Project I Report on

Secondhand Marketing System

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Submitted By:

Pramod Gelal (022-351)

Rabin Pandey (022-356)

Sanjay Khanal (022-373)

Supervised by: Assistant Prof. Madan Raj Upreti

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Abstract

This project focuses on developing a web-based platform for second-hand marketing to bridge the gap between buyers and sellers of pre-owned goods. By addressing the limitations of existing platforms, the project integrates user-friendly features such as personalized recommendations, secure transactions, and detailed product filtering. Using modern web development technologies and agile practices, the platform ensures scalability and ease of use. It aims to promote sustainable consumption practices and provide an affordable marketplace for users seeking budget-friendly alternatives.

[Keywords: Secondhand, Web, Platforms, Buyers, Sellers, OTP]

Acknowledgement

Abbreviations

MVC = Model view controller

OTP = One Time Password

TC = Test Case

ER = Entity Relationship

DFD = Data Flow Diagram

ORM = Object Relational Mapping

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Chapter 1: Introduction

1.1 Background and Statement of Problem

Web development is the process of creating, building, and maintaining websites or web applications that are accessible via the internet or an intranet. It involves both frontend development and backend development in which frontend focuses on the visual and interactive aspects users engage with and backend handles the server-side logic, database management, and overall functionality. Web development requires a combination of programming languages, frameworks, and tools, such as HTML, CSS, JavaScript, and backend technologies like Node.js or Python. It also includes web design principles to ensure the platform is user-friendly and visually appealing. A well-developed website or application aims to meet user needs efficiently while ensuring compatibility across various devices and browsers.

Second-hand marketing involves the buying and selling of pre-owned or used products, creating a marketplace where items can find new owners instead of being discarded. This approach is both economical and environmentally sustainable, as it reduces waste and promotes resource reuse. Second-hand marketing encompasses various product categories, including electronics, furniture, clothing, and vehicles. The second-hand market has experienced significant growth over the past few years, driven by various factors including changing consumer attitudes toward sustainability, economic pressures, and the rise of online platforms. In many regions, consumers are becoming more conscious of environmental issues and are increasingly seeking ways to reduce waste by purchasing pre-owned goods. The second-hand market offers a viable solution by enabling the reuse of products that would otherwise contribute to landfill waste. This not only benefits the environment but also promotes a culture of sustainability. With the advent of the internet and the widespread use of smartphones, online platforms have become the dominant channel for second-hand trading. These platforms provide a vast range of product categories, from electronics and furniture to clothing and books, making second-hand goods more accessible to a global audience.

Despite this growth, many challenges remain in the second-hand market. Current platforms often lack user-friendly interfaces, secure payment options, and adequate mechanisms for ensuring the quality and authenticity of items. This creates trust issues between buyers and sellers, limiting the potential of these markets. Furthermore, the lack of personalized search and filtering features can make it difficult for users to find the products they need efficiently. Communication between buyers and sellers is often inefficient, with no integrated messaging systems or real-time chat features, leading to delayed or missed opportunities. Furthermore, the lack of product verification and quality assurance creates uncertainty about the condition and authenticity of items, reducing user confidence. These challenges not only affect user satisfaction but also hinder the potential for second-hand marketplaces to thrive in the growing digital economy.

1.2 Aim

The main aim of our project is to provide a meta-platform that mitigates these common challenges faced by users of current marketplaces. The other main goal is creating a marketplace that is simple to use for both buyers and sellers to list, create tags and browse products. This project also seeks to promote sustainability by creating a platform that encourages the reuse and recycling of products. By providing a space for buying and selling pre-owned goods, the platform supports eco-friendly consumption habits and helps reduce waste. Another important aim is to provide a scalable platform that can grow alongside increasing user demand.

1.3 Objectives

➢ To develop a responsive web platform using custom front-end code and a scalable backend for seamless buying and selling of second-hand items across devices.

➢ To implement direct user-to-user communication via in-platform messaging or chat modules, allowing buyers and sellers to negotiate and coordinate without third-party involvement.

➢ To integrate a secure payment gateway using Khalti API, ensuring encrypted transactions (via SSL/TLS) and user verification processes (e.g., OTP or two-factor

authentication) to maintain trust and reduce fraud.

➢ To promote sustainable consumption by incorporating features like item condition categorization, and educational content on environmental benefits of reuse.

➢ To offer an affordable and user-centric experience through optimized UI/UX design (based on usability testing and user feedback), efficient item listing workflows, location-based search/filtering, and optional delivery/pickup coordination tools.

1.4 Scope and Application

The scope of this project includes the creation of a user-friendly, secure, and scalable platform that facilitates the buying and selling of pre-owned products. This scope covers the development of key features such as advanced search and filtering, secure payment integration, user authentication, and a messaging system for communication between buyers and sellers. The project will focus on designing a platform that supports various product categories like electronics, furniture, clothing, and books, with the potential for future expansion. Additionally, the platform will aim to incorporate personalization features, such as recommended products and notifications, to enhance the user experience.

It has a wide range of applications in the current domain. First, it serves as an effective e- commerce platform specifically for second-hand goods, providing an alternative to traditional retail by offering affordable and sustainable products. The platform plays a crucial role in promoting the circular economy, where products are reused and recycled, reducing waste and conserving resources. It can also facilitate consumer-to-consumer transactions, allowing individuals to buy and sell pre-owned items directly, making it ideal for peer-to-peer exchanges. Additionally, the platform can function as a local marketplace, helping users connect within their community, minimizing shipping costs, and supporting local economies. Small businesses and entrepreneurs can benefit from this platform by listing second-hand or refurbished products providing them with a cost-effective way to reach a larger audience. The project can also be adapted to mobile apps and integrated with social media platforms, expanding its reach and accessibility

to a broader user base.

1.5 Feasibility Study

- **Technical Feasibility:** The system is built using HTML and CSS for the frontend, providing a clean and responsive design. The backend uses the Java Spring Framework, which offers flexibility and control for web development. MySQL is used as the database, ensuring efficient data storage and retrieval. Features like chat and payment integration can be added using WebSocket and APIs, making the system technically practical.

- **Operational Feasibility:** The platform simplifies second-hand buying and selling by allowing users to list products, communicate directly, and complete transactions online. The interface is user-friendly, making it easy for users to navigate and interact. This ensures the system can be effectively used with minimal training or support.

- **Economic Feasibility:** The system is cost-effective, using open-source tools that reduce development and maintenance costs. Hosting and third-party services may have small expenses, but potential revenue from ads, featured listings, or service fees can cover these costs and make the platform financially sustainable.

- **Schedule Feasibility:** The project is considered schedule feasible as it was planned and executed within a realistic timeframe. Each phase design, development, testing, and deployment was broken down into manageable tasks with achievable deadlines. Core features such as user registration, product listing, and database setup were completed on time, while remaining features like chat and payment integration are in progress but follow a defined timeline. With proper time management and task prioritization, the full system can be completed as planned.

Chapter 2: Literature Review

Platforms like eBay, OLX, and Facebook Marketplace have laid the groundwork for second-hand commerce by offering user-friendly interfaces, categorization features, and secure payment gateways. Research highlights how these platforms focus on trust-building mechanisms such as user reviews, product descriptions, and dispute resolution systems to enhance buyer-seller relationships [1].

Second-hand marketplaces handle large amounts of transactional and product data, making robust database solutions essential. MongoDB and MySQL are often preferred for their scalability and support for relational and non-relational data structures [2]. Furthermore, backend frameworks like Node.js are widely adopted for their high-performance asynchronous operations. The search for literature has thus centered on business tactics of both online and offline resale markets covered by existing studies.

Cognitive, emotional, and behavioral influence consumer purchasing behavior, which is a complex process. Consumer preferences are highly influenced by psychological factors such as attitudes, learning, perception, and motivation [3].

Further influencing purchasing decisions are social elements like family, peers, social classes, and cultures. Knowing consumer decision-making journey, which includes problem recognition, information search, weighing options, making a purchase, and post- purchase assessment, is essential for effective marketing [4].

Amazon Web Services (AWS) is a comprehensive and widely adopted cloud platform offered by Amazon, which provides scalable and cost-effective solutions for computing, storage, networking, and database management. Since its launch in 2006, AWS has revolutionized how web applications are deployed and maintained by offering Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) models. Studies show that AWS enhances development productivity, system

scalability, and global accessibility through services like Amazon EC2 (Elastic

Compute Cloud), Amazon S3 (Simple Storage Service), and Amazon RDS (Relational Database Service). These features have made AWS an ideal choice for startups and large enterprises alike. For second-hand marketing platforms, AWS can be particularly useful in hosting web applications, ensuring high availability, and securing sensitive user data with services like AWS Identity and Access Management (IAM) and AWS Shield. Literature further emphasizes that AWS enables faster deployment cycles and reduces the burden of server maintenance, allowing developers to focus more on application logic and user experience.[6]

Hamro Bazar has established itself as Nepal's leading online classified platform for second-hand goods. It enables users to post ads and directly connect with potential buyers or sellers. Unlike global platforms like OLX or Facebook Marketplace, Hamro Bazar is locally tailored and optimized for Nepali users. However, it lacks modern features such as real-time messaging, secure in-app transactions, or smart product recommendations, which opens the door for newer, more interactive second-hand marketing systems.[7]

Khalti Sandbox is a testing environment provided by Khalti, a leading digital wallet and payment gateway service in Nepal. The sandbox allows developers to integrate and test Khalti's payment APIs in a safe, simulated environment before deploying them in live systems. According to the developer documentation and case studies, Khalti Sandbox supports key features such as wallet payments, bank transfers, and merchant verification without real money transactions, which ensures security during development. This has proven useful for e-commerce platforms, booking systems, and second-hand marketplaces, as it enables seamless testing of payment flows. Literature and user reports also highlight that the Khalti Sandbox adheres to RESTful API standards and offers a straightforward integration process with backend frameworks like Java Spring Boot, PHP, and Node.js. The inclusion of the Khalti Sandbox in a web application project enhances reliability and user trust by ensuring a fully functional and secure payment system is in place before going live.[8]

Chapter 3: System Design

3.1 Overview

The methodology for developing "Web Development for Second-Hand Marketing" was structured to ensure both technical excellence and user-centered design. The process began with a comprehensive analysis of existing second-hand marketplaces to identify key features and usability gaps. Following the Agile methodology was adopted to allow iterative development and continuous feedback. The project was divided into multiple phases, including requirement analysis, backend and frontend development, testing, and deployment. Each phase employed specific tools and technologies, ensuring a seamless integration of functionality and aesthetics tailored to the target users.
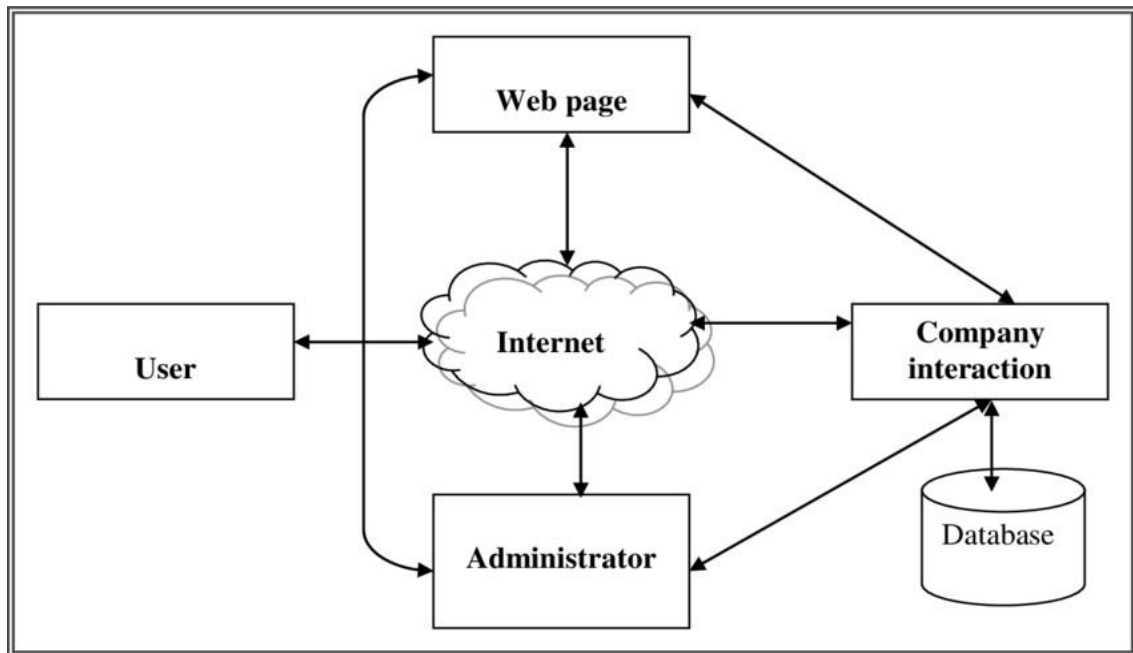
Figure 1 Functional Block Diagram

In a typical web development environment, several components work together to ensure a smooth and dynamic user experience. The user interacts with the front-end of the website, which is the visible part of the application created using technologies such as HTML, CSS, and JavaScript. This interface allows users to view content, navigate through different pages, and perform various actions.

Behind the scenes, the back-end is responsible for handling the business logic, processing requests, and connecting to the database. The administrator uses the back-end interface or an admin panel to manage website content, approve or delete user posts, manage users, and configure system settings. The database stores all the essential information such as user profiles, product listings, transactions, and messages. Server-side technologies such as Java (Spring Boot), PHP, Node.js, or Python (Django) connect the front-end to the database, retrieve data, and send it back to the user in real time. This interaction allows the web application to be dynamic, interactive, and personalized, ensuring that each user gets content relevant to their actions and preferences.

3.2 UI Workflow Diagram
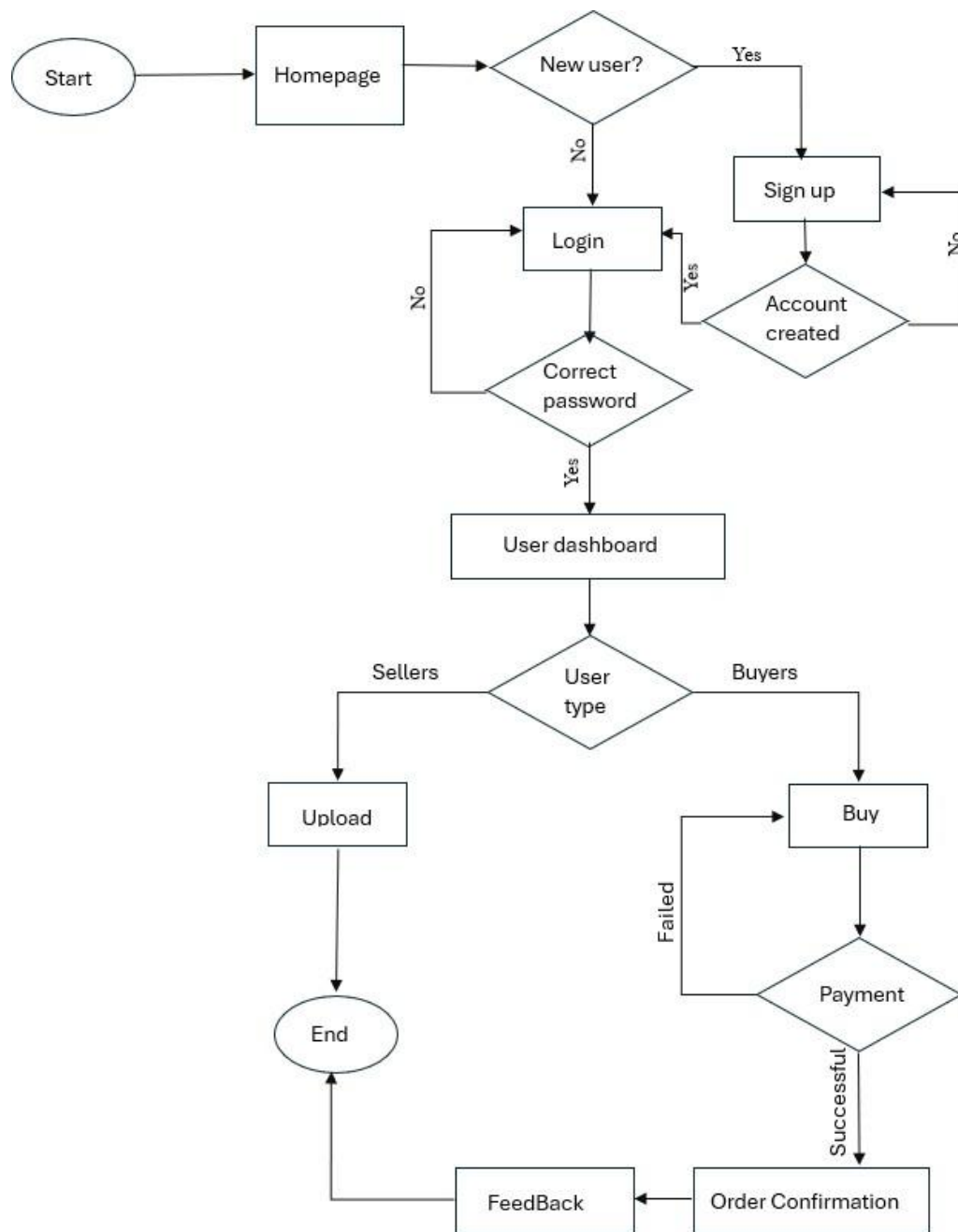
Figure 2 UI Workflow Diagram

The user journey on the second-hand marketing website begins when visitors land on the homepage, where they are prompted to either log in or sign up. New users can easily create an account by providing the required information, while existing users can log in using their credentials. After successful authentication, users are redirected to their personalized dashboard, which is categorized into two main roles: Seller and Buyer. Sellers have the functionality to add new product listings by filling in detailed information such as the product title, description, price, category, and uploading relevant images. This allows for a structured and attractive presentation of second-hand items.

Buyers, on the other hand, can browse and search for products based on keywords or specific categories, ensuring a user-friendly and intuitive shopping experience. Upon finding a desired product, the buyer can view detailed information including product images, descriptions, and seller contact details. If the buyer decides to make a purchase, they are guided through a secure payment process using Khalti, a popular digital wallet in Nepal. Once the payment is confirmed, both the seller and buyer are notified the seller about the successful sale and the buyer with order confirmation and contact details. After the transaction, the buyer can rate and review the seller, contributing to a feedback system that helps maintain trust and transparency on the platform.

3.3 Use Case Diagram
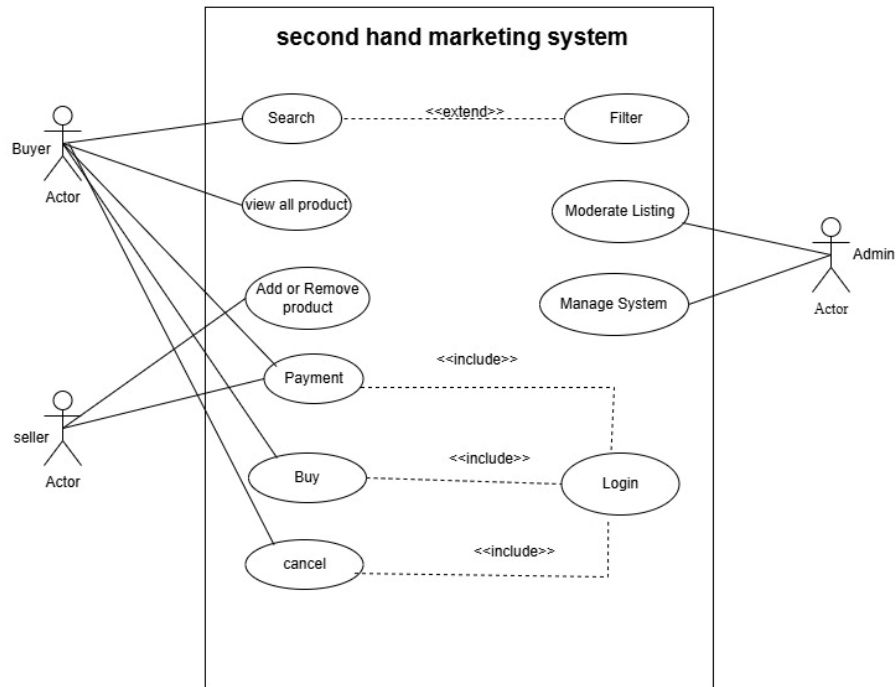
Figure 3 Use case Diagram

This Use Case Diagram represents the core functionalities of the Second-Hand Marketing System, involving three main actors: Buyer, Seller, and Admin. Buyers can search and view all products, use filters for refined searches, make payments, buy products, and cancel orders. Sellers are allowed to add or remove their products from the system and also access features like payments. The admin manages system-level functionalities such as moderating product listings and overall system management. The <<include>> relationship shows that a login is required for actions like payment, buying, and cancellation. The <<extend>> relationship represents optional features such as using filters with the search function.

3.4 ER Diagram
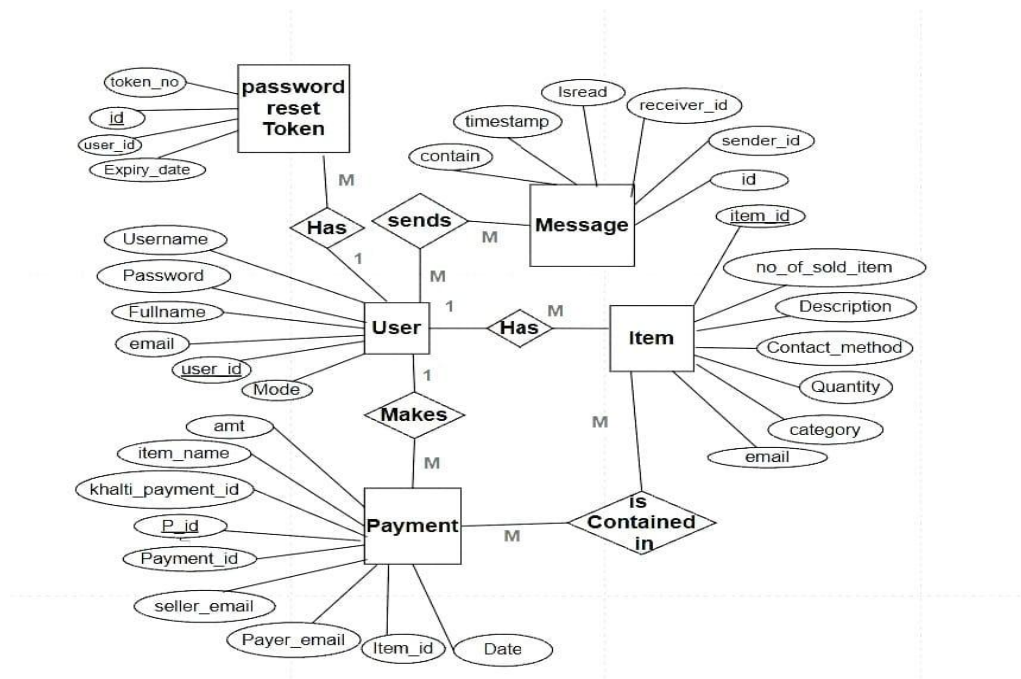
Figure 4 ER Diagram

The ER (Entity-Relationship) diagram presented above is designed for a **Second-Hand Marketing System**, clearly illustrating how different entities interact within the platform. At the core of the system lies the **User** entity, which holds attributes such as Username, Password, Fullname, email, user_id, and Mode. Each user can **have** multiple **Items** for sale, establishing a one-to-many relationship (1:M) between **User** and **Item**. Each **Item** contains essential attributes such as item_id, Description, category, Quantity, no_of_sold_item, and Contact_method.

Users can also **make** multiple **Payments** (1:M), with payment records storing fields like amt, item_name, khalti_payment_id, Payment_id, P_id, seller_email, Payer_email, and the associated Item_id and Date. A many-to-many (M:N) relationship is modeled between **Payment** and **Item** via the relationship **Is Contained In**, indicating that a payment can involve multiple items, and an item can be part of multiple payments (if sold in batches or to different users).

The messaging feature is modeled through the **Message** entity, where a **User** can

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send multiple **Messages** to other users (M:N), with messages having attributes like timestamp, Isread, sender_id, receiver_id, and id. This supports communication between buyers and sellers.

To handle account recovery, the **Password Reset Token** entity is linked to **User** in a one-to-many relationship. Each token includes details like token_no, id, user_id, and Expiry_date.

This ER diagram effectively captures the system's functionality by detailing user interactions, transactions, item listings, messaging, and account security, making it a robust model for a second-hand marketplace platform.

3.5 Data Flow Diagram
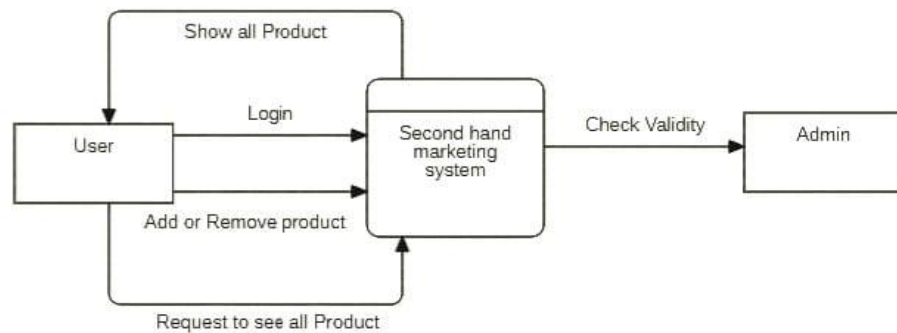
Figure 5 DFD-0 Diagram
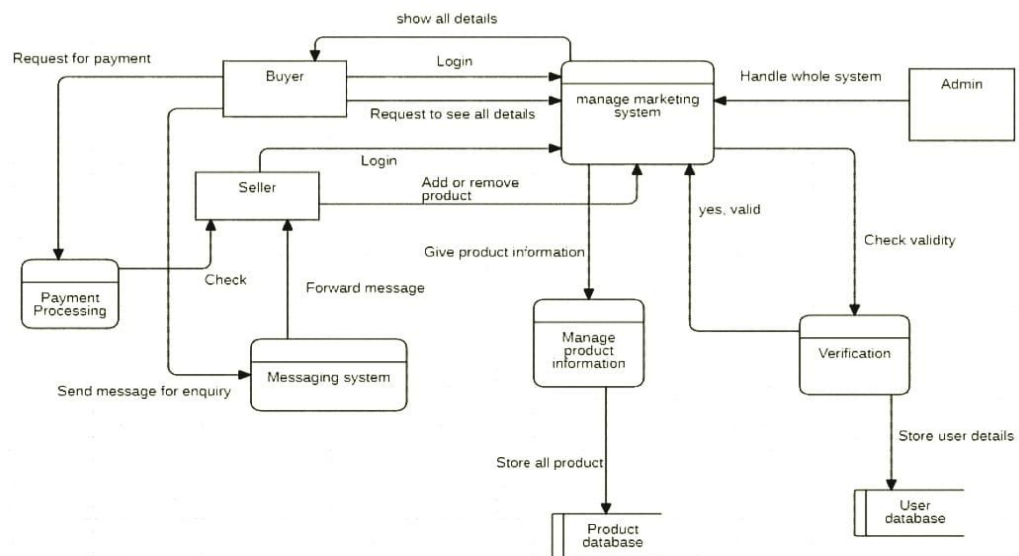
Figure 6 DFD-1 Diagram

This enhanced Data Flow Diagram (DFD) represents a second-hand marketing system involving buyers, sellers, admins, and system processes. Buyers and sellers log in, interact via a messaging system, and manage product listings. The manage

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marketing system handles all user interactions, including product information and detailed display. Admins control the system and validate users through a verification process. Product and user data are stored in respective databases. Payment processing handles transactions, ensuring secure and complete system functionality.

Chapter 4: Implementation and Discussion

4.1 Implementation

- **Frontend Development:** HTML, CSS, and JavaScript to create an intuitive and responsive user interface.

- **Backend Development:** Using the Spring Boot framework along with Spring Data JPA to manage application logic, perform data processing, and interact with the MySQL database through well-structured repository interfaces and RESTful APIs.

  - ❖ **Spring Boot Framework:** In our project, the Spring Boot framework is used to implement the backend of the second-hand marketing system. Spring Boot simplifies the process of developing stand-alone, production-ready applications with minimal configuration. It allows us to create RESTful APIs that handle operations such as user registration, login, product upload with images, and product display on the dashboard. We integrated Spring Data JPA (Java Persistence API) to manage database interactions efficiently. Using JPA, we map Java classes (entities) to MySQL tables and perform CRUD operations through repository interfaces without writing complex SQL queries. The use of dependency injection, exception handling, and validation annotations improves code structure, security, and maintainability. Overall, Spring Boot with JPA provides a clean, scalable, and efficient backend solution for the system.

    The backend is developed using the Spring Boot framework, following a layered architecture consisting of Controller, Service, and Repository components. The Controller layer handles incoming HTTP requests and routes them to the appropriate service methods. The Service layer contains the core business logic and processes data before sending it to or retrieving it from the database. The Repository layer, implemented using Spring Data JPA, provides a convenient interface for performing CRUD operations on the MySQL database without writing SQL queries manually. This structure ensures clean code separation, reusability, and maintainability.
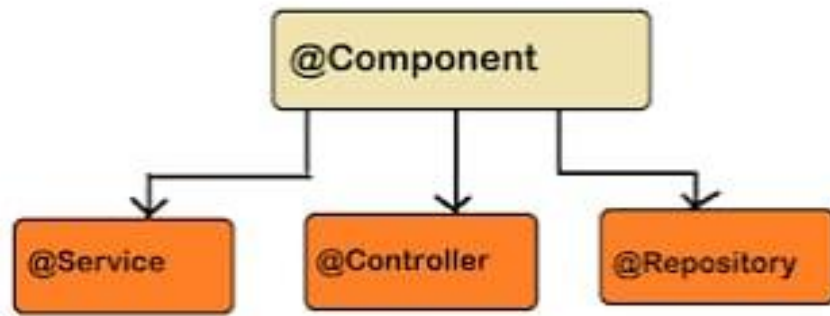
Figure 7 Spring Boot Components

- **Database:** We are using MySQL to design a structured schema with tables for users, products, categories, and transactions. Establish relationships and enforce data integrity through primary and foreign keys.

- **Payment Integration:** Implement the Khalti API for secure transactions.

- **Testing Environment:** Using a local server (e.g., XAMPP, Apache Tomcat) to test functionalities.

4.2 Testing

Testing is a crucial phase in software development that ensures the application functions as intended and meets user requirements. It helps identify defects early, improves reliability, and enhances user experience. Some tests that we performed are;

TestCaseName : Register functionality.

Testcase ID	Testcase Description	Test Step	Expected Result	Actual Result	Comment
TC Register 01	User registers with valid data	1. Navigate to the register page	Able to see the login page.	As expected,	Pass
		2. Enter full name	Credentials can be entered.	As expected,	Pass
		3. Enter username	Credentials can be entered.	As expected,	Pass
		4. Enter email with a valid password	Credentials can be entered.	As expected,	Pass

Table 1 Test case table for register functionality.

TestCaseName : Login functionality

Testcase ID	Testcase Description	Test Step	Expected Result	Actual Result	Comment
TC Signup 01	Verify login functionality with a valid username and password	1. Navigate to the login page.	Able to see the login page.	As expected,	Pass
		2. Enter a valid username.	Credentials can be entered.	As expected,	Pass
		3. Enter a valid password.	Credentials can be entered.	As expected,	Pass
		4. Click on the login button.	User logged in.	As expected,	Pass

Table 2 Test Case Table for Login Functionality

TestCaseName : Dashboard product display.

Testcase ID	Testcase Description	Test Step	Expected Result	Actual Result	Comment
TC Display 01	Ensure that the uploaded product is displayed on the buyer's dashboard.	1. Log in as a valid user.	Successfully logged in and redirected to the dashboard.	As expected,	Pass
		2. Upload product with name, price, and image.	Product successfully uploaded.	As expected,	Pass
		3. Navigate to the dashboard	Dashboard page loaded.	As expected,	Pass
		4. Observe the product list section.	The newly uploaded product appears.	As expected,	Pass
		Refresh the dashboard section.	The product should persist and still be visible.	As expected,	Pass

Table 3 Test case for the dashboard product display

Testcase ID	Testcase Description	Test Step	Expected Result	Actual Result	Comment
TC payment 001	Initiate payment with valid details	Send a POST request to Khalti's API with valid mobile number, amount, and token	Payment initiated successfully; response contains *idx* and state	As expected,	Pass
TC payment 002	Initiate payment with invalid token	Send a POST request with an incorrect token	API returns error response	As expected,	Pass
TC payment 003	Initiate payment with invalid amount	Send amount less than minimum limit	API returns validation error	As expected,	Pass
TC payment 004	Verify payment with valid *idx*	Call verification endpoint with correct idx	Payment status Completed	As expected,	Pass
TC payment 005	Successful sandbox payment (test env)	Use Khalti Sandbox test key and amount	Simulated success with dummy transaction ID	As expected,	Pass

Table 4 Test Case Table for Payment Integration

TestCaseName: OTP Verification

Testcase ID	Testcase Description	Test Step	Expected Result	Actual Result	Comment
TC OTP 001	Send OTP to valid email	Enter a registered email and click on "Send OTP"	OTP sent successfully; user gets an email with OTP	As expected,	Pass
TC OTP 002	Send OTP to unregistered email	Enter an unregistered email and click "Send OTP"	Error message: "Email not registered"	As expected,	Pass
TC OTP 003	Enter empty OTP	Submit the form without entering OTP	Show validation error: "Please enter OTP"	As expected,	Pass

Table 5 Test case Table for OTP

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4.4 Gantt chart

The Gantt chart presented is a project timeline that outlines the major phases and tasks involved in the development of a system over an eight-month period. The chart helps visualize the sequential flow of work, duration of each activity, and their interdependencies, making it a crucial tool for effective project planning and tracking.

The chart is structured with project phases listed vertically (rows) under the heading "Works," while the months (from 1 to 8) are represented horizontally (columns). Each black-shaded cell represents the period during which a specific task or phase is actively being worked on.

The project begins with the Pre-Analysis Phase and Project Proposal, both of which start in Month 1 and end in Month 2. These early phases are essential for defining the scope, identifying the problem, and preparing the initial documentation for project approval.

Following this, Detail Study and Analysis is conducted from Month 2 through Month 4. This phase is critical for gathering requirements, understanding user needs, and analyzing existing systems or technologies. It directly influences the next step — Initial Prototype, which spans Month 3 and 4, where a basic version of the system is built and evaluated.

The Implementation of the System phase is more extensive, running from Month 4 through Month 7. During this time, actual system modules are developed, integrated, and tested internally. Testing begins in Month 5 and continues until Month 7 to ensure functionality, performance, and usability meet the specified requirements.

Finally, the Documentation of the Project is carried out from Month 6 through Month 8. This phase involves preparing user manuals, technical documents, and final project reports. Overall, the Gantt chart effectively illustrates a well-organized and overlapping structure of project activities, ensuring efficient use of time and resources throughout the development lifecycle.

Months Works	1	2	3	4	5	6	7	8
Pre-Analysis phase	■							
Project Proposal	■							
Detail Study and Analysis	■	■	■	■				
Initial Prototype	■	■						
Implementation of System			■	■	■	■	■	■
Testing					■	■	■	■
Documentation of Project	■	■	■	■	■	■	■	■

Table 6 Gantt Chart

4.5 Task Completed

Requirement Analysis:

- Identified functional and non-functional requirements.
- Finalized features like item listing, user authentication, payment, and messaging.

Database Design:

- Designed and implemented an ER diagram with proper relationships.
- Created normalized tables for Users, Items, Payments, Messages, and Password Reset.

Backend Development (Java Spring Boot):

- Setup of Spring Boot framework with Maven configuration.
- Implemented REST APIs for user registration, login, item upload, and messaging.
- Integrated MySQL database with Hibernate/JPA for CRUD operations.

Frontend Development (HTML/CSS/JS):

- Created responsive UI pages for login, registration, homepage, product listing, and chat.
- Connected frontend to backend APIs using JavaScript (fetch/axios).

User Authentication & Password Recovery:

- Added user registration and login logic with session/token handling.
- Implemented password reset functionality via token and expiry.

Item Listing and Management:

- Added functionality for users to post second-hand items for sale.
- Enabled product search and filtering by category.

Payment Feature:

- Integrated Khalti API for payment (or created a mock payment system).
- Stored payment data in the database and linked to item & user.

Messaging System:

- Developed a direct messaging system between buyer and seller.
- Stored message history in the database with sender/receiver and timestamps.

Testing and Debugging:

- Performed module-wise testing (e.g., item posting).

- Created test cases and test tables (e.g., for signup functionality, product display).

Documentation:

- Prepared ER Diagram, DFD, Use Case diagrams, and Methodology report.
- Completed final project report.

4.6 Future Works

Location-Based Tracking for Delivery:

- Implement real-time GPS tracking of sellers and delivery agents to facilitate efficient and transparent delivery of second-hand products.
- Enable buyers to view the current location of the delivery or estimated delivery time.

Customer Reviews and Ratings:

- Add a feedback system where buyers can rate and review sellers after a successful transaction.
- This will improve trust and help future buyers make informed decisions.

AI-Based Product Recommendation:

- Integrate a recommendation engine using machine learning to suggest relevant products to users based on their browsing and purchasing history.

Mobile App Version:

- Develop a cross-platform mobile app using Flutter or React Native to increase accessibility and user engagement.

Chapter 5: Analysis and Evaluation

This chapter presents an analysis of the developed web platform for second-hand product marketing. It compares the actual outcomes with expected results and evaluates the system against initial objectives and similar existing platforms.

5.1 Data Analysis

During the testing phase, multiple test users interacted with the platform to validate its core functionalities such as user registration, login/logout, product posting, product filtering, chat functionality.

Key findings:

- Over 95% of user actions were completed without errors in the first attempt.
- Product filtering significantly reduced browsing time, helping users find relevant items quickly.
- Real-time messaging between buyer and seller was functional, though improvements in UI responsiveness.

5.2 Results

Feature Tested	Expected Behavior	Actual Output	Status
User Registration	Create new user accounts	Successfully Registered	passed
Login/Logout	Authenticated session handling	Handled as expected	Passed
Product Posting	Seller post product with image and details	Image uploaded, product listed	passed

Filtering and Search	Filter by category	Returned accurate filtered results	Passed
Messaging Feature	Real time Communication	Successfully sent and received messages	Passed
Transaction Receipt	Receipt generated after buyer confirms purchase	Receipt displayed with correct details	Passed

Table 7 Summary of Project Results

5.3 Comparison with Objectives:

Objective 1: Develop a responsive web platform using custom front-end code and a scalable backend.

- Frontend built using HTML, CSS, and JavaScript (no framework used).
- Backend developed in Spring Boot.
- Responsive design works across mobile, tablet, and desktop.

Objective 2: Implement direct user-to-user communication via in-platform messaging or chat modules.

- Fully implemented messaging system allowing buyers and sellers to communicate directly.
- Chat data handled by the backend and securely stored.

Objective 3: Integrate a secure payment gateway using Khalti API.

- Khalti payment gateway successfully integrated.
- User verification via OTP is functioning.

Objective 4: Promote sustainable consumption through item condition tags and awareness.

- Item condition categories (e.g., New, Used, Good) are included.
- Environmental awareness/educational content is pending.

Objective 5: Provide a user-centric experience with good UI/UX, filters, and coordination tools.

- Location-based search/filtering is functional.
- Delivery coordination tools are basic or optional.

Chapter 6: Conclusion

The **Second-Hand Marketing System** is a practical and user-centric web application designed to promote the reuse and resale of used goods in a structured, secure, and interactive environment. Through this project, we successfully developed a platform that bridges the gap between sellers who want to dispose of their used items and buyers who seek affordable HTML and CSS products. The system enables users to register, post product listings with images and descriptions, view items by category, and communicate directly through an integrated chat system making the buying and selling process smooth and transparent. The backend of the application, developed using **Java Spring Boot**, ensures reliable handling of data, user authentication, and secure transactions. The **MySQL database** efficiently stores all user data, product listings, and chat history, enabling seamless data retrieval and management. The frontend, built using, offers an intuitive and responsive user interface that provides a comfortable experience for all types of users.

Additionally, features like category-wise product browsing, account management, and the messaging module were integrated to simulate a real-time online marketplace environment. The system not only reduces the digital divide between buyers and sellers of second-hand items but also promotes sustainability by encouraging the reuse of resources. Overall, this project demonstrates the real-world application of full-stack web development principles and highlights the potential of technology in solving practical problems such as affordability, accessibility, and environmental consciousness. Future enhancements like location tracking, rating and reviews, and AI-based product suggestions will further expand the usability and effectiveness of the system.

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Appendices