

**North South University**

**Department of Electrical & Computer Engineering**

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| **Course Code:** | **CSE327** |
| **Section:** | **09** |
| **Course Name:** | **Software Engineering** |
| **Faculty Initial:** | **MMA1** |
| **Group ID:** | **04** |
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**1.** **Introduction:**

The Second-Hand Marketplace Management System is an online platform designed to facilitate the buying and selling of used items in a secure, organized, and user-friendly manner. In today’s digital era, second-hand trading has become increasingly popular due to its cost-effectiveness and positive environmental impact through product reuse. However, traditional second-hand markets often face issues such as lack of trust, product misrepresentation, and limited communication between buyers and sellers. This project aims to solve these challenges by developing a well-structured database-driven system that enables verified users to trade items efficiently and transparently. The platform allows sellers to post detailed product listings under specific categories, while buyers can search, negotiate, and place orders easily. Administrators ensure quality control by monitoring users, moderating listings, and maintaining overall system integrity.

**1.1 Purpose of the Project:**

The main purpose of the Second-Hand Marketplace Management System is to create a safe, organized, and efficient online platform where people can buy and sell second-hand items conveniently. In real-life situations, many people want to sell used products such as books, electronics, clothes, or furniture, but they often face difficulties like a lack of trust, poor communication, and fraudulent activities in existing informal marketplaces. This project aims to solve those issues through a well-structured, database-driven system that ensures transparency, security, and convenience for both buyers and sellers.

A major goal of this project is to build trust among users by introducing verified profiles, user ratings, and product review features. These elements help buyers identify genuine sellers and good-quality products while also allowing sellers to gain credibility through positive feedback. The inclusion of an admin panel ensures quality control and monitoring, helping to prevent fake accounts, misleading posts, and inappropriate product listings. Another important purpose is to apply advanced database design concepts in a practical environment. This includes creating an entity-relationship model, relational schema, and implementing SQL-based CRUD (Create, Read, Update, Delete) operations. By doing this, the project connects theoretical database knowledge with real-world applications, showing how data can be effectively organized, retrieved, and managed across multiple entities such as users, products, orders, and payments. Additionally, the system aims to simplify the process of trading second-hand goods by enabling buyers and sellers to negotiate prices, make offers, and complete transactions efficiently. It supports both delivery options and direct meetups, giving users flexibility while maintaining transaction safety and proper data tracking. These features make the platform not only user-friendly but also secure and reliable for managing online second-hand exchanges.

**1.2 Intended Audience**

* Developers: For understanding the database, APIs, and modules to be implemented.
* Test Engineers: For validating the functional and non-functional requirements.
* Project Manager & Instructor: For project tracking, evaluation, and risk management.
* End Users (Buyers/Sellers/Admin): For understanding the features and usability expectations.

**1.3 Intended Use:**

The Second-Hand Marketplace Management System is an online platform for secure, transparent, and efficient exchange of used goods. These include books, electronics, clothing, and furniture. Its fundamental purpose is to establish a trusted peer-to-peer trading ecosystem. Users can transact without issues thanks to mandatory user verification and a robust mutual rating and feedback system. This ensures accountability for all Buyers and Sellers.

The system is a secure and scalable online application that runs on the web. Users can access it using standard web browsers. Registration and profile verification are required for all users. This ensures a trusted trading environment.

**1.4 Product Scope:**

The Second-Hand Marketplace Management System is an online web application developed to enable secure and efficient transactions of pre-owned items among verified users. The primary objective of the platform is to establish a reliable and transparent environment for the exchange of used goods, including books, electronics, clothing, furniture, and various household products.

The system allows users to register as buyers or sellers, complete profile verification, and participate in trading activities with assurance. Sellers are able to create product listings that include images, prices, and detailed descriptions. Buyers can browse available items, negotiate prices, and place orders using a user-friendly interface. The platform incorporates extensive administrative controls to ensure product authenticity, moderate content, and oversee user activities.

The system is designed to achieve the following objectives:

* Provide user registration, authentication, and profile verification for buyers, sellers, and administrators.
* Allow sellers to list, update, or remove second-hand items under relevant categories.
* Enable buyers to browse items, add products to a cart, and complete purchases securely.
* Support messaging between buyers and sellers for price inquiries and negotiation.
* Manage transactions through an order and payment tracking module.
* Provide administrators with tools for user management, product moderation, and report generation.
* Implement data modeling using ERD and relational schema, ensuring efficient data storage and retrieval.
* Maintain data integrity and scalability for future expansion of features such as bidding, rating, and delivery tracking.

**1.5 Risk Definitions:**

The development and deployment of the Second-Hand Marketplace Management System involve several potential risks that may affect the system’s functionality, performance, and user experience. Identifying and addressing these risks early in the project lifecycle ensures system reliability, data security, and successful implementation. The major risk categories and their definitions are as follows:

### 1. Technical Risks

Technical risks arise from challenges in the system’s design, implementation, and technological dependencies.

* Database schema or relational design errors may cause data loss, data duplication, or inconsistent relationships among entities including users, products, and orders.
* Difficulty in integrating multiple system components (user module, chat system, order management) may lead to functional incompatibilities.
* High traffic loads or inefficient queries may degrade response time, affecting overall system performance.
* Weak authentication mechanisms or unprotected user data could lead to unauthorized access, data breaches, or identity theft.

### 2. Operational Risks

Operational risks refer to issues that could impact the system’s day-to-day functioning or maintenance.

* Hosting server failures may interrupt platform availability for buyers and sellers.
* Improper use of the system (fake profiles, scams, or inappropriate listings) could reduce platform credibility.
* Absence of regular backups could result in irreversible data loss in case of hardware failure or cyber incidents.

### 3. Project Management Risks

These risks are associated with project planning, execution, and resource allocation.

* Delays in development stages (such as database implementation or UI design) may impact timely project completion.
* Limited technical expertise or human resources can hinder progress and affect project quality.

### 4. User and Market Risks

These involve uncertainties related to user behavior and market acceptance.

* Users may hesitate to adopt the platform due to trust concerns or unfamiliarity with digital second-hand trading.
* Inadequate interface design or poor system usability may lead to reduced user engagement and retention.
* Negative reviews, fraudulent activities, or unresolved complaints can harm the platform’s credibility.

### 5. Legal and Compliance Risks

Legal risks emerge from non-compliance with regulations or misuse of the platform for prohibited activities.

* Failure to comply with data protection laws (such as misuse of personal information) could result in legal penalties.
* Miscommunication or false claims between buyers and sellers may lead to legal disputes or loss of trust.

**2. Overall Description**

**2.1 User Classes and Characteristics**

**Admin:**

* Manages user verification, moderates listings, resolves disputes, and generates reports.
* Requires advanced controls, analytics, and oversight capabilities.

**Buyer:**

* Registers, browses products, negotiates prices, places orders, and leaves reviews.
* May have varying technical skills; expects a simple, secure, and intuitive interface.

**Seller:**

* Registers, lists products, manages inventory, responds to offers, and completes sales.
* Needs efficient product management tools and clear communication features.

**Secondary Users:**

* Marketing, support, or analytics teams may access data for business insights.

**2.2 User Needs**

**Buyers:**

* Trustworthy listings, secure payments, easy product search/filter, and responsive support.

**Sellers:**

* Fast product listing, clear negotiation tools, reliable order management, and feedback.

**Admins:**

* Efficient moderation, fraud detection, user/product management, and reporting.

**All Users:**

* Data privacy, account security, and smooth communication.

**2.3 Operating Environment**

* Frontend: HTML, CSS, Bootstrap, JavaScript, AJAX
* Backend: PHP
* Database: MySQL (with InnoDB engine)
* Web Server: Apache/XAMPP environment
* Operating Systems: Windows, Linux, macOS
* Browsers Supported: Chrome, Edge, Firefox, Safari
* Hosting: Localhost for dev; cPanel for production

**2.4 Constraints**

**Legal:**

* Must comply with data protection laws.

**Technical:**

* Must support real-time chat and bidding without lag.
* Database must scale with user and product growth.

**Security:**

* All sensitive data must be encrypted; strong authentication required.

**Performance:**

* System should handle high traffic and concurrent users.

**2.5 Assumptions**

* Users have basic internet and device literacy.
* Product data and user inputs are valid and verified.
* Internet connection is available during system use.
* Payment gateway is available and stable.
* Admins actively monitor and moderate the platform.
* Users will follow verification and security protocols.

**3. Requirements**

**3.1 Functional Requirements**

**Authentication & User Management:**

* As a user, I want to register and verify via email/OTP, so that I can securely log in.
* As a buyer, I want to edit my profile and change my password, so that I can manage my identity.
* As an admin, I want to ban or suspend accounts, so that I can ensure safety.
* Register, login, and logout for buyers, sellers, and admins.
* Profile verification including email, phone, or document upload.
* Implement role-based access control to manage different user privileges.

**Product Management:**

* As a seller, I want to add, update, and delete product listings, so that I can manage my sales.
* As a buyer, I want to search and filter items, so that I can quickly find what I need.
* As an admin, I want to approve or reject flagged listings, so that I can moderate content.
* Sellers can categorize products, upload images, and provide detailed descriptions.
* Admin reviews and approves or rejects product listings to maintain quality.

**Negotiation and Chat:**

* As a buyer, I want to chat with a seller in real-time, so that I can negotiate price or delivery.
* As a seller, I want to view past chat history, so that I can review offers.
* Buyers can make offers or bid on products.
* Sellers can accept, reject, or counter offers.
* Implement a bidding system for select high-demand products.

**Order and Payment Management:**

* As a buyer, I want to place an order and choose a payment method, so that I can complete purchases.
* As a seller, I want to track my sold items and earnings, so that I can plan future listings.
* As an admin, I want to review transaction logs, so that I can audit payments.
* Order tracking with status updates (pending, shipped, delivered).
* Secure payment processing integrated with third-party gateways.

**Communication and Notifications:**

* Real-time chat between buyers and sellers with conversation history.
* Notifications for new offers, messages, and order updates.

**Administration:**

* Admin can verify or suspend users and moderate product listings.
* Resolve disputes between users.
* Generate reports on user activities, sales, and disputes.
* Admin dashboard showing site analytics such as active users, products sold, and reports.

**3.2 Non-Functional Requirements**

**Performance:**

The system should handle 100+ concurrent users with response times under 3 seconds (95% requests under 2 seconds). Real-time updates for chat and bidding must be seamless.

**Security:**

Use password hashing, HTTPS, SQL injection prevention, data encryption in transit and at rest, and secure authentication/authorization.

**Usability:**

Interface should be mobile-friendly, intuitive, and responsive on all device types. Accessibility considered for all user groups.

**Reliability:**

The system should maintain over 99% uptime during active hours with automatic data backup and recovery procedures.

**Scalability:**

Architecture should support easy migration to cloud environments and API support for mobile apps. The system should handle increasing users and products without performance loss.

**Maintainability:**

Codebase should follow modular MVC design patterns for easy maintenance and updates, with clear documentation for future developers.

**Portability:**

The system should run on all major browsers and operating systems without compatibility issues.