Palestine Polytechnic University

College of Administrative Science and Informatics
Information Technology Department

E-Bill

(Applied on PALTEL Company)

Project Team

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This project is submitted in partial fulfillment of the requirements for the degree of B.Sc. in Information Technology in Palestine Polytechnic University

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Graduation Project

Submitted to Information Technology Department in the College of Administrative Science & Informatics
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Approved by chairperson of supervisory community ----------

Date ----------

Abstract

The main goal of the project is to build web-based system PalTel. This project offers Internet-based paying system facility through which, the consumer can view and pay his bills via PalTel web site. In addition, he can view his consumption report. To enable consumer to use this e-Services, he / she must register firstly in PalTel web-based system and have sufficient Credit Card balance from VISA or MasterCard class in order to get benefits from this service.

The system does not provide the paying service only but also gives consumer the ability to report their comments and browse the advertisements that are delivered by the company, and other essential e-Services.

Dedication

To my beloved mother…

To my great father……..…

Baha'a

To my parents, sisters, brothers, friends, teachers and every one granted me the encouragement and support.

Bassam

To my lovely Parents, Brothers, Sister……..…

To every mother in Palestine

To every child who holds a stone in the face of the adversary forces

Qusay

Acknowledgment

We would like to give our thanks to every one participated in the success of this project, whether by an advice or encouragement or useful material related to the project.

First of all, we are so grateful to our supervisor **Mr. Faisal Khamaisah**, who gave us a lot of his precious time to put us on the right track during our work in the project, and he is never being hesitated or late to give us from his knowledge and experience.

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1.1 Initiation

This system supports the consumer to pay the telephone bills using internet services, The principal idea in this system that is minimizes the time and cost for both consumer and service provider (Palestine Telecommunication Company).

Paper bills, invoices, statements and other documents are rapidly becoming a tradition, as consumers and corporate clients demand the flexibility of electronic access to account information. In return, financial institutions and large size companies are looking for ways to satisfy the consumer' needs. This presents a great opportunity for existing mail service providers, payment service providers, or new billing service providers to expand business and create new revenue streams.

E-Bill is a secure online billing service. Nowadays, receiving and paying bills online (E-Bill) is becoming a necessity in our society. It is expected that E-Bill systems can provide fast, easy and secure system. Just by a click or hit on a button the user can make payment so easy.

1.2 Introduction to E-Service

Electronic Service (ES): is where business transactions take place via telecommunications networks, especially the Internet. Electronic services and information via computer networks including the Internet.

The infrastructure for ES is a networked computing environment in business, home, and government and of course high level of security.

Using E-bill can provide the following services:

1. Viewing bills online. Once the consumer set up the payment account, he will be able to pay it with just a mouse click or hit of a button.
2. Paying bills any where, at work or on the road, any time you have an extra two minutes.
3. The Consumer will be able to save or print bills detailed on his PC.

1.3 Paying Bills Online Using Credit Card Account

Such payments can be made into any Credit Card account. Many people pay their monthly rent and other bills directly into the payee's Credit Card accounts. See the following figure that represents the main items that interact together in E-service cycle.

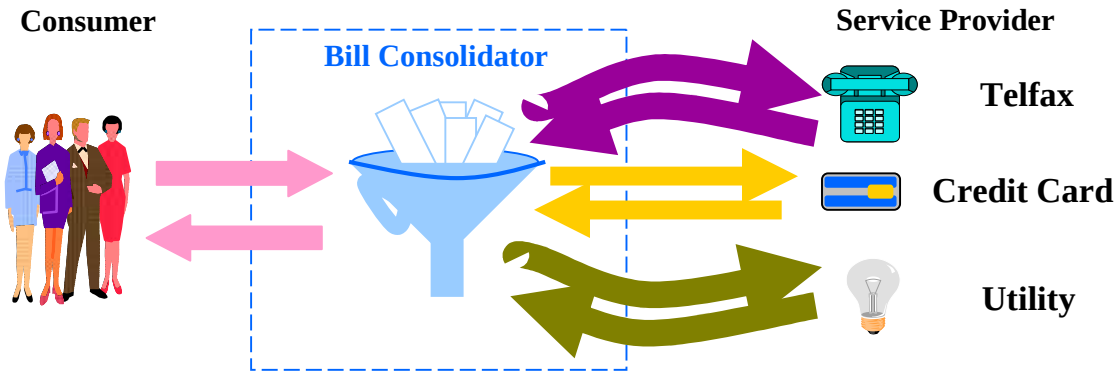

Figure [1.1] E-Service Interaction Cycle [1]

[1] Dave Chaffey, E-Business and E-commerce Management, Nine Edtion ,2004

Under this model figure [1.1], a service provider like **PalTel** posts bills on its Web site, where consumer can view and pay them in any places in the world. This means that the consumer is required go to service provider Web site to pay all their bills.

E-service could be the solution, because of its huge number of benefits that could be gained, some of them are:

1. Serving consumers more easily.
2. Reduce the time and effort during paying process.
3. Staying in touch with wide variety of service provider offers.
4. Improving competition.

By considering all these issues, we have decided to construct a system that serves as an intermediary web-based solution between the consumer and service provider.

2.1 Introduction

In this chapter the system is described precisely for its requirements and its constraints and objectives, topics that are covered in this chapter:

1. System objectives.
2. Functional and Non-Functional requirements.
3. Allocation of roles of system developers.
4. Constraints.
5. Feasibility study (Alternatives, Cost-Benefit analysis, and Evaluation of risks).
6. Resources and Costs.
7. Time Schedule for development.

2.2 System Objectives

This system aims to serve as an electronic government services that plays as the intermediary between **PalTel** and consumer, to reach this goal, certain objectives should be achieved:

1. Building the system database that contains consumers, and PalTel files.
2. Enable consumer to view and pay the PalTel bill online.
3. Enable consumer to get detailed PalTel consumption reports.
4. Reducing the time and cost for both consumers and PalTel.
5. Increasing the efficiency of service.
6. Having reliable and secure data storage.

2.3 Functional Definition

In this section we describe and concentrate on system requirements and the services that should be provided by the system.

1. Browsing bills information.
2. Online payment bill process.

3. Provide consumer with authenticated registration via specific authorization process.
4. Collect the needed information about each consumer.
5. Provide consumer with help tools and facilities.
6. Provide managerial and administration tools and facilities.

	Objective1	Objective2	Objective3	Objective4	Objective5	Objective6
Function1		✕	✕		✕	✕
Function2		✕	✕	✕	✕	✕
Function3					✕	✕
Function4	✕					
Function5					✕	
Function6	✕					✕

Table [2.1] Function- Objectives Matching Table

2.4 Requirements Specification

1) Browsing bills information.
   1.1 Viewing debts and collections.
   1.2 Viewing bill details.

2) Online payment bill process.
   2.1 Get credit card information.
   2.2 Check credit card.
   2.3 Update credit card.
   2.4 Generating bill consumption report.

3) Provide consumer with authenticated registration via specific authorization process.
   3.1 Consumer registration.

3.2 Consumer login.

3.3 Consumer logout.

3.4 Unsubscribe Consumer account.

4) Collect the needed information about each consumer.

4.1 Update login password.

4.2 Update consumer information.

4.3 Forget Password.

5) Providing consumer with help tools and facilities.

5.1 Viewing help.

5.2 Viewing FAQ.

5.3 Viewing announcement and advertisements.

5.4 Acquiring comments and suggestion from consumer.

5.5 Viewing company contact information.

6) Provide managerial and administration tools and facilities (locally).

6.1 Administrator login.

6.2 Administrator logout.

6.3 Viewing the sent comment.

6.4 Update and maintain FAQ.

6.5 Update and maintain announcements and advertisement.

6.6 Bill generation.

2.5 Non-Functional Description

In this section, all system non-functional requirements are described as well their specifications.

1. Appearance: attractive and competitive methodology for displaying web interface.
2. Usability: easy and simple for consumer to make agreements with the web site to pay through it.
3. Speediness and performance: the system response to inputs of consumer with speedily.
4. Security: means for ensuring privacy and protection for consumer's information and the specific authentication should be implemented used to permit accessibility.
5. Operability: simultaneous operations are allowed to take place in the site and are managed to not allow interruption or what ever type of corruption or errors and consumer should be allowed freely to view and navigate contents of the site without time, cost, or load limitations.
6. Compatibility: all types of browsers (clients) can access and brows the site.

2.6 Allocation of roles of system developers:

1. Leader: responsible of planning, scheduling and controlling flow of system development processes.
2. Programmer: responsible of the system programming, implementation testing so he must have enough experiences in the ASP.NET development environment.
3. Software engineer: responsible for the documentation and tracing of the development stages of the software.
4. Interface designer: responsible of the web design and user interface of the system (GUI).

2.7 Constraints:

This section covers the constraints, restrictions, and obstacles that faced us during the development process, some of them are described below:

1. The system is to be developed within a fixed time interval; just fifteen weeks are available for developing the system.

2. Since E-billing is a new idea, consumers will not really trust with this idea, exactly in Palestine.
3. Lack of information about using internet regarding to the consumers.
4. The weak of telecommunication infrastructure in Palestine.

2.8 Feasibility Study

For a system to be developed from scratch, the most important issue is to evaluate its benefits against its cost.

In this section, we show system alternatives that could be adapted; a Cost-Benefit analysis is conducted to justify the decision for developing the system, and an evaluation of the risks that may face the system and the development process.

2.8.1 Alternatives:

Which methodology is the best for developing our system? What are the available ones? What technologies are available? And which of them is the most appropriate? These questions and others are covered and explained through this section.

2.8.1.1 Topology

We can develop our system by working on two different topology:

A) Implementing WAN technologies; the idea of our system could be implemented developing distributed software applications that run on a network comprised of several computers and connected by a network connectivity technology (wired or wireless connections).

Advantage:

1. High level of security and reliability could be achieved.

Disadvantages:

1. More expansive, because it’s required special hardware and software.

2. The existence of networking problems, such as communication problems.
3. More time is needed to install and configure the system.

B) Implementing a web-based client server technology: the computer running the site will act as a web server on the internet; consumer can view the system site on by browsing it using client machines connected to the web.

Advantages:

1. Cover the entire world without geographical restrictions.
2. Faster in registering new consumer.
3. No networking problems, by developing new reliable communication protocols.
4. More scalable.

Disadvantages:

1. Security issue is the major challenge, there is no web based system until now achieve full secure environment.

2.8.1.2 Environment

Server-Side Technologies for Providing Dynamic Content

Each of these technologies relies on a modular attachment added onto the web server rather than the browser. Consequently, only HTML, and any client-side script, is sent back to the browser by the web server. In other words, none of the server-side code is sent back. Server-side technologies have a more consistent look and feel than client-side ones and it doesn't take that much extra learning to move between some of the server-side technologies excepting CGI.

Common Gateway Interface (CGI)

The Common Gateway Interface (CGI) is a mechanism for creating scripts on the server, which can then be used to create dynamic web applications. CGI is a module that is added to the web server. It has been around for quite a bit longer than even ASP, and right now, a large proportion of dynamically created web pages are created using CGI and a scripting

language. However, it's incorrect to assume that CGI does the same job as ASP.NET or ASP. Rather, CGI allows the user to invoke another program (such as a Perl script) on the web server to create the dynamic web page, and the role of CGI is to pass the user supplied data to the this program for processing. However, it does provide the same end result – a dynamic web application.

Advantage:

1. CGI is still very popular with many big web sites, particularly those running on UNIX operating systems. It also runs on many different platforms, which will ensure its continued popularity.

Disadvantages:

1. It is not easy for a beginner to learn how to program such modules.
2. CGI requires a lot of server resources, especially in a multi-user situation.
3. It adds an extra step to our server–side model of creating dynamic content: namely, it's necessary to run a CGI program to create the dynamic page, before the page is processed on the server.

What's more, the format in which CGI receives and transmits data means that the data is not easily manipulated by many programming languages, so you need one with good facilities for manipulating text and communicating with other software. The most able programming languages that can work on any operating system for doing this are C, C++ and Perl. While they can adequately do the job for us, they are some of the more complex languages to learn. Visual Basic doesn't offer adequate text handling facilities, and is therefore rarely used with CGI.

Active Server Pages (ASP)

Developing ASP.NET web applications in the .NET framework are similar to developing windows applications. The fundamental component of ASP.NET is the web form. The web

form is the web page that users view in browsers. An ASP.NET web application comprises of one or more web forms. A web form is dynamic page that can access server resources.

For example, a traditional web page can run script on the client to perform basic tasks. An ASP.NET web form conversely, can also run server side code to access a database, to generate additional Web Forms or to take advantage of built-in security in the server.

In addition, because an ASP.NET Web Form does not rely on the client-side scripting, it is not dependent on the client browser type or operating system. This independence allows you to develop a single Web Form that can be viewed on practically any device that has Internet access and a web browser

Because ASP.NET is part of the .NET Framework, you can develop ASP.NET Web application in any .NET-based language.

Advantage:

1. ASP.NET make web developing much easier.
2. If you have any experience in visual basic or access you will see how familiar in the ASP.NET
3. ASP.NET make web developing much easier as developing windows applications.

Disadvantages:

1. You had a lot of related technologies from HTML, Script, Data access, etc.
2. The tools were terrible.
3. Expensive cost.

Conclusion:

By comparing the two available topologies and putting the need to globalize the scope of the system under light, we have chosen the second topology (web-based client server) and we worked on it.

Also by comparing the server- side environments technologies for providing dynamic web pages we as a team decided to choose the ASP technology as a development environment to build our web based system because the .NET match our programming capabilities, Although the .NET environment charge the team more money than other developments environment.

2.8.2 Cost-benefit analysis

The impact of electronic commerce on the economics will improve economic efficiency; several economic benefits are gained when an electronic commerce system takes place in world business.

According to our feasibility study on developing our system, we conclude that it is a great step for minimizing the costs of trade over the world.

Service Provider benefits:

1. Decrease the managerial time and efforts works.
2. Increase the efficiency by decreasing the error rate during payment processes.
3. The service is not restricted with time and distance; it's providing 24 hour /day.
4. Increase the competitive advantages.

Consumer benefits:

1. Reduce the time and effort too, and make the work more easily more enjoyable.

According to our feasibility study on developing our system, we conclude that it is a great step for minimizing the costs and efforts.

Also because the service provider PalTel consider the consumer as an asset the service provider seeking on the satisfaction of the consumer, so the system will increase the profit that in the future cover the system development costs?

2.8.3 Risk evaluation

There is an opportunity for several risks that may face our system; this section covers them accordingly with the proposed solutions.

Risks List:

1- The security issue and the lack of reliability on computer networks that may be invaded illegally.
2- The E-bill idea is still not accepted or not convenience from consumer.
3- The fear of companies to deal financially by electronic means such as the internet.
4- The resistance for change by mangers and employees in companies when there is a possibility of changing their traditional way of marketing.
5- Insufficient telecommunication data rate (network speed).
6- The need for special Web servers and other infrastructures, in addition to the network servers (additional cost).

Proposed solution:

1. Implementing reliable methods for financial transactions for companies and consumer. These methods will overcome the risks of the security issue and fear from dealing with internet for financial transactions.
2. Encouraging the public class to use the E-commerce application using media.
3. Educate the managers and employees with new modern marketing means to cope with latest technology.
4. Increase the quality of telecommunication services, increase the data rate speed.

2.8.4 Economical Study

In this section, resources and cost are described for both the development and implementation requirements.

- Hardware Costs For System Development:

No.	Item	Quantity	Specifications	Cost
1	Microsoft compatible PC	1	Pentium 4 1800 MHz 512KB cache memory RAM 512 MB Hard Disk drive 40 GHz Floppy drive 1.44 CD-ROM 52X Monitor 15” Keyboard and mouse	$900
2	Printer	1	HP 3420	$85
3	Network Adapter	2	3com (100Mbps)	$50
4	Cables	1	Twisted pair cables (RJ45)	$15
Total				**$1050**

Table [2.2] Hardware Costs

- Development and Implementation Software:

Table [2.3] shows the software products required and their costs for the system development and implementation.

No.	Software	Cost
1	Windows XP professional (Recommended in client side)	$200
2	Windows 2003 server (Recommended in servers)	$180
3	SQL server 2000	$120
4	Multimedia design tools	$200
5	Microsoft Visual Studio.Net V1.0 2003	$500
6	Microsoft Office2003	$450
Total		**$1650**

Table [2.3] Development and Implementation Software

- Human cost:

As shown in Table [2.4] the team costs are estimated as the market prices for software developers.

Number	Team Role	Hours/week	Cost\hour	Total
1	Programming	25	$25	$625
2	Software Engineering	25	$25	$625
3	Interface Design GUI	25	$25	$625
Total cost/week				**$1875**
Total Human Cost [15 week]				**28125**

Table [2.4] Human Cost.

- Other accessories cost:

Other costs such as books, papers, pens, and transportations are estimated to be $20/ week.

- Total Cost:

The table fellow represent the total cost of all system cost:

Number	System Cost	Total
1	Hardware cost	1050$
2	Software cost	1650$
3	Human cost	28125$
4	Other cost	300$
Total cost		**31125$**

Table [2.5] Total Cost

2.8.5 Time Feasibility

In this section we show how we have allocated the given period over the development stages, the time interval that was available to develop the system was 15 weeks, we have distributed

this interval over all of the development process. Table [2.6] shows the time schedule for all development tasks.

- Time Schedule:

As shown below in Table [2.6], all of the system development tasks are distributed over the available fifteen weeks. Some of these tasks were taken place in parallel; figure [1.1] shows the time distribution precisely.

Task	Work	Time in weeks
T1	Information gathering and System specification.	2
T2	Software requirement specification.	2
T3	System Design.	6
T4	Coding and implementation.	6
T5	System Testing.	3
T6	System Maintenance.	2
T7	Documentation.	15

Table [2.6] Time Schedule

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- Gantt chart for time schedule:

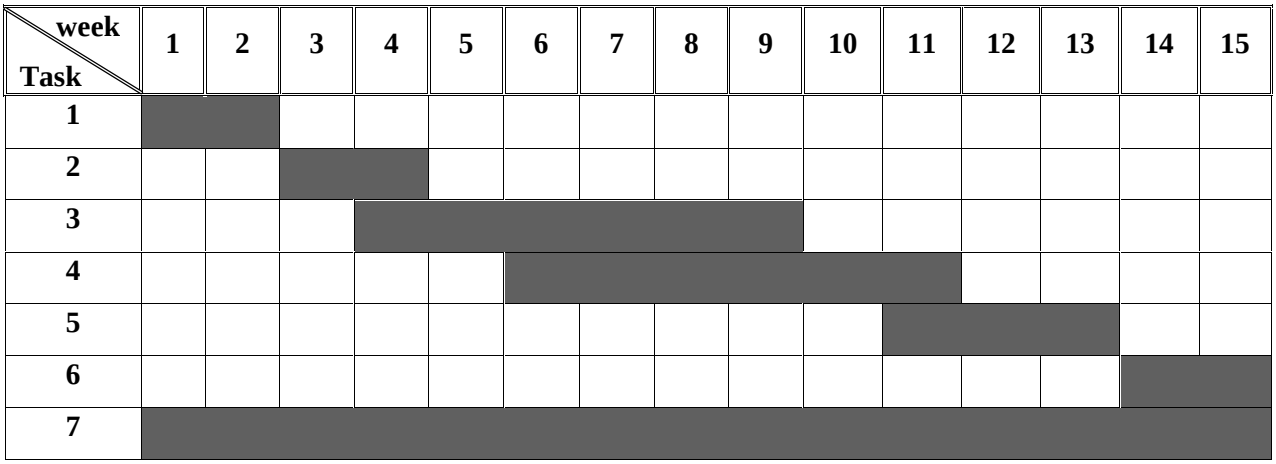

Figure [2.1] Gantt Chart

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2.8.6 Technical feasibility

This project requires a programming experience, and requires an experience in designing web pages and in dealing with database systems (building, interacting with database tables considering security issues, availability, etc). Team work members have an experience to some content in doing such application; they have experience in many programming languages such as C, Visual Basic .net, Java, and others. We can gain help from other expert persons in the university or by asking for it on the web.

2.8.7 Legal feasibility

While looking to our situation, there are no limitations or policies in building such a project. When implementing it in the real business environment, governmental regulation, and other policies should be considered.

3.1 Introduction

This chapter covers the software requirements specifications, by which the over all functionality for the system software will be described, as well the will be classified according to their roles in the system. Topics that are covered in this chapter are:

1. Functional description.
2. Validation criteria.
3. Information description.

Functional description

In this section we describe the major SW functions that meet our system requirements, Table [3.1] shows the functional description for the software system which meet the definition of the requirements which were previously described in chapter two (System Specification):

System requirements	Software Functional Description
1) Browsing bills information.	**1.1 Viewing debts and collections:** The registered consumer should be able to view last six bills status, does the bill paid or not. **1.2 Viewing bill details:** The registered consumer should be able to view, save and print bills.

2) Online payment bill process.	**2.1 Get credit card information:** Checking the validity of the credit card. **2.2 Check credit card:** The registered consumer should be confirmed by the credit card DB and check if he has sufficient balance to pay bill. **2.3 Update credit card:** This function updates the credit card after payment transaction is completed. **2.4 Generating bill consumption report:** The registered consumers should be able to view their consumption bill reports.
3) Provide consumer with authenticated registration via specific authorization process.	**3.1 Consumer registration:** Each subscriber in PalTel company able to register in web-based system to enable him to pay his bill online. **3.2 Consumer login:** This function will be the only method for consumer to login to their account login using Consumer ID and password. **3.3 Consumer logout:** This function enables consumers to end their sessions. **3.4 Unsubscribe Consumer Account:** This function allow the consumer to deactivate his account from PALTEL database records.

4) Collect the needed information about each consumer.	**4.1 Change login password:** The registered consumer should be able to change login password. **4.2 Update consumer information:** This function views or updates the personal information (E-mail) that belongs to specific consumer. **4.3 Forget Password:** This function enable the consumer to retrieve his account if he forget password via consumer E-mail.
5) Providing consumer with help tools and facilities.	**5.1 Viewing help:** The consumer should get help to deal with PalTel web-based system. **5.2 Viewing FAQ:** The user should be able to view the frequently asked questions about the system. **5.3 viewing announcement and advertisements:** The Consumer or public persons should be informed with company announcements and advertisements to keep in touch with company. **5.4 Acquiring comments and suggestion:** This function enables the consumers to send his comments and suggestions about real services. **5.5 Viewing company contact information:** The consumer should be able to view the company address, phone number, fax number, and E-mail address.

6) Provide managerial and administration tools and facilities.	**6.1 Administrator login:** This function will be the only method for administrator to login to PalTel database (locally). **6.2 Administrator logout:** This function enables Administrator to end his session. **6.3 Viewing the sent comments:** The administrator should be able to view comments that sent by consumer via Exchange server. **6.4 Update and maintain FAQ:** The administrator should be able to add, delete and modify FAQ's. **6.5 Update and maintain announcements and advertisements:** The administrator should be able to add, modify and delete announcements Advertisings. **6.6 Generate bills:** The administrator should be able generate bills, add modify bills.

Table [3.1] Functional Description.

3.3 Functional specifications

In this section we describe the major SW functions that meet our system requirements which were previously described in chapter two (System Specification):

3.3.1 Consumer Functional Requirement.

Function	**Viewing Dept And Collection.**
Description	The registered consumer should be able to view last six bills status, does the bill paid or not.
Inputs	Press on collection link.
Source	PalTel database.
Outputs	View last six bills status.
Destination	Screen.
Pre-condition	The registered consumer must have been logged in PalTel e-services website, and request to view his Bills Status.
Post-condition	None.
Validation	None.

Function	**Viewing bills Details.**
Description	The registered consumer should be able to view, save and print bills.
Inputs	Selecting E-bill details.
Source	PalTel database.
Outputs	Bill is displayed printed or saved.
Destination	Screen.
Pre-condition	The consumer must have been logged in PalTel e-services website consumer, and request to view his bill.
Post-condition	None.
Validation	None.

Function	**Get credit card info.**
Description	Checking the validity of the credit card.
Inputs	Credit card type, credit card ID, password, name, expired date, password.
Source	Consumer credit card.
Outputs	None.
Destination	None.
Pre-condition	Credit card information is available.
Post-condition	Ready or not to perform financial transactions.
Validation	1. All fields should be filled with information or making a selection, (change the default setting). 2. The credit card No should be entered as digit numbers.

Function	**Check Credit Card Sufficient.**
Description	The registered consumer should be confirmed by the credit card DB and check if he has sufficient balance to pay bill.
Inputs	None.
Source	Credit Card company database and PalTel database.
Outputs	Sufficient Credit Card balance.
Destination	Screen.
Pre-condition	Consumer should have valid credit card.
Post-condition	Select PalTel Services such as payments services.
Validation	None.

Function	**Update credit card.**
Description	This function updates the credit card after payment transaction is finished.
Inputs	None.
Source	Consumer.
Outputs	New credit card balance.
Destination	Bank database and credit card company.
Pre-condition	Payment process is completed successfully.
Post-condition	Updating the new credit card balance.
Validation	None.

Function	**Generation Bill Consumption Report.**
Description	The registered consumer should be able to view their consumption bill reports.
Inputs	Press the report button generator.
Source	PalTel database records.
Outputs	Payment bill information.
Destination	Screen.
Pre-condition	Payment process is completed successfully.
Post-condition	Print, Save the report (optional).
Validation	None.

Function	**Consumer registration**
Description	Each subscriber in PalTel company able to register in web-based system to enable him to pay his bill online.
Inputs	Consumer ID, ID card, Service value question, Password, Bill period cycle, Secret question, Secret answer, E-mail.
Source	Consumer.
Outputs	Login ID, Password.
Destination	New database records for the new consumer account information.
Pre-condition	The consumer should visit our home page.
Post-condition	The consumer can login and get e-services.
Validation	1. All inputs must be filled correctly. 2. The consumer ID card must match PalTel database record. 3. The password must be at least 6 characters. 4. Password doesn't include special character. 5. Consumer ID duplication also Not allowed.

Function	**Consumer Login.**
Description	This function will be the only method for consumer to login to their account login using Consumer ID and password.
Inputs	Consumer ID and password.
Source	Consumer.
Outputs	Consumer home page.
Destination	Screen.
Pre-condition	The consumer should have valid account.
Post-condition	Consumer can use any available E-services.
Validation	1. All fields should be filled with data. 2. Consumer ID and password must be meet data base record.

Function	**Consumer Logout.**
Description	This function enable consumer to end their session on the home page consumer.
Inputs	Selecting to logout Link.
Source	Consumer.
Outputs	PalTel Home page.
Destination	Screen.
Pre-condition	An existing consumer session.
Post-condition	Return to the Home page in the website.
Validation	None.

Function	**Unsubscribe Consumer account.**
Description	This function allows the consumer to deactivate his account from PALTEL database records.
Inputs	Selecting Unsubscribe Link.
Source	Consumer.
Outputs	Delete consumer account registration record.
Destination	PalTel DB.
Pre-condition	Consumer should have valid account.
Post-condition	None.
Validation	None.

Function	**Change Login Password.**
Description	The registered consumer should be able to change login password.
Inputs	Old password, new password and password confirmation.
Source	Consumer.
Outputs	New consumer password.
Destination	PalTel database.
Pre-condition	Already logged in consumer with the old password.
Post-condition	New password will take effect on the next login.
Validation	1. The new password must be at least 6 characters long. 2. New password equal password confirmation.

Function	**Update Consumer Information**
Description	This function views or updates the personal information (E-mail) that belongs to specific consumer.
Inputs	Insert New Personal Information (E-mail).
Source	PalTel data base Records.
Outputs	Information that belong to consumer.
Destination	Screen.
Pre-condition	The consumer should be login.
Post-condition	None.
Validation	None.

Function	**Forget Password.**
Description	This function enables the consumer to retrieve his account if he forget password via E-mail.
Inputs	Consumer ID, Secret Answer.
Source	Consumer.
Outputs	Forgetting Password.
Destination	PalTel DB.
Pre-condition	Consumer Should Have Valid Account.
Post-condition	None.
Validation	All fields should be filled with information .

Function	**Viewing help.**
Description	The consumer should provide with help.
Inputs	Browse help links.
Source	PalTel database.
Outputs	Help contents.
Destination	Screen.
Pre-condition	None.
Post-condition	None.
Validation	None.

Function	**Viewing FAQ.**
Description	The user should be able to view the frequently asked questions about the system.
Inputs	Browse FAQ's links.
Source	PalTel database.
Outputs	FAQ's list.
Destination	Screen.
Pre-condition	The consumer must visit PalTel e-services website, and request to view FAQ's.
Post-condition	None.
Validation	None.

Function	**Viewing announcements and advertisements**
Description	The Consumer or public persons should be informed of the company announcements and advertisements to keep in touch with company.
Inputs	None.
Source	PalTel Web pages.
Outputs	Announcements and advertisements.
Destination	Screen.
Pre-condition	The Consumer must visit PalTel E-services website, and request to view announcements and advertisements.
Post-condition	None.
Validation	None.

Function	**Acquiring Comments and suggestions from consumer.**
Description	This function enables the consumers to send his comments and suggestions about real services.
Inputs	Consumer comments and suggestion.
Source	Consumer.
Outputs	Comments.
Destination	PalTel database records.
Pre-condition	Consumer should login with PalTel web site.
Post-condition	Add records to PalTel DB.
Validation	None.

Function	**Viewing company contact us information.**
Description	The consumer should be able to view the company address, phone number, fax number, and E-mail address.
Inputs	Press company contact us link.
Source	PalTel web pages.
Outputs	Company address, phone number, fax number, and E-mail.
Destination	Screen.
Pre-condition	None.
Post-condition	None.
Validation	None.

3.3.2 Administration Functional Description

Function	**Administrator login.**
Description	This function will be the only method for administrator to login to PalTel database (locally).
Inputs	User Name, Password.
Source	PalTel database administrator.
Outputs	Login to his session.
Destination	Changes on administrator related account contents (Log files).
Pre-condition	Turn on the web server.
Post-condition	None.
Validation	1. Password should meat the existence roles in SQL server 2000 or operating system.

Function	**Administrator logout.**
Description	This function enables Administrator to end his session.
Inputs	None.
Source	Administrator.
Outputs	Session is ended.
Destination	Change during session are considered and kept.
Pre-condition	Administrator should be login to his session.
Post-condition	Changes are kept and session is closed.
Validation	None.

Function	**Viewing the sent Comments.**
Description	The administrator should be able to view comments that sent by consumer.
Inputs	None.
Source	Consumer.
Outputs	Comments list and details.
Destination	Screen.
Pre-condition	The administrator should have been logged in PalTel web server locally as administrator and select to view comments.
Post-condition	Write back to consumer comments.
Validation	None.

Function	**FAQ's Updating and maintaining.**
Description	The administrator should be able to add, delete and modify FAQ's.
Inputs	Questions and answers details.
Source	Administrator.
Outputs	FAQ list.
Destination	PalTel database.
Pre-condition	The administrator should have been logged in PalTel web server locally as administrator.
Post-condition	Publish the new changes, and activate it.
Validation	None.

Function	**Announcements and Advertisings Maintenance.**
Description	The administrator should be able to add, modify and delete announcements Advertisings.
Inputs	Announcements and Advertisings.
Source	PalTel database Administrator.
Outputs	Announcements and Advertisings.
Destination	PalTel database.
Pre-condition	The administrator should have been logged in PalTel website as administrator and select to maintain announcements.
Post-condition	Publish the new changes, and activate it.
Validation	None.

Function	**Generate Bills (add modify bills).**
Description	The administrator should be able generate bills, add modify bills.
Inputs	Bill's information.
Source	PalTel database Administrator.
Outputs	New bills.
Destination	PalTel database records.
Pre-condition	The administrator should have been logged in PalTel web server locally as administrator.
Post-condition	Publish the new changes and activate it.
Validation	None.

3.4 System Contexts (Relations with other systems)

The figure below shows an overview of the system and its relationships with other systems.

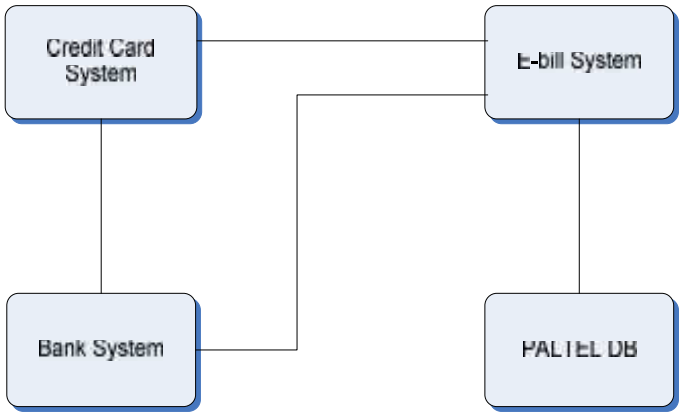


Figure [3.1] System Contexts Diagram

3.5 Information description

During this section, an over all description for the system information is discussed, as well a description for the database requirements and database model is available

3.5.1 System Data Flow Diagrams

Figure [3.2] System Data Flow

3.5.2 Data Dictionary

This dictionary describes system functions, procedures and abbreviations as shown in Table [3.2]

Entity Name	Type	Description
Consumer Registration	Function	Each subscriber in PalTel company able to register in web-based system to enable him to pay his bill online.
Consumer Login	Function	The consumer should be able to log in the system to get E-services.
Authenticate Inputs	Stored procedure	Validate consumer ID and password.
Logout	Function	The consumer should be able end his session.
Update Login Password	Function	The consumer can update the login password easily.
Viewing announcements and advertisements	Function	The user should be informed with the new company announcements to keep the user in touch with new features and services.
Viewing FAQ's	Function	The consumer should be able to view the FAQ's easily to understand the unclear subjects by viewing the most problems and its solutions.
Viewing Help	Function	The consumer should get help.
Viewing company	Function	The consumer should be able to

information.		view the company's information including address telephone No and other essential information.
Sending comments	Function	The consumers should be able to send their comments and feedbacks.
Viewing bills status	Function	The consumer should be able to view last 6 bills status paid or not.
Consumer Bill Viewing	Function	The consumers should be able to view, save and print their bills.
Viewing consumption report.	Function	The consumers should be able to view their consumption reports after the payment process is finished.
Reporting comments	Function	The administrator should be able to view and generate report comments that sent by consumers.
FAQ maintenance	Function	The administrator should be able to add, modify and delete FAQ's (Frequently Asked Questions).
Announcements maintenance	Function	The administrator should be able to add, modify and delete announcements.
Bills generations	Function	The administrator should be able generate new bills.
Online payment using credit card.	Function	The consumer should be able to pay the bill online using credit card.
Generating Balancing Reports.	Function	The credit card companies should generate balancing transactions to PalTel database records.
Browsing The New	Function	PalTel should browse the new

Transaction.		transaction and update its database.
FAQ	Abbreviation	Frequently Asked Questions.
E-bill and E-payment	Abbreviation	Electronic bill and Electronic payment.
PalTel	Abbreviation	Palestine Telecommunication.
WWW	Abbreviation	World Wide Web.
SID	Abbreviation	Session Identification.
Info	Abbreviation	Information.
VAT	Abbreviation	Value Added Tax.
Credit Card	Object	This is the object that represents a customer's credit document that has a unique number which identifies it on the bank to enable him make financial transactions that affects his account without the need to make these transactions manually.
Validation	String	This string is the code that is used to ensure that any user of the system has typed the right data types and formats into certain fields.
Consumer	String	A string that represents a person who browses the PalTel web site.
Credit Card	String	A string that represent the method of holding value, (Financial value). Those enable the consumer to pay the desired bills.

Services	String	This string identifies a certain entity in the system such as type of telephone calls.

Table [3.2] Data Dictionary

3.5.3 System Interface description

The interface between our system components, functions, modules, and subsystems are to be reliable and integrated, that is, all functions and other components are designed and implemented in a way that ensures the correctness of collaboration between them.

Doing so requires a clear definition of the exchanged parameters and their types and orders, a reliable methodology for dealing with shared memory along with the input/output resources, and other issues that could appear during system design and system testing phases. (Design and Testing phases are covered in chapter 4 and 6 respectively).

According to the user interface, the System will support only User (Consumer) interface.

Consumer Interface:

Input:

The interface between consumer and PalTel system is controlled to ensure that he entered parameters of the same type as they identified later during system development by using validation techniques available, the consumer will be permitted to input just valid parameters type within an allowed range of values to increase the consistency in database.

Output:

The output for consumer must give them a sense of what is happening in each process, as they choose a certain bill from bills list, also support the consumer with confirmation and reports to ensure that the process is completely done.

This report shows all information and details for each bill to enable the consumer to view the content of the bill.

GUI

The graphical user interface must be easy and attractive for users (consumers); it should provide some what guidance marks that guide consumer to the next step to be done.

Also the GUI provides the users (consumers) with Help and FAQ's to enable the user to understand the unclear subjects.

3.4.4 Database Requirements

PalTel System database will include the following major tables and fields:

3.4.4.1 PalTel Databases Tables

A- Consumer information tables

Telephone No: Each consumer has a unique Consumer ID.

Consumer Name: Contain the information about the full name of each consumer that includes First Name, Last Name, and Middle Name.

ID card No: Each consumer has a unique ID card no.

Address: the information that belong to the nature of the location that the consumer lives in including City Name, Street Name.

Consumer ID: A unique number for each registered consumer on the PalTel web site.

City Number: This is unique number for each city, each city have different sequence number city for example Hebron have 0221.

E-mail: Each consumer have a unique E-mail account.

Password: A unique characters for each consumer, these characters should encrypt in some encryption methods to increase the level of security.

B- City Table

City Number: This is unique number for each city, each city have different sequence number city for example Hebron have 0221.

City Name: A string that present the famous name of the city such as Hebron city.

Zip Code: It’s a unique number for each city for example Hebron has 02.

C- Bill details.

Bill No: The sequence number of the generated bill, each bill has a unique number.

Consumer ID: A unique number for each registered consumer on the PalTel web site.

Bill Period Cycle: the start date and the end date period for each bill, generally will be about two month's.

Issue Date: The date that the bill issued at.

Due Date: The date that PalTel allowed the consumer to paid at.

Status No: A flag that determine weather the bill is paid or not.

Payment Date: The date that the consumer paid the bill at.

D- Service Details

Service No: A unique No for each item such as the calls type.

Service Name: Strings that represent specific item for example 01 mean Local calls etc.

E- Bill - Service

Bill No: The sequence number of the generated bill, each bill has a unique number.

Service No: A unique No for each item such as 11.

Service Value: The value for each different item.

F- Bill Status

Status No: A unique No for each status.

Status Name: A unique name for each status such as paid or unpaid.

G- Question Details

Question No: A unique no for each question.

Question phrase: The question statement that is selected by consumer.

H- Consumer Question

Question No: A unique no for each question.

Consumer ID: A unique number for each registered consumer on the PalTel web site.

Answer: The secret answer that is selected by consumer.

3.4.4.2 Credit Card Information Table.

A- Credit Card Account

Credit card ID: A unique ID for each credit card.

Credit card Type No: A unique no for each credit card type for example 11 mean VISA card.

Password: A unique characters for each credit card, these characters should encrypt in some encryption methods to increase the level of security.

Expired Date (month, year): The expired date of the credit card.

Holder Name: The full name of the owner of the credit card including, First Name, middle Name, last Name.

Credit Card Total Balance: The credit card balance.

B- Credit Card Type

Credit card Type No: A unique no for each credit card type for example 11 mean VISA card.

Credit Card Type Name: The type of credit card company, ex: VISA card, MasterCard.

3.3.3.3 Bank Data Base Table

A- Bank Account

Account ID: Each account holder has a unique account ID.

Account Type: Each account has specific type.

Beneficiary Name: The name of the company that get benefits

Account Total Balance: The total balance of specific account.

B- Bank Transaction

Transaction No: each transaction has unique no that is generated by sequence.

Account ID: Each account holder has a unique account ID.

Payment Amount: The mount of money that is paid by consumer.

Payment Date: The date of the payment.

4.3 Input/output Design:

Designing the user interface forms is an important complementary issue when developing a powerful commercial system, as the system will operate within a context that contains huge numbers of different users; it should satisfy their needs towards system appearance and interface.

I/O design includes the detailed graphical description of all I/O forms for each consumer and Credit card forms.

Input screens design

A- Consumer Forms

- Consumer Login
- New Consumer registration
- Forget Password
- View/ Update personal consumer information
- Change Password
- Send Comments
- Agreement Terms & Conditions
- Disclaimer

B- Credit Card Forms

- Credit card Information

Output Screen Design

A- Consumer Forms

- Debt and Collection
- Bill Details
- Bill Consumption report

4.3.1 Input screens design

The system as specified previously has two forms categories; in this section we describe the input forms design for each of them:

4.3.1.1 Consumer Forms

- ***Consumer Login***

This screen enables Consumer to login into his account. After meeting the values typed by the Consumer into the two text boxes shown following in figure [4.25], with the consumer's login ID and password stored in a record in the database, Consumer types his login ID in the first text box and his login password in the second one. (Login) button is clicked to login the account and the new register link is used to make new login account if the consumer don't have an account yet, In addition, forget password link is used to retrieve the password if the consumer forgets it for some reasons.

Figure [4.25] Consumer Login Form

- ***New Consumer Registration***

To accomplish this process the consumer should do three main steps sequentially.

Step One:

In this form there is two text boxes and drop down list and button, the first text box the consumer should input his login ID, and in the second text box the consumer should insert his ID card No.

The second part of this form, the consumer should select secret question (drop down list one) and type secret answer in (text box three) to increase the efficiency of our system to enable the consumer to retrieve the password if consumer forgets it.

Then for more privacy, in drop down list two the consumer should select any bill cycle that belong to him, then the consumer should click on the Submit button to proceed the registration process as shown following in figure [4.26]

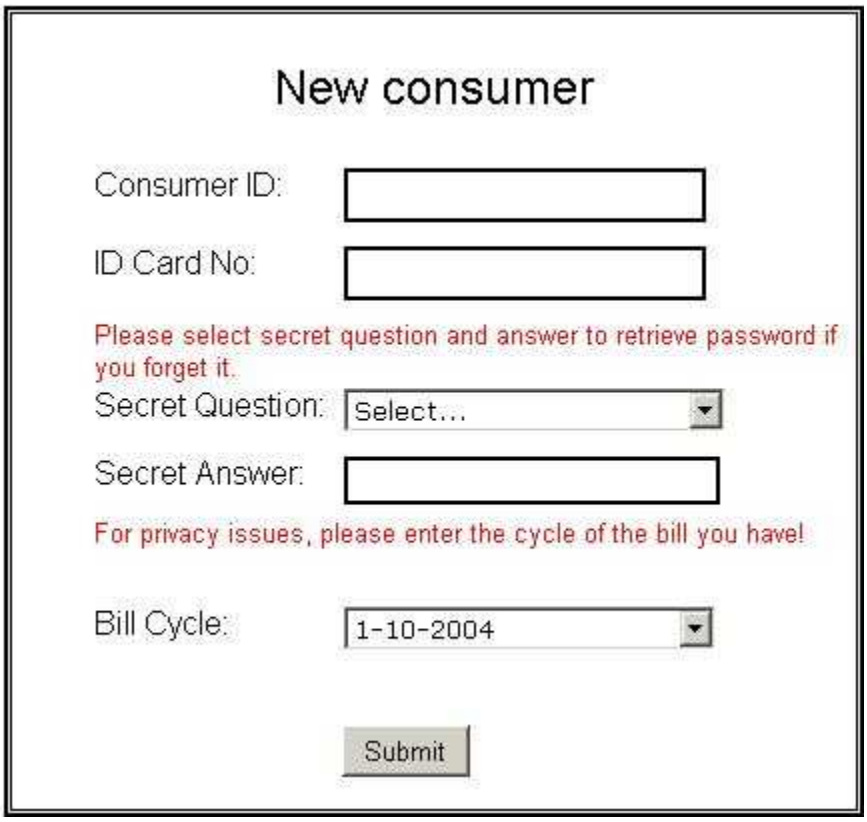


Figure [4.26] New Consumer Registration (Step One) Form

Step two:

This form contains three text boxes and button, the first and second text boxes represents consumer ID and Consumer ID card No from the first step in registration process as a confirmation output.

In the forth text box the consumer should insert the exact total service value that will generate randomly by our system of the selected bill cycle in step one in consumer registration process.

After that consumer should click on submit button to precede the registration process as shown below in figure [4.27]

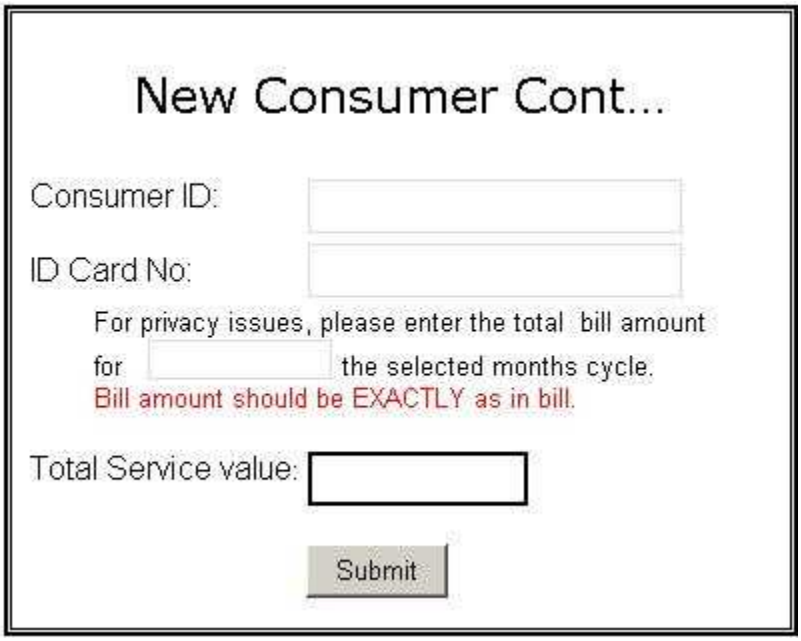


Figure [4.27] New Consumer Registration (Step Two) Form

Step three:

This form contains three text boxes and single button, in the first text box the consumer should insert his own password, this password text box should contain at least six characters without using special characters such as (/ ; , -).

In second text box the consumer should confirm the password in the first text box; also the consumer can insert his own E-mail in the third text box

After that he/ she should click on the submit button to finish the registration process as shown following in figure [4.28]

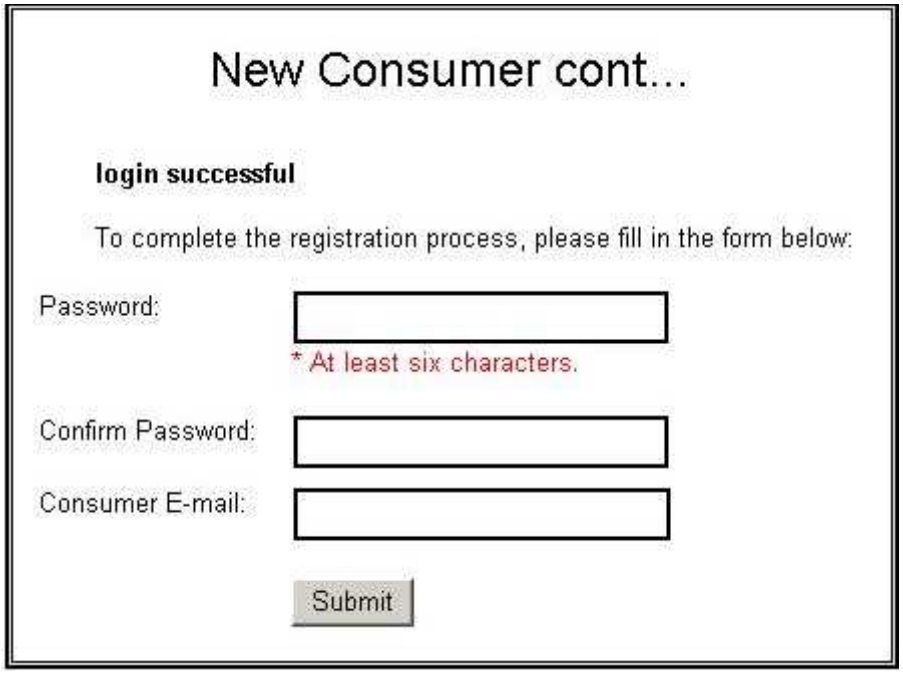


Figure [4.28] New Consumer Registration (Step Three) Form

- ***Forget Password***

This form enables the consumer to retrieve the consumer password; the form contains two text boxes, the consumer should type this controls carefully, that mean the entered values should match the values that entered in registration process, otherwise the consumer can't retrieve his password as shown in figure [4.29]

Figure [4.29] Forget Password Form

- ***View / Update personal Consumer Information***

This form enables consumer to view or update his own information, the first three text boxes are view the consumer name, Tel no, and his address respectively.

Note: these three text boxes are disabled in this form and that mean they are used for viewing purpose only.

The fourth text box is enabling the consumer to update his own E-mail if he wishes to do that.

Also there is tow link in this form, the change password link redirects the consumer to change password form, and the Unsubscribe link used to delete the consumer account.

To activate E-mail updating the consumer should click on update button or click on cancel button to cancel the operation as shown following in figure [4.30].

Figure [4.30] View/ Update Personal Consumer Information Form

- ***Change Password Form***

This screen enables the consumer to change their login password; a consumer who wishes to change his login password must type his Old password in the first Text box respectively, the new password is to be typed in the second text box and confirmation of the password in the third text box.

When the consumer decides to change his password, he should click on the update button, or cancel this operation by clicking on the cancel button as shown following in figure [4.31]

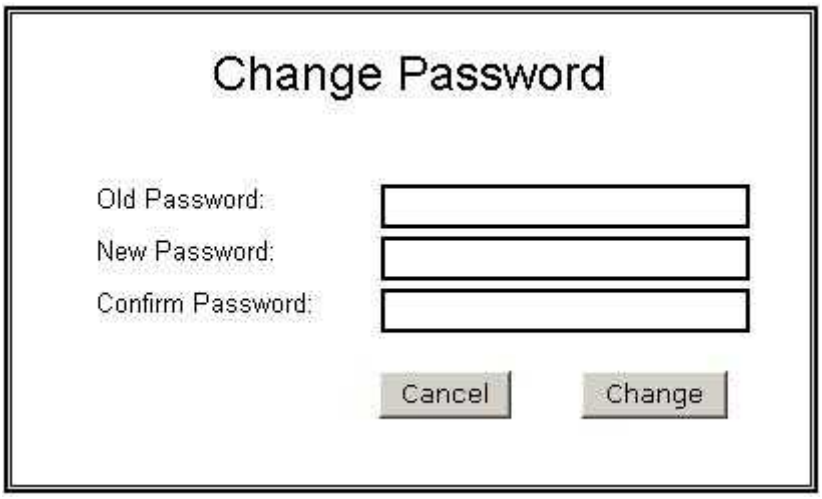


Figure [4.31] Change Password Form

- ***Comments Form:***

This screen contains text box that enable consumer to type comments and suggestion about the E-bill system that used.

If consumer decides to send these comments he should click on Send button, otherwise click on cancel button to exit from this form as shown following in figure [4.32]

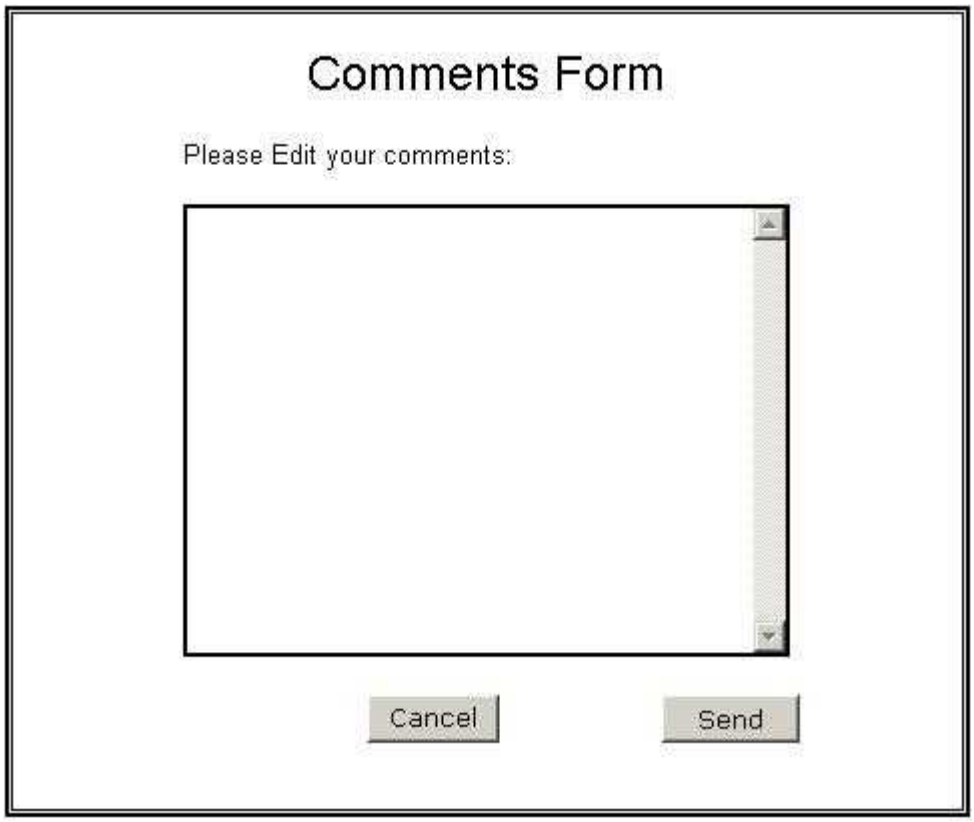


Figure [4.32] Comments Form

- ***Agreement terms & Condition Form:***

This form appears during the consumer registration process. The form contains the agreement script and two buttons, when the consumer clicks on the agree button, he can move to the next form, otherwise click on I don't agree button will exit this form, as shown following in figure [4.33]

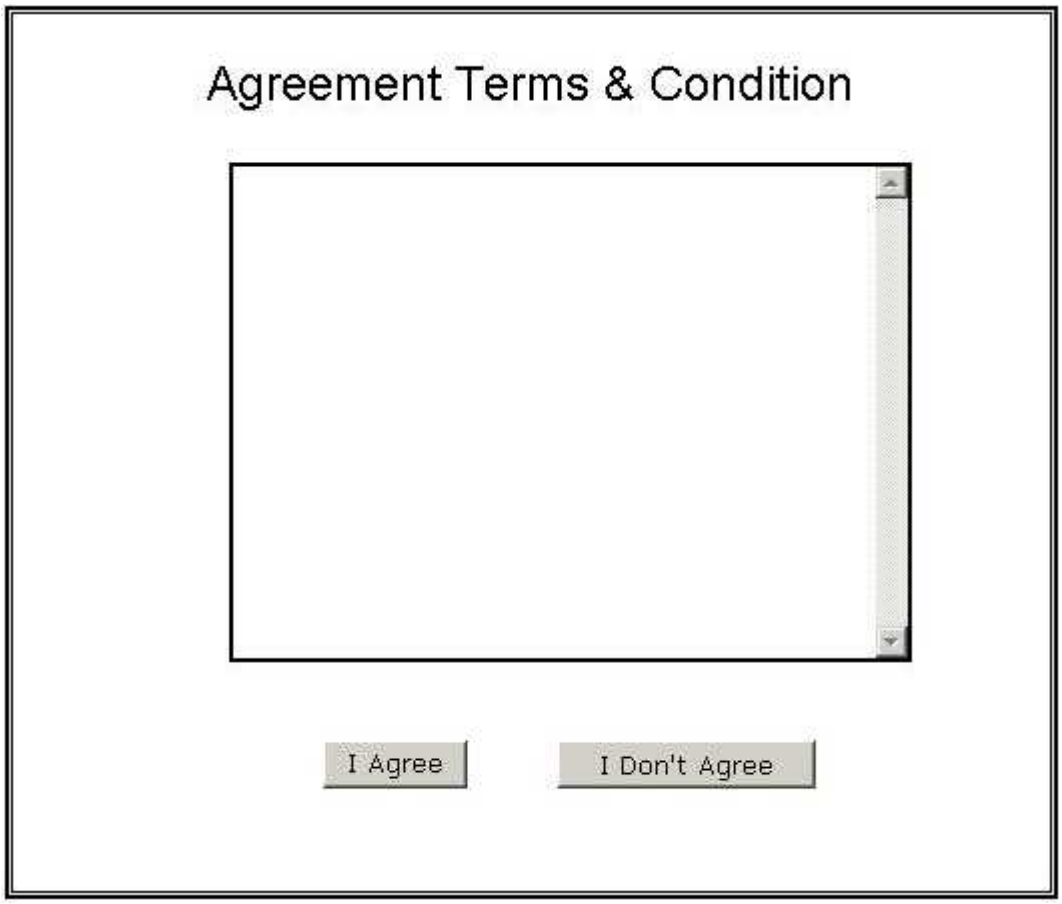


Figure [4.33] Agreement Terms and Condition Form

- ***Disclaimer Form***

Also this form is appeared during payment bill process, the form contain the disclaimer script and two buttons, if the consumer decide to accept the disclaimer script he should select agree button or if he don't he should click on I don't agree button as shown in figure [4.34]

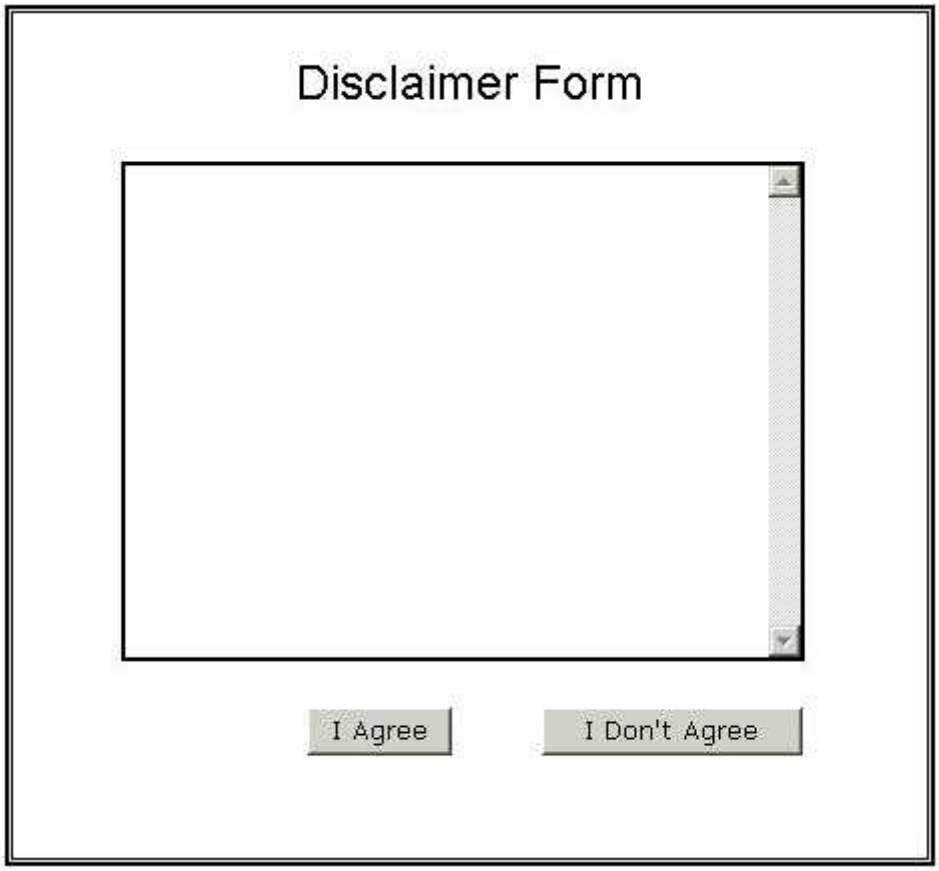


Figure [4.34] Disclaimer Form

4.3.1.2 Credit Card Forms

- ***Credit Card Information Form***

This form contains two canvases the first one that located at the top of the form which contains bill no, and bill total amount fields.

Note: These fields are just for output purpose to confirm the desired bill no, and the total bill balance.

In the second canvas the consumer must select his credit card type by selecting it from the first drop down list, then he will select the expiration month, year from the second and third drop down lists.

After that the consumer should types the card number on the first text box, then type the holder name in the second text box then the password in the third text box.

After that if the consumer decided to verify the credit card information he should click on submit button or click on cancel button to exit this form as shown in figure [4.35]

Figure [4.35] Credit Card Information Form

4.3.2 Output Screens Design

The system as specified previously has two forms categories; in this section we describe the output forms design for each of them:

4.3.2.1 Consumer Forms

- ***Debts and collection***

This screen display the last six issued bills, which contains basic information about each bill such as Tel No, Bill No, Bill Cycle, Total Amount, payment date, and Status.
Also this form contain two text boxes used for shown purpose include consumer name and account no.
If the consumer decides to view the bill details or pay the selected bill he should click on the Pay/ Details link as shown following in figure [4.36]

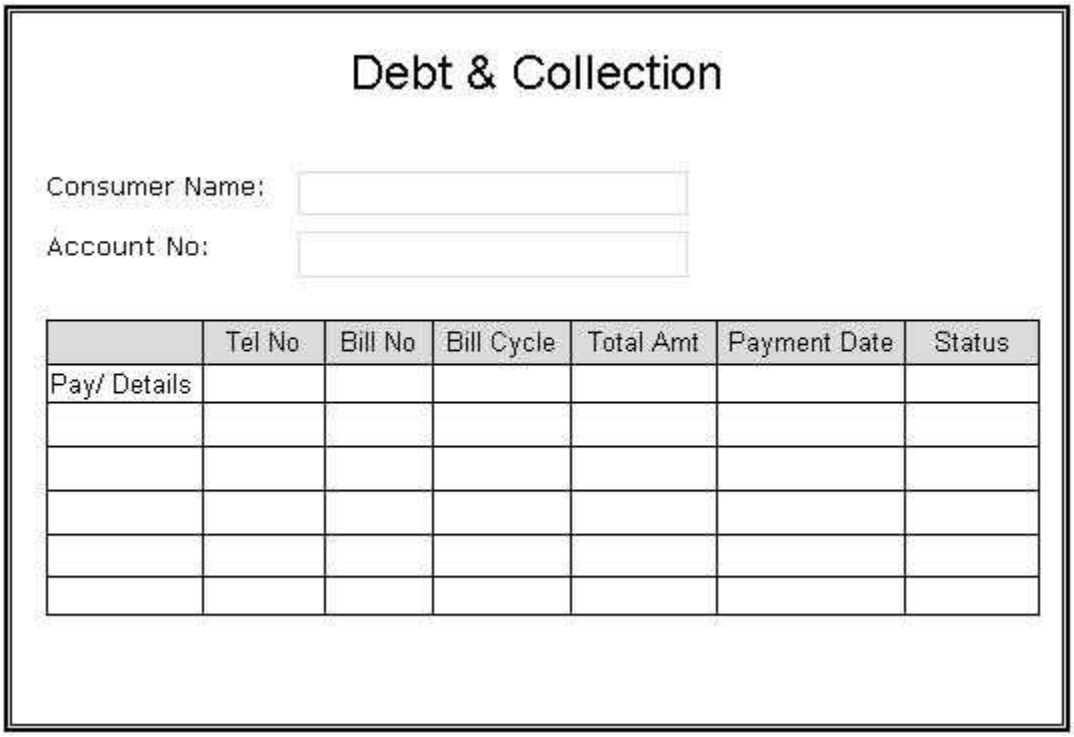


Figure [4.36] Debts and Collection Form.

- ***Bill Details Form***

This screen contain three canvases the first one contain the major information about selected bill, the other canvas describe the details information about this bill, and the third one contain three text boxes used for shown purposes contain total without VAT, VAT, total bill amount. If the consumer decides to pay the selected bill he should click on Pay button, otherwise click on back button to return to debt and collection form as shown in figure [4.37]

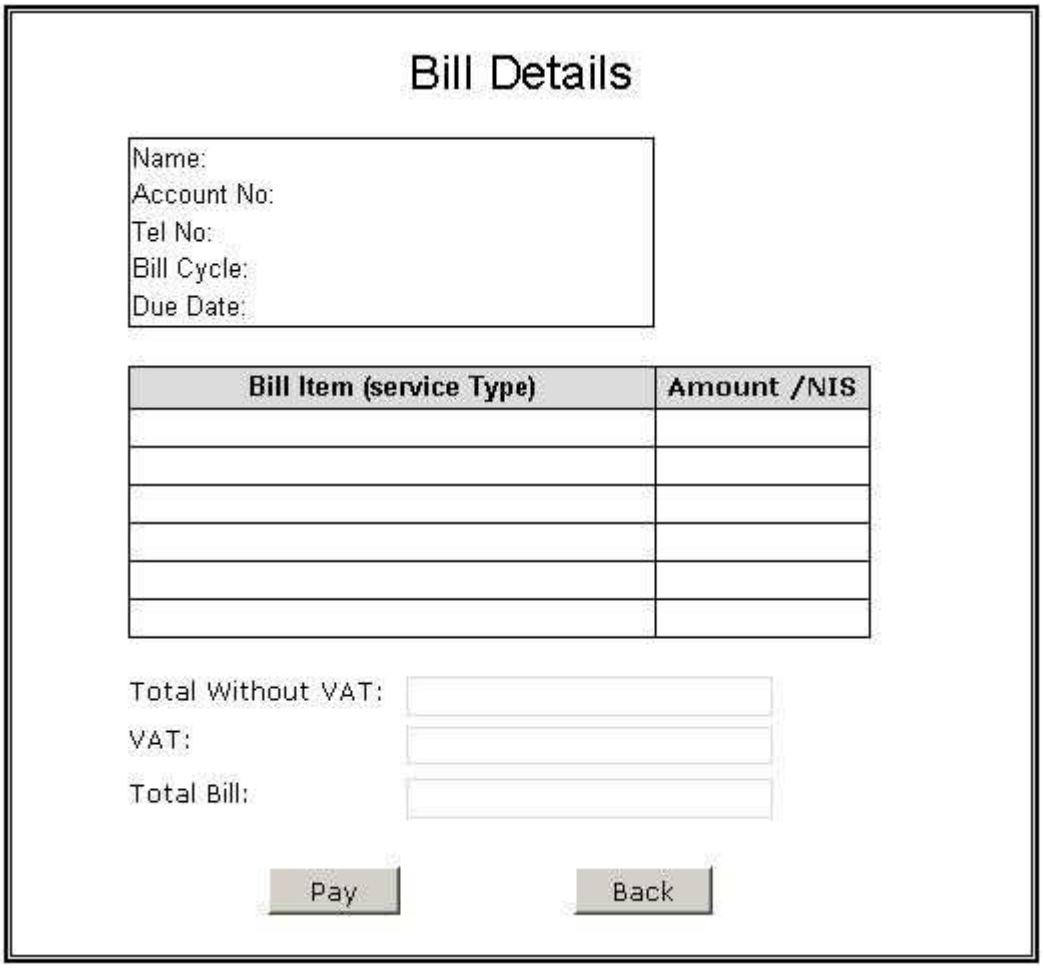


Figure [4.37] Bill Details Form

- ***Bill Consumption report***

This form contain three canvases the first part contain consumer information, the second part contain the information about the paid bill, and the third part contain the information of payment method. As shown in figure [4.38]

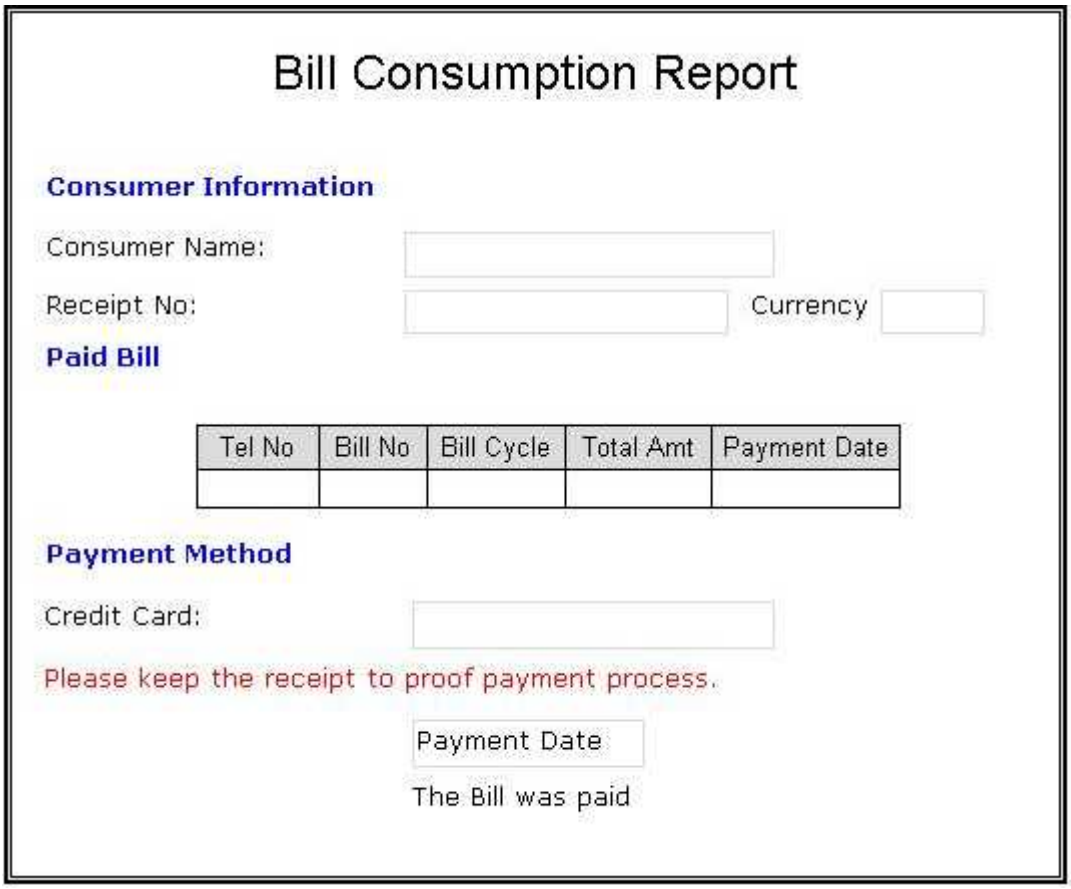


Figure [4.38] Bill Consumption Report Form

4.4 Database design

This section describes the design of the system database and the database model.

4.4.1 Database Dictionary

4.4.1.1 PalTel DB Dictionary

Consumer Table

Field	Data type	Required	Key	Extra	description
Consumer_ID	Numeric (9)	Yes	**PK**		A unique number for each registered consumer on the PalTel web site.
Password	Nvarchar (50)	Yes			Unique characters for each consumer.
FName	Nvarchar (50)	Yes			Consumer First name
MName	Nvarchar (50)	Yes			Consumer middle name
LName	Nvarchar (50)	Yes			Consumer last name.
ID_Card_No	Numeric (9)	Yes			Consumer ID card No.
Tel No	Numeric (9)	Yes			Each consumer have Tel No.
Address	Nvarchar (50)	Yes			Consumer full address.
E-mail	Nvarchar (50)	Yes			Each consumer has a unique E-mail account.
City _No	Integer (4)	Yes	**FK**		Unique No for each city.

Table [4.1] Consumer DB Table

City Table

Field	Data type	Required	Key	Extra	description
City_No	Integer (4)	Yes	**PK**		Unique No for each city.
City_ Name	Nvarchar (50)	Yes			A string that present the famous name of the city such as Hebron city.
Zip_Code	Integer (4)	Yes			It's a unique number for each city for example Hebron has 02.

Table [4.2] City DB Table

Bill Details Table

Field	Data type	Required	Key	Extra	description
Bill_No	Numeric (9)	Yes	**PK**	Auto Increment	The sequence number of the generated bill, each bill has a unique number.
Bill_Cycle	Nvarchar (50)	Yes			The start date and the end date period for each bill, generally will be about two month's.
Issue_Date	DateTime (8)	Yes			The date that the bill issued at.
Due_Date	DateTime (8)	Yes			The date that PalTel allowed the consumer to paid at.
Payment_Date	DateTime (8)	Yes			The date that the consumer paid the bill at.
Status_No	Integer (4)	Yes	**FK**		A flag that determine weather the bill is paid or not.
Consumer_ID	Numeric (9)	Yes	**FK**		A unique number for each registered consumer on the PalTel web site.

Table [4.3] Bill Details DB Table

Bill Service Table

Field	Data type	Required	Key	Extra	description
Service_No	Integer (2)	Yes	**PK, FK**		A unique No for each service such as the calls type
Bill _No	Numeric (9)	Yes	**PK, FK**		The sequence number of the generated bill, each bill has a unique number.
Service_Value	Float (8,2)	Yes			The value for each different service.

Table [4.4] Bill Service DB Table

Service Table

Field	Data type	Required	Key	Extra	description
Service_No	Integer (2)	Yes	**PK**		A unique No for each service such as the calls type
Service_Name	Nvarchar (50)	Yes			Each service have name. Ex: Jawwal calls.

Table [4.5] Service DB Table

Consumer Question Table

Field	Data type	Required	Key	Extra	description
Question_No	Integer (2)	Yes	**PK, FK**		Each Question contain unique no.
Consumer_ID	Numeric (9)	Yes	**PK, FK**		A unique number for each registered consumer on the PalTel web site.
Answer	Nvarchar (50)	Yes			The answer of the selected question typed by the consumer.

Table [4.6] Consumer Question DB Table

Question details Table

Field	Data type	Required	Key	Extra	description
Question_No	Integer (2)	Yes	**PK**		Each Question contain unique no.
Question_Name	Nvarchar (50)	Yes			Each Question has question phrase.

Table [4.7] Question Details DB Table

Bill Status Table

Field	Data type	Required	Key	Extra	description
Status_No	Integer (1)	Yes	**PK**		Flag used to determine whether the bill is paid or not.
Status_Name	Nvarchar (50)	Yes			Each status have status name.

Table [4.8] Bill Status DB Table

4.4.1.2 Credit Card DB Dictionary

Credit Card Information Table

Field	Data type	Required	Key	Extra	description
Credit_ Card_ID	Numeric (9)	Yes	**PK**		A unique ID for each credit card.
Credit_ Card_ Type_ No	Integer (2)	Yes	**PK FK**		Each credit card type have unique no.
FName	Nvarchar (50)	Yes			Each credit card has first holder name.
MName	Nvarchar (50)	Yes			Each credit card has middle holder name.
LName	Nvarchar (50)	Yes			Each credit card has last holder name.
Expired_Date_Month	Integer(2)	Yes			The expired date month of the credit card.
Expired_Date_Year	Integer(4)	Yes			The expired date year of the credit card.
Password	Nvarchar (50)	Yes			Each credit card have password.
Credit_Card_Balance	Float (8, 2)	Yes			The credit card balance.

Table [4.9] Credit Card Information DB Table

Credit Card Type Table

Field	Data type	Required	Key	Extra	description
Credit_Card_Type_No	Integer (2)	Yes	**PK**		Each credit card type have unique no.
Credit_Card_Type_Name	Nvarchar (50)	Yes			Name of credit card type Ex: VISA card.

Table [4.10] Credit Card Type DB Table

4.4.1.3 Bank DB Dictionary

Bank Account Table

Field	Data type	Required	Key	Extra	description
Account_ID	Numeric (9)	Yes	**PK**		A unique ID for each account.
Account_Type	Nvarchare (50)	Yes			Each Account has Account Type.
Beneficiary_Name	Nvarchar (50)	Yes			The beneficiary name in that bank.

Table [4.11] Bank Account Table

Bank Transaction Table

Field	Data type	Required	Key	Extra	description
Transaction_No	Numeric (9)	Yes	**PK**	Auto Increment	The sequence number of each transaction.
Account_ID	Numeric (15)	Yes	**FK**		A unique ID for each account.
Payment_Amount	Float (8, 2)	Yes			The mount of money that is paid via consumer credit card
Payment_Date	DateTime (8)	Yes			The date that the consumer paid the bill at.

Table [4.12] Bank Transaction Table

4.4.2 Database Model

We have implemented a relational database model for our system database design and implementation, shown bellow in figure [4.22] UML notations that describes the database model.

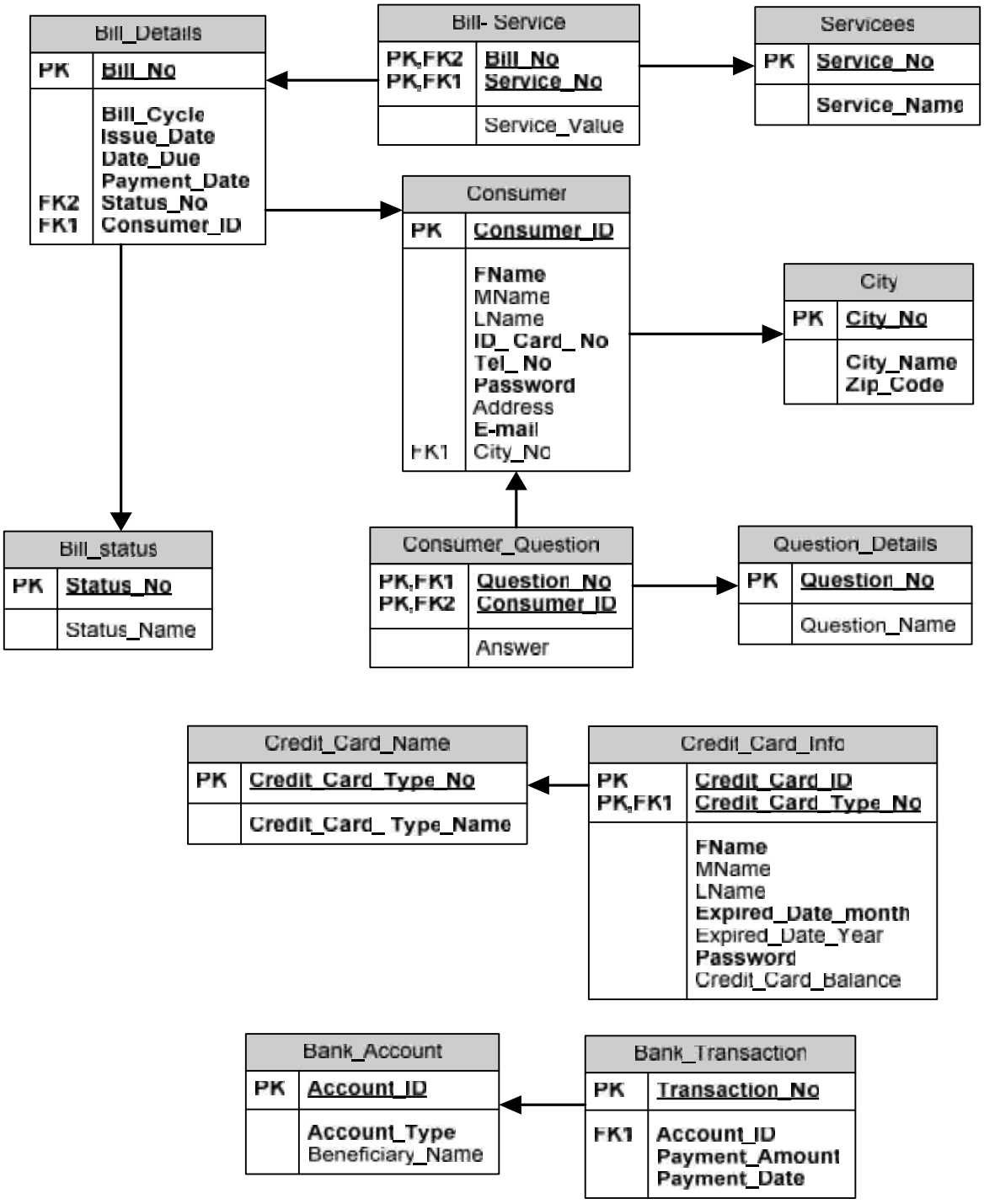


Figure [4.39] Database Model

4.5 Test Plan

Here we describe the methodology that we have adapted to test the system, steps that will be followed in the system testing are described bellow:

Testing steps:

1- Unit and Module testing:

We will use unit testing to ensure that each function or module will operate as expected.

2- Integration testing:

The integration of all units will be tested so that to ensure that the sub-systems work together properly as expected.

3- System testing:

The system will be tested to ensure that all functions work together properly, and that all errors were detected.

4- Acceptance Testing:

The system will be tested against its requirements, and test if that achieves its functional requirements, and operate in the real environment.

4.1 Introduction

This chapter describes the system design, the functional design for all modules in the software system, I/O design, and database design.

Topics that are covered in this chapter:

1. Functional design.
2. I/O Design.
3. Database Design.
4. Test plan.

4.2 Functional Design

This section describes the functional design for each module in the software system, accordingly with the description of the interface, the constraints, and the user interface design in which we use means of diagramming to help us understand it:

1- Consumer Registration

a) Description: Each subscriber in PalTel Company able to register in web-based system to enable him to pay his bill online.

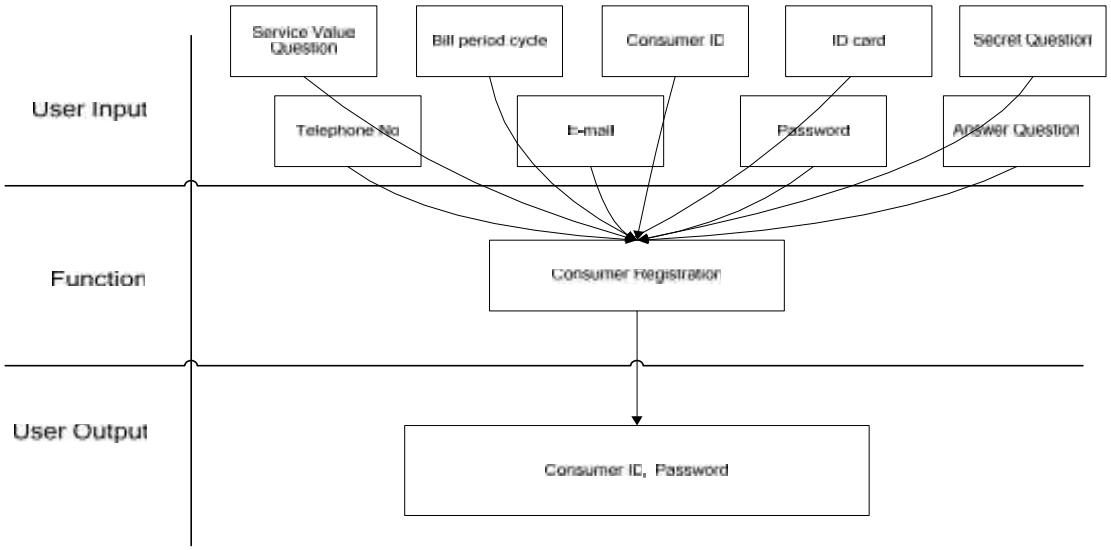
b) Interface:

- Inputs: Consumer ID, ID card, Bill period cycle, Password, Service value question, Secret question, Secret answer, E-mail.
- Outputs: Login ID, Password.

c) Constraints:

- All inputs must be filled correctly.
- The consumer ID card must equal PalTel database record.
- The password must be at least 6 characters.
- Password doesn't include special character.
- Consumer ID duplication also Not allowed.

d) User interface design:



e) Flowchart:

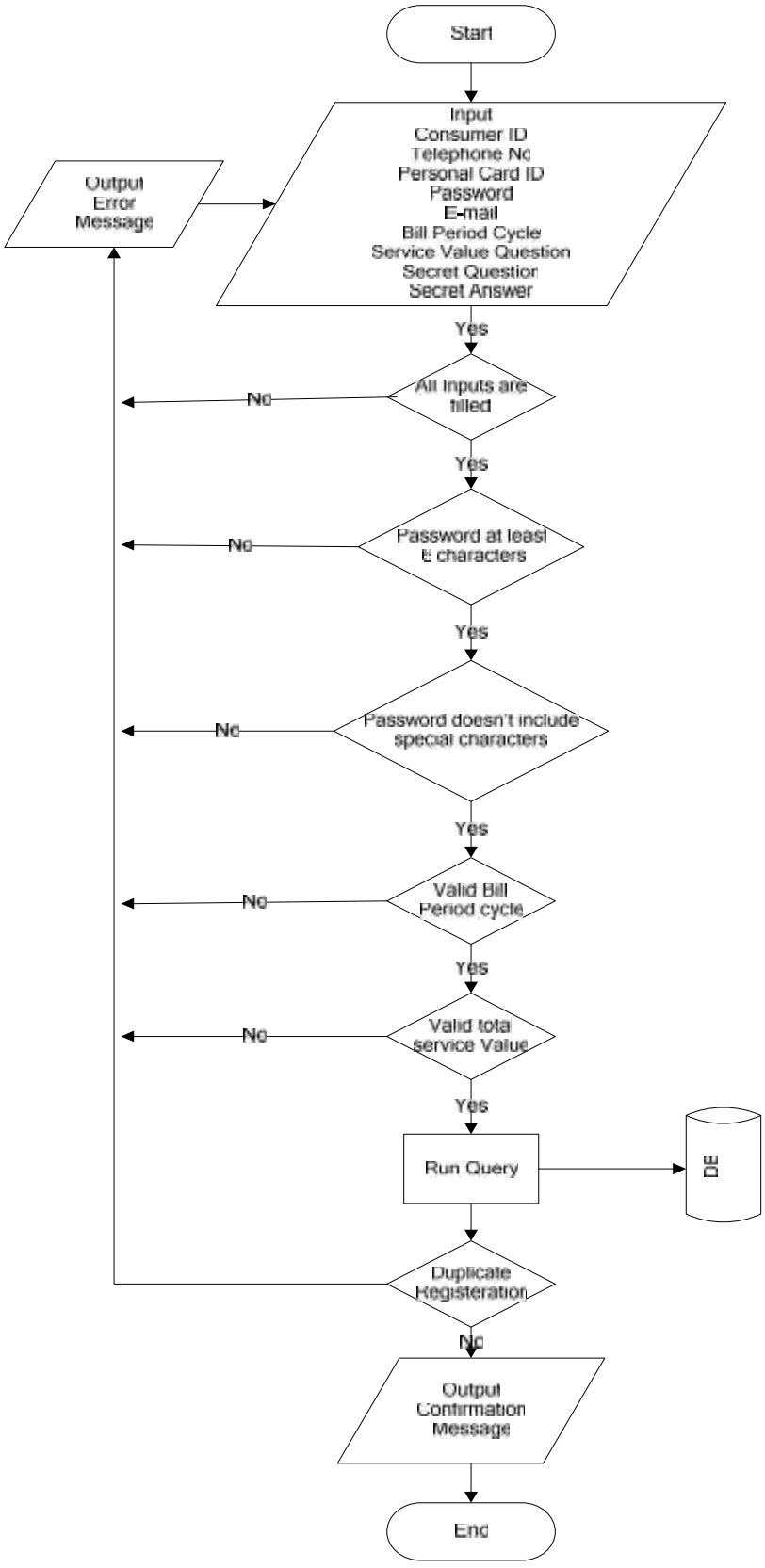


Figure [4.1] Consumer Registrations Flowchart

2- Consumer Login

a) Description**:** This function will be the only method for consumer to login to their account login using Consumer ID and password.

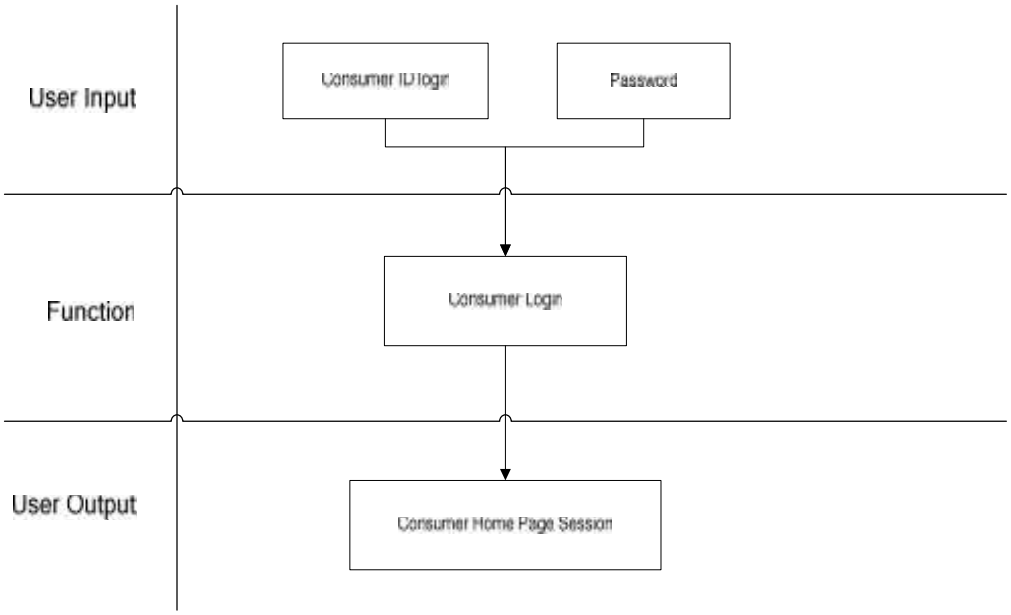
b) Interface:

- Inputs: Consumer ID and password.
- Outputs: Consumer home page.

c) Constraints:

- All fields should be filled with data.
- Consumer ID and password must be meet data base record.

d) User interface design:



e) Flowchart:

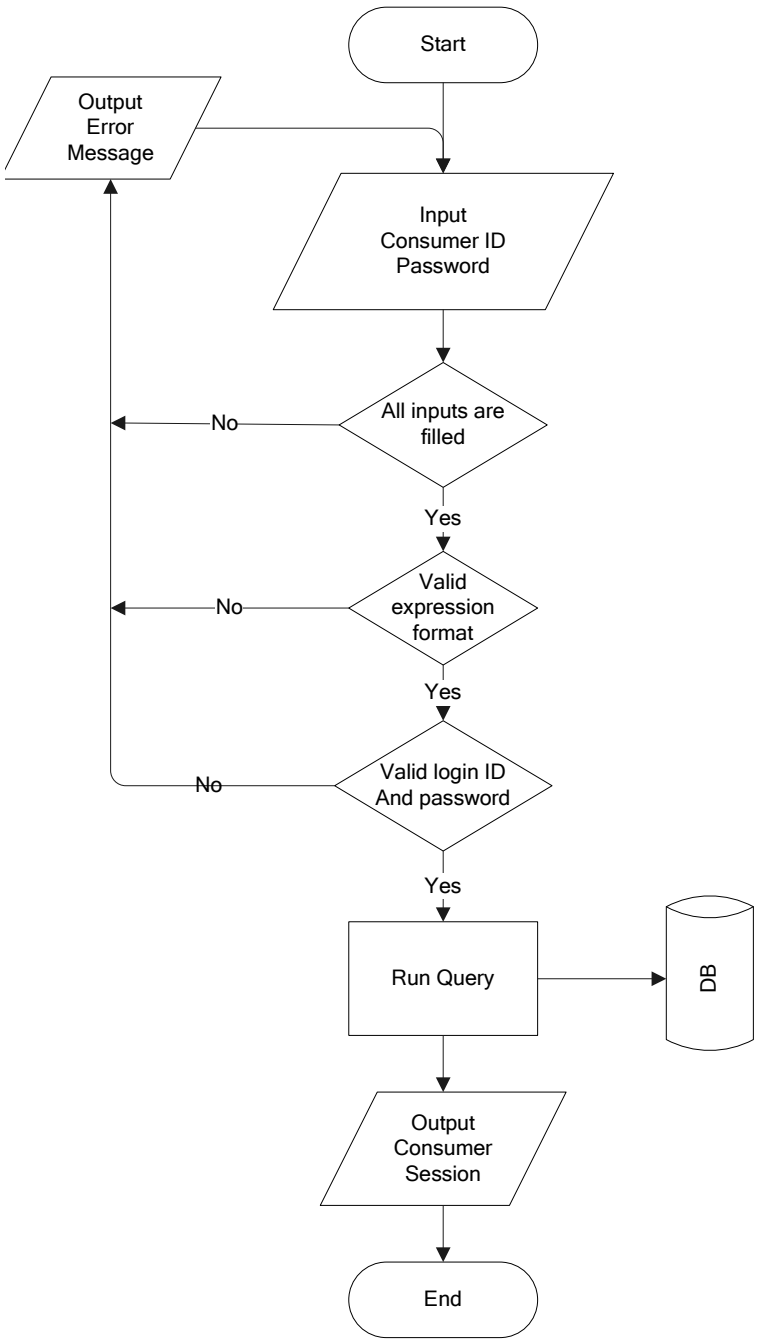


Figure [4.2] Consumer Login Flowchart

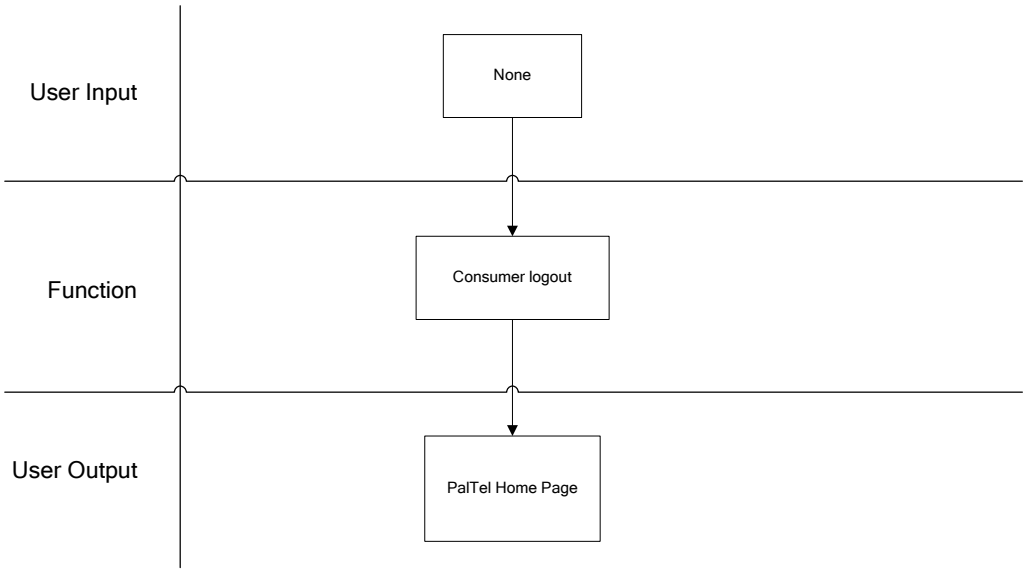
3- Consumer Logout

a) Description**:** This function enables consumers to end their sessions.

b) Interface:
- Inputs: Selecting to logout.
- Outputs: PalTel Home page.

c) Constraints:
- None.

d) User interface design:



e) Flowchart:

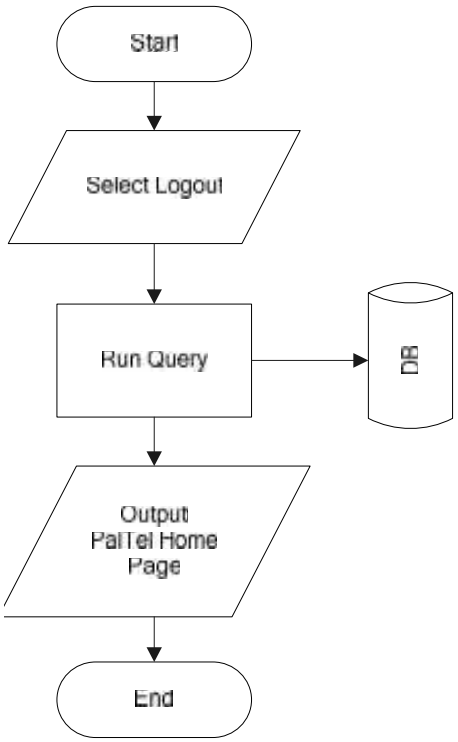


Figure [4.3] Consumer Logout Flowchart

4- Change Login Password

a) Description: The registered consumer should be able to change login password.

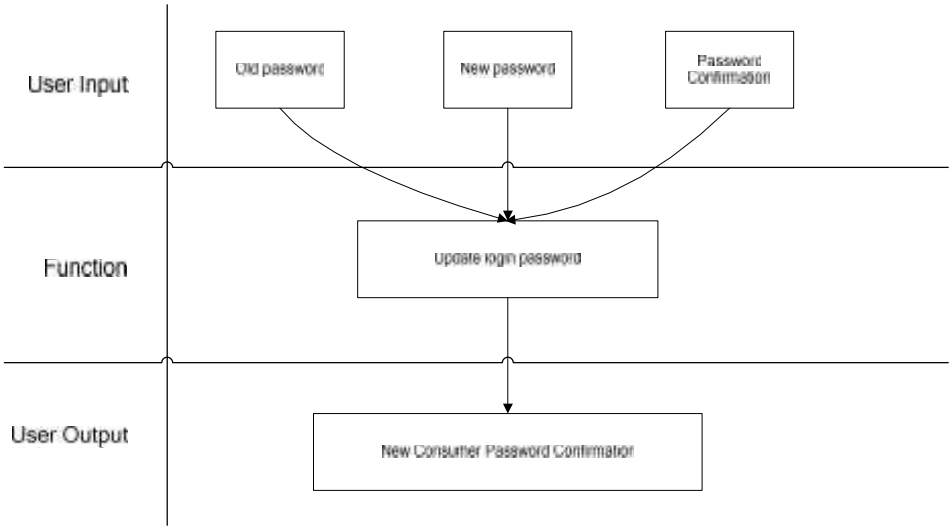
b) Interface**:**

- Inputs: Old password, new password and password confirmation.
- Outputs: New consumer password.

c) Constraints:

- The new password must be at least 6 characters long.
- New password equal password confirmation.

d) User interface design:



e) Flowchart:

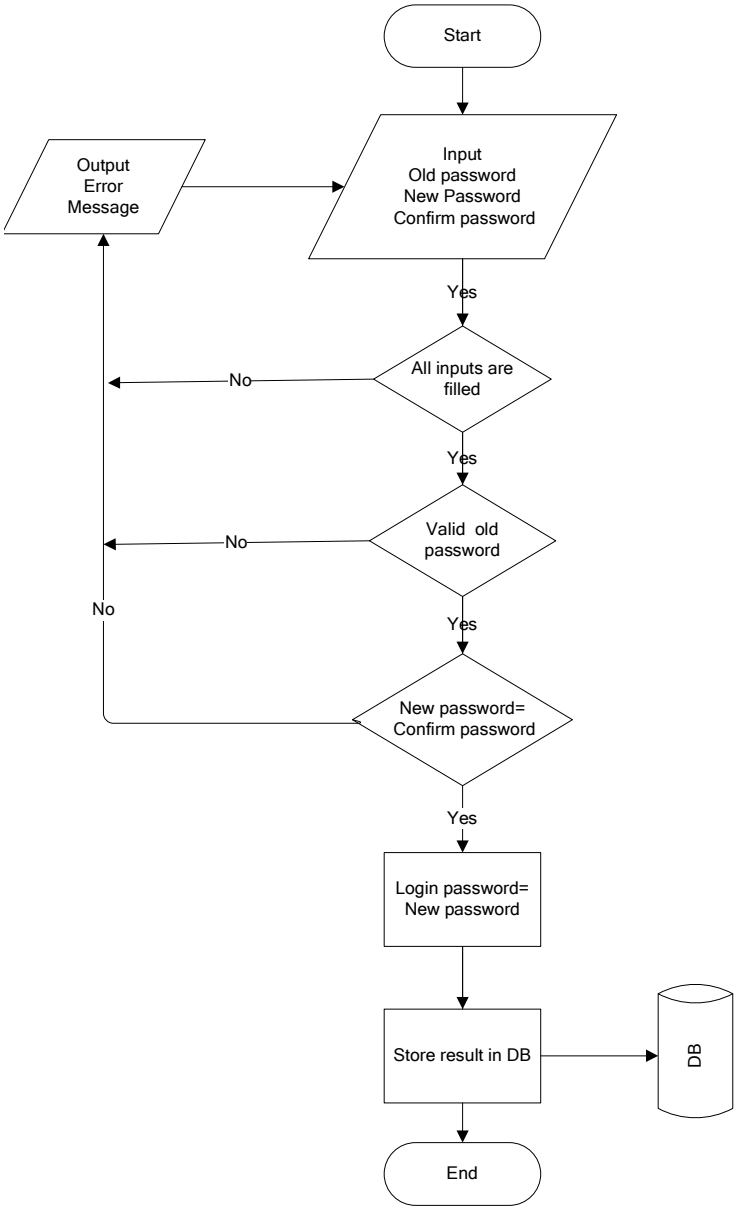


Figure [4.4] Change Login Password Flowchart

5- Viewing Dept and Collection

a) Description: The registered consumer should be able to view last six bills status, does the bill paid or not.

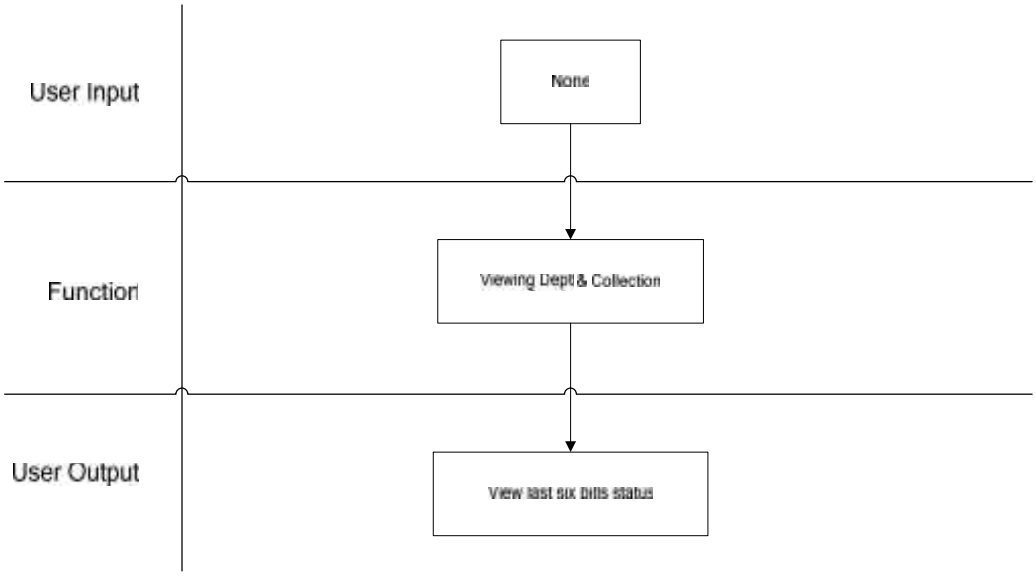
b) Interface:

- Inputs: Press on collection link.
- Outputs: View last six bills status.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

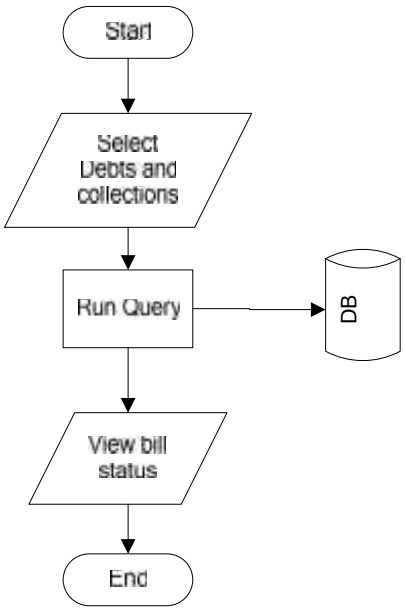


Figure [4.5] Debt and Collection Flowchart

6- Viewing Bill Details

a) Description: The registered consumer should be able to view, save and print bills.

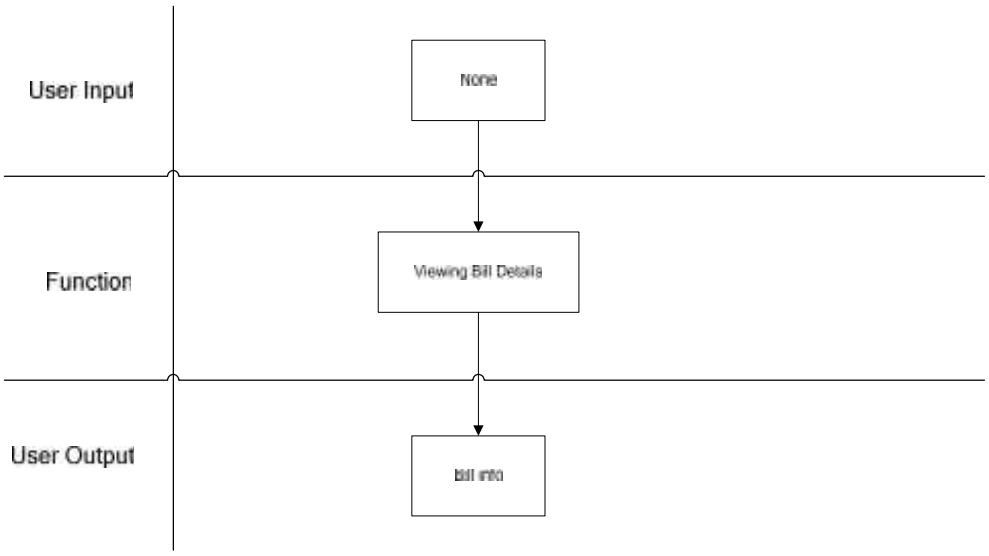
b) Interface:

- Inputs: Selecting details E-bill.
- Outputs: Bill is displayed, printed or saved.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

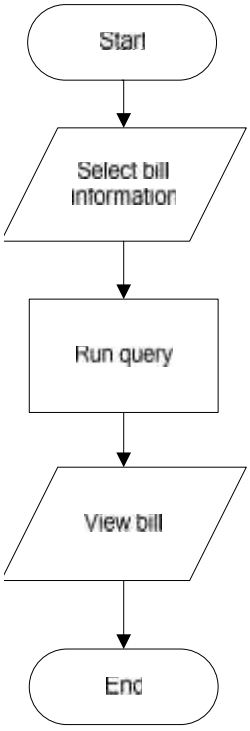


Figure [4.6] Viewing Bill Details Flowchart

7- Viewing Help

a) Description: The consumer should get help to deal with PalTel web-based system.

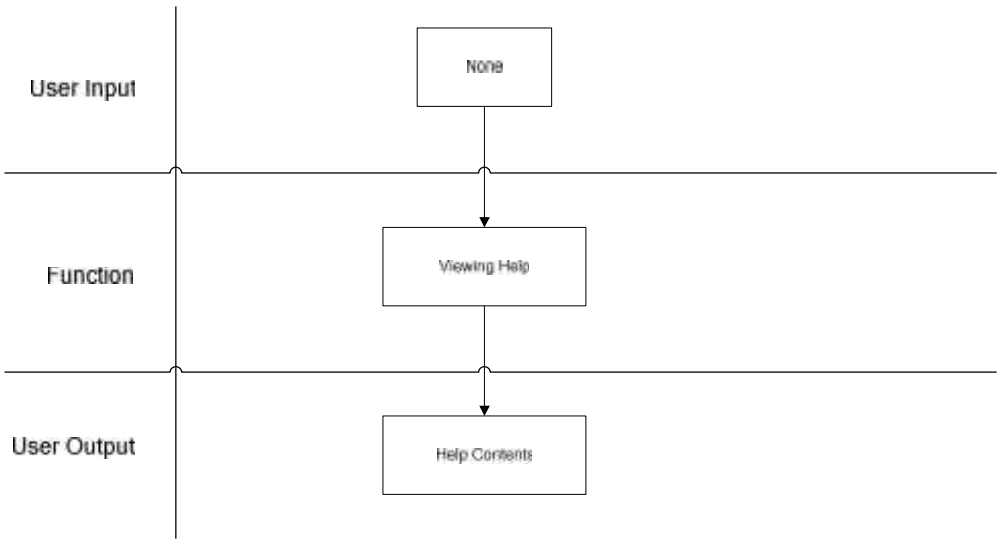
b) Interface:

- Inputs: Browse help links.
- Outputs: Help contents.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

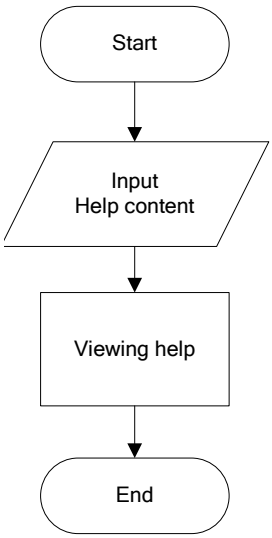


Figure [4.7] Viewing Helps Flowchart

8- Viewing FAQ

a) Description: The user should be able to view the frequently asked questions about the system.

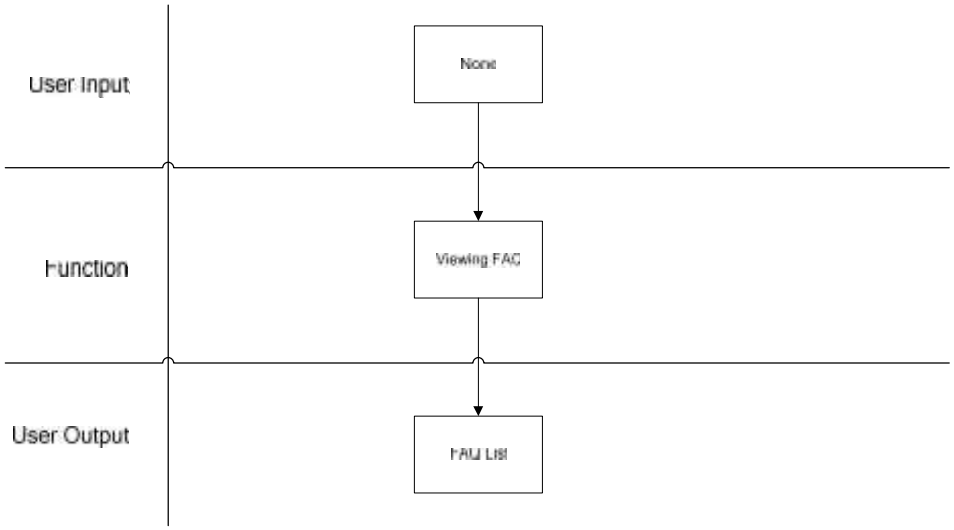
b) Interface:

- Inputs: Browse FAQ links.
- Outputs: FAQ list.

c) Constraints:

- None.

d) User interface design:



f) Flowchart:

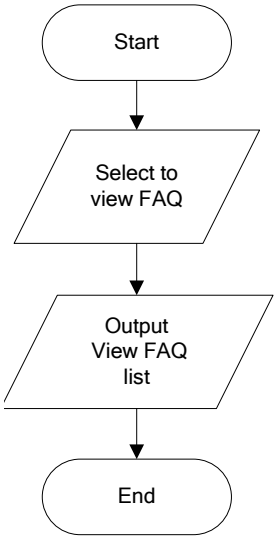


Figure [4.8] Viewing FAQ Flowchart

9- Viewing Announcements and Advertisements

a) Description: The Consumer or public persons should be informed of the company announcements and advertisements to keep in touch with company.

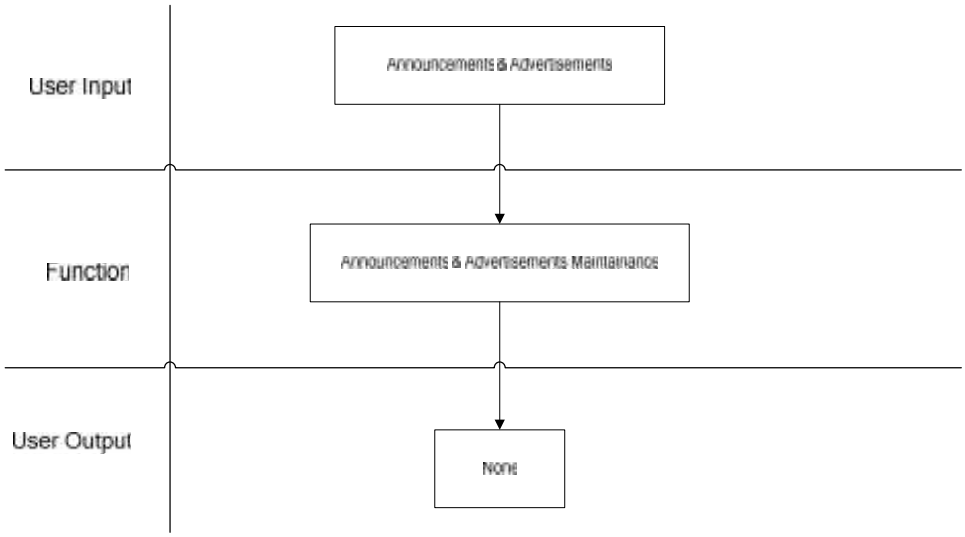
b) Interface:

- Inputs: None.
- Outputs: Announcements and advertisements.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

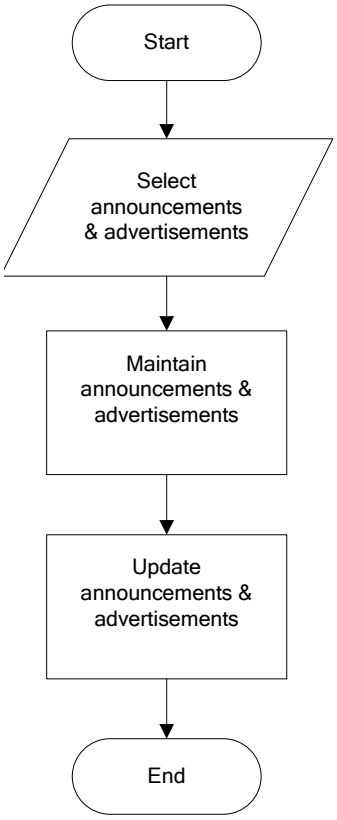


Figure [4.9] Viewing Announcements and Advertisements Flowchart

10- Acquiring Comments and Suggestion from Consumer

a) Description: This function enables the consumers to send his comments and suggestions about real services.

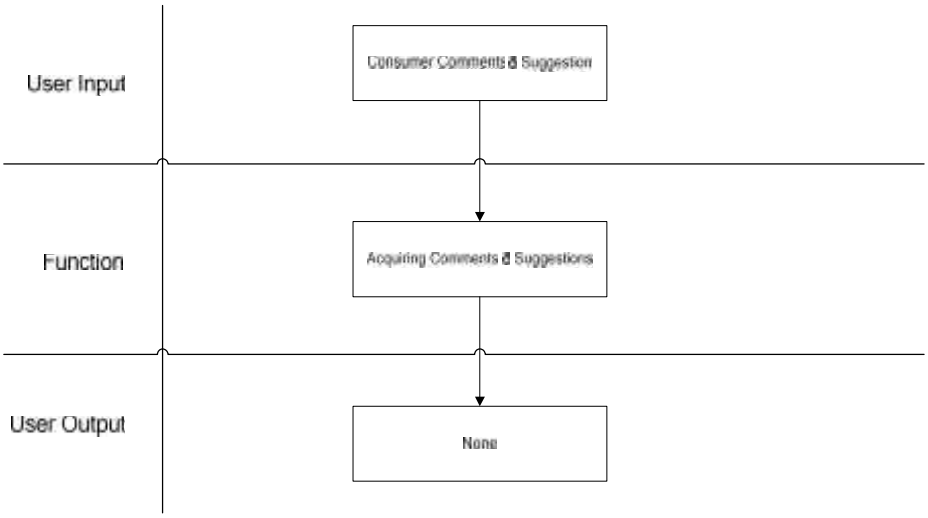
b) Interface:

- Inputs: Consumer comments and suggestion.
- Outputs: Comments.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

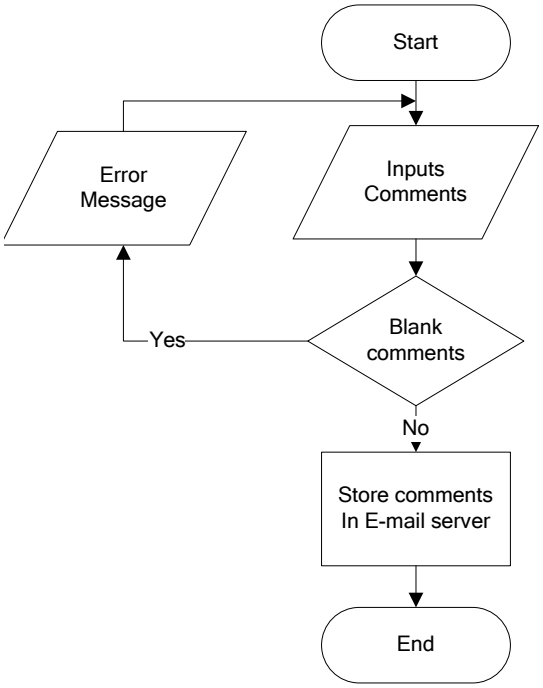


Figure [4.10] Acquiring Comments and Suggestion from Consumer Flowchart

11-Get Credit Card Information

a) Description: Checking the validity of the credit card.

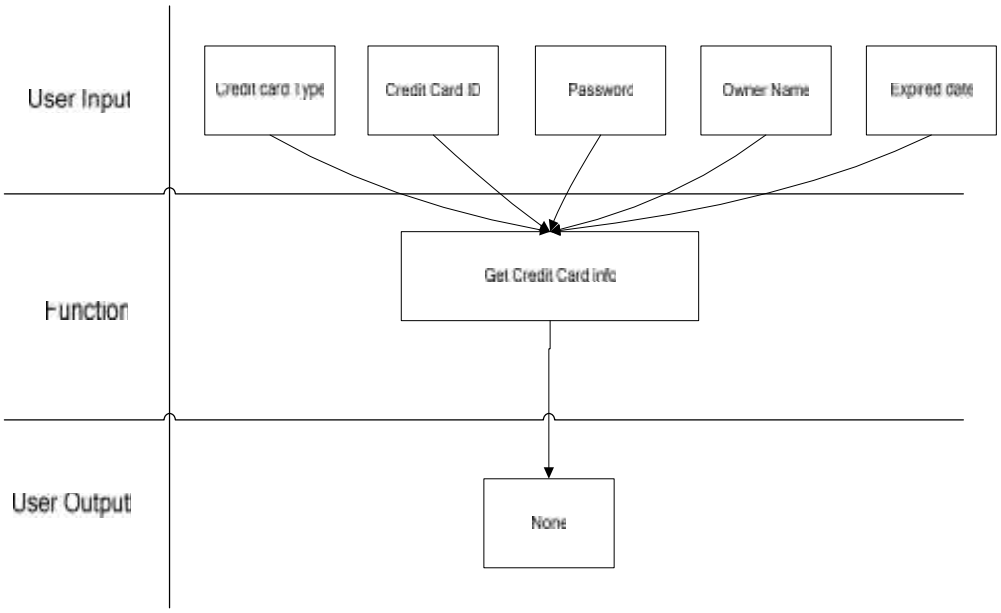
b) Interface:

- Inputs: Credit card type, credit card ID, password, Holder name, expired date.
- Outputs: None.

c) Constraints:

- All fields should be filled with information or making a selection, (change the default setting).
- The Credit Card No should be entered as digit numbers.

d) User interface design:



e) Flowchart:

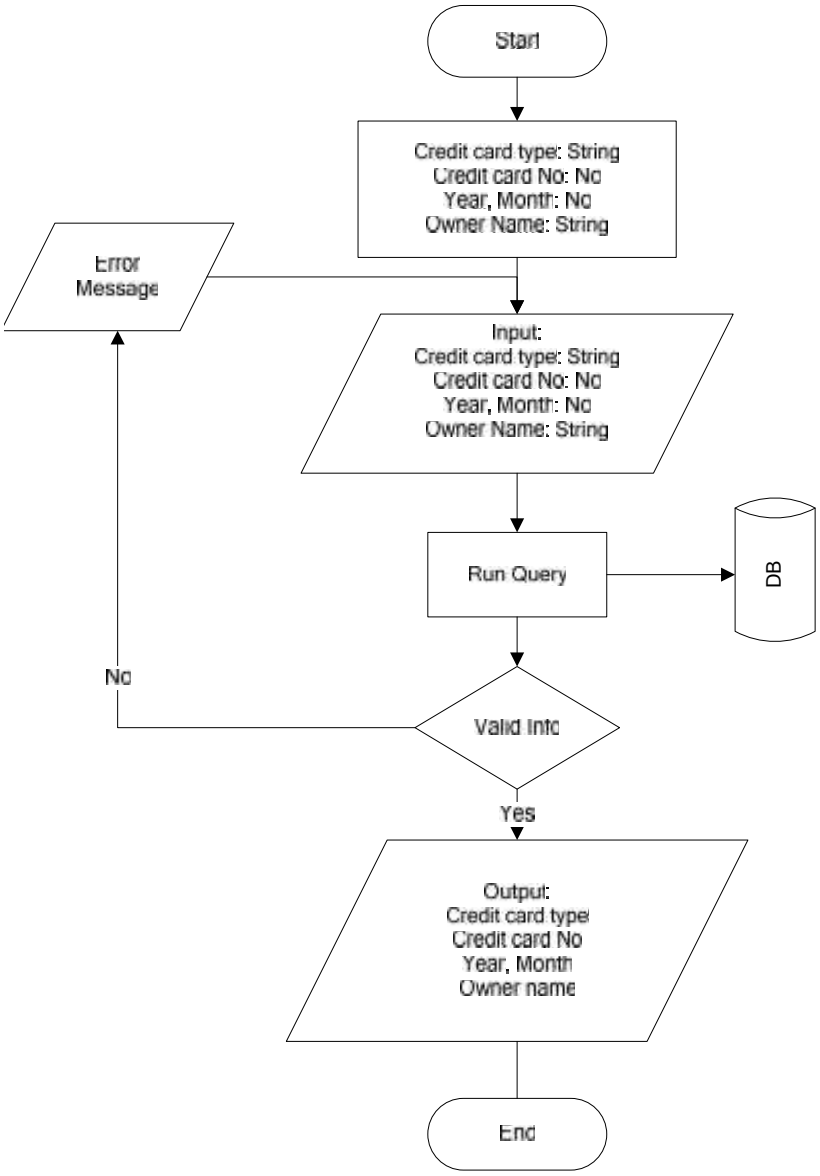


Figure [4.11] Get Credit Card Information Flowchart

12- Check Credit Card Sufficiency.

a) Description: The registered consumer should be confirmed by the credit card DB and check if he has sufficient balance to pay bill.

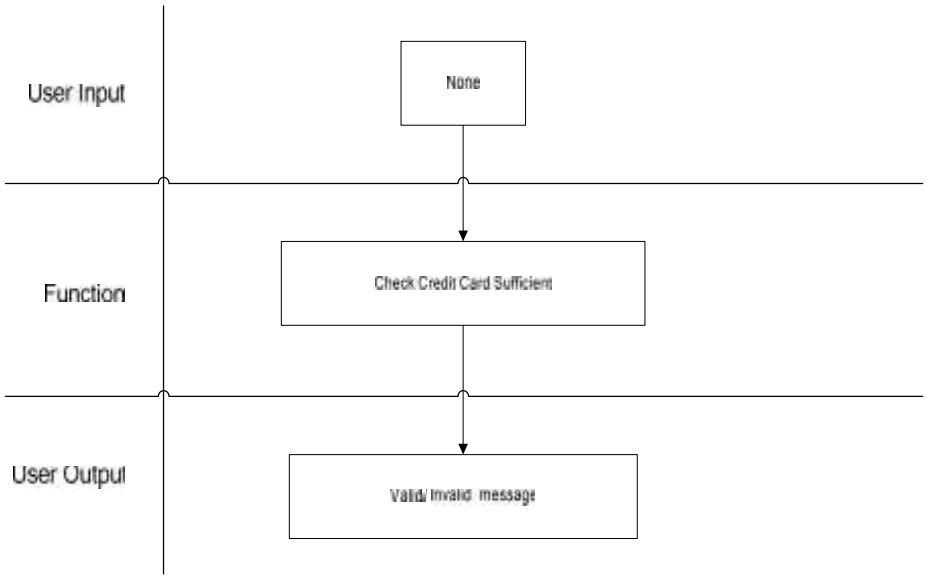
b) Interface:

- Inputs: None.
- Outputs: Sufficient Credit Card balance.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

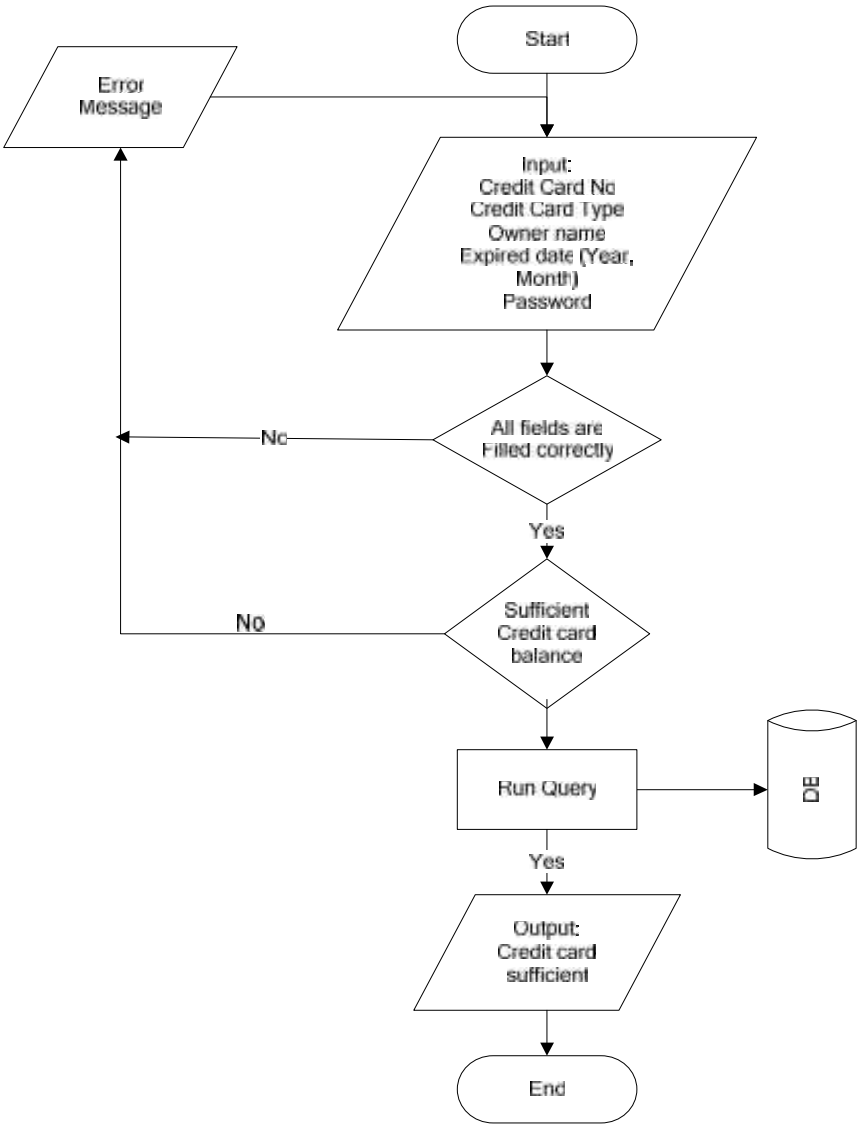


Figure [4.12] Check Credit Card sufficiency Flowchart

13- Update Credit Card.

a) Description: This function updates the credit card after payment transaction is finished.

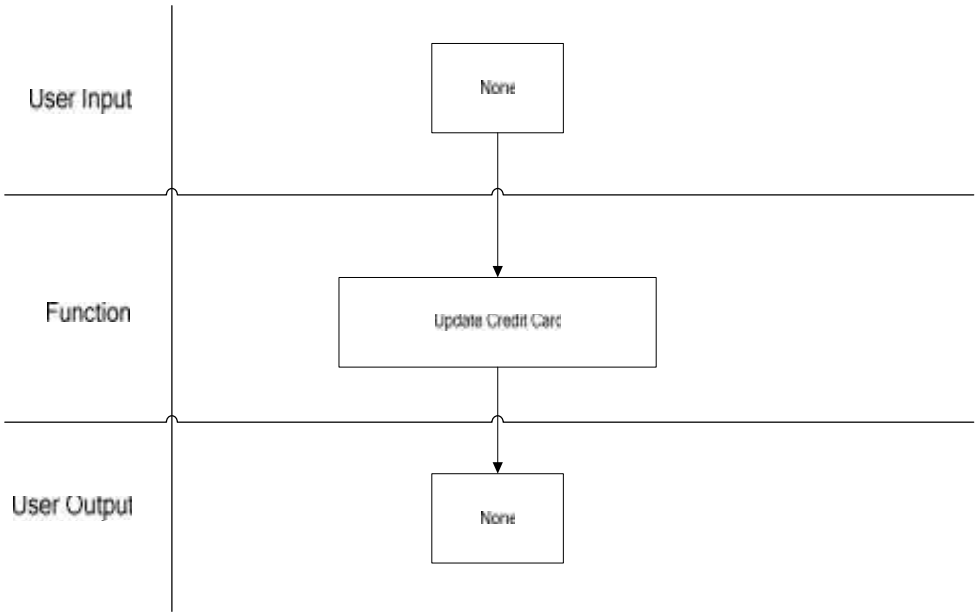
b) Interface:

- Inputs: None.
- Outputs New credit card balance.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

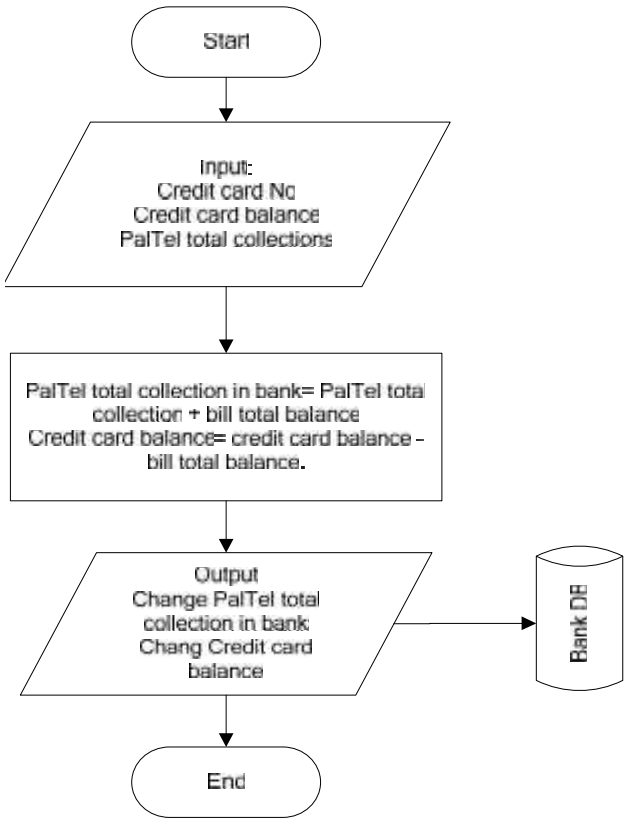


Figure [4.13] Update Credit Card Flowchart

14-Generate Bill Consumption Report

a) Description: The registered consumer should be able to view their consumption bill reports.

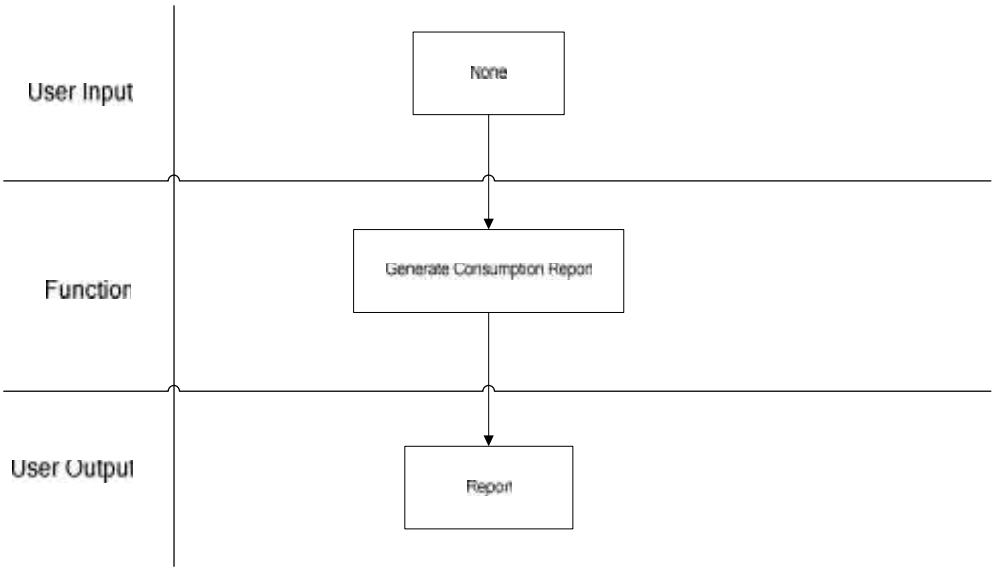
b) Interface:

- Inputs: Press the report button generator.
- Outputs. Payment bill information.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

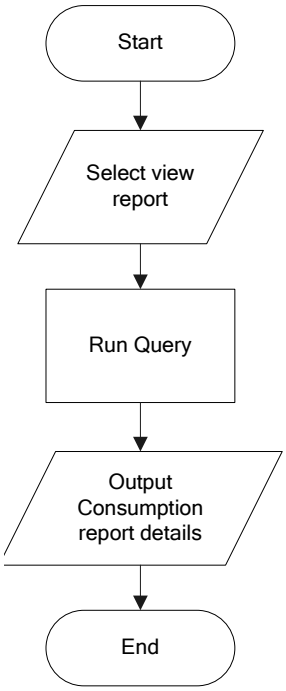


Figure [4.14] Generate Bill Consumption Report Flowchart

15- Update Consumer Information

a) Description: This function views or updates the personal information (E-mail) that belongs to specific consumer.

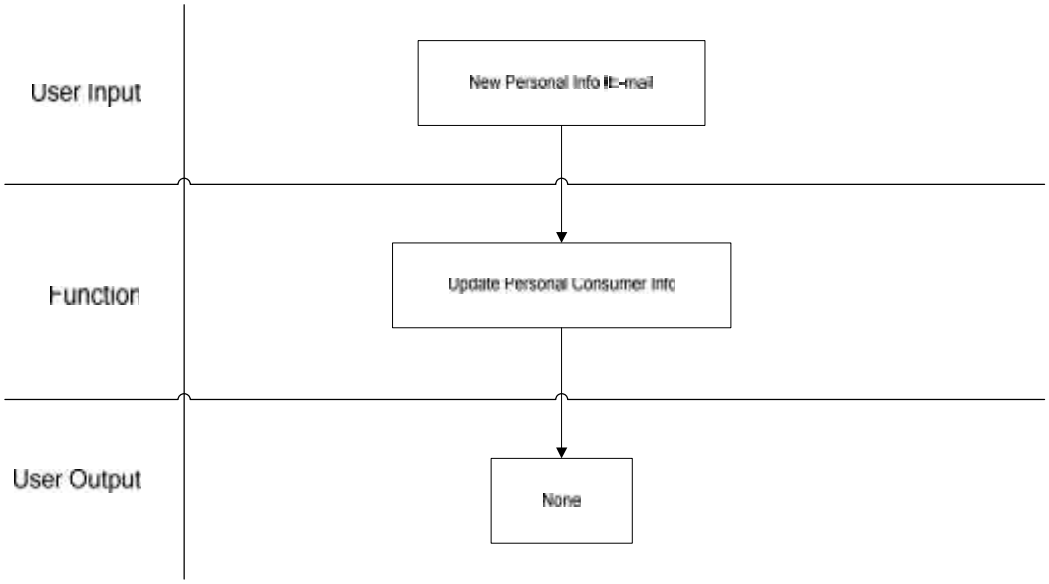
b) Interface:

- Inputs: Insert New Personal Information (E-mail).
- Outputs: Information that belong to consumer.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

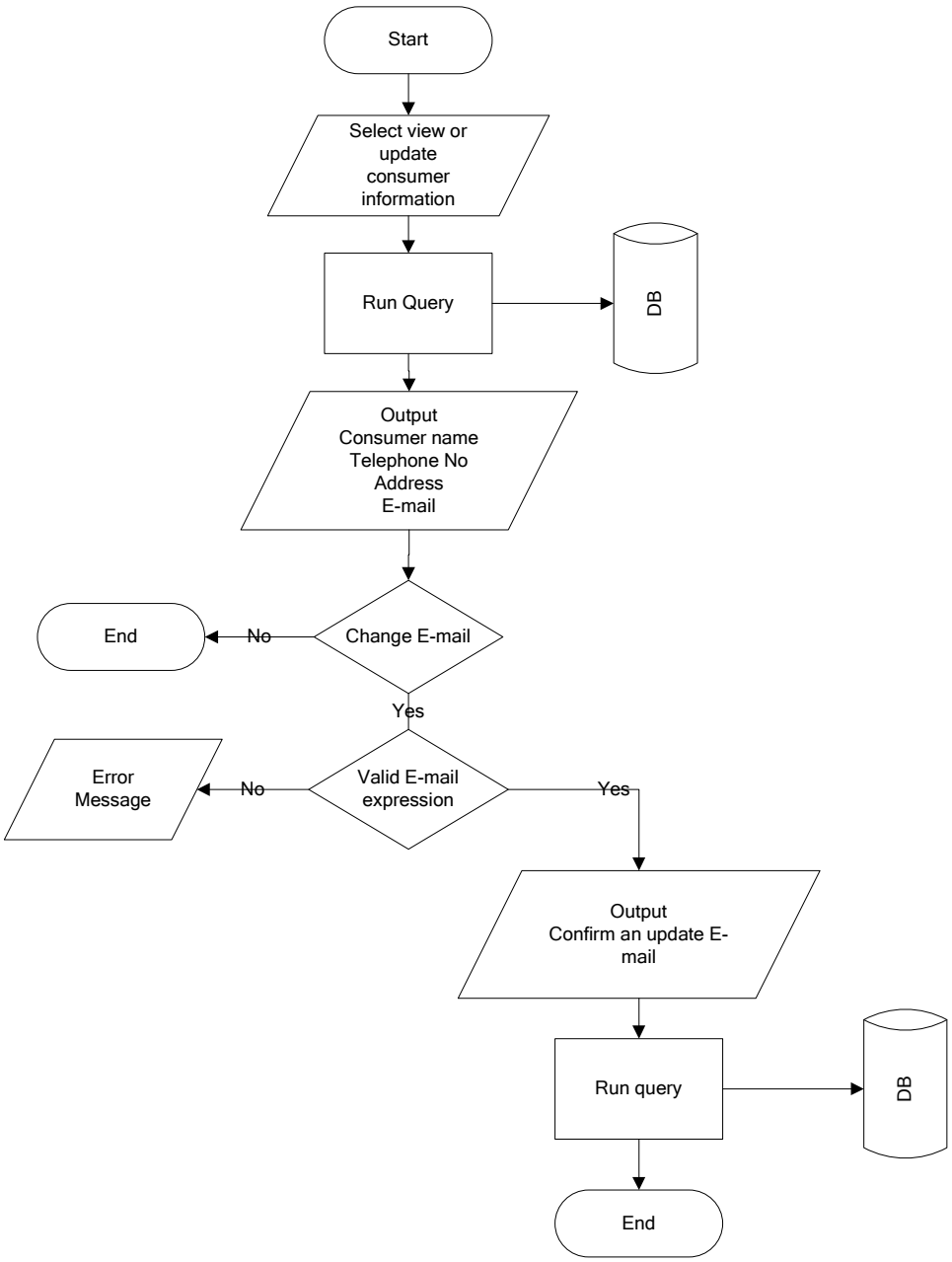


Figure [4.15] Update Consumer Information Flowchart

16- Viewing Company Contact Information.

a) Description: The consumer should be able to view the company address, phone number, fax number, and E-mail address.

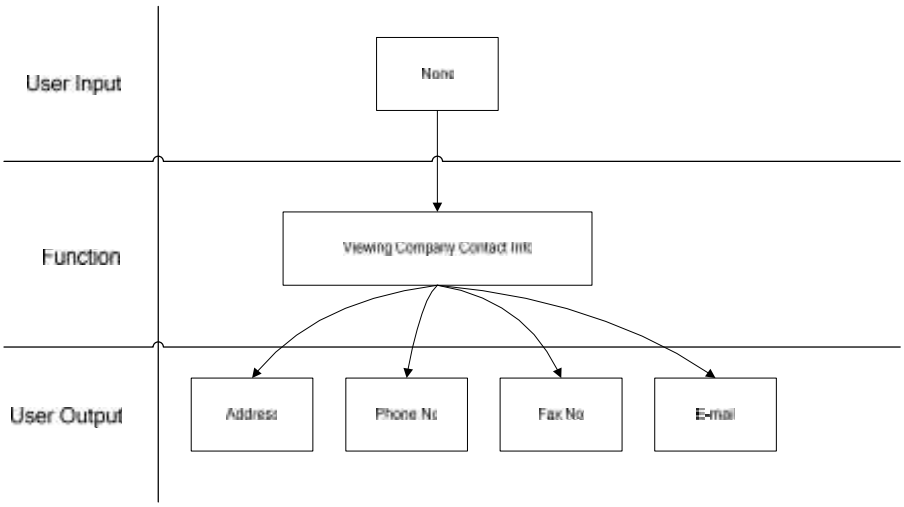
b) Interface:

- Inputs: Press company contact us link.
- Outputs: Company address, phone number, fax number, and E-mail.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

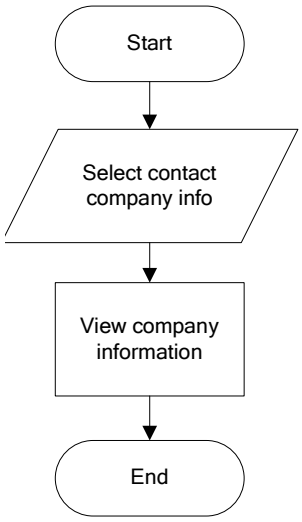


Figure [4.16] Viewing Company Contact Information Flowchart

17- Forget Password

e) Description: This function enables the consumer to retrieve his account if he forget password via consumer E-mail.

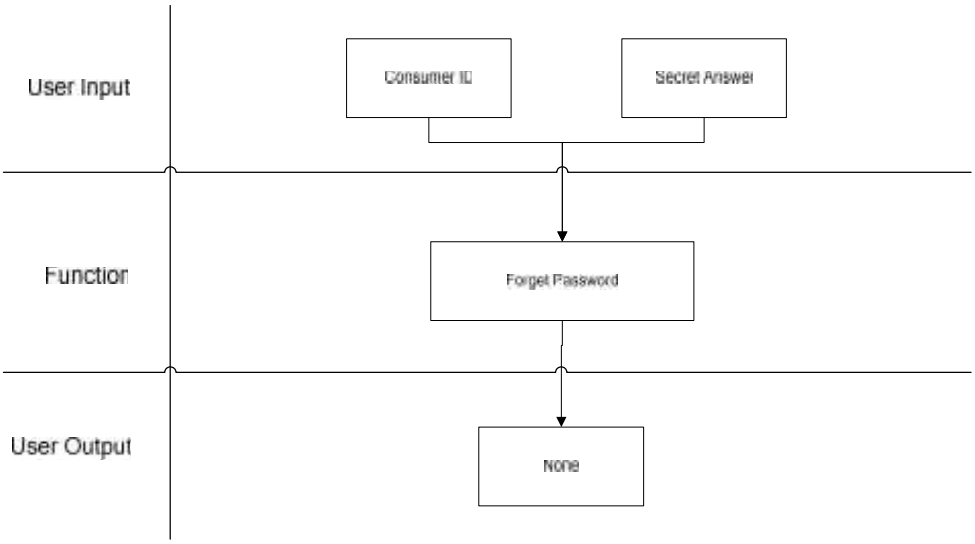
f) Interface:

- Inputs: Consumer ID, and Secret Answer.
- Outputs: Forgetting Password.

g) Constraints:

- All fields should be filled with information.

h) User interface design:



e) Flowchart

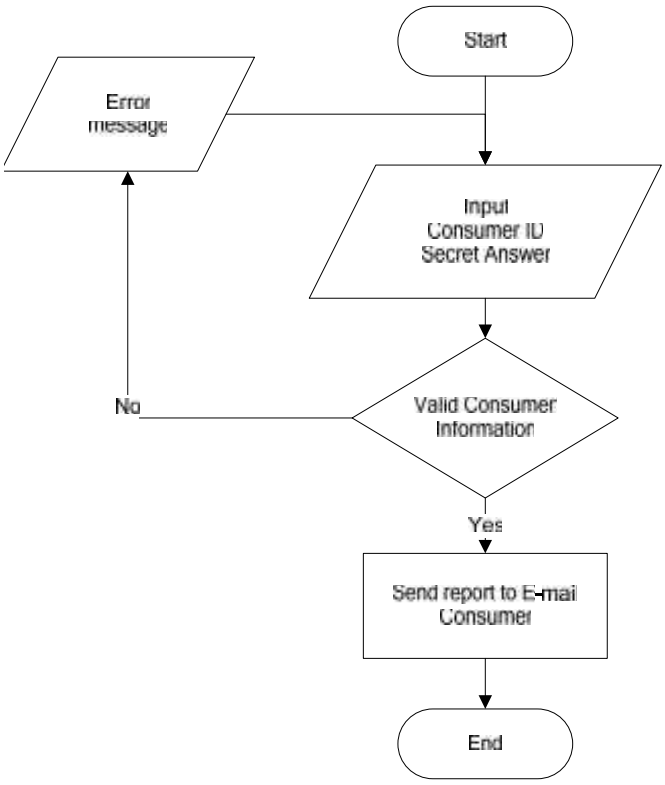


Figure [4.17] Forget Password Flowchart

18- Unsubscribe Consumer Account

a) Description: This function allows the consumer to deactivate his account from PALTEL database records.

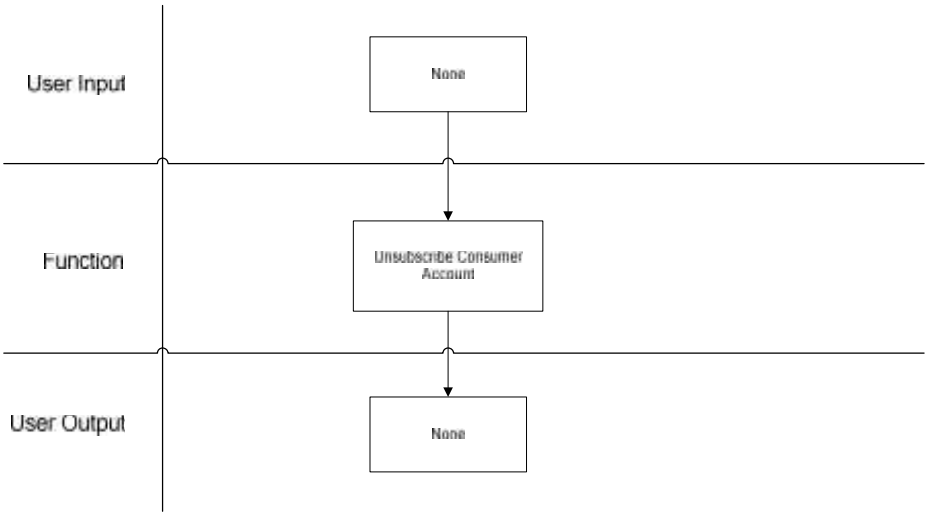
b) Interface:

- Inputs: Selecting Unsubscribe Link.
- Outputs: Deactivate consumer account record.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

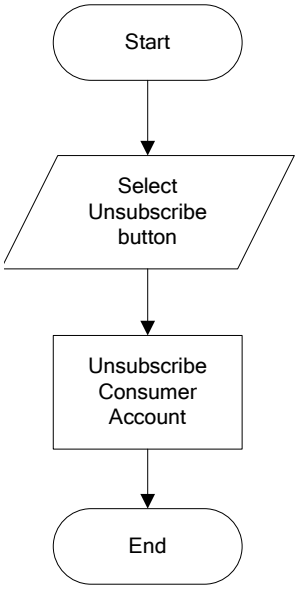


Figure [4.18] Unsubscribe Consumer Count Flowchart

19- Administrator Login.

a) Description This function will be the only method for administrator to login to PalTel database (locally).

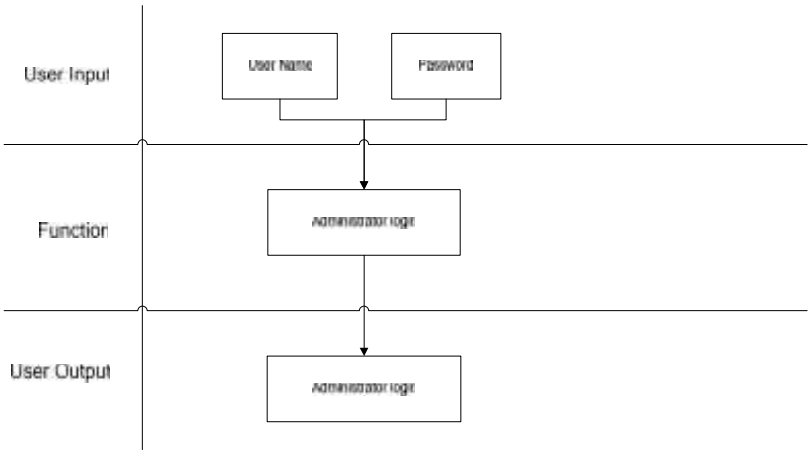
b) Interface:

- Inputs: User Name, Password.
- Outputs: Login to his session.

c) Constraints:

- Password should meat the existence roles in SQL server 2000 or operating system.

d) User interface design:



e) Flowchart

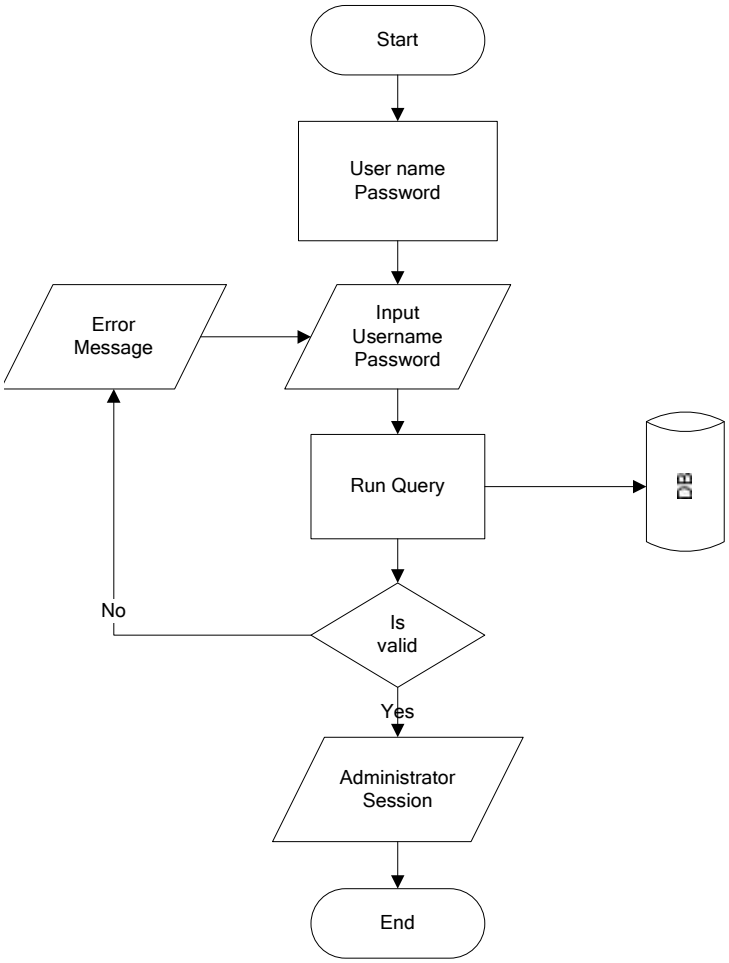


Figure [4.19] Administrator Login Flowchart

20- Administrator logout.

a) Description This function enables Administrator to end his session.

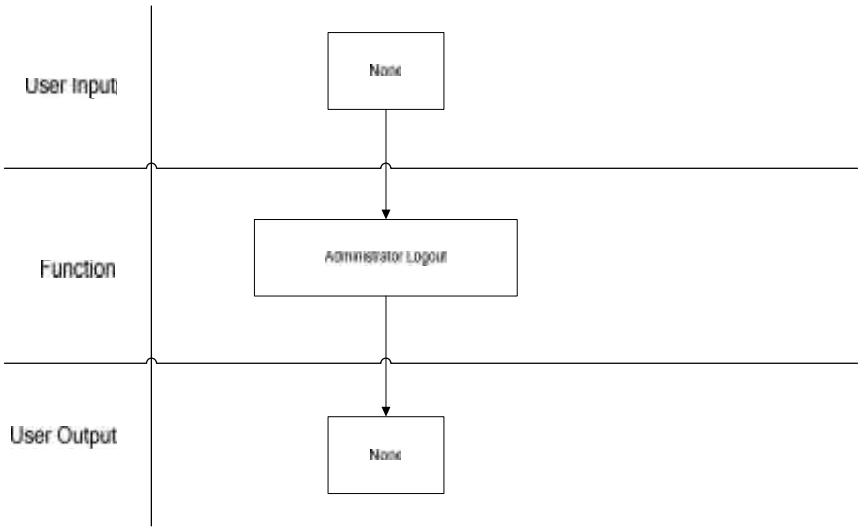
b) Interface:

- Inputs: None.
- Outputs: Session is ended.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

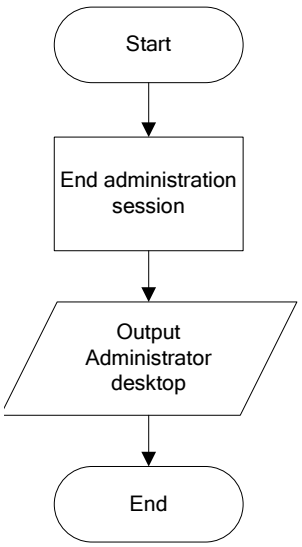


Figure [4.20] Administrator Logout Flowchart

21- Viewing Sent Comments.

a) Description: The administrator should be able to view comments that sent by consumer via exchange server.

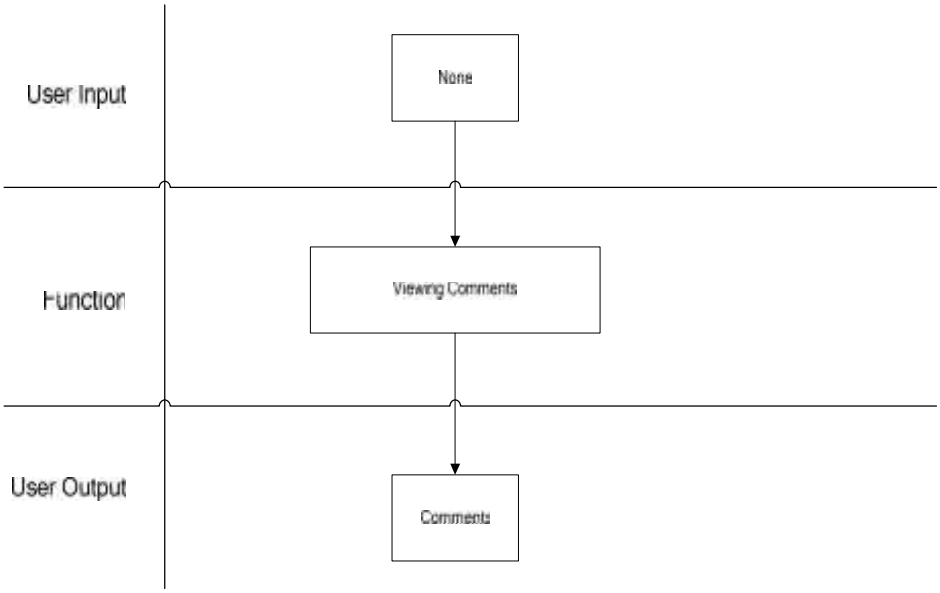
b) Interface:

- Inputs: None.
- Outputs: Comments list and details.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

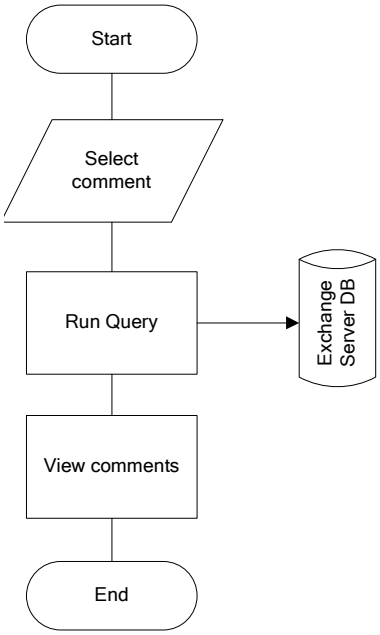


Figure [4.21] Viewing Sent Comments Flowchart

22- FAQ Updating and Maintaining.

a) Description The administrator should be able to add, delete and modify FAQ.

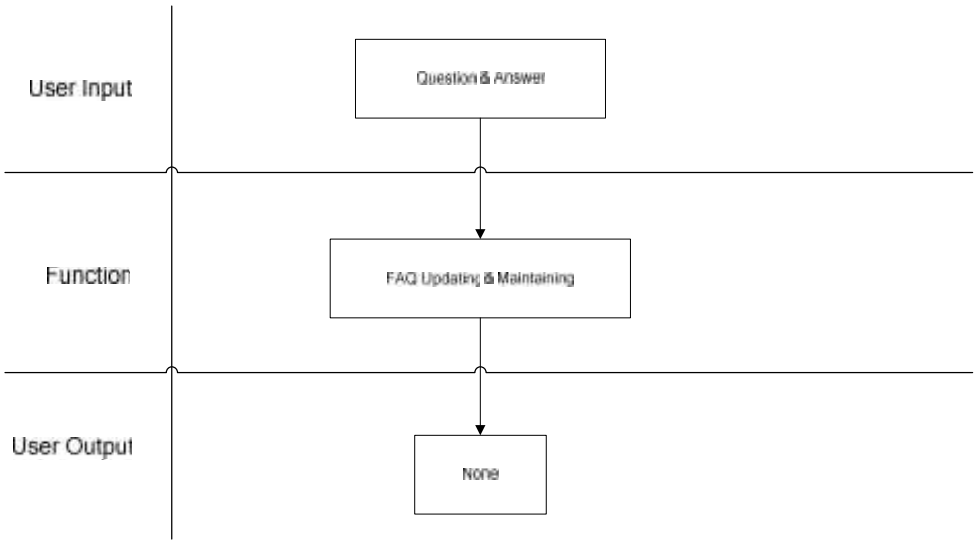
b) Interface:

- Inputs: Questions and answers details.
- Outputs FAQ list.

c) Constraints:

- None.

d) User interface design:



e) Flowchart

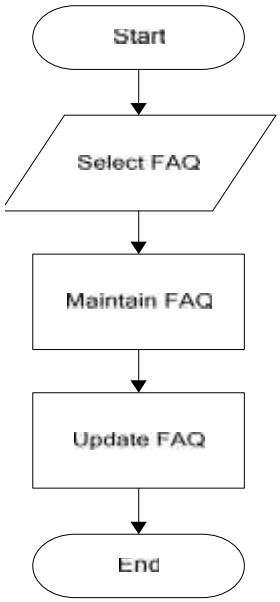


Figure [4.22] FAQ Updating and Maintaining Flowchart

23- Announcements and Advertisings Maintenance.

a) Description The administrator should be able to add, modify and delete announcements Advertisings.

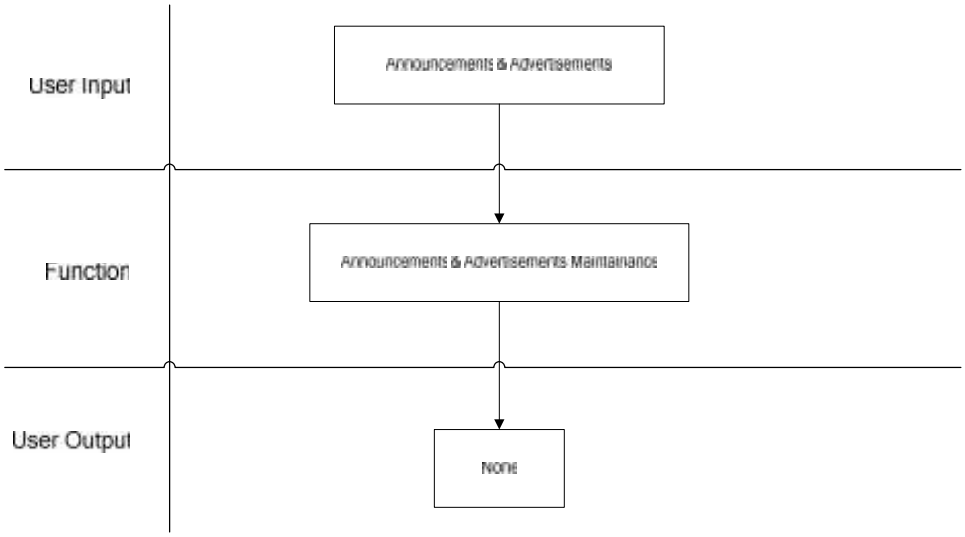
b) Interface:

- Inputs: Announcements and Advertisings.
- Outputs: Announcements and Advertisings.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

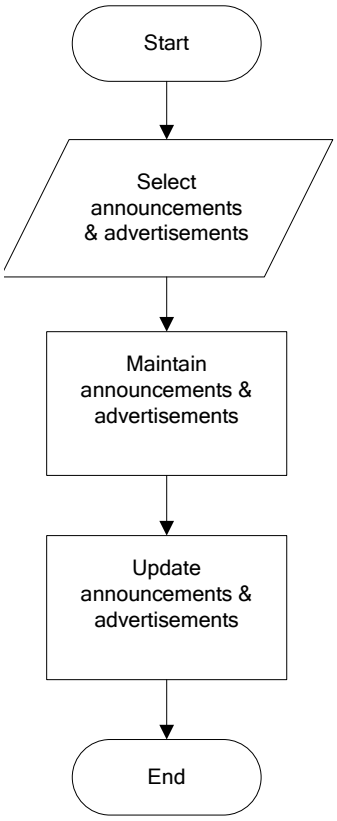


Figure [4.23] Announcements and Advertisings Maintenance Flowchart

24- Generate Bills (add modify bills).

a) Description: The administrator should be able generate bills, add modify bills.

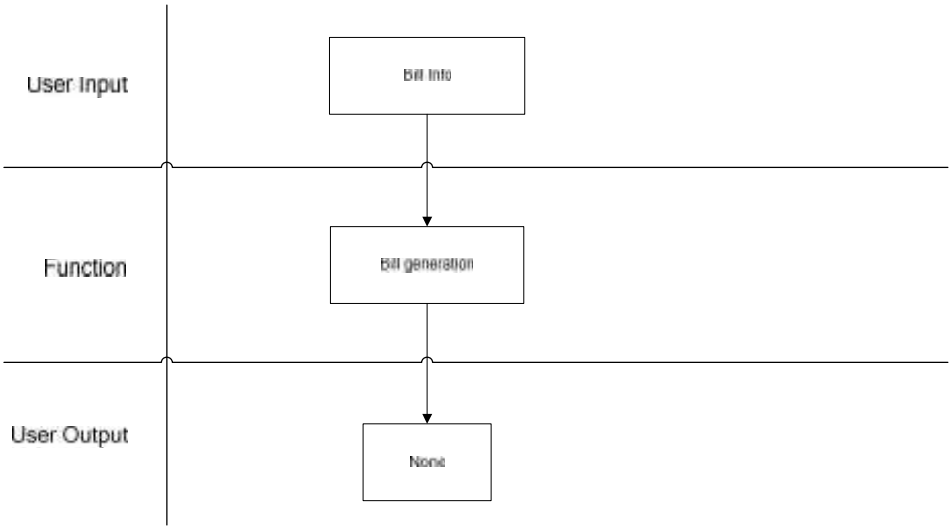
b) Interface:

- Inputs: Bill's information.
- Outputs: New bills.

c) Constraints:

- None.

d) User interface design:



e) Flowchart:

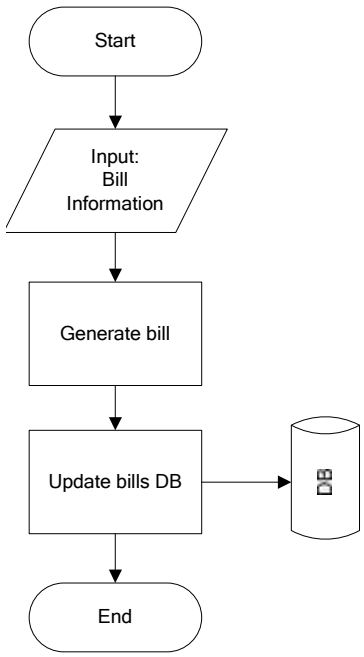


Figure [4.24] Generate Bills (add modify bills) Flowchart

5.1 Introduction

This chapter describes the main steps must be followed to start in coding and programming to reach to the design that is described in the previous chapters, and mention the programming language is used for this purpose.

This chapter focuses on the coding and implementation of PALTEL project.
Coding refers to the process of writing the necessary program, which implements the main procedures and functions of the project. The code of the project is to be written from the scratch using VB.NET language and ASP.NET.

The project is to be implemented as a set of programmed pages; each page carries out a specific functions related to the project, the project is to be programmed under windows server 2003 operating system.

5.2 Coding Programming Language

Before starting in coding, it is desirable to study the scopes of languages and to match between the project requirements and what a specific language offers. There are different programming languages and different DB systems to implement the project, but after studying and analyzing all these options, the development team has selected ASP.NET for coding the web-based application, SQL server 2000 for DB, Visual Basic.NET for coding and Exchange server 2003 for E-mail hosting.

- *Relationship between ASP.NET, VB.NET, SQL server2000* Exchange server 2003*:*

After creating the design specifications that will be used while creating the web application, create a new project in the Visual Studio.NET and create the interface for PALTEL web application by setting the initial properties for the ASP.NET web forms. Visual Basic.NET is used to write the events procedures that will run when different actions are performed on a control or object. Then PALTEL database is built using SQL server 2000.

From the visual studio.net a connection to PALTEL is created, this connection provides the facilities to access the database (input, output, access) from the web application. Since the desirable system is to be run on the internet and need a database handle its data, ASP.NET is chosen which is good to accomplish the project.

- *What is ASP .NET platform?*

There are many languages that can be used to develop a system such ours, but the most two effective languages are CGI language and .NET using Microsoft Visual Studio .NET as the development environment, here we describe the advantages of each, and why our selection was on the ASP.NET:

1- Device Independent:

ASP.Net are a device independent language, this means that any user can open the page that build using .NET framework environment from any explorer without any additional components or drivers, because the client host will receive only HTML code.

2- Security

ASP.Net technology has a high level of security during transmitting data; they provide us with many algorithms and techniques.

In the ASP.NET technology there are a build in valuators that ensure the user's input before any generation on the server, so if there any unusual input the webpage it self will not return to the server.

Note: Review appendix A to see the configuration of SSL that increase the security level in our web site.

3- Server side

One of the most powerful advantages of the ASP.NET technology is that it does not need to make any efforts on the client side, all operations and functions will work on the server.

Why Visual Studio.NET?

Visual Studio.NET simplifies the development of powerful, reliable enterprise Web solutions and increases developer efficiency by providing a familiar, shared development environment. Pre-build components, programming wizards and the ability to reuse components that are written in any language can reduce development time significantly. It provides Integrated Development Environment (IDE) that provides a consistent look and feel, regardless of programming language being used. IDE provides the tools that are used in programming as shown in figure [5.1]

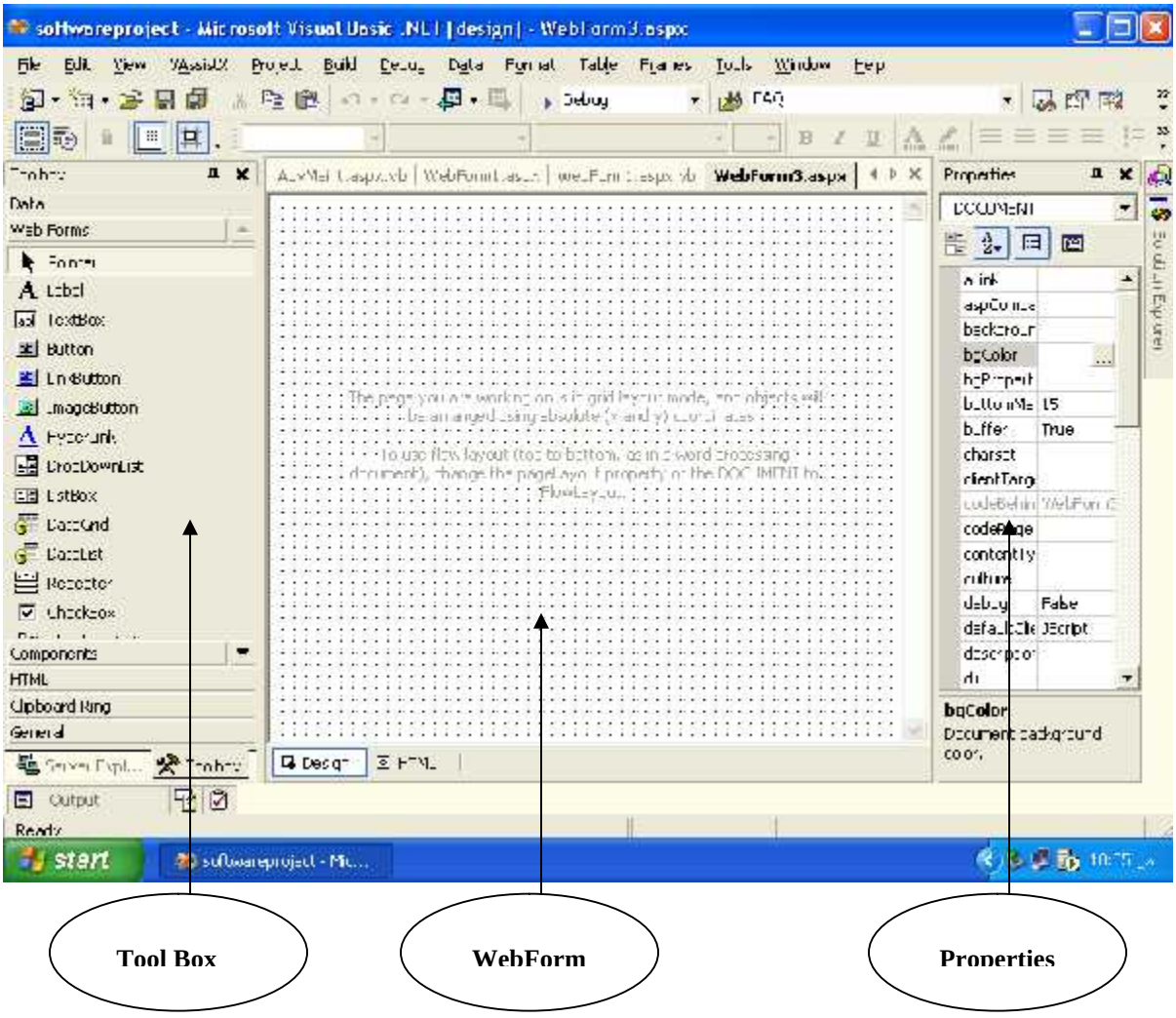


Figure [5.1] Integrated Development Environment in Visual Studio.NET

- *What is ASP.NET?*

Developing ASP.NET web applications in the .NET framework are similar to developing windows applications. The fundamental component of ASP.NET is the web form. The web form is the web page that users can view using internet browsers. An ASP.NET web application comprises of one or more web forms. A web form is dynamic page that can access server resources.

For example, a traditional web page can run script on the client to perform basic tasks. An ASP.NET web form conversely, can also run server side code to access a database, to generate additional Web Forms or to take advantage of built-in security in the server.

In addition, because an ASP.NET Web Form does not rely on the client-side scripting, it is not dependent on the client browser type or operating system. This independence allows you to develop a single Web Form that can be viewed on practically any device that has Internet access and a web browser.

Because ASP.NET is part of the .NET Framework, you can develop ASP.NET Web application in any .NET-based language.

- *Why SQL server 2000?*

SQL Server 2000 is a powerful tool for turning information into opportunity, enhanced tools for system management and tuning, and exceptional scalability and reliability make SQL Server 2000 the best choice for the agile enterprise.

It has the following features:

- *High Availability:* Maximize the availability of your business applications, online backups, and failover clusters.
- *Scalability:* Scale your applications up to 32 CPUs and 64 gigabytes (GB) of RAM. SQL Server 2000 has demonstrated record-breaking performance.
- *Security:* Ensure your applications are secure in any networked environment, with role-based security and file and network encryption.
- *Simplified Database Administration:* Automatic tuning and maintenance features enable administrators to focus on other critical tasks.
- *Data Transformation Services:* Automate routines that extract, transform, and

load data from heterogeneous sources.

- *Why Exchange server 2003?*

E-mail is currently the most widely used collaborative technology. More businesses use Exchange Server for e-mail-based collaboration than any other product. Exchange Server 2003 enables knowledge workers to gain access to critical business communications almost whenever and wherever they need to and is designed to deliver greater security, availability, and reliability.

Features at a Glance:

- Database size limited only by your hardware (with a maximum size of 16 terabytes).
- Multiple databases per server.
- Clustering support for four nodes on Microsoft Windows 2000 Advanced Server or eight nodes on Microsoft Windows Server 2003 Enterprise Edition.
- The flexibility to be configured as a Microsoft Office Outlook Web Access front-end server.
- Mailbox stores and public folder stores that are each limited to 16-gigabyte (GB) maximum.
- Recovery Storage Group.

5.3 Establishment of Development Environment

- Purchase the computers and the software required for developing the system.
- Install windows XP.
- Install the required utilities.
- Install the IIS; from the control panel, choose add remove programs then choose windows components then add the IIS component by choosing its check box then click Next as shown in figure [5.2], [5.3]

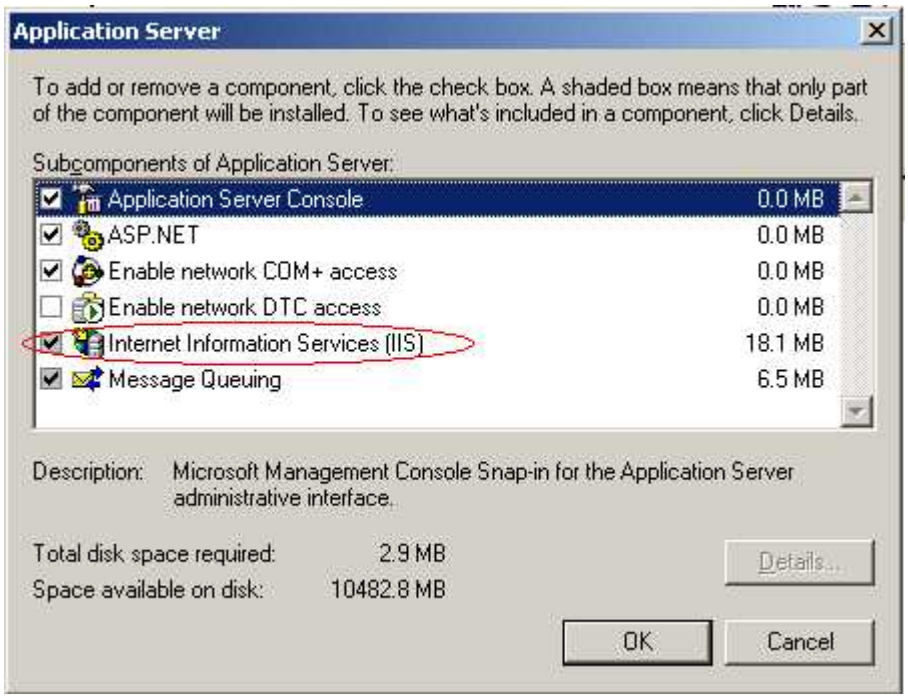


Figure [5.2] Installing IIS (Step One)

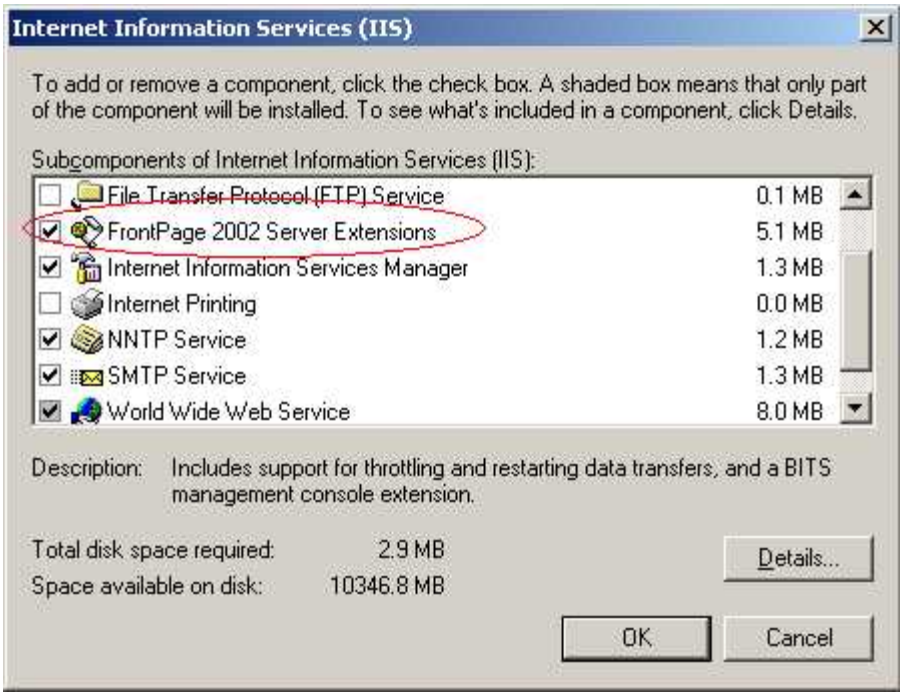


Figure [5.3] Installing IIS (Step Two)

- **Installing Visual Studio .NET 2003**

  To install Visual Studio .NET 2003

  - Close all open applications to prevent additional reboots during setup.
  - Insert the disc labeled Visual Studio .NET 2003 CD1.
  - Autorun starts Setup.exe. If Autorun is disabled, run Setup.exe from the root of the installation CD.
  - The setup program scans your disk for installed components. If the scan determines that the system requires a component update, Step 1: Install Visual Studio .NET 2003 Prerequisites is available in the Installation dialog box. Select Step 1 to update the system components. If a component update is not required, this option is not available. After updating the system components, the Installation dialog box enables Step 2: Install Visual Studio .NET 2003. Select Step 2 to install Visual Studio .NET 2003. As shown in figure [5.4]

Figure [5.4] Install Visual Studio .NET 2003

- **Install SQL server 2000 software.**

An Enterprise edition of the Microsoft SQL server 2000 meets our system requirement in creating, accessing, and managing the system database.

Configuration of SQL server 2000:

When using .NET technology ADO.NET is used for database connections, ADO.net which is a new technology that is based on the usefulness of Microsoft ActiveX Data

Object (ADO), however. It is a new technology for manipulating data, it contains numerous improvements over the previous version of ADO, and it is greatly simplifies the process of connecting a web application to a database.

Unlike ADO, ADO .NET is specifically designed for data connections located in a disconnected environment, so it the best choice when developing and implementing internet based applications.

By configuring the SQL server 2000 to be mixed mode authentication, which is the preferred method to use when connecting a web application to SQL server 2000 DBMS, this method need user name and password to be transferred back and forth between servers. Figure [5.5] shows the configuration of SQL server 2000 authentication mode to be "SQL server and windows authentication".

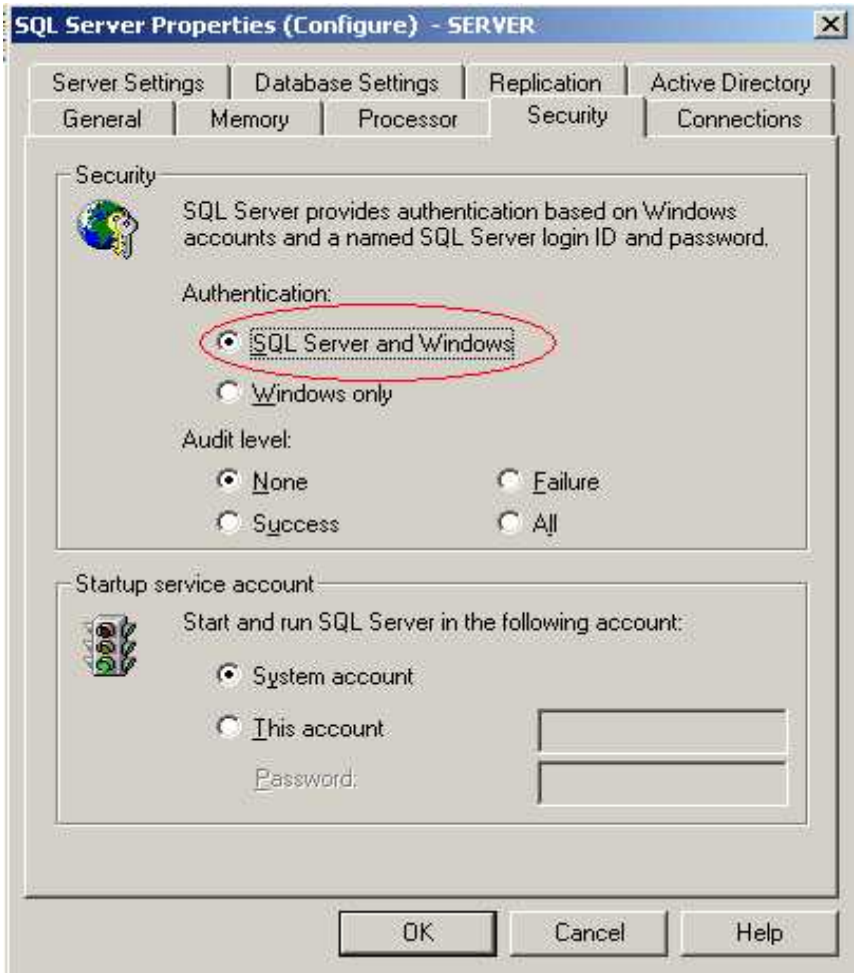


Figure [5.5] Mixed Mode Authentication (Step One).

The last configuration of the SQL server 2000 is to work effectively and ensuring that the integration more comfortable is to add a new account in the login group of the SQL server. This account (sa) is created by the SQL 2000 during installation process and it should be added to the login group of the SQL server. Figure [5.6] shows how to add this account to the logins group of the SQL Server.

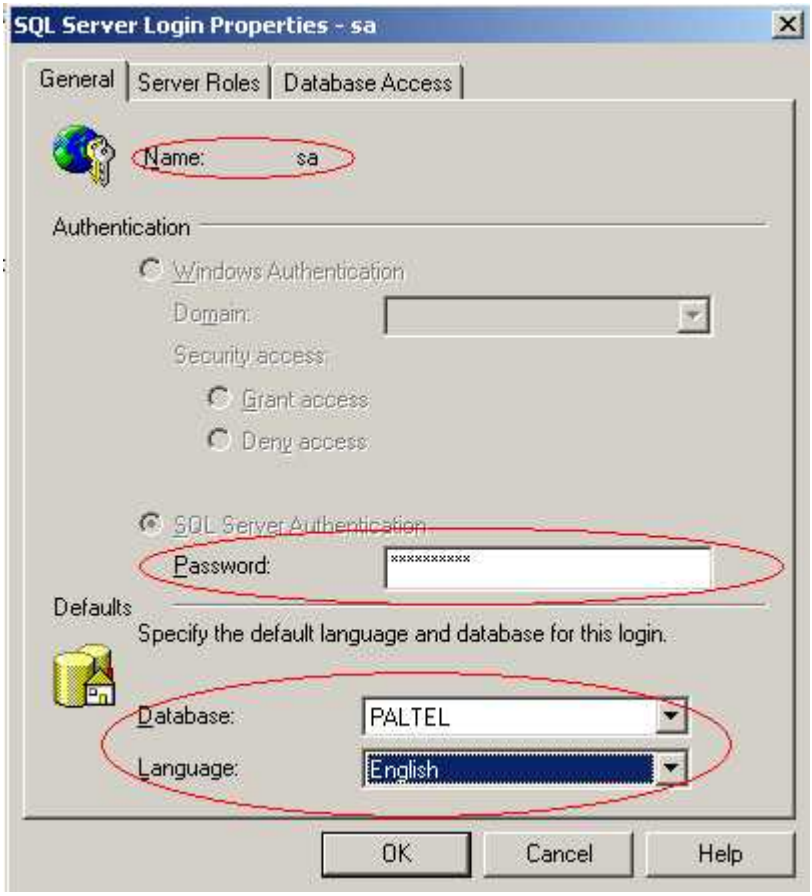


Figure [5.6] Mixed Mode Authentication (Step Two).

- **Install Exchange server 2003.**
  - On the server, install windows 2000 server SP3 or later, windows 2000 advanced server SP3 or later, or windows server 2003.
  - Verify that the NNTP, SMTP, and World Wide Web services are installed and enabled on the server, if you are running windows server 2003, verify that ASP.NET is installed.
  - Run forestprep to extend the active directory schema for exchange server 2003, to run forestprep your account should have the administrator permission.
  - Run domainprep to prepare the domain for exchange 2003.
  - Install exchange server 2003 on the new server by running exchange setup.

As shown in figure [5.7]

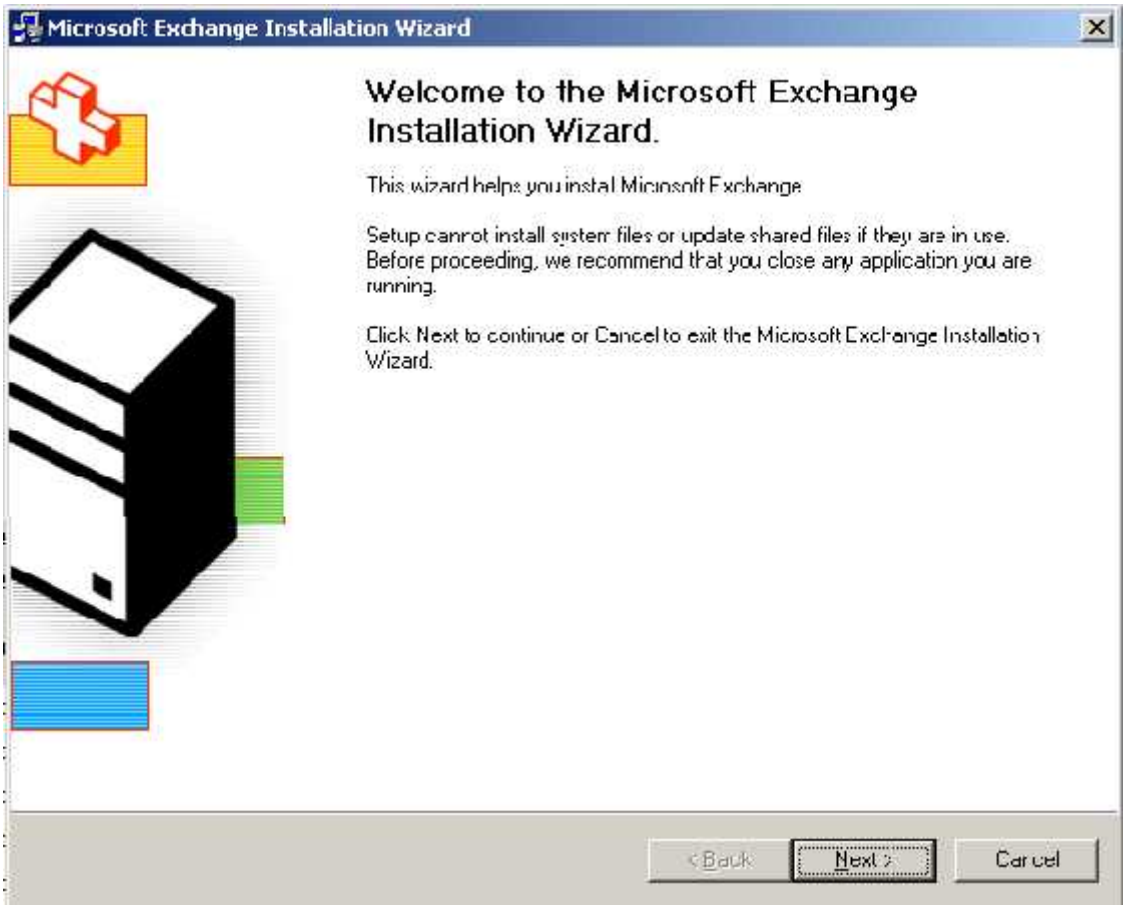


Figure [5.7] Exchange Server 2003 Installation Wizards (Step One).

After the installation complete go to the control panel > Microsoft exchange > Change/ remove button, you will get the window that shown bellow, and from this window you can perform some action on exchange server like Remove, Reinstall, figure [5.8] represented the action menu.

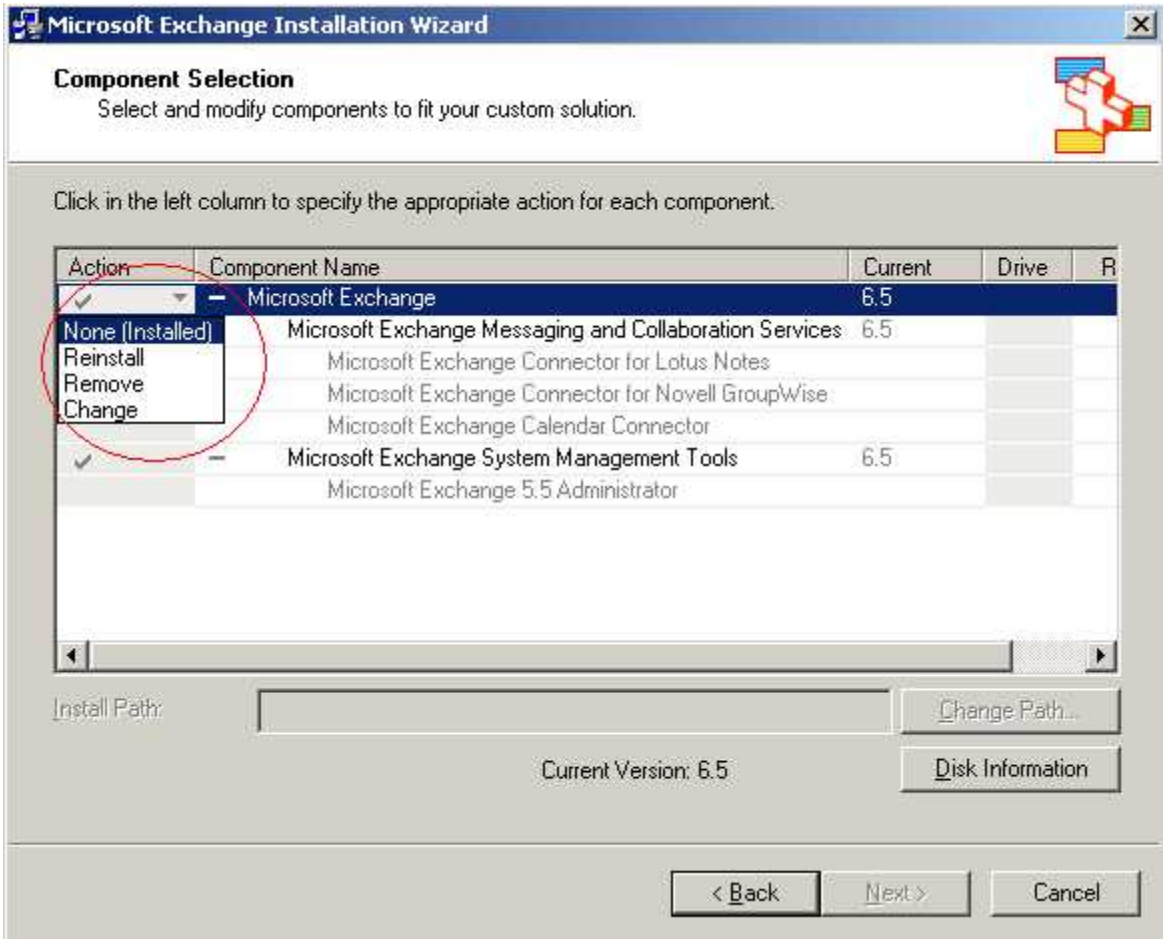


Figure [5.8] Exchange Server 2003 Installation Wizards (Step Two).

6.1 Introduction

Testing the system to ensure that it meets its specifications is one of the most important stages in the software system development.

For the purpose of delivering a system that works properly as expected, certain testing procedures should be performed on system and its components; accordingly with an acceptance testing that may be stated as a result for the success of the testing process.

This chapter covers the testing for:

- System units and module testing.
- Subsystems testing
- Integration testing.
- System testing.
- Acceptance testing.

Testing will take place in a time space that was assigned for the testing process. Table (6.1) shows the testing schedule:

Time in week / Testing process	1st week	2nd week	3rd week
Unit and module testing			
Sub-system testing.			
Integration testing.			
Acceptance testing.			

Table (6.1) Testing Schedule.

6.2 Unit and module testing

We have tested the units and modules using the whit box testing method, by using the path testing on each function in the system. In this section we describe some of these testing procedures on a number of selected functions that are classified as units and modules, these testing procedures are described here according with a certain snapshots that were captured from the real operating system interface.

1- **Tested Function:** " Consumer Login":
   Method: path testing.
   Test cases: each test case covers the set of input values in a certain execution path as shown in the function flowchart figure [6.1].

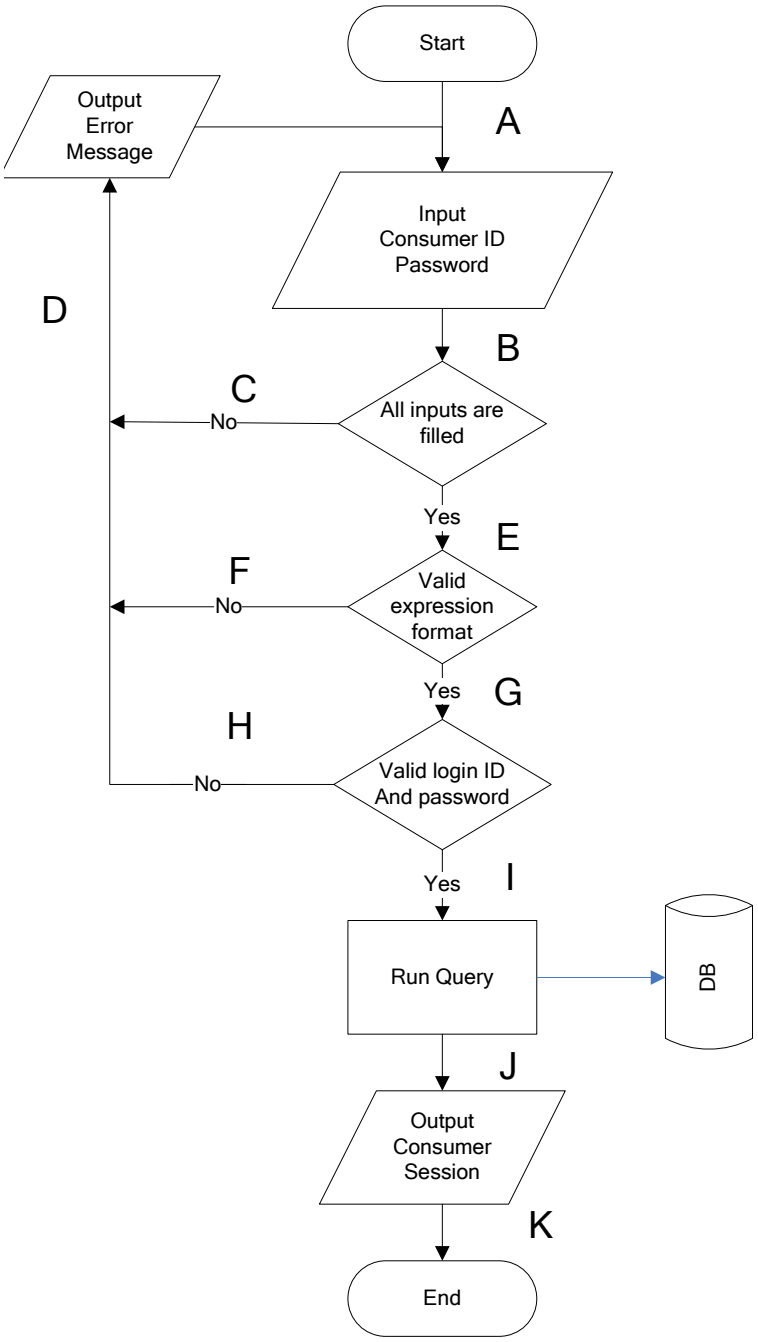


Figure [6.1] Login Consumer Execution Paths.

Test Cases Path	Test Data		Expected Output	Actual Output
	Login ID	Password		
A-B-E-G-I-J-K	123456	Qusay1	Valid login ID and Password (Accepted User).	Valid login ID and Password (Accepted User).
A-B-C-D	_____	_____	User ID and Password is not filled in.	User ID and Password is not filled in.
A-B-E-F-D	Qusay	123456	Invalid login ID format.	Invalid login ID format.
A-B-E-G-H-D	6767	Samer345	Invalid login ID or Password.	Invalid login ID or Password.

Table [6.2] Login Consumer Test Cases.

Conclusion: function confirms to its specifications.

2. **Tested Function:** " Check Credit Card Sufficiency "

   Method: path testing.

   Test case: each test case covers a set of values in a certain execution path in the function flowchart as shown in figure [6.2].

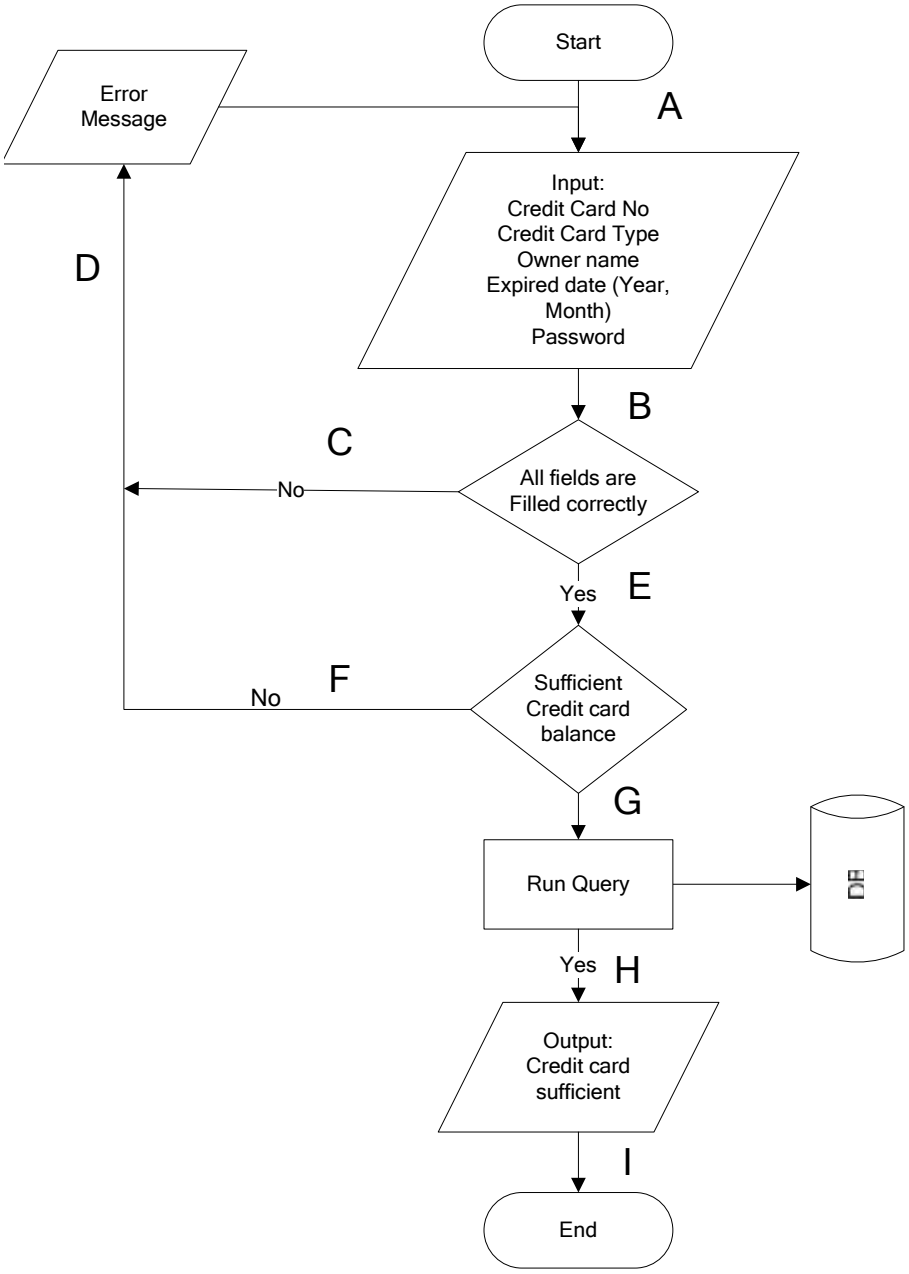


Figure [6.3] Check Credit Card Sufficiency Execution Paths.

Test Cases path	Test Data					Expected Output	Actual Output
	Credit card type	Credit card No	Holder name	Expired date	Password		
A-B-E-F-D	Master card	1234567891234	Bahaa himidan mujahed	1/2006	010802	Not sufficient credit card balance	Not sufficient credit card balance
A-B-C-D	_____	_____	_____	_____	_____	All field not filled	All field not filled
A-B-E-G-H-I	VISA card	0123456789123	qusay faraj jabari	2/2006	٠١٠١٧٢	sufficient credit card balance	sufficient credit card balance

Table [6.3] Check Credit Card Sufficiency Test Cases.

Conclusion: function confirms to its specifications

6.3 Integration testing

All module, and units are integrated and this integration is tested to show if there were defects that appear upon the integration of them. We have tested the integration using top-down testing. Testing here demonstrates on the interfaces between all modules, and the functionality of the integrated parts.
After testing the integration of all subsystems, the result indicated that they work together properly.

6.4 System Testing

The system was tested under several conditions, some errors were detected, and upon these results, we have solved these problems and we imposed the system another time to testing techniques to ensure that it disposed all types of defects and problems.

6.5 Acceptance Testing

The system was tested against its requirements, we conclude that it achieves its functional requirements, and could operate soon in the real environment.

6.6 Sample Snapshots

We have selected some program snapshots to be displayed here to show how the real program behaves when working under certain situations and these snapshots are describe the main functions of our web based system as shown bellow:

6.6.1 Registration Process Snapshots

To enable the consumer to get our e-services he /she must register first in PalTel web site, By clicking on New User Icon on the left panel or by clicking on Sign up new account in the middle of login page the consumer will start the registration process as shown bellow:

6.6.1.1 Login Page

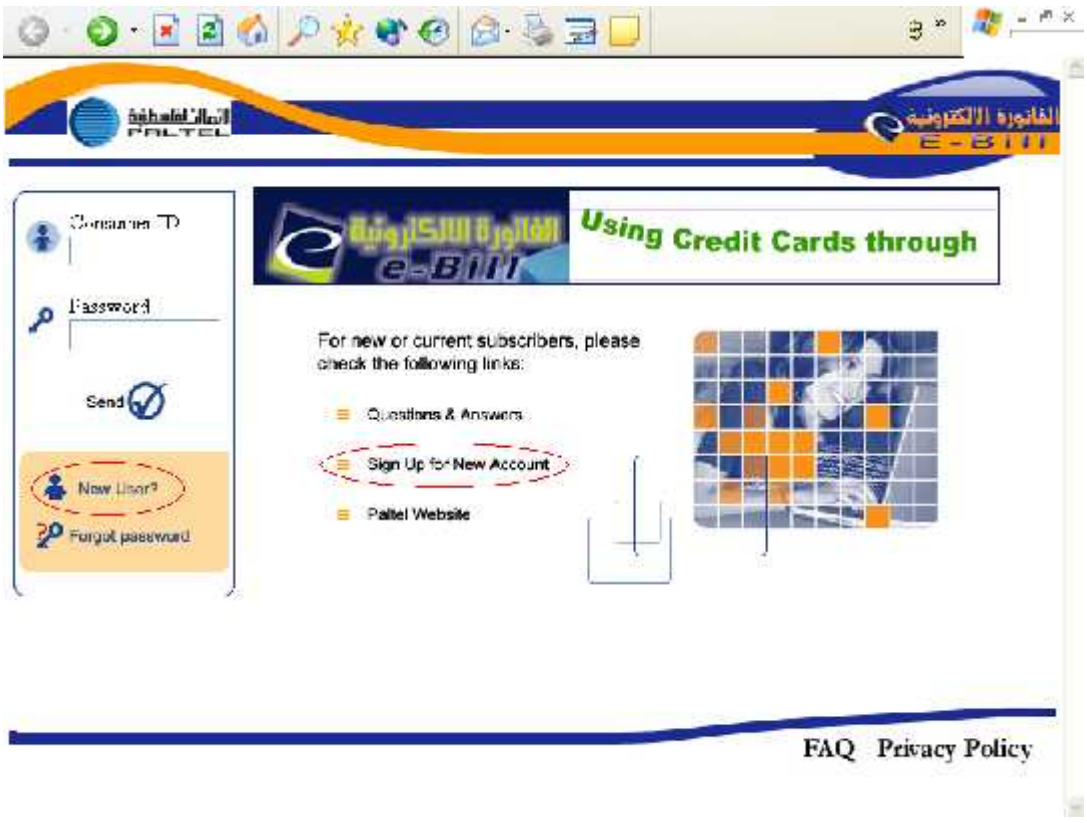


Figure [6.3] Login Page Snapshot.

6.6.1.2 Step one in registration process

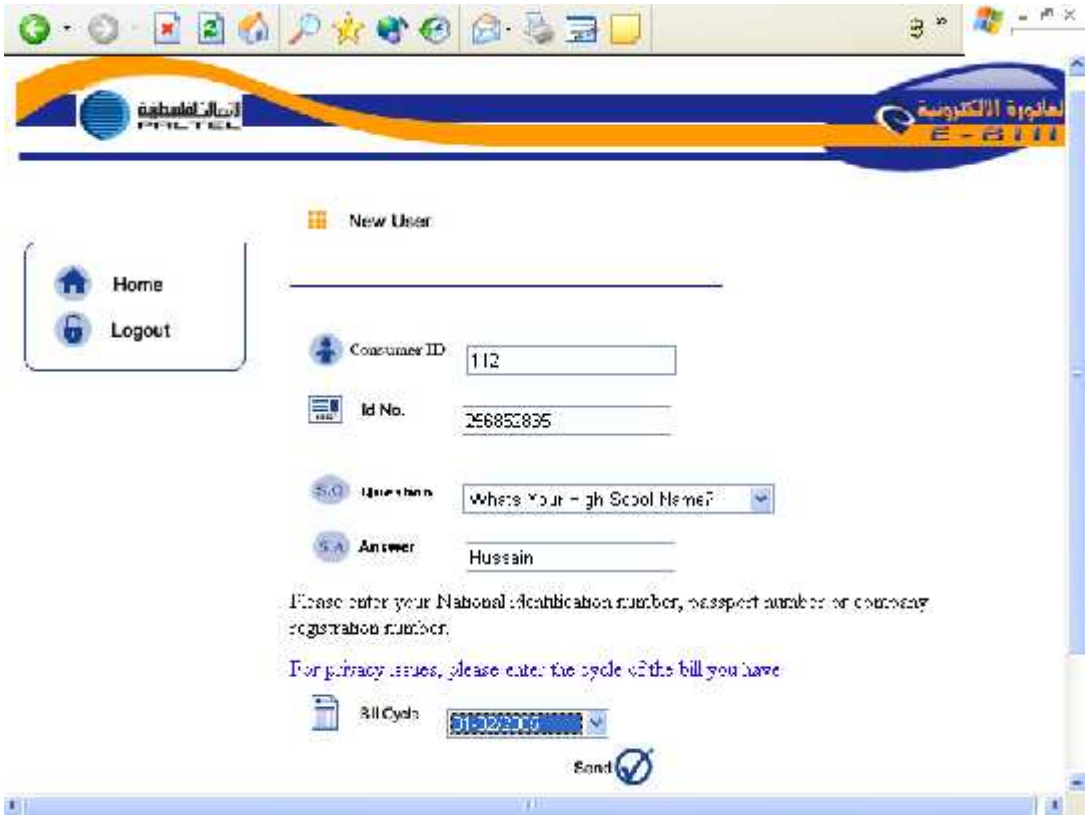


Figure [6.4] Step One in Registration Process Snapshot.

6.6.1.3 Step two in registration process

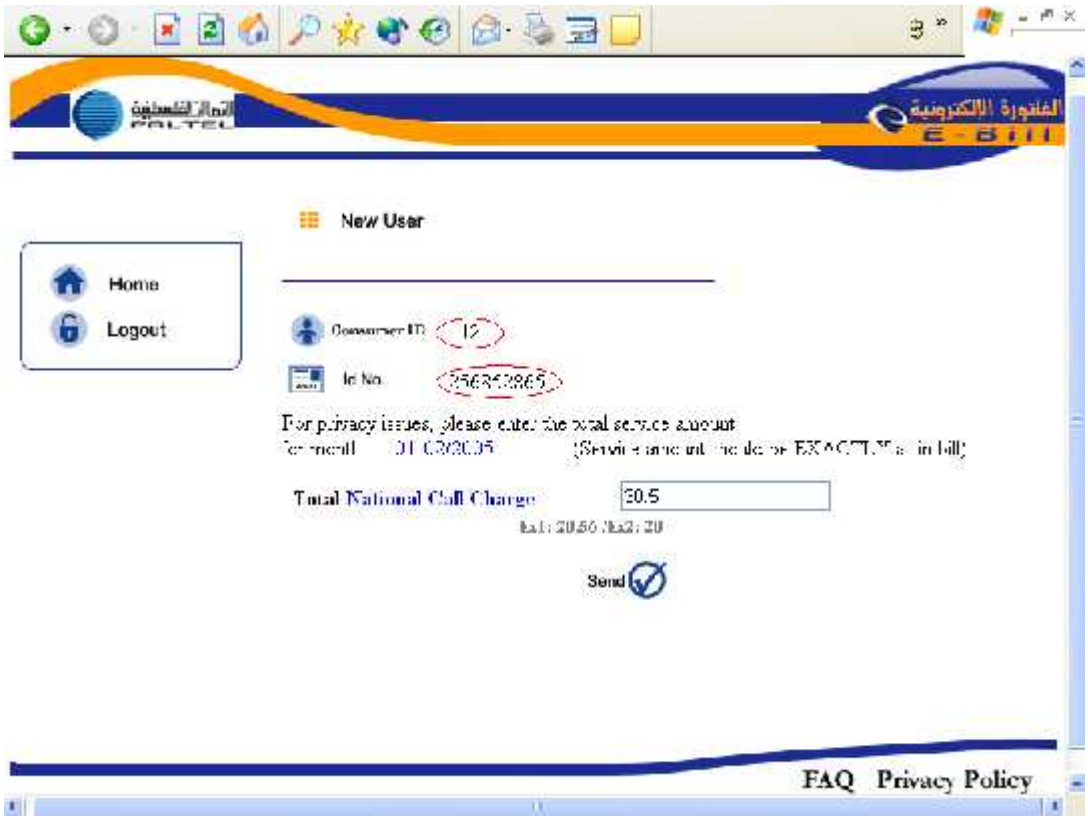


Figure [6.5] Step Two in Registration Process Snapshot.

6.6.1.4 Step three (final step) in registration process

Figure [6.6] Step Three (Final Step) in Registration Process Snapshot.

6.6.1.5 Consumer Home page

After the consumer finish successfully the registration process the PalTel system redirect the consumer to his home page as confirmation step that he completes the registration process successfully as shown bellow:

Figure [6.7] Consumer Home Page Snapshot.

After the registration process completed there some changes occurred in PalTel Database that include the information about new consumer account as shown bellow:

6.6.1.6 Consumer Table before changes

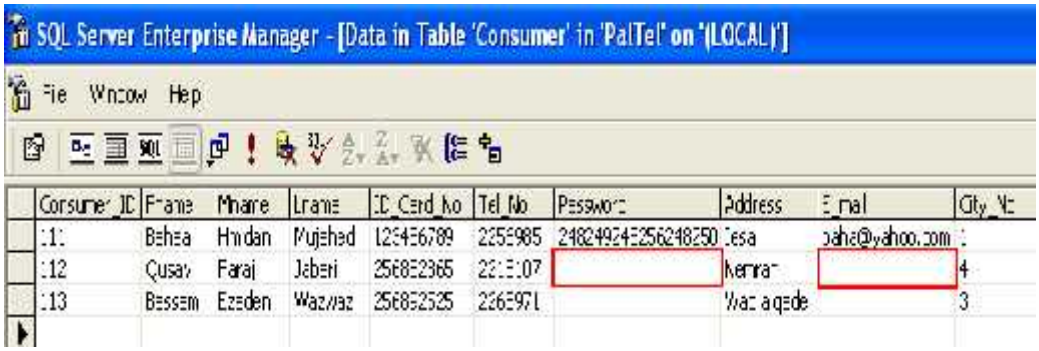


Figure [6.8] Consumer Table Before Changes Snapshot.

6.6.1.7 Consumer Table after changes

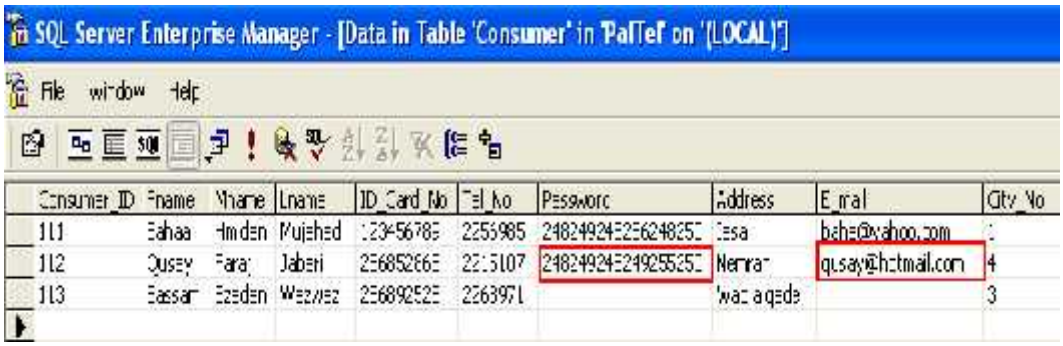


Figure [6.9] Consumer Table After Changes Snapshot.

6.6.1.8 Consumer Question Table before changes

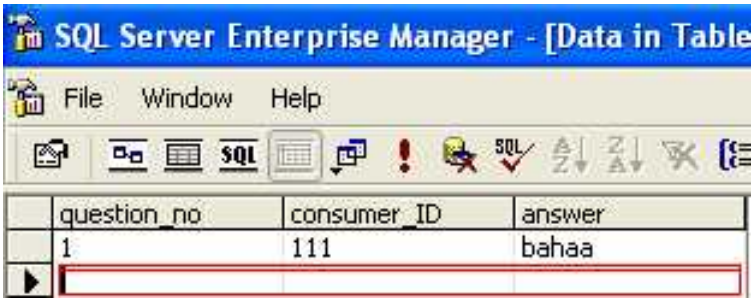


Figure [6.10] Consumer Question Table before changes Snapshot.

6.6.1.9 Consumer Question Table after changes

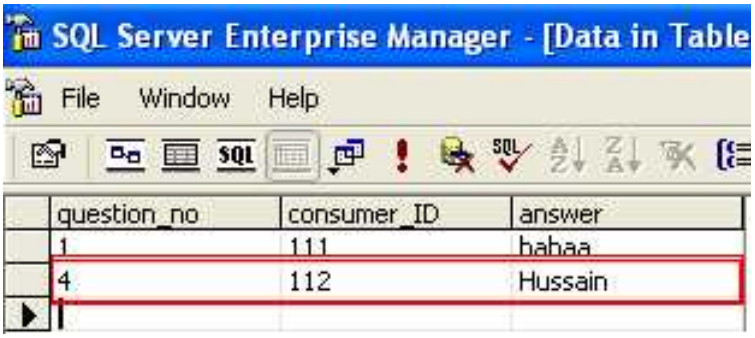


Figure [6.11] Consumer Question Table After Changes Snapshot.

6.6.2 Payment Process Snapshots

6.6.2.1 Login Page

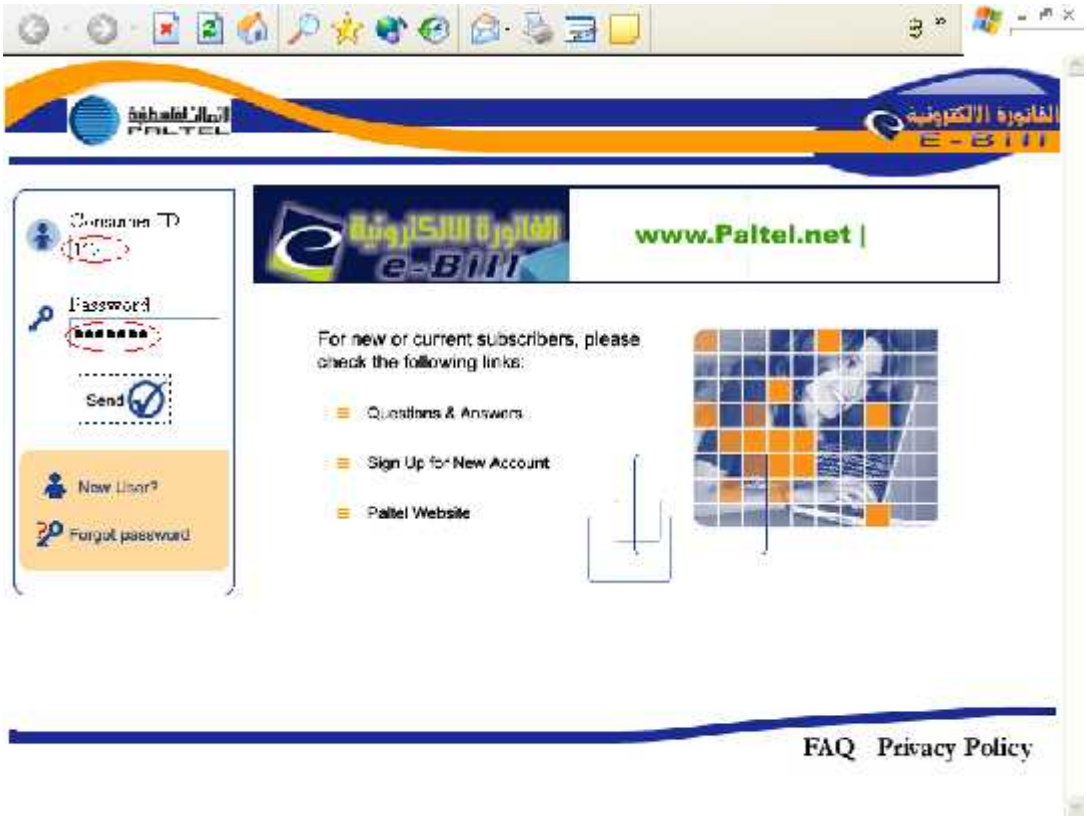


Figure [6.12] Login Page Snapshot.

6.6.2.2 Consumer Home Page

Figure [6.13] Consumer Home Page Snapshot.

6.6.2.3 Collection Page

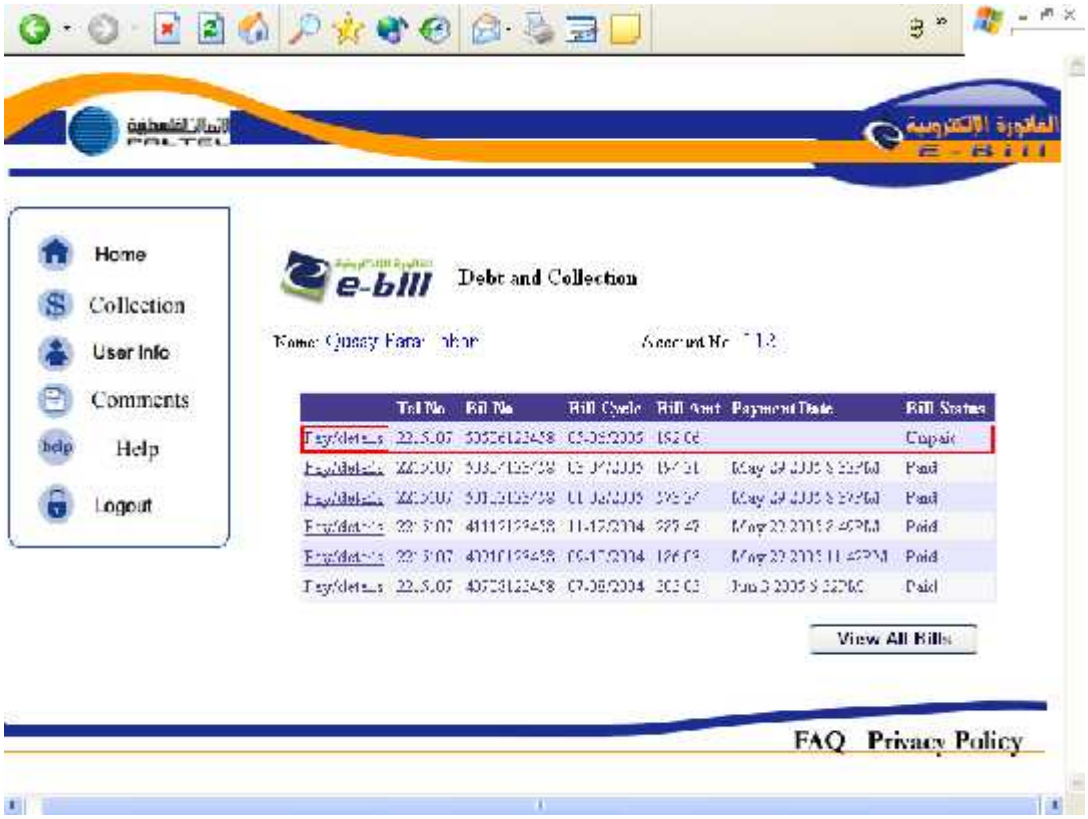


Figure [6.14] Debt and Collection Page Snapshot.

6.6.2.4 Bill Details Page

Figure [6.15] Bill Details Information Page Snapshot.

6.6.2.4 Credit Card Page

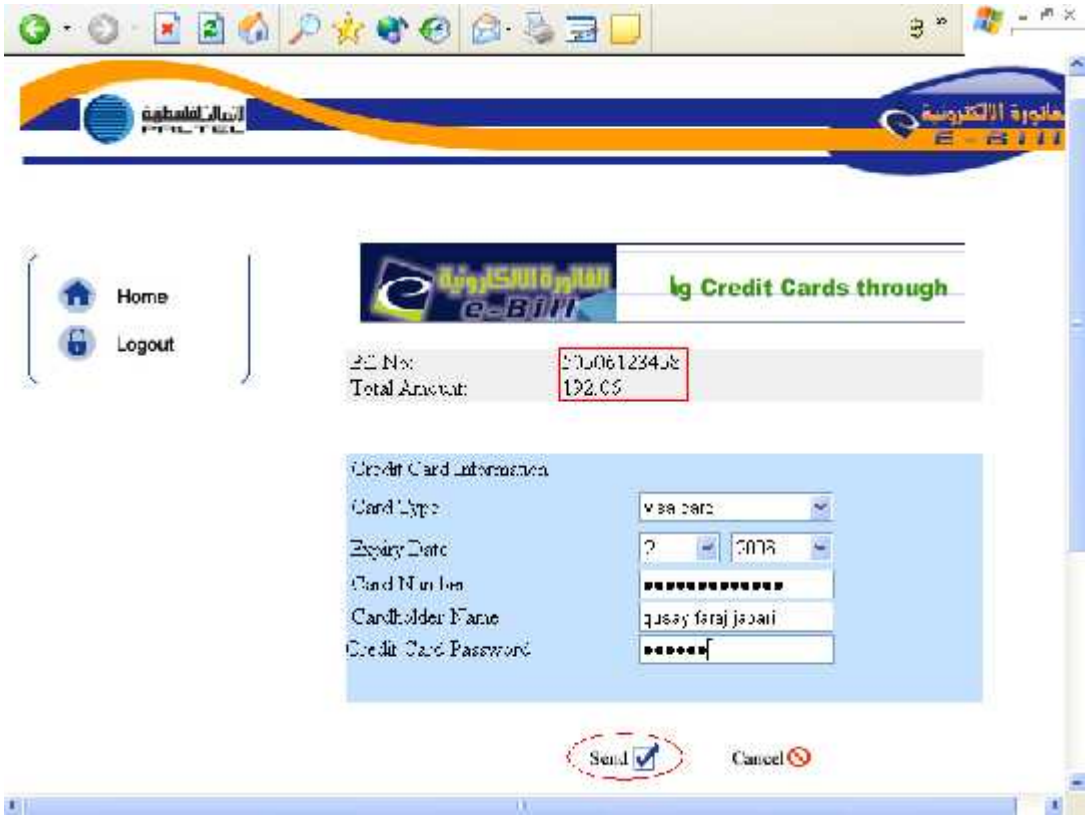


Figure [6.16] Credit Card Information Page Snapshot.

6.6.2.5 Bill Report

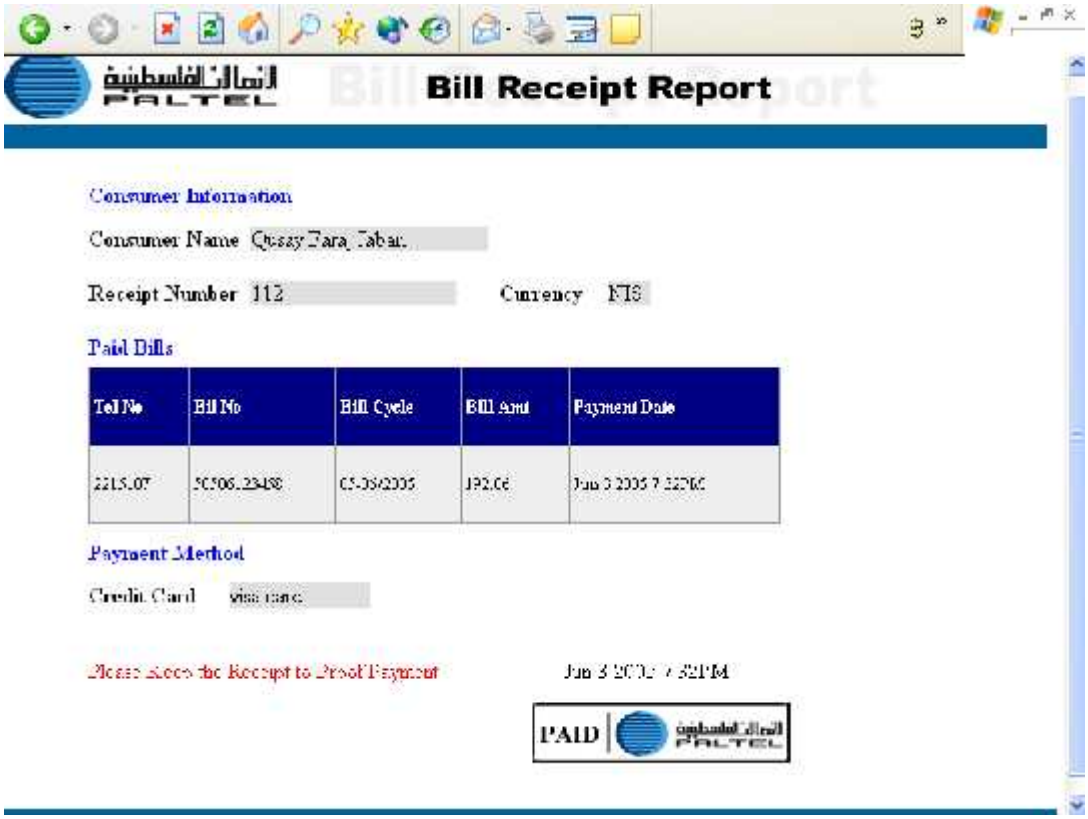
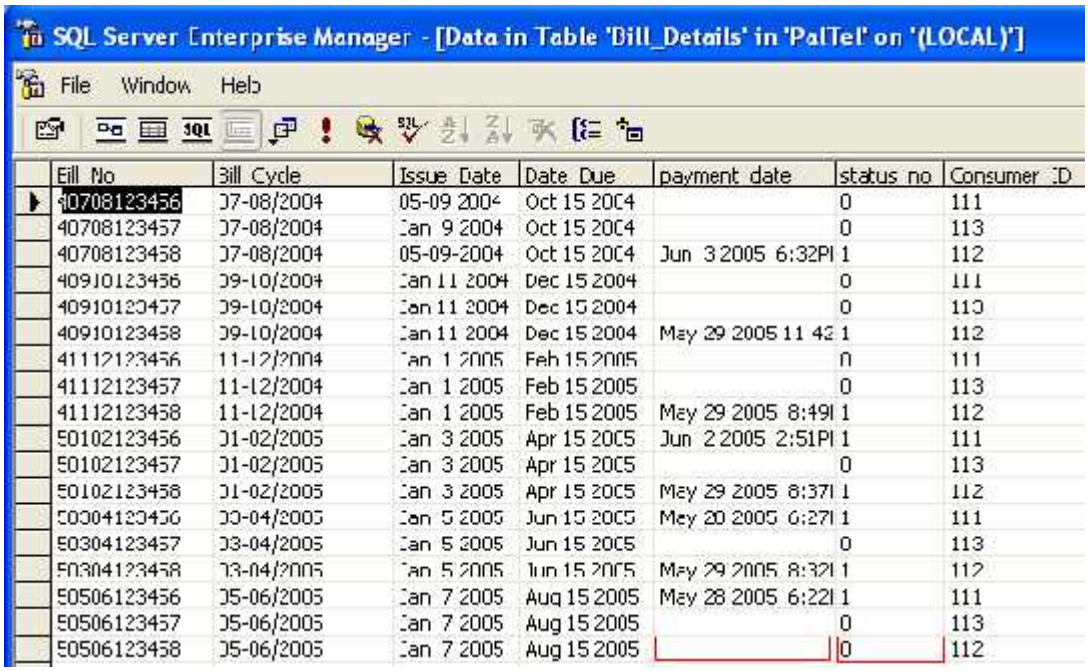


Figure [6.17] Bill Receipt Report Page Snapshot.

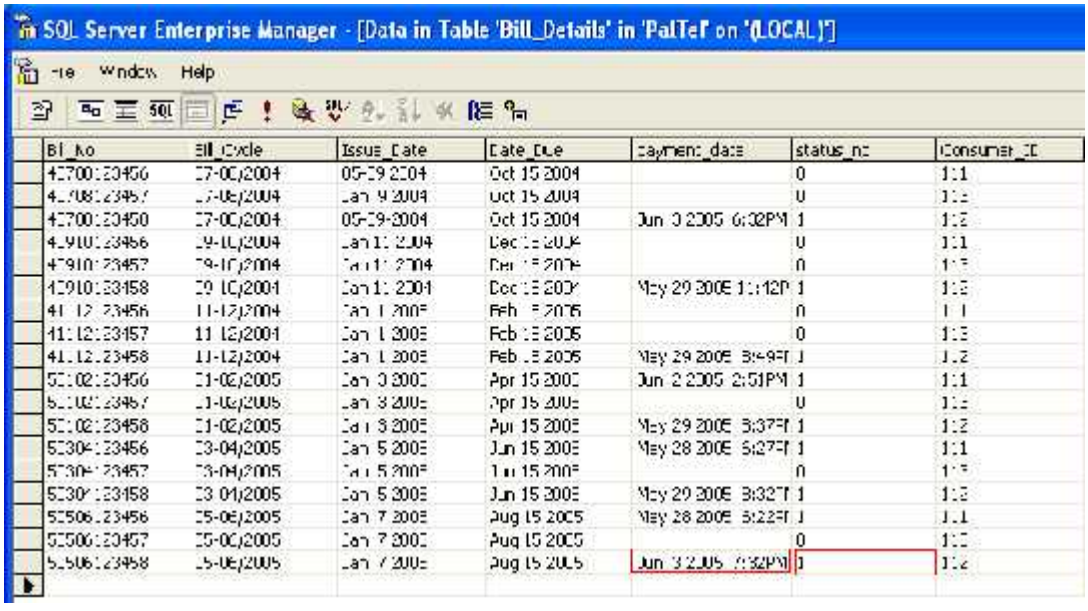
6.6.2.6 Bill Details before Changes



Bill_No	Bill_Cycle	Issue_Date	Date_Due	payment_date	status_no	Consumer_ID
40708123456	07-08/2004	05-09-2004	Oct 15 2004		0	111
40708123457	07-08/2004	Jan 9 2004	Oct 15 2004		0	113
40708123458	07-08/2004	05-09-2004	Oct 15 2004	Jun 3 2005 6:32PM	1	112
40910123456	09-10/2004	Jan 11 2004	Dec 15 2004		0	111
40910123457	09-10/2004	Jan 11 2004	Dec 15 2004		0	113
40910123458	09-10/2004	Jan 11 2004	Dec 15 2004	May 29 2005 11:42	1	112
41112123456	11-12/2004	Jan 1 2005	Feb 15 2005		0	111
41112123457	11-12/2004	Jan 1 2005	Feb 15 2005		0	113
41112123458	11-12/2004	Jan 1 2005	Feb 15 2005	May 29 2005 8:49	1	112
50102123456	01-02/2005	Jan 3 2005	Apr 15 2005	Jun 2 2005 2:51PM	1	111
50102123457	01-02/2005	Jan 3 2005	Apr 15 2005		0	113
50102123458	01-02/2005	Jan 3 2005	Apr 15 2005	May 29 2005 8:37	1	112
50304123456	03-04/2005	Jan 5 2005	Jun 15 2005	May 20 2005 6:27	1	111
50304123457	03-04/2005	Jan 5 2005	Jun 15 2005		0	113
50304123458	03-04/2005	Jan 5 2005	Jun 15 2005	May 29 2005 8:32	1	112
50506123456	05-06/2005	Jan 7 2005	Aug 15 2005	May 28 2005 6:22	1	111
50506123457	05-06/2005	Jan 7 2005	Aug 15 2005		0	113
50506123458	05-06/2005	Jan 7 2005	Aug 15 2005		0	112

Figure [6.18] Bill Details Table Before Changes Snapshot.

6.6.2.6 Bill Details after Changes



Bill_No	Bill_Cycle	Issue_Date	Date_Due	payment_date	status_no	Consumer_ID
40708123456	07-08/2004	05-09-2004	Oct 15 2004		0	111
40708123457	07-08/2004	Jan 9 2004	Oct 15 2004		0	113
40708123458	07-08/2004	05-09-2004	Oct 15 2004	Jun 3 2005 6:32PM	1	112
40910123456	09-10/2004	Jan 11 2004	Dec 15 2004		0	111
40910123457	09-10/2004	Jan 11 2004	Dec 15 2004		0	113
40910123458	09-10/2004	Jan 11 2004	Dec 15 2004	May 29 2005 11:42	1	112
41112123456	11-12/2004	Jan 1 2005	Feb 15 2005		0	111
41112123457	11-12/2004	Jan 1 2005	Feb 15 2005		0	113
41112123458	11-12/2004	Jan 1 2005	Feb 15 2005	May 29 2005 8:49	1	112
50102123456	01-02/2005	Jan 3 2005	Apr 15 2005	Jun 2 2005 2:51PM	1	111
50102123457	01-02/2005	Jan 3 2005	Apr 15 2005		0	113
50102123458	01-02/2005	Jan 3 2005	Apr 15 2005	May 29 2005 8:37	1	112
50304123456	03-04/2005	Jan 5 2005	Jun 15 2005	May 28 2005 6:27	1	111
50304123457	03-04/2005	Jan 5 2005	Jun 15 2005		0	113
50304123458	03-04/2005	Jan 5 2005	Jun 15 2005	May 29 2005 8:32	1	112
50506123456	05-06/2005	Jan 7 2005	Aug 15 2005	May 28 2005 6:22	1	111
50506123457	05-06/2005	Jan 7 2005	Aug 15 2005		0	113
50506123458	05-06/2005	Jan 7 2005	Aug 15 2005	Jun 3 2005 6:32PM	0	112

Figure [6.19] Bill Details Table After Changes Snapshot.

6.6.2.7 Bill Status Table

Figure [6.20] Bill Status Table Snapshot.

6.6.2.8 Credit Card Table before Changes

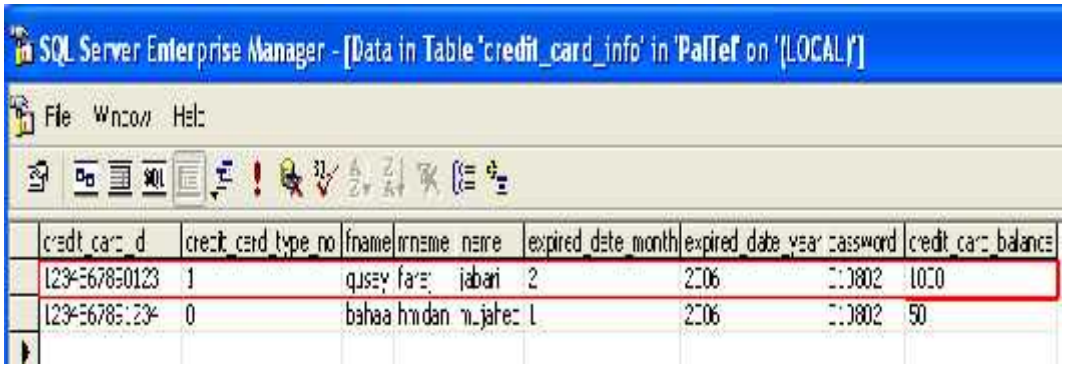


Figure [6.21] Credit Card Table Before Changes Snapshot.

6.6.2.9 Credit Card Table after Changes

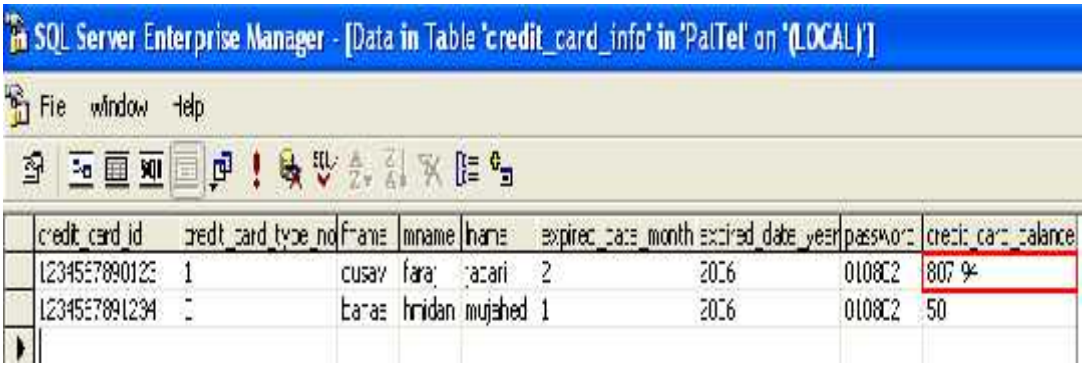


Figure [6.22] Bill Details Table After Changes Snapshot.

6.6.2.10 Bank Transaction Table before Changes

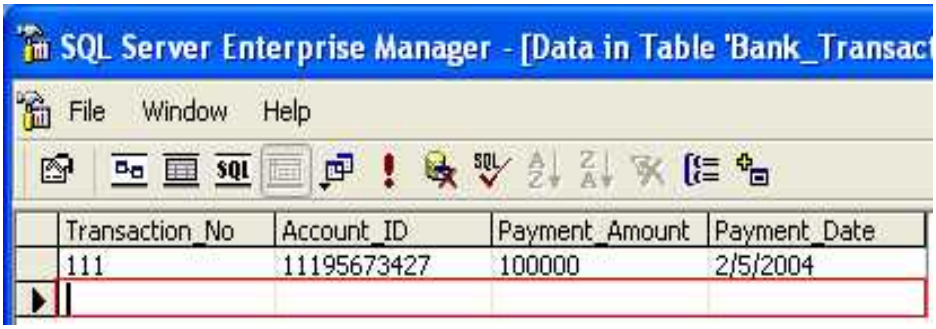


Figure [6.23] Bank Transaction Table Before Changes Snapshot.

6.6.2.11 Bank Transaction Table after Changes

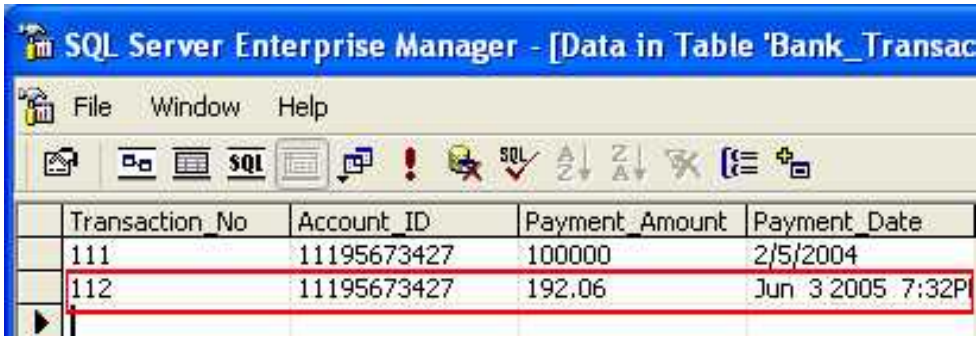


Figure [6.24] Bank Transaction After Changes Snapshot.

7.1 Introduction

This chapter describes how to start working with the system; the establishment of the environment that the system will work in, what is the process of deployment, and the maintenance plan.

7.2 Migration

The deployment of the system must be built by certain steps so that to work properly within its environment; the production environment has to be established, configured, and a decision of operating on the new system must be taken considering all constrains and risks of the process of migration to the new system. Toward deploying and migrating to the new system we describe here the steps that must be done:

1. **Establishment of the production environment:**

   The minimal requirements of deploying the system are described in chapter two [system specification], and the needed configurations for the machine running the system are described in chapter five [Coding and implementation]. For example, we say that our software system will not operate on a machine that doesn't have the .NET Framework, so that the company that decides to work on our system must have all of the production environment elements.

2. **Deciding to deploy the new system:**

   A decision of the deployment of the new system must be taken according to the plan of the deployment and migration to this new system, these are managerial issues and managers with their company capabilities are responsible for doing so. Does this system cover our requirements? Do we have the minimal requirements to deploy it? How could we deploy it?

   Here we say that our system was tested and we found that it works well as it should be, the system can operate immediately whenever a suitable production environment is created, but we say that our software is an integrated system that must run with its all parts integrated, nevertheless the system may not work

properly. Now, the way of migration to it depends on the technicians and managers recommendations in the company that wishes to deploy this new system.

3. **Running the system:**
   The aim of having the new system is to work on it, after it was being designed and tested during the development process, and whenever a company buys it, decides to migrate to it, and deploy it, the system will operate and run.

7.3 Maintaining the system

When running the system there is always a possibility for failure, errors, and other types of problems that may appear. We describe here the maintenance plan that covers some of the actions that is to be taken when certain situations occur:

1. **Backup:**
   This is an issue where the adaptation of the backup methodology [type and time interval] is determined and implemented by the company working on the system itself. The backup on the system database could be configured by means that are provided by the producer company of the DBMS that we have used in our software system which is Microsoft© on its DBMS product [SQL Server 200].

2. **Error reporting :**
   When errors occur, certain actions are to be taken as the contract agreement describes the conditions and situations of the maintenance and the responsibility allocation on the contract sides.
   Our system provides a simple way for reporting certain errors immediately when they occur, means of messaging on the computer screen describing what the problem is are implemented.

3. **Upgrade:**

   This process is to be carefully implemented if it is essential and by considering the software producers. Upgrading to the new system doesn't need a previous operating E-commerce software, all what it needs is the production environment that was described earlier in this chapter.

   Note: See Appendix B to view System Service Request SSR

   SSR is used to request new development, to report problems, or to request new features within an existing system.

8.1 Introduction

In this chapter we will provide recommendations that result during our system development and implementation processes.

8.2 Conclusion

The work team has concluded the following:

- The web-based systems reduced the time and efforts for both consumer and e-Service provider PalTel, and increase the efficiency of service during the payment process.
- The web-based system is work beside the traditional system, and both choices are available to consumer to select the suitable method to pay his bill.

8.3 Recommendations

The project team recommend for the following works and enhancements on the system:

1. Integrate our system with real web services like credit card system to enable our system to check the credit card information validity, and currency rate exchanger.
2. Inform the consumer with new bills via consumer e-mail accounts.
3. Integrate our web-based system with service value calculator system instead of using virtual values in our system DB.

TABLE OF CONTENETS

Chapter Four (System Design)

Chapter Five (Implementation and Coding)

Chapter Six (System Testing)

List of Tables

List of Figures

On IIS 6.0, How to configure my website to use SSL?

By default, web browsing is being performed by use of the HTTP protocol, i.e. a connection between the client computers (using a web browser) to the web server (using IIS, Apache or any other sort of web server program). HTTP relies on TCP (Transmition Control Protocol) and uses port 80 on the listening server.

The main security issue with HTTP is the fact that all the traffic between the client and the server is done as clear text, meaning that anyone could potentially "listen" to your talk and grab frames and valuable information from the net.

To secure the transmission of information between your web server running IIS 6.0 on Windows Server 2003 and your browser clients, you can encrypt the information being transmitted by using SSL (Secure Sockets Layer).

Note: The procedure for applying SSL on IIS 5.0 (on Windows 2000) and IIS 5.1 (on Windows XP) is quite the same.

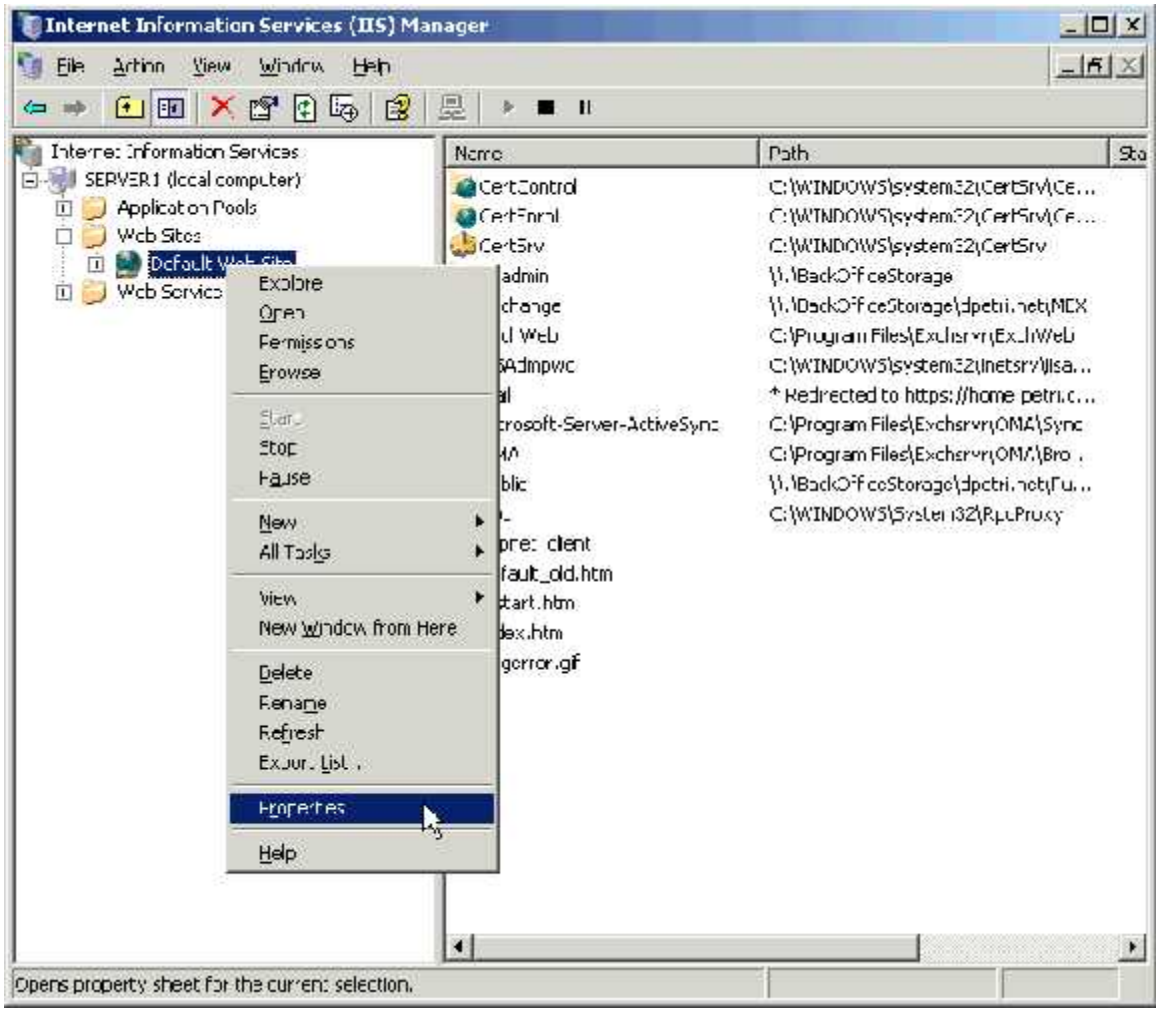
Configure SSL

To configure SSL for your website on IIS 6.0 (running on Windows Server 2003) complete the following steps:

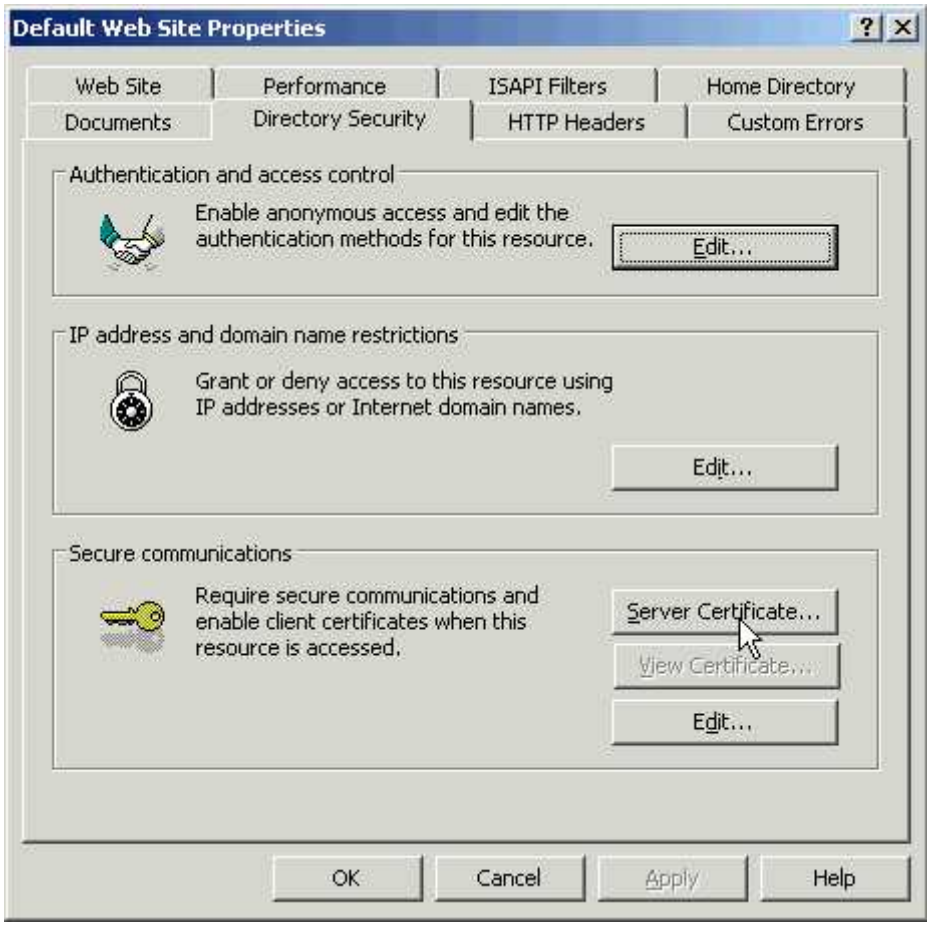
Note: Although the screenshots are made with IIS 6.0 on Windows Server 2003, the same procedure applies for IIS 5.0 and IIS 5.1.

1. Click Start, point to All Programs, point to Administrative Tools, and then click Internet Information Services (IIS) Manager.
2. In Internet Services Manager, in the console tree, expand *SERVERNAME* (your local computer), and then expand Web Sites.
3. In the console tree, right-click Default Web Site, and then click Properties.

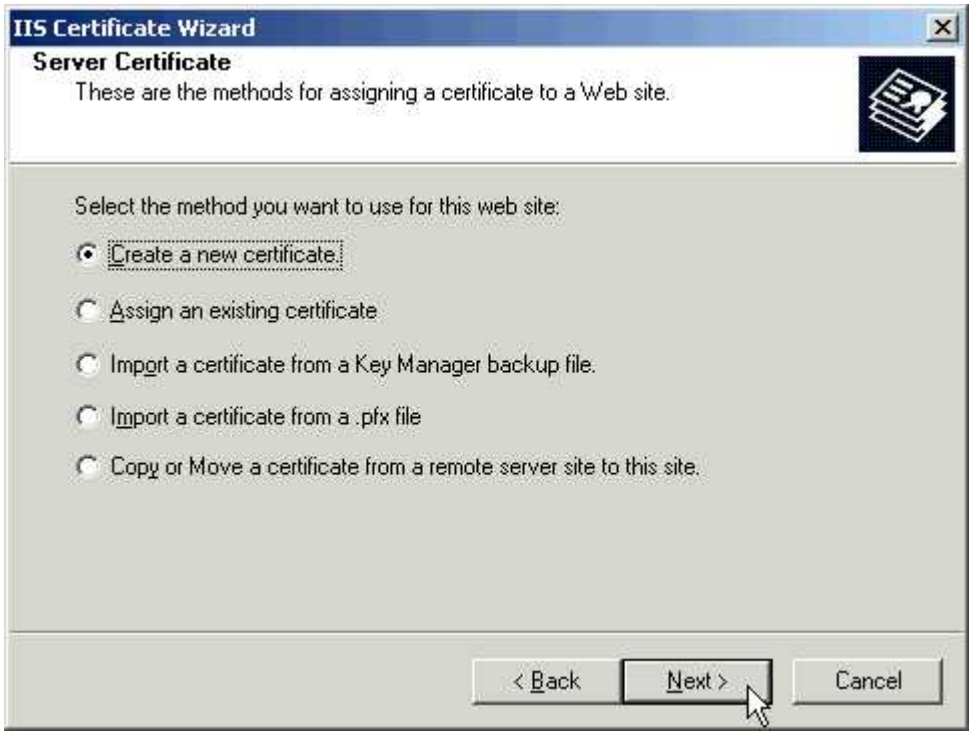
Note: It's possible that the site you've created was stored under a different virtual server. If your website is not stored within the Default Web Site, right-click your own web site and click Properties.



4. In the Default Web Site Properties dialog box, click Directory Security.

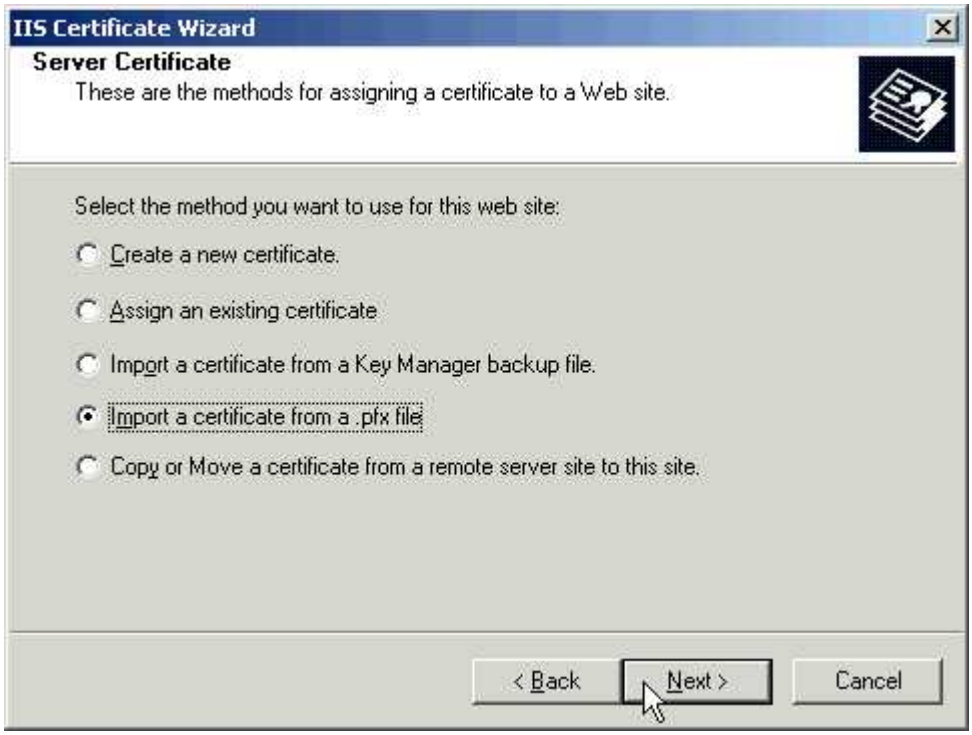


5. On the Directory Security tab, click Server Certificate.
6. In the Welcome to the Web Server Certificate Wizard, on the Welcome page, click Next.
7. On the Server Certificate page, verify that Create a new certificate is selected, and then click Next.

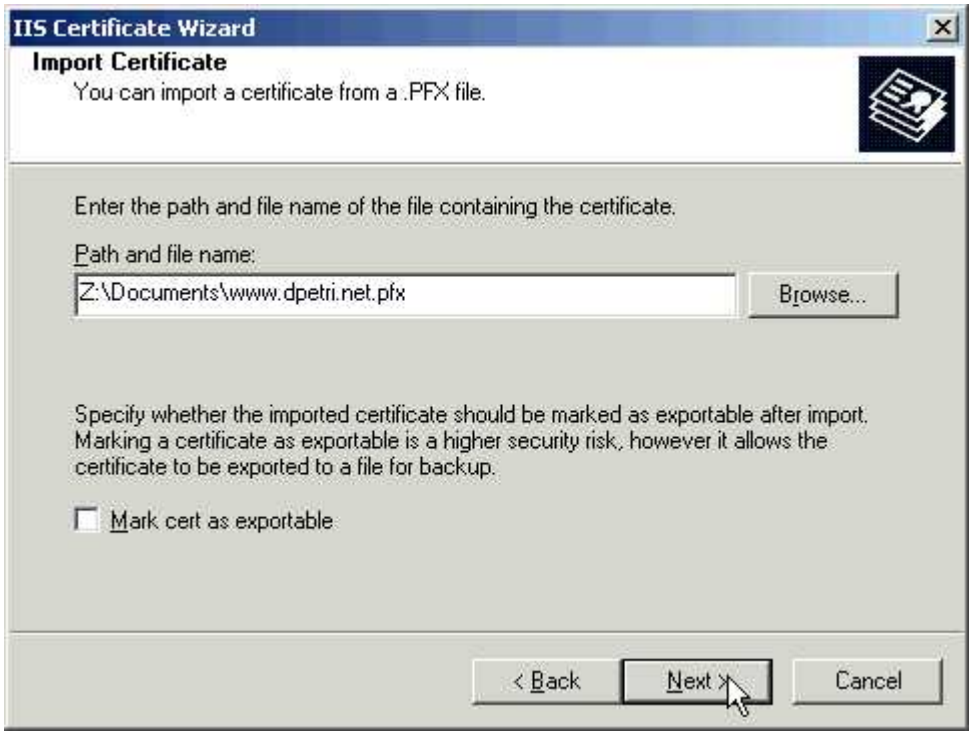


Note: You can also import an already existing certificate. Do so follow these steps:

1. Click Import a certificate from a .pfx file. Click Next.

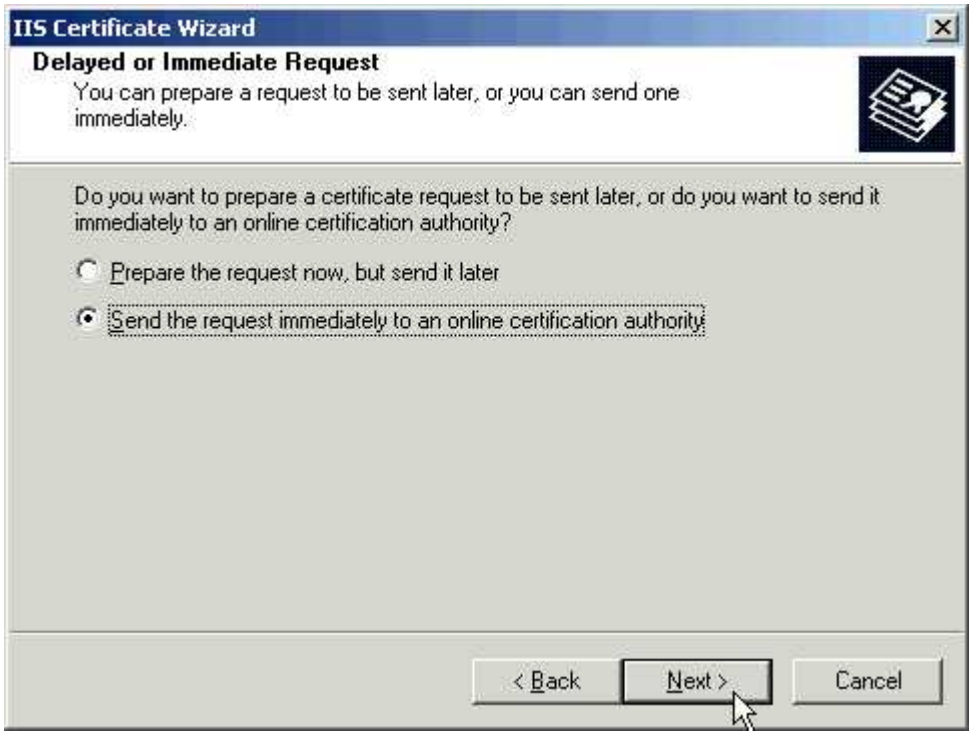


2. In the Import Certificate path enter the path to where you've stored your existing certificate. Click Next.



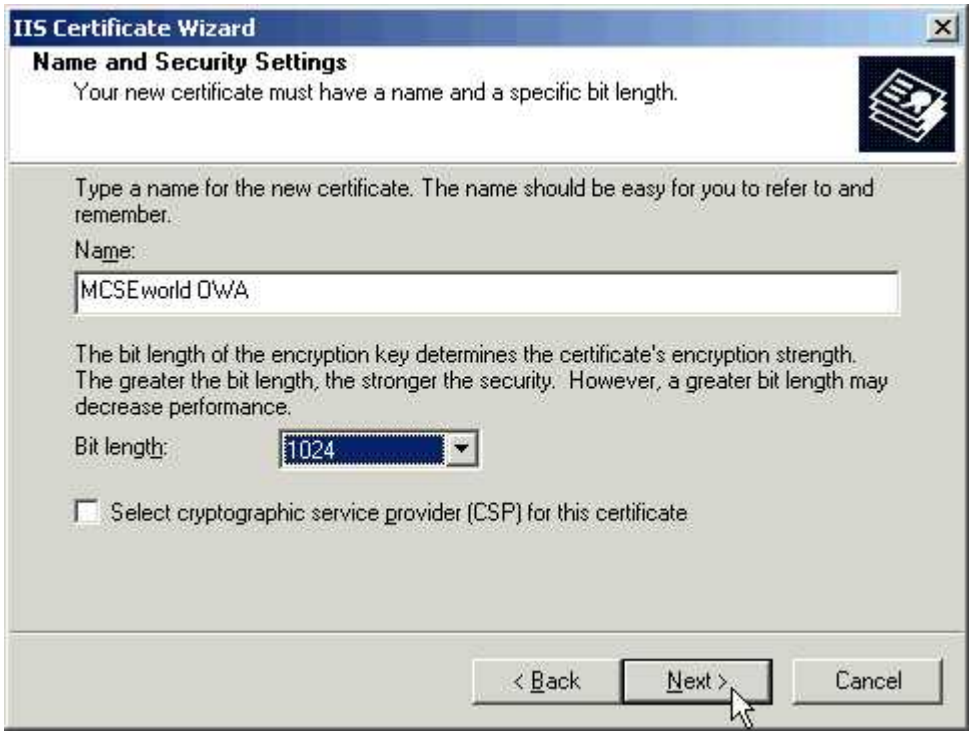
3. Enter the password configured for the .pfx file. Click Next.

8. On the Delayed or Immediate Request page, click Send the request immediately to an online certification authority, and then click Next.



Note: If you don't have a Certificate Authority (CA) installed on your server or on a different server on the network you can prepare the request but you'll need to manually send it to the CA.

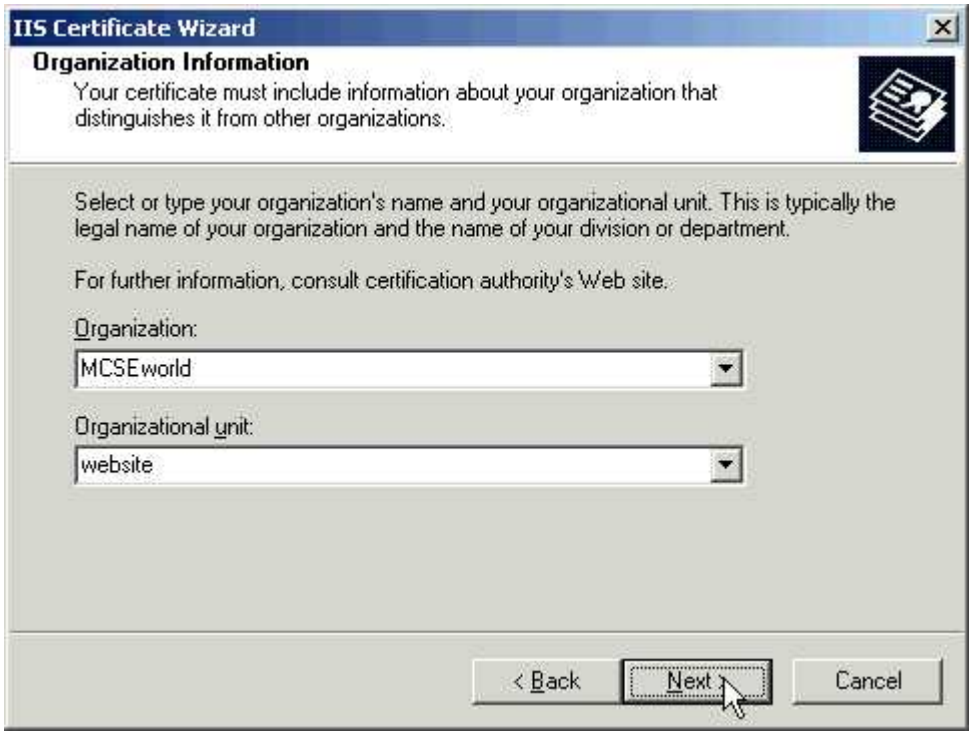
9. On the Name and Security Settings page, in the Name box, type *yourservername.domainname.com* (or .net, .org, .mil etc. Use your own registered domain name, the one you want people to use when browsing to your site) and then click Next.



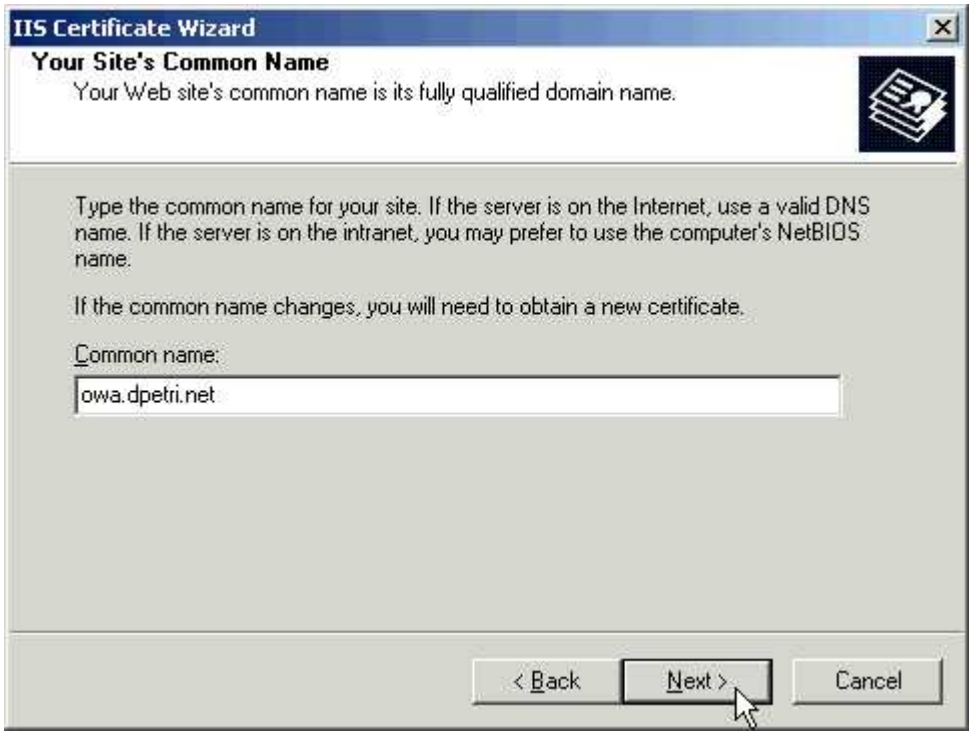
Note: You will need a different certificate for each website you'll run on this server, so make sure you provide the exact server URL.

You can also change the Bit Length for the encryption key if you want.

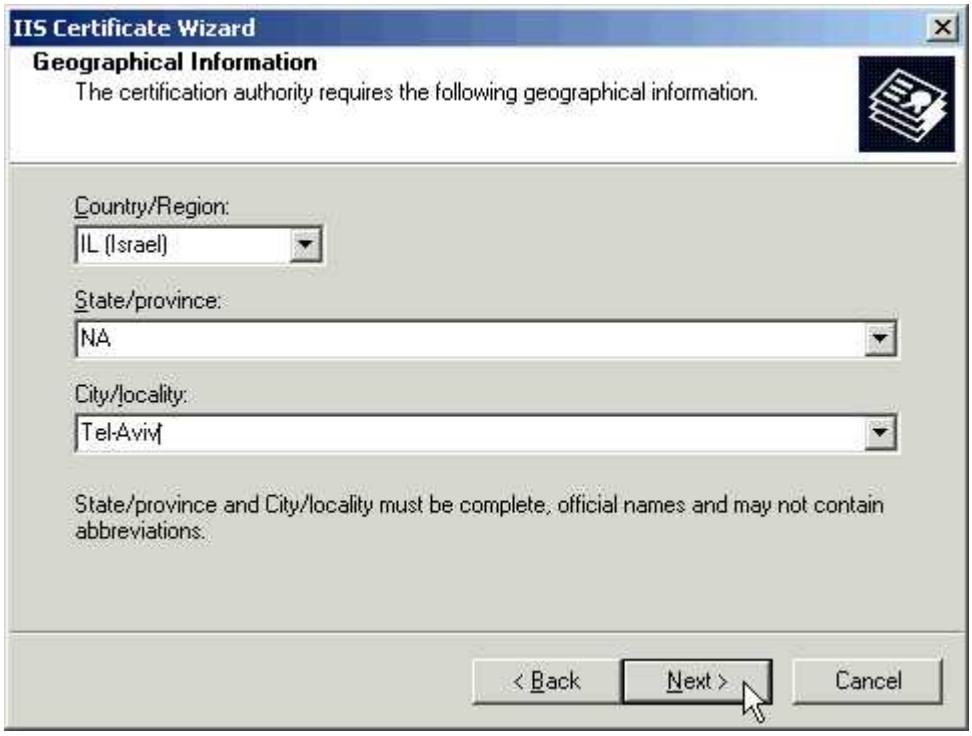
10. On the Organization Information page, in the Organization box, type your own company name. In the Organizational Unit box, type a descriptive name and then click Next.



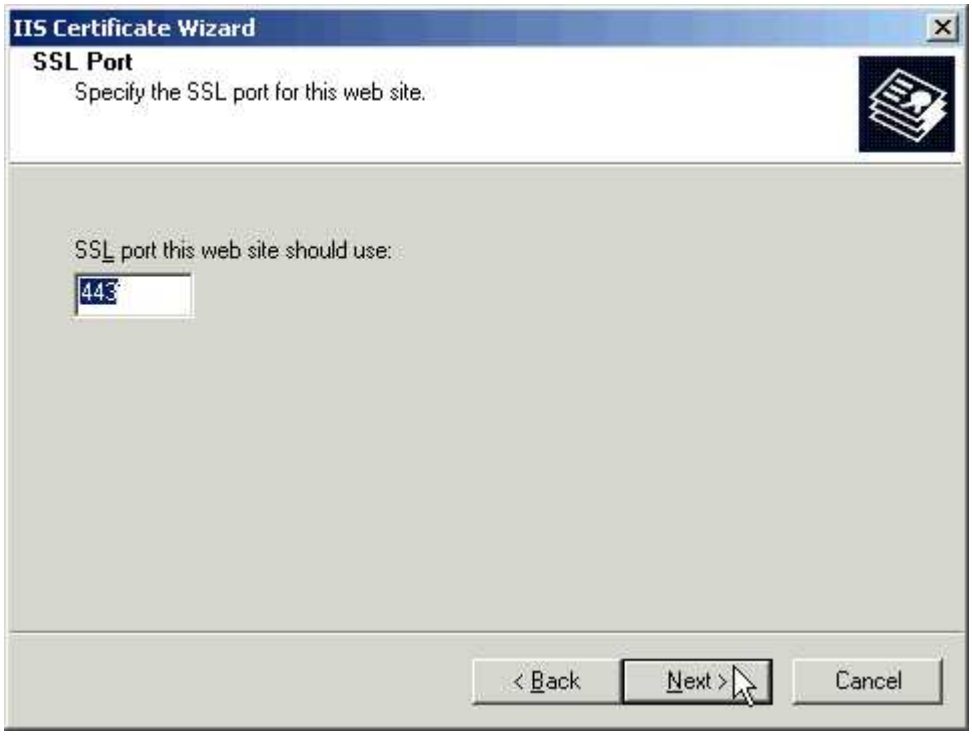
11. On the Your Sites Common Name page, in the Common name box, type *yourservername.domainname.com* and then click Next.



12. On the Geographical Information page, in the State/province box, type the required info and then click Next.

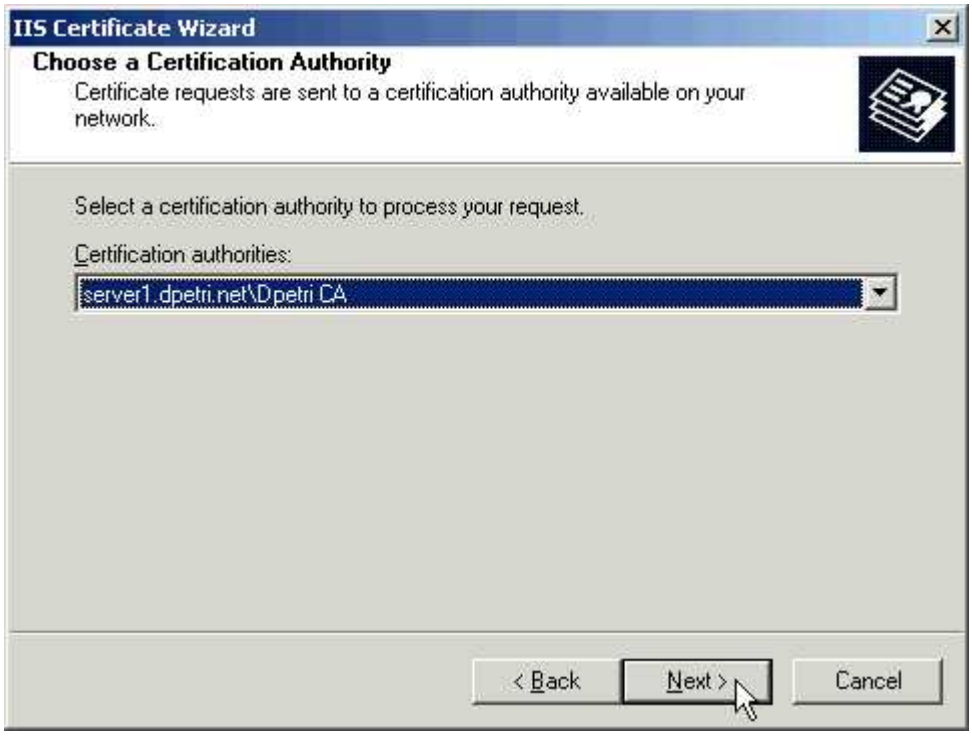


13. On the SSL Port page, in the SSL port this web site should use box, verify that 443 is specified, and then click Next.

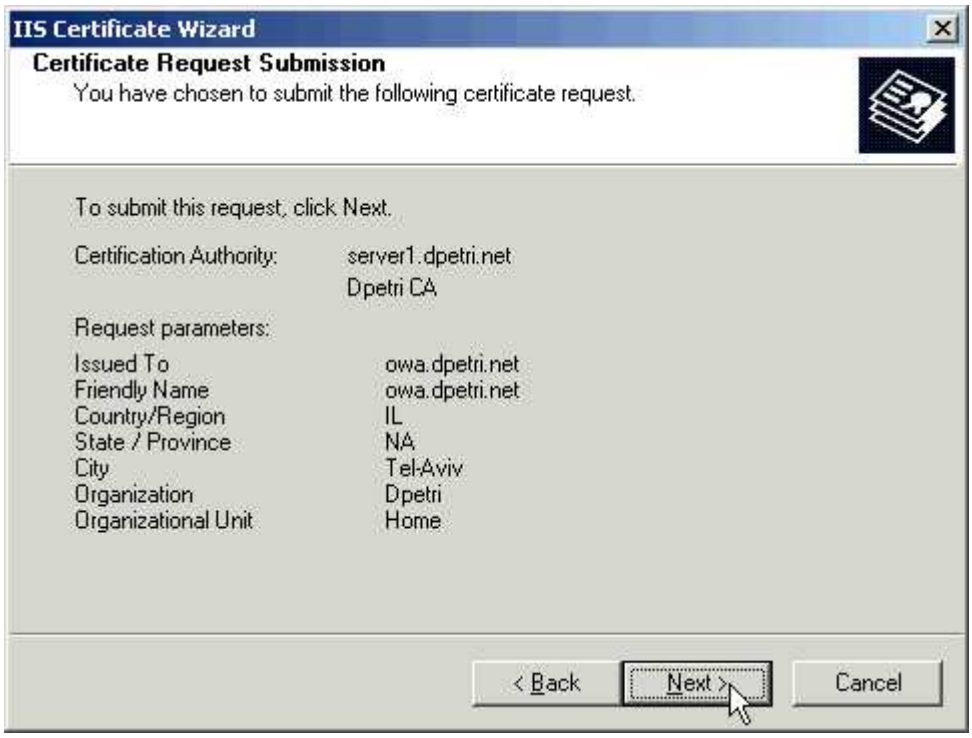


Note: SSL can only listen once on port 443, requiring you to either select a different SSL port for each SSL protected website you're about to host on the server, or, even better, use a different static IP for each site, and share port 443 amongst them.

14. On the Choose a Certification Authority page, in the Certification Authorities box, verify that your online CA is selected, and then click Next.



15. On the Certificate Request Submission page, click Next to submit the request, and then click Finish to complete the wizard.



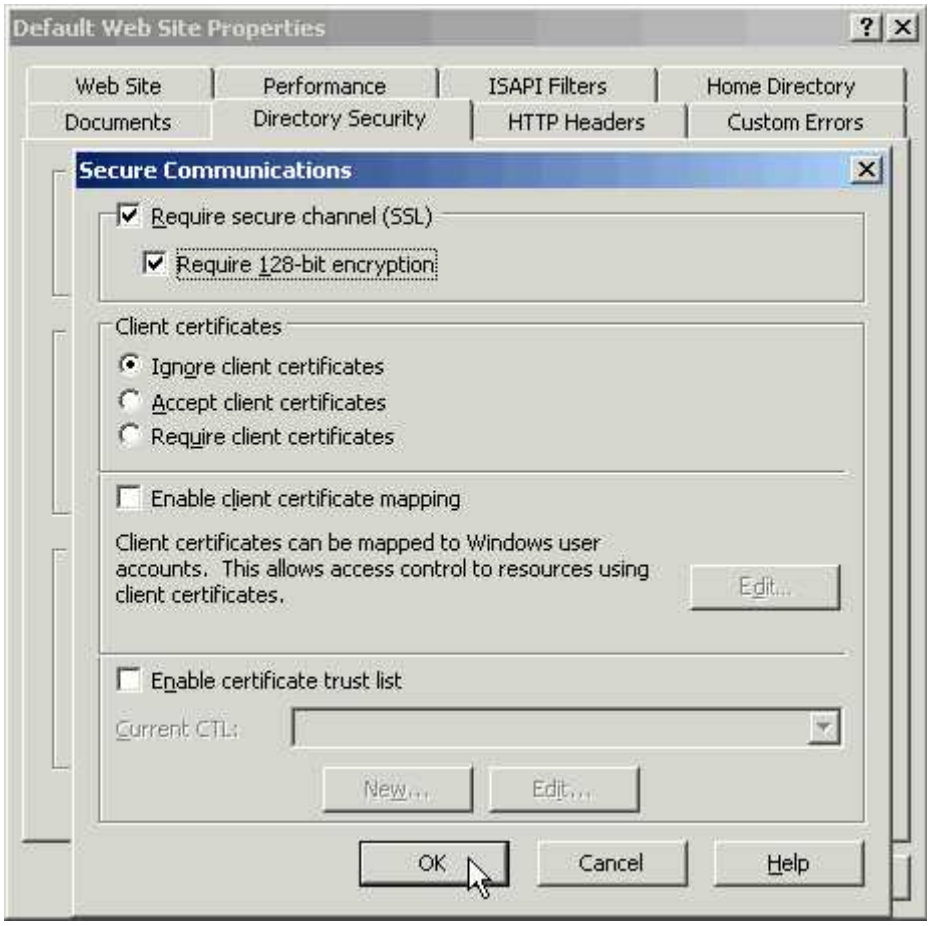
To use the certificate to secure the web site that is using SSL

1. In the Default Web Site Properties dialog box, on the Directory Security tab, in the secure communications area, click Edit.

Note: It's possible that the site you've created was stored under a different virtual server. If your website is not stored within the Default Web Site, right-click your own web site and click Properties.

Note: It's also possible that you might not wish to protect the entire website, but merely one or two pages within the large website. In fact, this scenario is highly probable for most site operators that would only like to protect a couple or important pages, such as an online store or registration form. In that case you do NOT need to SSL-protect the entire site, so do NOT right-click the entire site. Right-click only the directory or pages within the site.

2. In the Secure Communications dialog box, click the Require secure channel (SSL) check box, click the Require 128-bit encryption check box, and then click OK.

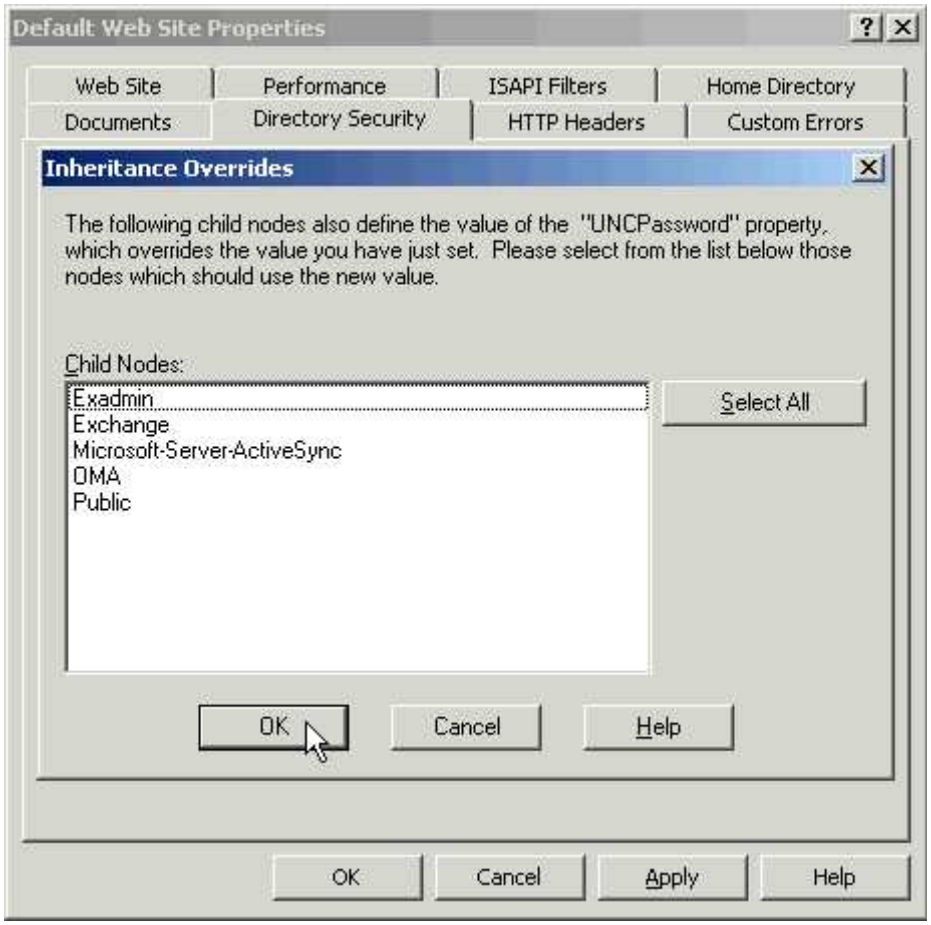


Note: Using a requirement of 128-bit encryption should pose no problem to current operation systems and web browsers, but keep in mind that older OSs might not be able to connect to your site.

3. On the Directory Security tab, in the Authentication and access control area, click Edit.
4. In the Authentication Methods dialog box, click Basic authentication (password is sent in clear text), and then click Yes to acknowledge the warning.

Note: You are NOT required to disable anonymous access; this is just a security measure. It might be likely that your site is supposed to allow anonymous access, while still using SSL as the encryption method. This is true for websites that offer online shopping carts where surfers are supposed to enter their credit card numbers. You might not want to restrict these online shops only for people that hold a username and password. In that case keep the Enable Anonymous Access check boxes selected.

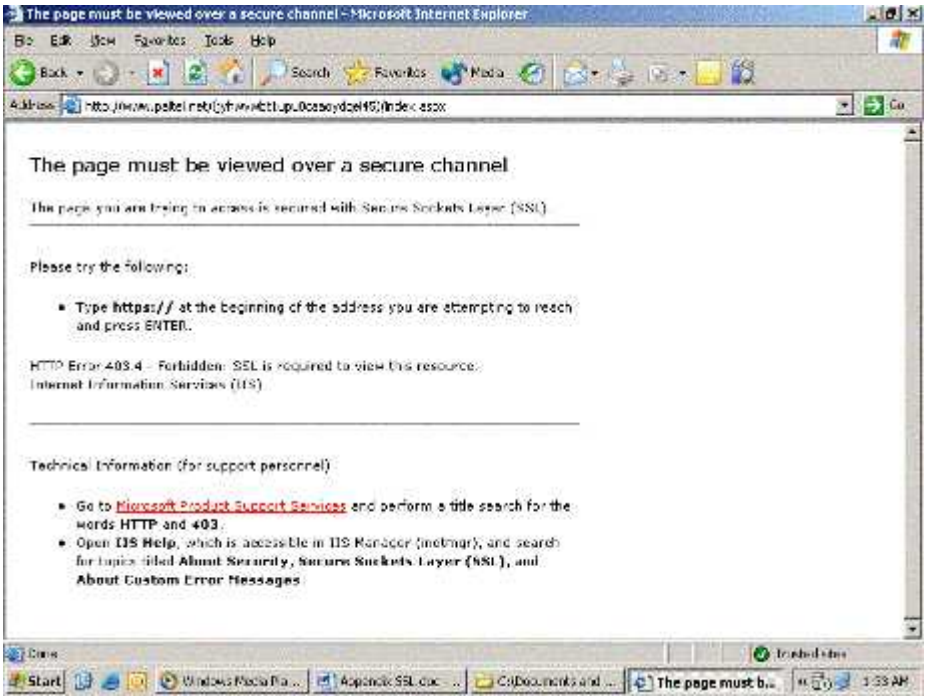
6. In the Default Web site Properties dialog box, click OK.
7. In all Inheritance Overrides dialog boxes, click OK.



8. Close Internet Information Services (IIS) Manager.

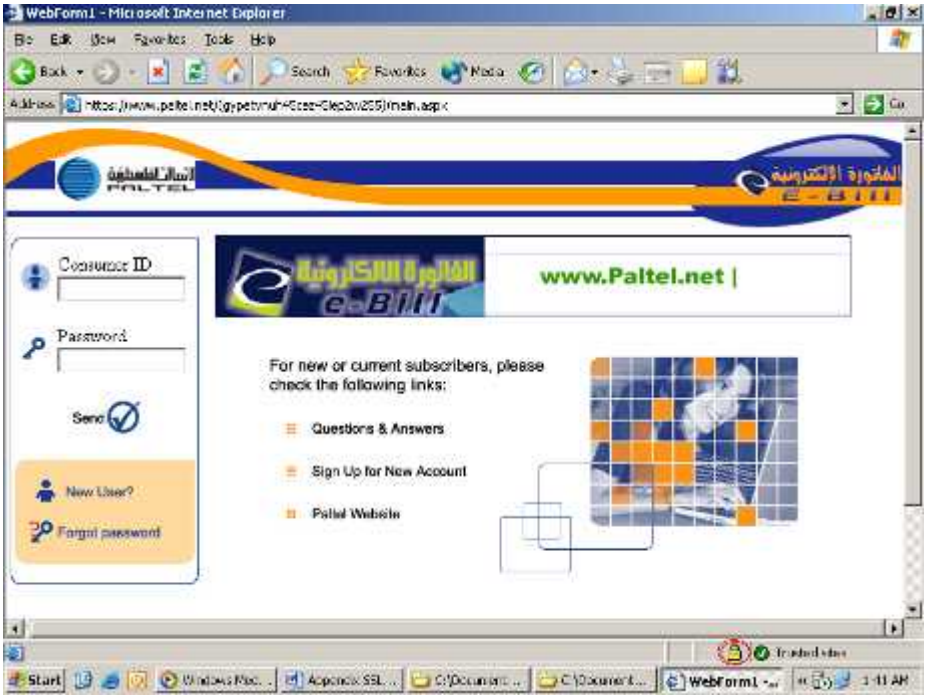
Verify that SSL is working

Since you still used HTTP (plain text http, using TCP port 80) you'll get the following error message:



Now re-type the URL by using **HTTPS** instead of **HTTP**. You should be able to view the OWA website.

You'll receive a Security Alert window. Click Ok. If configured correctly, you should be able to connect to your now SSL-protected website.



To verify that you're using SSL try to find a small yellow lock icon on the browser lower right corner. Double click the lock icon.

A Certificate window will open. Review the information that is entered into the certificate and click Ok.


Certificate
General
Details
Certification Path
Certificate Information
This certificate is intended for the following purpose(s):
• All issuance policies
• All application policies
Issued to: TEAM
Issued by: TEAM
Valid from 6/4/2005 to 6/4/2010
Install Certificate...
Issuer Statement
OK

System Service Request

Requested by _____ Date _____

Department _____

Location _____

Contact _____

Type request:

[ ] New system

[ ] System enhancement.

[ ] System error correction.

Urgency

[ ] Operation are impaired or opportunity lost.

[ ] problems exist, but can be worked around.

[ ] business losses can be tolerated until new System is installed.

Problem statements:

_____

_____

Service requests:

Is liaison _____

Sponsor _____

To be completed by the systems priority board

[ ] Request approved. Assigned to _____

[ ] Recommend revision. Start date _____

[ ] Suggest user development.

[ ] Reject for reason revision. _____

_____

_____

Please attach supporting documentation for the System service request

References

[1] www.infozech.com/product-ebill.asp

[2] www.lbwl.com/eBillFAQ.asp

[3] www.02.sbc.com/Billing_Accounts/OnLineBilling/0,,304,00.html

[4] www.PalTel.Net

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