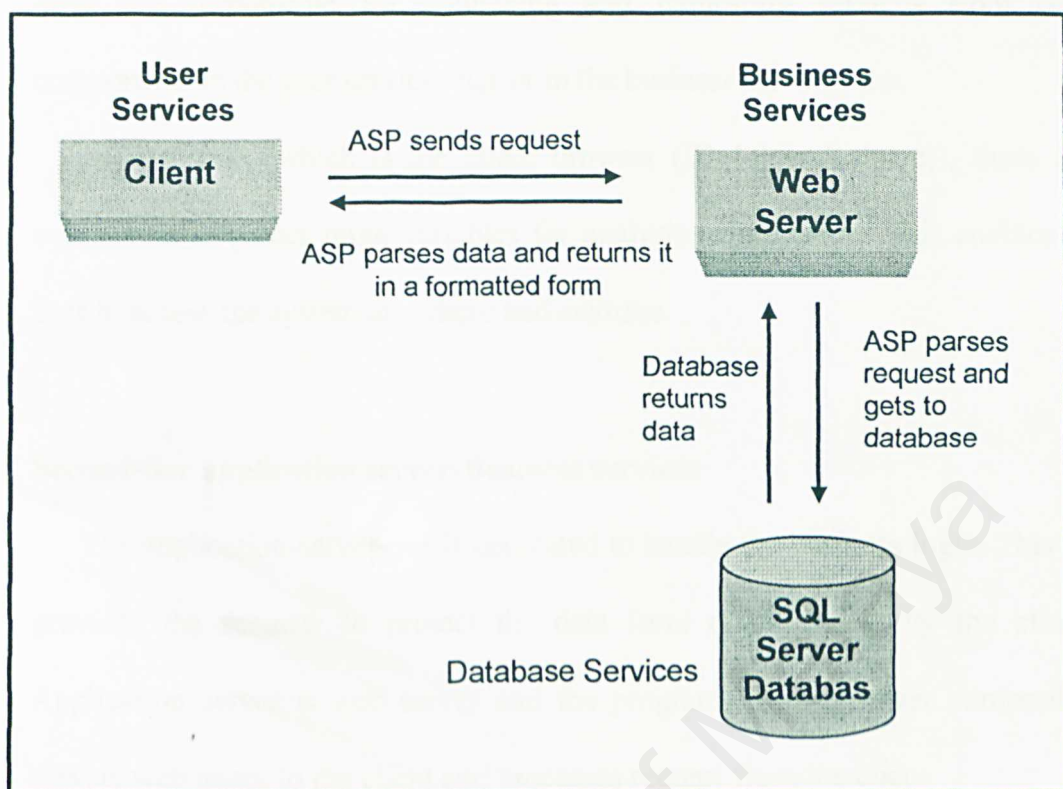
5.3 System Architecture Design

Figure 5-3   Overview of E-Office resources system architecture

Figure above shows the overview of E-Office Management System architecture, which is built after the feasibility study and also the relationship between services and system.

This system will be developed on 3-tier architecture. A 3-tier architecture design is the most common approach used for web application today. It is designed based on client-server architecture and extends it to web. This architecture is divided into three distinct tiers, included services-user, business services and data services.

Each of these services is used in the creation of system solution:

- **First tier-client-User services**

    This tier is responsible for the presentation of data, receiving user events and controlling the user interface. Components in the user services tier provide the

visual interface that a client will use to view info and data. Components in this layer are responsible for contacting and requesting services from other components in the user services tier or in the business services tier.

In this level (which is the client browser (IE 4.0 and above)), there is a component to gather input variables for analysis to the client. This enables the user to access the system anywhere and anytime.

- **Second-tier application server-Business services**

  The application-server-tier is dedicated to handle the business logic. This tier provides the security to protect the data from direct access by the clients. Application server is web server and the program. Active Server components servers web pages to the client and processes request from the client.

  At business services tier, there is an engine that performs the analysis. This tier resides on the machine naming Internet Information Server (IIS). Request and response are controlled by million codes specifying its business rules. Both clients coordinate these rules and server side script, such as exists in an ASP document.

Third tier-data server

This tier is responsible for data storage. In this system development Microsoft SQL Server will be used as a Data-Server-Tier to manage the database systems. At the data services level, a repository of relevant data stored in the Microsoft SQL server 7.0. Database is available to support the work performed by the analysis engine.

56

5.3.1 The advantage for this architecture is:

1) Simplified application maintenance, as a result of centralizing the business logic for many end-users into a single application server.

2) Added modularity, which makes it easier to modify or replace on tier- without affecting the other tiers.

3) Business processes run on the server which provides a higher security capabilities compared to the client side. This makes data protection and security is simpler to obtain.

4) Dynamic load balancing: if bottlenecks in term of performance occur, the server process can be moved to other tiers.

5) Clear separation of user-interface-control and data presentation from application logic. Through this separation more clients are able to have access to a wide variety of server applications. The two main advantages for client-applications are clear: quicker development through the reuse of pre built business logic components and a shorter test phase, because logic components and shorter test phase, because the server components have already been tested.

It is an online Internet based application that provides info and implements the task of info management in WWW. It is user-friendly system and designed to appeal and generate strong levels of interaction and the administrators of each module in e-office.

5.4 Database Design

Accounting Information System proposed in this proposal will be using Microsoft SQL Server as the database management system. There are 3 steps in order to develop the database which include identified the data flow, data modeling and table design.

5.4.1   Identify Data Flow

Before creating any database for the system, the flow of the data in a company should be recognized first. Below is a number of data flow diagrams created to help in the development of the database. These diagrams give the developers the whole picture of the database in terms of how each of the modules passing data among themselves.
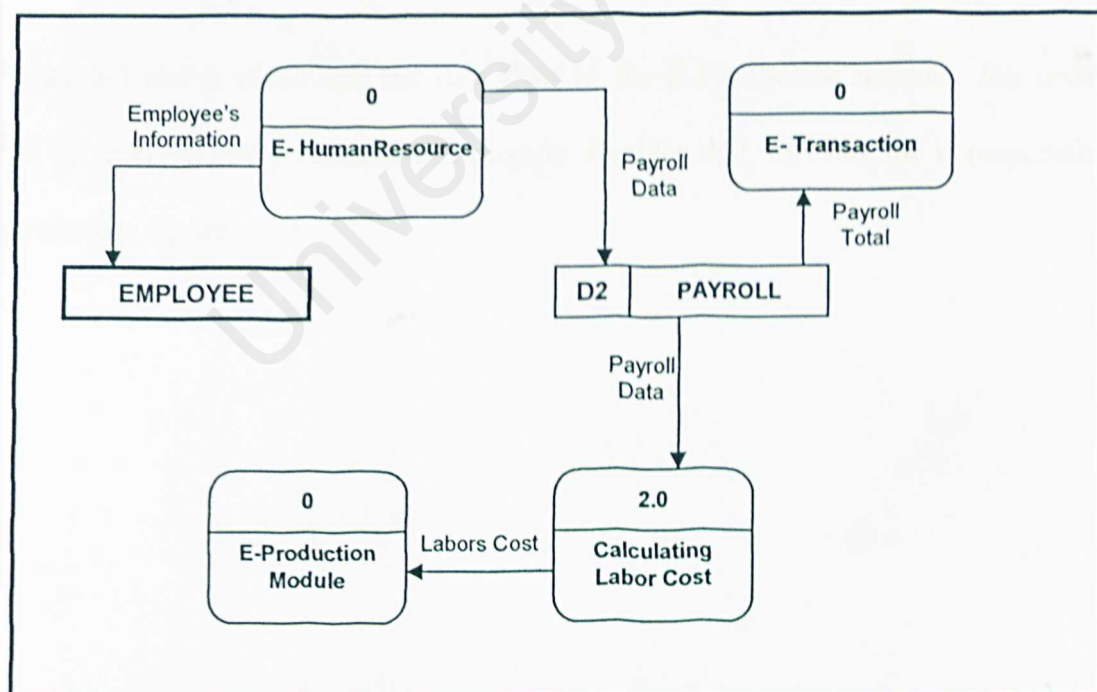

Figure 5-4   E-Payroll Module

Data flow for E-Payroll Module is shown in Figure 5-4. All of the employee information will be requested from E-HumanResource. Salary payments will be made according to the employees. Payroll data will be past to the Calculating Labor Cost Module to calculate the labors cost in order to determine the product cost.
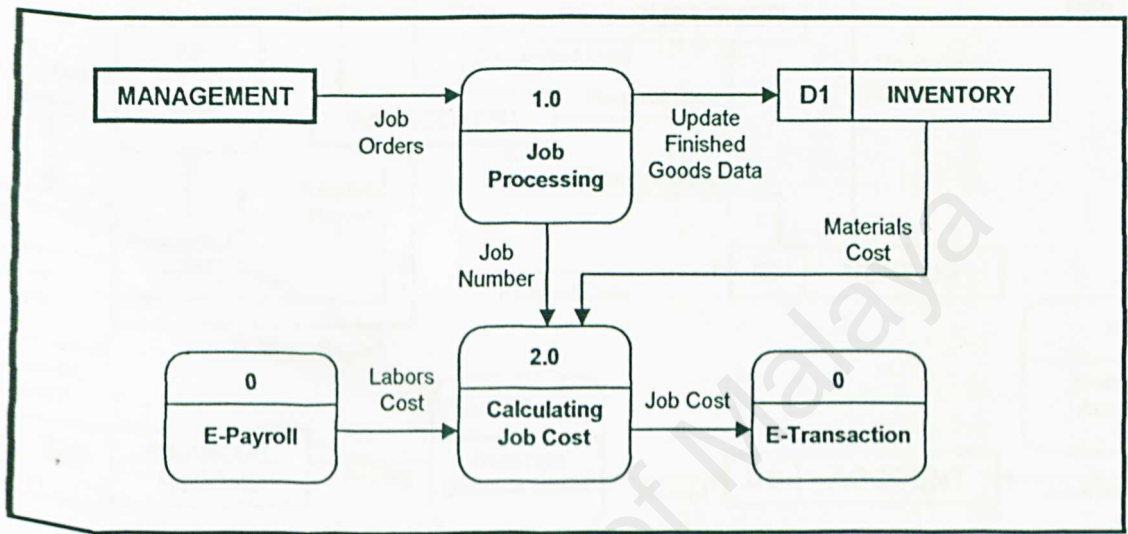

Figure 5-5   E-Production Module

Figure 5-5 above illustrated the data flow in the E-Production module. Job orders will be received and process in this module. Besides that, this module is responsible to calculate the job cost.
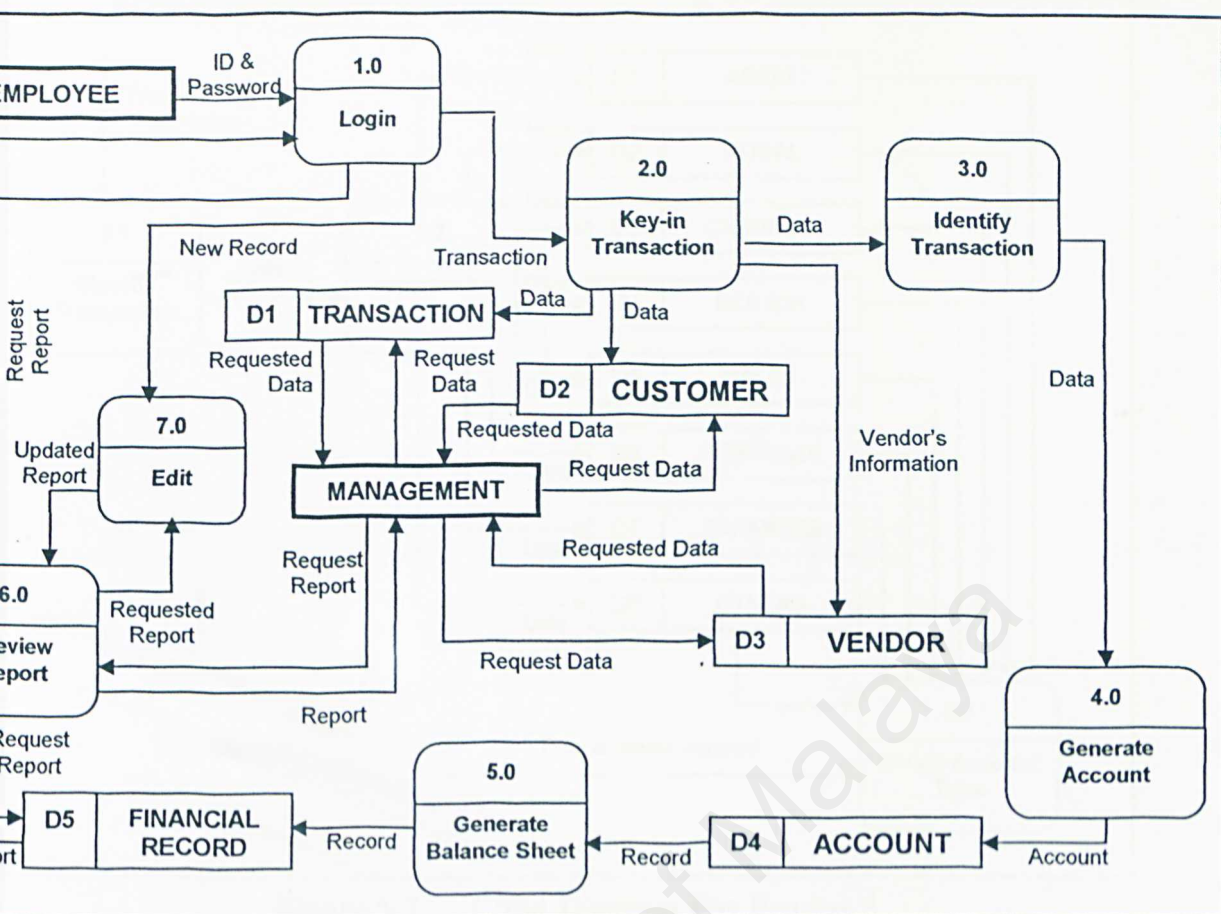
EMPLOYEE   ID & Password   1.0 Login

New Record   Transaction   2.0 Key-in Transaction   Data   3.0 Identify Transaction

Request Report

D1 TRANSACTION   Data   Data

Requested Data   Request Data   D2 CUSTOMER   Data

Updated Report   7.0 Edit   Requested Data   Request Data

MANAGEMENT   Vendor's Information

Request Report   Requested Data

6.0 Review Report   Requested Report   D3 VENDOR

Request Data   Report

4.0 Generate Account

Request Report   5.0 Generate Balance Sheet   Data

D5 FINANCIAL RECORD   Record   Record   D4 ACCOUNT   Account

Figure 5-6   Data Flow Diagram for the E-Transaction System

Figure 5-6 illustrated the entire data flow of the E-Transaction System. It provides the information on the sales transaction processes which begin with input from the staffs and end with preparing reports to the managers.

All the transactions details carried out by the companies will be edited and entry into 3 type of database which is Transaction, Customer and Vendor. Then, each transaction will be identified and classified in different type of account and then post to the Account database. From the database, balance sheet will be generated and will be recorded in Financial Record database. Finally, manager can get reports weather from preview report of financial record or directly with others database.
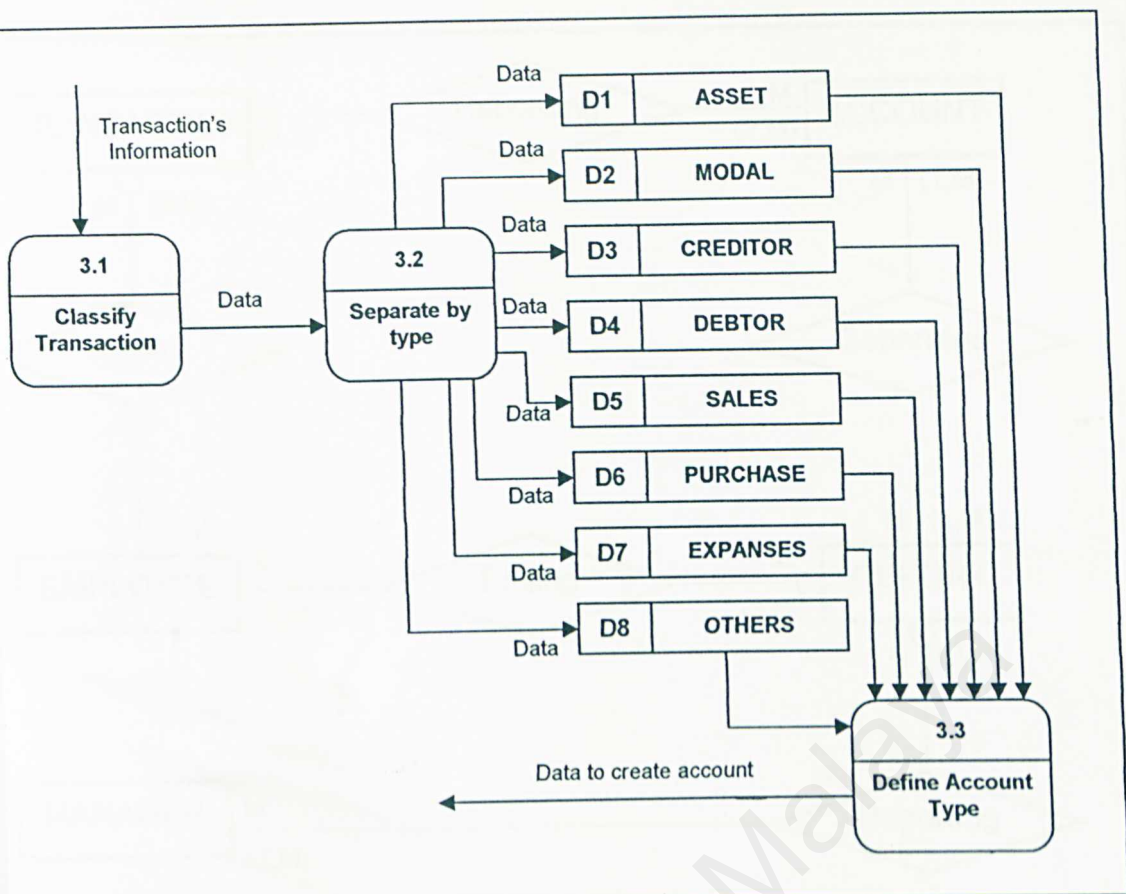
Figure 5-7   Child Diagram For Process 3

5.4.2 Data Modeling

The main objectives of data modeling is to allow for a complete, formal and understandable description that would be useful for a large category of data from the Boolean to relations and is efficient to describe only the semantics and not the implementation.

Figure 5-8 shows the data modeling in an E-R diagram for the revenue module of he system. This model contains 5 entities which are: TRANSACTION, ACCOUNT, EMPLOYEE, REPORT and MANAGER.
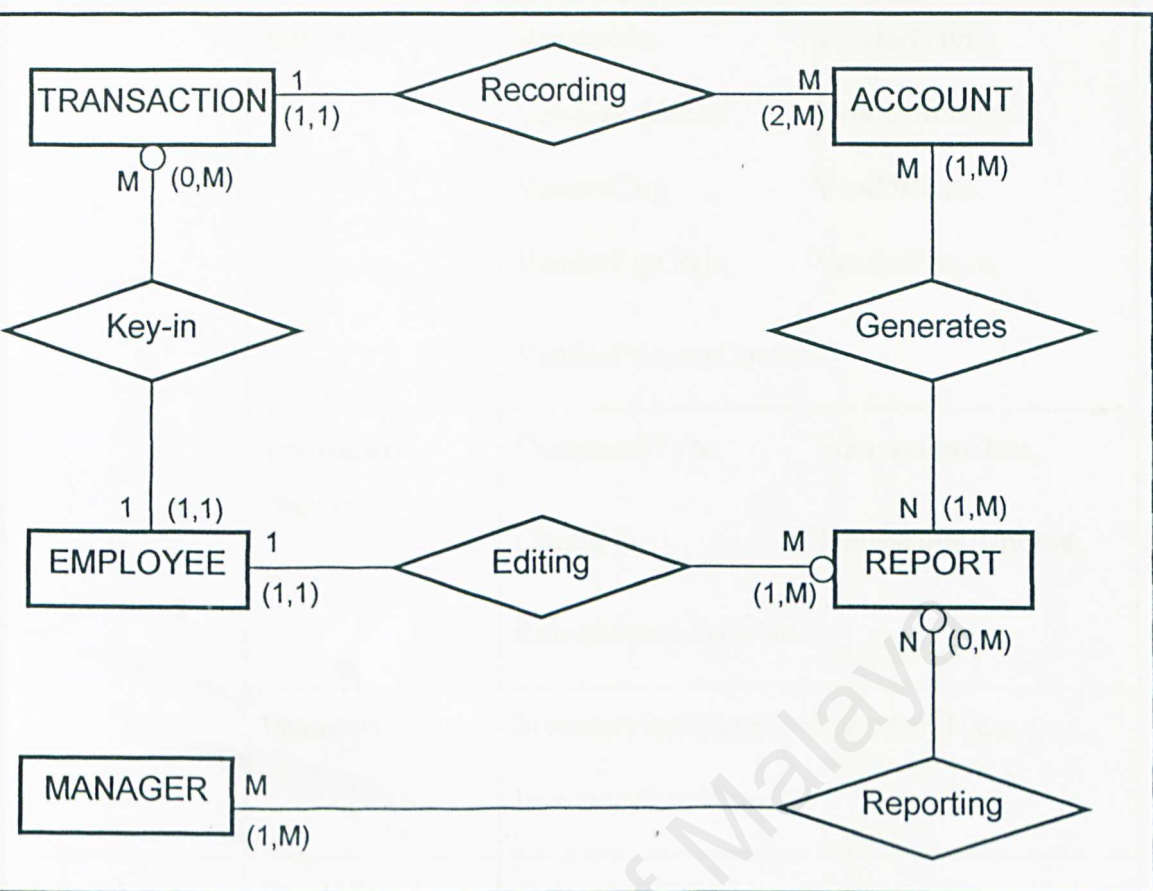
Figure 5-8   Entity Relationships diagram for E-Transaction

5.4.3   Table Design

After identifying the data flow and created the data model, the third step is to create the table and normalize them in order to prevent data redundancy. Table 5-1 shows the field name used to store data in each of the table.

Table 5-1   A list of fields used in the tables

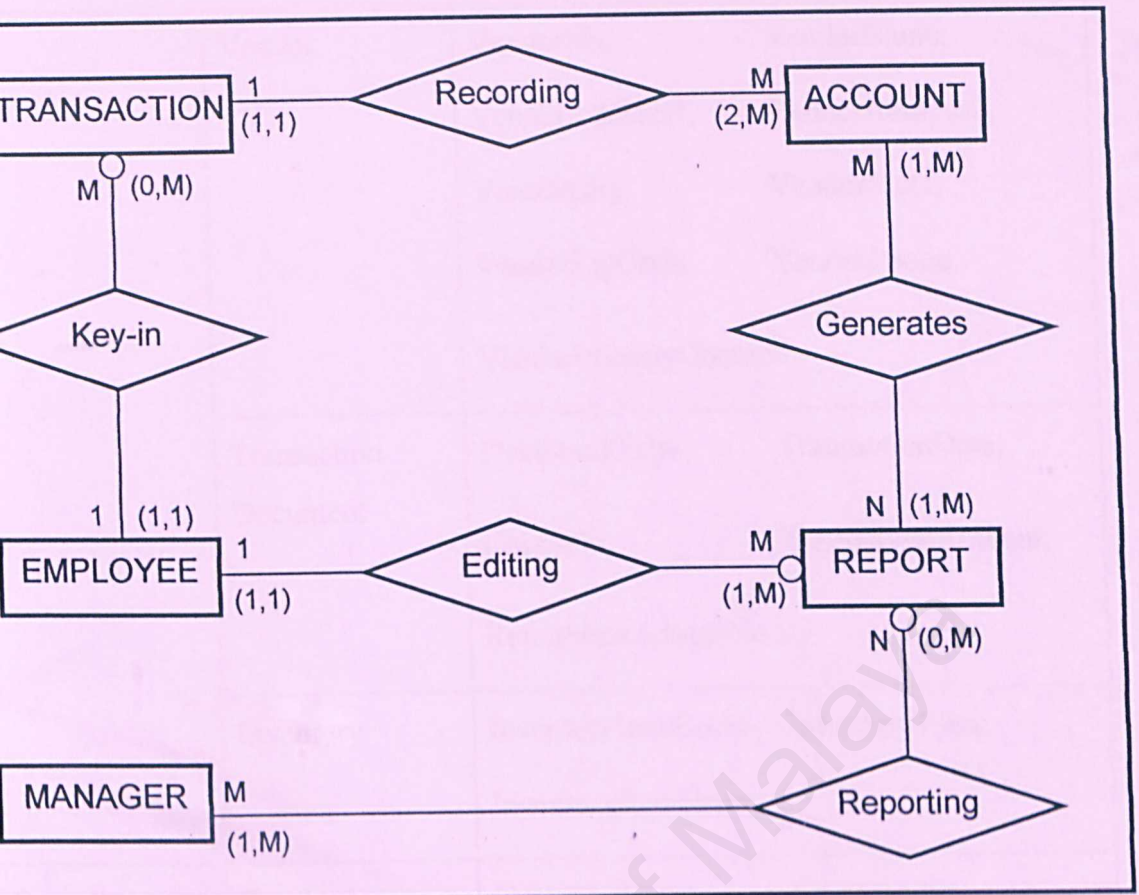| Module	Table	Field Name	
E-Transaction	Customer	CustomerNo,	CustomerName,
		CustomerAddress1,	CustomerAddress2,
		CustomerCity,	CustomerState,
		CustomerZipCode,	CustomerPhone

Figure 5-8   Entity Relationships diagram for E-Transaction

5.4.3   Table Design

After identifying the data flow and created the data model, the third step is to create the table and normalize them in order to prevent data redundancy. Table 5-1 shows the field name used to store data in each of the table.

Table 5-1   A list of fields used in the tables

Module	Table	Field Name	
E-Transaction	Customer	CustomerNo,	CustomerName,
		CustomerAddress1,	CustomerAddress2,
		CustomerCity,	CustomerState,
		CustomerZipCode,	CustomerPhone

	Vendor	VendorNo, VendorName, VendorAddress1, VendorAddress2, VendorCity, VendorState, VendorZipCode, VendorPhone, VendorPrimaryContact
	Transaction Document	DocumentType, TransactionDate, CheckNo, TransactionAmount, RemittanceAdviceNo
	Inventory	InventoryItemCode, InventoryType, InventoryItemName
E-Payroll	Employee	CustomerName, CustomerNo, CustomerAddress2, CustomerAddress1, CustomerState, CustomerCity, CustomerPhone, CustomerZipCode, EmployeeStartDate, EmployeeDepartment, EmployeePayrate, EmployeeMaritalStatus
	Department	DepartmentNo, DepartmentDescription
roduction	Job	JobNo, JobOrderDate, JobCompletionDate, CustomerNo, InventoryItemCode
	Directs Materials Inventory	DMStockNo, DMCategory, DMDescription, DMCost

Production Cycle Time Worked	EmployeeNo, TWHours, TWSequenceNo	JobNumber, TWPayPeriodEnded,
Finish Good Inventory	InventoryItemCode,	InventoryDescription

5.5 User Interface Design

Before creating any database for the system, the flow of the data in a company should be recognized first. Below is a number of data flow diagrams created to help in the development of the database.
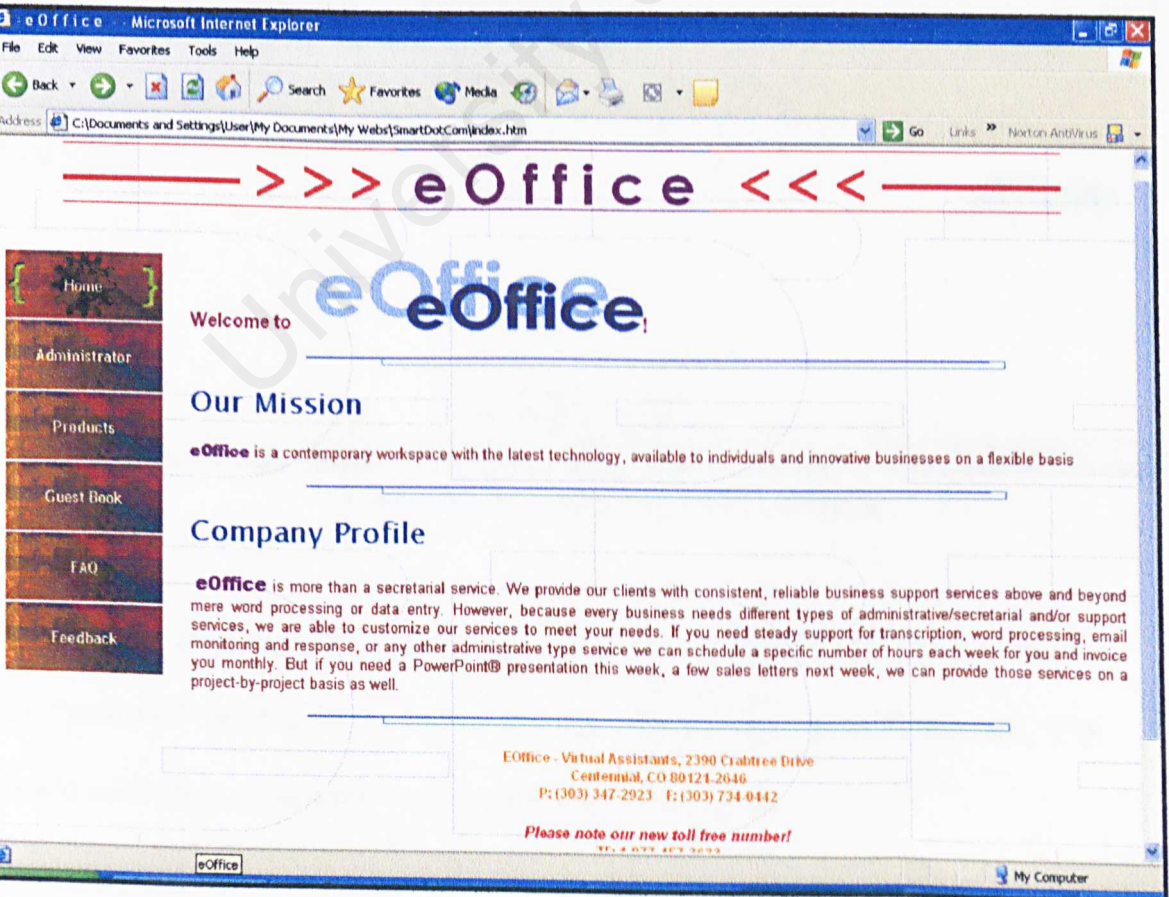
5.5.1 Interface Design

Figure 5-9   Client's View Interface

Figure above shows the sample of client's view interface. This is "Home" page or the 1st page in company's website. Link bar at the left side contents "Home", "Administrator", "Products", "Guest Book", "FAQ" and "Feedback". Client can browse and explore every link except "Administrator".

If user clicks at "Administrator", the login page will be linked to the login page. This page is show in Figure 5-30.
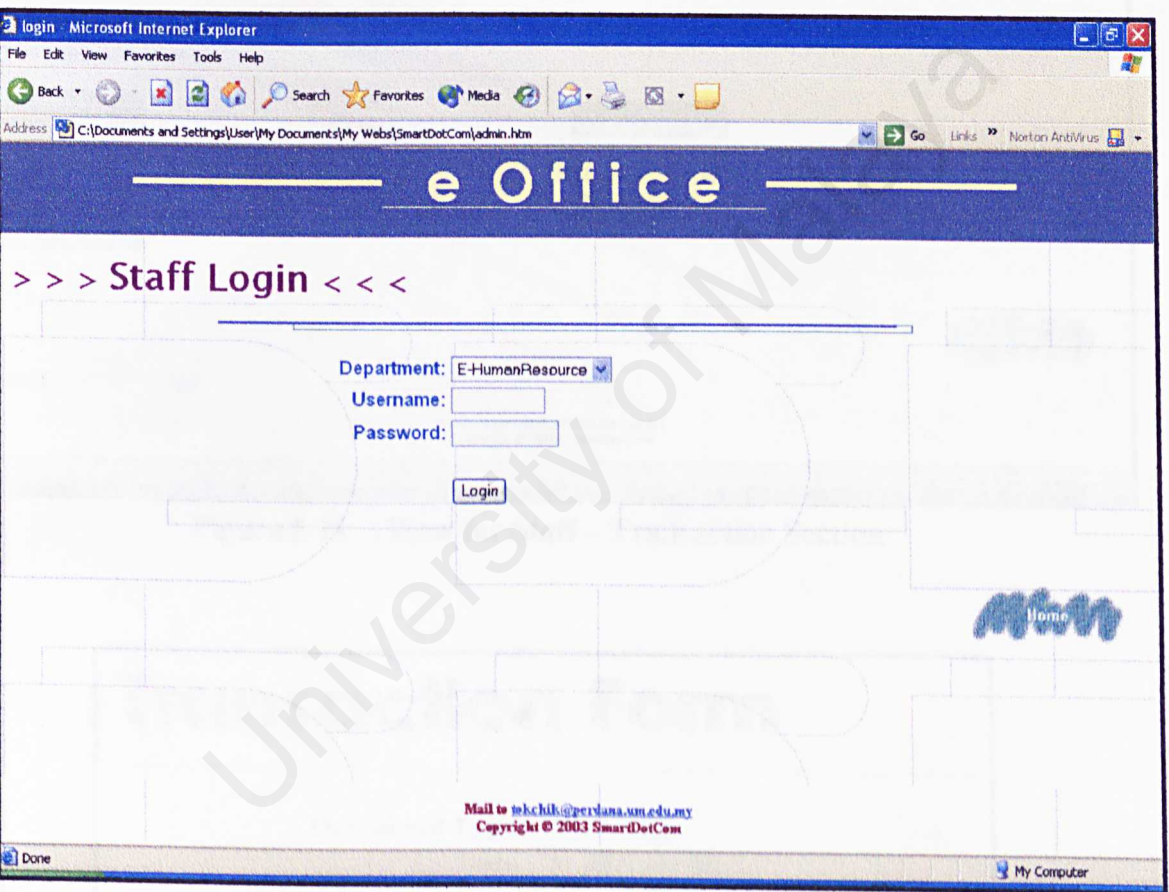

Figure 5-10   Login page for staff login

Every staff needs to login before they doing their job. This login is seemed like "punch-in" system. Every department has different view for different task. User should select their department before they login to the system.

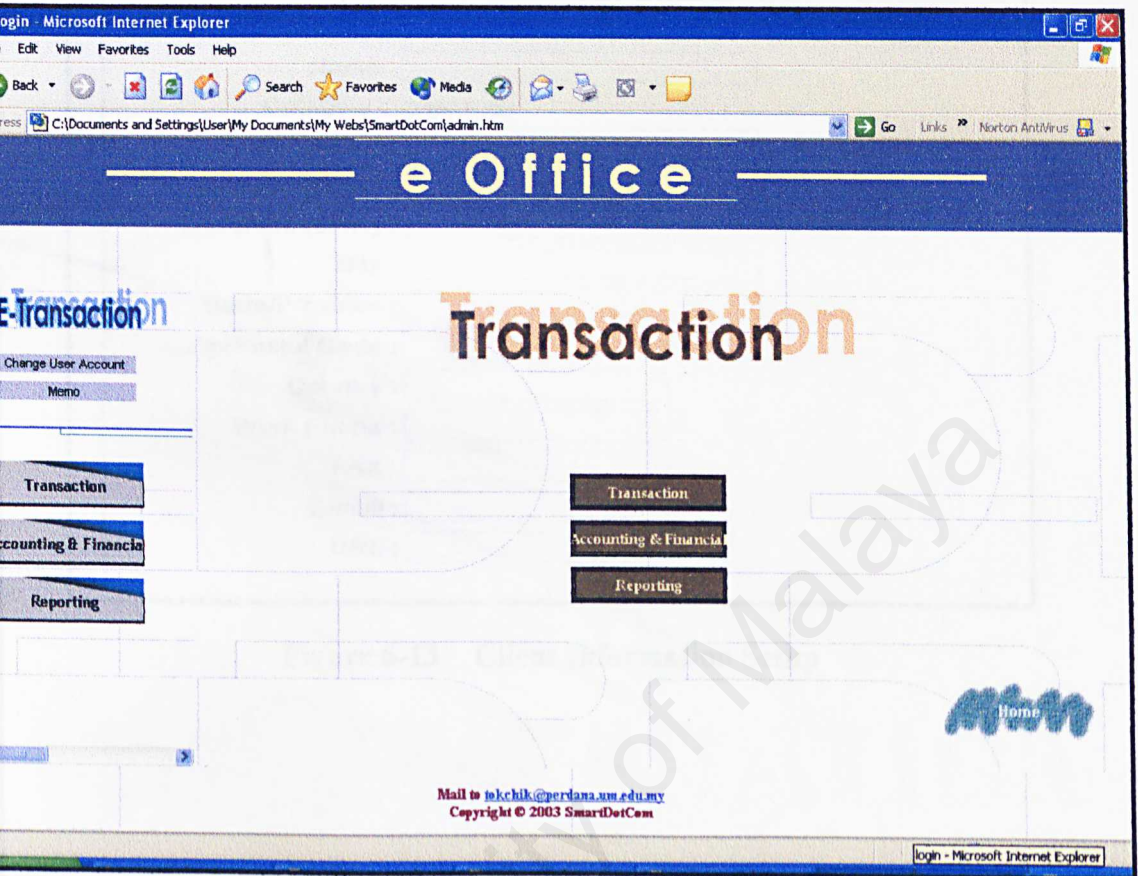Below is the page for Transaction Module. The next figures are the sample forms in Transaction Module.

Figure 5-11   View for Staff – Transaction Section

Figure 5-12   Transaction Entry Form

Client Information

Name :

Category : Vendor

Organization :

Street Address :

Address (cont.) :

City :

State/Province :

Zip/Postal Code :

Country :

Work Phone :

FAX :

E-mail :

URL :

Figure 5-13   Client Information Setup

CHAPTER 6:

SYSTEM IMPLEMENTATION

CHAPTER 6: SYSTEM IMPLEMENTATION

6.0 Overview

The system implementation stage revolves around stages in the development environment which is program coding and database development. In this phase, the system requirements and design are being implemented and converted into program code. However due to certain limitations on the programming language, selected Database Management System, development platform as well as protocol used which contradicts to the actual system design and therefore certain modifications are needed in order to develop the system.

Each module in the E-Office system is initially being developed and tested separately before being integrated as a fully functional system after each of the modules is able to run smoothly as an integrated system after the integration stage has been completed. The same can be said with the E-Transaction module of the E-Office system whereby each modules was also developed separately before final touches on integrating the whole E-Transaction module as a fully operational system which eventually be integrated as one of the module in the E-Office system.

6.1 Development Environment

6.1.1 Hardware Used In Developing The System

  i) Intel Celeron Processor 700MHz

  ii) Memory 176MB RAM

  iii) Hard disc 20.0 GB space

  iv) Other standard desktop PC compliance

6.1.2 Software Used In Developing The System

i) Windows XP Professional Server – used as the operating system and server platform to run Microsoft FrontPage2002, Microsoft Access2002 and Internet Explorer 6.0.

ii) Internet Information Server 6.0

iii) Internet Explorer 6.0 – used as web browser to view the web pages design.

iv) Microsoft FrontPage2002 – used to write ASP and HTML codes.

v) Microsoft Access2002 – used to create database for the system.

vi) Microsoft Word XP – used to write the documentations.

6.1.3 Operating System

As mentioned the platform or operating chosen for the development of E-Transaction system is the Microsoft Windows XP Professional Server. The rationality behind the choosing of Windows XP Professional Server as the operating system as mentioned in Chapter 3 is solely based on the performance as well as the reliability of the operating system architecture. These features eventually make the Windows XP Professional Server as the ideal operating system for most development of systems.

6.1.3.1 Installation of Windows XP Professional Server

The installation of Windows XP Professional Server may differ from the installation method of Home User versions of Windows operating system namely Windows98 and Windows ME since both the system requires DOS environment

to install the operating system. The same cannot be said to Windows XP Server because as the system disk is being booted, local installation files are being copied into the system and therefore the user will not interact in DOS environment. Instead, the user are being offered a simple interface which is the menu prompting the user to input their installation options whether to clean install a new version of Windows XP into the system or upgrade the current operating system into Windows XP. Hence this offers the user more user friendly computing environment.

6.1.4   Web Server Used

The Web Server chosen for the development for the E-Transaction module is the Internet Information Services 6.0 which is the default Web Server available in the Windows XP Professional Server. The Internet Information Services 6.0 provides the system administrator to configure the web server in accordance to their preferences such as the customization of the selection of protocol used, port configurations, scripting preferences, debugging options and other features in order for the server to accommodate the various functional requirements of the E-Transaction system.

Besides that, the selection Internet Information Services 6.0 as the Web Server is also based on the fact that it comes as default Web Server namely Apache, Netscape and other compatible Web Server which require further external installation and configuration. Therefore we can deduce that the selection of Internet Information Services 6.0 as the Web Server for E-Transaction system is because of the compatibility as well as the reliability of the Web Server with Windows XP Professional Server platform because it is the default Web Server for the platform.

6.1.4.1 Installation of Web Server

The installation of the Web Server for Windows XP Server is the Internet Information Services 6.0 (IIS 6.0) does not require user to configure them manually as the default configuration for the web server is enough for normal system development environment. However if the user intend to customize the configuration of their web server, they can just run the IIS 6.0 exe file and configure the system to their preferences.

6.1.5 Database Management System

As stated in the previous chapter, the chosen Database Management System (DBMS) is Microsoft SQL Server 2000 but the used DBMS in the real implementation phase is Microsoft Access 2002. The arrangement happened because I have no experience using this DBMS and it should take more time to study the DBMS. Even though I did literature review on Microsoft SQL 2000 but it is hard for me to develop the system using the DBMS without any guider. That is why I choose to develop E-Transaction using Microsoft Access 2002 but at the same time I still keep study the Microsoft SQL Server 2000.

Microsoft Access 2002 provides more wizards to help user finish their job faster and easier. This is the reason Microsoft Access 2002 is chosen to replace the Microsoft SQL 2000 as DBMS of E-Transaction System. Besides, as stated in literature review users are permitted to enter data directly or importing external files which contain the data need to be entering into database. It gives user a flexible way to enter the data.

6.1.5.1 Installation of Database Management System

The installation of the DBMS of E-Transaction system which is Microsoft Access 2002 is quite easy. It is because Microsoft Access 2002 is a part of Microsoft Office Package. The installation process is relatively simple as the user just need to follow installation instruction. Hence, the user must make sure that the creation of each table and their access restriction is correct so that the system will be able to connect to the database freely.

6.1.6   Programming Platform

As DBMS, I decide to change my programming platform from Microsoft Visual Interdev to Microsoft FrontPage2002. The selection of Microsoft FrontPage2002 for the development of the web based system of E-Transaction is seen as the most suitable programming platform especially when developing Active Server Pages.

Microsoft FrontPage2002 enables the user to develop a system via a Graphical User Interface (GUI) to create web pages for the E-Transaction system. Besides that, it also gives the user to view the web pages through browser in order for the user to debug the system in a runtime environment. Besides, it also replicates a copy of the E-Transaction system files directly into *Inetpub* and the folder *wwwroot* which enable the user to run the system and therefore permit the user more freedom in debugging their system.

6.2 Web Pages Development

6.2.1   Criteria in Choosing a Suitable Development Platform

A lot off criteria and requirements are needed to be fulfilled in choosing a suitable programming tool which can accommodate the functional needs of the E-Transaction system. Among the criteria that are to be fulfilled by the programming tools selected are as follows.

i) Availability of the development tools – this criterion refers to which extent are the tools available to the usage of the user. Besides, the tools have to be able to be installed and configured easily.

ii) Environment in which the software will execute – this criterion meanwhile refers to the extent of the computing environment whereby the system will be run. This means that the computing environment of the tools selected have to be able to accommodate the runtime requirements of the system.

iii) Knowledge of the software development tools – as the wise one says, it is better to use the tools that you are familiar than those you are not. Therefore the selection of tools have to be based on the user knowledge in using the tools because the user can use their familiarity on the tools to design and develop the system to accommodate all the functional requirements of the system compared to using the tools that they are not familiar of.

iv) Nature of the system to be developed – this criterion refers to the nature and the requirement that are needed to develop the system. Hence the programming tools need to accommodate such criterion. For example, Microsoft FrontPage2002 is more suitable in developing a web based system compared to Microsoft Visual Basic 6.0 which is a Window based programming tool.

6.2.2   Programming Language Chosen

The language chosen for the development of E-Transaction system is Active Server Pages which functions as the data processing web pages of the E-Transaction system. Active Server Pages or ASP pages can be described as a dynamic web page whereas it provides data processing capability which is executed through the web server of the host of the system.

Accompanying with the emergence of the ASP pages as the language chosen as the programming language for the E-Transaction system is scripting languages which permits the system the call and perform user defined functions for data processing which enable end user to request and process data. Here in the E-Transaction system, the scripting language chosen is Visual Basic Scripting Language or VBScript but it also mix with some JavaScript scripting. The reason to choose this scripting language is because of I am more familiar with VBScript as I had learn it during my industrial training which make it more easier for me to write scripts in this language compared others. But I still use other scripting language to make the system better.

With VBScript, the simple structure and syntax of this language makes it easier for me to identify and debug the system. Server side scripting which enable the user to perform data interaction between the user and the database system has also been taken into account for the language chosen.

Last but not least, the language chosen for the formatting of each web pages interface is the Hypertext Markup Language or HTML. This is because HTML is the standard language chosen for formatting web pages. The formatting abilities of HTML in formatting the web pages include the capability to create a user friendly

interface for the convenience of the user themselves. With this, one can define fonts and different style of interface design which they prefer.

6.2.3 Development Platform Chosen

After choosing the language, the eventual procedure is to select the most appropriate development platform and one cannot deny hat Microsoft FrontPage2002 server is suitable with ASP web based development platform. This is due to various advantages that the development platform offers such as:

i)   Providing a lot of tools and wizard to design the web page or create form.

ii)   Providing three page views:

    a. Normal view – to enable the user design the page or interface directly using the tools provided.

    b. HTML view – enable users to design by inserting or editing coding.

    c. Preview – enable user to view the page or interface in web's view.

6.3 Coding Approach

The coding paradigm adopted by the E-Transaction system is oriented at giving reliability and performance a balance. The focus on these 2 points gives the upper hand of the E-Transaction system coding approach compared to others. Listed below are the coding approaches which have been adopted for the E-Transaction system.

i)   Maintainability – codes are well organized. Task oriented codes are centrally located

ii)   Reusability – task-oriented codes are easily developed for reuse, specially for tasks that cross application boundaries

iii) Testability – modules can be tested easily. Modularization breaks up the code coverage task into smaller and manageable units

iv) Speed – module code can safely be optimized without affecting the calling procedures

6.3.1 E-Transaction Coding Approach Design

The E-Transaction system basically has two main functionality which is data retrieving or searching and data editing. These two types of functionality complement each other in the sense of design and coding approach whereby:

i) Searching and retrieving – the coding approach is more robust whereby the data being retrieved has to fulfilled all the constraints that are being imposed. Besides that, the data searching mechanism has to be able to accommodate different type of data organization.

ii) Data editing – the coding approach of data editing such as inserting data is more simple which focus on fast and absolute in inserting, updating and deleting records.

6.3.1.1 Approach in Searching and Retrieving

The approach if data searching and retrieving is a very complex approach whereby the focus of the approach is to reliably retrieve records which have to fulfill all the constraints imposed on the data retrieved. The other focus is to accommodate different type of data organization of data in the database. For example, in comparing records within a table itself, we have to take into account each scenario of how the data are being uniquely differentiate and

also if all the data are the same. Hence we have to prepare appropriate mechanism to handle such situation. The following algorithm depicts the mechanism of retrieving data from sales whereby after each sales transaction are being performed will be directly updated into the cash account since each sales transaction is a cash sales transaction.

Algorithm 6.1: Retrieving Data for Transaction Record

i)   Select all records from all the tables and sort them according to "Document type".

ii)   For each record in a table, compare the "Document Type" of current record with the next one.

iii)   If the "Document type" is different (which means that they are not the same document type), then the amount will not be added to the total amount.

From the first glance, the algorithm looks simple but the complex part is to deal different state of data organization and structure in the database. For example if the last record of the table is different with the previous record, they cannot be compared since the current record is already EOF. Hence a special mechanism is needed for this situation.

6.3.2   Approach in Data Editing

The coding approach in data editing of E-Transaction system is rather different whereby it focus on fast and absolute editing of records or data. Hence, this will enable fast and real time update of data which signifies the importance of real time update of data especially in an e-commerce organization. For example, data which are to be stored are being updated into the table with minimal constraints which means if data validates the minimal constraints of a rule, then the data will be updated immediately. This is to prevent the data from being 'hold up' too late in determining the validation of data through thorough validation constraints which affects the timeliness of the data.

6.4 Summary

To sum up chapter 6, we can say that the implementation of E-Transaction system focus on various aspects which governs the functionality of the system to fulfill the functional and non functional requirements of the system. Hence the choosing of development platform which ranges from the operating system till the programming platform chosen has to be up most suitable to the requirement pf the system. The coding approach meanwhile focus on giving the best reliability and performance of the system and by the end of the day the E-Transaction system can be say to be developed by the most suitable development platform with the most robust and flexible coding design focus on reliability and performance.

CHAPTER 7:

SYSTEM TESTING

CHAPTER 7 – SYSTEM TESTING

7.1 Overview

The E-Transaction system basically can be divided into three main functionality modules which are the input of transaction, client's information and the reporting module. The former emphasize on capturing user input and to be validated before being posted into the related accounts while the latter focus on reporting needs such as transactions for each accounts, balance sheet and others.

Although one may view all as different module but in actual data flow event, all functionality does has their cohesion whereby their existence complement each other. For example, we may not be able to view records in the Transaction Report if not for the input module ability to capture the transaction whereby it will be useless to capture the transaction record without the ability to view he transaction summary.

The E-Transaction system has several modules which includes create account module to generate the balance sheet from transaction record. Besides that, it is also providing the database of client information. In the E-Transaction module, each and every module work as independent but highly coupled modules whereby each module has the other modules to complement the existence of a record in an account. For example, a client's information record which resides in the Client table also has record in Transaction Record to complement it.

Each module in the E-Transaction system has been both coded and tested together and separately whereby after each module are being coded completely, will be tested for runtime validation rules and other logic constraints. After the testing phase, the modules are eventually integrated into a single system which is the E-Transaction System.

7.2 Testing Process

The testing process of the E-Transaction system was tested in parallel with the completed development of each sub module to check validation rules as well as other run time constraints. Here the system testing process is being divided into 5 main stages:

7.2.1 Unit Testing

This is a small unit testing where testing are done on individual components of the system to ensure that they operate correctly. Each function is tested independently, without other system components. The levels, which are tested, are basically at the field level / form level. In this system, E-Transaction is tested by form or document submission and input validation.

i) Form / Document Submission

This is to check whether the data which are to be submitted have been submitted or updated successfully. There are few ways such as prompting certain messages n the code thus giving an indirect but accurate signal that the data has been successfully updated. Another way is to open the database or table and by using SQL command, check whether the data was successfully submitted.

ii) Input Validation

Input validation is to test the inserted data whether they are valid and according to the specified criteria. Each condition of the criteria is entered into the form/field and tested. If the input is incorrect, a pop-up message will

appear to warn the user. Another way which is specifically for testing SQL command validation is to copy the line of code and run it in the SQL Query Analyzer and if the data was validly updated, thus the testing is successful.

7.2.2   Module Testing

As mentioned, the E-Transaction system consists of three modules which correspond to each transaction in E-Transaction system. Each module is being developed initially as an independent module. Upon completion, the module will be tested for its performance and reliability by giving it a run time test whereby input will be keyed in to the correspond module and then the testing begins by giving it a 'end user' testing environment by running all the functionality available in the module.

Besides run time testing, testing of the module is also conducted by referring to the tables which the data resides. By then, one can only make sure that the module is being developed correctly and able to process the data in the correctly and able to process the data in the correct manner.

After all the modules have been tested individually, they are being integrated as a sole e-Office system which is the E-Transaction System. The figure below depicts the flow of the approach for the testing of each module.
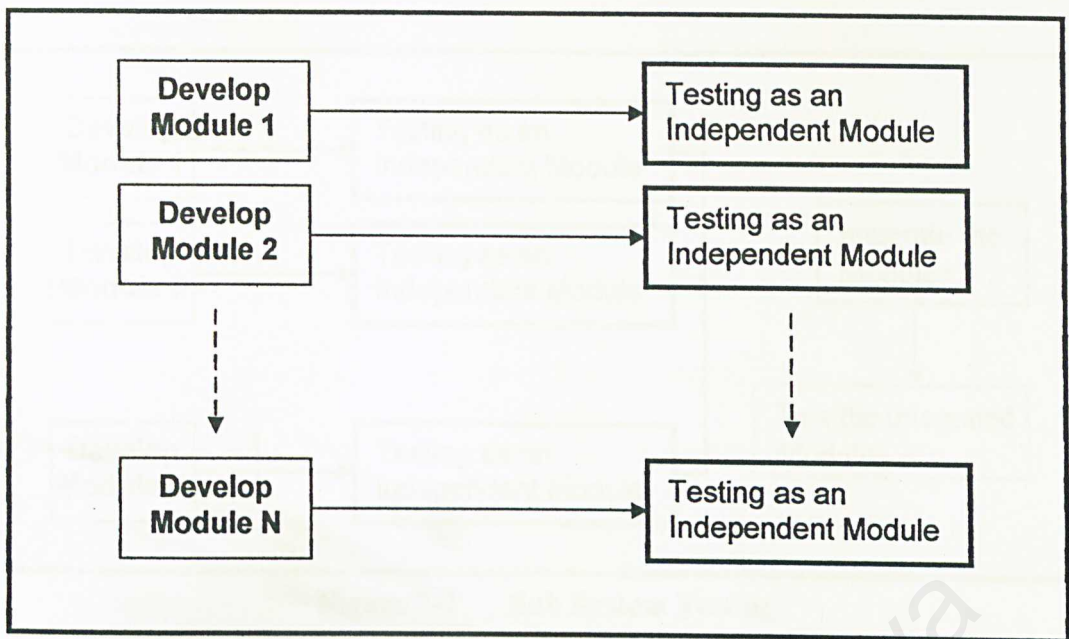
Figure 7-1   Module Testing Phase

7.2.3   Sub-system Testing

The eventual integration of the modules forms the backbone of the E-Transaction System. As stated before, each module although functions as an independent module but the existence of other module will complement the existence of the module. For example, for cash sales transaction there will be a record in the sales module and also in cash to complement and signifies that an amount of cash has been received for the particular sales.

Hence in the sub system testing of the E-Transaction system, a more thorough testing mechanism approach is adopted whereby the synchronization of the related accounts or modules for a particular business or transaction event is being monitored closely.

The testing method is carried out firstly by making sure that the records for a particular transaction resides in their respected accounts. Finally, the sub system testing is being carried by testing the functionality options for all the modules as an integrated system.
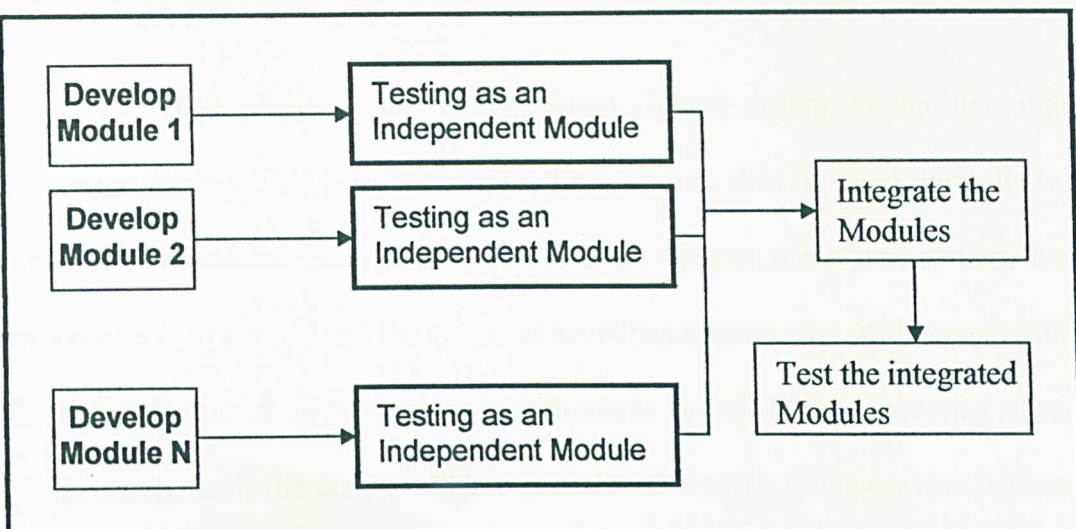
Figure 7-2   Sub System Testing

7.2.4   System Testing

As mentioned earlier above, the E-Transaction System actually consists of 3 main functionality options. The first is on the recording module which reflects the client information database. The other part of the E-Transaction System are on recording and reporting every transaction and account. The reporting functionality consists Balance Sheet and the transaction total amount of the day.

The testing phase requires the most robust and thorough testing method or mechanism. The focus of the testing phase will focus on the integration of all functionality. This is to ensure that all functionality as well as all the modules is able to work as an integrated unit as well as being able to perform their particular task correctly.

7.2.5 Acceptance Testing

The final phase of the E-Transaction System testing is on the user acceptance testing. This is to ensure that the system is able function normally in run time environment. Here in the E-Transaction System acceptance testing, the person who is to use and test the system is actually someone who well expose with the accounting rules. Already equipped with ample knowledge in accounting rules, this person remains the ideal candidate available to test the E-Transaction System for user acceptance testing.

The method carried out by the user during his acceptance testing is by performing real time business transaction events whereby a simulation of real time business event has been created to create simulation. The user will key in each and every business transaction as if he is using the common e-Office he once used.

To put it short, the acceptance testing mechanism approach is duly focusing on the simulation of a real time business event for an organization. This is deemed the most appropriate method because it will test out the eventual performance of the E-Transaction System if it is to be implemented in a real time business organization.
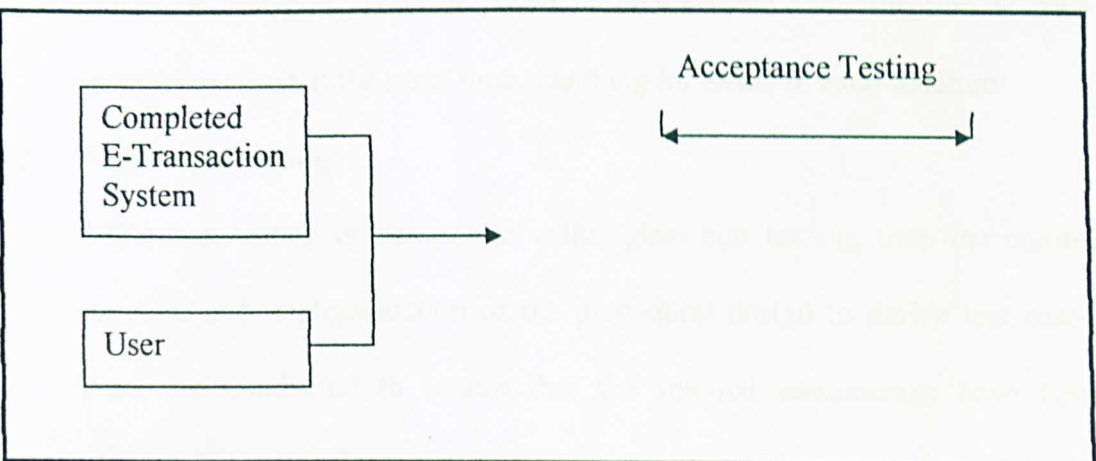
Figure 7-3   Acceptance Testing

3 Types of Testing

The testing type of the E-Transaction System is actually divided into 2 types which the statistical testing and also defect testing.

7.3.1 Statistical Testing

This test focuses on measuring the system reliability and performance rather than identify system errors and bugs. The method is to run the system in a real time simulation environment by testing the system for its endurance whereby try to focus whether the system reliability and performance has been affected by a long series of usage. If yes, the reason of the problem will have to be deal with so that the performance of the system will not be affected such way.

7.3.2 Defect Testing

Defect testing is intended to find areas where the program does not conform to its specification. Tests are designed to reveal the presence of defects in the system. There are two approaches to defect testing:

1. **Black-box testing**

   Black box testing or behavioral testing relies on the specification of the system or software. Tests are used to demonstrate each function is fully operational while at the same time searching for errors in each function.

2. **White Box Testing**

   White box testing or sometimes called glass-box testing, uses the control structure and implementation of the procedural design to derive test cases. Tests are conducted to ensure that the internal components have been adequately exercised.

4 Test Data

For the data testing of the E-Transaction system, it is important to view the system in different types of data scenario whereby the system is being fed with different types of data to test the ability of the system to endure the test without affecting its performance and reliability. There are 2 basic types of test data used:

1. Normal test data

Normal test data will provide a simple test to determine whether the program is error-prone or error-free. This is to make sure that the system is able to handle data with minimal constraints. If the system fails to pass this test, thorough investigation is needed because now the system did not pass the most minimal data test.

2. Extreme test data

Extreme test data will test how well the system in handling huge amounts of data without affecting the overall system's accuracy and efficiency. This is important in order to make sure that the system is able to handle huge amount of data without affecting its performance and reliability.

7.5 Summary

The testing phase of the E-Transaction System adopts a more robust and stressful approach in order to make sure that the system withstands the most stressful conditions during run time environment. Hence the E-Transaction System can be said has been tested thoroughly and to present testing verdict, no major errors or bugs have been detected. This statement underlines the fact the not a single system in the world is flawless but it is merely little errors which unknown to the developer at that time ant the same can said with the E-Transaction System.

CHAPTER 8:

SYSTEM EVALUATION

CHAPTER 8: SYSTEM EVALUATION

Overview

The final chapter for the final project report of E-Transaction module of the E-Office focuses on the system evaluation of the system as a functional Web Based Accounting Information System. The evaluation of the system will eventually focus on the problems encountered during the development of the system, evaluation of the system by end user, system strength and limitations as well as its proposed enhancements.

8.1 Problems Encountered and Solution

Upon completing the development of the E-Transaction System as the financial module for the E-Office, there are many problems which did affect the smoothness of the development process. However, after further thoughts, reconsideration of system design, architecture and further literature research, the problems are eventually been overcome. Amongst the problems encountered during the development of the E-Transaction System are defining the system scope, coding and design, setting up of the DBMS, setting up the development platform, retrieving and editing records from database and understanding various run time errors.

8.1.1 Defining The System Scope Due To Wide Area of Study

Most of the problems encountered under this category eventually occurred during the literature review period. Thorough research has to be conducted in order to understand how a normal E-Office works especially in account and transaction

part. More research has to be done in getting more knowledge on web based Integrated Business System which has been because most products available in the market namely UBS are more of Window based system.

However the most challenging thought came from understanding how the accounting information flows in a real time business transaction event. Since the principles of accounting disciplines seemed quite new and raw in my knowledge and understanding, therefore I find it quite hard to understand the accounting background consultants, I eventually got a better understanding and able to relate them with the actual data flow in a computer system design and architecture. Hence advice and guidance of my accounting background consultant as well as from business related references books had really helped me much in understanding the system scope appropriate for a web based E-Office system.

8.1.2 Web Page Coding And Design

The most difficult problem I have to face during the development of the E-Transaction System is during the system design and coding period. Problems arise when I am trying to relate the real time business transaction event with the information flow of a computer system. Hence I face some difficulties in trying to design the most suitable method to relate the real time business transaction event of an organization into a system design architecture model.

The methods include using model as well as abstract data representation of the business event. But at the end of the day, I had been able to overcome this task by doing some module arrangement and building a model which very much resembles the real time business event. By referring to this model, I was able to design my own

system architecture and eventually apply it for coding. The latest user interface design is shown in User Manual.

However the problem does not stop here, although it is quite straightforward to perform coding by referring to the algorithm derived from the model, but sometimes things may not be simple as it could have been. During the period there are certain problems which has occurred where I did not took notice during the modeling period which eventually leads to some violation of validation rules. However, as the testing phase proceeded, the errors have been detected and therefore I have found the cause for the errors as well as rectifying the errors. I am not going to say that the system is bug free but until testing phase has completed, the errors which was detected has been rectified.

8.1.3   Setting Up The Development Platform

The foremost problem encountered in the setting up of the development platform was when I am trying to set up the operating system for my server which is the Windows XP Server. Initially no problems have arisen but hardware compatibility seemed an issue here since some of my hardware drives are not suitable for Windows XP Server. Hence I have to hardware device which the driver is suitable for the use under this operating system.

The same can also be said for setting up my development platform which is the Microsoft FrontPage2002. Everything was going very smooth as t was doing my system development until an eventual improper shut down caused a system file to corrupt. This made me unable to run the Microsoft FrontPage2002 to do my development. So I have to backup partition and then format my primary hard drive

and re-setup my development platform and after that restore my system as well as restoring the E-Transaction development files back into the system.

8.1.4 Setting Up The Database Management System

Although I have some experience using Microsoft Access2002 before but I still got errors when running the system. The initial problem is just on the part of conflict in figuring the system access control such as permitting unauthorized personnel to access the database and in doing some calculation. But after some exposure and reference from both friends and books, I was able to look into the problem and eventually able to solve the problem.

8.1.5 Retrieving Data And Inserting Data Into A RecordSet

Since I am using the Recordset object to retrieve and edit information from and into database careful consideration has to be taken care during the coding of the system especially when writing an SQL command in the program. This is because the invoked values of variables in the SQL statement may cause system to fault if they are being treated correctly. There is once when I accidentally invoked an 'error' value into variable which is to be executed into the system through an SQL command but the system eventually performs an error process which eventually corrupted my whole system data which made me to input the data into the database all over again.

91

3.1.6 Understanding The Error Messages

There are times when the coding of the system may have some syntax error or worse which is run time error. This eventually leads the system unable to process the user request and the system eventually pops an error message.

The content of the error message varies from merely syntax error to more serious errors such as invalid procedure call as well as run time error. Syntax error are easy to detect and rectify but other error messages such as invalid procedure call is quite tricky since some error if written in Visual Basic will not have error but if an ASP will eventually pop an error message notifying of invalid procedure call.

This is quite tricky because the procedure cal for both Visual Basic and VBScript shall be the same. However we must be flexible and I have change another method to perform a task if the current method does not work.

The most serious of all is the run time error because the system will not tell you what if the cause of error but just merely telling of run time error. Hence, I must detect line by line to detect and rectify the error which is a very tedious work.

8.2 System Strength

Well in terms of strength, E-Transaction System strong point is on its data retrieving mechanism, ease of use and simplicity in interface and data presentation format.

8.2.1 Easy Management and Maintenance

One of the main strength of the E-Transaction System is its ability to process on going data as well as performing generic and real time data transactions. The mechanism of data retrieving focus on reliability and performance which enable the system to perform correctly under all kind of situation especially in a disorganized data situation and many more.

Besides that, the system also gives the user more option to perform the task they want. This means that the user have more control of the system such as creating the accounts they deemed appropriate under the justified account types. In short, the system gives user the flexibility to perform their job. Not to mention also on the reporting module where the user can customize on how they want to view their report whether a detailed report be it annually or monthly.

However, the main strength of the E-Transaction System is the ability to perform and synergized in real time business information with those which are not real time which some systems could not address.

8.2.2 User Friendly Graphic User Interface

At first glance, the E-Transaction System may not attract much attraction because it does not have attractive 'decorations' such as animations and others which

may give it a more attractive look. But the reason behind the simple interface design is intended for the use of accounting professional of an organization, it may seem ridiculous to 'decorate' the system as of the 'normal people' oriented system. The simple design is specially designed to suite a more professional look with simple background and less animation but with few color combination to make user feel too bore.

The reason of simplicity is because the main concern of the E-Transaction System is on the data processing. Hence more effort has to be put in giving the best mechanism on data processing. Besides that, it will give user an uncomfortable act if the data retrieved are being displayed in a crowded and animated interface. Hence, each interface is just consists if the necessary options for the user and try not to confuse the user with all different kind of decorations being 'crafted' on the interface.

Last but not least, the simplicity of the interface design is to enable the user to make ease of use. This means that a simple interface will give the user more and faster understanding in using the system ad they are able to use the system to the fullest potential.

8.3 System Constraints

Owing to the insufficient time given to research on the various aspects of the development of E-Transaction System such as learning a new language of ASP, configuring IIS, Microsoft FrontPage and much more, I am unable to address all the functionality of what an E-Office shall have but however the current system developed is adequate for the use of a business organization.

8.3.1 Lack Functional Modules

Although being able to perform the major and important task of an E-Office, the E-Transaction System still lacks certain functionality such as printing the reports into hard copy, automating the issuing of Transaction forms and much more. Well this minor functionality may provide the ideas for the future enhancements of the E-Transaction System.

8.3.2 Database Not Encrypted

The database is not secured enough because all the information are stored in a plain text form rather than in an encrypted format.

8.3.3 Lack of Functionality To Assist User In Creating Accounts

Portable one of the most obvious limitation of the system is the inability of the system to assist the user to identify the account information being input previously. This is mainly due to the consideration of flexibility whereby some users prefer to organize the account information to their preferences. If there is a function which guides the user in doing such task, the user power will eventually cut down. The other reason is on the time constraints for not being able to design a more generic type of function which can balance both factors of giving user the assistance in creating account and not affecting their power.

8.4 Future Enhancement

8.4.1 Provide More Functionality

As mentioned above, the E-Transaction System may not have what it takes to compete with other available system. But not because of the design but the lack of extra functionality for user such as

i)   Automating the issuing of the purchase order form

ii)   Maybe a more attractive interface

iii)   Fixing the bugs which is yet to be known during documentation time

iv)   Create a more generic function in assisting the user to create accounts

8.4.1.1 Automating The Issuing Of The Purchase Order Form

Admitting that the algorithm of issuing the system method of issuing the purchase order for is deemed to have the user to put some effort to using input stock that the organization intend to purchase. The method of attaching a text file into an email message is seemed as the only way because there are must exist independence between the organization and supplier.

Whilst designing the method, there is an idea to straight posting the message using CDONTS object in ASP. However, since the information can be stored only in one variable, the probability of overflow may occur in a very high manner. Hence the only method is to use attachment.

Future enhancements can modify the design of the system by maybe permitting the external module to share certain level of information which eventually leads to supplier emerge as a part of the system of E-Office. By the sharing of information which decreases the independence between both modules, the automation of issuing the purchase order can be more effective.

8.4.1.2 More Attractive Interface

Although the concept of the interface of E-Transaction System is on simplicity but there may be future enhancements whereby the creative minds of others may give some life into the interface. However the main focus of the enhancement is to let the user comfort using the system, not to confuse the user with over 'decorate' interface.

8.4.1.3 Fixing Bugs Which Is Still Not Known During Testing Time

Although until documentation period, no more bugs have been identified but it does not mean that the system is bug free. Hence future enhancement should focus on maybe finding bugs on the system.

8.4.1.4 Creating A More Generic Function In Assisting User In Creating Accounts

Future enhancement can focus on displaying the account numbers for the user to check before creating an account.

8.5 End User Evaluation

Admitted the E-Transaction System does not have much of end user evaluation because it is rather difficult to find accounting background personnel. Although the argument of the evaluation may not be strong, the evaluation of the user is deemed quite important whereby the professional comment and criticism by the user will be taken into note during development period.

Hence as far as the end user evaluation is concern, the E-Transaction System has gone through a thorough usage by accounting background personnel and the feedback by the user is quite satisfactory and the system weakness pointed out by the user also signifies the weakness of the system which was already been mentioned above.

8.6 Knowledge and Experience Gained

Well for the past 4 months or so, things have been very interesting because I have been able to gain invaluable experience and knowledge whilst doing this project. The knowledge and experience varies from programming, setting up of platforms, System Analysis and Design and other system design principles.

Besides that, the knowledge gained from this project is the awareness of user's needs. It was found that users need a user-friendly environment, a readable homepage and clear instructions and guidance. And the programmer needs to find and organize the information acquired and analyze the behavior.

These are improvements in skills of finding information, classifying fields, solving problems and independently plan and accomplish the project on schedule without much supervision.

But the most important experience I have gained is the ability to work as a team where I have worked with a group of fantastic people, coordinating our system design as well as integrating our final system. At the same time, the ability and experience to develop such a huge system is deemed very beneficial to me and believe that these knowledge and experience I acquired during my time doing this project will sure prove its worth in the future especially when I approach the working world in the future.

8.7 Conclusion

Building a web-based application package is a challenging task. A lot of research, time and effort have been involved in making this project successful and in fulfilling the task requirements. A comprehensive knowledge in building a web-based application is also necessary and important especially knowledge about the client and server. It is because they are the main communication feature to a web-based application.

In conclusion, the E-Transaction System has met its own objective of becoming an Account Information System which is capable of performing real time business transaction where most accounting information system such as the famous UBS could not do.

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USER MANUAL

E-TRANSACTION

USER MANUAL

Introduction

E-Office is an integrated solution for an E-Commerce organization to perform their business transaction events in an automated computing environment. The focus or objective of E-Office is to automate the usual business transaction events which will play a big role in helping the organization to achieve their strategic objectives.

E-Office is developed to be embedded in organization's website as a web-based system. E-Office is designed to support knowledge workers; individuals for whom the manipulation of information and knowledge is their business. For this version, three modules are develop there are Human Resource Management System (HRMS), E-Transaction and Leave Approval System (LAS). These modules which represent internal functionality as an integrated unit whereby interaction and integration between modules occur. Besides integrating as a unit, the modules also interact with external system of other organizations. In this project, only one module will be discussed – **e-Transaction**.

This user manual is intended to give the end user more information about the specification and the user guide for the E-Transaction System. The user manual can be categorized into system specification and user guide in using the system.

1.0 System Specifications

The system specification of the E-Transaction System consists mainly of the hardware being used for the server side and the client side

	Hardware Specification	Software Specification
Server Side	- Intel Pentium 133 MHz and above 64 MB RAM and above 2 GB hard disk with a minimum of 650 MB of free space - Mouse and Keyboard	- Windows XP Professional - Internet Information System 5.0 (IIS) - Active Server Pages (ASP) - Microsoft SQL Server 7.0 - VBScript, JavaScript - Internet Explorer 5.0 - Microsoft Visual Interdev
Client Side	- Intel Pentium 133 MHz and above 64 MB RAM and above 2 GB hard disk with a minimum of 650 MB of free space - Mouse and Keyboard	- Windows XP Professional - Internet Explorer 5.0

2.0 User Guide

2.1 Login

To access the system, the user should log in. Only financial staff is allowed to access the E-Transaction System. (Check the database to get your username and password.)
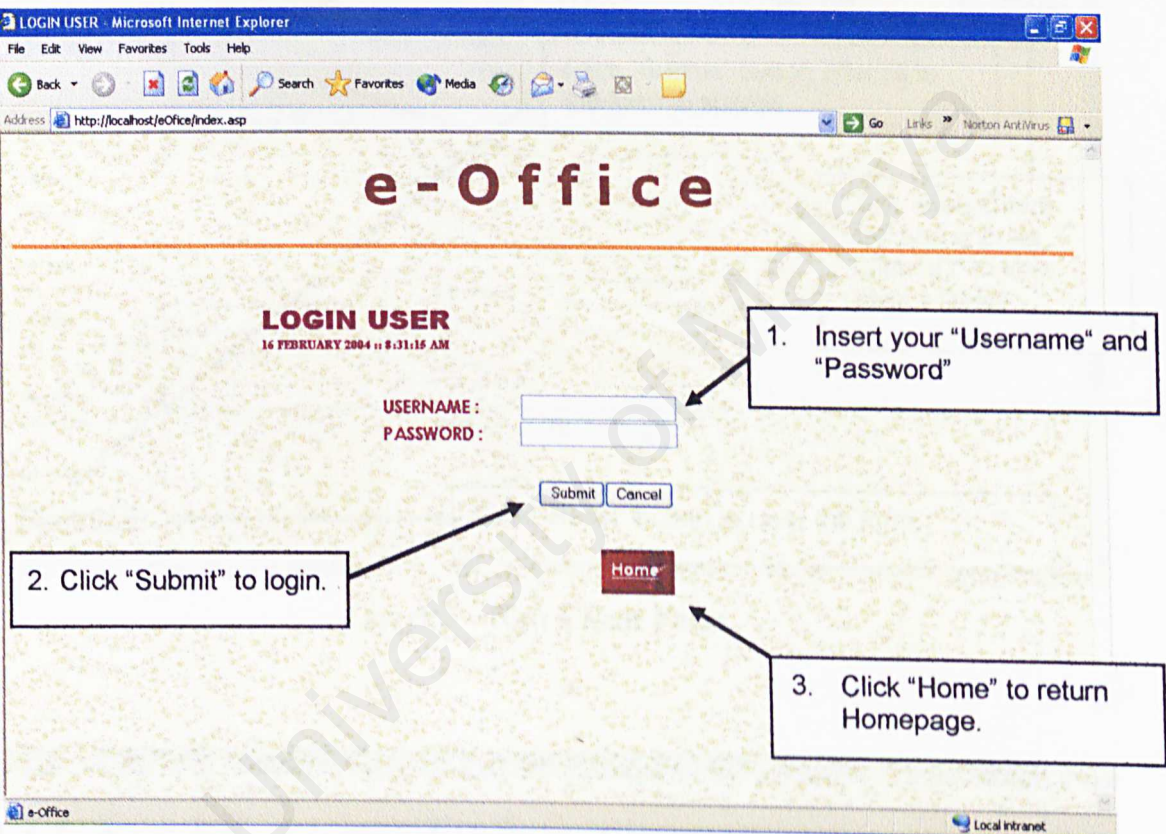
Figure 1 – Login page

After login, "Transaction Menu" page will appear.

Here are links to three different section or module whis are Client, Transaction and Account Module.
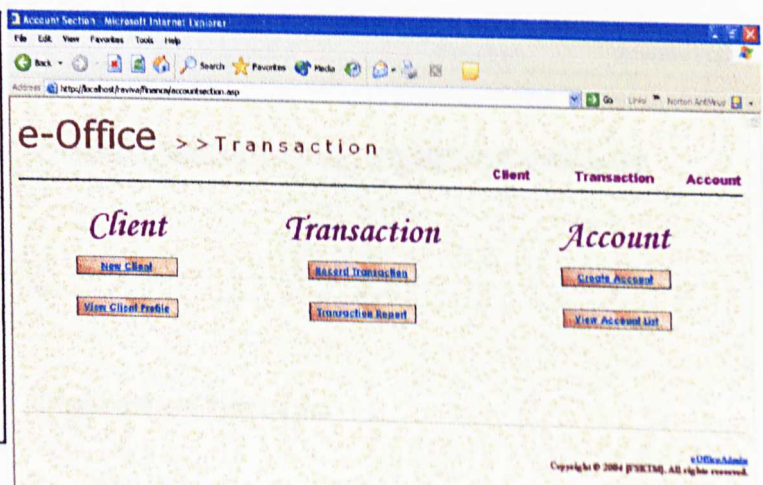
Figure 2 – Transaction Menu Page

2.2   Client Section

This section consist "New Client" and "View Client Profile" link.

Figure 3 – New Client Form

Figure 4 – Client List

Figure 5 – View Client Details

2.3 Transaction Section

Figure 6 – Transaction Form
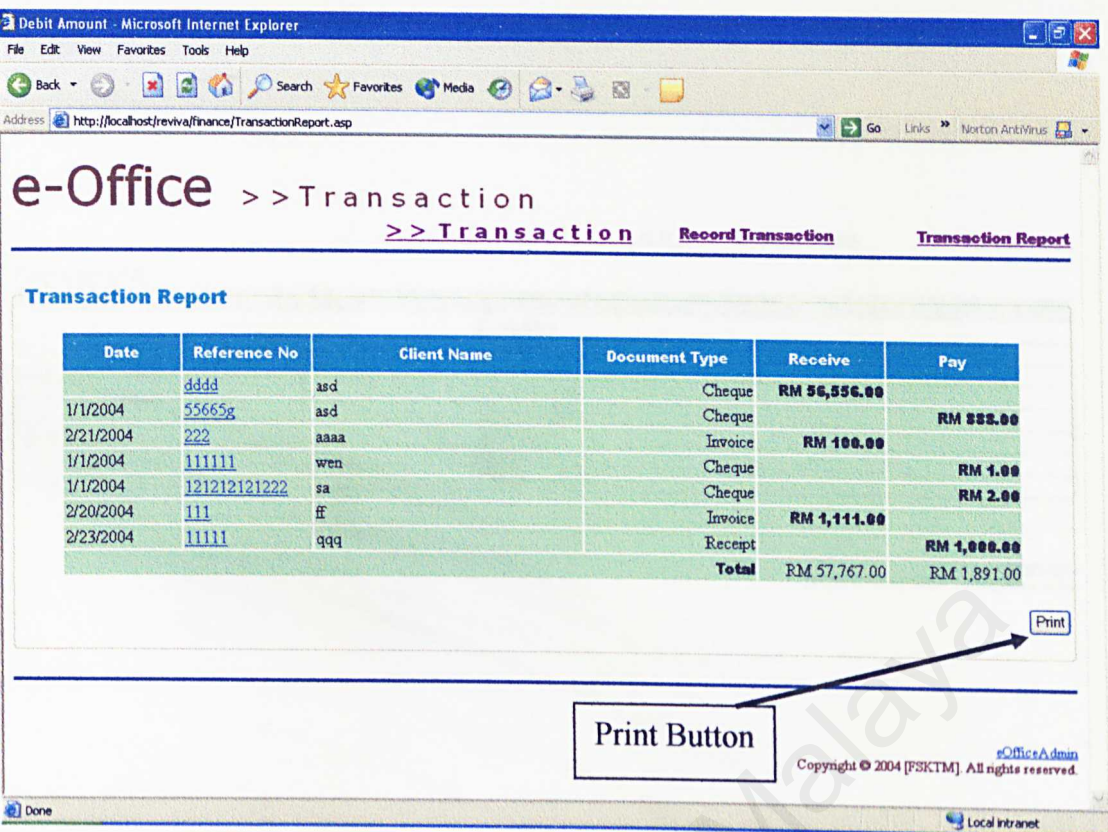
Figure 7 – Transaction Report

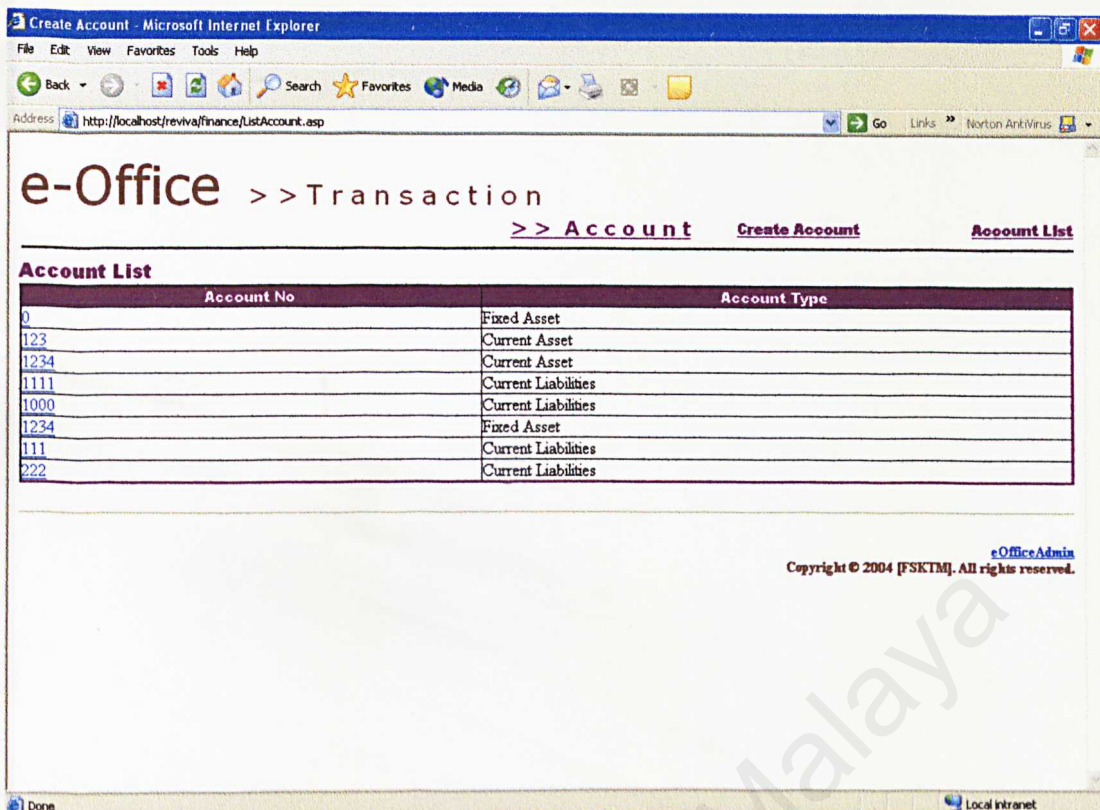## 2.4 Account Section

Figure 8 – Create Account Form

Figure 9 – View Account List

Figure 10 – View Account