

Design & Development of Web Based Auction System

By

**Ghani Iftikhar Khan
(2001-NUST-BIT-773)**



**A project report submitted for the fulfillment of
the requirements for the degree of
Bachelors in Information Technology**

in

**NUST Institute of Information Technology
National University of Sciences and Technology
Rawalpindi, Pakistan
(2005)**

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CERTIFICATE


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DEDICATED TO

My family that includes my parents and my sister and 'bibi', all my childhood friends at Peshawar and my friends at NUST, because without their support and faith, All this would not have been possible.

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ABSTRACT

Infrastructure of Smart Auction is the solution to the problems of customers and individual sellers or companies. Smart Auction is an online auction website with minimum user or in other words administrative intervention and full automation so that there is least amount of interaction among the buyers and sellers of the product at the time of purchase.

The system being implemented and has potential to attract the buyers and sellers of the product and to make it easier for both the parties to sell or purchase the product online. There is a separate account for each seller and buyer of the product on this application and they will interact with the system through the specified account. All the transactions and other information will be communicated through email given in the account.

The system has properties of robustness, reliability and usability of the system and also how the system behavior can be used to make it work in a more effective way. There are still possibilities for future enhancements of Smart Auction.

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List of Abbreviations

ASP	Active Server Pages
CA	Certification Authority
HTC	Hyper Text Component
HTML	Hyper Text Markup Language
MDX	Multi dimensional expressions
OLAP	Online Analytical Processing
PIN	Personal Identification Number
PKI	Public Key Infrastructure
SOAP	Simple Object Access Protocol
SSL	Secure Socket Layer
SQL	Sequential Query Language
VI SAN	Virtual System Area Network
UDDI	Universal Description, Discovery, and Integration
WSDL	Web Services Description Language
XML	Extendable Markup Language

INTRODUCTION

Smart Auction is based on the concept of Application Service Provider. The idea is to provide a web space for already established brick and mortar companies to go online, as well as new entrepreneurs to start their business online. It is basically an online auction site which is provided with the features of selling a product or buying it either through bidding mechanism or at a fixed rate.

1.1 BACKGROUND

The meaning of the term "electronic commerce" has changed over time. Originally, "electronic commerce" meant the facilitation of commercial transactions electronically, usually using technology like Electronic Data Interchange (EDI, introduced in the late 1970s) to send commercial documents like purchase orders or invoices electronically.

Later it came to include activities more precisely termed "Web commerce", the purchase of goods and services over the World Wide Web via secure servers such as HTTPS, a special server protocol which encrypts confidential ordering data for customer protection with e-shopping carts and with electronic pay services, like credit card payment authorizations.

1.2 SCOPE OF PROJECT

The main objective of this project is to build a web based online auction system for Selling and Buying of Books and Electronic equipments which includes Multimedia, Computer Hardware/Software, Cell phones & other Accessories and Services. The application will act as an online intermediary between the buyer and the seller of product they will coordinate online with the intermediary. The aim of the project is to provide full automation so that there is minimum interaction between the seller, buyer and the system (application). This system is associated with other similar projects; hence the prevailing systems can be analyzed for requirements and problems. The system has to be built from scratch. All the requirements must be collected from the users and stakeholders on which all they must agree.

1.3 PROBLEM STATEMENT

The system will act as an online intermediary between the sellers of the products and the buyers.

1.4 DOMAIN

The Domain of the Project is Web Technologies and Design along with E-Commerce as all the business is conducted online.

1.5 MOTIVATION

In view of the recent discoveries, it is noticed that many businesses around the world are shifting on web i.e. they are moving towards E-Business. In this regard very less amount of work has been done in our country, rather there is no such auction application in which we can perform these activities which are useful for the sellers and the buyers because the sellers can get rid of the unwanted products and buyers can get some products at a lower price.

1.6 PROPOSED SOLUTION

The Online Auction application will have two separate business processes. (i) Seller of the Product & (ii) Buyer of the Product.

The Seller will place their product's picture on the site, the system will act as intermediary and purchaser will bid for the product until the seller is satisfied, this bidding is done until a specified time set by the seller, after that the user can either sell the product or cancel the bid for that particular product as in traditional Auction system. Also there will be an option of "Secret Bidding" for the buyer in which the buyer will select a possible range for himself to buy a particular product, this price will be hidden from other buyers, if other buyers exceed this range then this secret bid is cancelled otherwise if time ends up then the secret bidder will get the product for a dollar above the highest bid. One more option will also be there if the seller wants a fixed price for his product so he can set that. Also there is a question in view for the payment process for product and its delivery. As there are very niche amount of credit

card users in our country, so an alternate way of payment should also be devised. Also graphs and reports of the products being sold through the system on daily, weekly or monthly basis will be generated.

The solution for these problems in my view is that the purchaser should be paying for the products delivery and the company (intermediary) will only take responsibility of delivering the product to the purchaser. Also the seller will be charged some amount by the intermediary for advertising their product through them. The payment will be sent through intermediary to the seller and this can be through credit card or bank drafts in the name of seller. The intermediary will only finalize the deal among seller and buyer when he receives the payment and product from both sides respectively within a period of one week or it will return the product to seller or payment to buyer.

Looking at it from technical perspective, This project can be obtained via many alternatives such as HTML, Java Scripts and CGI tools(dynamic pages) can be used for designing the interfaces and for maintaining Databases we can use Perl Scripts and MS Access, Another Solution is to use the “.NET Framework” for the development of the project with built-in tools including C#(C-Sharp) for code implementation, ADO.NET for creating and maintaining Databases, ASP.NET for generating interfaces, and other such tools.

The solution which I propose is to use “.NET Framework” for this project. The developer can easily create and modify changes to the interfaces without making any code for it. Secondly for databases ADO is more powerful because of its flexibility and reliability and also expandability, that is, In MS Access we can store at

the most up to 65,000 entrees per table which is insufficient for our project because it has a lot of users (including sellers and buyers) therefore we prefer to use these tools. Also we can create crystal reports very easily for the analysis of the systems performance.

1.7 GOALS AND OBJECTIVES

The aim of the project is to build a system, which can actually be implemented and has potential to attract the buyers and sellers of the product and to make it easier for both the parties to sell or purchase the product online. For this purpose we need a system which has the following properties:

1.7.1 Reliability

The system will never crash or hang, other than as the result of an operating system error. This is essential as the point stressed in this project is to make the transaction process fast, efficient and easy. Other than that, the system is hoped not to be faced with more than few inconsistencies in a month, for the first couple of months after deployment. The number of discrepancies is expected to become nil after a few months.

1.7.2 Availability

Communication (for information retrieval and authentication) is a critical issue within as well as outside the organization hence the system must be able

to quickly recover and restart if required of calamity in order to provide the owner and the operator with a proficient service.

1.7.3 Security

Each authorized operator will be assigned a login name and password pair, by virtue of which he/she will be able to access the system. Unauthorized users will not be able to login to the system. As far as information retrieval is concerned, that data is being encrypted and this encryption is being provided by SQL.

1.7.4 Maintainability

After the project is finished, Regular maintenance will be done by the administrator through constant reviews.

1.7.5 Software Generation and Integration

All code must be hand-written as opposed to self generated code (commented and documented). Each function shall be commented with pre- and post-conditions. The process for building the finished product and all its sub-components from source code must also be documented.

1.8 PROJECT FEATURES AND LIMITATIONS

The limitations and application features of the system titled “Design & Development of Web Based Auction System” are given as:

- Application is Windows based using Client Server Architecture.
- Development is in .Net and SQL server 2000.
- The application should be scalable and be useful for an enterprise environment.
- The application makes use of the available network bandwidth and other features of the existing network.
- The application does not operate in an environment other than that of .Net and SQL.

1.9 TIME LINE

Phases	Tasks	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Deliverables
1	Project Planning and Requirement gathering	X					1. Requirements Document 2. Project Plan 3. Task Level WBS
2	Web Pages Design & DB Design		X				Design Of DB and Web Pages
3	Web Site Design and Implementation			X	X		Web Site Structure
4	Security Implementation				X	X	Security implementation
5	Web Server Configuration					X	Web Server
6	Integration and Testing					X	Complete Web Site Implementation
7	Document Report					X	Final Report
8	Documentation		X		X	X	Complete Documentation

Figure 1.1: Time Line of the Project WBAS

1.10 DELIVERABLES

The main deliverables of this Project are:

1. Documentation

2. Databases

2.1 Seller's Payment Record

2.2 Buyer's Payment Record

2.3 Inventory Management Record

2.4 Sales Record

2.5 Products Details DB

2.6 Products Images DB

3. Configuration Files

4. WebPages/Modules

4.1 Home Page

4.2 Login Page / Registration Page

4.3 Seller's Page

4.4 Buyer's Page

4.5 Administrator's Page

4.6 Bidding Module Page

4.7 Fixed Transaction Module Page

4.8 Item's Status Page (Buyer/Seller/Admin)

4.9 Product Search Page

4.10 Vendor Products Page

4.11 Categorical Products Page

4.12 Help Page

4.13 Contact Us Page/Suggestions Page

4.14 Crystal Reports

5. Programs

5.1 HTML(ASPX)/XML Codes, C# Codes, ADO.NET Codes

5.2 Security Implementation for Credit card validation.

5.3 SQL DB Queries

1.11 ORAGANIZATION OF REPORT

Introduction: This chapter includes the introduction of the system, i.e. all the functionality and features that it will provide to the users.

Literature Review: This portion of the documentation will include the Literature Review or the literature that has been studied for developing the system.

System Design: This chapter involves the design of the system in every aspect, it includes the system architecture, entity-relationship diagram, sequence diagram etc.

System Implementation: The Implementation of the system done is given a review in this chapter, all the functionality that the system will provide and how it will be operated is described here.

Conclusion and Future Recommendations: This part includes the future enhancements that can be brought to the system and also the conclusion of the overall system.

LITTERATURE REVIEW

This chapter contains the discussion of important literature studied for the project. I used the divide and conquer approach for carrying out the survey for my related work. The means for my every major task I searched for the related work that has been already done. One reason for the following approach is that it is more difficult to find a single product or work, comparing all the features together of my tasks. It is more probable to find them individually in different areas of research and development. These findings are discussed in more detail as follows.

2.1 RELATED WORK

The Survey of online stores has been divided into two categories. The first one includes surveying world wide available shopping malls and online stores. The second part includes surveying those that are made for Pakistan. As this product has to be developed in Pakistan's environment so it was important to look for what has already been done over here. The worldwide auction sites and online stores include.

2.1.1 Amazon.com and eBay.com

These shopping and auction websites have been surveyed for the navigation and shopping options i.e. fixed price purchase and bidding. All the main

features of these sites are introduced in the site being developed. The tutorials on the working of eBay were being studied and applied on the solution.

eBay is a very successful online auction website, at which people from all around the world buy and sell goods and services. Millions of collectibles, home appliances, computers, furniture, equipment, vehicles, et cetera are listed, bought and sold daily. Some items are rare and valuable, while many others are dusty gizmos that would have been discarded if not for the thousands of eager bidders worldwide, proving that if one has a big enough market, one will find someone willing to buy anything. Large international companies, such as IBM, sell their newest products and offer services on eBay using competitive auctions and fixed-priced storefronts. Regional searches of the DB make shipping slightly more rapid or cheaper. Software developers can create applications that integrate with eBay through the eBay API. eBay generates revenue from sellers, who pay a 1.25% to 5.25% premium on the final bid price of each item, a fee based on the starting price, and from advertising. It does not handle the goods, nor does it transact the buyer-seller payment, except through its subsidiary PayPal. Instead, much like newspaper want-ads, sellers rely on the buyer's good faith to make payment, and buyers rely on the sellers' good faith to actually deliver the goods intact. To encourage fidelity, eBay maintains, rates and publicly displays the post-transaction feedback from all users, whether they buy or sell. This way, the buyer is encouraged to examine the sellers' feedback profile before bidding to rate their trustworthiness. Sellers with high ratings generally have more bids and garner higher bids.[1]

2.1.2 Local Shopping malls

In Pakistan there has been no development of auction websites, and to overcome this deficiency this system is being developed but to understand the current state of online shopping in Pakistan some of the local shopping malls were studied so to bring in a new shopping experience to the customers.

The first one I surveyed in local shopping malls was jinnah super shopping (<http://www.jinnahsuper.com>). This is basically an advertisement and yellow pages site for shops in jinnah super Islamabad. There are no online transactions in this site. The second site was DesiStore (<http://www.desistore.com>). DesiStore is a joint venture between DesiStore Internet Services, a US based internet marketing company and XIBER.COM. These local websites do not have any business going on and are not generating any income either to itself or any local shops linked with them.[2]

2.2 TOOLS AND TECHNIQUES

This portion includes the tools and techniques that I have used in the project, In other words it presents the literature review which is necessary for an understanding for the details of the project. Some of the tools used are being given below.

2.2.1 Application Service Provider

Abbreviated as ASP, is a part of .NET Framework.

What is .NET Framework?

.NET is the Microsoft Web services strategy to connect information, people, systems, and devices through software. Integrated across the Microsoft platform, .NET technology provides the ability to quickly build, deploy, manage, and use connected, security-enhanced solutions with Web services. .NET-connected solutions enable businesses to integrate their systems more rapidly and in a more agile manner and help them realize the promise of information anytime, anywhere, on any device.

The Microsoft platform includes everything a business needs to develop and deploy a Web service-connected IT architecture: servers to host Web services, development tools to create them, applications to use them, and a worldwide network of more than 35,000 Microsoft Certified Partner organizations to provide any help you need. [3]

Application Service Provider is a third party entity that manages and distributes software based services and solutions to customers across a wide area network from a central data center. ASPs host and manage applications from their facilities and coordinate the support, maintenance, upgrades and administration of the software. ASPs combine state-of-the-art hardware, software, networking technologies and technical know-how to provide superior performance, increased security, and 24/7 reliability more effectively and affordably than traditional, in-house IT departments. In

short, ASPs are a way for companies to outsource some or almost all aspects of their information technology needs.

Application Service Providers operates by hosting software package/application for clients to access through the internet or in certain cases through dedicated communication channels via a web interface.

2.3 SQL SERVER 2000

Microsoft SQL Server 2000 is the complete database and analysis solution for rapidly delivering the next generation of scalable Web Applications.

SQL Server 2000 Enterprise Edition is the complete SQL Server offering for any organization. It offers the advanced scalability and reliability features necessary for mission critical line-of-business. It also takes full advantage of the highest-end hardware with support for up to 32 CPUs and 64 GB of RAM. SQL Server 2000 Enterprise Edition includes advanced features which are discussed as follows.[4].

2.3.1 Features and technologies

SQL Server 2000 is a powerful tool for turning information into opportunity. Industry-leading support for XML, enhanced tools for system management and tuning, and exceptional scalability and reliability make SQL Server 2000 the best choice for developing a web based system.

Driven by customer requests, cutting-edge research and strategic direction, SQL Server 2000 is the complete database and analysis offering for rapidly delivering the next generation of scalable e-commerce, line of business and data warehousing solutions. It includes features and technologies that make it :

- Fully Web-Enabled
- Highly Scalable and Reliable
- Deliver Fastest Time-to-Market

In addition to focusing on these core design themes, the SQL Server development team, at every level has emphasized quality.

Other features due to which this specific tool was adopted are:

Rich XML Support: Simplify the integration of your back-end systems and data transfer across firewalls using XML.

Integration with Windows Server System—BizTalk Server and Commerce Server: SQL Server 2000, in conjunction with other Microsoft Windows Server System™ integrated server software, provides even more power for your e-business.

Web-Enabled Analysis: Analyze data from remote OLAP cubes that are Web accessible.

Web Access to Data: Connect to your SQL Server 2000 databases and OLAP cubes flexibly, by using the Web with no additional programming.

Application Hosting: With multi-instance support, SQL Server enables you to take full advantage of your hardware investments so that multiple applications can be run on a single server, or outsourced.

Clickstream Analysis: Gain a deep understanding of online customer behavior, so that you can make better business decisions.

Security: Ensure your applications are secure in any networked environment, with role-based security and file and network encryption.

Full-Text Search: Use and manage both your structured and unstructured data, including searching through Microsoft Office documents.

High Availability: Maximize the availability of your business applications with log shipping, online backups, and fail over clusters.

Security: Ensure your applications are secure in any networked environment, with role-based security and file and network encryption.

Distributed Partitioned Views: Partition your workload among multiple servers for additional scalability.

Indexed Views: Gain performance from your existing hardware by storing query results and reducing response times.

VI SAN: Improve your overall system performance with built-in support for a virtual system area network (VI SAN).

Replication: With SQL Server 2000 you can implement merge, transactional, and snapshot replication with heterogeneous systems.

Simplified Database Administration: Automatic tuning and maintenance features enable administrators to focus on other critical tasks.

Improved Developer Productivity: User-defined functions, cascading referential integrity, and the integrated Transact-SQL debugger allow you to reuse code to simplify the development process.

Data Transformation Services: Automate routines that extract, transform, and load data from heterogeneous sources.

Extend Applications: Support for access by devices, such as Microsoft Windows® CE handheld units, provides broader access to applications and extends your user base.

Web and Application Hosting: Have your e-commerce solution hosted by a third party, with SQL Server 2000 support for multiple instances.

English Query: Enable your users to pose questions in English instead of using multi dimensional expressions (MDX).

Data Mining: Discover patterns and trends with data mining, and make predictions about future trends in your business.

Analysis (OLAP) Services: Perform rapid, sophisticated analysis on large and complex data sets using multi-dimensional storage.

OLAP Flexibility: Use multiple dimension types for flexible business analysis.

Closed-Loop Analysis: Take analysis one step further with OLAP actions, allowing results to drive next steps in the business process. [5]

2.4 BIDDING

In Traditional Auctions 'Bidding' is a process in which an entity is being displayed to all the buyers and they give different price range offers to that product according to their will and the highest bidder at the end wins the bid with highest value offered, but in this scenario the bidding time is the time until that auction

goes on which is mostly a day or two. The buyers and sellers have to finalize everything in this duration.

Online Bidding on the other hand is a similar process as that of traditional bidding but the difference is also very vast. As in the first difference is that of the duration of the bid of a particular entity or product can be according to the will of the seller. The seller is charged on daily basis and the charges vary due to the physical characteristics of the product. Also here different buyers around the globe can bid for the product because internet is an open market-place and in the end the bidder who has the highest bid will get the product and delivery is done to him through third party distributors. Also along with this feature the buyer will have an option of comparing different products of the same type which is not mostly available in traditional auctions due to physical limitations where as there is no limit to the space of web and you can keep as much items for bidding as you want. One new development in the context of bidding online is that of 'Proxy Bidding' or in simpler words 'Secret Bidding'. This term will be explained separately.[6]

2.4.1 Proxy Bidding

Proxy Bidding or Secret Bidding is a process in which the buyer places a bid for certain product and then that bid is confirmed if it is greater than the previous bid being done for the same product. If successful then this bid is place in the database for the particular product but this bid is not being displayed to any other buyer other than the Proxy Bidder himself or the Seller of the product and in some cases when there is an administrator, then he can also view that particular bid. When another buyer

comes and bids for the same product which was being secretly bid then the value of his bid is being compared with the value of proxy bid of the other user or buyer and if that value is greater than the proxy bid then the proxy bid is cancelled and the new bid is updated in the database, and if in case the new bid done by one user is less than another user's proxy bid then the new bidder will be prompted to re-enter with a higher bid and the value of the secret bid will still not be displayed to him. The new bidder can do the process repeatedly until the proxy bid is overcome.[7]

2.5 ONLINE TRANSACTIONS

2.5.1 Transaction

The action between a cardholder and a merchant that results in a financial activity between the merchant and cardholder's account.

An order form is a simple page on your site that the customer fills in with details of themselves and the goods they want to buy. There is no automation and the fields in the forms are sent to you as an e-mail. As a very basic method of taking orders through your online catalogue this can be very manual and labor intensive. An automatic 'buy product' button can take the user to the order form page where product details are already filled in but customers who want to buy separate products need new forms for each one and it soon becomes clear that a simple shopping cart product is more effective.

A slightly more advanced option is available by using a shopping cart software product as most carts have the ability to either store credit card numbers

securely so you can view them over the Internet or send them securely over e-mail. By making use of an existing merchant account, payments can be processed by using a PDQ swipe card machine or by old -fashioned credit card slip.[8]

Advantages

- Secure forms require a minimal outlay
- Avoid paying for a Payment Service Provider facility.
- Avoid an extra internet merchant number for online transactions
- Merchants can manually screen orders as they come in and reject risky transactions
- Site superficially appears to be fully credit/debit card enabled

Disadvantages

- Secure forms have limited use for more than one product on your site.
- Some bank acquiring services disapprove of merchants using an offline merchant number for Internet transactions so the merchant may be in breach of their acquiring bank's terms and conditions.
- There is no "live" authorization of card details so incorrect details will still appear to have been accepted. Contact (by telephone) may then be necessary.
- Transactions are processed manually - time consuming.

Credit

A credit is a transaction type that transfer funds from the merchant's account back to customer's credit card. It is the only way to handle a refund after a transaction has been settled. The type of transaction is usually performed when a product is returned to the merchant. A credit can be performed in the Transaction Terminal area or through a merchant's storefront application. Check refunds can only be done via credit card or through a non-electronic, paper check. A credit can only be issued to an account that has not had a previous authorization.[9]

2.5 PAYMENTS METHODS

Payments are made for the usage of the software i.e. the services that the software provides rather than the software itself, In other words it is the difference between selling and renting.

2.5.1 Debit Card

An ATM bankcard used to purchase goods and services and to obtain cash. A debit card debits the cardholder's personal deposits account and requires a Personal Identification Number (PIN) for use. Debit cards branded with a bank card logo (e.g AskCard) can be accepted in Internet Transactions without a PIN.

2.5.2 MasterCard

An association of banks that governs the issuing and acquiring of MasterCard credit card transactions, and Maestro debit transactions.

2.5.3 VisaCard

An association of banks that governs the issuing and acquiring of VisaCard credit card transactions. [10]

2.6 SECURITY FEATURES

2.6.1 Secure Socket Layer (SSL)

An encryption system that allows merchants to securely process electronic transactions to processors.

2.6.2 Public Key Infrastructure(PKI)

PKI is a security architecture that has been introduced to provide an increased level of confidence for exchanging information over an increasingly insecure form of communication called internet.

2.6.3 Public Key

Public Key is freely distributed and can be seen by all the user that have logged onto the internet.

2.6.4 Private Key

This is something that you keep secret, it is not shared amongst users. Private Key enables you to prove unequivocally that you are who you claim to be.

2.6.5 Certification Authority(CA)

A CA issues and verifies certificates. The CA takes responsibility for identifying (to a stated extent) the correctness of the identity of the person asking for a certificate to be issued, and ensures that the information contained within the certificate is correct and digitally signs it [11].

2.7 WEB SERVICES

Web services are "self-describing software modules, semantically encapsulating discrete functionality, wrapped in and accessible via standard Internet communication protocols like XML and SOAP." [12]

Web services are an approach that helps the business connect with its customers, partners, and employees. They enable the business to extend existing services to new customers. They help the business work more efficiently with its partners and suppliers. They unlock information so it can flow to every employee who needs it. They reduce development time and expense for new projects. You'll hear less about what Web services are and more about what they enable the business to do.

The WebService behavior enables client-side script to invoke remote methods exposed by Web Services, or other Web servers, that support the SOAP and Web Services Description Language (WSDL) 1.1. This behavior provides developers the opportunity to use and leverage SOAP, without requiring expert knowledge of its implementation. The WebService behavior supports the use of a wide variety of data types, including intrinsic SOAP data types, arrays, objects, and Extensible Markup Language (XML) data. The WebService behavior is implemented with an HTML Component (HTC) file as an attached behavior, so it can be used in Microsoft Internet Explorer 5 and later versions.

This article provides a general overview of the WebService behavior and examines the improvements and alternatives it offers to traditional database-driven Web page design. Once the WebService behavior is attached to a Web page, Internet Explorer 5 can invoke methods from Web Services and use the results directly in client-side script. The Using the WebService Behavior article complements this overview by providing detailed code samples and by discussing the specific functionality of the behavior.

2.7.1 Benefits of Web Services

By enabling applications to share data across different hardware platforms and operating systems, Web services provide many benefits, including:

- Opening the door to new business opportunities by making it easy to connect with partners.

- Delivering dramatically more personal, integrated experiences to users through the new breed of smart devices, including PCs.
- Saving time and money by cutting development time.
- Increasing revenue streams by enabling businesses to easily make their own Web services available to others.[13]

2.7.2 Applications of Web Services

Web services are revolutionizing how applications talk to other applications—or, more broadly, how computers talk to other computers—by providing a universal data format that lets data be easily adapted or transformed. Based on XML, the universal language of Internet data exchange, Web services can communicate across platforms and operating systems, regardless of the programming language in which the applications are written.

Each Web service is a discrete unit of code that handles a limited set of tasks. However, although Web services remain independent of each other, they can loosely link themselves into a collaborating group that performs a particular task.

Web services also make it possible for developers to choose between building all pieces of their applications, or consuming (using) Web services created by others. This means that an individual company doesn't have to supply every piece for a complete solution. The ability to expose (announce and offer) your own Web services creates new revenue streams for your company.

Web services are invoked over the Internet by means of industry-standard protocols including SOAP; XML; and Universal Description, Discovery, and Integration (UDDI). They are defined through public standards organizations such as the World Wide Web Consortium (W3C).

SOAP is an XML-based messaging technology standardized by the W3C, which specifies all the necessary rules for locating Web services, integrating them into applications, and communicating between them. UDDI is a public registry, offered at no cost, where one can publish and inquire about Web services.

Form Submit Process



WebService Process

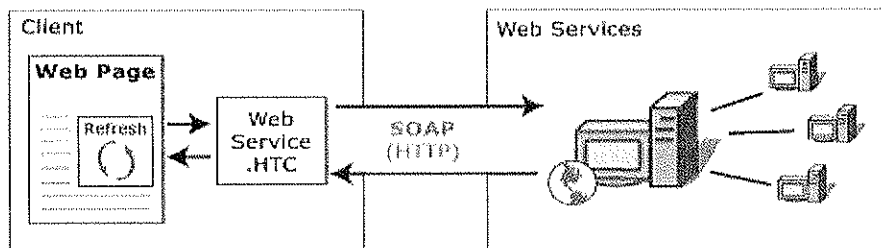


Figure 2.1: The Web Service Process

SYSTEM DESIGN

The design of any application poses a vital concern to its functionality and efficiency in the same. A well-designed application will function in accordance with its design; a poorly designed application is as good as none at all. The design of an application must be conceived such that it facilitates the tools that are been used along with its contents. It must also provide for a user friendly interaction for end users.

This section gives a detailed explanation of the system design, the required model containing the Entity Relationship Diagram, Use Case views and Sequence diagrams, etc.

The professional approach adopted in such application is a speedy execution and probability, also user-interface comes as a second factor. Yet another consideration which is vital to the design of personal computer applications is the support available in tools been used, so that they can include all necessary resources, keeping in view the system requirements in terms of hardware as well as software.

3.1 SYSTEM ARCHITECTURE:

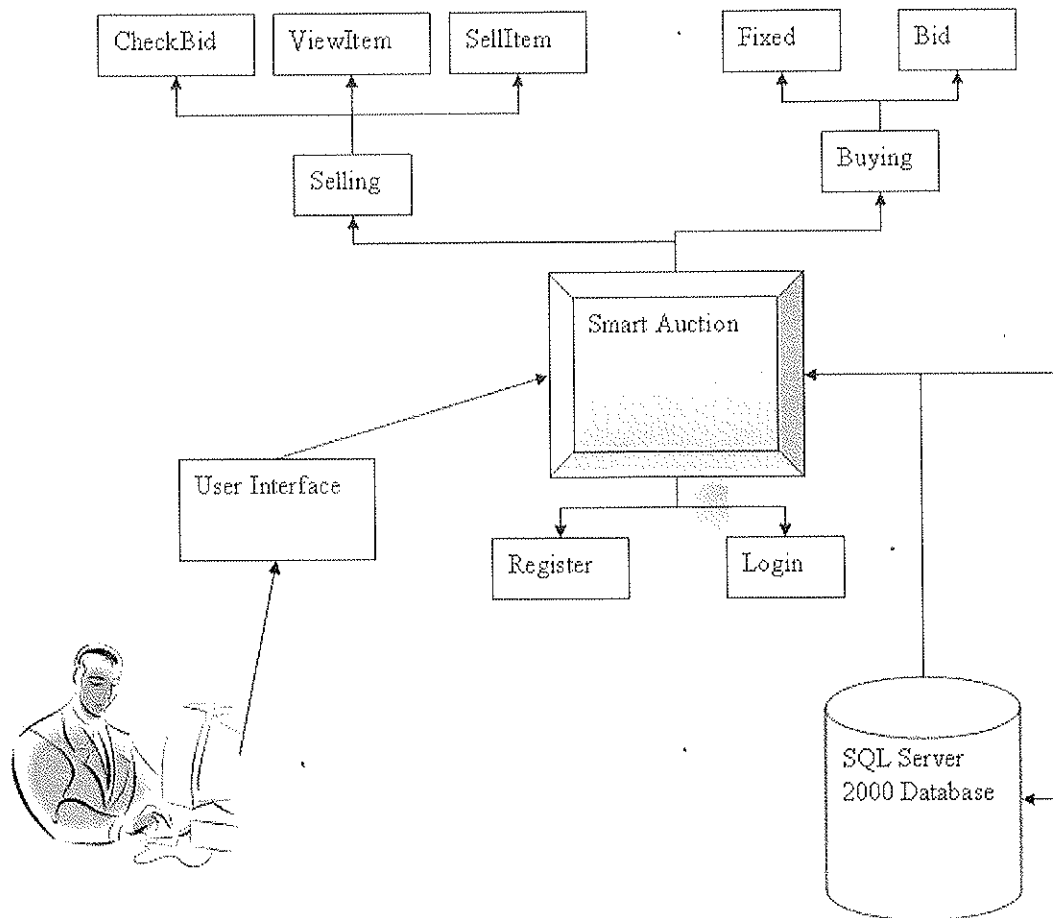


Figure 3.1: System Architecture of Smart Auction

Figure 2 explains the System Architecture of Smart Auction. The software is basically divided into two portions. One is Smart Auction which is the transaction system being built in “.NET Framework” and its user interface provides the user with different functionalities such as buying and selling. The second portion is that of the database which is implemented in SQL Server 2000 and all the data is in flow from the Smart

Auction Website to the database and then stored there and also data in the database is being checked and results are being generated on the basis of that data.

3.2 ER DIAGRAM

The object/relationship pair is the corner stone of the data model. The primary purpose of the Entity Relationship diagram is to represent entities (data objects) and their relationships with one another.

Assumption: All relationships are considered to be one at a time. The ERD of Smart Auction is given below:

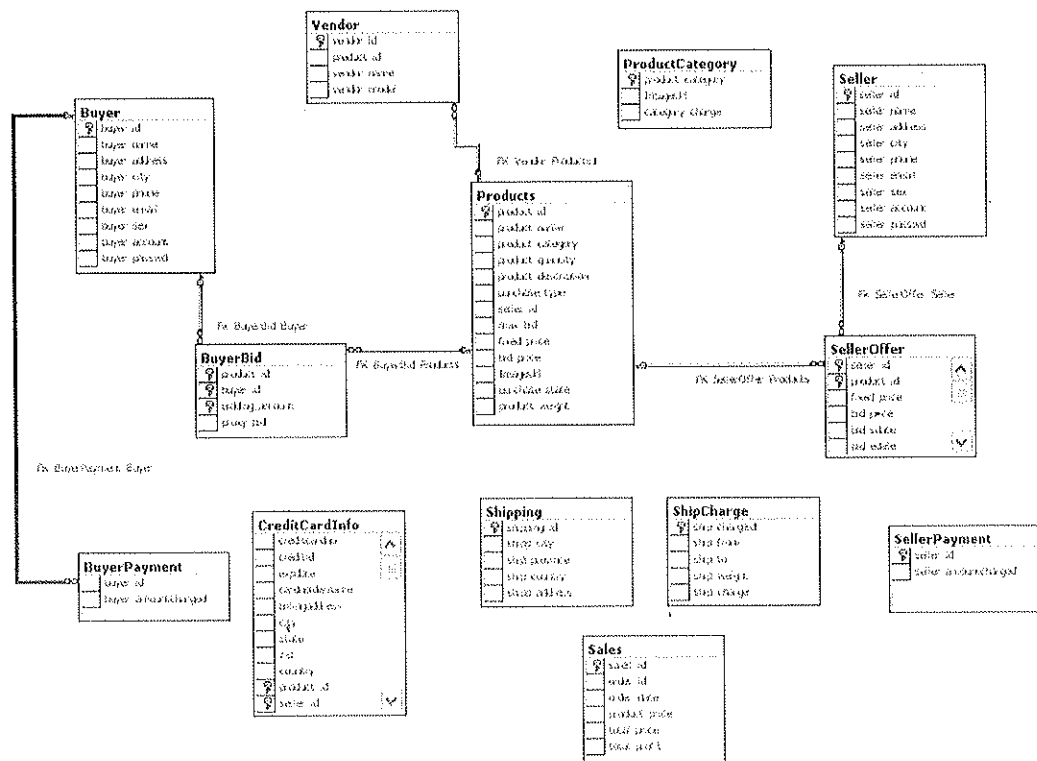


Figure 3.2: Entity Relationship Diagram of WBAS

3.3 DATA FLOW DIAGRAM

3.3.1 Context DFD

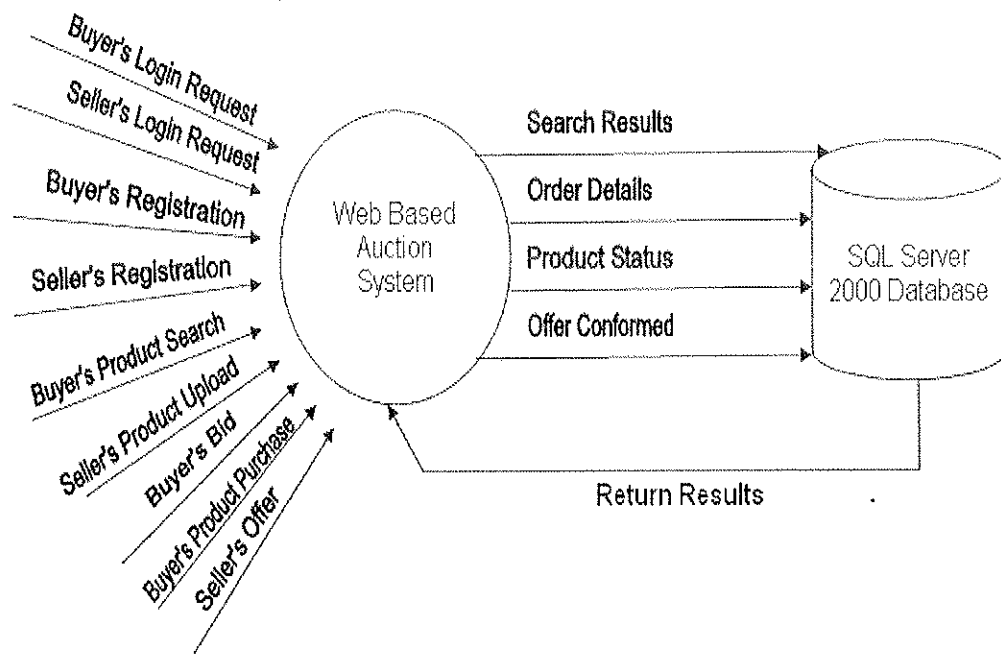


Figure 3.3: Context Data Flow Diagram of WBAS

3.3.2 DFD-O (Buyer's Process)

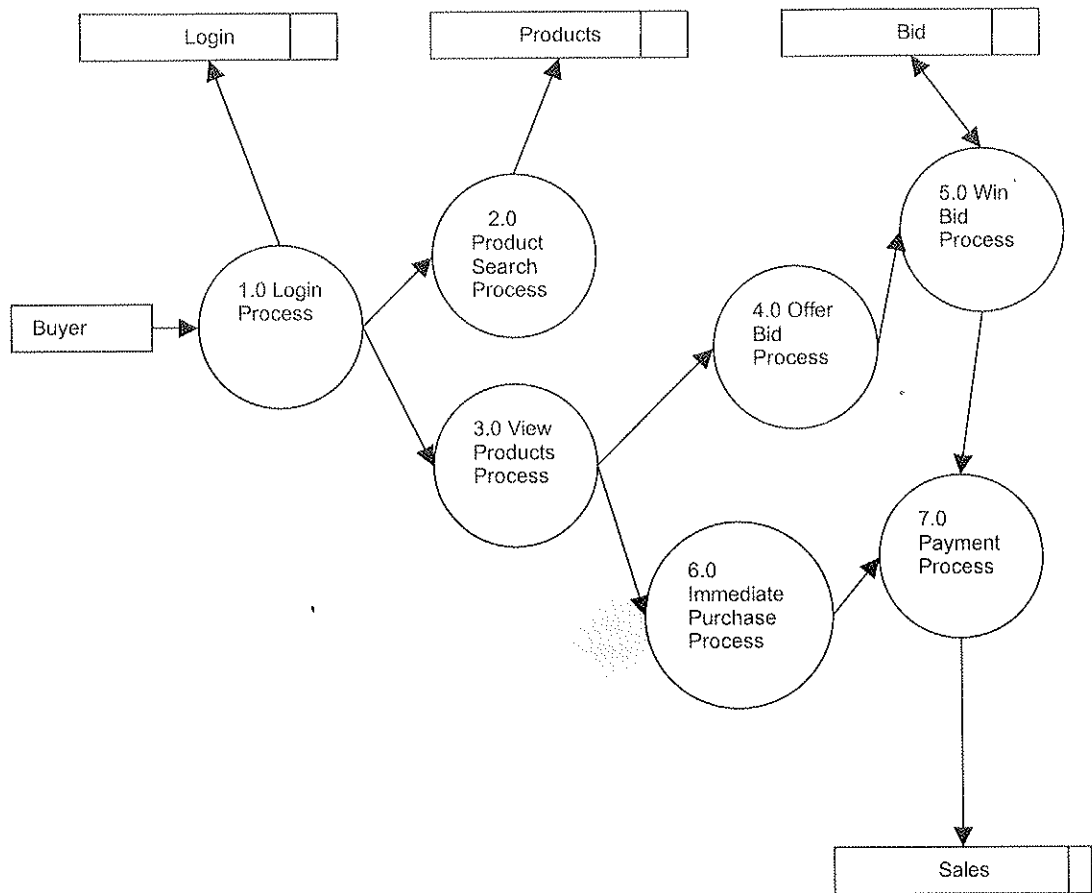


Figure 3.4: Buyer's Data Flow Diagram - 0

3.3.3 DFD-0 (Seller's Process)

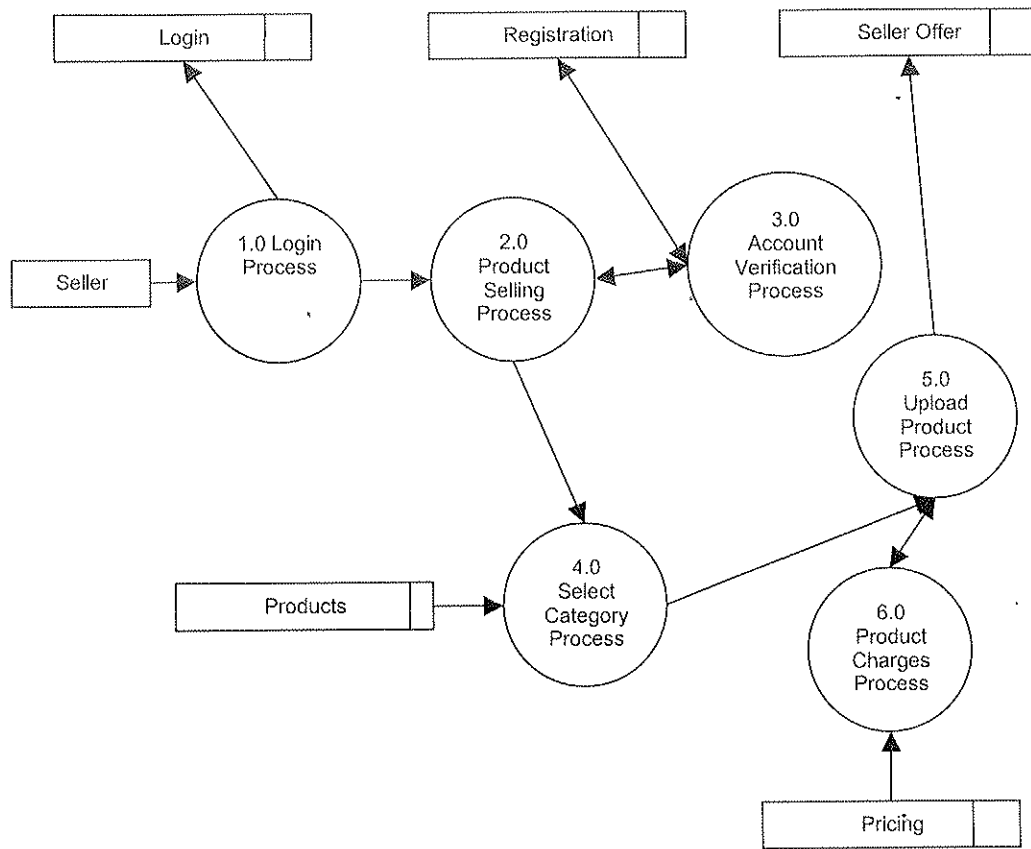


Figure 3.5: Seller's Data Flow Diagram - 0

3.4 USE CASE DIAGRAM

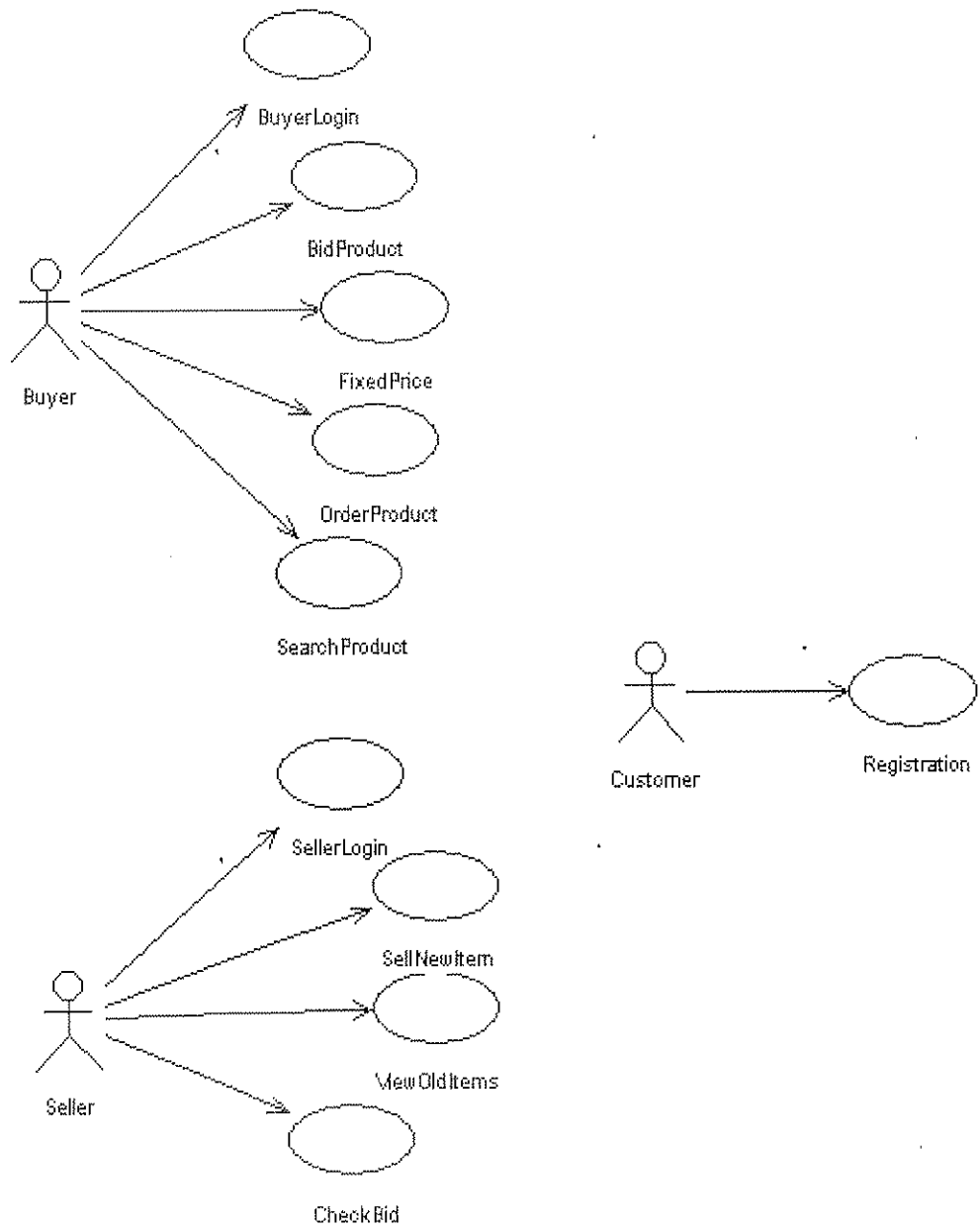


Figure 3.6: Use Case Diagram of WBAS

3.5 SEQUENCE DIAGRAMS

Register

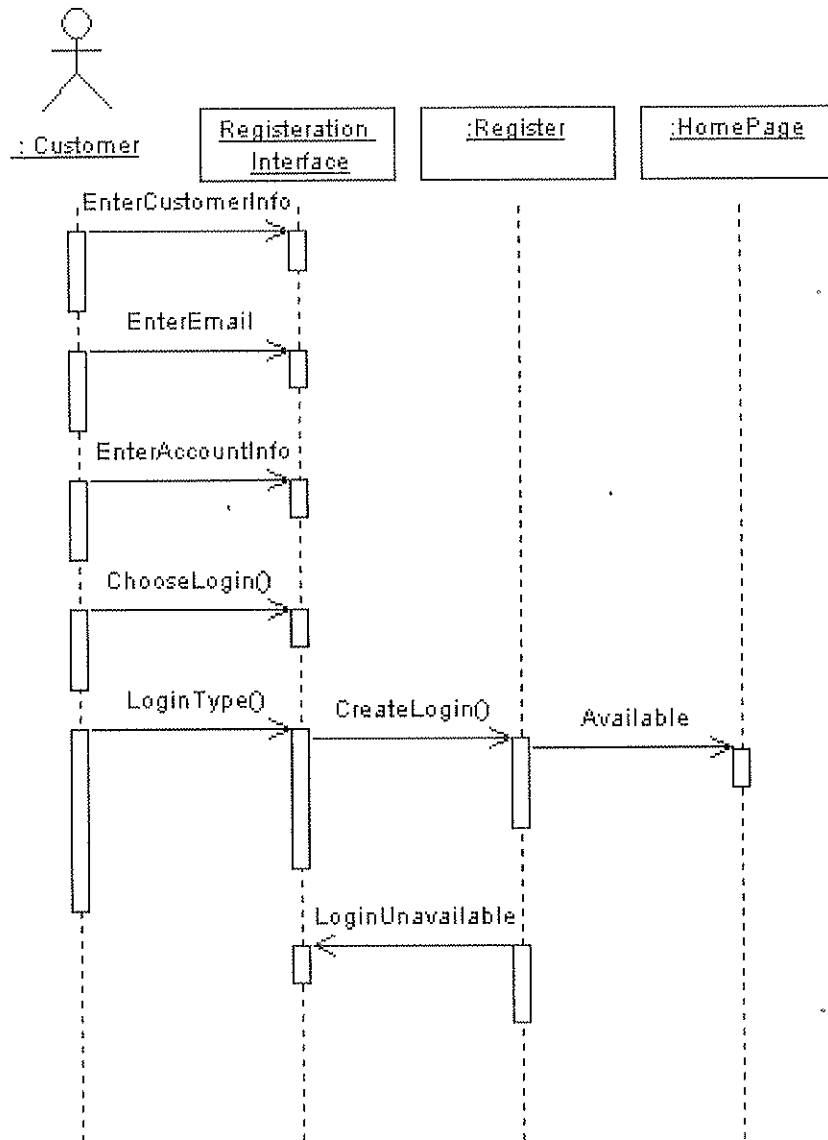


Figure 3.7: Sequence Diagram for Registration Process

BidProduct

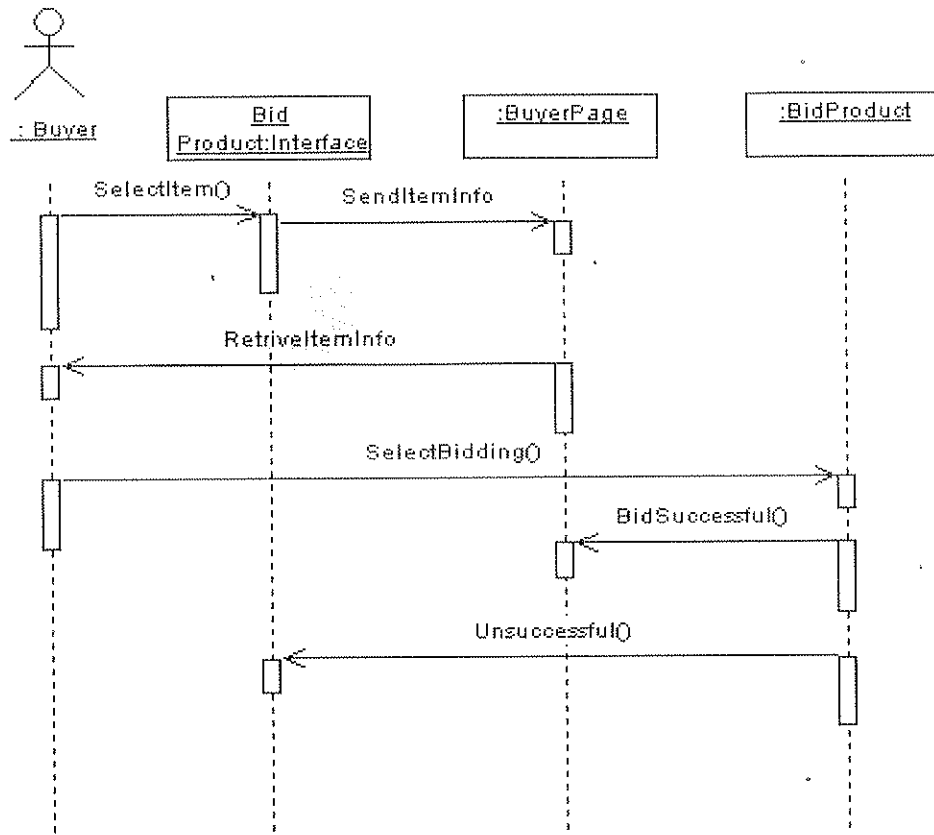


Figure 3.8: Sequence Diagram for Bidding Process

BuyerLogin

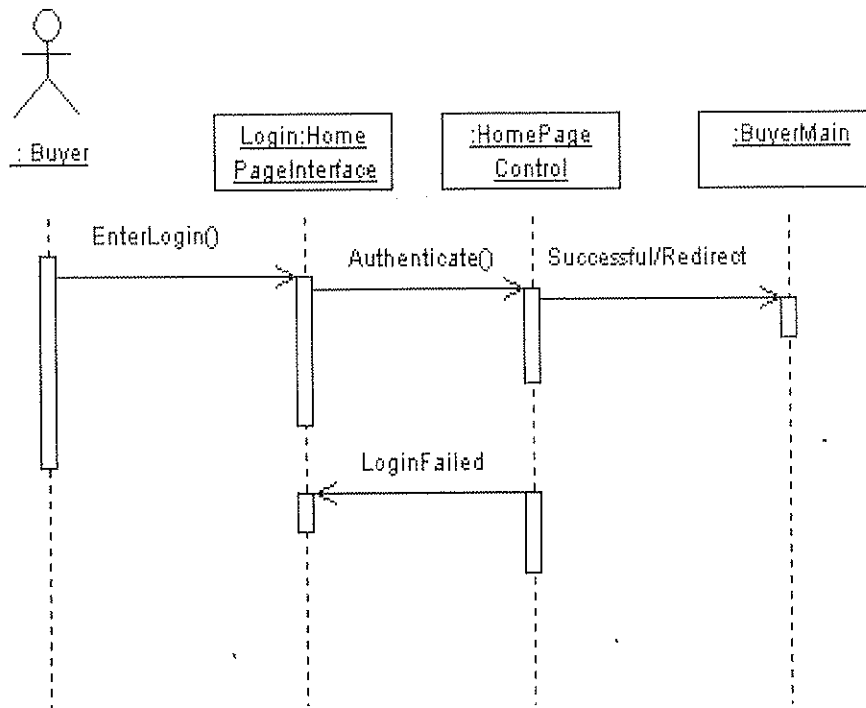


Figure 3.9: Sequence Diagram for Buyer's Login Process

FixedPrice

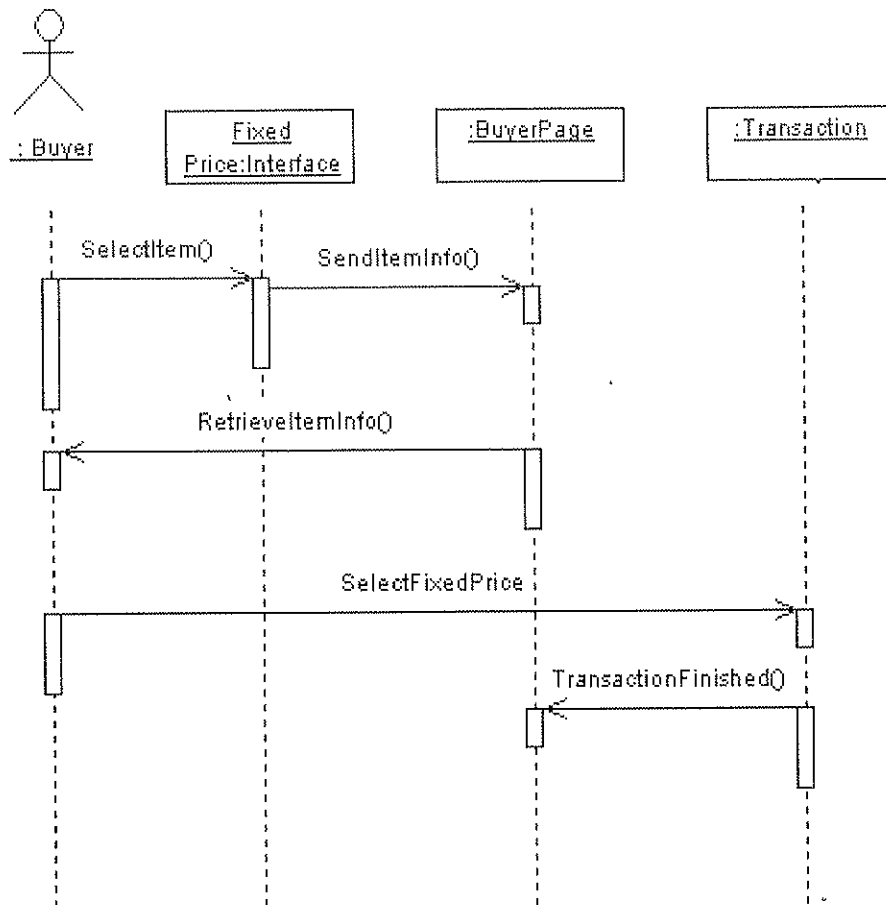


Figure 3.10: Sequence Diagram for Fixed Price Purchase Process

Order

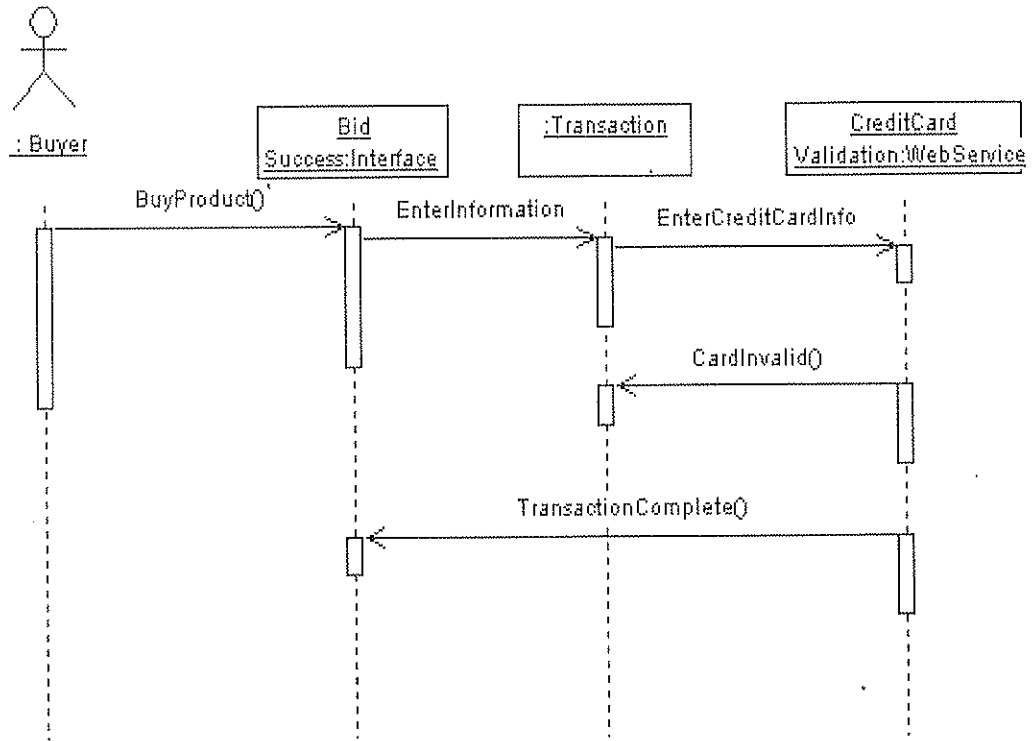


Figure 3.11: Sequence Diagram for Product Order Process

Search

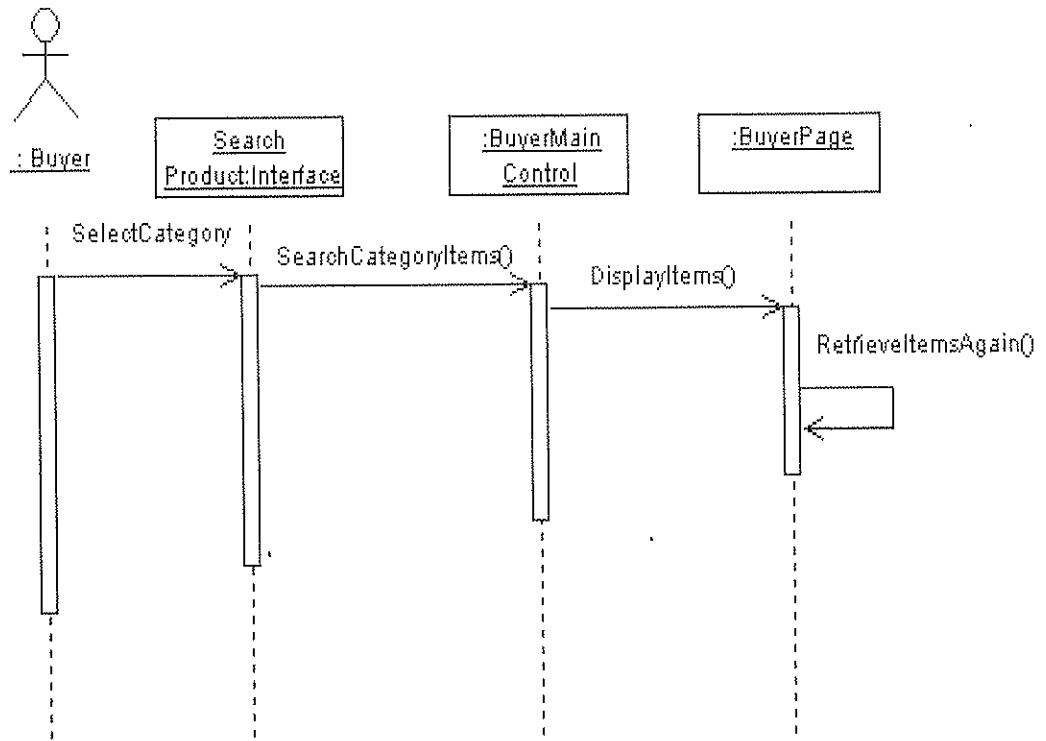


Figure 3.12: Sequence Diagram for Search Product Process

SellerLogin

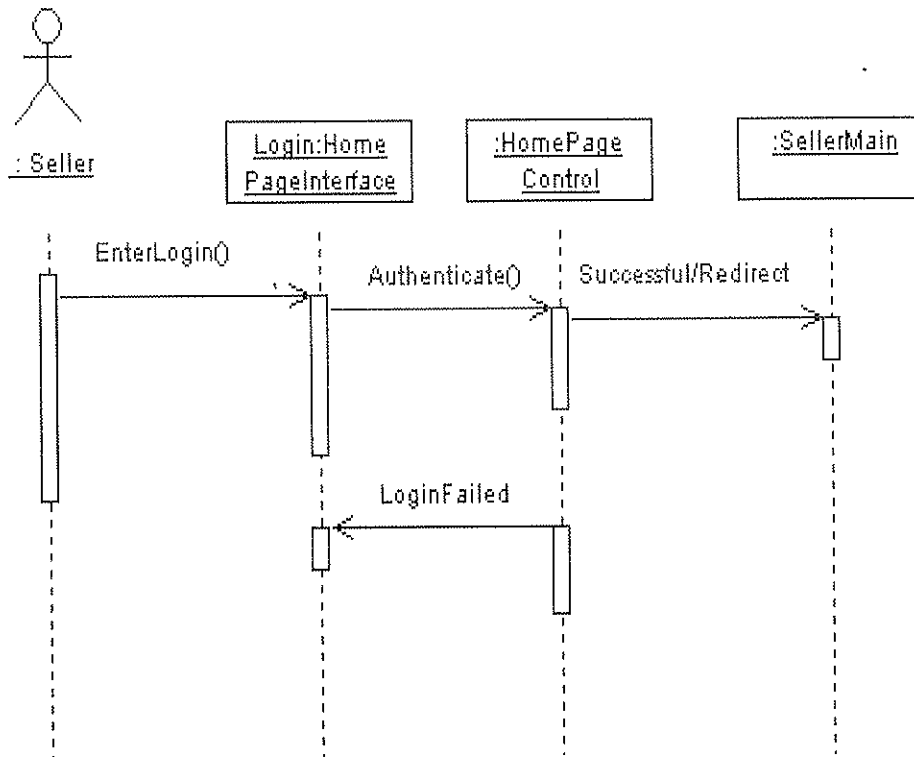


Figure 3.13: Sequence Diagram for Seller's Login Process

NewItem

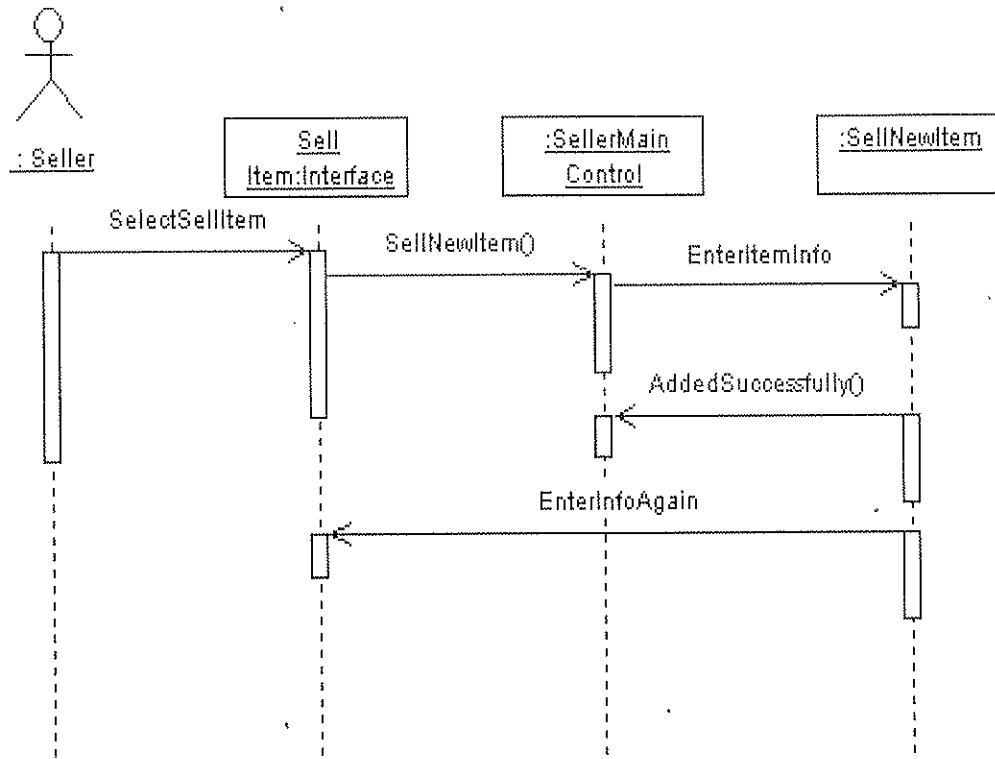


Figure 3.14: Sequence Diagram for Adding New Item Process

ViewItems

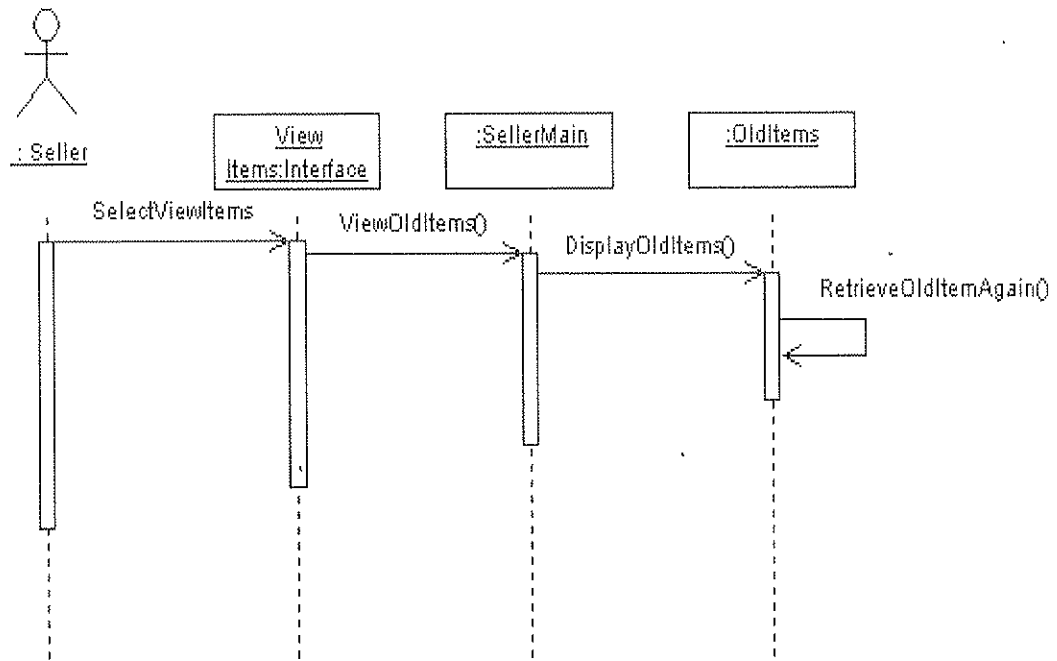


Figure 3.15: Sequence Diagram for Viewing Products Process

CheckBid

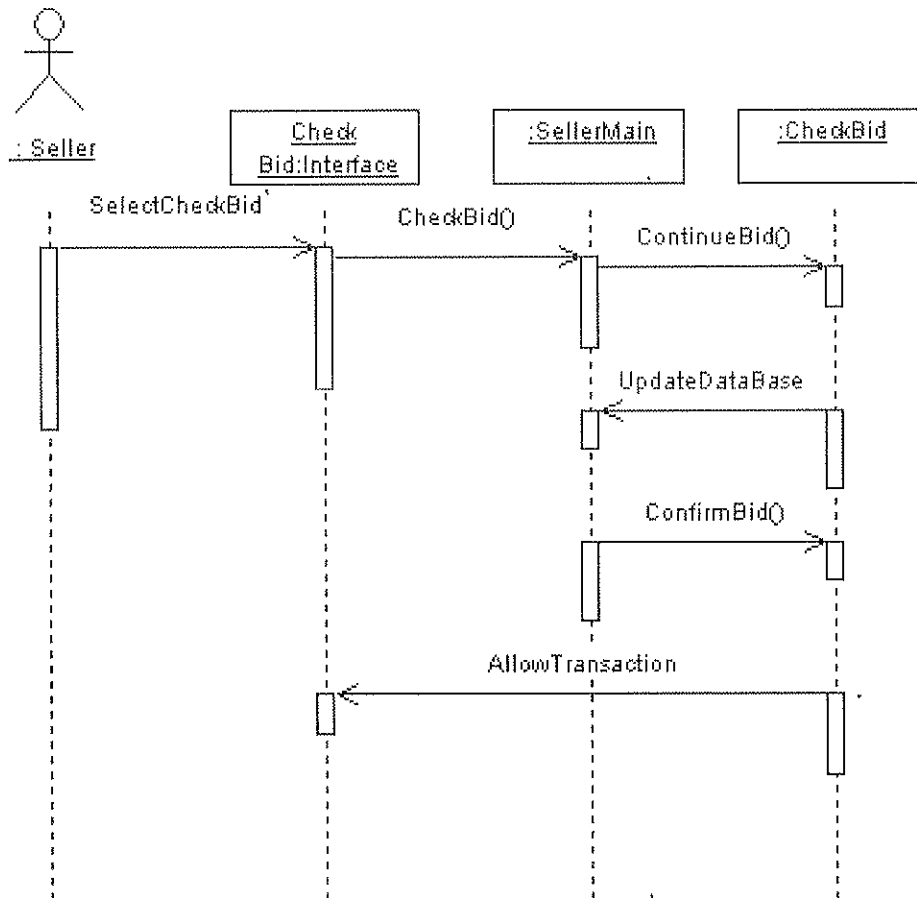


Figure 3.16: Sequence Diagram for Checking Product bid Status Process

SYSTEM IMPLEMENTATION

4.1 INTERFACE DESIGN FOR EACH MODULE

4.1.1 Interface of the System

The language adopted for designing the system's interface (web forms or web pages) was ASP.NET. This language is a part of Microsoft Visual Studio .NET 2003. This particular language was chosen because of its easy drag and drop facility of different Web Components and HTML components. Creating the same in other languages would bring in the complexity because each web component is created through writing code for it. The screenshots of various web forms are given in Appendix A.

4.1.2 Database

SQL Server 2000, Enterprise Edition was used for the development of the database for the system. This software was used due to its vast amount of features and capabilities. SQL Server 2000 is a powerful tool for turning information into opportunity. Industry-leading support for XML, enhanced tools for system management and tuning, and exceptional scalability and reliability make SQL Server 2000 the best choice for the development of such applications.

4.1.3 Backend Functionality

C-Sharp is used for the backend functionality of the system due its vast functionality and support to the system's other modules. It is also a part of Microsoft Visual Studio .NET 2003 and fully supports ASP.NET and SQL Server 2000. Along with these features, C# or C-Sharp has built-in functions which make it very easy to program.

4.2 CODING FUNCTIONALITY FOR EACH MODULE

The interface made, now was the time when the functionality behind the screens had to be coded. The functionality for interfaces is described so forth:

4.2.1 Login

All the users of the system will authenticate themselves by providing the username and password pair given to them at the time of registration. If the user is new, he will first register himself and then login as a registered user from the homepage. There are two users of the system i.e. Buyer and Seller. If the user is registered as a buyer, he will have to login as a buyer by selecting the option 'Buyer' from the radiobuttonlist and similarly for the seller. If the user does not follow this constraint, he cannot login to the system and hence cannot perform any transaction. After logging in, the user has various option depending upon his login type i.e. Buyer or Seller. This is done by maintaining a session throughout the system and this session expires when the user logs out.

4.2.2 Register

Every user of the site must register with the site. This process will be done by entering information in the register module. The user will have to provide personal information, contact information which is email in this case. Also the bank account number will be provided by the user, and in the end he will select a login on the page for his registered access to the system. The system will check the login account provided by the user in the database. If the login is already created by another user then he will be prompted to re-enter with another login, this will happen unless it is verified that the a new login has been created in the database.

4.2.3 Bidding

A registered user when buying a product will select a particular item from the DataGrid in the buyepage, then if the seller has defined the option of bidding for the product, the user shall select that option from the radio button list provided at the end of the datagrid. From here the user will be redirected to the bidding module where he will be shown the current bid of that product. The user will provide a bid higher than that amount, then the system will check if the bid is greater than the bid for that item in the database. If it is then the bid will be updated for that product else the user will be prompter to enter a higher bid. Sometimes a user is prompted to enter a higher even when the bid value is higher than that of the current bid. Here comes the concept of 'Proxy Bidding' i.e. another user has given a secret bid for that product and the bid provided by the current user is less than that bid. The user will be prompted

again and again until he exceeds the proxy bid of that user. The proxy bid is hidden and cannot be seen by any other buyer other than the buyer himself or the seller. An option of proxy bidding is also available in this module for the seller and is done by checking the checkbox named 'proxy bid'. Once a user checks this checkbox the proxy bid text box is enabled dynamically.

4.2.4 Fixed Price

This is a simple process of buying a product online. When a buyer selects a product from the buyerpage and there is an option of fixed price buying then after selecting the fixed price, the system will take the buyer to the transaction module of the system. There the user will provide the required data and order the product immediately.

4.2.5 Order Product

When a user confirms that he wants to buy a product, he can do that after conforming from the transaction page that the data he provided was valid. Here the user will provide the Shipping Address where he will be provided the product, which he is buying. The buyer will have an option of payment through credit card or payment on delivery (bank draft on the name of seller). Payment on Delivery will be a manual process, where as the Credit Card payment will be totally online. The product will then be delivered to the buyer by a third party.

4.2.6 Search Products

A user can also search through the different categories of products available on the website. The search can be product category based or vendor based i.e. If a user is looking for particular type of product such as some book, then he will click the category of 'Books' in the list provided in the buyersearch page. Also he can look for a particular product of a particular vendor e.g. MP3 Player by Sony, so he can select from the list provided for the vendors in the same page. The system after the selection of the categorical selection will display the items of that particular search and display them in buyerpage.

4.2.7 Sell New Item

When the user creates a seller account, he can sell or place a product, which he wants to sell through the system by selecting sell new item from the seller's main page. The seller will place all the details of his product on the sell new item page and then will send the information to the database, but before that Smart Auction makes an agreement with the seller by storing his credit card information and confirms that the seller will complete the transaction without any fraud. After confirmation of this agreement, the seller's product is being placed into the system's database.

4.2.8 View Old Items

This module contains the items that are already being placed by a registered user. He can view his old products by clicking the view products from the

seller mainpage. The user can then view the status of his products which he has placed on the system, that is, he can check their remaining bid time, also he can see if the item has been purchased.

4.2.9 Check Bid

This module is divided into three parts, one for administrator, one for the buyer on the system and one for the seller of the system. The administrator can check which items have completed their bid state and are ready for transaction. The administrator can do this by clicking on checkbid button on the adminstart page. The buyer can see which items are there in the system whose highest bidder is the buyer himself, he can select the checkbid button on the buyer mainpage and the seller can see which items are there in the system whose bid has been completed and should be forwarded for a transaction. For this the seller has to click on the checkbidstatus button on the seller mainpage.

4.2.10 Transaction

This module is after the registered buyer has selected some product, if the buyer has selected 'fixed price' then he will be directly redirected towards the transaction page else when he wins the bid and he revisits the site, he will be redirected here. The user will provide his credit card information here along with the shipping address where the product will be received by him, the credit card information will be validated through a web service and if valid then the transaction will take place. This transaction includes the product price and shipping charges, the shipping charges for

every category of product is calculated through different mathematical formula's being devised, and then the total amount is deduced from the user.

4.3 DATA DICTIONARY

My SQL Server 2000 was chosen as the tool for designing the database required by the system. The reason for this choice is highlighted in the previous sections.

The data dictionary of Smart Auction is given as follows:

Table Name: Advertisement

	Column Name	Data Type	Length	Allow Nulls
▶	add_id	int	4	✓
	ImageUrl	varchar	50	✓
	add_charge	varchar	50	✓
	add_enddate	datetime	8	✓
	add_link	varchar	50	✓

Figure 4.1: SQL Database Table for Advertisements Record

Table Name: Buyer

	Column Name	Data Type	Length	Allow Nulls
PK	buyer_id	varchar	50	
	buyer_name	char	20	
	buyer_address	char	50	
	buyer_city	char	10	
	buyer_phone	int	4	
	buyer_email	char	30	
	buyer_sex	char	2	
	buyer_account	int	4	
	buyer_passwd	varchar	10	

Figure 4.2: SQL Database Table for Buyer's Record

Table Name: Bidding

	Column Name	Data Type	Length	Allow Nulls
PK	product_id	int	4	
	buyer_id	varchar	50	
	bidding_amount	int	4	
	proxy_bid	int	4	✓

Figure 4.3: SQL Database Table for Bidding Record

Table Name: BuyerPayment

	Column Name	Data Type	Length	Allow Nulls
▶	buyer_id	varchar	50	
	buyer_amountcharged	int	4	

Figure 4.4: SQL Database Table for Buyers Payment Record

Table Name: CreditCardInfo

	Column Name	Data Type	Length	Allow Nulls
▶	creditcardno	bigint	8	✓
	creditid	int	4	✓
	expdate	varchar	50	✓
	cardholdername	varchar	50	✓
	billingaddress	varchar	50	✓
	city	varchar	50	✓
	state	varchar	50	✓
	zip	int	4	✓
	country	varchar	50	✓
⚡	product_id	int	4	
⚡	seller_id	varchar	50	
	amount_charged	float	8	✓

Figure 4.5: SQL Database Table for Seller's Credit Card Record

Table Name: ProductCategory

	Column Name	Data Type	Length	Allow Nulls
▶	product_category	varchar	50	
	ImageUrl	varchar	50	
	category_charge	float	8	

Figure 4.6: SQL Database Table for Products Categories Record

Table Name: ProdOrder

	Column Name	Data Type	Length	Allow Nulls
▶	order_id	int	4	
🔑	buyer_id	varchar	50	
🔑	seller_id	varchar	50	
🔑	product_id	int	4	
	product_price	int	4	
	order_status	char	10	
	order_date	datetime	8	
	shipping_chargeid	int	4	
🔑	shipping_id	int	4	

Figure 4.7: SQL Database Table for Product's Order Record

Table Name: Products

	Column Name	Data Type	Length	Allow Nulls
PK	product_id	int	4	
	product_name	varchar	50	
	product_category	varchar	50	
	product_quantity	int	4	
	product_description	varchar	500	
	purchase_type	int	4	
	seller_id	varchar	50	
	max_bid	int	4	✓
	fixed_price	int	4	✓
	bid_price	int	4	✓
	ImageUrl	char	100	✓
	purchase_state	varchar	50	✓
	product_weight	float	8	✓

Figure 4.8: SQL Database Table for Product's Details Record

Table Name: Sales

	Column Name	Data Type	Length	Allow Nulls
PK	sales_id	int	4	
	order_id	int	4	
	order_date	datetime	8	
	product_price	int	4	
	total_price	int	4	
	total_profit	int	4	

Figure 4.9: SQL Database Table for Products Sales Record

Table Name: Seller

	Column Name	Data Type	Length	Allow Nulls
<input checked="" type="checkbox"/>	seller_id	varchar	50	
<input type="checkbox"/>	seller_name	varchar	50	
<input type="checkbox"/>	seller_address	varchar	50	
<input type="checkbox"/>	seller_city	varchar	50	
<input type="checkbox"/>	seller_phone	int	4	
<input type="checkbox"/>	seller_email	varchar	50	
<input type="checkbox"/>	seller_sex	varchar	50	
<input type="checkbox"/>	seller_account	int	4	
<input type="checkbox"/>	seller_passwd	varchar	10	
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				

Figure 4.10: SQL Database Table for Seller's Record

Table Name: SellerPayment

	Column Name	Data Type	Length	Allow Nulls
<input checked="" type="checkbox"/>	seller_id	varchar	50	
<input type="checkbox"/>	seller_amountcharged	int	4	
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				

Figure 4.11: SQL Database Table for Seller's Payment Record

Table Name: SellerOffer

	Column Name	Data Type	Length	Allow Nulls
PK	seller_id	varchar	50	
	product_id	int	4	
	fixed_price	int	4	✓
	bid_price	int	4	✓
	bid_sdate	datetime	8	✓
	bid_edate	datetime	8	✓

Figure 4.12: SQL Database Table for Seller's Product Offer Record

Table Name: Shipping

	Column Name	Data Type	Length	Allow Nulls
PK	shipping_id	int	4	
	shipp_city	varchar	50	
	ship_province	varchar	50	
	ship_country	varchar	50	
	shipp_address	varchar	50	

Figure 4.13: SQL Database Table for Product Shipping Record

Table Name: ShipCharge

	Column Name	Data Type	Length	Allow Nulls
PK	ship_chargeid	int	4	
	ship_from	char	50	
	ship_to	char	50	
	ship_weight	float	8	
	ship_charge	float	8	

Figure 4.14: SQL Database Table for Products Shipping Charges Record

Table Name: Vendor

	Column Name	Data Type	Length	Allow Nulls
PK	vendor_id	int	4	
	product_id	int	4	
	vendor_name	char	10	
	vendor_model	char	10	

Figure 4.15: SQL Database Table for Product Vendor's Record

CONCLUSION AND FUTURE RECOMMENDATION

Smart Auction provides online procurement service to customers/corporate organizations by acting as an intermediary between the vendors/suppliers and the organizations. It owes its creation to the fact that present procurement system prevalent in corporate organizations is not only laden with lot of paper work but involves many employees and time. It also gives rise to fraudulent activities as manipulation becomes easy.

The project eliminates tiresome and at times corrupt procurement system where by making the entire process online, easy to handle and involving a lot less number of employees thus giving an opportunity to the organizations to cut down their costs and become more profitable. We will take the orders from our customers and deliver the product to them.

Our process of bidding will give a lot of variability in the price of certain products. The customers can get used items for a lesser price rather than a new one, which has in comparison a very high price. The products are in a very good state and the customer can evaluate the conditions of the products from its given pictures.

For further enhancements we will broaden our business region from national market to international market and provide our services worldwide. Also a

feature of intelligent database can be brought into the system through rich data analysis and data mining capabilities that integrate with familiar applications such as Microsoft Office, SQL Server 2000 enables you to provide your customers with comparison-shopping. The users can compare same kind of products provided by different manufacturers and placed by different sellers for different price ranges. The customers can then select the product, which is most suitable to them in price and requirements.

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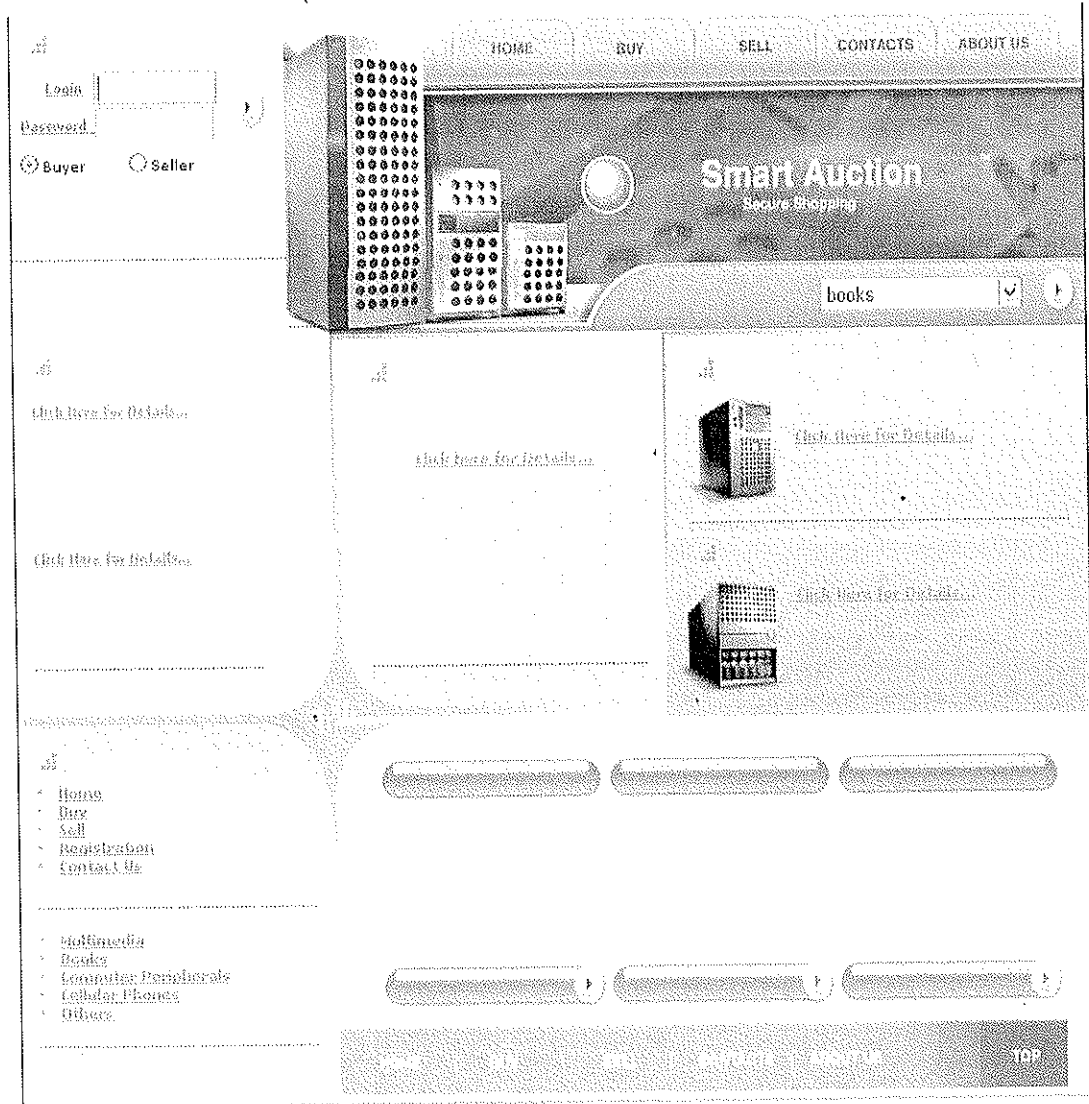
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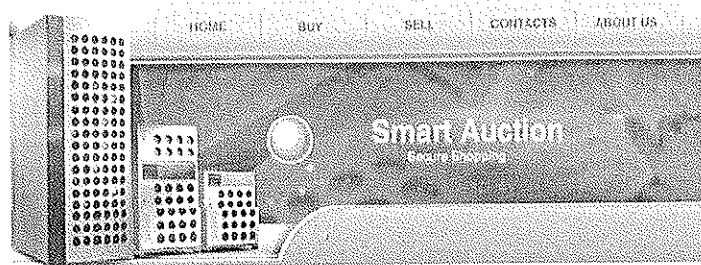
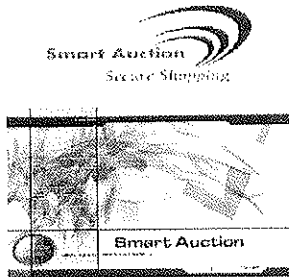
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<http://www.tpisoft.com/smartpayments/transact.aspx>
- [9] Electronic Commerce Web Dictionary
http://www.bambooweb.com/articles/e/1/Electronic_commerce.html
- [10] Evaluate Alternative Online Payment Methods
www.directron.com/payment-policy.html
- [11] Firewall, Internet, LAN and e-Commerce Security Audit.
www.e-security-e-commerce-security.com/
- [12] Peter Drayton, Ben Albahari "C# in a Nutshell", March 14th 2002
<http://www.oreilly.com/catalog/esharpnut/chapter/ch01.html>
- [13] Benefits and Usage of Various Web Services
<http://www.webservices.org/>

SNAPSHOTS

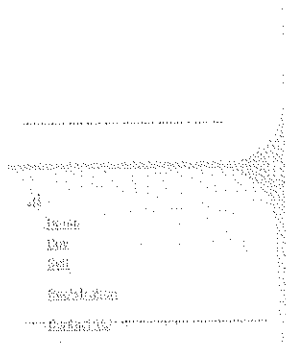
Main Page



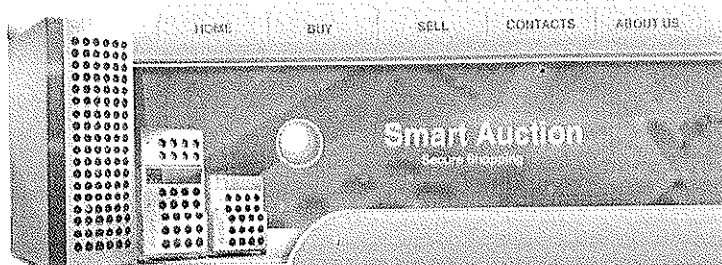
Admin Start Page



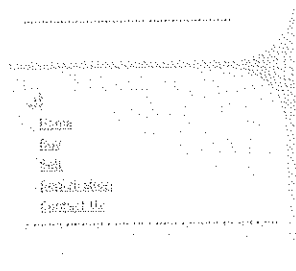
Select from the below buttons, if you want to check monthly sales of different categories, click 'Show Sales', To add new category, click 'Add New Category' and to check items whose bidding date has ended and ready for a transaction, click 'Check Bid Items'.



Admin Add Category



Dear Administrator, You can add new categories of items from below.



Category Name	<input type="text"/>
Insert Picture	<input type="text"/> <input type="button" value="Browse..."/>
<input type="button" value="Done"/>	

SE1 Done

Buyer Products

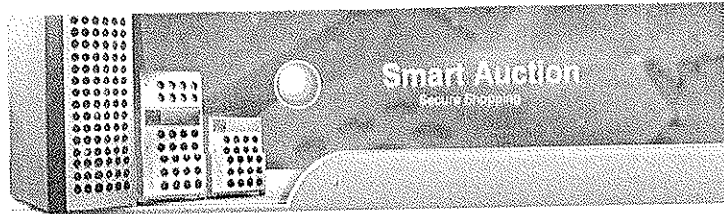
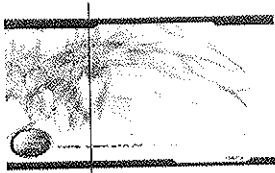





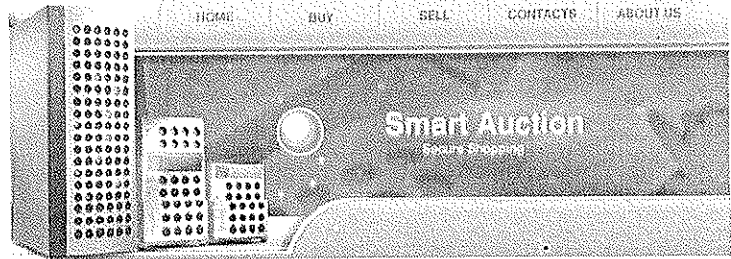
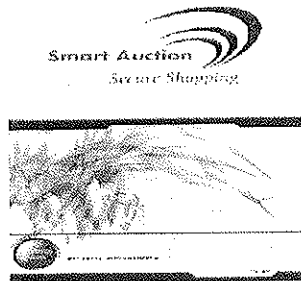
Image	Select	Product	Description	Quantity Available	Current Bid
 Image	<input type="button" value="Button"/>	Dell P4 Mobile Processor M	One of teh latest technology is introduced into these new systems of DELL. Check em out! Im definite you wont regret.	1	0
 Image	<input type="button" value="Button"/>	Compaq p4	Hellooooo	1	0
 Image	<input type="button" value="Button"/>	HP P4	3 GHz	1	0

Choose from the available options of Purchasing option

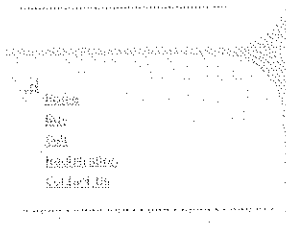
Bidding

2001 Dons

Bid Product

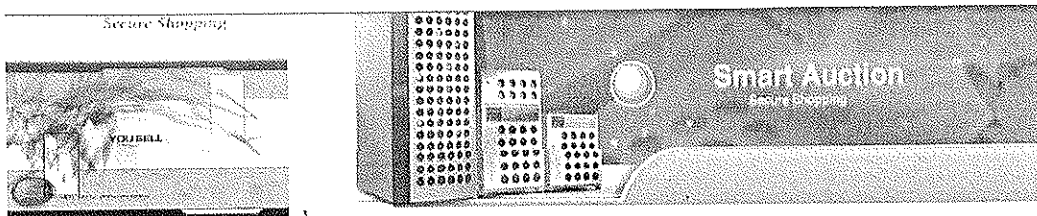


33



Bid Here:	10	CurrentBid
		10
	<input checked="" type="checkbox"/> Proxy Bid	
	55	
	<input type="button" value="Bid"/>	

Transaction



3

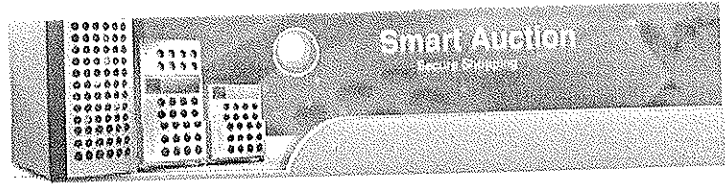
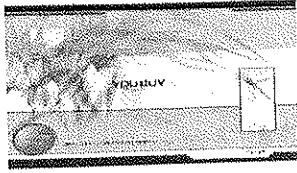
Label



Name (As appears on the card)	
Credit Card No	
Card Identification Number	
Credit Card Type	Master Card <input type="button" value="v"/>
Expiry Date	--Month-- <input type="button" value="v"/> --Year-- <input type="button" value="v"/>
Shipping Address	
City	
Province	
Country	Pakistan <input type="button" value="v"/>
<input type="button" value="Done"/>	

Cash on Delivery

Sell Item



Product Name

Quantity

Product Description

Product Category

Pricing Strategy

Fixed Price

Bid Price

Weight of Item (lbs)

Bid Start date

Product Name

Quantity

Product Description

Product Category

Pricing Strategy Bidding Fixed Price Bid and Fixed Price

Fixed Price

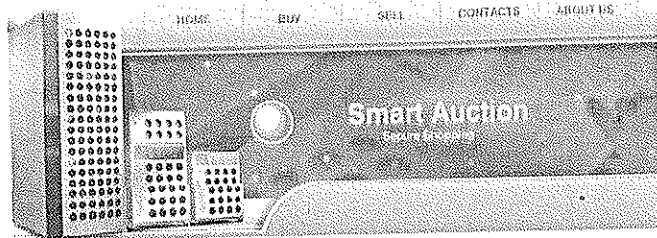
Bid Price

Weight of Item (lbs)

July 2005						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23

Bid Start date

View Old Items



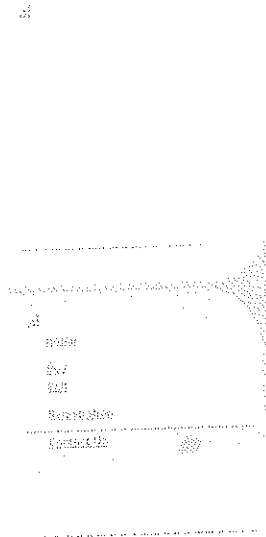
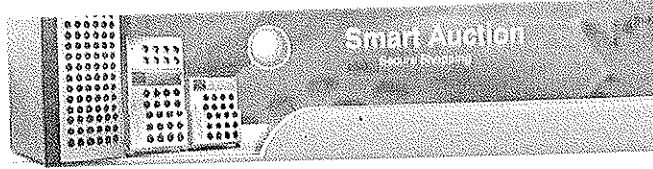
all

Image	ImageURL	ProductName	CurrentBid	ProxyBid
	c:\inetpub\wwwroot\auction\Uploaded-Files\L_16-10a.jpg	Compaq p4	10	55
	c:\inetpub\wwwroot\auction\Uploaded-Files\CA4RY2IB.jpg	IBM	23	444

[TOP](#)

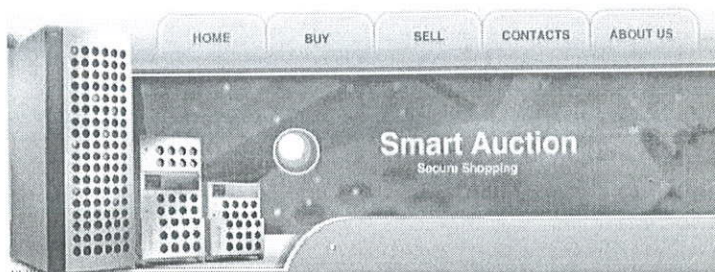
Home
Buy
Sell
Manage
Contact Us

Authorize Credit Card



	Place your card on Smart Auction
Credit Card Number	<input type="text"/>
Card Identification Number	<input type="text"/> This is a 3 digit number on the back of your Credit or Debit card. In some cards it may be a 4 digit.
Expiration Date	-Month- [v] -Year- [v]
Card Holder's Name	<input type="text"/>
Billing Address	<input type="text"/>
City	<input type="text"/>
State/Province	<input type="text"/>
Zip Code	<input type="text"/>
Country	Pakistan [v]
	Please Read the agreement before going forward.
	By selecting "Authorize Card" below, I hereby authorize 'Smart Auction' to initiate an authorization to validate that the card is in good standing.

Register



Customer Information

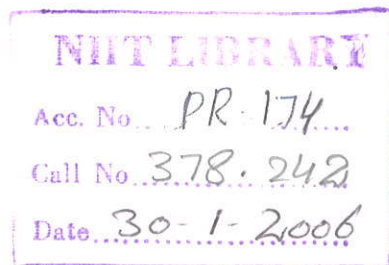
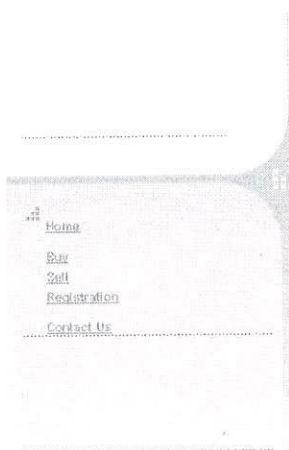
Full Name
Address
City
Phone No.
Gender male female

Customer Coordination Information

Email Address

(Please Enter a valid e-mail address for correspondence)

Account Information



GHA