

E-COMMERCE MANAGEMENT SYSTEM

Submitted By
Md. Muslim Uddin
ID: 2011-2-96-003

Supervised By
Md. Shamsujjoha
Senior Lecturer
Dept. of CSE, EWU

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ABSTRACT

Electronic Commerce is process of doing business through computer networks. A person sitting on his chair in front of a computer can access all the facilities of the Internet to buy or sell the products.

Unlike traditional commerce that is carried out physically with effort of a person to go & get products, ecommerce has made it easier for human to reduce physical work and to save time. E-Commerce which was started in early 1990's has taken a great leap in the world of computers, but the fact that has hindered the growth of e-commerce is security. Security is the challenge facing e-commerce today & there is still a lot of advancement made in the field of security.

The main advantage of e-commerce over traditional commerce is the user can browse online shops, compare prices and order merchandise sitting at home on their PC.

For increasing the use of e-commerce in developing countries the B2B e-commerce is implemented for improving access to global markets for firms in developing countries. For a developing country advancement in the field of e-commerce is essential. The research strategy shows the importance of the e-commerce in developing countries for business applications.

DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Md. Shamsujjoha, Senior Lecturer, Department of Computer Science and Engineering, East West University**. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma. Any material reproduced in this project has been properly acknowledged.

Supervised by:

Md. Shamsujjoha
Senior Lecturer
Department of Computer Science and Engineering
East West University
Bangladesh

Submitted by:

Md. Muslim Uddin
ID: 2011-2-96-003
Department of Computer Science and Engineering
East West University

LETTER OF ACCEPTANCE

This Project entitled **E-COMMERCE MANAGEMENT SYSTEM** submitted by Md. Muslim Uddin (ID:2011-2-96-003) to the Department of Computer Science and Engineering, East West University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Master of Science in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 8th December, 2016.

Supervisor

Md. Shamsujjoha

Senior Lecturer
Department of Computer Science and Engineering,
East West University, Dhaka, Bangladesh

Chairperson

Dr. Md. Mozammel Haq Azad Khan

Chairperson,
Department of Computer Science and Engineering,
East West University, Dhaka, Bangladesh

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Chapter 1

Introduction

As the retail industry continues to change rapidly, retailers need increasingly sophisticated ecommerce management solutions to stay competitive. Consumers today expect to engage in omnichannel ecommerce, using multiple devices and moving between online and offline channels with ease. Unaware of the complications this creates for retailers, consumers expect merchants to seamlessly accommodate their omnichannel shopping experience. But only the most advanced ecommerce management technology can deliver the infrastructure to meet consumer demands today and to integrate the new ecommerce technologies that will emerge tomorrow.

1.1 Project Background

Needless to say that Information technology has changed the way in which business is being done today. It has turned the world into a huge virtual market place where the activities can be done in second sitting in front of the computer terminal and using the cell phone from anywhere. This technology helps users to make the activity effective and fast.

1. Cost of management being low and leads to financial benefit.
2. Removal of business complexities.
3. A huge number of activities can be done in less time.
4. Capacity to provide large number of information, which is not possible by the existing system.

Web portals are emerging as the new generation of web enabled services for the internet users where the users not only views information about a certain sector or range of products but now a day they are taking part in receiving various online services that ease their various needs. It is

giving opportunities for the providers to provide various unique services that benefit their clients and give them an opportunity to do business using technologies and internet. This project investigates why it is important to establish an e-commerce portal for our country, also investigates the overall problem of implementing e-commerce. In this project deals with introducing some extended forms of ecommerce called Business to Consumer (B2C) ecommerce. Also some extended features like how many businesses can be unite together into a single platform for the betterment of their own and targeted buyers.

1.2 Key Features

A web based online shop to provide e-commerce solution and services to customer using some integrated tool like product display tools, shopping cart, payment system etc. This will have the following key features:

- An online store where information about various products in different category like foods, cloths etc. will be displayed where customer can purchase it online.
- Standalone platform for the customers where they can easily compare products quality and price.
- Customer will be able to purchase product online with different local payment options like online credit card, payment by cell phone (Bkash, mobicash) and pay after delivery etc.
- There will have the shopping cart facility where customer can choose the product and add it to the shopping cart or even delete from the cart.

1.3 Expected Impact of the Project

The B2C e-commerce portal that will be developed for buy and selling products is the key starting Business to consumer e-commerce of our country. Hopefully other sectors of our country will encourage a lot with this template or generic design or functional developments that they can use to develop their own B2C or others different form of e-commerce portals.

1.4 Report Breakdown

This report begins with a literature review of the topics relating to B2C e-commerce and e-readiness of the developing world. A design for the e-commerce portal is then presented. The design is followed by the implementation section, which describes in detail what technologies were used in setting up the B2C e-commerce portal. The implemented system is then evaluated by users. The e-commerce portal is then tested and the test cases are presented. The findings and conclusion close off the report.

1.5 Definitions

- **E-Commerce:** Buying and selling of goods and services over a digital medium (i.e. the internet).
- **Database:** A collection of similarly structured electronic data.
- **B2C:** A transaction between a business and a consumer.
- **B2B:** A transaction between a business and another business.
- **B2E:** A transaction between a business and an employee of the business.
- **C2C:** A transaction between a consumer and another consumer.
- **SSL:** Also known as Secure Socket Layer, it can be used to encrypt and secure an online communication channel between two parties.
- **GUI:** The Graphical User Interface of an application, through which a user can interact with the system.

CHAPTER 2

SURVEY OF EXISTING MODELS

The potential for e-commerce exists in virtually every economy. However, when it comes to Bangladesh, it is a double-edge sword. The Internet figures for country are dismal, one of the lowest in (with a huge population of 158 million, only 1.1% have access to the Internet).

Despite being some technological barriers, selected segments of the Bangladeshi business community has embraced technology with reasonable success. The Facsimile in the 1980's and mobile telephones in the 1990's popularized modern technology in the mass market. Personal computers and the Internet are also emerging as day-to-day business tools. These positive indicators are favoring the prospects of e-commerce in Bangladesh.

2.1 Current state in Bangladesh

The focus of this paper was on the current state of the regulatory environment in the financial and technological sectors of Bangladesh. Necessary reforms in order to introduce e-commerce have also been suggested. Lack of awareness among the policymakers has been identified as the major deterrent to introducing e-commerce. Conventional understanding of payment mechanisms raises false alarms against the flight of capital if e-commerce is implemented. Synergy between telecommunications and information technology has the proven capability of monitoring and administering the real-time transactions. Therefore, liberalizing the telecom and IT sectors as well as reforming the country's financial and commercial procedures is the preconditions of successfully implementing ecommerce in Bangladesh. In the case of marketing, simply having a website in the vast sea of the Internet is not sufficient. Uniformity is an important factor in the commencing of contracts through the Internet. Therefore, to take advantage of the newer opportunities that IT development presents, the Bangladeshi companies have to attain

internationally accepted certification on quality control, competitive price and timely delivery. This paper presents possible e-commerce application in the RMG sector. Availing of the IT technology by the E-commerce as well as other export-oriented industries is likely to become a necessity (because of international demands and expectations) rather than a choice. Banks, customs and other supporting institutions, along with the entrepreneurs exporting goods and services, will have to accommodate the external demands in order to maintain competitiveness and open new global opportunities. Creating awareness among the Bangladeshi exporters regarding e-commerce is essential. They have to be knowledgeable to appreciate and to utilize the benefits of IT. The exporters are not required to acquire operating knowledge on IT. Their understanding on the cost-benefit aspects followed by adopting e-commerce would be an achievement. Business associations can play a major part at this juncture by highlighting the benefits of IT to its members, and encouraging them to use customized software for their day-to-day operations.

2.1.1 E-Commerce in different countries

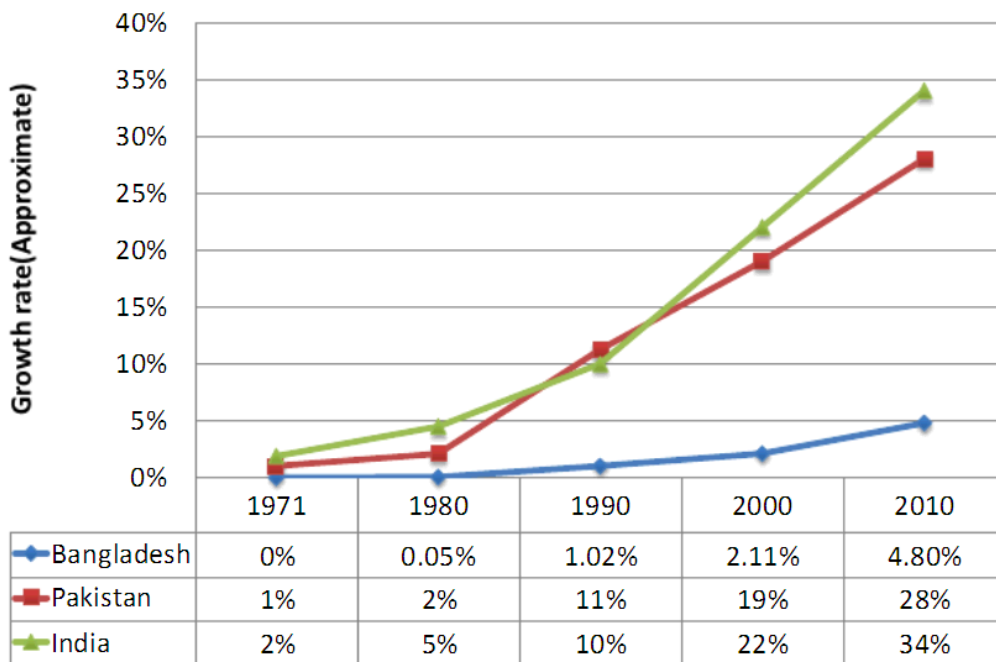


Figure 2.1: Growth rate of E-commerce in our subcontinent

2.1.2 Background of Online System and SMS System in Bangladesh

Bangladesh's mobile market passed 117.75 million subscribers by June 2016 with penetration running at 48%.

This had been preceded by a significant three-year period in which the country saw mobile subscriber numbers more than treble as the market expanded rapidly.

Grameen Phone was far and away the leading mobile operator, claiming close to 52 million subscribers, or 46% of the total mobile subscriber base, as at mid-2016, despite the best commercial efforts of its five competitors.

Internet penetration remains low (0.4% user penetration by end-2009) and Internet subscription rates are considerably lower.

Although broadband Internet services remain virtually non-existent in Bangladesh, following the granting of a number of WiMAX licenses in 2008, there was considerable optimism that this is about to change as WiMAX networks were being rolled out.

Table 2.1: Bangladesh - Telecoms, Mobile, Broadband and Forecasts [10]

Category	2009	2010	2015
Total number of subscribers	52.4 million	65.0 million	92.0 million
Annual growth	16%	24%	32%
Mobile penetration (population)	32%	39%	55%

The number of mobile user in Bangladesh is growing day by day. The persons who don't have internet access they can easy make appointment with the system. It will take less the one minute to make an appointment.

2.1.3 Statistical data

In Bangladesh about 82 per cent of Internet traffic consists of e-mail, while in the United States the Web accounts for 70 per cent and e-mail only 5 per cent (ITU 1999). As a mode of information management, the Internet competes with, but also complements, other modes. It is a cheap if imperfect substitute for telephone and fax services: cheap because of the higher transmission speed of given information bundle or viewed differently the large quantities of information that can be transmitted per unit time imperfect because unlike telephone at least:

- a) It does not permit two-way communication in real time, and
- b) It presumes basic literacy or the ability to hire a literate message transcriber.

In any event, it makes use of the telecommunications infrastructure, whose inadequacy in many parts of the developing world (notably in rural areas, where most of the developing world's population, and a disproportionate share of its poor people, still lives) precludes telephone, fax or Internet use. Wireless (or mobile) telephony has emerged as a potential solution to the rural telephone deficit and as a possible "bridging" technology from an unwired world to an Internet accessible one. While state-of-the-art mobile telephones already offer the potential of direct Internet access, even without this capability in many low-income countries mobile phones are diffusing rapidly, in some cases even in rural areas (e.g., the Grameen village phone network in Bangladesh).

2.2 Problem in the existing system

We are going to highlight various constraints to commerce and trade in general and ecommerce in particular. Many of these constraints are endemic across the business sector and demands major reforms through strong political commitment and an ability to implement policy changes. A list of specific constraints to e-commerce that policy makers can address in the short and medium term is summarized below.

- Too few telephone connections.
- Absence of a strong independent regulatory body for the telecommunication sector.
- Absence of encryption law that precludes acceptance of digital signature.
- Strong dependence of Letter of Credit to conduct international transactions.
- Non-issuance of international credit cards for cross border transactions.
- Interest rate ceiling on export loans.

2.3 Proposed Solution to problems

Now these days online order through shopping cart has made the life very straightforward for both customers and shoppers. The customer can browse different items by sitting in their home with comfort. But this is on the form of C2C (Consumer to Consumer) e-commerce area. The form of B2B (Business to Business) is getting very popular also and making the business very easy, trouble free era. We want construct a unique B2C solution e-commerce portal. Through which buyers of every region of the world will be able to get our every their products in one platform. They will be able to compare the quality, quantity and price in a one portal sitting in front of their computer. And finally they will be able to order and purchase products from it from the appropriate provider. It will be an open market for the buyers. It will be the country's first e-commerce solution where multiple providers will be tied into a single place and they can upload their products separately from their own account, they can also handle their orders, payments individually. Buyers can also win bids from the auction market section placing bids. This portal will be work as an online directory of Bangladesh.

CHAPTER 3

PROPOSED MODEL

The commonly listed functions and features revolve mainly around the transaction processing capabilities of an e-commerce system. As noted earlier, however, e-commerce systems, like most information systems, provide information to support the management of the organization. Much of this information results from the analysis of data gathered during the customer's visit to the e-commerce site. We need to include the necessary functionality in an e-commerce system model to gather and analyze this data to provide information to management.

3.1 Introduction

E-commerce can be defined as the digital enablement of commercial transactions between and among organizations and individuals, where all the transactions are mediated by digital technology [1]. It brings into being a virtual marketplace with new relationships among businesses and consumers.

E-commerce represents not only the ability to purchase and sell goods and services via a digital medium such as the internet, but also the ability to automate the entire sales and purchase process. A typical goods or services business will have the following business processes:

- Customer support
- Sales
- Refunds
- Inventory management
- Customer information management
- Marketing

Using the new digital business approach, all these processes can be managed by a single functional unit. E-commerce can be conducted either business-to-business (B2B), business-to-consumer (B2C), business-to-employee (B2E) or consumer-to-consumer (C2C) [1].

E-Commerce refers to the process of buying or selling products or service over an electronic network. The most popular medium in which e-Commerce is conducted is the internet. It combines a range of process such as:

- Electronic Data Interchange (EDI)
- Electronic mail (E-mail)
- World Wide Web (WWW)
- Internet Applications
- Network Applications.

E-commerce can be divided into primarily three categories:

- Business to consumer (B2C): Where enterprises sell directly to the customer, often cutting out ('disinter mediating') wholesalers or 'bricks and mortars' retail outlets. B2C is the most commonly understood form of internet business (www.amazon.com). The most successful trading has been with standard products such as CDs, Books, Software, downloadable music etc.
- Business to Business (B2B): it is larger, growing faster. This includes procurements of raw materials and supplies, liaison with contractors, sales channels, servicing customers, collaborating with partners, integrated management with data and knowledge.
- Business to Government (B2G): Here business trade directly with government offices and agencies for public procurement (e.g. supplies for hospitals, school and other government contracts).
- Consumer to consumer (C2C): Online transaction between private individuals.
- Consumer to business (C2B)

3.2 History of E-commerce in Bangladesh

Bangladesh e-commerce market growth rate

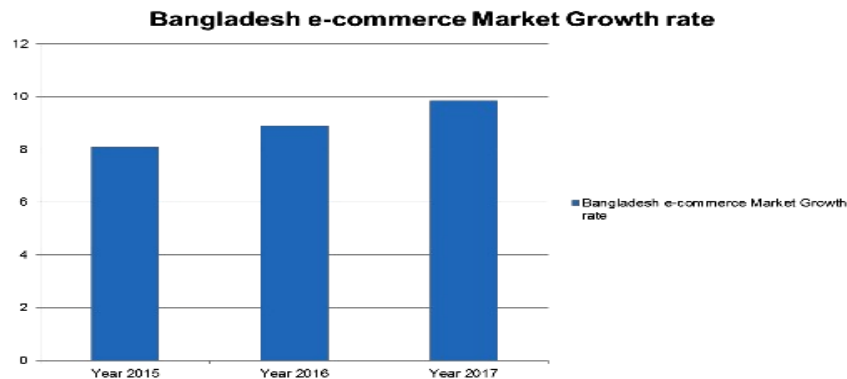


Figure 3.1: Growth rate of E-commerce in Bangladesh

3.3 Advantages of E-commerce

- 24X 7 operations: Round the clock operation is an expensive proposition in the brick and mortar world while it is natural in the click and conquer world.
- Global reach: The net being inherently global, reaching global customers is relatively easy on the net compared to the world of bricks.
- Cost of acquiring serving and retaining customers: It is relatively cheaper to acquire new customers over the net. Thanks to 24 X 7 operation and its goal reach. Through innovative tools of push technology to retain customers, loyalty with minimal investments.
- An extended enterprise is easy to build: In today's world every enterprise is a part of the 'connected economy' as such you need to extend your enterprise all the way to your suppliers and business partners like distributors, retailers and ultimately you end

customers. Internet provides an effective (often less expensive) way to extend your enterprise beyond the narrow confines of your own organization. Tools like enterprise resource planning (ERP), supply chain management (SCM) and customer relationship management (CRM) can easily be deployed over the net permitting amazing efficiency in time needed to market, customer loyalty, on time delivery and eventually profitability.

- Dis-intermediation: Using the net one can directly approach the customers and suppliers, cutting down the number of level sand in the process, cutting down the costs.
- Improved customer service to your clients: It results in higher satisfaction and more sales.
- Power to provide the ‘best of both the worlds’: It enhances traditional along with internet tools.

3.4 Advantages of E-commerce in Bangladesh

- Provides consumers with more choices
- Expands the Marketplace to national and international market
- Decrease the cost of production and distribution
- Allows consumers to interact and exchange ideas
- Enables consumers to shop or other transaction 24 hours a day

3.5 Benefits of E-commerce in the Perspective of Bangladesh

The possible ways by which Bangladesh can be benefited in business sector using E-commerce are as follows:

3.5.1 Expansion area of the business sectors

The multidimensional activity of E-commerce includes various phase of services. The typical e-business models are now doing well in our country which helps people to create several business policies. E-commerce helps to develop various business sectors in our country which has brought in tremendous expansion in the linkage industry.

3.5.2 Reducing of unemployment problems

The internet based e-commerce helps to create new business opportunities for producer firm in our country which helps to reduce unemployment problem. By the help of E-commerce one can easily deal any business. So many people show their interest to do the business. By taking this business as a profession many unemployed people get a new path to earn their live hood. Using the glorious effect of E-commerce in this country can decrease the unemployment problem which can help to improve our economic condition.

3.5.3 Reducing of communication difficulties

Before acquiring the field of e-commerce we faced many problems like betting crowds, standing in long check out time, fighting for parking spaces at busy mall etc. E-commerce helps to connect us with the world whenever we are and online shopping allows us to browse the web for purchasing goods and decision in the privacy of our own home.

3.5.4 Access to the international market

E-Commerce has created a wide range of business for both companies or firms and individuals to export their goods and services abroad and earn foreign remittance in Bangladesh. The e-commerce which has a vast use in export sector already in operation for years in Bangladesh.

3.5.5 Competition against exporting in other countries

Bangladesh has large population and labor cost is lowest comparatively with neighbor countries like India, Pakistan, Sri Lanka and China. So, Bangladesh can achieve a good position in foreign markets in USA, Australia and European countries producing quality products with lowest cost.

3.5.6 Business in round the clock

Now a day, global time difference is not a barrier. Because any people from any country can communicate with people of other countries from any corner of the world very easily through Internet. Any business man can collect the data, analysis data, put their comments and order through different company's websites round the clock that means 24 hours a day, 7 days a week without physically visiting any business organization.

3.5.7 Helps to enhance the knowledge about business

There are some local websites available in Bangladesh visiting these websites one can get knowledge about business and establish plan about how a small groups deals inside a big firms funded with seed capital.

3.6 Barriers of E-commerce in Bangladesh

- High price of Very minimum Telecommunication computer and number of user's infrastructure hardware of web sites is poor.
- Lack of fulfillment small number technically and customer of credit efficient personnel relation problem Card users.

3.7 Components of an E-Commerce System

An E-commerce system consists of a number of vital components:

- A database
- E-commerce website
- Security system
- Payment gateway

These 4 components make up the Content Management System, which is the core of the E-commerce system [15]. The following diagram shows how these components fit together:

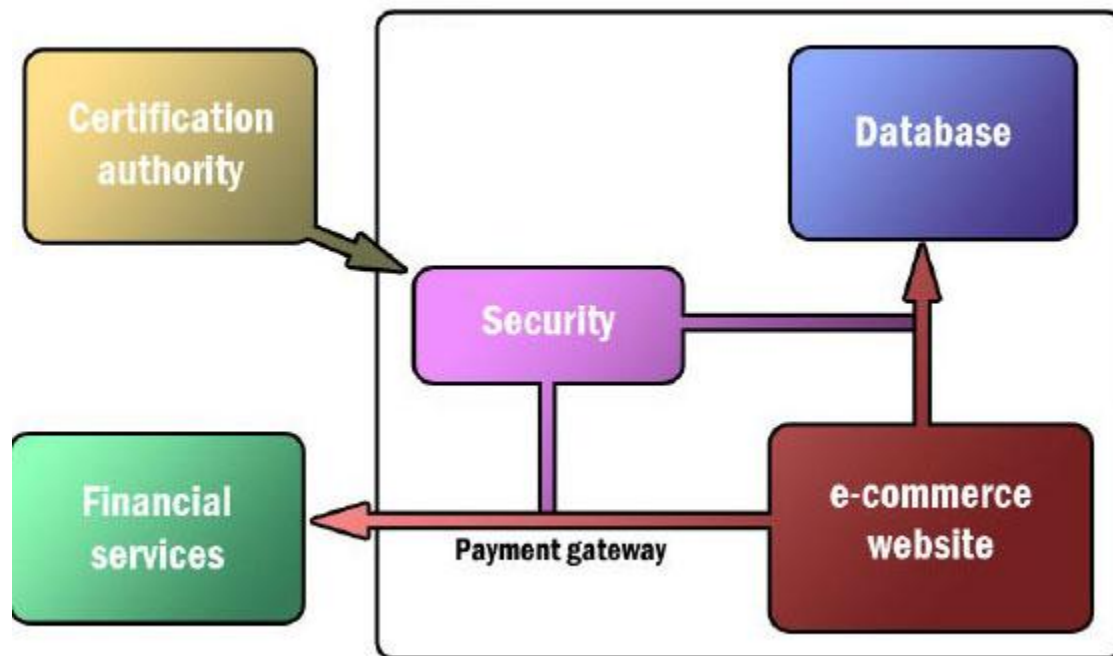


Figure 3.2: Components of an e-commerce content management system

Each of the 4 components of a CMS will be described in more detail in the rest of this section.

3.7.1 Database

We are going to use MySQL because it is characterized as a free, fast, reliable open source relational database. It does lack some sophistication and facilities, but it has an active development team and, as it goes from release to release, more capabilities are added. I choose this database because

- Because of its unique storage engine architecture MySQL performance is very high and lightweight.
- Supports large number of embedded applications which makes MySQL very flexible.
- Use of Triggers, Stored procedures and views which allows the developer to give a higher productivity.
- Allows transactions to be rolled back, commit and crash recovery.
- Triggers & cursor.

3.7.2 Website

The website of the e-commerce system is the interface which a user, such as an online shopper, will use to interact with the business. This means that all the information relevant to the user has to be displayed on the website in a comprehensive manner. This information will include product information, order status, shipping and billing addresses, etc. Much research has gone into making e-commerce website interfaces more user-friendly and helpful to the online shopper. Recommender systems [2] are an example of this as they present the online shopper with product recommendations based on the shopper's purchase history. Studies have shown that by doing this, e-commerce businesses can increase their sales volumes.

An e-commerce front-end can be either an application or a website [10]. The former can be written in practically any programming language that can interface with a database (C++, Java, Visual Basic, etc.). The latter can be developed using a web language (PHP, HTML, ASP, etc.).

3.7.3 Security

As electronic commerce grows, so does the number of online commercial transactions involving the exchange of sensitive information, such as credit card details and people's personal information [8]. This brings a need for better privacy and security as more and more online shoppers are exposed to hacking and fraud.

A widely used solution to the problem of fraud in e-commerce is certification authorities such as Thawte and VeriSign [11]. These authorities can issue a certificate to an e-commerce business only if it meets certain security standards.

This ensures that the two parties involved in an online commercial transaction are really who they claim to be.

A widely used solution to the hacker problem is a Secure Socket Layer (or SSL) [12], which allows information exchanged between two parties to be encrypted. This can help prevent any unauthorized third party from intercepting sensitive information.

3.7.4 Payment Gateway

An online business transaction cannot occur without some sort of payment gateway. A payment gateway allows funds to be transferred electronically from the purchaser to the seller. In the late 90's a non-bank payment service was introduced to electronic commerce: PayPal [14]. Today, this eBay owned service allows consumers to make online credit purchases and even transfer funds to another person (called C2C or consumer-to-consumer transactions).

There are many payment options through mobile in Bangladesh like bKash, Mobicash, Altitude, mPAY, trust bank mobile money etc. We implemented and tested with bKash. Similarly it is possible to use other payment gateway through mobile.

bKash is one of the easiest and fastest methods of sending money anywhere in Bangladesh by using mobile network.

We are going to use bKash because:

- Possible send money anywhere in Bangladesh within a second.
- Shopping facilities anywhere inside the country. So far I know this is currently available in various shopping centers. And if you have a shop, you can receive the payment from your customer through bKash. It only needs a simple registration.

3.7.5 Other Services

➤ SMS Service

Short Message Service (SMS) is text messaging service component of phone, web, or mobile communication systems, using standard communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices.

In our proposed we are going to implement the following features using SMS

- Order placement notification using SMS
- Payment confirmation can be done using SMS
- Product can be purchased using SMS
- Special offer can be sent to users using SMS

➤ Cron Jobs

Cron is a UNIX, Solaris utility that allows tasks to be automatically run in the background at regular intervals by the cron daemon and the service name is crond. These tasks are often termed as cron jobs in UNIX, Solaris. Crontab is a file which contains the schedule of cron entries to be run and at specified times.

Basically this run a PHP script file in specific intervals. In my system this will execute a php file every 5 minutes.

Using Cron Jobs we are going to implement the following features

- SMS, Email will be sent on a particular day with special offer.
- Any outstanding payment reminder will be send.

➤ **XAMPP**

XAMPP (or) is a free and open source cross-platform web server package, consisting mainly of the Apache HTTP Server, MySQL database, and interpreters for scripts written in the PHP and Perl programming languages.

3.8 Development Process

There are many ecommerce system but most don't have some features like SMS confirmation in Bangladesh based and export date for other software use available on the market. However, if I want to develop online e-commerce system from scratch, one can use a 5-step development process

Step 1: Requirements analysis

Step 2: Sub-system selection

Step 3: Prototype development

Step 4: GUI development

Step 5: Integration and system test

This design process begins by gathering user requirements and building a general model of the e-commerce system. An analysis is then done of how the new system will integrate into the current business model. The new system design is then divided into modules, which are developed separately. A prototype of the e-commerce system is produced in the early stages of development to give users and admin a feel of what the final system will be like. The fourth step of the process involves developing the GUI for the front-end of the system. The final step in the development process is the testing of the various modules and components of the system and the integration of the online e-commerce system into the business.

3.9 E-Readiness of the Developing World

There has been a significant amount of research done on e-commerce in various industries of the world business. However, little emphasis has been placed on developing countries, especially in Bangladesh. This is due to the fact that most developing countries lack the infrastructure required for the development of e-websites like -

<http://www.made-in-china.com>

<http://www.indiamart.com>

<http://www.ecplaza.net>

<http://www.alibaba.com>

<http://www.busytrade.com>

<http://www.busyeurope.com>

Which sell various products.

3.10 Software and Tools

3.10.1 Front-End design

As per requirement the front-end of the website is designed using HTML 5 and CSS3 and for some features some jquery modules have been integrated to the system.

3.10.2 Back-End design

The back-end of the system is developed using PHP 5 and MySQL for integrating and managing database.

3.10.3 Other Tools

➤ Bizagi

Bizagi is the leading Business Process Management (BPMS) solution for faster and flexible process automation. A powerful and simple BPM Suite designed to solve real business problems. Corporate customers in over 50 countries rely on Bizagi to run their core business processes

➤ JQuery

JQuery is a multi-browser JavaScript library designed to simplify the client-side scripting of HTML. It was released in January 2006 at BarCamp NYC by John Resig. Used by over 55% of the 10,000 most visited websites, jQuery is the most popular JavaScript library in use today.

➤ JQuery UI

The jQuery UI Datepicker is a highly configurable plugin that adds datepicker functionality to your pages. You can customize the date format and language, restrict the selectable date ranges and add in buttons and other navigation options easily.

➤ **PHPMailer**

PHPMailer is a PHP class for PHP that provides a package of functions to send email. PHPMailer supports nearly all possibilities to send email: Postfix, Sendmail, Qmail & direct to SMTP server. You can use any feature of SMTP based e-mail, multiple recipients via to CC, BCC etc.

3.11 Why I chosen PHP and MySQL

PHP will be our doorway to MySQL, a middle man of sorts that can communicate with various technologies and transfer data between them. MySQL is one of those languages that PHP seems to mesh with very well, and the open source community is constantly adding a more expansive and useful structure to the language. We will use PHP to open connections, close connections, select data from the database, parse it, and much more.

If you happen to be new to database technologies and deep data storage, MySQL offers a nice soft cushion to bring you into understanding and working with database systems. When you feel comfortable working with MySQL and PHP together you can jump into our PHP+MySQL applications made for learning application logic. Many open source applications use MySQL as a data storage method, including many of the applications we offer here. If a database is required for the project, we will use MySQL to cover our needs. MySQL is very stable, secure, and user friendly enough for beginners to jump right into it.

3.12 Conclusion

Based on this study, we can conclude that there is potential for e-commerce in developing countries like us, despite the consumer mistrust of local internet and low credit card penetration in Bangladesh. In order to achieve the objective of providing electronic means to sell their goods to their potential buyers, in a secure and user-friendly e-commerce portal must be designed. Using the 5-step development process mentioned earlier.

CHAPTER 4

USER MANUAL

In this chapter, we will discuss in detail the process of designing the e-commerce portal. We will look at the design methodologies used as well as the UML models of the system.

Our approach to achieve the goal of a usable E-commerce system. This approach was selected as it will reduce the cost and implementation time of the system.

PART A: SYSTEM DESIGNING ISSUES

4.1 Design Methodology

In any software development project, it is very important to select and utilize the correct combination of design methodologies. The methodology must suit the problem that one is trying to find a solution to. For the development of the e-commerce portal for Botswana, it was decided to use a blend of two design methodologies, namely Stepwise Refinement and Object Oriented Design.

4.1.1 Stepwise Refinement

Stepwise Refinement represents the iterative process which begins with specifications obtained from requirements analysis. The solution to the problem is then broken down into a number of modules. These modules are then refined and divided up into smaller modules at every iteration, until sufficient detail is visible. This makes the implementation of the design in an actual

programming language much easier as the inner details of each module have been revealed and simply need to be mapped to their code equivalents.

Using this methodology will help us divide the e-commerce portal into manageable modules, which will perform a set of specific tasks and whose inputs and outputs are well-defined. This will make the debugging process much easier as errors will be traceable back to the modules that generated them.

4.1.2 Object Oriented Design

Object-oriented analysis and design (OAD) is often part of the development of large scale systems and programs often using the Unified Modeling Language (UML). OAD applies object-modeling techniques to analyze the requirements for a context for example, a system, a set of system modules, an organization, or a business unit and to design a solution. Most modern object-oriented analysis and design methodologies are use case driven across requirements, design, implementation, testing, and deployment. Use cases were invented with object oriented programming, but they're also very well suited for systems that will be implemented in the procedural paradigm. The Unified Modeling Language (UML) has become the standard modeling language used in object-oriented analysis and design to graphically illustrate system concepts. For the reason "UML" methodology is going to be used in the project which supports Object-oriented analysis and design.

4.2 Object Oriented Design of Portal Features

4.2.1 Process Modeling

➤ Use Case diagram

i. Use Case Diagram for ecommerce user

Actor: Users

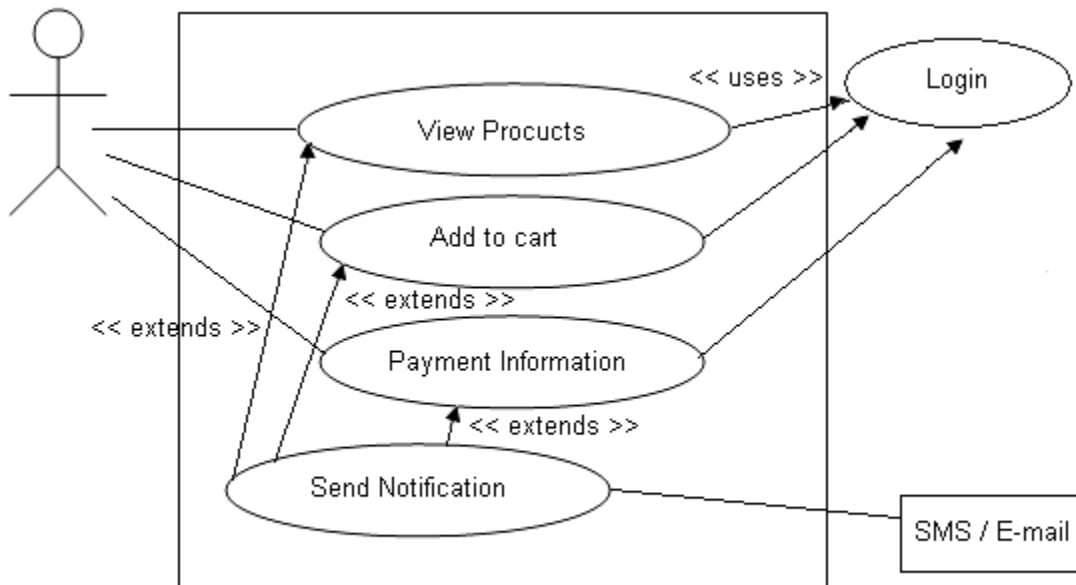


Figure 4.1: Use Case Diagram for buying product

Here the user will come to the shop and view the product information. Then the user will add the product to the cart and finally place the payment information.

ii. Use Case Diagram for Admin

Actor: Admin

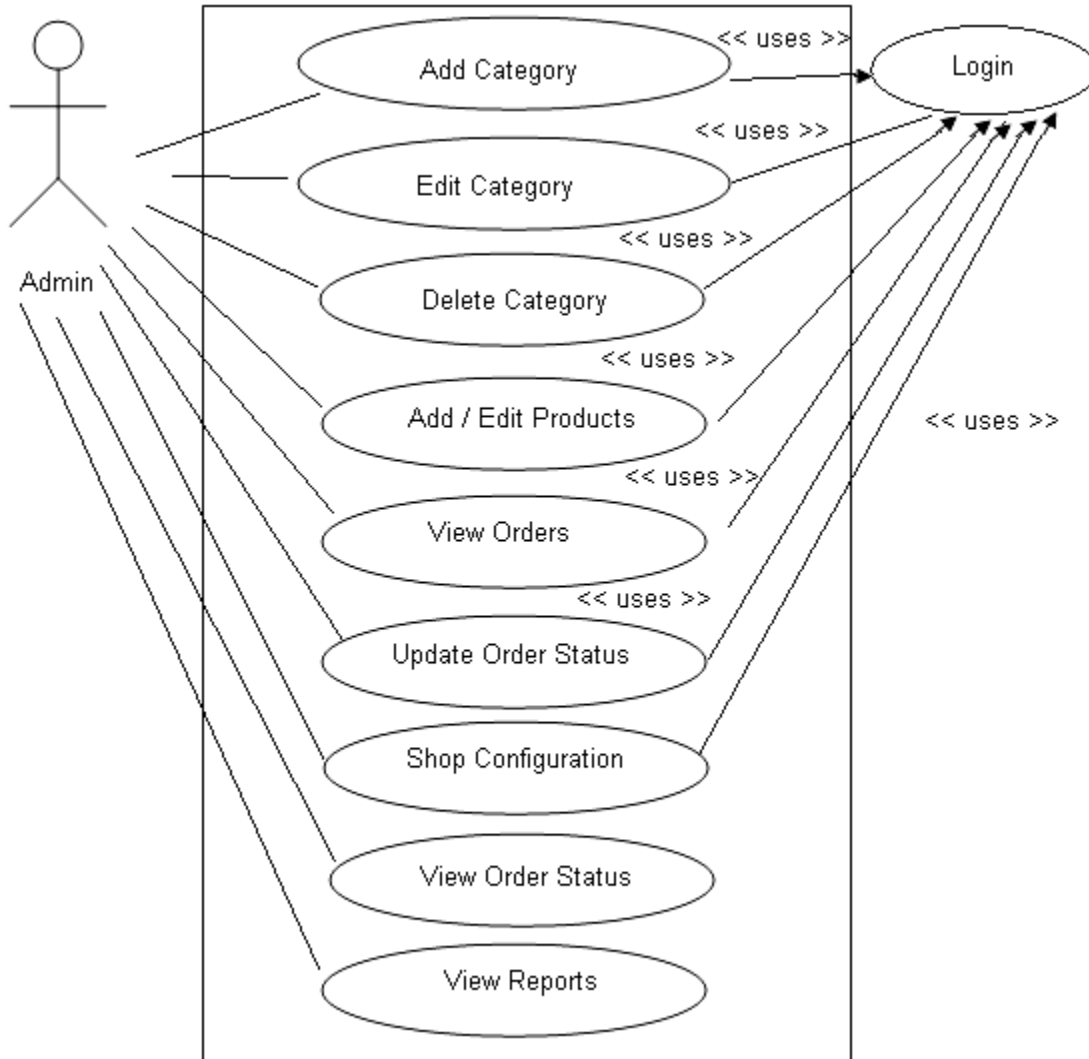


Figure 4.2: Use Case Diagram for Admin

Admin can add edit categories and products and control the stock. They can check the payment status and update the payment status if required.

4.3 Dynamic Modeling

4.3.1 Class diagram

A Class diagram gives an overview of a system by showing its classes and the relationships among them. Class diagrams are static they display what interacts but not what happens when they do interact

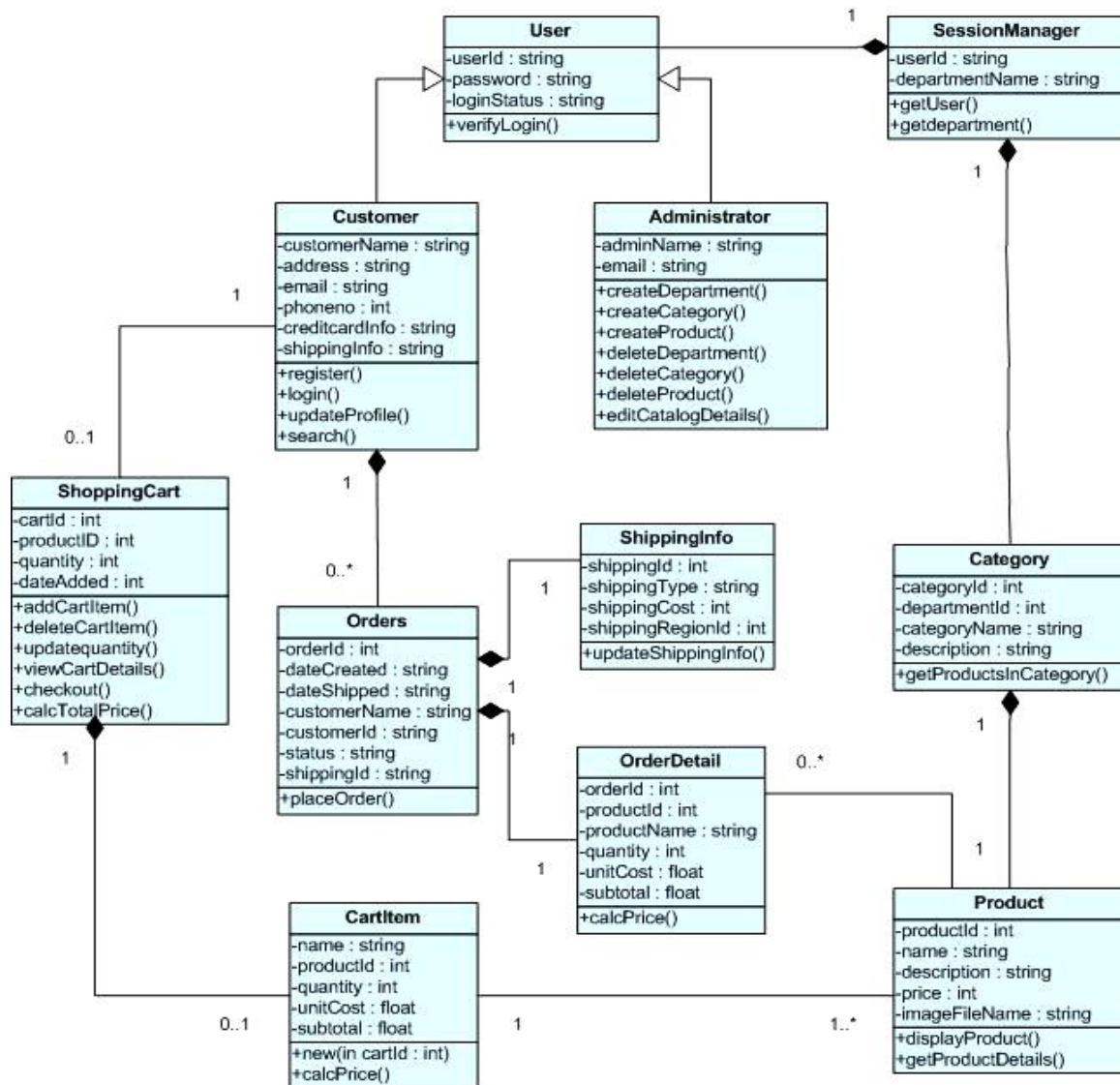


Figure 4.3: Class Diagram

4.4 Sequence Diagram

Class and object diagrams are static model views. Sequence diagrams are dynamic. They describe how objects collaborate.

4.4.1 Users buy products and get confirmation

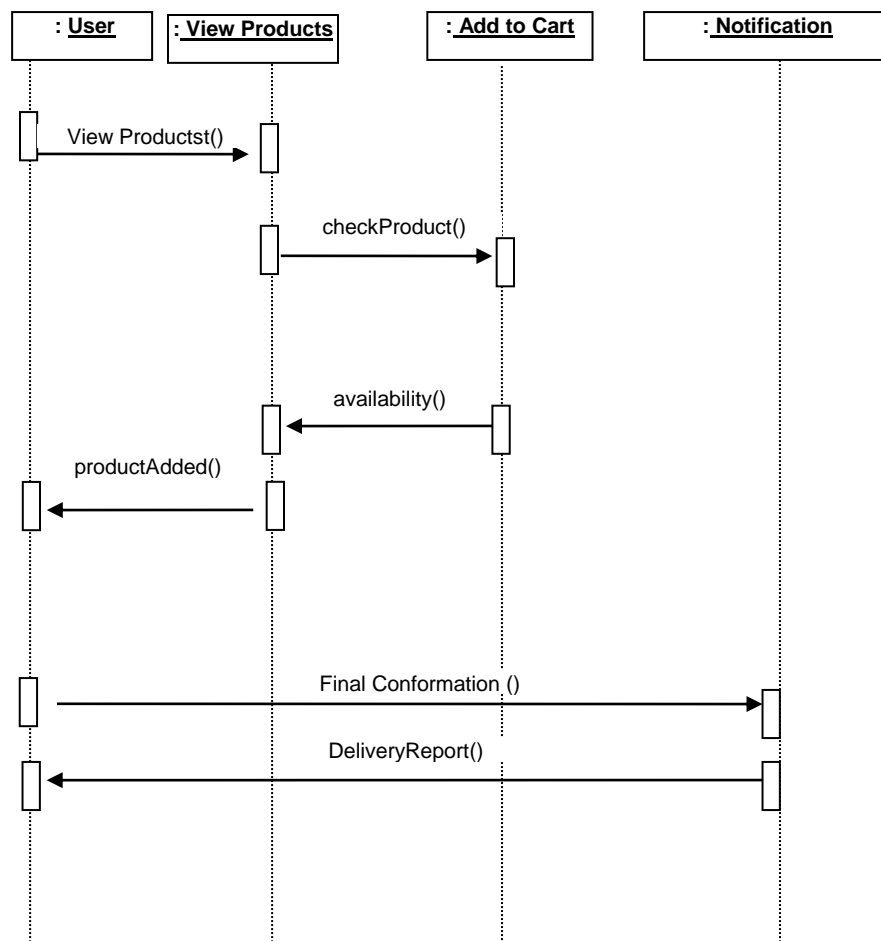


Figure 4.4: Users buy products and get confirmation

4.4.2 Admins Add product and category

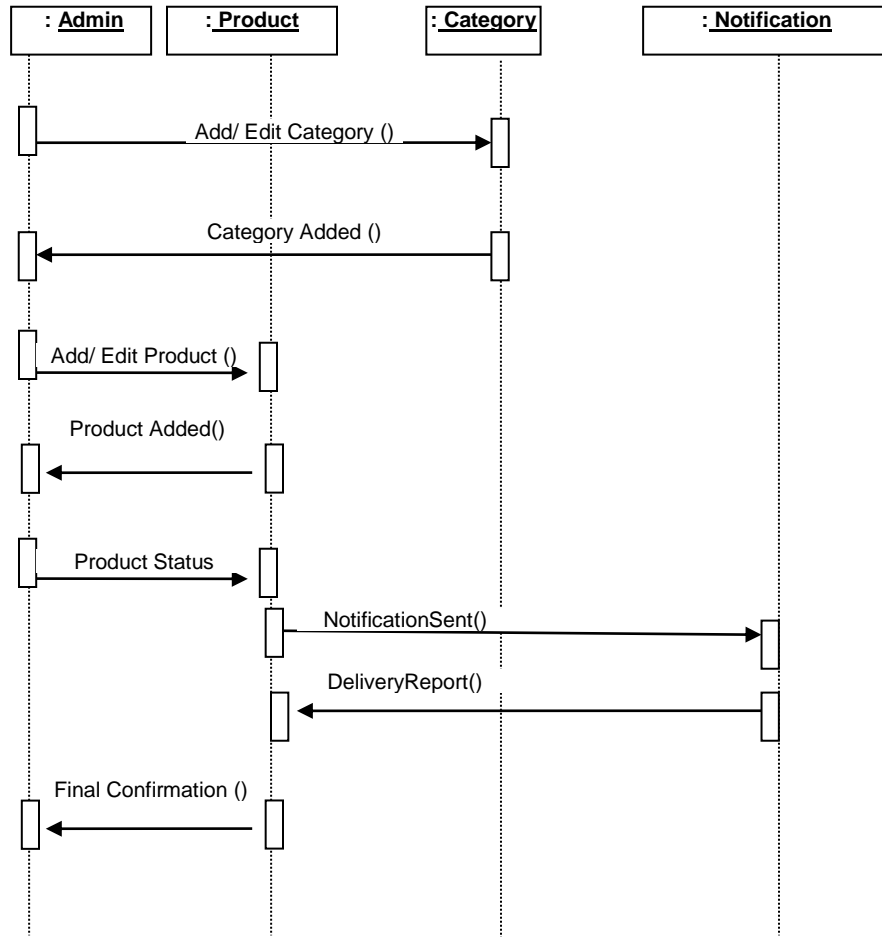


Figure 4.5: Admin's add product and category

4.4.3 Sequence diagram for product shopping

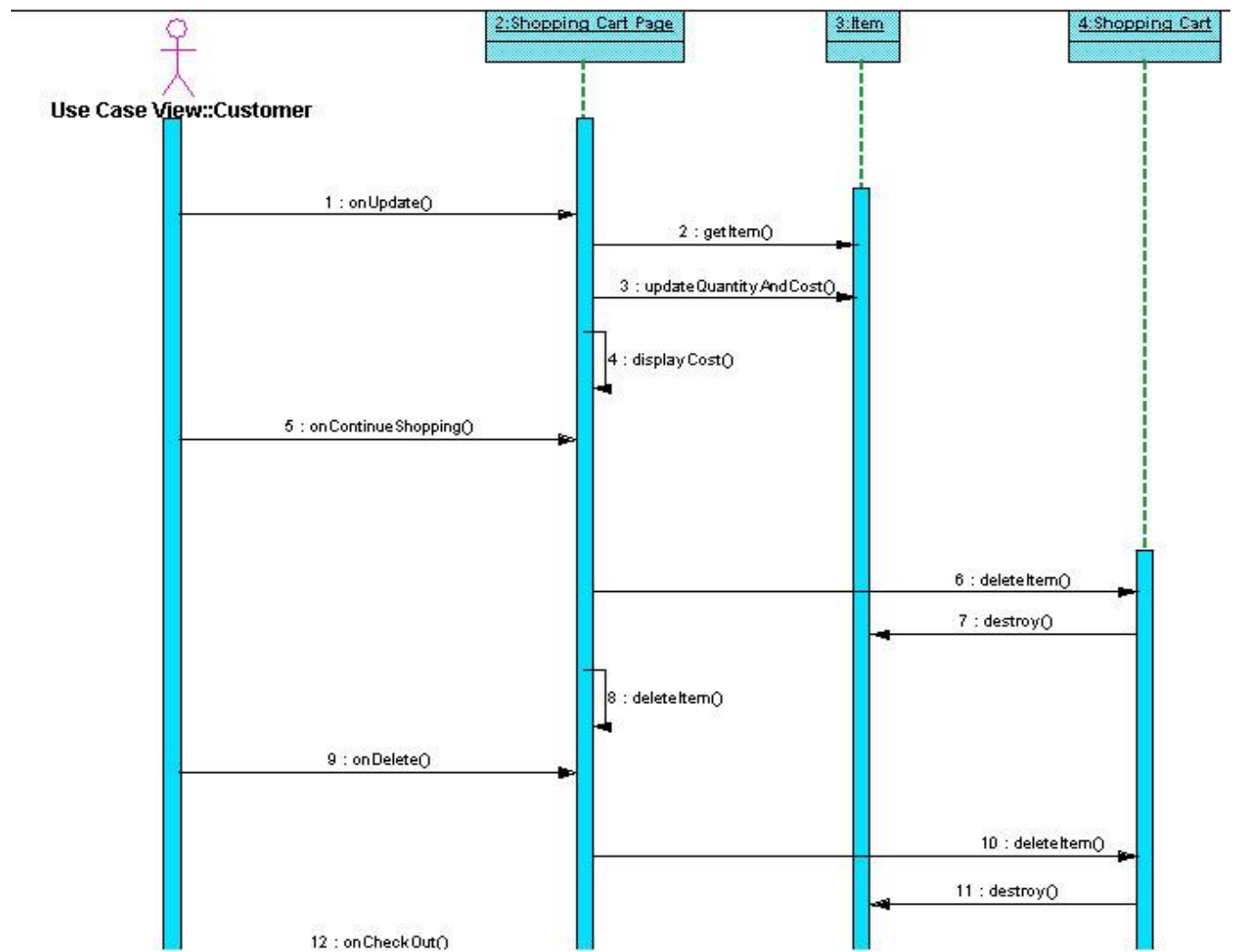


Figure 4.6: Sequence diagram for product shopping

4.5 Process Flow

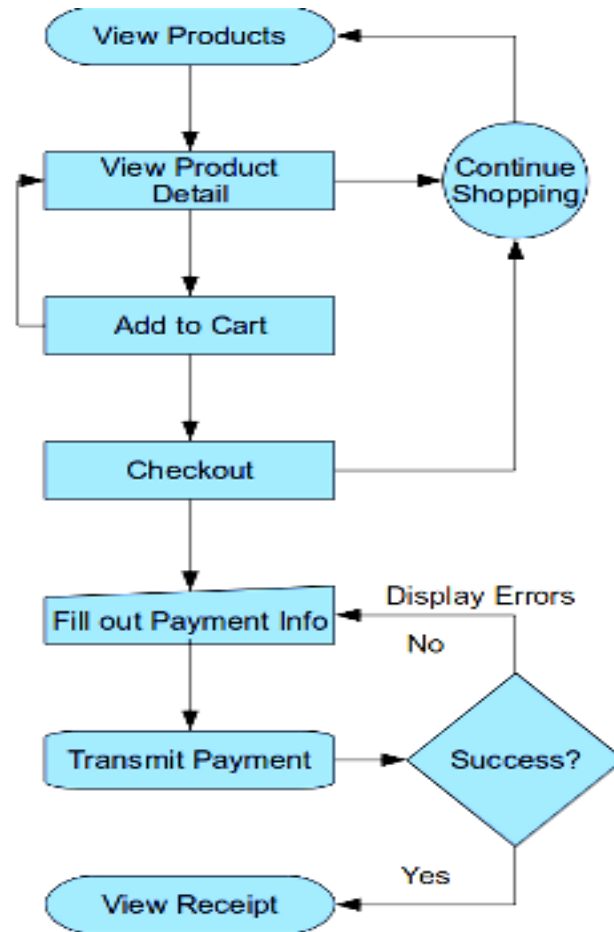


Figure 4.7: Flow chart of the shopping process

4.6 Product Shopping Feature

Shopping cart seems to be a web pages containing products this will contain a link "Add to Cart" button; selecting an item for purchase this will add the product and you will be able to see the products quantity are increased and similarly you will be able add multiple products.

On the inside, a shopping cart is maintained by PHP Sessions allows you to add and delete products, set up categories, take orders, and sometimes other functionalities such as allowing you to email shipping information to customers etc.

On the Shopping Cart Page, the users can modify modifies the quantity of an Item in the Shopping Cart, and then presses the Update button. The system stores the new quantity, and then computes and displays the new cost for that Item.

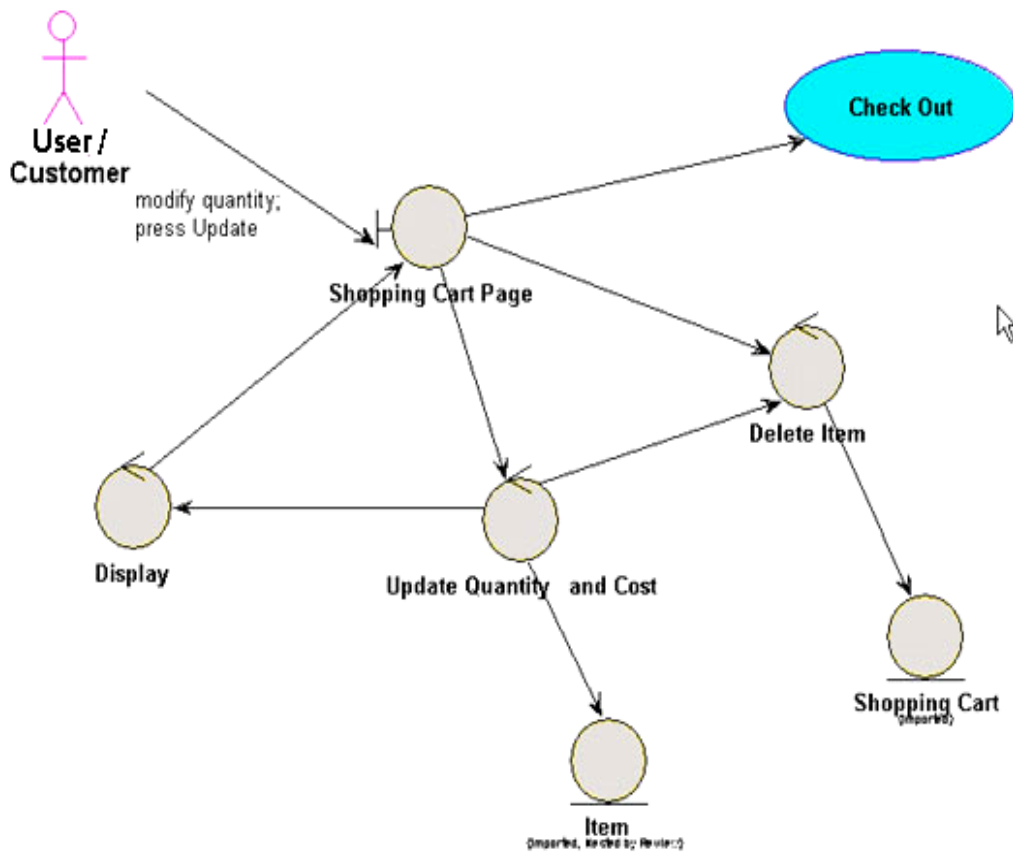


Figure 4.8: Use-case diagram for product shopping

4.7 Website Administration Page

A trained website administrator will be given the task of maintaining the e-commerce portal. The administrator's tasks will include management of vendor and customer accounts, making regular backups of the database, and making sure that the system is working correctly. In order to do this the administrator will need an interface through which he or she can access the portal's data. For this purpose, we will provide the administrator with a website administration webpage, which will allow the administrator to carry out the following tasks:

- Manage Categories
- Manage products
- Upload images
- Send notices and newsletters to customers via e-mail or SMS
- Change order status
- Make backups of the database

4.7.1 ER Diagram

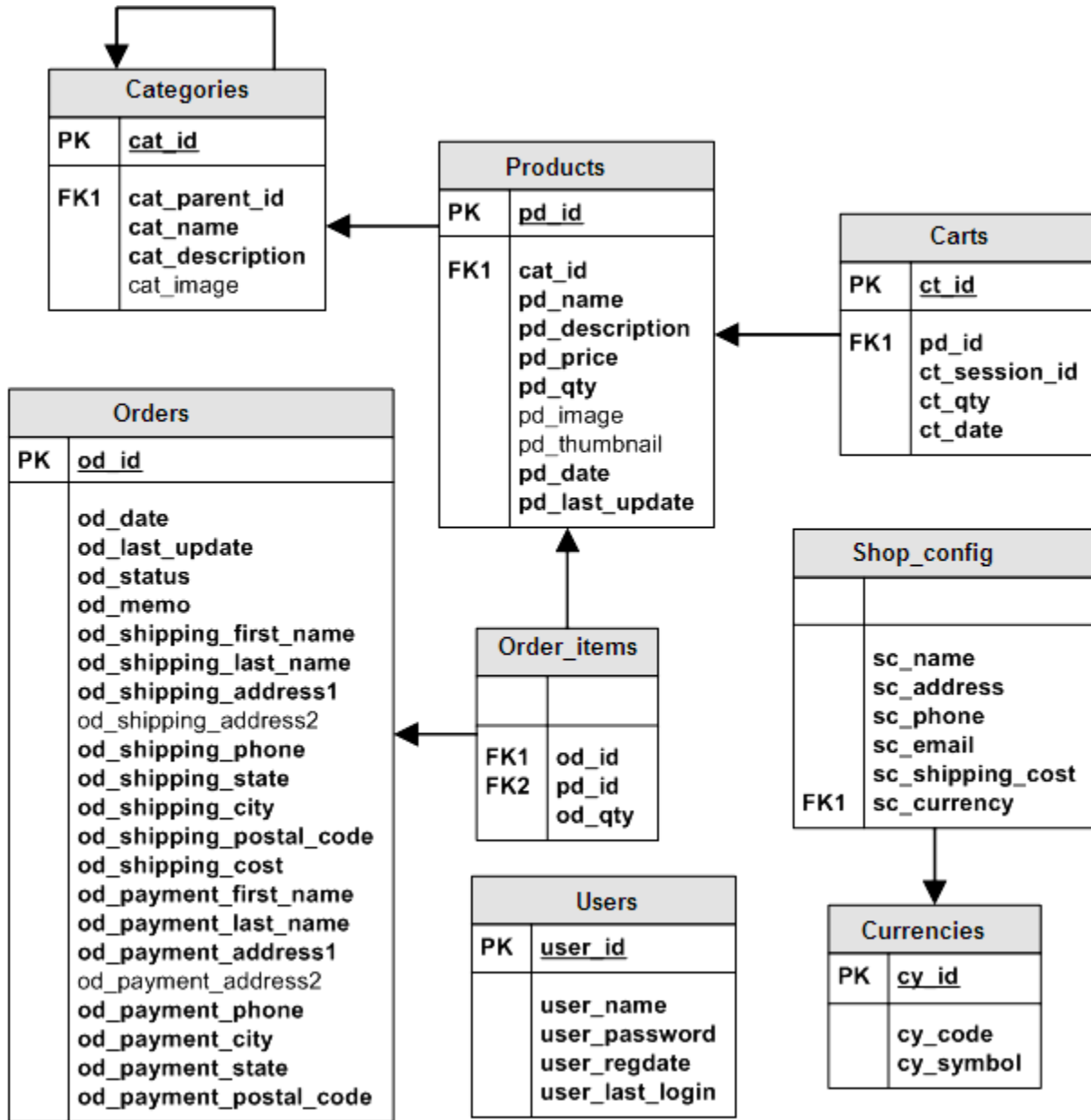


Figure 4.9: Entity Relationship diagram

4.7.2 Schema Diagram

The objects identified in the previous section can be mapped into database tables, which will store all the necessary information about each object. The following diagram shows how some of these objects will be mapped to database tables:

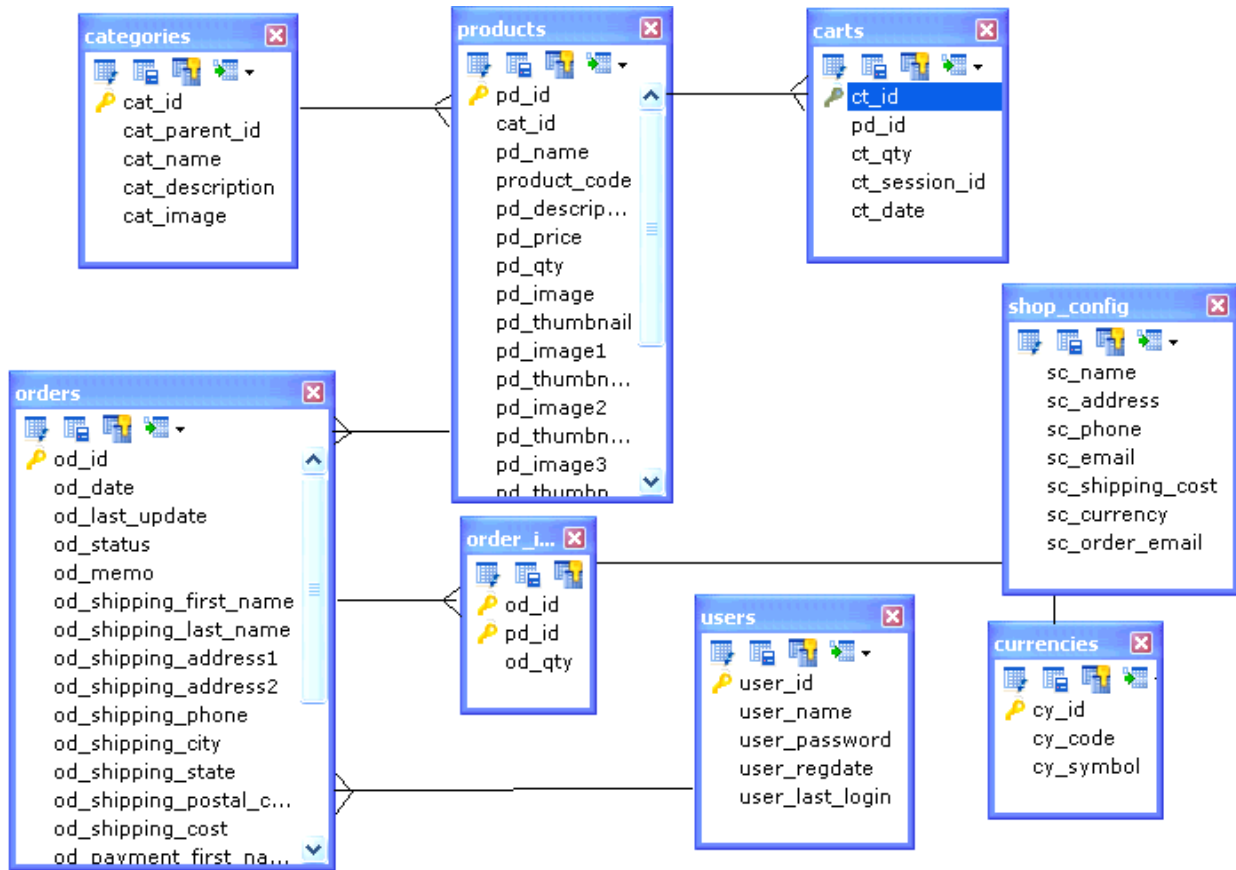


Figure 4.10: Schema diagram

Table Name	Description
Categories	Storing all product categories
Products	The products (what else)
Carts	When the shopper decided to put an item into the shopping cart we'll add the item here
Orders	This is where we save all orders
Order_items	The items ordered
Users	Store all shop admin user account
Shop_config	Contain the shop configuration like name, address, number, email, etc

➤ **Table Categories**

This table stores the product categories. From the ER diagram you can see that our current database design enables a category to have a child category and for the child category to have another child category and so on. But for this tutorial we make a restriction that the category will only two level deep.

➤ **Table Products**

In this table we store the product's name, category id, description, image and thumbnail. For now a product can only have one image. It may not be enough if you want to show a picture of you product from multiple angles so i plan to improve this on future version.

➤ **Carts**

This table will store all items currently put by the customer. Here we have ct_session_id to save

the id of a shopping session. We will explore this further when adding a product to shopping cart

➤ **Orders**

Finally when the customer take place the order, we add the new order in this table. The shipping and payment information that the customer provided during checkout are also saved in this table including the shipping cost.

➤ **Order_items**

All ordered items are put here. We simply copy the items from the cart table when the customer place the order.

4.8 E-Mail Notification Service

Online shoppers will be the end-users of the system. Online shoppers who purchase goods off the portal website will be notified via e-mail when the status of their order changes (i.e. from processing to shipped). In order to do this we need to utilize an SMTP server to automate the e-mails sending process.

4.8.1 Payment using bKash

Recently some Bangladeshi banking companies and mobile network provider companies have launched mobile banking in Bangladesh. A new door of technology is opening in Bangladesh. Now people of Bangladesh can use their mobile phone as a bank account with balance transfer, payment, money upload and many more facilities at a low cost .We will give some useful information about bKash services:

bKash Limited is a joint venture between BRAC Bank Ltd., Bangladesh, and Money in Motion LLC, USA. Ensuring access to a broader range of financial services for the people of Bangladesh

is the ultimate objective of bKash. It has a special focus to serve the low income people of the country and promote sustainable micro-savings to achieve broader financial inclusion by providing financial services that are convenient, affordable and reliable.

You can make payment from your bKash Account to any “Merchant” who accepts “bKash Payment”. For example, if you want to pay. Use the following steps-

- Go to bKash Mobile Menu by dialing *247#
- Choose “Payment”
- Enter our Merchant Account number 017.....
- Enter the amount you want to pay
- Enter the reference as 'BCEL'
- Now enter your bKash Mobile Menu PIN to confirm

Done! You will receive a confirmation message from bKash

4.8.2 Registration in bKash

To register in bKash, please do the following -

At first go to any of your nearby bKash center along with -

- Your mobile phone with active Robi or Grameenphone number.
- A copy of your Photo ID (National ID/Passport/Driving License/Other valid Photo ID).
- 2 copies of Passport size photographs.

The agent will register your bKash Account. Your mobile number will be your bKash Account Number. When the registration is done, you will receive a confirmation message from bKash. After registration, you need to activate your bKash Mobile Menu. To activate you bKash Mobile Menu-

- Dial *247#
- Chose “1” for “Activate Mobile Menu”
- Enter a PIN for your bKash Mobile Menu
- Enter your PIN again to confirm

You will receive a confirmation message that your bKash Account is ready to use.

4.9 Website Security

The e-commerce portal must offer sufficient security measures to ensure that customer’s sensitive information such as passwords, email addresses and telephone numbers are processed and stored in a secure manner. It is important to establish a relationship of trust between the online store and the customer. To achieve this, we must use trusted and proven security measures to secure the communication between the website and the customer. We must also restrict access to the vendor administration portal, the website administration page and the customer account manager. All these components must provide some form of user authentication (i.e. username and password). Security of communication between the user and the website can be achieved by obtaining a signed certificate from a Certification Authority such as VeriSign or Thawte, or by generating a self-signed certificate. This certificate can then be used to establish a SSL-secured communication channel between the customer and the portal

4.10 Usability Study

4.10.1 Current Design Trends

To gain some insight into current design trends for e-commerce websites, we have analyzed some existing and successful e-commerce websites such as Amazon.com (www.amazon.com), which is an international online store that sells everything from electronics, to gourmet foods, to sports and fitness products. We also did a study on the popular online auction website eBay

(www.ebay.com). Both of these e-commerce portals have been at the forefront of the e-commerce movement, and through years of redesign and refinement have achieved close to an epitome of usable web interfaces.

The third site that was analyzed was a South African online electronics and digital entertainment store called Take2 (www.take2.co.za). Although it is a fairly new enterprise, its webpage layout and design closely matches those of the more well-known international e-commerce websites.

All three candidate websites appear to have the same basic features:

- A product catalog listing products with images, descriptions and prices.
- An account management system where password and personal information can be changed.
- An access-restricted administration page.

All of the websites also appear to have similar layouts: the category navigation bar appears to be on the left in all 3 cases and the other features like the shopping basket, customer account manager, and checkout are on the top of the page, as part of the website's banner or just under it.

Now a day there are some e-commerce websites in our country like cell bazaar (www.cellbazaar.com), iFeri (www.iferi.com), Bikroy (www.bikroy.com) containing the online shopping features.

4.10.2 Website Layout

It would appear that a large number of e-commerce websites, besides the 3 that were discussed in the previous section, have similar front-end layouts. This means that users who have shopped online, who visit the e-commerce portal will intuitively look to the left for the product categories, and will look up to the top of the page for the account manager and the shopping cart icons/buttons.

The website's logo will be placed at the top of the webpage so that it will be the first visible image on the page and will allow users to immediately identify the web page that they are visiting. The logo must depict the nature of the business and will therefore contain images of the goods that will be sold on the website. Since the goods are of Bangladesh origin and from Dhaka, Chittagong in particular, the logo must contain either one of the two words. This will make it easier for the online shoppers to identify the origin of the goods that are sold on the website.

Taking all the above mentioned points into consideration, we can develop a conceptual design for the e-commerce portal's website. This conceptual design is shown in the diagram below:



Figure 4.11: Conceptual layout for the e-commerce portal

For the website administration page, it is very important to keep in mind that the users of the vendor administration portal will be vendors that do not possess almost any e-commerce or IT

experience. Therefore, it is very important for us to develop a web interface that is easy to understand, and is easy to use. No technical information should be presented to the vendor unless it is really necessary. The vendor portal must also contain only the features that the vendor will use.

For the purpose of finding out how to design the vendor portal menus, 10 individuals with no prior experience in e-commerce or website administration were approached. They were shown two printed designs on paper, one containing only text-based menus, and the other containing a Windows XP-style menu with large colorful images for the menu options. They were asked to select the design that is the most intuitive and easy to understand. The latter was chosen, as the graphical interface was the most user-friendly and had images that were relevant to the menu options. Based on our findings from the interviews, we can state that the vendor portal should be designed with as much graphical elements as possible as it appears that a colorful, graphical interface is easier to understand than a simple text-based one.

4.11 System Models

4.11.1 Objects

The E-commerce portal will consist of a set of many interacting objects or entities. Using Object Oriented Analysis, the following objects were extracted from the project requirement

4.11.2 Customer

- First name and surname
- Shipping address
- Billing address
- Telephone number
- E-mail address

4.11.3 Product

- Price
- Product description
- Supplying vendor
- Quantity available
- Category

4.11.4 Order

- List of Products
- Customer who placed the order
- Total value
- Payment method
- Date created
- Status

4.11.5 Image

- Image description
- Filename

4.12 Business Process Modeling

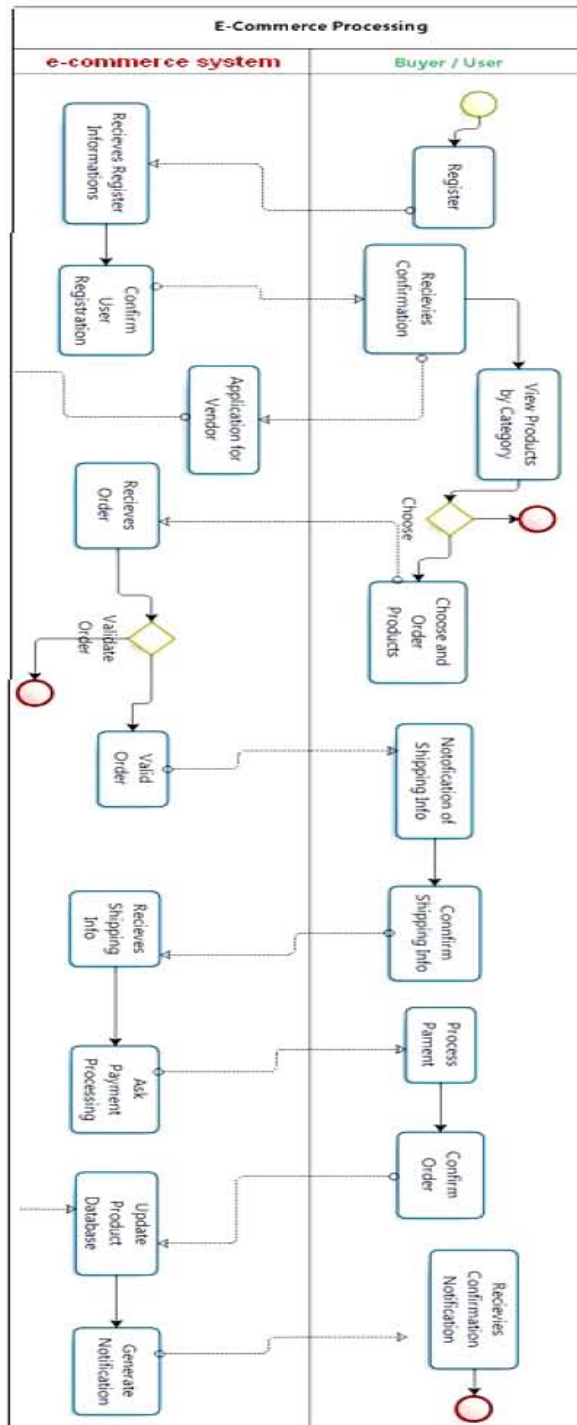


Figure 4.12: Business Process Model

4.13 Data Flow Diagram

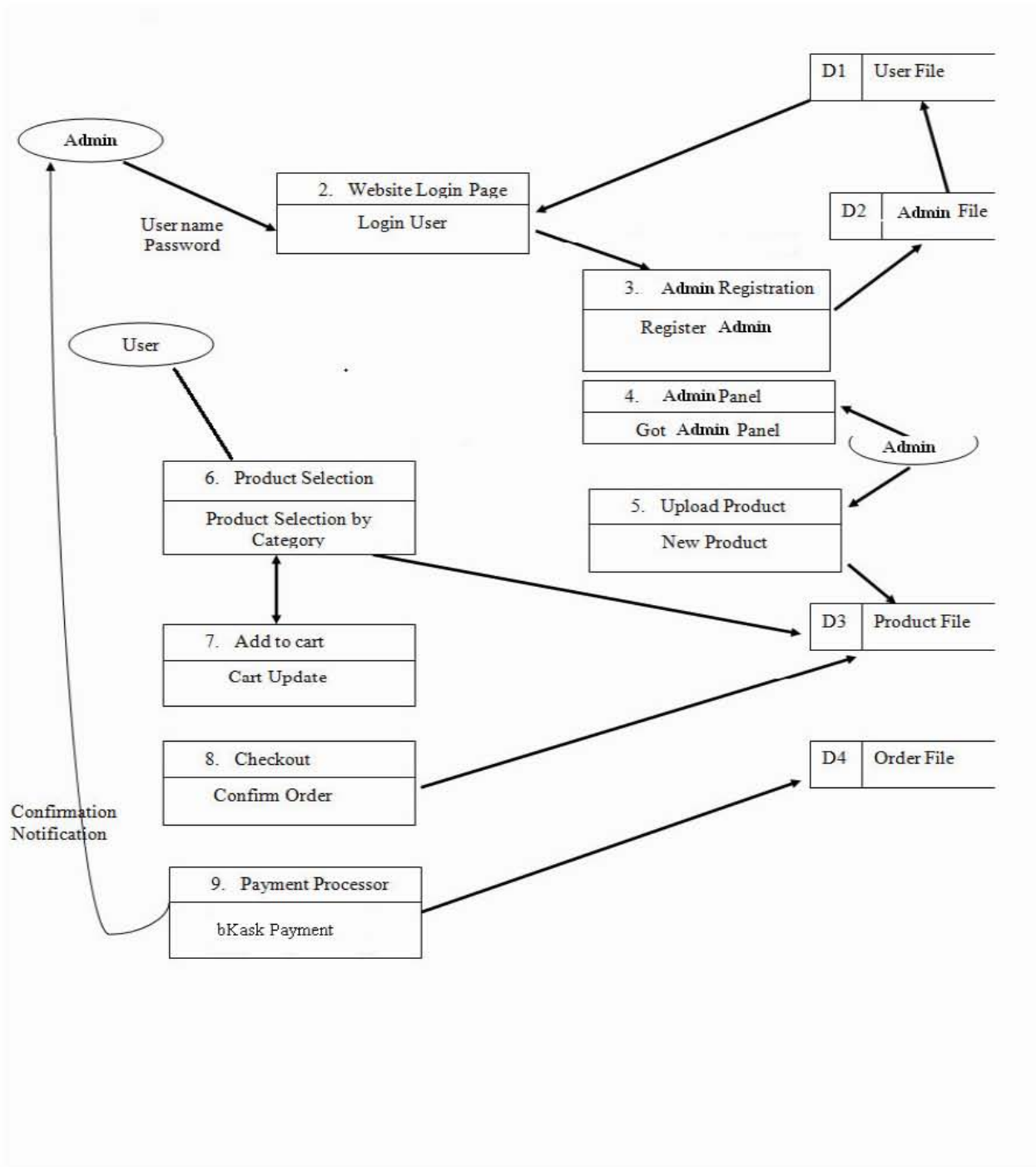


Figure 4.13: Data Flow Diagram

4.14 Web Pages

4.14.1 Product Catalog

The following diagram shows the website model for the e-commerce portal's front-end, which is the online store that will be accessible to all users:

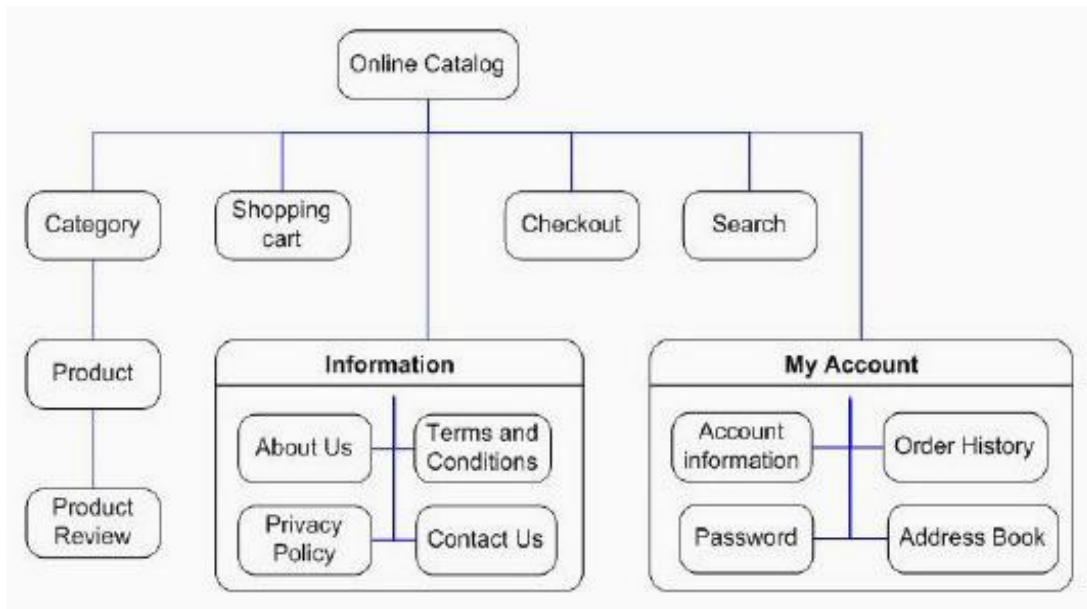


Figure 4.14: Website model for the e-commerce portal's online store

The online catalog forms part of the open-source CMS that will be implemented.

4.14.2 Website Administration

The following diagram shows the layout of the online shop administration page:

4.14.3 Admin Panel Feature

E-commerce admin page consists of the following:

i. Category

- Add Category
- Add a new category

➤ View Category

List all the category we have. Admin can also see all the child categories and show many products in each category. Admin can modify and update a category information, name, description and image.

➤ Delete Category

Remove a category. All products in it will be set to have `cat_id = 0`.

ii. Product

➤ Add Product

Insert an item into our store. We also need to supply the product image and we'll create a thumbnail automatically from this image.

➤ **View Product**

View all the products we have. Since our online shop can have many products we can view the products grouped by category.

➤ **Modify Product**

Modify product information. We can also remove the product image from this page.

➤ **Delete Product**

Remove a product from the shop.

iii. Order

➤ **View Orders**

Here we can see all the orders we have and their status. When you click the "Order" link on the left navigation you will go straight to the "Paid" orders. The reason is so you can respond immediately upon your customers that already paid for their purchase.

➤ **Modify Orders**

Sometimes a customer might contact us saying that she made the wrong order like specifying the wrong product quantity or simply want her order cancelled so she can repeat the buying process again. This page enables the admin to do such a thing.

➤ **Shop Configuration**

This is where we can set and change our online shop appearance, behavior and information (like the shop name, main url etc).

4.14.4 Admin Panel

➤ Login Page

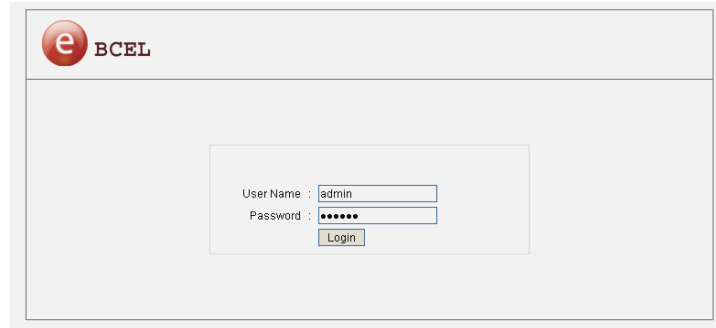


Figure 4.15: Login page

This is how the login works

- The admin enter its username and password.
- The script check whether that username and password combination do exist in the database.
- If it is set the session then go the admin main page.
- If it's not then show an error message.

➤ Admin Page

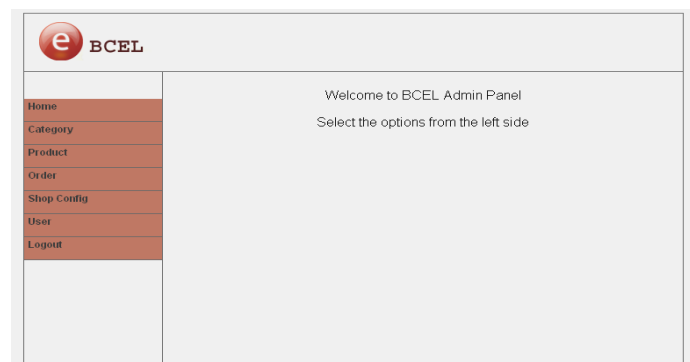
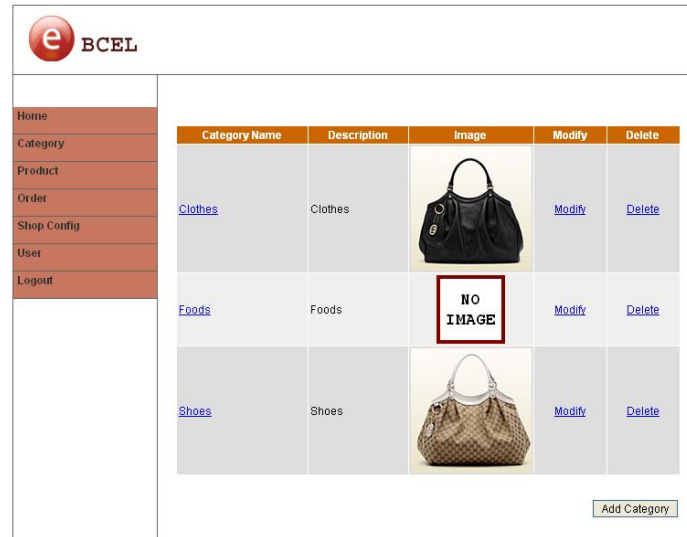


Figure 4.16: Admin main page

➤ Category Page



The screenshot shows the BCEL website's category management page. It features a navigation menu on the left and a table of categories. The table has columns for Category Name, Description, Image, Modify, and Delete. The categories listed are Clothes, Foods, and Shoes. The 'Foods' category is highlighted with a red box around its 'NO IMAGE' placeholder. An 'Add Category' button is located at the bottom right of the table.




Category Name	Description	Image	Modify	Delete
Clothes	Clothes		Modify	Delete
Foods	Foods		Modify	Delete
Shoes	Shoes		Modify	Delete

Figure 4.17: Category page

Below is the screenshot for the category list page. You can see that on each row there's a Modify link and Delete link. Clicking on the Modify link will take you to the category modification page where you can update the category name, description and image. Clicking on the Delete link will pop a java script confirmation box asking whether you are sure to delete the category. Using a confirmation is a must when you want to delete something. This will prevent stupid accident where you unknowingly click on the delete link and suddenly the category disappear before you even realize what's going on.

➤ Add Category Page

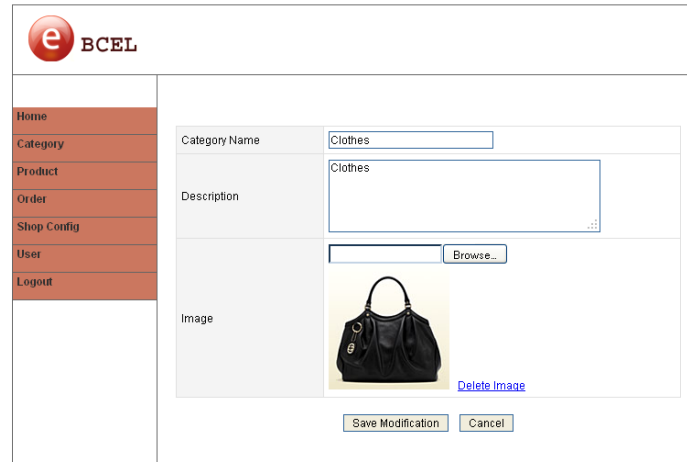


Figure 4.18: Add category page

Here the admin can add new product category for the online shop. The information we need are the category name, description, and image. Both the name and description are mandatory but the image is not. If we don't have the category image we can leave the field blank. Of course it's not recommended because when the customer comes to the shop she will see the default image.

➤ Edit Category Page

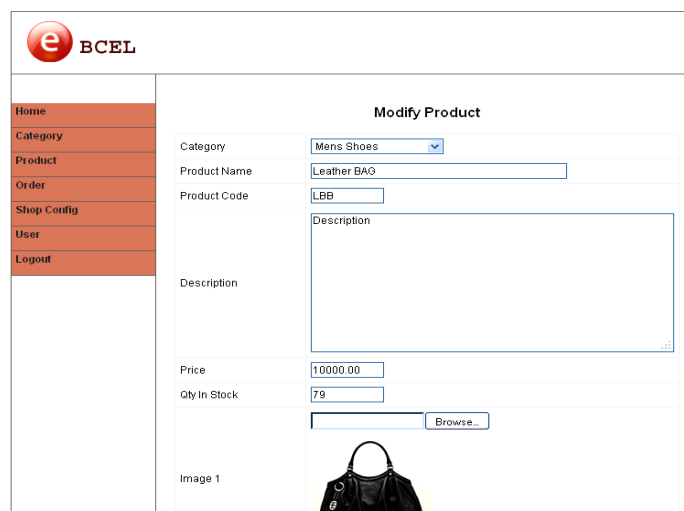


Figure 4.19: Edit Category page

This page is where you can modify category information. You can see that the form is just a lame copy from add.php. The difference is that in this page we need to fetch the category information first so we can show it in the input boxes.

➤ Product View Page




Home	Category	Mens Shoes
Category	Product Name	Leather BAG
Product	Description	Description
Order	Price	10,000.00
Shop Config	Qty In Stock	79
User	Image 1	
Logout	Image 2	
	Image 3	

Figure 4.20: Product view page

Another difference is that in this form we also display the category image. If you change the category image then the old image will be deleted from the server and the new image is uploaded.

➤ Home Page

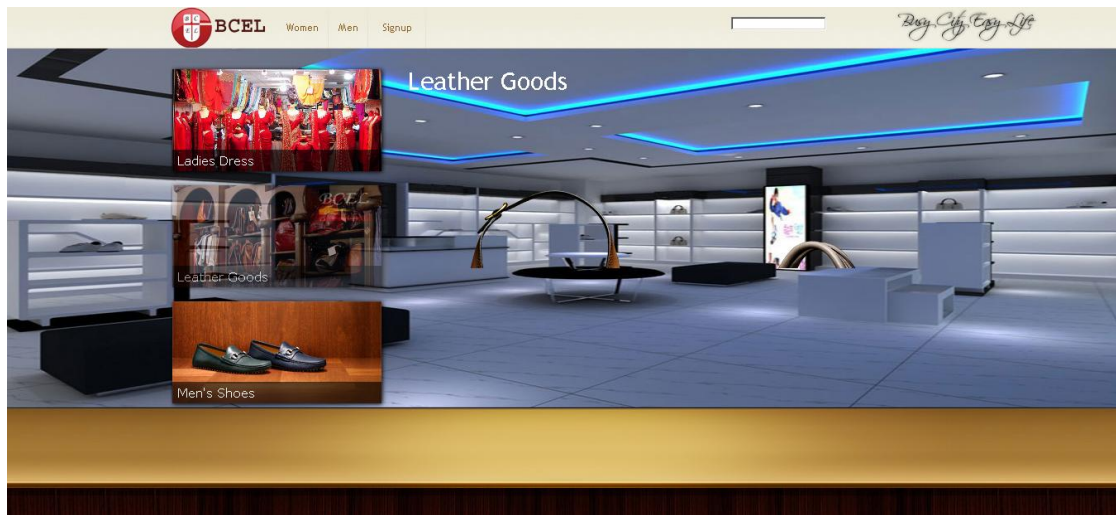


Figure 4.21: Home page

This is the home of the project that contains major categories line leather goods, dresses, jewelries etc.

User can choose the products from the quick links or even from the top navigation sub menus.

➤ **View all categories**

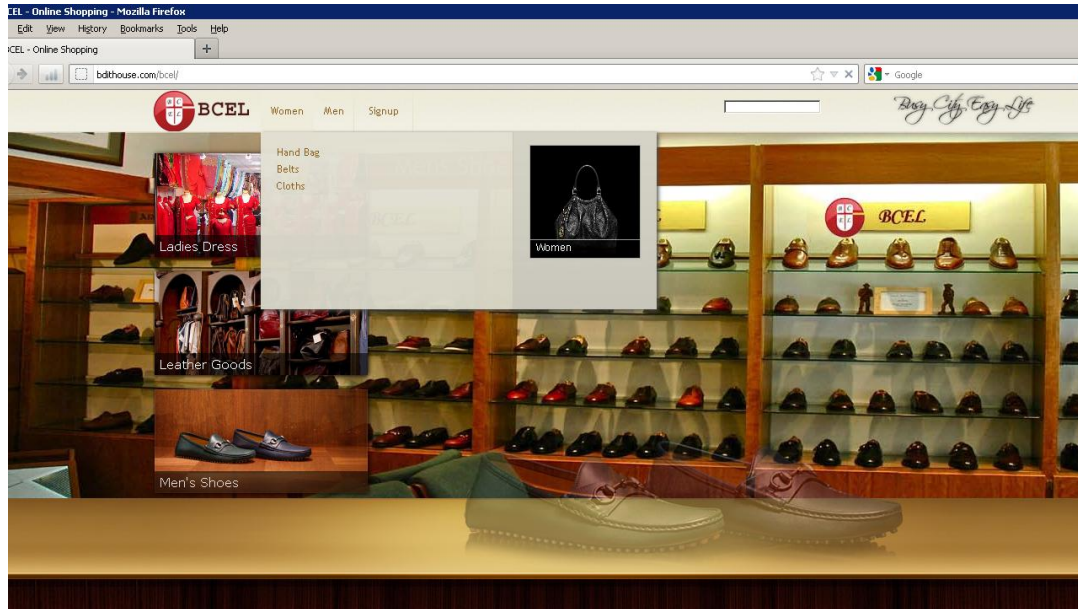


Figure 4.22: All categories page

Top drop down menu contains all the categories and subcategories with all the images of the categories.

A. Add Products

Adding a product for the online shop is a straightforward process. Just enter the product information and hit the 'Add Product' button. When adding a product we will require these information:

- Category
- Product name
- Description
- Price

- Quantity in stock
- Image

All is mandatory except for the image. We can add the product image later. The add product form look like this:

The screenshot shows the 'Modify Product' form in the BCEL system. On the left is a sidebar menu with the following items: Home, Category, Product, Order, Shop Config, User, and Logout. The main form area is titled 'Modify Product' and contains the following fields:

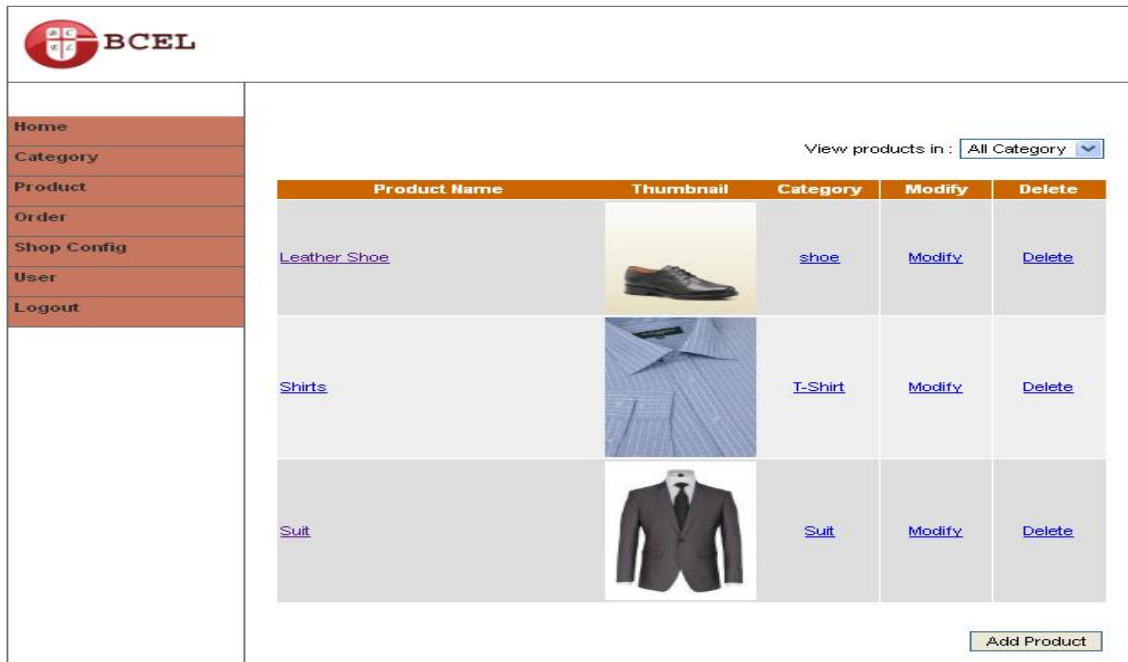
- Category:** A dropdown menu currently showing 'Suit'.
- Product Name:** A text input field containing 'Raymonds'.
- Product Code:** A text input field containing 'ms001'.
- Description:** A large text area containing 'Men's Complete Suit'.
- Price:** A text input field containing '2500.00'.
- Qty In Stock:** A text input field containing '4'.
- Image 1:** A section containing a preview image of a dark suit, a 'Delete Image' link, and a 'Browse...' button.
- Image 2:** A section containing a small preview image of a suit and a 'Browse...' button.

Figure 4.23: Add products page




Not much difference from the add category form. We just have more input box. On top of the form you can see the category combo box. We build this so that you can only select the second level category. This is to ensure that all products are added on the second level category and not put in the top level category by mistake.

B. View Products

This page lists all the products we have. We can see all products or just products from certain category. From this page we can see the product detail, add new product, modify and delete.



The screenshot shows the BCEL View Products page. On the left is a sidebar menu with the following items: Home, Category, Product, Order, Shop Config, User, and Logout. The main content area has a header with the BCEL logo and a dropdown menu for 'View products in : All Category'. Below this is a table with the following structure:

Product Name	Thumbnail	Category	Modify	Delete
Leather Shoe		shoe	Modify	Delete
Shirts		T-Shirt	Modify	Delete
Suit		Suit	Modify	Delete



At the bottom right of the table is an 'Add Product' button.

Figure 4.24: View products page

Below is what the page look like. The table shows the product name, thumbnail, category, modify and delete link. We show the product image if it exist. In case we haven't supply the image the default image is shown instead.

C. Edit Products

We can change the product information. Display the image thumbnail if the product has an image and put a delete link right next to it.

ID	Category Name	Description	Image	Modify	Delete
5	Men	Men's Product		Modify	Delete
1	Women	Women Products		Modify	Delete

[Add Category](#)

Figure 4.25: Modify products page

D. Order Management

All customer order will be shown here. You can see the orders and take appropriate action. For example all orders initially have the status "New". When you pack the product and ship it to the customer you can then change the order status to "Shipped".

The order status are:

- New
- Paid

- Shipped
- Completed
- Cancelled

Let's take a better look at each status

The screenshot shows the BCEL order management interface. On the left is a navigation menu with items: Home, Category, Product, Order, Shop Config, User, and Logout. The main area displays a table of orders with columns: Order #, Customer Name, Amount, and Order Time. A 'View' dropdown menu is open, showing status options: All, New (selected), Paid, Shipped, Completed, and Cancelled.

Order #	Customer Name	Amount	Order Time
10	Mithun Hassan	Taka4,400	2012-12-11 11:11:24
6	Mithun Hassan	Taka1,700	2012-12-11 10:54:32
5	Mithun Hassan	Taka2,500	2012-12-11 10:22:18

Figure 4.26: Orver management and veiw report page

➤ **New**

All orders initially have this status

➤ **Paid**

An order's status is changed from "New" to "Paid" by the IPN script after completing the payment process.

➤ **Shipped**

After we pack the ordered items and ship it we can change the order status to "Shipped".

➤ **Completed**

We got the payment the customer received the goods that mean the order is completed.

➤ **Cancelled**

In case you see a suspicious order and you feel that it's a fraud you can set the status to "Cancelled". Or in some case a customer calls you and for some reason she ask you to cancel her order.

➤ **Shop Configuration**

Here we can set some settings which are used site wide. They are

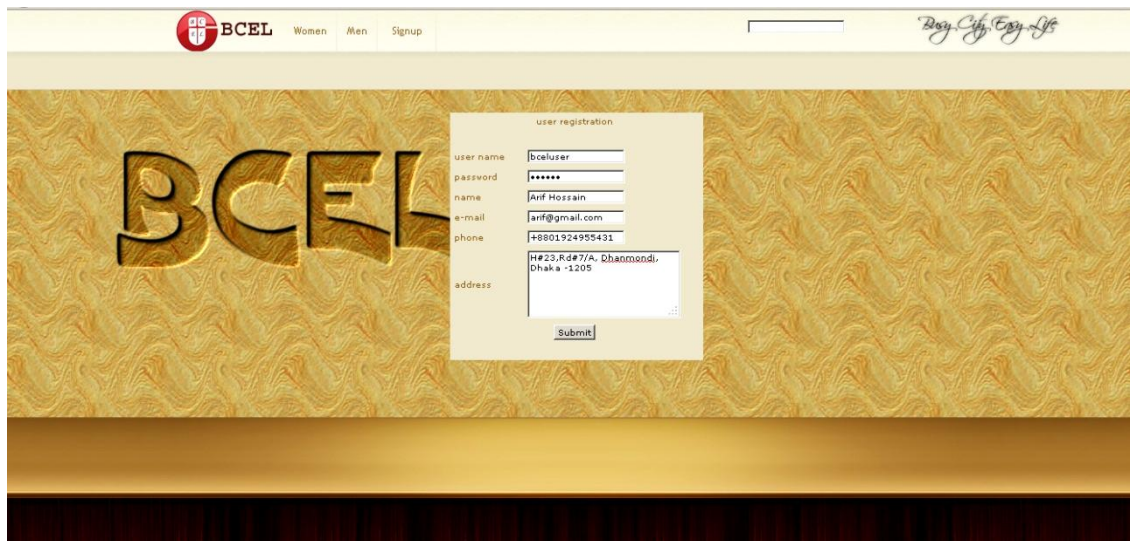
- Online shop information
 - ❖ Shop Name
 - ❖ Real world address
 - ❖ Phone number
 - ❖ Contact email
- Shipping cost
- Currency
- A flag whether to send a notification email to admin when a customer place an order

A user of the shop is actually the shop admin itself. Currently all user are granted the permission to do all administration task. In future version I'll modify this so one user can be assigned to specific task such as managing the products or managing the orders etc.

4.14.5 User Panel Feature

E-commerce user page consists of the following:

➤ User Registration Page



The screenshot shows the BCEL user registration page. The header includes the BCEL logo, navigation links for 'Women', 'Men', and 'Signup', and the slogan 'Buy. Sell. Easy. Life'. The main content area features a large 'BCEL' logo on the left and a 'user registration' form on the right. The form fields are: 'user name' (filled with 'bceluser'), 'password' (filled with six asterisks), 'name' (filled with 'Arif Hossain'), 'e-mail' (filled with 'arif@gmail.com'), 'phone' (filled with '+8801924955431'), and 'address' (filled with 'H#23,Rd#7A, Dhanmondi, Dhaka -1205'). A 'Submit' button is located at the bottom of the form.

Figure 4.27: User Registration Page

Very simple registration form with username password, cell phone, address etc. Required fields are username, email, phone number.

They can create an account and it requires email verification. So then one the customer is registered with the system they can use this user id and password later anytime.

➤ **Home page**

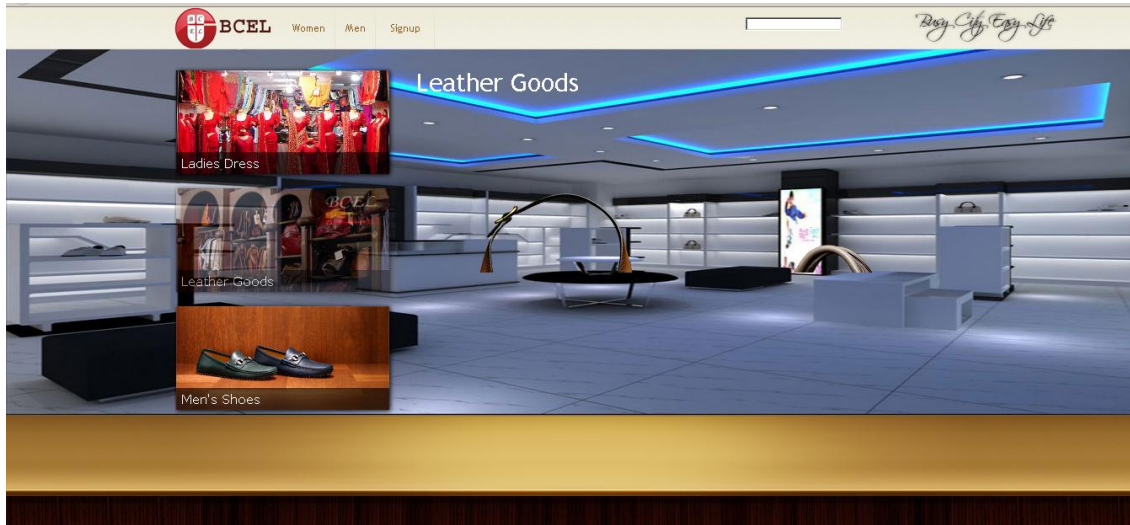


Figure 4.28: Home Page

This is the home of the project that contains major categories line leather goods, dresses, jewelries etc.

User can choose the products from the quick links or even from the top navigation sub menus.

➤ **View all categories page**

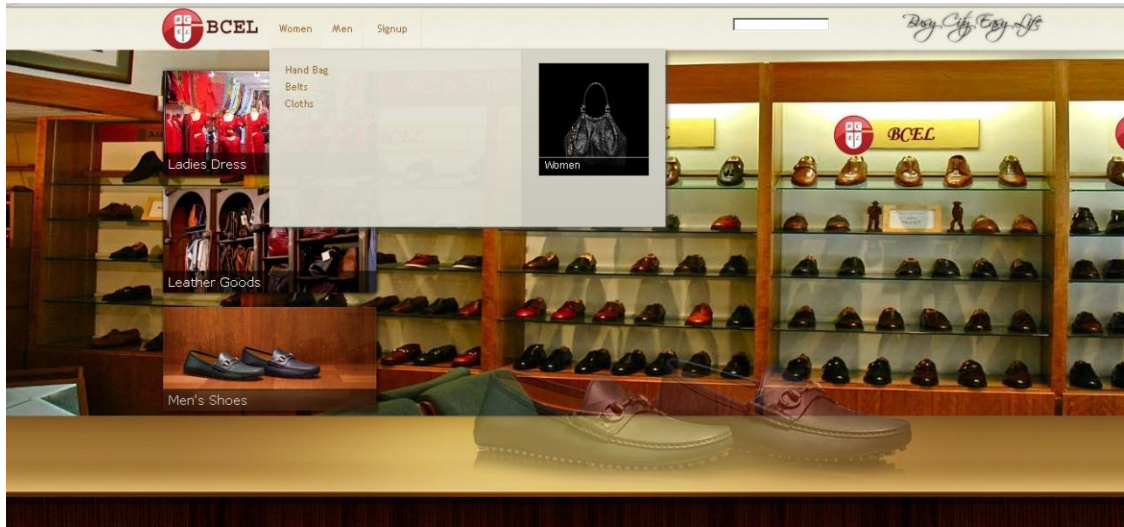


Figure 4.29: View all categories page

Top drop down menu contains all the categories and subcategories with all the images of the categories.

➤ **Product display category wise page**

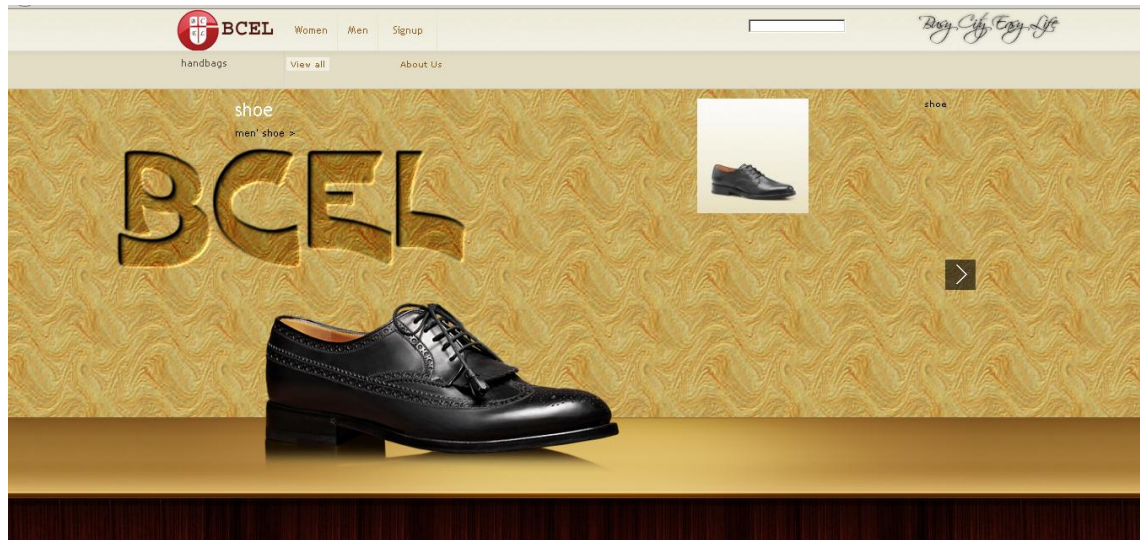


Figure 4.30: Product display category wise page

If one category is selected the all the products in the particular category is seen. Here in the image we can see there is one product in shoe category.

➤ Product Detail Page

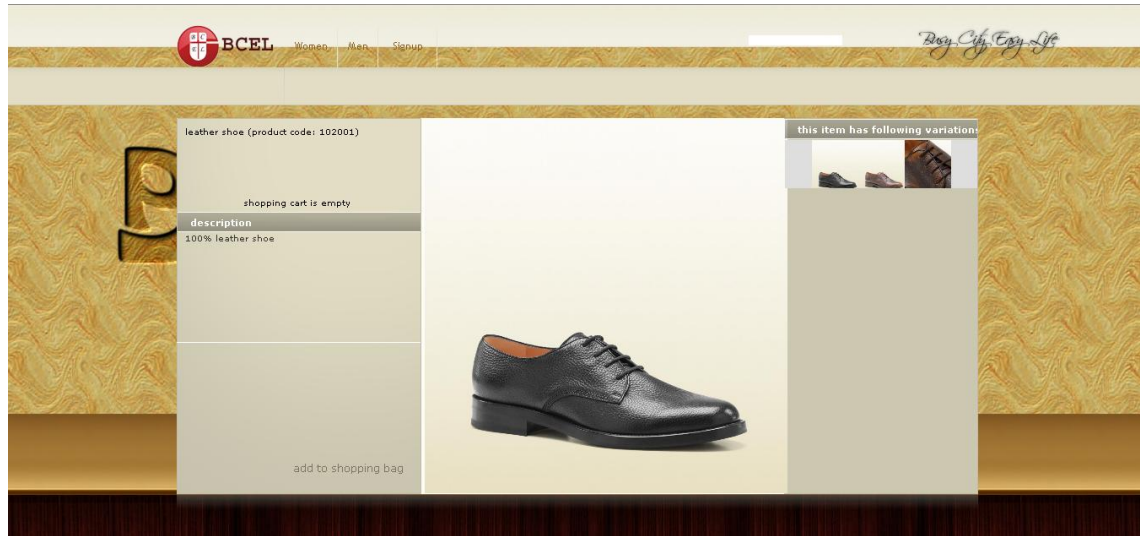


Figure 4.31: Product Detail Page

This is the product details page that contains details information of the product with multiple images snaps taken from different sides.

➤ Add to shopping cart page

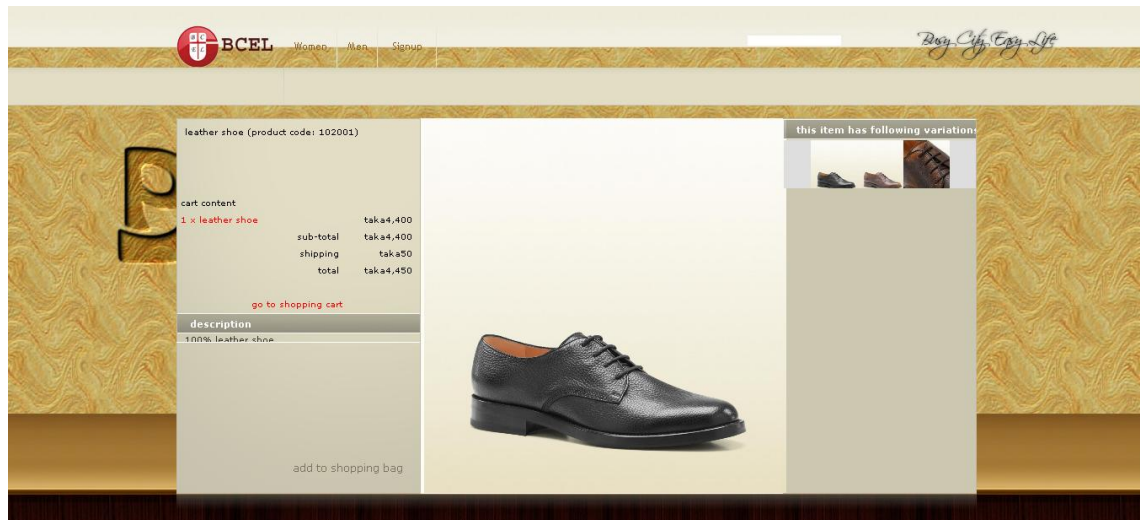


Figure 4.32: Add to shopping cart page

By clicking the link add to shopping cart it is possible to add the product to purchase. Here an area will appear with the product details and quantity and also the shipping costs.

The shopping cart is one of the most important parts to having a smooth E-commerce transaction.

➤ Shopping Cart Detail Page

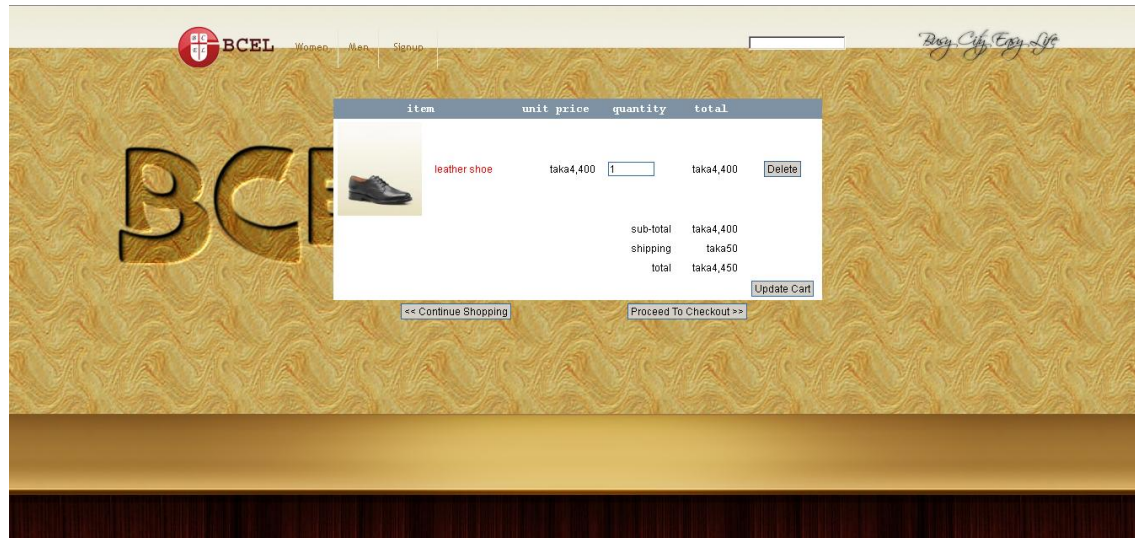


Figure 4.33: Shopping Cart Detail Page

This is cart detail page where it is possible to change the quantity of the products and even delete a product from the cart if and anyone don't want to purchase it.

➤ **Update shopping cart page**

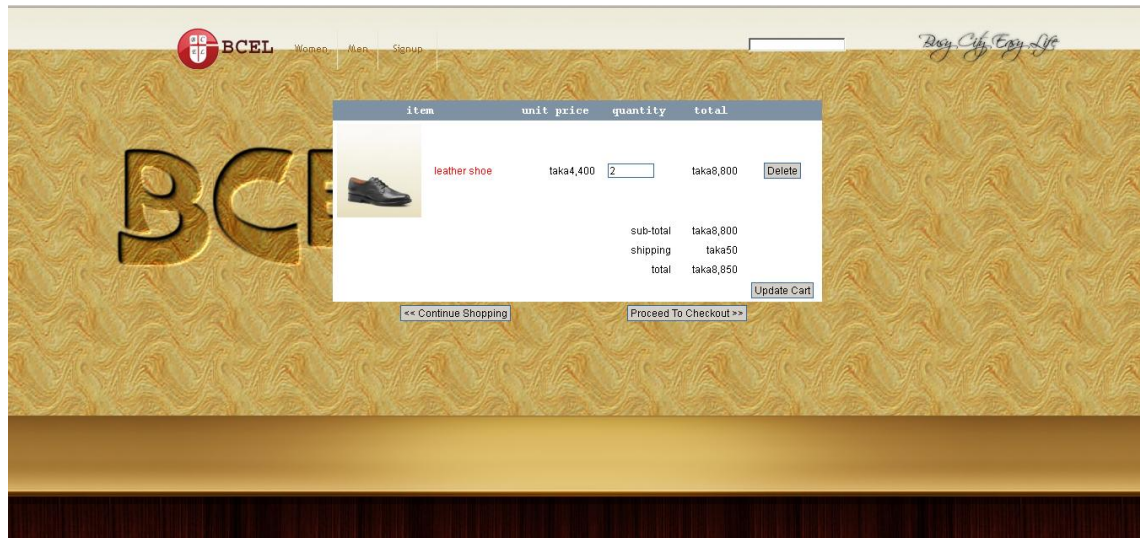


Figure 4.34: Update shopping cart page

Here I updated the quantity from 1 to 2 then can see the amount has been changed in the shopping cart.

➤ **Final check out page**

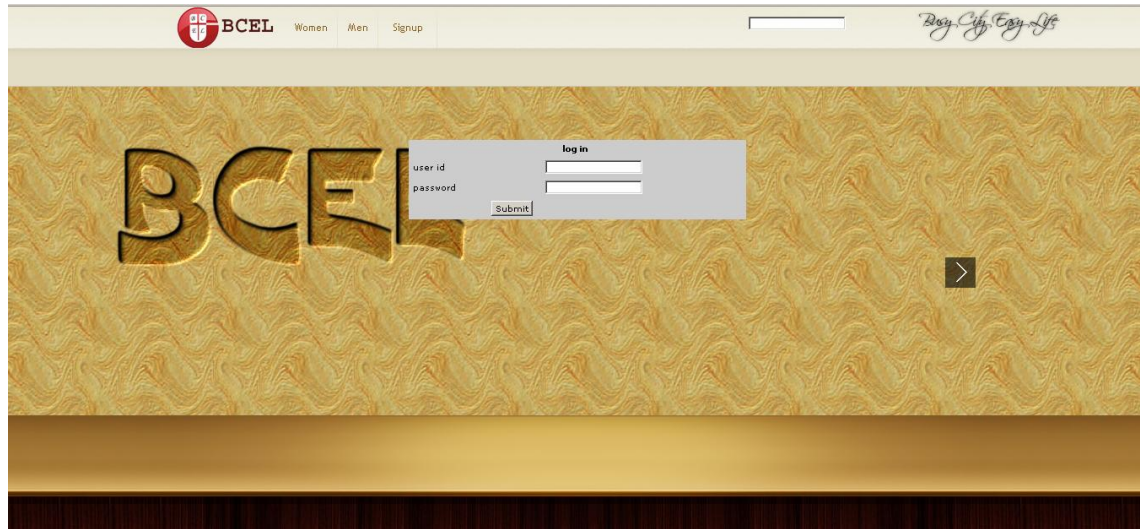


Figure 4.35: Final check out page (Requires login)

When want to go for final checkout then the user is not logged it then the login window will appear and user can put their user_id and password to purchase the products.

➤ Payment Option page

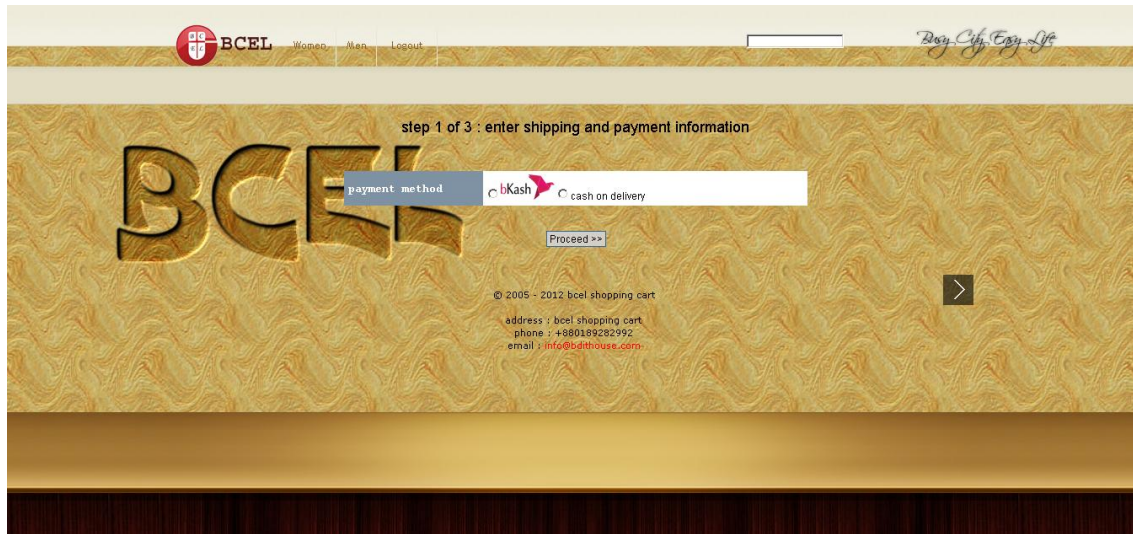


Figure 4.36: Payment option page

After this the payment option will appear the will ask for payment by bKash or cash on delivery.

➤ **Final Confirmation page**

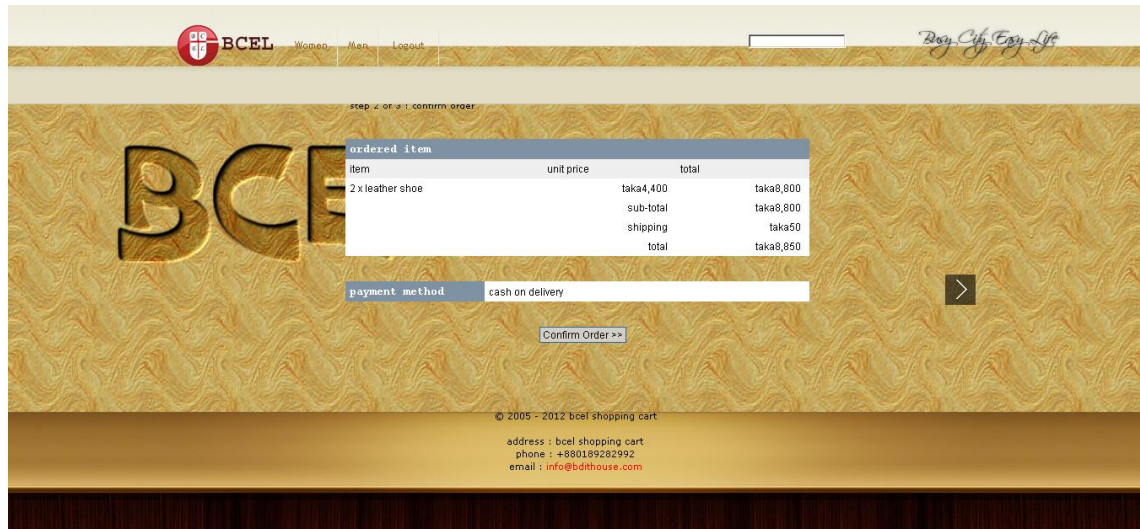


Figure 4.37: Final Confirmation page

After this the final conformation page will appear.

➤ Final Invoice page

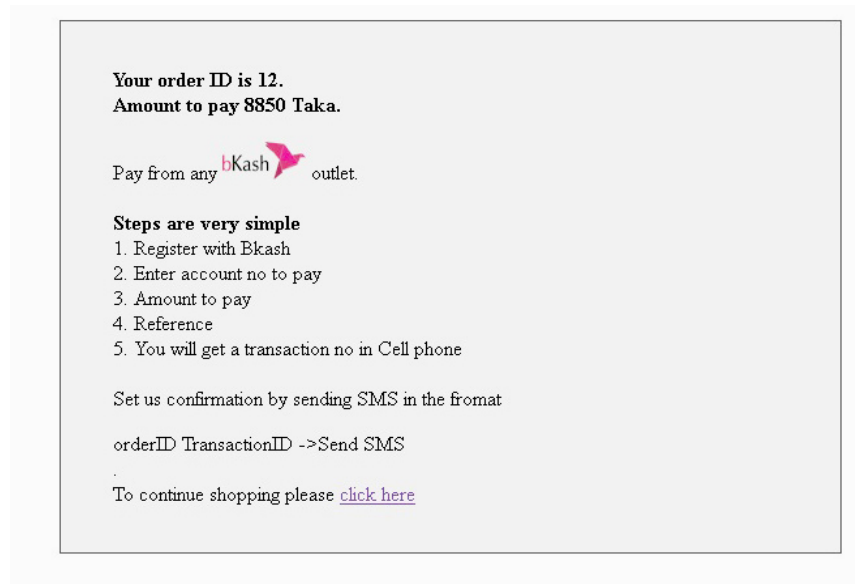


Figure 4.38: Final Invoice page

After clicking the confirm button the invoice page will appear the will have the order id and amount and the instructions to pay.

PART B: IMPLEMENTATION

4.15 Introduction

In this section, we will discuss in detail the process of implementing the e-commerce portal. We will discuss the hardware and software requirements of setting up a functional e-commerce website, as well as the step-by-step process of installing, configuring, coding and integrating all the various system components.

4.16 Hardware Requirements

➤ Computer Server

The computer server is used to store the e-commerce website's files, as well as the database which will contain the website's data. This computer system will be used to host the e-commerce website. It was decided that the website would be hosted from the author's desktop computer, which has a 3.4 Gigahertz CPU, 2 Gigabytes of DDR2 memory and 500 Gigabytes of Hard Drive storage. We believe that this is sufficient for development and testing purposes.

➤ ADSL Router

The ADSL router is used to establish a broadband internet connection from the server hosting the e-commerce website to the internet. The internet connection used in this instance is a 4 Megabit ADSL line provided by Telkom. This line provides transfer speeds of up to 460 Kilobytes per second for FTP and HTTP transfers. We believe this transfer speed is sufficient for testing purposes, where the load on the server is relatively low.

4.17 Software Requirements

4.17.1 E-commerce System

A web based online shop to provide e-commerce solution and services to customer using some integrated tool like product display tools, shopping cart, payment system etc.

4.18 Database Server and Administration Tools

The database server allows the Content Management System to store and retrieve information that will be used by the e-commerce portal. The administration tools allow the database administrator to make backups or any necessary changes to the website's database.

Since one of our objectives is to minimize the cost of this e-commerce portal, we chose MySQL Server for our database needs. MySQL was chosen because it is a trusted and very popular open-source database system that is available free-of-charge and comes with a multitude of useful administration tools (MySQL Query Browser, MySQL Administrator and MySQL Instance Manager). These GUI-based tools accommodate for the average computer user in terms of usability.

MySQL Server version 5.1.1 together with MySQL GUI Tools version 5.0 RC9a (for Windows XP) was used for the e-commerce portal and both are available at www.mysql.com.

4.18.1 Web Server

The web server allows any computer with an internet or local area network connection to host a website. It does this by associating a particular folder on the local machine with the computer's IP address (WAN or LAN). When someone from a different computer attempts to access the IP address of the hosting computer using HTTP, they are redirected to chosen root folder specified in the web server's configuration file.

For the purposes of the e-commerce portal, we decided to use the popular open-source web server called Apache, which is available at <http://www.apache.org/>. Apache Web Server version 2.0.59 was chosen due to its full compatibility with version 5.2.2 of the PHP Server.

Another advantage of Apache Server is that it is bundled with OpenSSL (v0.9.7j) open-source security package. This package will allow us to secure our connections when credit purchases are made on the website.

4.18.2 SMTP Server

The SMTP (Simple Mail Transfer Protocol) server allows a computer with an internet connection to send out e-mails. This application is necessary as it will allow the e-commerce website to send out e-mails to its customers. E-mail notifications are sent whenever an order for goods is placed, or when a customer registers an account.

The SMTP server used for the e-commerce portal is Post Case Server Free Edition v2.6.0. This is a free-of-charge commercial application that is a cut down version of the Professional edition of the same software. Nevertheless, its feature set and security measures are sufficient for our e-commerce portal. The software is available at <http://www.postcastserver.com/>.

4.18.3 PHP Server

The PHP Server allows the host computer's browser to execute PHP code and view PHP web pages.

PHP version 5.2.2 was used for the e-commerce portal. Although version 6.0 was available, this older version of PHP is fully compatible with the version of the Apache Web Server that was used. The PHP Server is available at <http://www.php.net/>.

4.18.4 FTP Server

The FTP server allows files to be transferred to the hosting computer server using the File Transfer Protocol. This can be done via the web, which allows the e-commerce website's files to be updated from any location that has an internet connection.

The freeware War FTP Filezilla v3.5.0 was used to accomplish the task of setting up a fully functional FTP site. The FTP site allowed the development and testing of the website to be done from different locations. It also allowed files to be downloaded and uploaded to and from the server with ease. The War FTP Filezilla comes with an extensive security feature that ensures that only authorized users gain access to the website's files. Authentication is done using a username and password.

The FTP Filezilla is available at <http://filezilla-project.org>.

4.19 PHP Integrated Development Environment (IDE)

PHPEdit version 2.12 was used as the development environment for this project. It is a sophisticated development tool for PHP code with strong debugging capabilities and an on-the-fly syntax correction function.

4.20 Implementation Process

The implementation process for the e-commerce portal was carried out in a number of steps. In this section we will describe these steps in the order in which they were carried out.

4.21 Installing Servers

Before the system could be installed and the coding would begin, all the server software that the CMS would need to utilize had to be installed and configured. The first server than was installed

was the MySQL database server. It was configured to run on a Developer Machine, as a Multifunctional Database using the InnoDB and MyISAM engines.

The PHP Server was then installed and configured to include the MySQL extension, which would allow the e-commerce portal's PHP classes to communicate with its MySQL database.

The next step was to install the Apache Web Server with OpenSSL security. The Web Server was configured to include the PHP 5 module, which would allow the web server to recognize and execute PHP scripts.

The War FTP Daemon was then installed to allow the website's root folder to be accessed remotely. Access to this folder was limited by allowing only users with the correct username and password, as well as administration rights to change the files.

Lastly, the SMTP server was installed and configured to allow the e-commerce portal to send e-mails to customers.

4.22 Database Configuration

When installing the shopping cart script it will need to modify library/config.php. You need to change the database connection info (database host, username, password and name) according to server own configurations.

4.23 Enabling GD Support

The next thing need to do is to enable the GD support. This is usually enabled by default by web hosting company but in case you test it on your own computer you may need to enable it manually.

First open the php.ini file using a text editor (notepad is okay) and search for this line of code:

```
extension=php_gd2.dll
```

If you see that code preceded by a semicolon (;) that means GD library is not enabled yet. Remove the semicolon to enable GD and then restart the web server (apache) for the changes to take effect.

4.24 Implementing Security Measures

The e-commerce portal will be storing sensitive information about its customers and its vendors. This information includes ID numbers, bank account numbers, telephone numbers and addresses. That is why it is very important for security measures to be put into place so that this information does not get accessed by unauthorized users.

4.24.1 Database Security

Access to the website's MySQL database is controlled by a username and password. It will only be accessible to the website administrator using the administrator login details. This will ensure that no unauthorized party can access the information stored in the database unless he or she possesses the admin username and password. To make this security measure more effective, the admin username and password consist of uppercase and lowercase letters of the alphabet as well as numbers. The username and password will also be changed on a monthly basis.

4.24.2 Transactions Security

The e-commerce portal has a self-signed secure certificate which allows customers to establish SSL-secured connections to the website. This ensures that any sensitive information that is exchanged between the customer and the online shop is secure and cannot be compromised by unauthorized third parties. The secure certificate was created using the OpenSSL software:

The command: `openssl req -config openssl.cnf -new -out my-server.csr` was used to generate a certificate request.

The command: `openssl rsa -in privkey.pem -out my-server.key` was then used to remove the passphrase from the private key.

The command: `openssl x509 -in my-server.csr -out my-server.cert -req -signkey my-server.key` was then used to create a self-signed certificate.

To further ensure the security of the website and its customers, the customer's credit card information is not stored in the e-commerce website's database. Instead, it is entered on the payment gateway's website (such as PayPal) which is also certified and secured using SSL.

4.24.3 Login Security

Customer and vendor usernames and passwords are stored on the CMS database. To protect the customers' passwords, they are encrypted into a 128-bit string using the Message-Digest 5 algorithm (or MD5). This is one-way encryption, and the passwords cannot be decrypted. This poses some problems when customers or vendors wish to retrieve a forgotten password. To overcome this problem, the customer or vendor is sent a temporary password, which they can then use to log into the website. Once they have logged in, the user can change their password to a desired value.

PART C: TESTING

4.25 Introduction

Testing is the process of establishing the existence of errors. The main aim of testing is to find errors. I made a test plan to test my system. I have used three types of test method in this project which is given below:

- Module testing (including validation test)
- Integration testing
- Acceptance testing

4.26 Website Administration Functions

The user accessed the website administration page by clicking on the Admin button at the bottom left-hand-corner of the main website. This took the user to the Login page, where the user was prompted for a username and a password. This was the expected output of the test case.

4.26.1 Logging In

The user entered the username “admin” and password “admin”, which were assigned to the administrative website user when the system was installed and configured. The webpage refreshed and displayed the main administration webpage. This was the expected output of the test case.

4.26.2 Logging Off

The logged in user clicked on the Logoff button at the top of the website. This refreshed the page and presented the user with the Account Logout page, which informed the user that successfully logged off and that it was safe to leave computer. The user then clicked on the login button make sure that she was logged off, the webpage refreshed and presented her with the Account Login page. This was the expected output of the test case.

4.27 Testing Summery

I tested all three panels assigned for Doctors, patients and administrator. The project was tested in the localhost with all possible options. The testing involved using some dummy records and inserting them to populate the database and to check whether the features are producing results properly.

The testing process involved:

- Testing for the PRODUCT purchase process
- Testing for the email sending and validation process
- Testing for the successful login process
- Testing for form validation
- Testing for proper record generation and maintenance

The project was successfully tested and few bugs were fixed. It was discovered during the testing that some features would be easier to implement in some alternative manner, and their implementation methods were changed.

CHAPTER 5

CONCLUSION AND FUTURE WORKS

5.1 Achievements and Discussion

The e-commerce that was designed, developed, implemented and tested in the duration of this project achieves its intended goals. It does this by allowing customers to advertise and sell their goods online. The feature of the customer applying and acting as vendor to sell their own products also given an extended phenomenon of online marketplace.

Aim of this project is to establish e-commerce portal and on the other hand establishing e-commerce in our country is still a big challenge. Followings are the limitations at the moment:

1. Technological limitations:

- Lack of universal for standard, security and reliability.
- Lack of bandwidth to support E-Commerce especially for m-commerce.
- Existing applications and database brings difficulty to integrate Internet with EC software.
- Implementing E-Commerce require special servers to support it which may increase cost.

2. Non-technological limitations:

- There are still many legal issues to be resolve.
- Products are not able to be tested first.

- People lack in trust when trading with strangers.
- FRAUD cases are increasing.

All these limitations are the complexities for this project implementation. But we have all these issues can be overcome through proper cultivation of discussion and nursing to proper authority.

5.2 Conclusion

This report represents the full development and evaluation process of the e-commerce portal. The aim of the project was to create an e-commerce portal that allows products buyer's a single one stop marketplace or home to purchase their products. They can also manage their products, payments, currencies etc.

The design process involved usability studies into how the e-commerce website should be presented to the users as well as to determine the best design for the customer administration feature and the vendor portal. Using use-cases, website models, and database models, a final design for the system was successfully developed.

The implementation process involved setting up a ecommerce System. All the features were developed in PHP, to maintain consistency with the rest of the System and to ensure seamless integration of the new features with the original System. The vendor feature gave customers access to their personal details, their product information

This E-commerce portal was then evaluated by multiple users using 5 criteria which are responsiveness, aesthetics, user-friendliness, feedback from system and number of features. The evaluation scores and feedback from the users were all relatively high, with no given scores lower than 6 out of 10. This indicates that the users are satisfied with the system, based on the 5 criteria that were evaluated.

The E-commerce portal was thoroughly tested by multiple users, each assigned to a particular part of the portal. The main features were all tested and the system outputs compared to the expected outputs of the test cases. The testing of the system concluded that the e-commerce portal features were working as intended and that the system appeared to be free of bugs.

5.3 Future Work

The country needs intermediary institutions to complete transactions. And fortunately, banks, Visa and Master Card operating in Bangladesh, can do it. Bangladesh has the infrastructure to start. Stable internet connection and a law supporting e-commerce are prerequisites.

The government needs to make a realistic e-commerce law. It should work in collaboration with the private sector to ensure a stable and reliable internet connection. E-commerce facilitates payment of utility bills, fees etc.

Limited time and resources was the key bindings for this project. While doing the project many important features had been skipped for the simplicity of the project. Below some points showing the future considerations of this project:

- The involvement of local bank credit card transaction can be implemented.
- The entire project can be implemented online to get the realistic feedback from its users.

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