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**Software Design & Analysis**

**Section: BCS-5A**

**Software Requirements Specification**

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**E-Bazaar E-Commerce Website**

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# Revision History

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| **Name** | **Date** | **Reason For Changes** | **Version** |
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# 1. Introduction

## 1.1 Purpose

The purpose of this software requirement specification is to provide a clear, documented model of the requirements for the **E-Bazaar E-commerce Website**. This document serves to provide top level use cases for a web customer making purchases online. The system includes the **client subsystem** as well as the **seller subsystem.**

The online shopping system provides a platform for conducting sales of a wide variety of goods across the globe. It is implemented as an **internet-based enterprise** and has a vast inventory of products from books, houseware, electronics, groceries and much more.

Sellers use this system to easily expand their service to a more global platform. This guarantees better flexibility, a larger audience, and an improved market.

The appeal of online shopping systems experienced a large boost in the last decade because the customers can browse easily through various options, brands, and price ranges with very little hassle. The ability to reap its benefits from the comfort of one’s own home has only bolstered its claim as one of the biggest enterprises that dominates the internet.

## 1.2 Intended Audience

The document describes the scope, functionality and features of an E-commerce system which has a large audience. This document finds relevance to people from various technical and non-technical backgrounds. The document outlines various corporate goals, business strategies and design features that are important from a management point of view and can be used by project managers. It analyzes performance, visibility and brand awareness which is important for marketing and advertising. With detailed analysis of the system design, features, implementation and performance, the document proves highly valuable to developers and testers.

Through the rest of the document, one becomes familiarized with the scope of these online shopping systems- from their purpose, benefits, and business strategies. The context and origin of the product as well as its basic functionality are then explained in relevant detail along with an analysis of its different classes, design and implementation. We then detail the interface requirements, build analysis models and examine system features and non-functional requirements.

## 1.3 Product Scope

The Ecommerce Website system provides a platform for conducting sales of a wide variety of goods and provides a way of bringing sellers and customers on an online platform to conduct transactions in a secure manner across the globe. It is implemented as an online enterprise. This system provides an avenue for customers to shop for a wide variety of products online. It also provides sellers a platform where they can upload their listing to the system for customers to view and purchase. The biggest advantage of the service is the comfort it brings with remote usage. The ability to compare various price ranges, brands and even customer reviews and experiences provides for a more honest/despiteful understanding of the product. It also provides a platform for retailers and sellers to reach a global audience. Our project also contains Auction feature that plays a role between Wholesaler and the Seller where wholesalers creates an Auction Listing for a single product and sellers bids on those listings, whoever wins that listing will get those products and make it available for the customers to buy it. Fitted with recommendation models to analyze customer interests, previous purchases and ratings can help recommend other products that the customer may like. This model is essential to increase the visibility of useful products to the customer but also to boost the service’s revenue. The service also has a large database that stores customer data and history. Another important benefit provided by the service is the reviews section. The reviews section offers transparency around product performance and user experience. Not only do items have ratings given to it by users, but also detailed user reviews with an option to attach pictures of the product. This feature boosts customer trust and creates a community of customers who can engage with each other and help one another select the right products. A key feature is secure money transactions along with guaranteed and time bound product delivery.

Increasing sales is the highest priority to the online shopping system. Turnover can increase only with an increase in sales. Various strategies need to be tested to find suitable growth strategies for the business. Minimizing management costs, customer loyalty and retention and customer satisfaction are essential corporate goals that are important to boost sales. A huge part of the business strategy is using the internet and its various resources to its advantage from technological innovation, marketing strategy and business model. Continuous and adaptive research and development with a focus on logistics is essential for business growth. Besides M&A, investments and strategic partnerships, another way to expand business is to invest in emerging markets and new businesses. The vision of the online shopping system is to be able to provide a smooth and user friendly platform for customers to select from a wide range of products conveniently and to cater to the needs of both customers and sellers.

## 1.4 References

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Author: Lawrence Gregory

Date: February 13, 2019

# 2. Overall Description

## 2.1 Product Perspective

The system includes the user subsystem as well the seller subsystem. The E-commerce system provides an outstanding way of bringing sellers and customers on an online platform to sell and make purchases in an efficient and secure manner irrespective of the distance between the two. It is a platform for customers to shop items online without having to visit a store or meet a seller physically, and a platform for vendors to sell their items online without having to meet the customers physically or have a physical store set up for his products. This system is a one stop for customers to shop from millions of products online. The seller uploads his listing to the system and the customers browse from these items and purchase them.

## 2.2 Product Functions

Enlisted below are all the major functions supported by the online shopping system along with the user classes.

* **Register:** for Customers and Sellers
* **Login:** for customers and sellers
* **Logout:** for customers
* **Search item:** for customers
* **View item:** for customers
* **Add item to cart:** for customers
* **View shopping cart:** for customers
* **Change items in cart:** for customers
* **Proceed to buy:** for customers
* **Delivery & payment:** for customers
* **Place order:** for customers
* **Track order:** for customers
* **Cancel order:** for customers
* **View orders:** for customers
* **Review item:** for customers
* **Recommendations:** for customers
* **View sales:** for sellers
* **Upload listings:** for sellers

## 2.3 User Classes and Characteristics

**Customer** - He/she is a verified user of the system who is intended to buy a product sold by a seller using the platform. The functions used by customer are register, view account, login, browse item, view item, buy item now, add to cart, view cart, proceed to buy, enter delivery address, enter mode of payment, make payment, place order, view orders, track package, write review, cancel

order, return item, logout

**Seller** - He/she is a verified user of the product who is intended to sell items over the platform. The product functions used by sellers are register, view account, login, upload listing, your sales, deliver the items to customers.

## 2.4 Operating Environment

There are two modes of using the software - **mobile applications** and **web applications.** Mobile apps can be run on any android, iOS versions. Web applications can be run on Windows 10: Google Chrome (78 and later); Mozilla Firefox (70 and later); Internet Explorer (11 and later); Microsoft Edge (18.18362 and later), Mac OS X: Apple Safari (13.0.1 and later). The Internet is a basic necessity for the system to be accessed.

## 2.5 Design and Implementation Constraints

For ease of maintenance, the customer will only be able to make payments once items have been added to cart. There is no option to proceed directly to checkout with an empty cart. Brand specific agendas have been excluded from our design. To build a community of customers, many sites had experimented with creating friendship communities on shopping platforms however, due to the transparency into costs of products, revealing personal expenditures to people even within friendship communities could be seen as too transparent and even a breach of user data protection. This puts a limitation to developers. As these systems lean heavily on the ability to make real-time updates, the servers must be capable of handling sufficiently high traffic bursts, which may not always be the case. Logistically, most companies outsource their tasks to a third-party organization which costs them more control over their implementation. Due to interfaces with payment methods like google pay or PayPal, the risk for middle attacks is often higher and may require additional safety at payment gateways. The recommendation system is assumed to be a server-side feature. Our system is also partial to the needs of the customer more than it is to the seller. Customer functionalities have been more elaborately designed than Seller functionalities.

## 2.6 Assumptions and Dependencies

Under the assumption that a Windows/iOS/Linux based operating system is available with C++/Python working along with database management software available, designing a modular view of the system is smooth. For a basic tool we are also assuming that only one customer may place an order at a given time but will attempt to expand the scope. The recommendation models are assumed to be dependent on the server and its functionalities though relevant to customers will be more clearly defined by the server.

# 3. External Interface Requirements

## 3.1 User Interfaces

**-> Home Page**:

* The home page of this online shopping system is designed to be attractive and user friendly.
* It includes - search bar, buttons like Sign in, Cart, & Orders, Buy Again, Browsing History, Sell, Registry, Delivery Address and All Options & Categories.
* It also displays the top selling products in some of the popular categories like electronics, clothing, skin care etc. It advertises the current sales, discounts and offers.

**-> Sign in**:

* This page allows the users with an from account under this online shopping system to Sign in to their account. The user can Sign in either with their phone number or email id.
* The user, after entering their email id or phone number can click on the continue button. If the entered email id or phone number is valid, the system asks the user to enter the password which if entered correctly, takes the user to the homepage of the system and the user name is displayed on the top navigation bar.
* If the entered email id or phone number is wrong, the system displays an error message saying ‘Incorrect email id (or phone number)’ and ‘We cannot find an account with that email id (or phone number)’.
* If the email id or phone number entered by the user is valid and the password entered is invalid, then the system displays an error message saying ‘There was a problem’ and ‘Your password is incorrect’.
* There is also a ‘Keep me signed in’ checkbox which is optional. If the user checks it, then the system keeps the user signed in.
* The sign in page also has a ‘Create Your Account’ button to new users. The user on clicking that button is taken to the Create Account page.

**-> Create Account:**

* This page allows users to create a new account. The user is asked to provide their Name, Email id and password. The constraint on the password field is that the password must contain at least 6 characters.
* The user is also asked to re-enter the password after which the user can create a new account by clicking on the ‘Create your Account’ button.
* There is a sign-in field on this page for the users who already have an account.

The user shall be taken to the sign in page after clicking on it.

* There is also a field for creating a business account if the user is purchasing products for work. After clicking on the ‘Create a Business Account’ field, the user will be taken to the business account creation page. The account creation step is followed by the steps providing business details and verification process after which the business account creation will be completed.

**-> Orders:**

* This page provides the user with complete information about their orders. It has multiple fields which are ‘Your Orders’, ‘Open Orders’, ‘Buy Again’, ‘Cancelled Orders’.
* Your Orders page gives information about all the orders placed by the user. It gives the user various options like ‘Buy it again’, ‘View your item’, ‘Track Package’, ‘Return or replace items’, ‘Leave seller feedback’, ‘Write product review’ which provide appropriate functionalities.
* The ‘Open Orders’ field provides the user with the complete information about the orders that the user has placed and hasn't been shipped yet. The ‘Buy Again’ field allows the user to buy their ordered items again.

**-> Cart:**

* This page allows the user to save the items they wish to buy in the cart. It provides information about all the items added to the cart by the user. For each item in the cart functionalities like ‘Delete’, ‘Save for later’ and ‘Compare with similar items’ are provided to the user.
* The user can select all the items they wish to buy from the cart by clicking the checkbox next to each item. The user can then select the ‘Proceed to check out’ button to proceed with purchasing the item(s).

**-> User:**

* This page provides the user some information about their activities in the online shopping system. This includes fields like ‘Recommended for you’, ‘Improve your recommendations’.
* ‘Your Browsing History’ field provides the user with the information about the items they have searched.
* The ‘Recommended for you’ section lets the user find new products that may interest them. Based on the history of the user’s orders and their evaluations, new products that may interest them will be recommended.

**-> Sell:**

* This page allows the users to sell their products on this online shopping system. The user wishing to sell their products must sign up as a seller. This requires the user to provide certain details about themselves and their business such as business location, contact, address.
* Once the user has been registered as a seller, the user has to upload their product listings to the online shopping system. The customers can then choose to buy the seller’s products. The seller must then deliver the products to the customers and receive payment.

**-> Delivery Address Field:**

* This field allows the user to change the location of delivery of the products.
* The user can also specify a default address for the deliveries.

**-> User Account and Lists Field:**

* This field provides the users with various functionalities and account details like ‘Your Orders’, ‘Your payments’, ‘Login and security’, ’Recommendations’ etc.

**-> Options and Categories Field:**

* This section displays various categories of products from which the user can shop.
* This section also provides various programs and features of this online shopping system.
* Here is also provided with various help and settings options for the convenience of the users.

**-> Product Details Page:**

* The users while searching for products, can click on them to view the complete information about the products.
* This usually includes one or more images of the product, product’s name, features, price, brand that is selling it etc.
* The user after viewing the product details can then add the product to cart or buy it by clicking on the ‘Add to cart’ or ‘Buy now’ buttons respectively.
* By clicking on the ‘Buy now’ button, the user will be asked to select a payment method and click on the ‘Continue’ button to proceed with placing the order.
* The user is provided with the billing details of the product. Then, the user can also review the order, edit the delivery address and click on ‘Place your order’ button to complete placing the order.

## 3.2 Software Interfaces

* All the web pages of this Ecommerce system are majorly built using development tools like HTML, CSS, JavaScript, Bootstrap, Django, MySQL etc.
* This online shopping system is accessible through the internet on any Operating System like Unix, Linux, Mac, Windows, etc.
* This system stores the product data, customer data and seller data in multiple databases which are present in data centers located at various geographical locations. The types of databases mainly include MySQL database, etc.
* The complete information about the products is stored in the databases of the system. The content manager gets various information about the product like the images of the product, product’s name, features, price, brand that is selling it, product reviews, product ratings etc. which is displayed to the users.
* The system shall communicate with the bill-paying system to identify the available payment methods, validate the payments, and process them. The data which includes customer email id/ phone number, selected bill payment method, product id of the products selected to be purchased, their quantities, prices and payment details like (Card number, Name on the card, Expiration date etc) are shared with the bill-payment system.
* The system shall communicate with the Sales system for order management. The orders placed by the customers are managed by the Sales system based on the order details, the date & time when the order was placed, delivery address of the product(s) and approximate delivery date.
* The system shall communicate with the shipping system for tracking orders and updating of shipping methods. Once the order is placed, the shipping system is responsible for updating the users about the shipping process of the products they ordered. The updates are provided to the customers by sending messages to their phone number and email id about the shipping process.

## 3.3 Communications Interfaces

* The user can access the E-Bazaar E-commerce system through the internet by searching the system’s name on the web browser.
* The system shall use the HTTP protocol for communication over the internet.
* The system shall give confirmation to the customer that their order is placed by sending a message to the customer’s email id and phone number.

# 4. System Features

1. **User Authentication and Authorization:**

- User registration and login.

- Differentiate user roles (Buyer, Seller, Auctioneer, Wholesaler, Admin).

- Secure authentication mechanisms (e.g., password hashing, session management).

2. **Product Management:**

- Add, edit, and delete products.

- Product categorization and filtering.

- Inventory management (quantity tracking, stock notifications).

- Product search functionality.

3. **Auction System:**

- Create and manage auctions for bulk quantities.

- Bidding functionality for buyers.

- Auction closing and winner determination.

4. **Shopping Cart and Checkout:**

- Add/remove products to/from the cart.

- Multiple payment options.

- Checkout process with order confirmation.

5. **Order Management:**

- Track order status (processing, shipped, delivered).

- View order history and details.

- Order cancellation and refund management.

6. **User Interaction and Communication:**

- Messaging system for users (buyer-seller communication).

- Review and rating system for products and sellers.

- Wishlist for users to save desired products.

7. **Seller Tools:**

- Dashboard for sellers to manage products and orders.

- Seller analytics and reporting tools.

- Bulk upload for product listings.

8. **Admin Panel:**

- Administrative controls and user management.

- Product and user moderation.

- Analytics and reporting for system usage.

9. **Mobile Responsiveness and Cross-Platform Compatibility:**

- Ensure the platform is responsive across various devices (desktop, tablet, mobile).

- Compatibility with different browsers and operating systems.

10. **Performance Optimization:**

- Fast loading times for product listings and pages.

- Scalability for handling increased user traffic.

- Cache management and optimization.

# 5. Other Non-functional Requirements

5.1 **Performance Requirements**:

* Response Time: The platform should load product pages within 2 seconds and process checkout requests within 5 seconds to ensure a seamless user experience.
* Scalability: The system should support a minimum of 10,000 simultaneous users during peak times without a degradation in response time or system performance.
* Throughput: The platform should handle at least 500 transactions per minute without affecting performance.

5.2 **Safety Requirements**:

* Data Protection: Safeguards must be in place to ensure that sensitive user information, such as payment details, is encrypted during transmission and securely stored to prevent unauthorized access.
* Compliance: Adherence to GDPR and PCI DSS regulations to protect user data and ensure secure payment processing.
* Safety Certifications: The platform must comply with industry-standard safety certifications to ensure the safety and privacy of users' information.

5.3 **Security Requirements**:

* User Authentication: Implement secure user authentication mechanisms (e.g., two-factor authentication) to prevent unauthorized access to user accounts.
* Data Integrity: Ensure data integrity and prevent data breaches by implementing robust security measures against common threats like XSS, CSRF, and SQL injection.
* Privacy Compliance: Comply with privacy regulations, ensuring user data privacy and consent for data usage and sharing.

5.4 **Software Quality Attributes**:

* Reliability: The platform should have a reliability rate of 99.9%, minimizing downtime and ensuring continuous availability.
* Maintainability: Codebase should follow best practices and be well-documented to facilitate future updates and maintenance.
* Usability: Prioritize ease of use for both buyers and sellers, ensuring an intuitive and user-friendly interface.

5.5 **Business Rules**:

* Role-Based Access Control: Differentiate functionalities and access levels for different user roles (buyer, seller, auctioneer, etc.).
* Product Listing Policies: Define rules and restrictions for product listings, ensuring compliance with platform guidelines.
* Transaction Regulations: Define rules for order cancellations, returns, and refunds based on business policies and legal regulations.

# 6. Other Requirements

A robust commercial backend that delineates customer and seller information is necessary. A general management backend with inventory and general system requirements is also required.

Authorization from payment services is needed for customers to be able to make payments through payment gateways. A defined privacy policy, SSL certification and two-step verification through external mail or phone number is also necessary to ensure no breach in both user data and system data.

# Appendix A: Glossary

Some key terms used repeatedly throughout the document are

1. **Customer subsystem**: A subsystem within the online shopping system support for customers
2. **Seller subsystem:** A subsystem within the online shopping system support for sellers
3. **Seller listing:** Sellers will add their product listings to the system
4. **Turnover:** net sales generated by the system
5. **avg response time:** average time taken to respond to a user request
6. **failure rate:** frequency of failure of an individual component
7. **Liability failure rate:** amount of product or service defects that hold the system liable
8. **Inventory turnover:** ratio that measures the number of times **inventory** is sold or consumed in a given time period
9. **brand awareness:** marketing term that describes the degree of consumer **recognition** of a product by its name
10. **Fulfilment cost: costs** associated with receiving and storing products along with processing orders from handling to shipping.

# Appendix B: Analysis Models

**4.1 CUSTOMER USE CASE DIAGRAM:**

A screenshot of a diagram

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**2) SELLER USE CASE DIAGRAM:**

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**3) SELLER ACTIVITY DIAGRAM:**

A diagram of a software

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**4) USER ACTIVITY DIAGRAM:**

**A diagram of a flowchart

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**5) Class Diagram:**

**A computer screen shot of a computer

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**6) Sequence Diagram:**

**A diagram of a project

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**7) Communication Diagram:**

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**8) Component Diagram:**

**A screenshot of a computer

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**9) State Diagram:**

**A diagram of a flowchart

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**10) Deployment Diagram:**

**A diagram of a process

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# Appendix C: To Be Determined List

1. User Interface Design Guidelines: Specific design elements, color schemes, and UI/UX guidelines are pending approval from the design team.

2. Detailed Performance Metrics: Specific thresholds for response times, throughput, and scalability need further analysis based on load testing and user feedback.

3. Payment Gateway Integration: The choice of payment gateways and the integration process are pending evaluation and selection by the finance team.

4. External Service Integrations: Finalization of third-party services (shipping, analytics, etc.) and the integration methods required.

5. Regulatory Compliance Details: Detailed documentation regarding compliance with GDPR, PCI DSS, and other data protection regulations.

6. Specific Security Measures: Final determination of specific security measures (e.g., encryption standards, firewalls) to be implemented based on security assessment results.

7. Mobile Application Development: Deciding on the mobile app development framework and specific features for the mobile application.

8. Customization and Personalization Features: Requirements for personalized product recommendations, user-based preferences, and customization features need further clarification.

9. Promotional and Marketing Strategies: Finalization of marketing strategies, promotional campaigns, and their integration within the platform.

10. User Support and Helpdesk System: Determining the structure and features of the user support system, including FAQs, live chat, or ticketing system.

11. Reporting and Analytics Needs: Identifying the specific metrics, reports, and analytics required by stakeholders for performance evaluation.

12. Documentation Standards: Determining the format and standards for system documentation, including user manuals, technical guides, and API documentation.

13. Product Listing Policies: Defining specific guidelines for product listings, including image sizes, descriptions, and allowable content.

14. Business Rules and Restrictions: Further clarification on business rules regarding user interactions, returns, refunds, and order processing.

This list highlights areas where specific details or decisions are pending, requiring further discussion, analysis, or stakeholder input to finalize the requirements and details for the successful development and implementation of the e-commerce platform.