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Retail Web Store Using .NET

Sunil Uppuluri
Dakota State University

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RETAIL WEB STORE USING .NET

A graduate project submitted to Dakota State University in partial fulfillment of the requirements for the degree of

Master of Science

in

Information Systems

December, 2010

By

Sunil Uppuluri

Project Committee:

DR. Mark Moran

Dr. Stephen Krebsbach

DR. Shan Ronghua



PROJECT APPROVAL FORM

We certify that we have read this project and that, in our opinion, it is satisfactory in scope and quality as a project for the degree of Master of Science in Information Systems.

Student Name: Sunil Kumar Uppuluri

Master's Project Title: RETAIL WEB STORE USING .NET

Faculty supervisor: Mark Moran Date: 12/13/10

Committee member: Steph J... Date: 12/13/10

Committee member: Konghua Shan Date: 12/13/10

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ABSTRACT

Retail web store is a store used to sell items and products online, using the most recent technologies in the software market. Customers from different geographical locations can buy products from their drawing rooms; with just one mouse click. The Retail web store uses .NET technologies, WINDOWS Vista as the Operating System and SQL SERVER as Database. The front end GUI was built using the C#.NET and the back end source code that deals with SQL SERVER was developed using ASP.NET.

With the click of the mouse, one can view all the product information like the product cost, product name, Product Image, Length etc. When any product is added to the shopping cart, the product is locked, so that no other Customer buys the product that's already sold. This web store is more secure as it separates confidential web pages from unauthorized or normal Customers. Only Administrator can add/remove any product from sale, accept/cancel orders or transactions.

DECLARATION

I hereby certify that this project constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

I declare that the project describes original work that has not previously been presented for the award of any other degree of any institution.

Signed,

_____ Sunil Kumar Uppuluri _____

<Student name>

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INTRODUCTION

The retail web store empowers the users with the latest web technology that is fast, user friendly and smart. The Retail Web Store is a secured distributed system for a retail chain which has many (in this case two) retail stores and a administration office that monitors the warehouse inventory, customer list and the functioning of each and every individual store. Each retail stores sells different range of products depending upon the location and customer's requirement. These products are supplied to the stores from the fixed set of suppliers.

Each store has its own database which maintains the records of the purchases, stocks remaining in the respective stores, customers list, list of suppliers associated with that store. Similarly a database about each supplier is maintained, to keep track of the inventory in each of the stores with which the supplier is associated, Supplier details, and details of the stock left at the Supplier warehouse. The retail store's database and supplier's database can be accessed by the administrator, using the web services.

The Retail Web store displays all the products that are available in the store and also provides the scope for customers/administrators to login using their accounts to make purchases, edit orders or to monitor the system. However all the transactions related to the banking, placing/canceling/paying orders needs secure login and secured communication. The customers can also surf through the web site without possessing the login credentials.

Buying a product is subjected to the availability of the product. The supplier of the product keeps a constant track of the inventory in the store it is associated with. The retail store sends a request to the Supplier to ship the commodities to the respective store if any item becomes out of stock. These privileges are also available to the administrative offices to transfer the stock automatically (Through the Retail Web store).

VISION

“To design a User Interface that gives at most importance to all the human factors affecting the System. The system must be easy to use and should run fast on client computer with minimum software and hardware requirements”

MISSION

The missions for this project are as follows

- The product details should be visible to every user.
- Maintain Data about Users (Clients) and Suppliers.
- Provide a Secured way to make money transactions through credit/debit card.
- The Users can view the purchased items, total quantity of items purchased.

AIM

The Retail Web Store system should be fast, user friendly, Paperless, can be easily accessible from mobile phones, 24/7 customer support through live online chat, highly secure by protecting the confidential information about the Users and their Bank/Credit card details. The system should cut the software and hardware cost at the client Side.

SCOPE

EXISTING SYSTEM

The existing system has many issues. The items in the warehouse are not auto updated, which means a person should manually keep track of the items remaining and update the system (customers and suppliers), which is cumbersome and prone to human errors, and might become more complex, as business grows. There is no 24/7 customer care and the mode of communication between Customer and company is through phone, which is time consuming, resulting in less customer satisfaction that may lead to loss of business.

Disadvantages of the Existing System

The shortcomings in present system are as follows

- It is not accessible through Mobile phones.
- Much manual work and Paper waste, because of documentation requirement for each sale or procurement of Products.
- The present system runs slow and has high software and hard ware requirements at the client side.
- Does not store Customers and Suppliers data, which are required for future business success.
- Does not include latest technology in the market like VeriSign which makes the system more secure from hackers and spammers.

PROPOSED SYSTEM

The proposed system is designed by keeping in mind the negativities of the existing system, to find permanent solutions to the issues. The proposed system should provide the users with an opportunity to shop from different devices like computer, mobile phones or other hand held devices. In any business the customer satisfaction plays an important role, many latest features like 24/7 live chat, customer support through mobile phone texting, status of the shipment and order, are emailed or texted daily. The anticipated system is eco-friendly; it reduces the paper usage by 90% saving more Trees.

Features of the Proposed System

- User friendly, eco-friendly.
- Daily status updates about the shipment or products through text or email.
- Stores the information about the items regularly purchased by a particular Users, which helps in future Decisions support and business planning.
- Paper less reports can be generated, saved and transferred with less effort.

Steps drawn in Proposed System

The webpage of retail web store displays the information about all the products, like price, availability, available quantity, image that describes the item, next available date etc. In this page, if the user selects a particular product, then it will show all information concerning that particular product, and the user can add that product to the shopping cart, for checking it out at the end of the session. New products can be added or removed from the sale by the administrator only. To make the website more secured, only authorized personnel are allowed to view the information about the users like userid, password, bank or card details etc.

This section encloses two categories of computation. They are as follows:

1. Based on the availability of the product.
2. Based on the authentication of the user and bank/card information.

Step 1: Any user can view the available Products, but only registered members or authentic members are allowed to buy the products.

Step 2: New Users can register for the membership by providing their personal information including Banking information.

Step 3: Members can decide on the product and quantity they are interested to buy by selecting the product.

Step 4: All the transaction information's will be maintained in a secured Data Warehouse.

Step 5: At the end point, after the bill payment is done the user has two ways to get the purchased items; they can either get it shipped by mail or pick it up at the nearest store outlet.

Advantages of the Proposed System

- Is fully automated, faster than the existing manually maintained system and can handle bulk load of data with ease.
- Data Warehouse to store the details about the Customers and Suppliers.
- Huge reductions in report generation time, maintenance cost.
- Supports technologies required for future growth, like mobile phone or hand held applications.

FEASIBILITY REPORT

TECHNICAL FEASIBILITY

Feasibility study is defined as “looking at the viability of an idea with the emphasis on identifying potential problems and attempts to answer one main question: Will the idea work and should you proceed with it?” [Wikipedia, 2010]. Technical feasibility is the part of a feasibility study, where we raise questions like

- Do the present technologies (software’s and hardware’s) support the development of the Project?
- Do we need to buy any new software’s or hardware’s to support the project?
- Will the new technologies support future development projects other than the present project?

This study helps us to understand the different technologies available, involved in the proposed system before the commencement of the project. This makes us clear about the technologies that are required for the development of the new system, the technologies possessed by the company and if required are they readily available?

OPERATIONAL FEASIBILITY

Operational feasibility is defined as “Measure of how well a proposed system will solve the problems and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development”, [Wikipedia, 2010].

Operational feasibility is that part of feasibility study where we raise these questions

- Will the proposed system meet the company's operational requirements?
- Will the proposed system work in different environments like cultures, languages, and hardware and software environment?
- What are the major road blocks that we might face during development and deployment of the project?
- Do we have good support for the proposed project from the project stakeholders, users and company management?

After carefully studying the proposed project it was decided that, the project is operationally feasible.

ECONOMIC FEASIBILITY

Economic feasibility is also known as cost/benefit analysis, this is done to determine the benefits and savings that are expected from the proposed system and compare them with the total cost of implementing, designing and deploying the proposed system. If the benefits and savings outweigh the costs, then the decision is made to design and implement the system (Proposed Project).

There are mainly two types of costs that might occur during the project implementation and development they are

- **Development Costs:** The total of all costs incurred from initiation to implementation of a project.
- **Operational Costs:** It documents the price of running the IT services on a day to day basis. These include expenditure for staffing. Hardware maintenance,

software procurement etc. After a good research it was found that the proposed project is economically feasible.

SOFTWARE & HARDWARE REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor Intel core 2 Duo 3GHz
- RAM 2 GB
- Hard Disk 40 GB
- Cache Memory 11,011,968 Bytes
- Virtual Memory 32 MB
- Display Card Super Video Graphics Adapter (SVGA)
- Mouse xpire optical Mouse
- Keyboard Standard 104 Enhanced Keyboard

SOFTWARE REQUIREMENTS

- Web Server IIS 6.0 or higher.
- Browser Internet Explorer 8.0
- Server side scripting ASP.NET
- Database SQL Server 2005
- Language C#.NET
- Client side scripting HTML, CSS

SYSTEM DESIGN

System design is defined as “the process or art of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified business requirements and functional requirements”, [“cio.ny.gov”, 2010]. The business requirements for the project are known from the BRD document, which details

- An agreement with the stakeholders.
- The base to communicate to software developer about the project solutions and means to satisfy customer and business needs.
- The estimation about the technical flexibility, performance and security of the project.

In a software life cycle of development the system design is done after the requirement gathering phase. System design is a process of applying different rules and methods for the purpose of defining a device, to its minute detail.

The major steps involved in doing system design are

- Understanding the present working of the system.
- Charting out the different functionalities of the present system.
- Predicting about the working of the new system.
- Predicting the additional functionalities offered by the new system.

In the previous retail web store System, all the transactions and invoices were manually monitored, which was grave concern for the customers, employees and suppliers. There was no back process involved to store the customer and supplier details, thus making it difficult to contact them for any emergency purposes, like if the credit card payment was not approved or the items were out of stock etc, which makes lot of inconveniences to customer

as well as the company employer's. As we were not storing the customer details every time, when a customer checks out certain items and prepares to make the payment it asks him enter his/her details like First Name, Last Name, Address etc, which could be avoided if we create a database to store the customer information and retrieve it whenever and where ever required. In order to get rid of these difficulties, the proposed system was designed. Therefore all the manual process involved were replaced by software codes integrated with the SQL (storing and retrieving from Database), and navigation through the web pages is really simple, easy and more descriptive.

FUNCTIONAL REQUIREMENTS

The functional Requirement includes Register-sign up, Buy- check out, payment complete

Register-sign up

This section of the system is the most important one. Every user (customer) and supplier is should compulsorily register before accessing the website. This helps in storing the customer and supplier information for contacting and future business purposes. This also helps in tracking each and every user session, which helps in making the website more secure. The System users need to fill the Registration form which asks for Name, Last Name, email address, Address etc. After filling the registration form a conformation email will be sent to the users email address. The users need to verify the conformation email for the first time access of the website. After that users can use the assigned UserId and password for future browsing of the website.

Buy-Check Out

The different items that are available for sale along with its images and price are shown in this page. The users can select different items they want to buy and place it in their shopping cart for later checkout. During the check out the user (in this case the buyer) can specify the quantity of the item needed, and the web store displays the total amount (price) of items purchased.

Payment Complete

After the required items are placed in the cart for the check out, the web store shows the summary of the amount due. In order to buy the stuff the user needs to enter his/her credit/debit card details, this section is protected from hackers and spammers through “Secured Socket Layer” (SSL) provided by the VeriSign. SSL is a protocol designed to enable applications to transmit information securely by encrypting/decrypting data and communicating using unique encryption keys. After the payment is done the User has option to select between two different types of delivery modes,

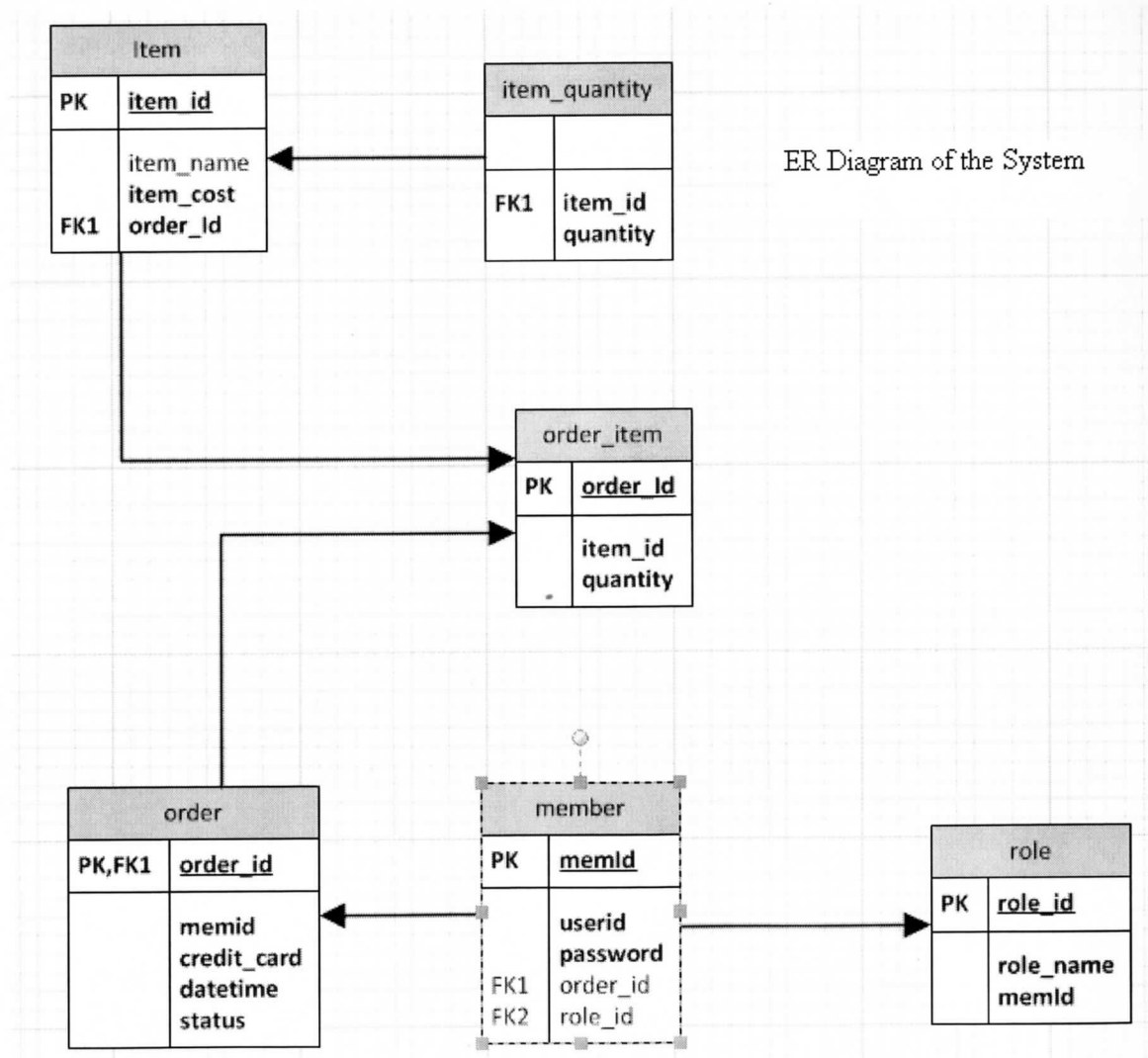
1. Receive items through mail.
2. Pickup at the nearest store.

To receive items through mail the user needs to enter his/her present address, the shipments will be delivered through USPS within 6 days. If the user decides to pick up the products will be available at the store location given after the bill payment. The user need to get the print out of the receipt, to confirm that he/she is the authorized person to pick up the Products.

Events Description

Flow Chart

The figure below shows the flow of user session between the web pages in the new system. The flow described below is applicable to Users/Customers because certain web pages are hidden from normal users/customers for the security purposes, only authorized personnel like system administrator and top managers can view those web pages. The words used in the web page are less technical and of day to day usage, the purpose of this was to make the web pages easy to understand.



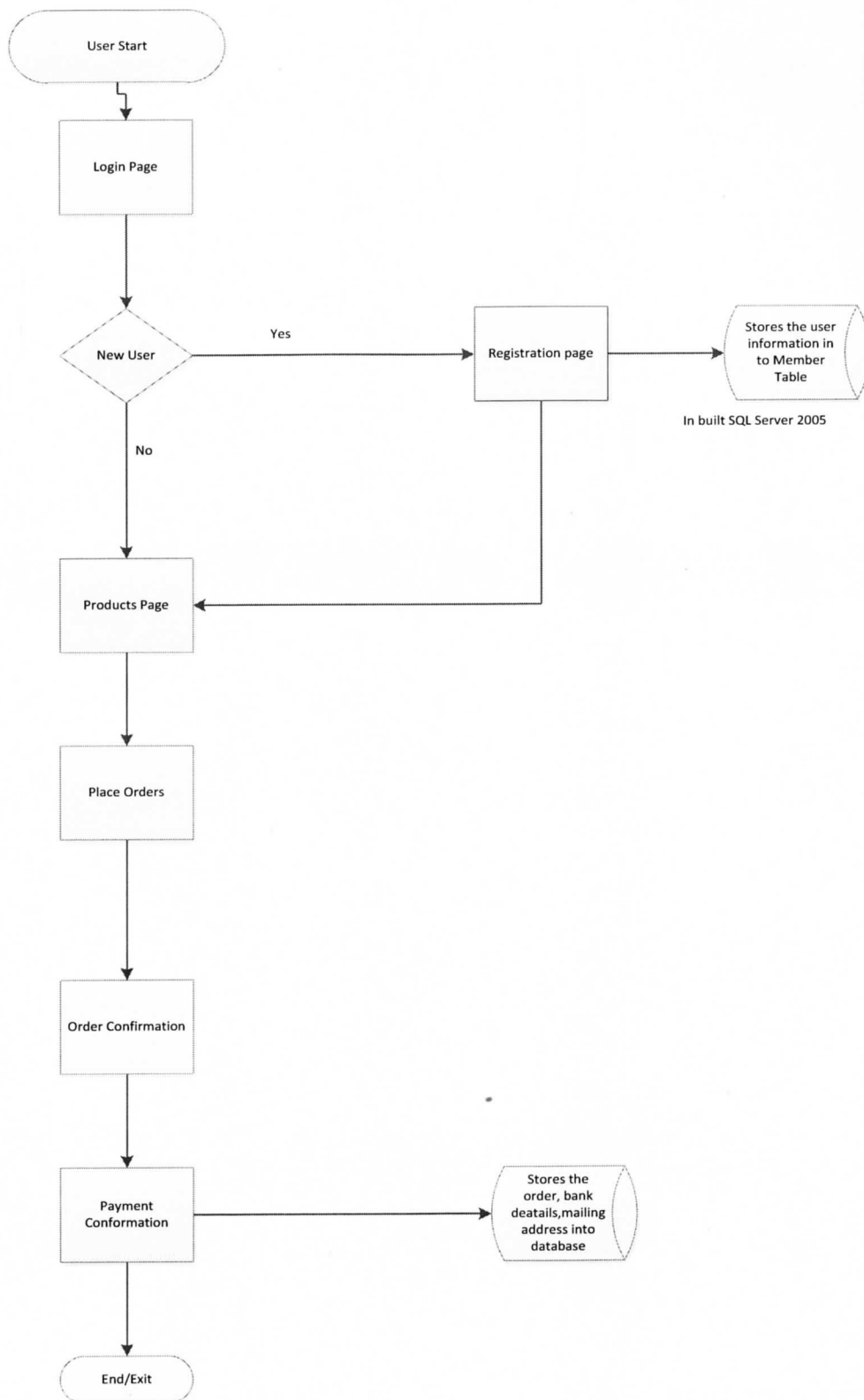


Figure 1 Flow chart describing the steps encountered to complete a Buy

Module Description

Administrator

The Retail web store provides the detailed information about the items on sale, like pictures, price and length. Administrator has the sole privilege to add or remove any product from the sale, apart from these duties the administrator is responsible to maintain all the back process, where the users and the suppliers information is stored in to Database. The administrator makes sure that the web store is secure from spammers and the highest level of security is maintained, to protect the confidential information like the bank details and address of the customers from the Hackers and identity thieves. Every night Administrator runs anti viruses tools to protect the web site from any virus attacks.

If there is any pending transactions administrator commits the transaction and sends the confirmation to the customer via email or text. These are the main roles or duties of an administrator.

Supplier

The Suppliers play an important role in the retail web store. In order to make sure that the web store has, unlimited supply of products, the details of each and every supplier like address, phone number and email address are stored in a secured database, using this information the management can order the shipments for the items that are running out in the web store. With the help of decision support systems, a certain quantity of each item is stored in the warehouse, the items that do not go well with customers are returned back to the supplier, this helps in trimming down the web store with unwanted items or products, thus making the web store more competitive and customer friendly.

Buyer

The retail web store empowers the users with the latest web technology which is fast, user friendly and smart too. The buyers are bombarded with the items that are most required or customer worthy (prior research is done on the relation between products and users taste and location, then the product is rated on a scale of 1-5 on its ability to get sold) . The customers can buy different items available on the web store for less price, after registering with the website.

INPUT DESIGN

Input design acts as an interface between users and the computer system. Input design involves the selection of the best strategy to get accurate information (data) from the users that the computer system needs to process to get the best possible output. For example if there is a computer system that calculates age of the user, the best input design will be asking for the date of birth, name of the user as required information but not the date of birth of the users father. The errors in the input design can be greatly reduced when the data is inputted directly by using appropriate forms and well-designed screen layouts.

These are the following forms which needs input data from the users

1. Login page→BuyLoginPage
2. Registration Page→CreateUserForm
3. Product Information→ProductsPage
4. Place Orders Form
5. Catalog page

Login Page

The users and Admin will give their login credentials like user name and password, to enter in to the system. This form checks the username and password with the database and confirms, if the user is legitimate or not. Only authorized users are allowed to use the system.

Registration Form

New users need to get registered to access the website. In this form the customer provides his/her first name, last name, phone number, Address, email id, username and password for the web store and a question to procure the password. This page is called as Create User Form in the retail web store system.

Products Page

This page will be accessible to both Users and Admin, through which they can view all the products that are available on the sale. The items that are added on to the shopping cart are taken as the inputs for this page, apart from this there is a dialogue box which takes userid and password to make users to re login, if the current session expired.

Place Orders Form

This module is used by the users to complete the checkout and bill payment process. This page takes the inputs for the fields like total quantity of each item to be ordered, delivery method, Credit/debit card details. This page is the most secured of all the pages.

Catalog Page

This page is used by the Administrator to add new items or products to the list of items on sale. In order to access this page the user should have special Admin privileges. Before accessing this page the user must login using the admin user Id and Password. The catalog page takes the following inputs Item Name, Cost, Image URL, Item Quantity, Description, and Length.

OUTPUT DESIGN

Output design generally deals with the propagation of the processed output by the information system to the end users. The main purpose of the output design is to make sure that the system output format, the output layout is easily understood by the user. The medium through which the output should be displayed will be decided in this design (like computer desktops, mobile phone text, or email). It gives a look and feel of the system that is going to be designed. These following questions are answered during the output design

- Who will need/see/use the output from the system?
- What is the purpose/format of the output (storage, printing, email etc)?
- If the output is to be stored in the database, for how long the information needs to be stored?

The system outputs the processed information on to these pages

- Products Page
- Order Details

- Order conformation

The products page displays all the items available on the web store to the users and Admin. The words used to describe items are simple and of daily usage, this makes it easy for illiterate customers and Users from non-English countries to understand. The order details show the confidential information about the customer's bank details in the form of a table this page is highly secured and can be accessed by the Administrator only. The order conformation page display the total bill paid and company's address to pick up items in a simple text format.

TABLE DEFINITION

Item Table

| Column Name | Data Type | Nulls |
|-------------|-------------|-------|
| Item Id | Int | No |
| Item Name | Varchar(50) | Yes |
| Item Cost | Money | No |

Table 1 Item Table

Item Quantity Table

| Column Name | Data Type | Nulls |
|-------------|-----------|-------|
|-------------|-----------|-------|

| | | |
|----------|-----|----|
| Item Id | Int | No |
| Quantity | Int | No |

Table 2 Item Quantity table

Member table

| Column Name | Data Type | Nulls |
|--------------------|------------------|--------------|
| MemID | Int | No |
| UserName | Varchar(50) | No |
| Password | Varchar(50) | No |

Table 3 Member Table

Order Item table

| Column Name | Data Type | Nulls |
|--------------------|------------------|--------------|
| Order Id | Int | No |
| Item Id | Int | No |
| Qty | Int | No |

Table 4 Order Item Table

Order table

| Column Name | Data Type | Nulls |
|-----------------------|------------------|--------------|
| OrderId | Int | No |
| MemId | Int | No |
| DateTime | Timestamp | No |
| Status | Varchar(50) | No |
| Credit Card Number | Varchar(50) | No |

Table 5 Order Table**Role table**

| Column Name | Data Type | Nulls |
|--------------------|------------------|--------------|
| Role Id | Int | No |
| Role Name | Varchar(50) | No |

Table 6 Role Table

SOFTWARE & HARDWARE IMPLEMENTATION

.NET Web Services

According to the W3C, **Web service** is "a software system designed to support interoperable Machine to Machine interaction over a network". A Web service provides services to other applications by exposing callable Application Programming Interfaces (API) over the network like Internet. Many kinds of services can be provided by using the Web service; but it is up to the software implementer to choose the service which suits the business requirement.

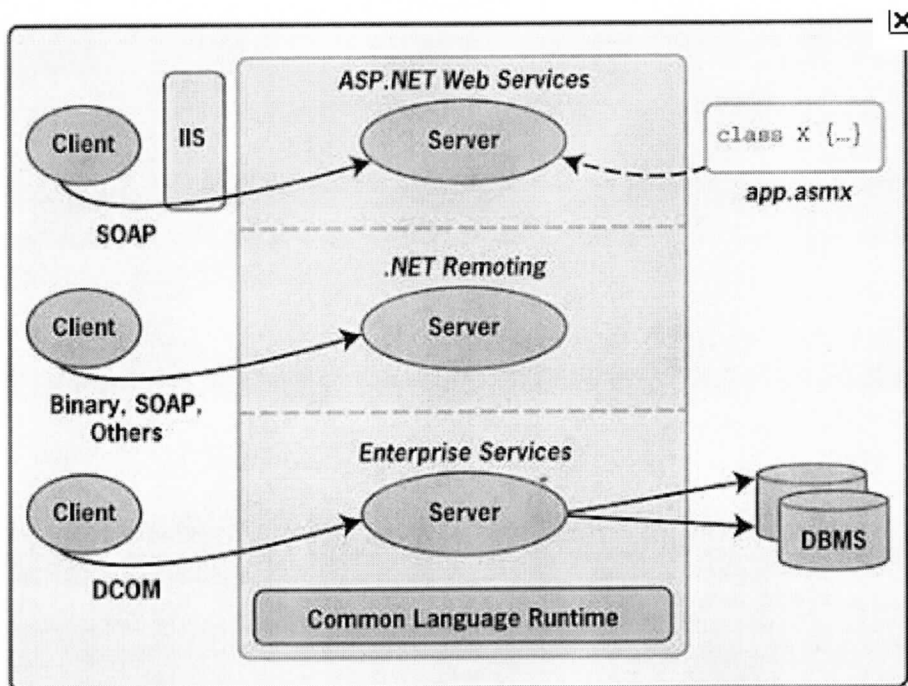


Figure 2 ASP .NET Web Services

The following describe a web service:

- Web service Runs on a Web server
- Web service exposes all the Web methods to interested callers
- Web service listens to HTTP requests that represent the commands to invoke Web methods
- Web service executes Web methods and returns the results.

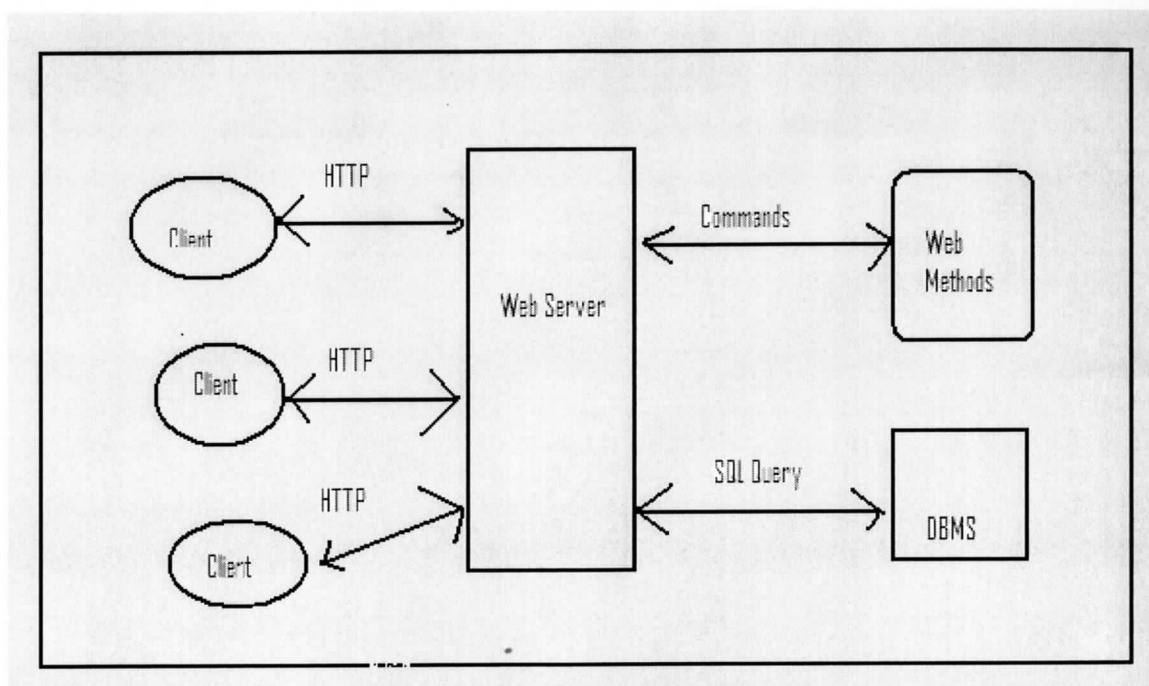


Figure 3 Mode of communication in Web Servers

We can make the web service available to different clients present at different geographical locations by exposing it over internet, by hosting a Website. The Web Services has no web pages or User Interface; it is just a set of classes with public and private methods and properties. For the applications to access the Methods present in the web service, we need

to add Uniform Resource Locator (URL). The method call goes across the internet using Simple Object Access protocol (SOAP) and results are returned across internet in the form of Extended Markup Language (XML). The communication across the internet happens transparently and the application need not know anything about this communication.

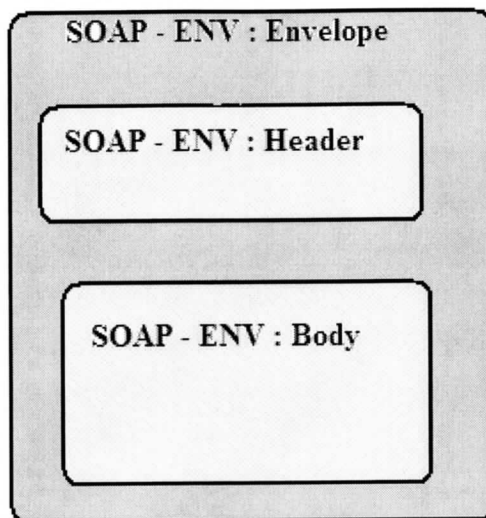


Figure 4: Simple Object Access Protocol

Web services in .NET are run by invoking methods in the service directly through HTTP or SOAP requests, so if we want to use a particular service, then we need to send an HTTP call to the service. A Web service mainly has three attributes: Discovery, Description and Writing protocol. These three attributes answers the following questions

- How to find the web services that client (User) would like to use?
- How does a particular web service work?
- How to send messages to a web service?
- How does a web service send messages to client?

The Discover service protocol is used to locate the web service that suits the client requirement. The client is notified about the availability of the web services using the Web Service Definition Language (WSDL). The HTTP and SOAP protocols are used to format the messages that are sent to a web service.

Following example demonstrates a web service: The calculator web service provides its Users with two web methods or services such as ADDING and SUBTRACTING.

```
<%@ WebService Language="C#" Class="CalculatorWebService" %>
using System;
using System.Web.Services;

[WebService (Name="Calculator Web Service", Description="Performs simple math over the Web")]
class CalculatorService
{
    [WebMethod (Description="Computes the sum of two Numbers")]
    public int ADDING (int P, int Q)
    {
        return P + Q;
    }

    [WebMethod
(Description="Computes the difference between two Numbers")]
    public int SUBTRACTING (int P, int Q)
    {
```

```
        return P - Q;
    }
}
```

In order to use the calculator web service, the user needs to call the service using the name of the web service that is “Calculator web service” in the URL. When the user calls the web service it displays the name and the description provided in the attributes of the Web Service.

The following example demonstrates the invocation of the ADDING method using GET command and passing of the required arguments.

```
GET /calculator.asmx/ADD?P=1234&Q=1130 HTTP/1.1
```

```
Host: localhost
```

The response of the Web Service will be like the following:

```
HTTP/1.1 200 OK
```

```
Content-Type: text/xml; charset=utf-8
```

```
Content-Length: 80
```

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<int xmlns="http://tem
```

```
puri.org/">4</int>
```

.NET Web Application

The general definition of a web application is “Any application that uses web browser as a client, and can be accessed on a network like internet or intranet” [Wikipedia, 2010]. We can develop enterprise level web applications using the ASP.NET, which provides a unified web development process that includes all the web services required by the web application. ASP.NET along with Active server pages (ASP), provides syntax compatible programmable language that takes advantage of the Common language runtime (CLR) like inheritance, language interoperability etc to create powerful new web applications. Using these processes we can develop web applications that are compatible with our web forms, to provide services like email and text bill payments, security and shipment tracking application etc.

Components of Web Application

Every Web applications have the same components as in any desktop or client-server application. These are as follows:

- **File Management:** while creating a web application, there is a need to manage files that are needed to compiled and deployed.
- **User interface:** This is defined as the medium that acts as an intermediate between end users and the system. The retail web store presents the processed system output through web forms on to web browsers. We can also modify the outputs so that it can be accessed through mobile phones or other hand held devices.
- **XML Components:** we can create XML Web services which call another third party XML web service or Windows forms. This helps in reducing the software code

required to create the third party XML service, thus saving time and reducing the overall system complexity.

- **ADO .NET:** This is used to provide access to data and data services to the .NET web application. This can also be used to modify and select the data stored in different relational database management systems.

1.1. .NET Web Application Data Access

Many Web applications used back end databases to store and access data. In order to access the different Relational Database management systems, Web applications use the ADO.NET data services. **ADO.NET** is a mechanism that provides a complete framework for managing data from different types of data sources like XML files, text, complex flat files, data streams and RDBMS. These are the important components of ADO.NET

.NET Framework Data Providers: These data providers are used to connect to databases execute SQL commands and retrieve results.

Dataset: this is similar to result set in SQL. The data retrieved by the data providers is processed by the web application and the results are stored in the Dataset.

The present .NET web application is designed to support and maintain maximum load and longer sessions.

SQL Server

In order to understand more about the SQL server, it is important to get familiar with RDBMS and DBMS. DBMS is a software system that uses standard methods of cataloging, retrieving and running queries on database. The DBMS manages, organizes and provides ways for the incoming data to be modified or extracted by users and other applications. RDBMS is different from DBMS in a way that data is stored in the form of collection of tables, which might be related by common fields.

Out of many available RDBMS, SQL server best suits our project because it runs on every platform, from desktops to super computes and mainframes. The SQL server can handle varying loads from small tables to large tables like BLOB and CLOBS. SQL server can be used to host real time Data Marts which are very helpful for future decision support systems and business planning.

SQL Server Advantages

These are the following useful features of the SQL Server

- The administrative and Development tools provided by SQL Server are easy to install, deploy, manage and use.
- This database is mostly platform independent that means SQL Server is compatible with different operating systems like Windows 95 to vista, Mainframes and UNIX.
- Flexible and supports third party tools which are used for monitoring, Version control and backup automation tools like CA Agent, VSS etc.
- Supports future Business intelligence, decision support systems and reporting tools like IBM Cognos, MicroStrategy etc.

TESTING AND IMPLEMENTATION

Testing

The designed system was fully constructed using Microsoft Visual Studio 2005. The constructed system was put through different kinds of tests to make sure that it was error free. These were the following tests that were performed on the constructed/developed code

Unit Test: The functionality of each component of the developed code was thoroughly tested. The developed code was divided in to many modules, and each module was executed separately to check whether the design and functional objectives were achieved. During this phase each web page like login page, Product Information page, Catalog pages etc, were tested individually to check for functionality, typing/spelling errors.

Integration test: All the modules of the developed/constructed code were clubbed together and tested to check the data/control flow from one page to another. All the web pages like login page, product information page, place order page, confirmation page etc were deployed together and tested. The test was successful as the control flow from one page to another was swift.

User Acceptance testing: The developed system was installed on the client/customer hardware (in this case a laptop) to be tested by the user. The user here checks for the functionality, ease of use and compares the new system with the old system. The user found

the developed system (retail web store) is easy to learn and user friendly when compared to the existing system.

Implementation

Implementation is the process of migration of the code from development environment to production environment. This process is also known as deployment, go-live or rollout. During the implementation phase, complete initial training of the user, user manual and post implementation review was done. Complete demonstration about the features and working of the developed system was given, and all the doubts about the new system were cleared.

Since, the website is not hosted on web server; whole C# code and the images, Visual studios settings were installed and deployed on the clients system. If we host the web site on the web server, then we can access the web store directly by typing the URL in the address bar of a web browser.

The first page of the design is the login page for the retail web store as shown in the **Figure 7**. The login details are verified against our database to make sure that the user is registered in our database. During this phase these possibilities may arise the user is registered or unregistered. If the user is not registered, then he/she needs to get registered by fill the registration form, as shown in the **Figure 8**.

If the user is already registered, then depending upon his role will be transferred to different web pages. If the user is a customer then he will be transferred to the Products Page, which lists all the items that are for sale as shown in the **Figure 9**. If the User has administrative privilege, then the control automatically jumps to catalog page as shown in the **Figure 14**, using this page administrator can add or remove products from sale.

In the products page items are described to the minute detail, through images and description. If the user likes any items he/she can add them to the shopping cart, just by clicking “Add to Cart” button. Similarly a user can remove unwanted items from the cart by clicking “Remove from Cart” button.

After adding the items to cart the user can save the cart to check out later. While checking out the user should fill the information shown in the place orders page as shown in the **Figure 11**. This page asks for the item quantity, delivery type and to make the card Payment. This page is the most secured of all the pages as it deals with the banking information of the customers. This page has the “**SSL**” certificate from the most trusted online security company VeriSign.

After filling the above information the user can confirm the order by clicking the “Confirm order” button. After the credit card transaction was successful, the user will be transferred to the Order confirmation page as shown in the **Figure 13**, that shows the amount paid, delivery method, if shipping it takes generally 5-6 working days, if delivery method was pick up the store address will be displayed. This page can be printed, emailed or texted to mobile phone.

The administrator has different data flow, due to the security reasons. After logging in, the administrator will be transferred to the Catalog page, where the administrator can add or remove items from the sale. The administrator can view all the orders made and can cancel any order, if the bank details provided were false. All the orders are listed in the orders page, shown in the **Figure 16**. By clicking the order number, the administrator will be transferred to Order Details page, as shown in **Figure 17**. This page has all the confidential information about the customers like bank details, first name, last name, mobile number and address can

be only viewed by the administrator. The flow chart below describes the data flow for the administrator.

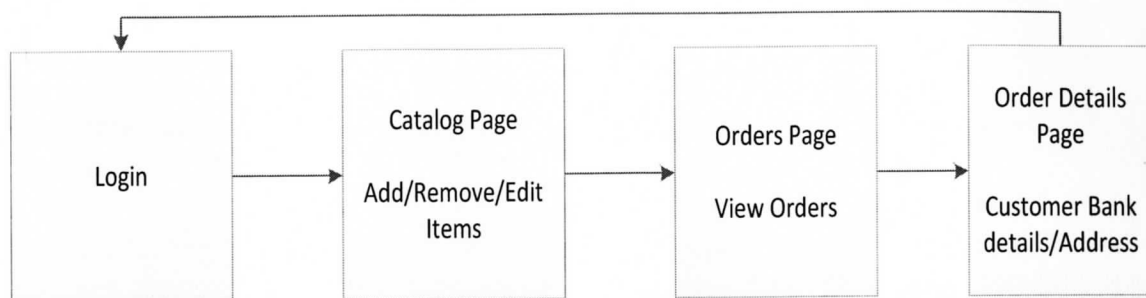


Figure 5: Data flow for Administrator role

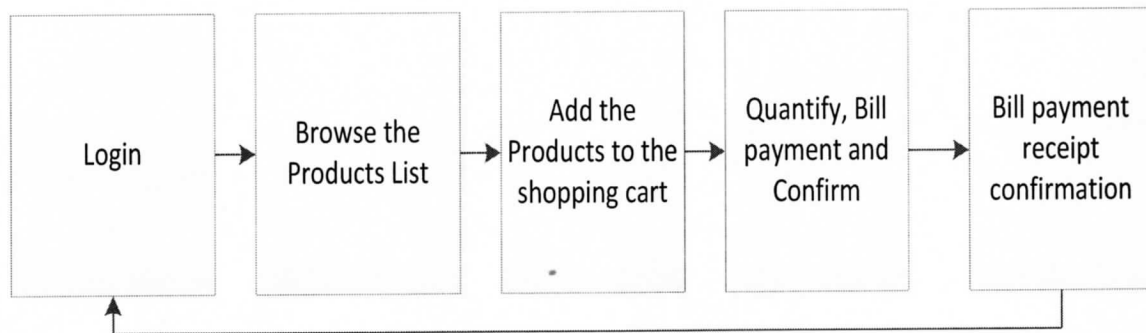


Figure 6 Working of the System

SCREEN SHOTS

Login Page

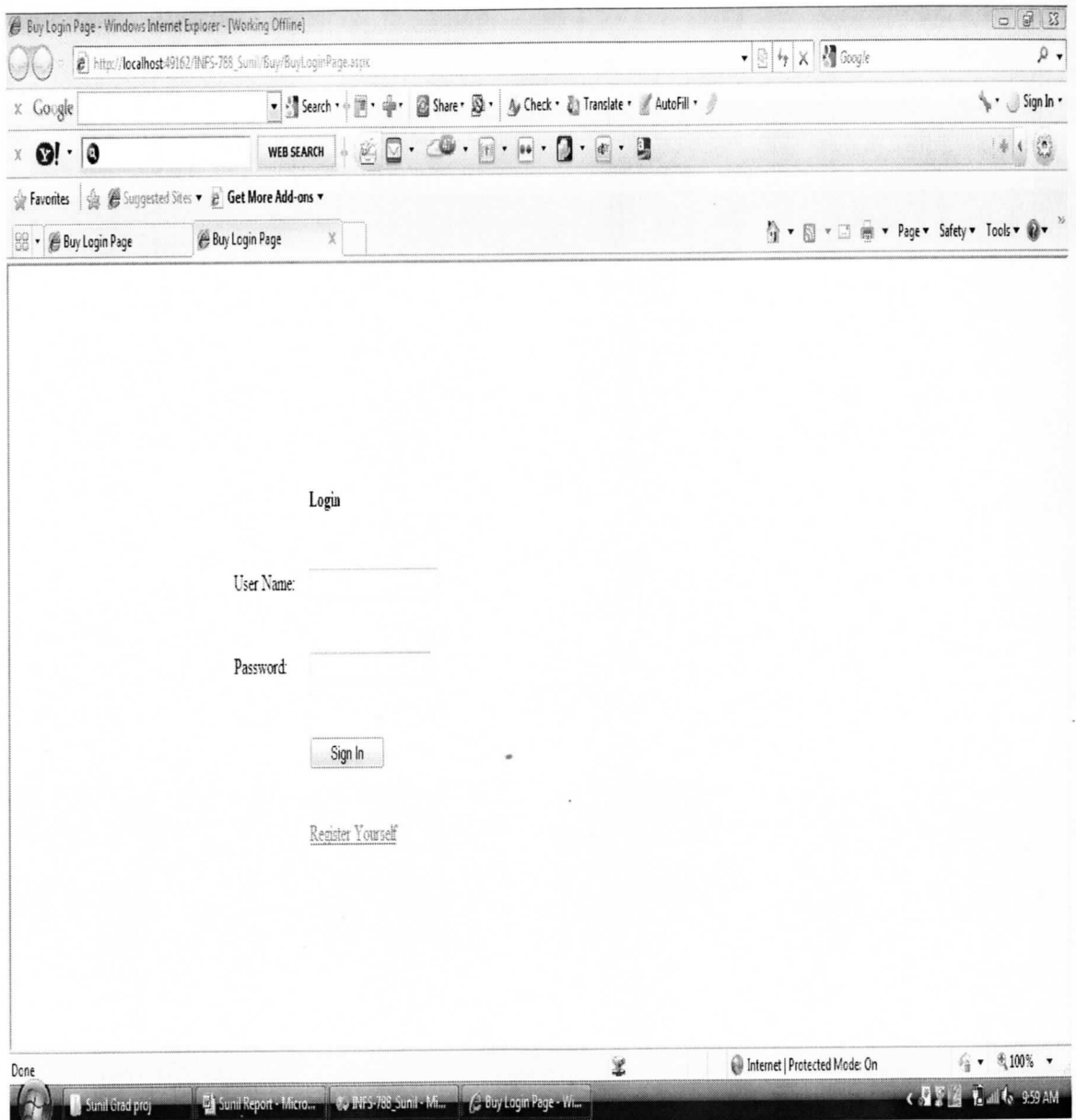
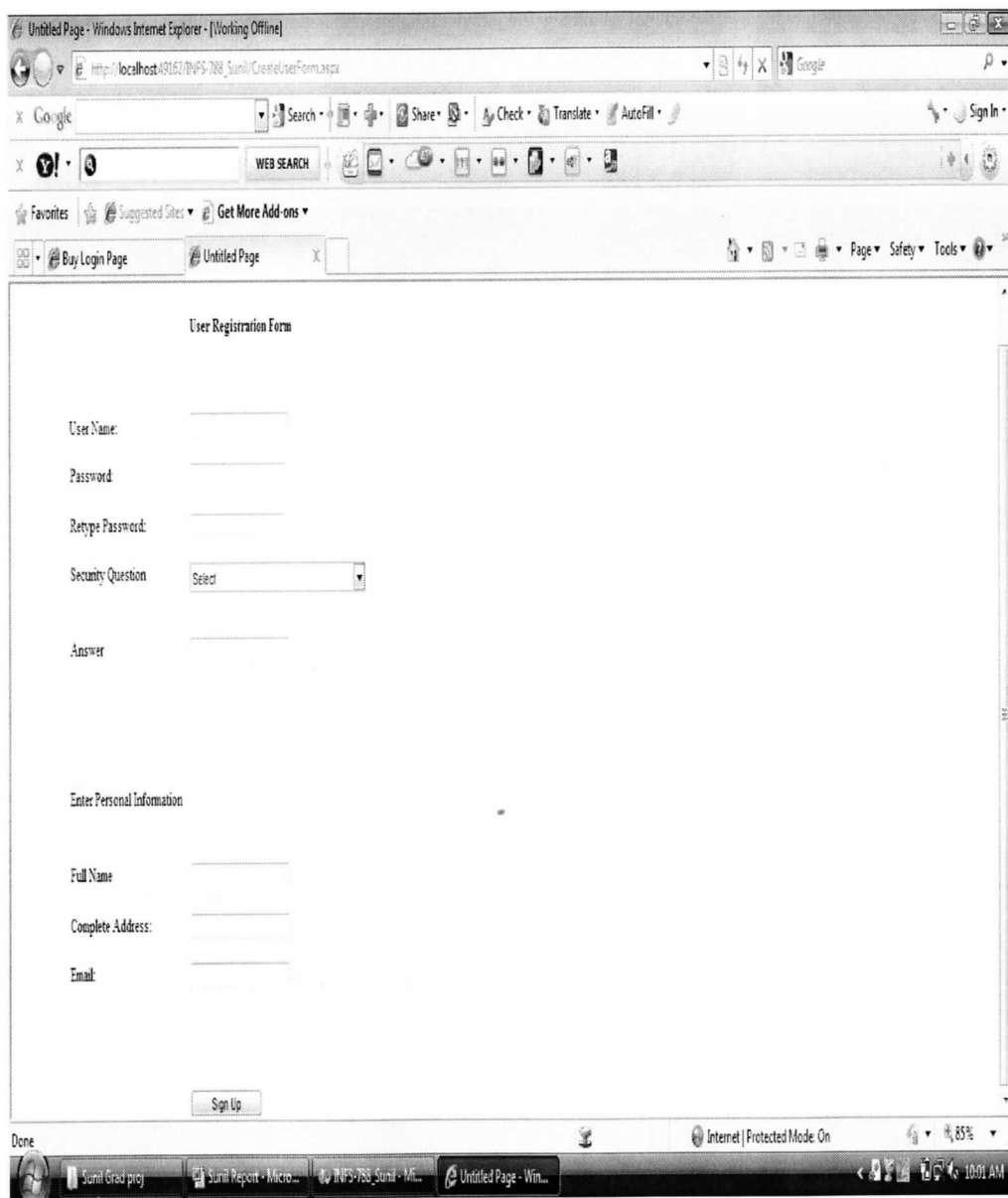


Figure 7 Login Page

Registration Page



The image shows a screenshot of a web browser window displaying a registration page. The browser is Windows Internet Explorer, and the address bar shows the URL: `http://localhost:49167/INFS-788_Sunil/CreatedUserForm.aspx`. The page title is "User Registration Form".

The form contains the following fields and controls:

- User Name:
- Password:
- Retype Password:
- Security Question:
- Answer:
- Enter Personal Information section:
 - Full Name:
 - Complete Address:
 - Email:

A "Sign Up" button is located at the bottom of the form.

The browser's taskbar at the bottom shows several open windows: "Sunil Grad proj", "Sunil Report - Micro...", "INFS-788_Sunil - Mi...", and "Untitled Page - Win...". The system tray shows the time as 10:01 AM and the battery level at 85%.

Figure 8 Registration Page

Products Page

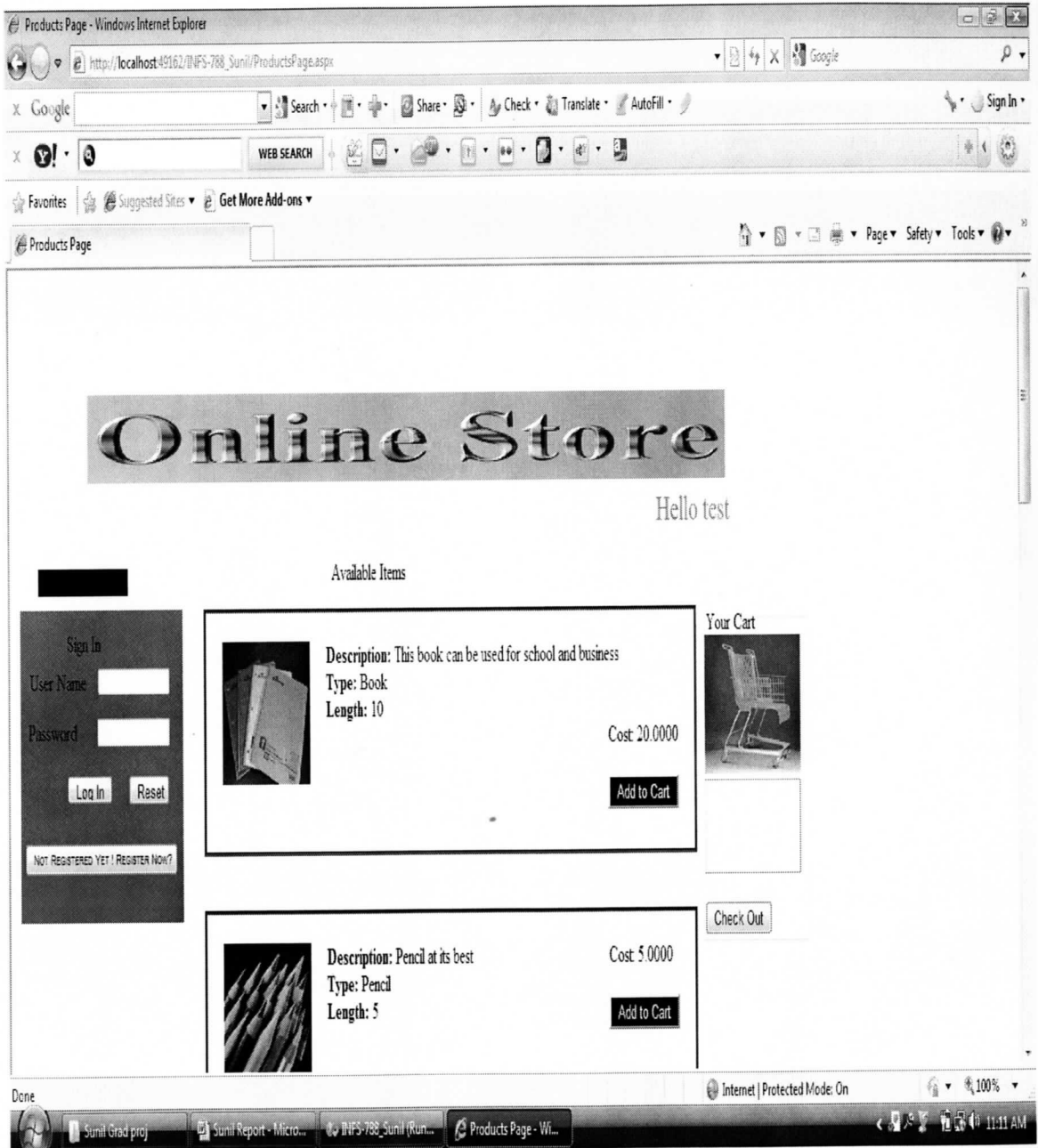


Figure 9 Products Page1

The screenshot shows a Windows Internet Explorer browser window titled 'Products Page - Windows Internet Explorer'. The address bar displays 'http://localhost:49162/INF5-788_Sumil/ProductsPage.aspx'. The browser interface includes a search bar with 'Google' and 'WEB SEARCH' options, and a taskbar at the bottom with several open applications: 'Sumil Grad proj', 'Sumil Report - Micro...', 'INF5-788_Sumil (Run...', and 'Products Page - Wi...'. The main content area of the browser displays three product listings, each in a separate box:

- Product 1:** Sony Laptop. Description: Sony Laptop. Type: laptop. Length: 50. Cost: 1000.0000. Includes an image of a laptop and an 'Add to Cart' button.
- Product 2:** iPhone. Description: iphone. Type: cell phone. Length: (blank). Cost: 150.0000. Includes an image of an iPhone and an 'Add to Cart' button.
- Product 3:** LCD TV with s plasma experiance... Description: LCD TV with s plasma experiance... Type: TV. Length: 60. Cost: 1500.0000. Includes an image of a TV and an 'Add to Cart' button.

Figure 10 Products Page 2

Place Orders Page

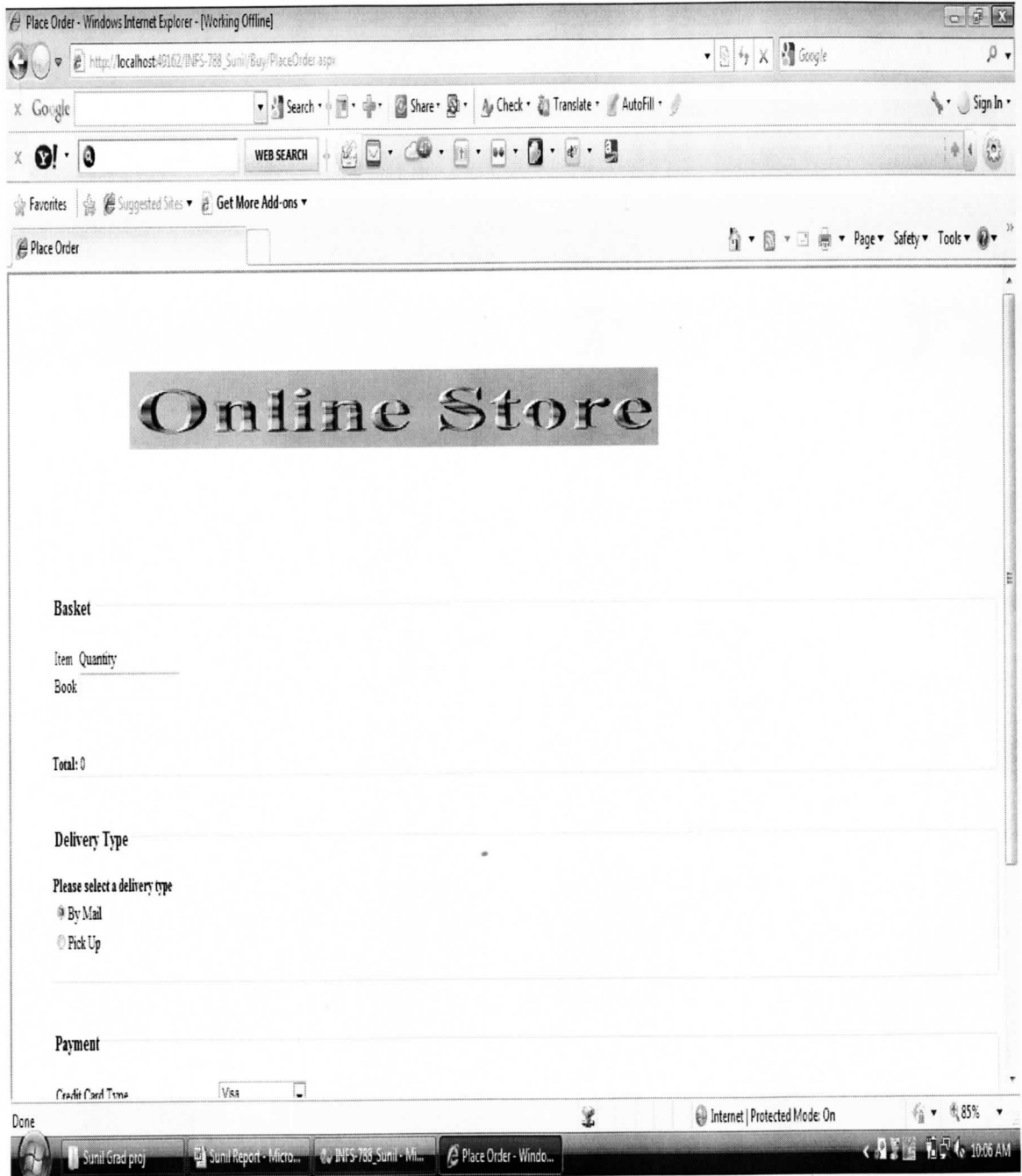


Figure 11 Place Orders page1

Place Order - Windows Internet Explorer

http://localhost:40162/INFS-788_Sunil/Buy/PlaceOrder.aspx

Google Search Share Check Translate AutoFill Sign In

WEB SEARCH

Place Order

Total: 0

Delivery Type

Please select a delivery type

By Mail

Pick Up

Payment

Credit Card Type: Visa

Expiration Month: 01

Expiration Year: 2010

Credit Card Number: _____

CVV: _____

First Name: _____

Last Name: _____

Done Internet | Protected Mode: On 100% 5:20 PM

Sunil Report - Micro... INFS-788_Sunil - Mi... Place Order - Windo...

Figure 12 Place Order Page2

1.2. Confirmation Page

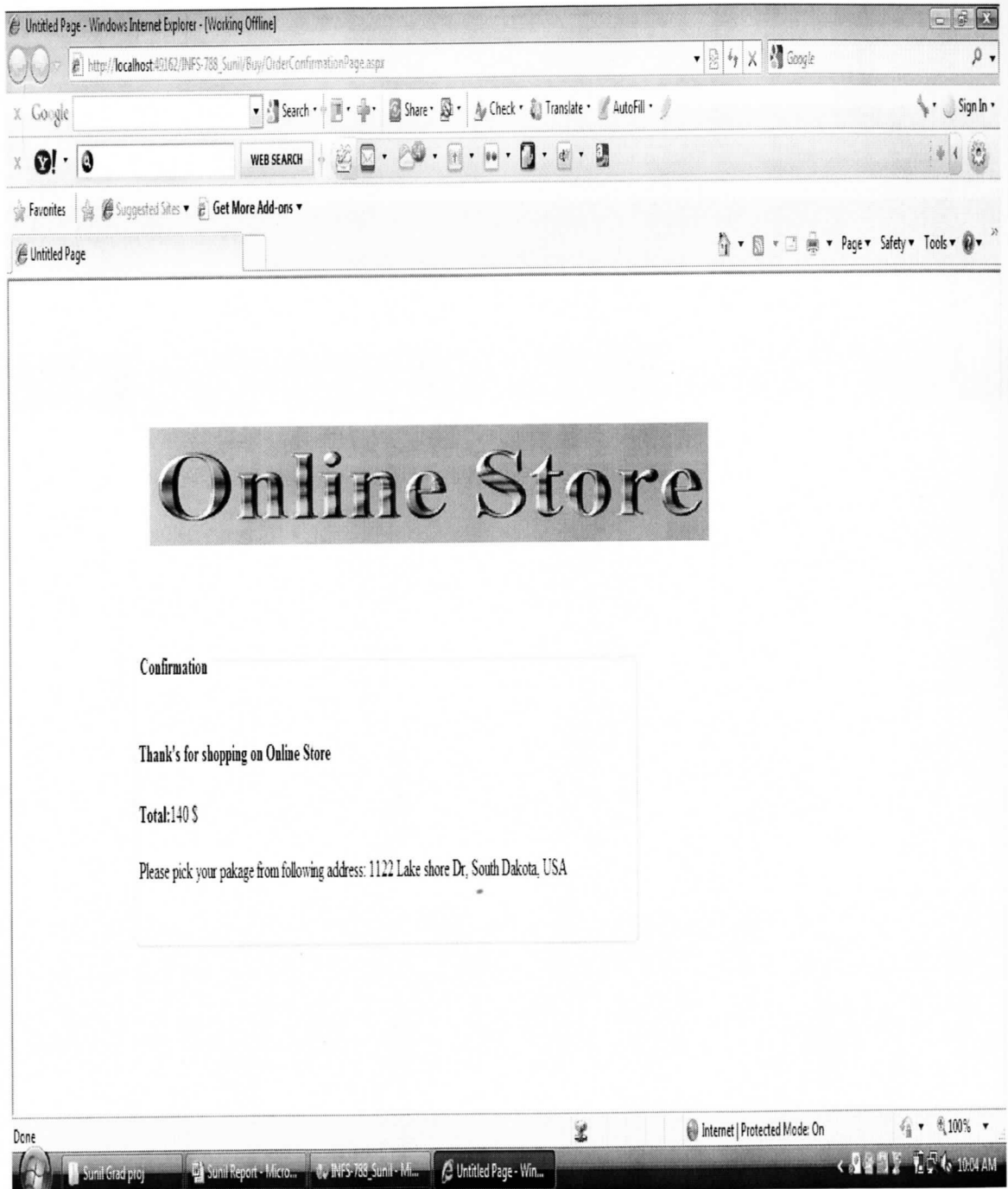


Figure 13 Order Confirmation Page

1.3. Catalog Page

Untitled Page - Windows Internet Explorer - [Working Offline]

http://localhost:49162/INFS-788_Sunil/Administrators/Catalog.aspx

Google

Search

Share

Check

Translate

AutoFill

Sign In

WEB SEARCH

Favorites

Suggested Sites

Get More Add-ons

Untitled Page

Page

Safety

Tools

Online Store

Catalog Order

Catalog Details

Please enter new product

ItemID 1

Itemname Book

Cost 20.0000

ImageURL ~Images/notebook.jpg

Item_Qty 199

Description This book can be used for school and business

Length 10

New

| ItemID | Itemname | Cost | ImageURL | Item_Qty | Description | Length |
|--------|----------|------|----------|----------|-------------|--------|
|--------|----------|------|----------|----------|-------------|--------|

Dcne

Internet | Protected Mode: On

100%

Sunil Grad proj

Sunil Report - Micro...

INFS-788_Sunil - Mi...

Untitled Page - Win...

10:15 AM

Figure 14 Catalog Page1

Untitled Page - Windows Internet Explorer - [Working Offline]

http://localhost:49162/INFS-788_Sunil/Administrators/Catalog.aspx

Google Search

WEB SEARCH

Favorites Suggested Sites Get More Add-ons

Untitled Page

Itemname Book

Cost 20.0000

ImageURL ~/Images/notebook.jpg

Item_Qty 199

Description This book can be used for school and business

Length 10

New

| ItemID | Itemname | Cost | ImageURL | Item_Qty | Description | Length | |
|--------|------------|-----------|--|----------|---|--------|---|
| 1 | Book | 20.0000 | ~/Images/notebook.jpg | 199 | This book can be used for school and business | 10 | Edit Delete |
| 2 | Pencil | 5.0000 | ~/Images/images(5).jpg | 100 | Pencil at its best | 5 | Edit Delete |
| 7 | Pen | 10.0000 | ~/Images/pens.jpg | 198 | Pen best for professionals | 10 | Edit Delete |
| 8 | Picture | 20.0000 | ~/Images/TOYSF326(1).gif | 198 | Pictures that makes ur day | 50 | Edit Delete |
| 9 | Stapler | 6.0000 | ~/Images/KS367+(1).jpg | 198 | Multi purpose | 6 | Edit Delete |
| 10 | laptop | 1000.0000 | ~/Images/mini-Laptop-Sony-Vaio-Vgn.jpg | 30 | Sony Laptop | 50 | Edit Delete |
| 13 | Camera | 500.0000 | | 0 | Camera from Canon | 30 | Edit Delete |
| 14 | cell phone | 150.0000 | | 4 | iphone | | Edit Delete |
| 16 | TV | 1500.0000 | ~/Images/LCDTV.jpg | 100 | LCD TV with s plasma experiance... | 60 | Edit Delete |

Done

Internet | Protected Mode: On

100%

Sunil Grad proj Sunil Report - Micro... INFS-788_Sunil - Mi... Untitled Page - Win...

10:16 AM

Figure 15 Catalog Page2

1.4. Order Page

The screenshot shows a web browser window titled 'Untitled Page - Windows Internet Explorer - [Working Offline]'. The address bar displays 'http://localhost:40162/INFS-788_Sunil/Administrators/Orders.aspx'. The page content features a large 'Online Store' header and a navigation menu with 'Catalog' and 'Order' options. Below the menu is a table of orders. The table has the following data:

| OrderID | First Name | Last Name | Address | DateTime | Type | Status |
|-----------|------------|-----------|---|------------------------|---------|-----------|
| <u>36</u> | test | test | | 11/28/2010 11:08:20 AM | Pick Up | Completed |
| <u>35</u> | sunil | datastage | 1122 sss asda test schaumiburg il 60173 | 11/25/2010 6:51:15 PM | By Mail | Completed |
| <u>34</u> | sunil | kumar | 134 n weds Apt # 4 madison sd 57042 | 11/22/2010 9:23:43 PM | By Mail | Completed |
| <u>33</u> | sunil | kumar | 134 n weds Apt # 4 madison sd 57042 | 11/22/2010 9:18:29 PM | By Mail | Completed |
| <u>32</u> | test | test | | 10/28/2010 8:06:16 PM | Pick Up | Completed |
| <u>31</u> | test | test | | 10/28/2010 7:39:43 PM | Pick Up | Completed |
| <u>30</u> | test | test | test test test tet 123123 | 10/25/2010 8:11:42 PM | By Mail | Completed |
| <u>29</u> | test | test | | 10/25/2010 8:11:17 PM | Pick Up | Completed |
| <u>28</u> | test | test | | 10/25/2010 8:09:48 PM | Pick Up | Completed |
| <u>27</u> | test | testlast | | 10/25/2010 8:08:26 PM | Pick Up | Completed |

Below the table, there is a search bar containing the text '1234'. The browser's taskbar at the bottom shows several open applications: 'Sunil Grad proj', 'Sunil Report - Micro...', 'INFS-788_Sunil - Mi...', and 'Untitled Page - Win...'. The system tray on the right shows the time as 10:17 AM.

Figure 16 Order Page

1.5. Order Detail Page

The screenshot shows a Windows Internet Explorer browser window with the address bar displaying `http://localhost:49162/INFS-788_Sunil/Administrators/OrdersDetails.aspx?orderid=30`. The page content includes a navigation menu with 'Catalog' and 'Order' links. Below this, there are two main sections: 'Credit Card Details' and 'Items Ordered'.

Credit Card Details

| OrderID | Credit Card Number | Exp Month | Exp Year | CVV | First Name | Last Name |
|---------|--------------------|-----------|----------|-----|------------|-----------|
| 30 | 41234123123123 | 1 | 2010 | 123 | test | test |

Items Ordered

| Itemname | Quantity |
|----------|----------|
| Book | 4 |
| Pencil | 1 |

The browser's taskbar at the bottom shows several open applications: 'Sunil Grad proj', 'Sunil Report - Micro...', 'INFS-788_Sunil - Mi...', and 'Untitled Page - Win...'. The system tray on the right indicates the time as 10:19 AM.

Figure 17 Order Detail Page

CONCLUSION

For any company to succeed in the present competitive markets, it should bring in to use all the advantages offered by the latest technologies. With incorporation of latest technologies companies can save lot of time, money and human resources. The errors due to human negligence can be reduced to maximum extent, by using automated software and hardware systems. The Retail web store provides simple, fast and new ways to do online shopping, from any part of the world. The retail web store does not only sell goods, but it is cheering the cause called globalization, where people and good travel from one part of the world to another dissolving the man-made barriers and borders. The retail web store helps in improving the management and functionality of the organization.

This is done by stating the roles and privileges of each and every employee working in the organization; this also helps in cutting short the time and cost consumed in fulfilling the day to day functionalities. The retail web store supports third party tools like IBM DataStage, Cognos, Microstrategy and Business objects. These tools help the organization to build transactional Data warehouse to store each and every business transaction, business Data Mart that supports future decision support and business intelligence systems.

Secured transactions were achieved using the HTTP protocol. HTTP protocol is used to transmit and receive information across to the web without letting any unauthorized user to listen and record the information details. Using the Secured Socket Layers the data sent over the web server is encrypted and decrypted providing more security to the confidential information from the hackers and spammers.

Certificates are used to make sure that the site we are dealing with at the other end is reputable; it needs to be certified by a Certificate Authority. VeriSign (www.verisign.com) is the most trusted Certificate Authority. The authority is paid a yearly fee by the e-commerce vendor and in return the authority performs checks on the business to prove that it is legitimate. These checks are then recorded in the form of a certificate. We can browse particular sites' certificates during the checkout process. To make the website trustworthy, we need to have a certificate from a Certificate Authority.

The list of goals achieved through Retail web store is

- Easy and Quick access.
- Improved productivity and efficiency.
- Utilization of resources to a maximum extent.
- Reduced complexity of operation.
- Reduced processing time and improved shipment tracking system.
- User and Eco friendly.
- Supports future technologies and enhancements

FUTURE ENHANCEMENTS

- Improving the Product Catalog features: To improve the product catalog, we can add additional features that show quantity of products currently in stock, time needed to deliver, and the release date of the products, add customer reviews or testimonies about the product.
- Providing a log that stores Employee credentials, when any product is removed, added, when existing orders are modified.
- Improving the Membership Tracking and Personalization: Adding a member discount, recording credit card details, mailing out special offers related to past purchases.
- Improving the Checkout Process: Making the checkout process simpler so that it can be achieved in a few clicks.

REFERENCES

1. Prosise, Jeff (2002). *Programming Microsoft .NET*. Washington: Microsoft Press
2. Chand, Mahesh (2002). *A Programmer's Guide to ADO.NET in c#*. Berkeley, CA: APress
3. Chris, Payne (2002). *Teach yourself ASP.NET in 21 days*. Washington: SAMS
4. *TenStep Project Management Process*. Retrieved November 13, 2010 from <http://www.lifecyclestep.com/open/450.0Implementation.htm>
5. *Overview of ADO.NET*. Retrieved on November 24, 2010 from [http://msdn.microsoft.com/en-us/library/h43ks021\(VS.71\).aspx](http://msdn.microsoft.com/en-us/library/h43ks021(VS.71).aspx)
6. *Software Testing*. Retrieved on November 27, 2010 from http://en.wikipedia.org/wiki/Software_testing
7. Mike, Gunderloy; Joseph, Jordan & David, Tschanz (2005). *Mastering Microsoft SQL Server 200*. NJ: Wiley Publishing