



Faculty of Computer Science and Information Technology

UNIMAS E-COMMERCE WEBSITE FOR PRELOVED ITEMS AMONG STUDENTS

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**UNIMAS E-COMMERCE WEBSITE FOR PRELOVED ITEMS AMONG
STUDENTS**

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This project is submitted in partial fulfilment of the
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**LAMAN WEB E-DAGANG UNIMAS UNTUK BARANG TERPAKAI DI
KALANGAN PELAJAR**

CHIN KHAI YANG

Projek ini merupakan salah satu keperluan untuk Ijazah Sarjana Muda Sains Komputer
dengan Kepujian (Sistem Maklumat)

Fakulti Sains Komputer dan Teknologi Maklumat UNIVERSITI MALAYSIA

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DECLARATION

I hereby declare that this project is my original work. I have not copied from any other student's work or from any other sources except where due reference or acknowledgement is not made explicitly in the text, nor has any part had been written for me by another person.

Signed,



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ABSTRACT

Many soon-to-be graduate students face difficulty selling their preloved items to freshmen who are in need of affordable preloved items because there are no localized websites available for buying and selling preloved goods. Conversely, freshmen often struggle to find reliable websites for purchasing preloved items, leading to missed opportunities for both groups to benefit from earning money and contributing to environmental sustainability. Therefore, this system is proposed to address these challenges by providing a localized platform specifically designed for UNIMAS students to buy and sell preloved items within their university community. This platform will create a convenient and trusted space where students can easily connect with one another to trade preloved items, fostering a community-driven marketplace that supports both financial gain and sustainability.

ABSTRAK

Banyak pelajar yang akan tamat pengajian menghadapi kesukaran untuk menjual barang terpakai mereka kepada pelajar baru yang memerlukan barang terpakai yang berpatutan kerana tiada laman web tempatan yang tersedia untuk membeli dan menjual barang terpakai. Sebaliknya, pelajar baru sering kali menghadapi kesukaran untuk mencari laman web yang boleh dipercayai untuk membeli barang terpakai, menyebabkan peluang yang terlepas untuk kedua-dua kumpulan untuk mendapat manfaat daripada memperoleh wang dan menyumbang kepada kelestarian alam sekitar. Oleh itu, sistem ini dicadangkan untuk menangani cabaran-cabaran ini dengan menyediakan platform tempatan yang direka khas untuk pelajar UNIMAS bagi membeli dan menjual barang terpakai dalam komuniti universiti mereka. Platform ini akan mewujudkan ruang yang mudah dan dipercayai di mana pelajar boleh berhubung dengan mudah antara satu sama lain untuk bertukar barang terpakai, menggalakkan pasaran yang dipacu oleh komuniti yang menyokong kedua-dua keuntungan kewangan dan kelestarian.

CHAPTER 1: INTRODUCTION

1.1 Introduction

E-commerce today has revolutionized the way of shopping by making it more convenient, accessible, and time-efficient compared with the traditional commerce. E-commerce platforms have increased the reach of buyers and sellers, eliminating all geographical barriers and facilitating faster and smoother transactions. However, most of the time, these conveniences are limited only to bigger, global e-commerce platforms. Conversely, localized e-commerce solutions are limited, especially for buying and selling preloved items within specific communities like university campuses such as University Malaysia Sarawak (UNIMAS). Therefore, there is a need to develop a platform which could facilitate such transactions in a localized way.

Many UNIMAS students, especially those in-campus residential areas, find it very challenging to sell and purchase preloved items due to logistics issues, high shipping costs, and the lack of a nearby marketplace. A localized e-commerce website, aside from helping students manage their belongings effectively, would also encourage reusing items and hence promote sustainability by contributing to less waste. An e-commerce platform will be developed in this project to enable UNIMAS students to buy and sell preloved items easily within the community, saving on costs and logistics while strengthening campus connections through a circular economy within the university.

1.2 Problem Statement

Currently, UNIMAS students still face quite a number of problems when it comes to the selling and buying of preloved items, particularly as graduating students usually find it difficult to carry their belongings home. This situation provides an opportunity for other students to make some money by selling items that they no longer need. Furthermore, freshmen often struggle to find reliable and affordable websites for purchasing preloved items. However, without the existence of a localized website for these transactions, students often encounter challenges such as irrelevant product listings and high shipping fees when using external marketplaces such as Carousell and Mudah, which are not designed for campus-based exchanges. According to Sautan, N. I., & Hassan, N. (2024), e-commerce has made transactions easier with less physical effort and has saved time compared to traditional commerce, whereby one needs to travel physically and collect items. Therefore, there is a need to have a platform that solves these issues, where students can easily buy and sell preloved items within their residential community.

1.3 Aims and Objectives

1. To design a web-based system for facilitating the purchase and sale of preloved items among UNIMAS students.
2. To develop an e-commerce platform that supports the listing, browsing, and transactions of preloved items.
3. To evaluate the e-commerce system using User Acceptance Testing (UAT) to ensure functionality and a positive user experience before launch.

1.4 Scope

This project will design, develop, and implement an e-commerce website for UNIMAS students to buy and sell preloved items, particularly for those living in campus residential areas such as Dahlia, Cempaka, Allamanda, and so on. The platform will serve as a centralized system for connecting buyers and sellers that providing real-time data. Detailed item listings will be one of the major functionalities, where sellers can add descriptions, prices, and photos to make their offerings more appealing and informative. In the listing section, buyers will be able to search the listings by category of the preloved item, thus finding a specific product easier. Since it is an e-commerce website, the system will support transactions through payment methods such as QR and Cash on Delivery (COD).

1.5 Brief Methodology

The Waterfall methodology will be applied in this project. This methodology is chosen because it is a linear, sequential approach that assures structured development with clearly defined stages and well-understood milestones. Each defined phase in the waterfall model has to be finished before moving to the next (Udesh S. Senarath, 2021). Moreover, the Waterfall model allows for orderly arrangement of tasks and detailed documentation at each phase, thereby ensuring clarity and traceability throughout the whole project duration (Heriyanti & Ishak, 2020). The Waterfall model consists of six distinct phases, as shown in Figure 1.1.

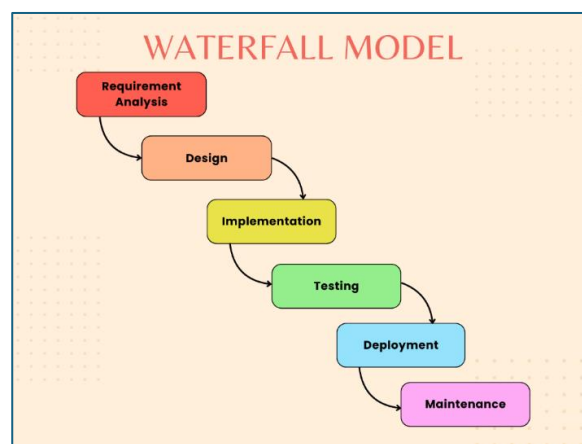


Figure 1.1: Waterfall Model

During requirement analysis phase, the project will begin with requirements gathering of the users through questionnaire method using Google Forms. In the design phase, there will be interface mockups of the E-commerce website created in Figma and user flow diagrams for better visualization of the user experience. The development phase will include front-end implementation using Vue 3.js, JavaScript, and CSS, the back end will be developed by using C# .NET 8 and MySQL as the database. Once development is complete, testing will be done to identify and fix any bugs so that the website functions as expected. The deployment will be done by hosting the platform on a suitable web server. The last phase is the maintenance phase, which consists of ongoing support and updates to maintain the functionality of the website and its relevance.

1.6 Significance of Project

This project provides an opportunity for UNIMAS students to manage their preloved items, minimize waste, and foster a sustainable environment on campus. By developing this platform, it would assist students in looking for necessary items within the campus environment and avoid the need for extremely high shipping fees or long delivery times from external platforms such as Shopee, Lazada, Carousell and so on. Additionally, it promotes a circular economy within the residential campus area, making it easier for students to buy and sell items ranging from textbooks to furniture. The platform also fosters a sense of community by enabling communication between buyers and sellers, allowing them to connect, interact, and build relationships through the exchange of preloved items. This not only strengthens relationships among students but also encourages sustainable practices within the UNIMAS community.

1.7 Project Schedule

The project is planned to start on October 10, 2024, and end on June 30, 2025. Sufficient time has been allocated for each process, including milestones for tracking the progress. The detailed project schedule is presented in a Gantt chart, which can be found in Appendix A.

1.8 Expected Outcome

The project will result in a fully functional e-commerce website that will allow UNIMAS students to easily buy and sell preloved items within their community. In addition, it will also provide students with a convenient solution to handle their belongings.

1.9 Outline of Project Report

This project report is structured into five chapters, which are introduction, literature review, methodology, implementation and testing, and conclusion.

1.9.1 Chapter 1 Introduction

This chapter summarizes the project in relation to the background, problem statement, objectives, scope, methodology, and its significance. It also provides a foundation for one to understand the intent of the project and what it hopes to achieve by outlining the expected outcome and project schedule.

1.9.2 Chapter 2 Literature Review

This chapter discusses a review of related research, articles, and existing platforms associated with e-commerce and the transactions involving preloved items. It highlights the gaps present in existing solutions and discusses the importance of establishing a localized e-commerce platform for the UNIMAS community.

1.9.3 Chapter 3 Methodology

This chapter discusses the methodology of design and development of the e-commerce website. In fact, the explanation goes deep into Waterfall methodology on each phase of requirement analysis, design, development, testing, deployment, and maintenance. The tools, technologies, and techniques used are also elaborated.

1.9.4 Chapter 4 Implementation and Testing

This chapter discusses the practical steps taken to develop the website, such as coding, interface design, and integration of features. It also covers the testing phase in regard to methodologies applied to test the functionality, usability, and reliability of the website.

1.9.5 Chapter 5 Conclusion

This chapter discusses the findings and outcomes of the project, with emphasis on what the project contributed to the UNIMAS community. It will further include an analysis of insights obtained, and possible ways of improving in the future.

1.10 Summary

This chapter begins with the introduction of the project UNIMAS E-Commerce Website for preloved items among students. This website aims to help UNIMAS students find a localized platform in the buying and selling of preloved items within our campus community. The project helps address common student challenges such as high shipping costs and logistic difficulties especially for students that live in campus residential areas. The platform also promotes the reuse of items which help in promoting sustainability and minimizing waste. Besides, it promotes the feeling of the community, increasing the opportunity for students to conduct easy transactions among themselves, and also simplify the way they take care of their belongings while at the same time supporting the environment on campus.

CHAPTER 2: LITERATURE REVIEW

2.1 Overview

E-commerce or electronic commerce is the use of digital media and information technology to conduct product deals and service deals in a way that does not require being in physical stores or having face-to-face interaction (Jain et al., 2021). This digital transformation has revolutionized the way commerce is conducted globally, providing greater convenience, accessibility, and efficiency for both buyers and sellers.

According to Taher (2021), there are six types of e-commerce, namely Business to Business (B2B), Business to Consumer (B2C), Consumer to Consumer (C2C), Consumer to Business (C2B), Business to Administration (B2A), and Consumer to Administration (C2A). B2B refers to a situation where one company sells services to another company. B2C refers to a business organization selling products to individual consumers. A well-known B2C is Amazon. C2C is the selling of goods or services between individuals through platforms such as eBay. When those individuals are selling products or services to businesses, this becomes C2B. For instance, a freelance graphic designer selling their services to a company. B2A involves transactions of goods and services between organizations and governmental authorities, such as submitting tax reports or requesting a license. Lastly, C2A involves consumers engaging directly with government services, such as paying taxes or submitting applications for permits online.

2.2 Introduction

According to Paul & Criado (2020), literature review is a critical review of existing literature on a specific topic or theme, which eventually enhances the knowledge in the concerned subject area. This chapter will review the literature to exploring the fundamental

ideas and findings on e-commerce. By synthesizing prior studies, the literature review aims to strengthen the theoretical basis of e-commerce while identifying knowledge gaps and pointing out potential future research directions.

2.3 Benefits of E-commerce for students

Time saving is one of the important benefits of e-commerce brings to a consumer. E-commerce allows customers to shop at any time, 24/7, all year (Kadam, 2019). It is helpful for people with packed schedules that make it difficult to shop at physical stores. Instead of spending hours of time to travel between retail shops, consumers can order what they want from home or office with a few clicks of their mouse. Furthermore, E-commerce platforms provide customers access to a wide range of products including those unavailable locally, allowing them to compare items easily.

Time saving is one of the key benefits e-commerce offers to students. E-commerce allows students to shop at any time, 24/7, all year (Kadam, 2019). It is helpful for students with packed schedules that make it difficult to shop at physical stores. Instead of spending hours of time to travel between retail shops, students can order what they want from home or hostel with a few clicks of their mouse. Furthermore, E-commerce platforms provide students access to a wide range of products including those unavailable locally, allowing them to compare items easily.

Another benefit of e-commerce is convenience. With e-commerce, consumers can effortlessly shop from anywhere in the world without the need of considering the geographical or physical limitations. It would be helpful for individuals who cannot access to retail shop such as individuals who live in rural areas or with mobility problems. With just an internet connection and a device, customers can simply order from their comfort of either their homes

or office without the need to walk to a store. Additionally, the e-commerce platform provides the convenience of simple and versatile payment methods, including QR Code, Cash on Delivery (COD), bank transfer, and e-wallet. These options allow customers to complete transactions with ease and flexibility, making the shopping experience more seamless and user-friendly.

From a seller's point of view, e-commerce makes it possible to increase sales while reducing operational and maintenance cost. If you operate online, it gives you access to a global market and thus more revenue generating opportunities. It also helps reduce costs associated with traditional retail like transportation and maintenance of stores. Additionally, e-commerce strengthens customer relationships by facilitating better communication through live chat support, enabling fast responses. The ease of use and convenience offered by e-commerce platforms contribute to customer satisfaction, which can lead to greater retention and long-term success for sellers.

2.4 Review on Similar Existing Website

2.4.1 Carousell

Carousell is a multi-category classified and recommerce marketplace founded in 2012 in Singapore. It makes selling easy by making it as easy as snapping a picture and buying as easy as chatting. Carousell is a company that operates across countries such as Singapore, Hong Kong, Indonesia, Malaysia, Philippines, and Taiwan for a variety of products in different categories such as cars, lifestyle items, gadgets and fashion accessories.

2.4.1.1 Product Details in Carousell

Figure 2.1 shows that Carousell displays an entire product details section with key information about items. In this section, there are product images and detailed product descriptions which enable the users to understand the item condition before making any purchase.

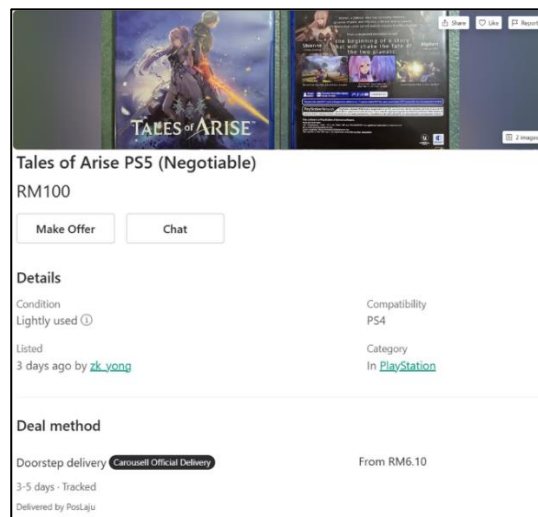


Figure 2.1: Product Details Page of Carousell

2.4.1.2 Product Categories in Carousell

Figure 2.2 shows that Carousell has a strong category filter that allows users to explore a specific category. Users can simply filter through the long list of items using Carousell's category filter, to find products that suit their needs or preferences, rather than scrolling continuously.

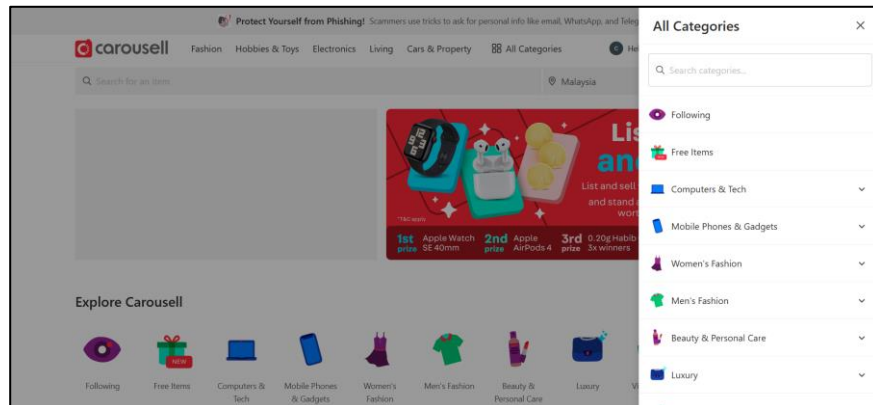


Figure 2.2: Product Categories of Carousell

2.4.1.3 Shopping Cart in Carousell

As seen in Figure 2.3, Carousell has a shopping cart function so the customers can add desired items in their cart. This gives users the ability to review their selection before proceeding to checkout.

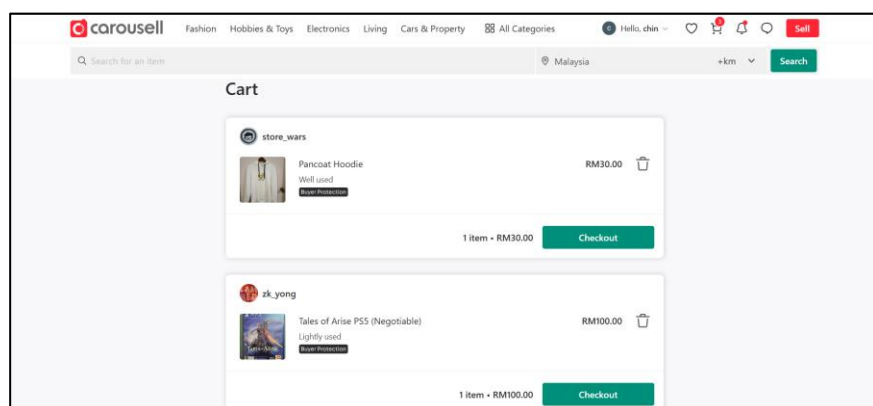


Figure 2.3: Shopping Cart of Carousell

2.4.2 Mudah

Mudah.my also known as Mudah, is a popular online classifieds platform based in Malaysia. Mudah, which is famous for its localized approach, has always focused on the Malaysian market, providing a comfortable and accessible platform for customers to trade not only new products but also preloved goods.

2.4.2.1 Product Details in Mudah

Figure 2.4 shows that Mudah displays an entire product details section with key information about items. In this section, there are product images and detailed product descriptions and specifications which enable the users to understand the item condition before making any purchase.

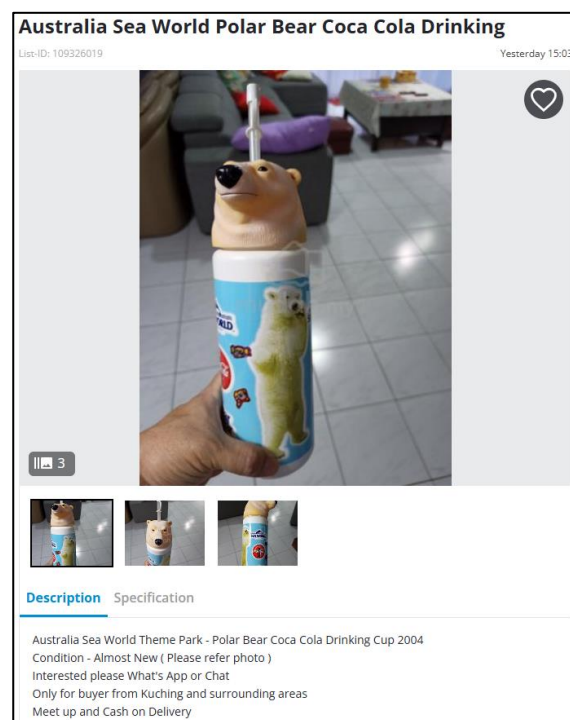


Figure 2.4: Product Details Page of Mudah

2.4.2.2 Product Categories in Mudah

Mudah features a strong category filter as shown in Figure 2.5 that allows users to narrow down their search to a particular category. With Mudah's category filter, users will be able to quickly narrow their options to products that match their needs or preferences rather than scrolling through the long item listings. There are various categories, such as vehicles, electronics, and more, offering a diverse selection to cater to different user interests.

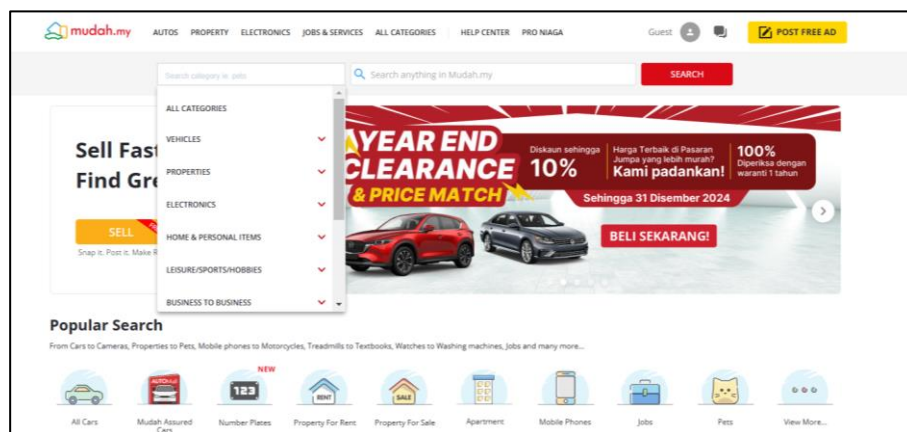


Figure 2.5: Product Categories of Mudah

2.4.3 Barnything

Barnything is more than just an e-commerce platform. It provides a space for people to declutter, share memories, and celebrate the beauty of second chances. Barnything caters to eco-conscious individuals and sentimental souls who want to pass on their cherished items. By giving items a second chance, users not only contribute to a greener planet but also connect with like-minded individuals who value the history and memories attached to each object.

2.4.3.1 Product Details in Barnything

Figure 2.6 shows that Barnything displays an entire product details section with key information about items. In this section, there are product images and detailed product descriptions and condition which enable the users to understand the item condition before making any purchase.

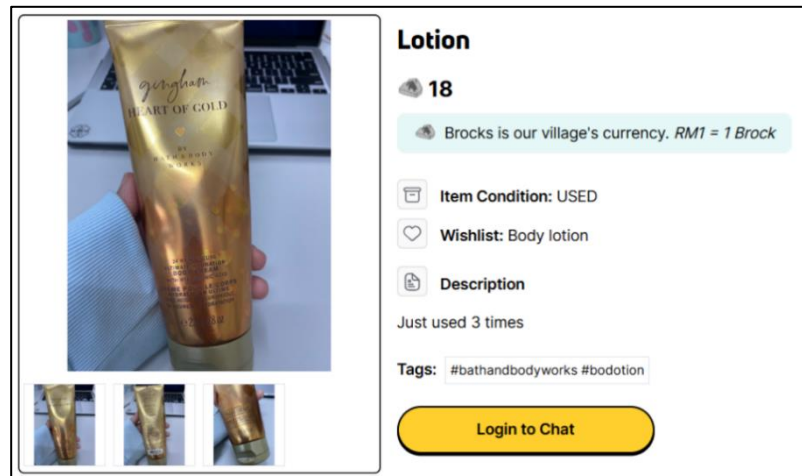


Figure 2.6: Product Details Page of Barnything

2.4.3.2 Product Categories in Barnything

Figure 2.7 shows that Barnything has a strong category filter that allows users to explore a specific category. Users can simply filter through the long list of items using Barnything's category filter, to find products that suit their needs or preferences, rather than scrolling continuously. There are various categories, such as fashion, furniture, and more, offering a diverse selection to cater to different user interests.

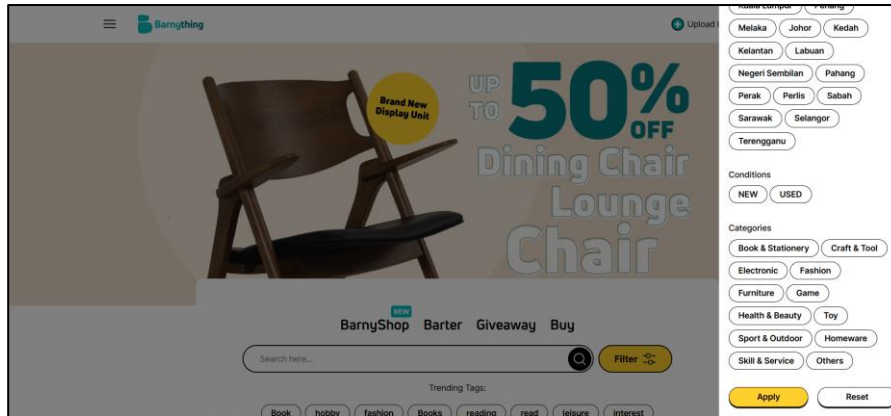


Figure 2.7: Product Categories of Barnything

2.5 Comparison of Reviewed Website

Table 2.1: Comparison of features of existing E-commerce website

Feature	Existing E-commerce Website that sells preloved items			Proposed Website: SecondLife UNIMAS
	Carousell	Mudah	Barnything	
Product Details	✓	✓	✓	✓
Product Categories tailored for Students	✗ (contains irrelevant product categories such as car for sale)	✗ (contains irrelevant product categories such as professional industry equipment)	✗ (contains irrelevant product categories such as toy)	✓
Shopping Cart	✓	✗	✗	✓
Payment Method	✓	✓	✓	✓
Order Tracking	✓	✗	✗	✓
Product Reviews	✓	✗	✓	✓
Real-Time Messaging	✓	✓	✓	✓

This section analyzes the features of the currently existing e-commerce platforms by showing similarities and differences between them, and in particularly describes their functionalities and user-oriented features in detail. Table 2.1 presents a comparison between three existing e-commerce platforms, Carousell, Mudah, and Barnything along with the

proposed system, SecondLife UNIMAS. All three existing websites, together with the proposed system, have basic features such as product details, payment methods, and real-time messaging. These features are very essential for ensuring a seamless transactions and good interaction between a buyer and a seller.

One of the most striking features of SecondLife UNIMAS is its product categories tailored for students. Unlike other existing platforms that have irrelevant categories such as cars, industrial equipment, and toys, the proposed system strongly focuses only on items that align students' needs. This makes it more relevant and useful to its target users, hence filling the gap in the current market.

Only two e-commerce websites, Carousell and the proposed platform support the shopping cart feature. This feature is very important since it saves users' desired items and enables them to review all items in cart at once. Similarly, the feature called order tracking, where the customer can track the status of their orders, is only supported by Carousell and the proposed platform. Lastly, the absence of product reviews on Mudah makes it difficult for customers to evaluate the quality of products and the credibility of sellers.

2.6 Review on Tools and Technology

2.6.1 Vue.js

Vue.js is a progressive JavaScript framework and ecosystem that includes most of the basic functionalities required to build dynamic user interfaces. It utilizes standard web technologies such as HTML, CSS, and JavaScript. It also features a declarative, component-based programming model that greatly facilitates the development of complex applications. For instance, every Vue.js component is divided into three separate blocks, including template tags that define the HTML structure, script tags that embed JavaScript functionality, and style

tags that enable the application of CSS, thus encouraging a clean and modular way of development (Al-asaad et al., 2022). Even if you're new to development, learning Vue.js is rather simple thanks to its comprehensive and understandable online documentation. All you need to know are the basics of HTML and JavaScript. In addition, Vue.js offers great efficiency in reusing the codes, UI designers can create flexible components that can be applied to other webpages to minimize development time (Novac et al., 2021).

2.6.2 MySQL

According to Dawodi et al. (2019), MySQL is a free and open-source relational database management system (RDBMS) developed by Oracle, based on Structured Query Language (SQL). Due to its scalability, reliability and rapid performance, MySQL is widely used, largely in cloud hosting. MySQL allows users to store data efficiently for various applications, websites, and systems, and helps retrieve data easily. MySQL is a key tool for handling massive datasets because it allows you to both search and manipulate data in databases in using the standard CRUD (Create, Read, Update, Delete) operations.

2.6.3 Visual Studio Code

Visual Studio Code, commonly referred to as VS Code, is a free, open-source, and lightweight source code editor developed by Microsoft. It can be run on various platforms, including Windows, macOS, and Linux. It offers a wide range of features, including syntax highlighting, intelligent code completion, debugging, and version control, that help in writing, testing, and managing code efficiently. VS Code supports a large number of programming languages such as JavaScript, HTML, CSS, Python, and Java (Prakash et al., 2022). Moreover,

VS Code allows users to customize the editor by adding specific extensions relevant to their project and further enhance the development experience.

2.7 Summary

In summary, this chapter has provided a comprehensive review of the literature on e-commerce, including its definitions, benefits, and features of existing platforms. This review established a strong theoretical basis for understanding the e-commerce domain while identifying gaps and opportunities of current platforms. This analysis contributes to the development of the proposed system by providing valuable guidelines for tailoring features according to the needs of the target group. The proposed platform can be designed to deliver a more user focused, more efficient and innovative solution, through addressing their limitations and leveraging the strengths of existing systems.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter will focus on the requirement analysis phase and design phase of Waterfall Model as illustrated in Figure 3.1. The requirement analysis phase focuses on gathering and evaluating UNIMAS' s student opinions and needs to define the functional and non-functional requirements of the proposed project. Meanwhile, the design phase takes these requirements and translates them into structured models of the system, such as use case diagrams, activity diagrams, sequence diagrams, and class diagrams, which form the basis for the implementation phase in the subsequent chapter. By collecting valuable insights through a questionnaire and creating detailed visual representations, this chapter ensures a comprehensive understanding of the project scope and system architecture.

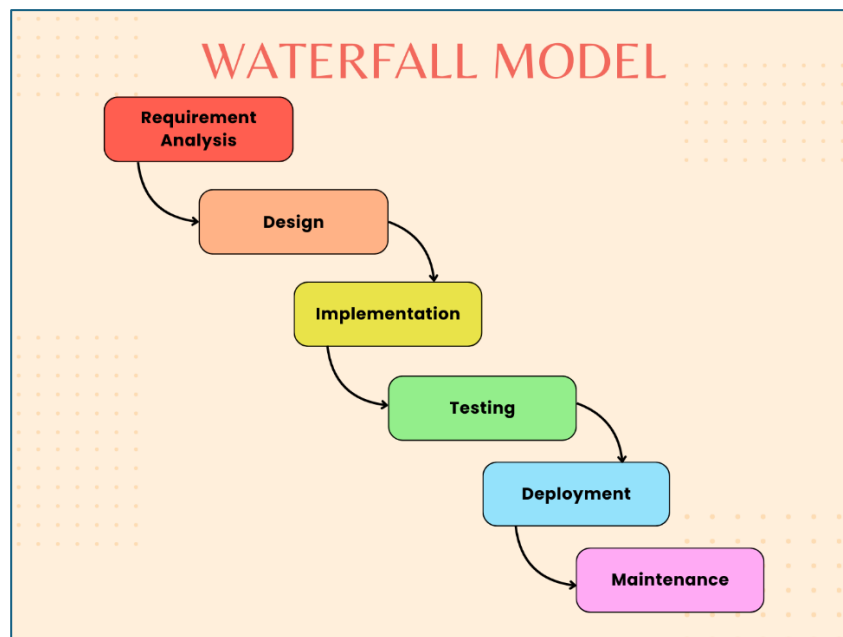


Figure 3.1: Waterfall Model

3.2 Requirement Analysis Phase

3.2.1 Requirement Gathering and Analysis

To collect the requirements needed to develop the platform, a questionnaire-based survey was carried out among 20 UNIMAS students. The detailed questionnaire used for this survey is provided in Appendix B. The questionnaire was divided into four sections. Section A focused on the demographic profile, gathering basic background information about the respondents. Section B focused on current practices and preferences, exploring students' habits and choices in buying and selling preloved items. Section C concentrated on opinions about features, identifying key features that students consider important. Lastly, Section D focused on challenges and expectations, uncovering difficulties with existing platforms and what students hope to see in an improved marketplace.

3.2.1.1 Demographic Profile

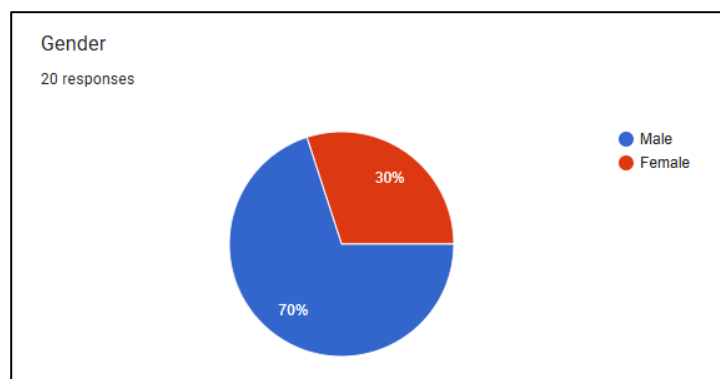


Figure 3.2: Gender Distribution of Respondents

Figure 3.2 illustrates the gender distribution of the respondents, where 14 respondents (70%) being male while 6 respondents (30%) being female.

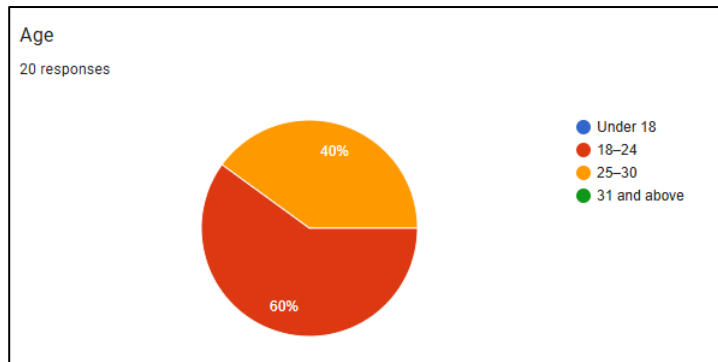


Figure 3.3: Age Distribution of Respondents

Figure 3.3 highlights the age range of the participants, with 12 respondents (60%) falling within the 18-24 age group and 8 respondents (40%) within the 25-30 age group.

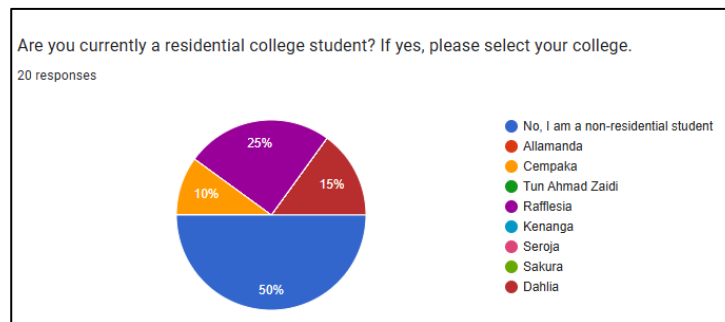


Figure 3.4: Residential Status of Respondents

Lastly, Figure 3.4 examines the respondents' residential status. Half of the respondents (50%) are non-college residents, while the remaining are college residents, distributed as follows: 15% from Dahlia, 25% from Rafflesia, and 10% from Cempaka. These figures provide a demographic overview of the surveyed participants.

3.2.1.2 Current Practices and Preferences

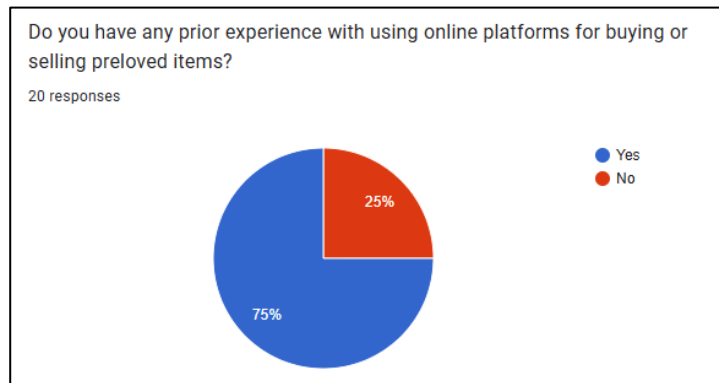


Figure 3.5: Respondents' Experience with Online Platforms

Figure 3.5 depicts the respondents' prior experience with online platforms for buying or selling preloved items, with the majority of 75% indicating they have such experience, while 25% reported no prior experience. This indicates that there is already familiarity and interest among students in using such platforms. It suggests that there is a clear need to develop the proposed system for buying and selling preloved items.

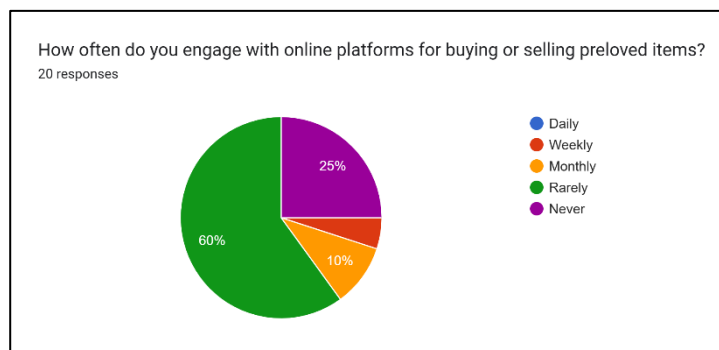


Figure 3.6: Frequency of Using Online Platforms

Figure 3.6 explores the frequency of engagement with these platforms, revealing that 5% use them weekly, 10% monthly, 60% rarely, and 25% never. This data indicates that only a small percentage of respondents use online platforms frequently, while the majority engage with such platforms rarely or not at all. This suggests that there is a lack of platforms

specifically catering to buying and selling preloved items, presenting an opportunity to develop a system that can address this gap and encourage more frequent usage among students.

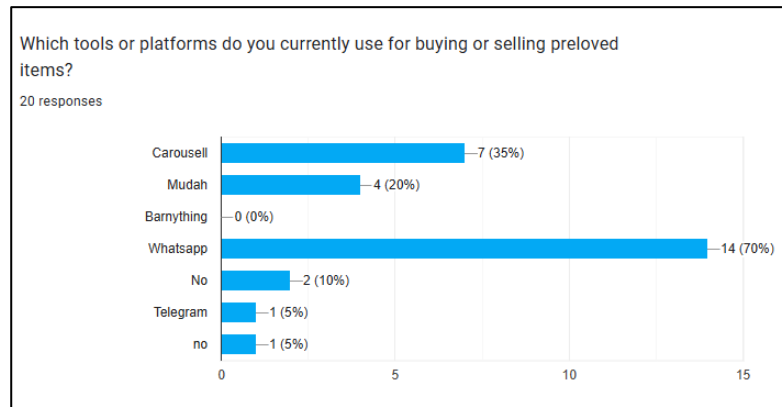


Figure 3.7: Platforms Used for Buying and Selling Preloved Items

Figure 3.7 examines the tools or platforms currently utilized by respondents, with WhatsApp being the most popular choice at 70%, followed by Carousell (35%), Mudah (20%), Telegram (5%), and 15% of respondents indicating they do not use any platform. WhatsApp is the most popular choice for buying and selling preloved items, likely due to its wide accessibility and familiarity among users. Additionally, WhatsApp's quick communication feature, along with the ability to share photos, videos, and product details, helps build trust and facilitates negotiations between buyers and sellers. However, one drawback of using WhatsApp is that its reach may be limited to a specific group, such as people within a particular compound or network. In contrast, the proposed system would allow sellers' products to be seen by everyone in UNIMAS, thereby expanding visibility and increasing potential transactions. This highlights the need to develop a platform that can serve a broader audience and overcome the limitations of WhatsApp.

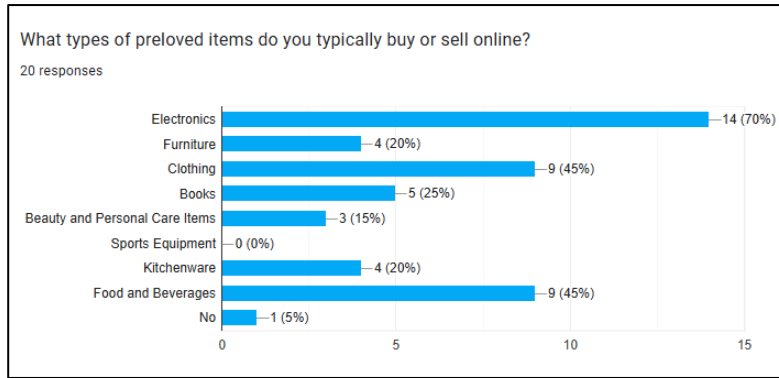


Figure 3.8: Types of Preloved Items Bought or Sold

Lastly, Figure 3.8 highlights the types of preloved items respondents typically buy or sell online. Electronics are the most common, with 70% of respondents buying or selling them, followed by clothing and food & beverage at 45%, books at 25%, furniture and kitchenware at 20%, beauty and personal care items at 15%, and no respondents engaging in sports equipment transactions. Additionally, 5% of respondents reported not participating in the buying or selling of preloved items. Given the diverse range of items, it highlights the need for the proposed system to incorporate effective filters, allowing users to easily search and browse specific categories, thereby enhancing the user experience.

3.2.1.3 Opinions on Features

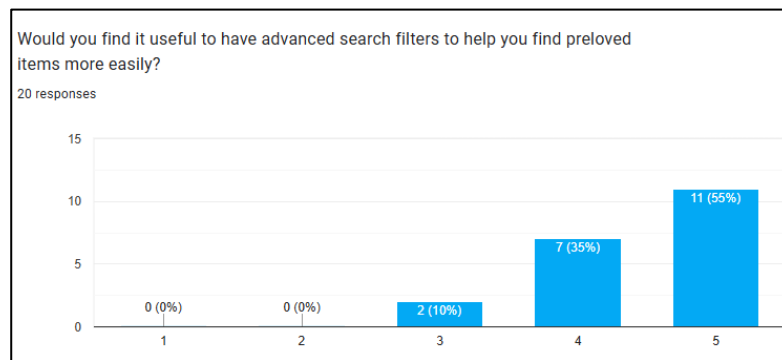


Figure 3.9: Respondents' Perception of the Usefulness of Advanced Search Filters

Figure 3.9 presents respondents' opinions on the usefulness of advanced search filters for finding preloved items more easily. The majority, 55%, rated this feature as "extremely helpful" (5), followed by 35% who rated it as "very helpful" (4), and 10% who found it moderately helpful with a rating of 3. This data indicates that a significant portion of respondents indicates the significant of advanced search filters, suggesting that such a feature would greatly enhance the usability and efficiency of the proposed platform.

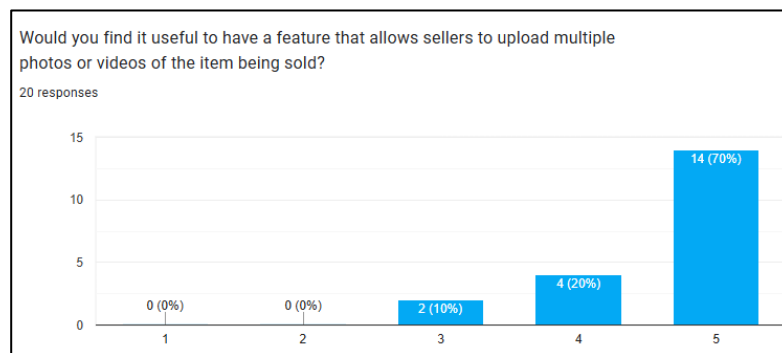


Figure 3.10: Respondents' Perception Usefulness of the Uploading Multiple Photos or Videos

Figure 3.10 presents respondents' opinions on the usefulness of a feature allowing sellers to upload multiple photos or videos of the item being sold. The majority, 70%, rated this feature as "extremely helpful" (5), followed by 20% who rated it as "very helpful" (4), and 10% who found it moderately helpful with a rating of 3. This data suggests that respondents believe

allowing sellers to upload multiple photos or videos would be extremely beneficial for buyers to assess the condition of an item before making a purchase.

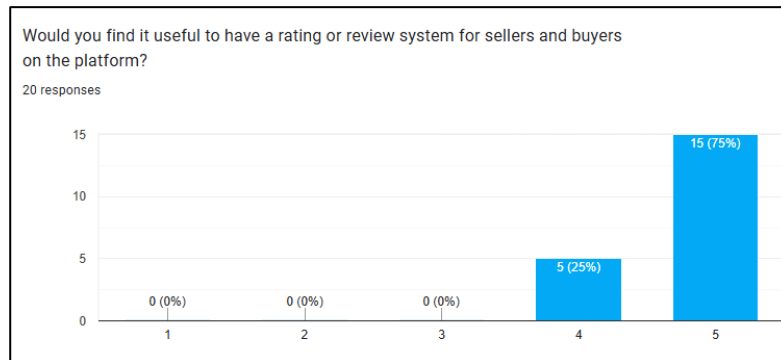


Figure 3.11: Respondents' Perception of the Usefulness of Rating System

Respondents' opinions toward a rating or review feature for sellers and buyers on the platform are presented in Figure 3.11. Majority of the respondents (75%) rated this feature as "extremely helpful" (5) while 25% of respondents rated it as "very helpful" (4). Based on these facts, rating or review systems are a crucial component in helping consumers establish credibility and trust between buyers and sellers, resulting in a safe and credible marketplace.

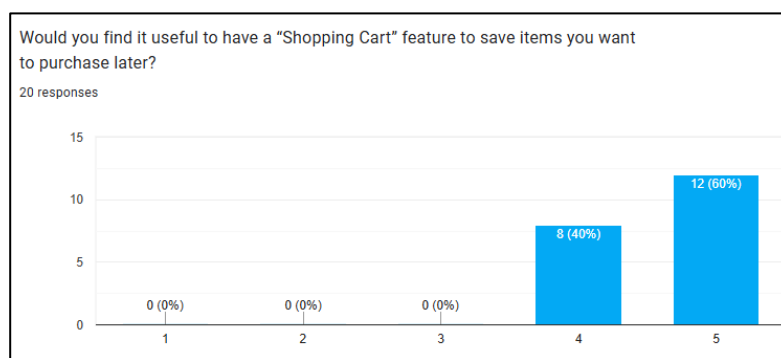


Figure 3.12: Respondents' Perception of the Usefulness of Shopping Cart

Figure 3.12 shows the opinion of the respondents having a "Shopping Cart" feature in the system. Majority of respondents (60%) rated this feature as "extremely helpful" (5) and the 40 % as "very helpful" (4). These data proves that there is a need for the proposed system to

have a "Shopping Cart" feature as this feature as it helps users save time by allowing them to add multiple items to their cart and review all items in one page before proceeding to checkout.

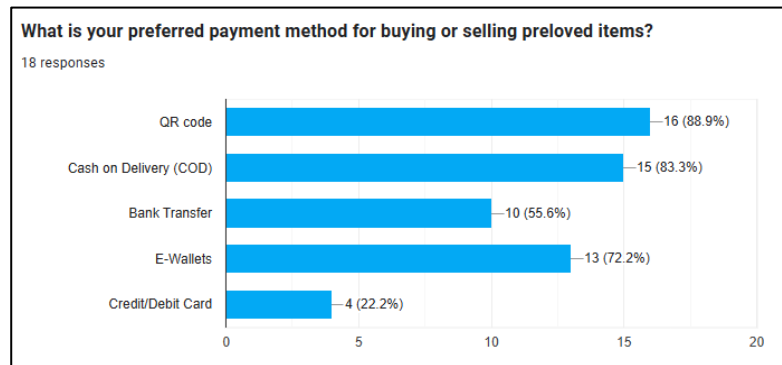


Figure 3.13: Respondents' Perception of the Preferred Payment Methods

Figure 3.13 presents respondents' preferred payment methods for buying or selling preloved items. 16 Respondents choose QR code as their preferred method, followed by 15 who selected Cash on Delivery (COD), 13 who preferred using e-wallets, 10 who chose bank transfer, and 4 who selected debit cards. The data indicates that the majority of respondents prefer QR codes and Cash on Delivery (COD) as their payment methods. This aligns with the proposed system's scope on offering these two payment options, catering to the preferences of most users.

What additional features would enhance your experience with a marketplace for buying and selling preloved item?

4 responses

Certified true seller
record of my progress or reward for my progress
Product Verification Badge to Verified sellers or items to build trust.
nothing

Figure 3.14: Respondents' Suggestions for Additional Features

Figure 3.14 presents respondents' suggestions for additional features that would enhance their experience with a marketplace for buying and selling preloved items. The responses include "Certified True Seller", "Record of My Progress or Reward for My Progress", "Product Verification Badge for Verified Sellers or Items", and "Nothing". Although these suggestions are valuable, they fall outside the scope of the proposed system. These ideas will be taken into consideration but will not be prioritized for implementation at this stage.

3.2.1.4 Challenges and Expectations

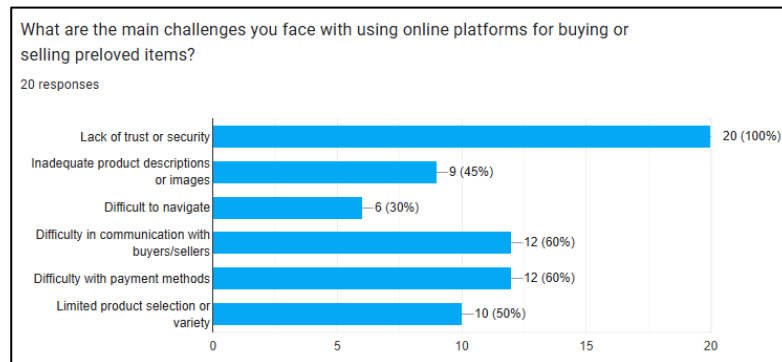


Figure 3.15: Respondents' Main Challenges in Using Online Platforms for Preloved Items

Figure 3.15 presents respondents' main challenges with using online platforms for buying or selling preloved items. The most common issue, selected by 100% of respondents, is a lack of trust or security. Other challenges include inadequate product descriptions or images (45%), difficulty navigating the platform (30%), challenges in communication with buyers or sellers (60%), difficulty with payment methods (60%), and limited product selection or variety (50%). The data indicates that significant challenges include trust and security issues, inadequate product descriptions and images, communication difficulties, payment method problems, and limited product variety. These concerns highlight the importance of developing the proposed system to address these issues and provide a more reliable, user-friendly platform for buying and selling preloved items.

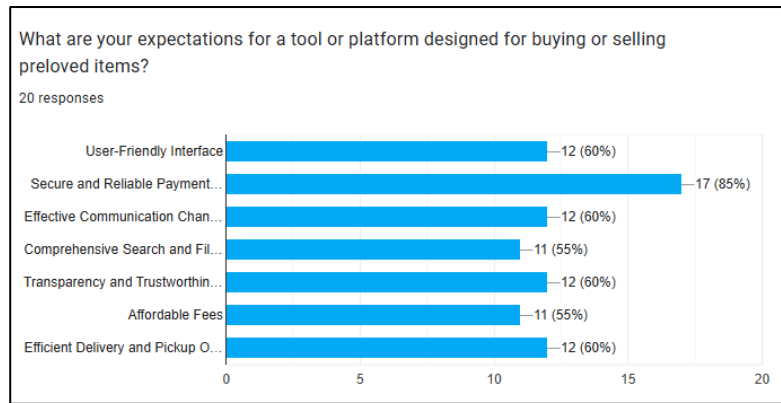


Figure 3.16: Respondents' Expectations for a Preloved Item Marketplace Platform

Figure 3.16 presents respondents' expectations for a tool or platform designed for buying or selling preloved items. The most selected features include secure and reliable payment options (85%), user-friendly interface (60%), effective communication channels (60%), transparency and trustworthiness (60%), and efficient delivery and pickup options (60%). Other expectations include comprehensive search and filter features (55%) and affordable fees (55%). The data shows that respondents equally concern on these key features for a platform, highlighting the importance of incorporating these elements into the proposed system to meet user demands and enhance their overall experience.

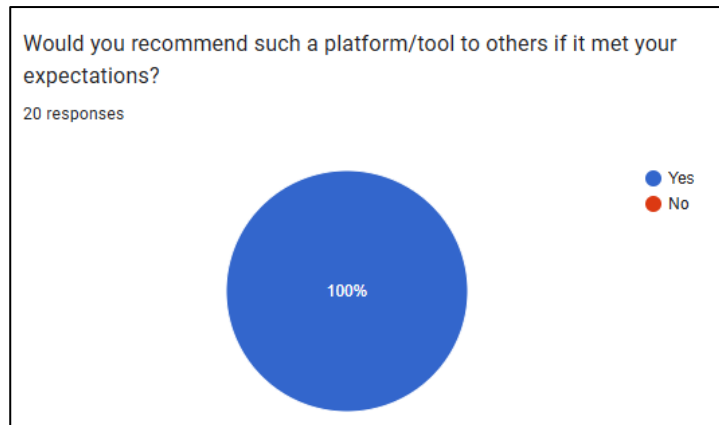


Figure 3.17: Likelihood of Recommending the Platform

Figure 3.17 presents respondents' willingness to recommend a platform or tool for buying and selling preloved items if it met their expectations. All respondents (100%) indicated they would recommend the platform.

3.2.2 System Analysis

3.2.2.1 Software Requirements

The software tools and platforms used throughout the project along with their respective descriptions are listed in Table 3.1.

Table 3.1: Software used in project

Software	Description
Windows	Operating system used for managing hardware and software resources on the laptop.
Microsoft Word	Used for creating and editing text documents.
Google Chrome	Used for accessing websites and researching for coding tasks and projects.
draw.io	Used for creating use case diagram, activity diagram, sequence diagram and class diagram.
Visual Studio Code	Used for writing, editing, and debugging code for Vue.js development.

phpMyAdmin	Used for managing MySQL databases.
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3.2.2.2 Hardware Requirements

The hardware utilized throughout the project along with their respective descriptions are listed in Table 3.2.

Table 3.2: Hardware used in project

Hardware	Description
Inspiron 15 3511 Laptop	Used for developing code and testing the system. It runs the necessary software like XAMPP, Visual Studio Code, and other tools.
Fantech Mouse	Used for precise navigation during coding.

3.3 Design Phase

3.3.1 Use Case Diagram and Use Case Specification



Figure 3.18: Use Case Diagram

Table 3.3: Use Case Specification of Login

Use Case ID	UC1
Use Case Name	Login
Actor	Buyer, Seller and Admin

Short Description	This use case allows both the Buyer, Seller and Admin to log into the system using their credentials.
Pre-Condition	1. The user or admin must have a registered account. 2. The user must have the correct username and password.
Basic Flow	1. The user enters their email and password. 2. The system validates the entered credentials (email and password). 3. If the credentials are correct, the system grants access and redirects the user to homepage.
Alternative Flow	1. The user will receive a request to input their registered email address to reset their password if they choose the forgotten password option. 2. Whenever users provide inputs in their username or password incorrectly, the system generates an error notice and asks users to re-enter again.
Exception Flow	If the system is down, the user is notified that the login process cannot be completed right now.
Post-Condition	User is successfully logged in.

Table 3.4: Use Case Specification of Register Account

Use Case ID	UC2
Use Case Name	Register Account
Actor	Buyer and Seller
Short Description	This use case allows a new user to create an account by providing email and password.
Pre-Condition	The user does not have an existing account.
Basic Flow	1. The user enters their email, and password. 2. The system validates the entered email to ensure it is unique and not already in use. 3. If the email is valid, system creates another account and redirect user to login page.
Alternative Flow	If the email is already registered, the system returns message saying that the email is already used.

Exception Flow	If the system is down, the user is notified that the registration cannot be completed at the moment.
Post-Condition	The user's account is created successfully.

Table 3.5: Use Case Specification of Search Product

Use Case ID	UC3
Use Case Name	Search Product
Actor	Buyer and Seller
Short Description	This use case allows both the Buyer and Seller to search for products on the platform by entering keywords.
Pre-Condition	The user must be logged into the system.
Basic Flow	1. The user enters a keyword of product name in the search bar. 2. The system processes the search query and filters the available products based on the entered keyword. 3. The system displays a list of products that match the search criteria.
Alternative Flow	In case of not finding any matching products, the system presents a message informing that there is no products found at all.
Exception Flow	If the system is down, the user is notified that the search cannot be completed at the moment.
Post-Condition	The user is presented with a list of products that match the search criteria.

Table 3.6: Use Case Specification of Filter Product

Use Case ID	UC4
Use Case Name	Filter Product
Actor	Buyer and Seller
Short Description	This use case allows both the Buyer and Seller to filter products based on category.
Pre-Condition	1. The user must be logged into the system.
Basic Flow	1. The user selects one or more filter criteria. 2. The system processes the filter selections and updates the product list to show only the products that match the selected criteria.

	3. The system displays the filtered list of products to the user.
Alternative Flow	If no products match the selected filter criteria, the system displays a message indicating that no products are available for the selected filters.
Exception Flow	If the system is down, the user is notified that the filter operation could not be completed at the moment.
Post-Condition	The system displays a filtered list of products based on the selected criteria.

Table 3.7: Use Case Specification of View Product Details

Use Case ID	UC5
Use Case Name	View Product Details
Actor	Buyer, Seller and Admin
Short Description	This use case allows both the User and Admin to view detailed information about a specific product on the platform.
Pre-Condition	The user must be logged into the system.
Basic Flow	User 1. The user navigates to homepage that contains a list of products. 2. The user clicks on a specific product. 3. The system displays the product details, including its name, images, description, price, condition and seller information. Admin 1. The admin navigates to the “Product List” page. 2. The admin clicks on a product to view its details. 3. The system displays the product details page, including full information.
Alternative Flow	If the user clicks on a product that is no longer available, the system displays a message stating that the product is unavailable.
Exception Flow	When the system is down, the user gets a notification that the product details are not currently available.
Post-Condition	The user views the details of the selected product.

Table 3.8: Use Case Specification of Post Review

Use Case ID	UC6
Use Case Name	Post Review
Actor	Buyer and Seller
Short Description	This use case allows a User to post a review for a product they have purchased.
Pre-Condition	1. The user must be logged into the system. 2. The user must have purchased with the product.
Basic Flow	1. The system displays a form for the user to enter their review, including rating and feedback. 2. The user fills in the review form and submits it. 3. If the review is valid, the system saves the review and updates the product's reviews section to include the new review.
Alternative Flow	If the user submits the review form without filling in all required fields, the system prompts the user to complete the missing information.
Exception Flow	When the system is down and fails to save the review, the user gets a notification that the review cannot be posted currently.
Post-Condition	The user's review is successfully saved and displayed on the product page.

Table 3.9: Use Case Specification of Edit Personal Information

Use Case ID	UC7
Use Case Name	Edit Personal Information
Actor	Buyer and Seller
Short Description	This use case allows a User to update their personal information.
Pre-Condition	The user must be logged into the system.
Basic Flow	1. The user navigates to their profile page. 2. The user clicks on the "Edit" button. 3. The user updates the necessary fields. 4. If the information is valid, the system saves the changes and updates the database.
Alternative Flow	If the user enters invalid information, the system displays an error message and prompts the user to correct it.

Exception Flow	If the system fails to save the updated information due to a technical issue, the user is notified that the changes could not be made at the moment.
Post-Condition	The user's personal information is updated in the system and reflected on their profile.

Table 3.10: Use Case Specification of Manage Product in Shopping Cart

Use Case ID	UC8
Use Case Name	Manage Product in Shopping Cart
Actor	Buyer and Seller
Short Description	This use case allows the User to add, update, or remove products in their shopping cart before proceeding to checkout.
Pre-Condition	The user must be logged into the system.
Basic Flow	Update Product in Cart 1. The user navigates to the shopping cart page. 2. The system displays all products currently in the shopping cart, along with their quantities and details. 3. The user updates the quantity of a product and click "Save." 4. The user now can view the updated cart details with the new total price. Delete Product in Cart 1. The user navigates to the shopping cart page. 2. The system displays all products currently in the shopping cart, along with their quantities and details. 3. The user clicks the "Remove" button next to the product they want to delete. 4. The user now views the updated cart details, including the new total price.
Alternative Flow	If a product in the cart is no longer available (sold), the system notifies the user.
Exception Flow	If the system fails to update and delete product from the cart, the user is notified that the operation could not be made at the moment.
Post-Condition	The shopping cart is updated with the user's changes.

Table 3.11: Use Case Specification of Proceed Checkout

Use Case ID	UC9
Use Case Name	Proceed Checkout
Actor	Buyer and Seller
Short Description	This use case allows a User to proceed to checkout and complete the purchase process.
Pre-Condition	1. The user must be logged into the system. 2. It must have at least one product in the shopping cart.
Basic Flow	1. The user navigates to the shopping cart page. 2. The user reviews the products in their cart and clicks the "Proceed Checkout" button. 3. The user confirms order and selects a payment method. 4. The system processes the payment and verifies the transaction. 5. If the transaction is successful, the system generates an order confirmation and displays a success message with the order details.
Alternative Flow	If the payment fails, the system notifies the user and prompts them to try again.
Exception Flow	If the system down, the user is notified that the transaction could not be made at the moment.
Post-Condition	The order is successfully placed, and the system updates the inventory accordingly.

Table 3.12: Use Case Specification of View Order

Use Case ID	UC10
Use Case Name	View Order
Actor	Buyer and Seller
Short Description	This use case describes how a user views the details of an order and requests cancellation if necessary.
Pre-Condition	The user must be logged into the system.
Basic Flow	Check Payment Receipt 1. The buyer navigates to the "My Orders" page and selects an order to view. 2. The system displays the order details, and the buyer can now view the order details.

	3. The buyer clicks "Check Payment Receipt" button to check the uploaded receipt for that order. Update Accounts 1. The buyer navigates to the "My Orders" page and selects an order to view. 2. The system displays the order details, and the buyer can now view the order details. 3. If the buyer wishes to cancel, they click "Request Cancellation," provide a reason, and submit the request. 4. The system updates the order status to "Cancellation Requested" and will notifies the seller. 5. The buyer is returned to the "My Orders" page.
Alternative Flow	If the order is not eligible for cancellation, the system displays a message indicating that cancellation is not possible.
Exception Flow	If the system down, the user is notified that the operation could not be made at the moment.
Post-Condition	The buyer successfully views the order details.

Table 3.13: Use Case Specification of View Admin Dashboard

Use Case ID	UC11
Use Case Name	View Admin Dashboard
Actor	Admin
Short Description	This use case describes how the admin accesses and views the admin dashboard to monitor platform activities and statistics.
Pre-Condition	The admin must be logged into the system.
Basic Flow	1. The admin navigates to the "Dashboard" page. 2. The system displays the Admin Dashboard interface. 3. The admin views the Sales Overview, which shows total sales, total orders, and last month's sales. 4. The admin views the User Overview, which includes new users, active users, and total registered users. 5. The admin analyses the visual chart displaying monthly sales and order trends.
Alternative Flow	If no sales data is available, the system displays an empty chart.
Exception Flow	If the system down, the admin is notified that the operation could not be made at the moment.

Post-Condition	The admin successfully views dashboard metrics and platform insights.
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Table 3.14: Use Case Specification of Manage Accounts

Use Case ID	UC12
Use Case Name	Manage Accounts
Actor	Admin
Short Description	This use case allows the admin to manage user accounts, including add, update or delete accounts when necessary.
Pre-Condition	The admin must be logged into the system.
Basic Flow	Add Accounts 1. The admin navigates to the "User List" page and clicks the "Add User" button. 2. The system displays a form for entering new account details (e.g., name, email, and password). 3. The admin fills in the required fields and clicks the "Save" button to submit the new account details. 4. The admin is redirected to the updated list of accounts, which includes the newly added account. Update Accounts 1. The admin selects a user account to update by clicking the "Edit" button. 2. The admin updates the necessary fields (e.g., name, email, or account status). 3. The admin clicks the "Save" button to submit the changes. 4. Upon successful validation, the system saves the changes and displays the updated list of accounts with the modified details. Delete Accounts 1. The admin selects a user account to delete by clicking the "Delete" button. 2. The system removes the user account from the database. 3. The admin now views the updated list of accounts with the deleted account removed.
Alternative Flow	If the Admin enters invalid data while updating, the system displays an error message.
Exception Flow	If the system down, the user is notified that the operation could not be made at the moment.
Post-Condition	The account is added, updated, or deleted successfully.

Table 3.15: Use Case Specification of Manage Product

Use Case ID	UC13
Use Case Name	Manage Product
Actor	Admin
Short Description	This use case enables the admin to manage products in the system, including adding, updating, and deleting products.
Pre-Condition	The admin must be logged into the system.
Basic Flow	Add Product 1. The admin navigates to the "Product List" page and clicks the "Add Product" button. 2. The system displays an empty product form with fields for product details. 3. The admin fills in the required fields and clicks the "Submit" button. 4. The system saves the product to the database. 5. The admin is redirected to the updated list of products, which includes the newly added product. Update Product 1. The admin selects a product to update by clicking the "Edit" button. 2. The system displays an editable form pre-filled with the product's current details. 3. The admin updates the desired fields and clicks the "Save" button. 4. The system saves the changes to the database. 5. The admin is redirected to the updated list of products. Delete Product 1. The admin selects a product to delete by clicking the "Delete" button. 2. The system prompts the admin to confirm the deletion. 3. Upon confirmation, the system removes the product from the database. 4. The system displays the updated list of accounts with the deleted product removed.
Alternative Flow	If admin enters invalid product details, the system displays an error message and prompts the user to correct it.
Exception Flow	If the system down, the user is notified that the operation could not be made at the moment.
Post-Condition	The product was successfully added, updated, or deleted by admin.

Table 3.16: Use Case Specification of Manage Order

Use Case ID	UC14
Use Case Name	Manage Order
Actor	Admin
Short Description	This use case describes how Admin can manage orders, including updating and cancelling orders.
Pre-Condition	The admin must be logged into the system.
Basic Flow	Update Order 1. The admin navigates to the "Manage Orders" page. 2. The admin selects an order to update by clicking the "Edit" button. 3. The system displays an editable form pre-filled with the order's current details. 4. The admin updates the desired fields and clicks the "Save" button. 5. The system saves the changes to the database. 6. The admin is redirected to the updated list of orders. Cancel Product 1. The admin selects an order to cancel by clicking the "Delete" button. 2. The system prompts the admin to confirm the cancellation. 3. Upon confirmation, the system updates the order status to "Cancelled" and removes it from the active orders list. 4. The system displays the updated list of orders with the cancelled order removed.
Alternative Flow	Admin failed to update or cancel the order.
Exception Flow	If the system down, the admin is notified that the operation could not be made at the moment.
Post-Condition	The order is successfully updated or cancelled.

Table 3.17: Use Case Specification of Manage Own Product

Use Case ID	UC15
Use Case Name	Manage Own Product
Actor	Seller
Short Description	This use case describes how a seller to sell products by adding, updating, and deleting product listings.

Pre-Condition	The seller must be logged into the system.
Basic Flow	Add Product 1. The seller navigates to the "Sell Product" page and clicks the "Add Product" button. 2. The system displays a form to enter product details. 3. The seller fills in the required fields and submits the form. 4. The product appears in the seller's product list. Update Product 1. The seller navigates to the "Sell Products" page and selects a product to update by clicking the "Edit" button. 2. The system displays the product details in an editable form. 3. The seller modifies the necessary details and submits the updated form. 4. The changes are reflected in the seller's product list. Delete Product 1. The seller navigates to the "Sell Products" page and selects a product to delete by clicking the "Delete" button. 2. The system prompts the user to confirm the deletion. 3. Upon confirmation, the system removes the product from the database and displays a success message. 4. The seller is returned to the "Sell Products" page with the deleted product removed from the list.
Alternative Flow	Seller failed to sell product by adding, updating and deleting the product.
Exception Flow	If the system down, the seller is notified that the operation could not be made at the moment.
Post-Condition	The product is successfully added, updated or deleted by seller.

Table 3.18: Use Case Specification of Manage Own Order

Use Case ID	UC16
Use Case Name	Manage Own Order
Actor	Seller
Short Description	This use case describes how a seller manages orders by processing cancellation requests from buyers.
Pre-Condition	The seller must be logged into the system.
Basic Flow	Check Payment Receipt 1. The seller navigates to the "My Orders" page and selects an order to view.

	- The system displays the order details, and the seller can now view the order details. - The seller clicks "Check Payment Receipt" button to check the uploaded receipt for that order. Process Order Cancellation Request - The seller navigates to the "Manage Orders" page and selects a cancellation request from the buyer. - The system displays the cancellation request details, including the reason provided by the buyer. - The seller approves or rejects the request. - If approved, the system updates the order status to "Cancelled" and initiates a refund. If rejected, the system notifies the buyer and maintains the order status. - The system displays a success message, and the seller is returned to the "Manage Orders" page.
Alternative Flow	Seller failed to manage orders.
Exception Flow	If the system down, the seller is notified that the operation could not be made at the moment.
Post-Condition	The order status is updated to "Cancelled" or remain unchanged based on the seller's action.

Table 3.19: Use Case Specification of Update Own Order

Use Case ID	UC17
Use Case Name	Update Own Order
Actor	Seller
Short Description	This use case describes how a seller updates the details of an existing order, such as modifying the order status.
Pre-Condition	The seller must be logged into the system.
Basic Flow	- The seller selects an order to update by clicking the "Edit" button. - The system displays an editable form with the order's current details. - The seller modifies the necessary fields and clicks "Save." - The system validates and saves the changes, then displays a success message. - The seller is returned to the "Manage Orders" page with the updated order list.
Alternative Flow	Seller failed to update orders.

Exception Flow	If the system down, the seller is notified that the operation could not be made at the moment.
Post-Condition	The order details are successfully updated in the system.

Table 3.20: Use Case Specification of Forget Password

Use Case ID	UC18
Use Case Name	Forget Password
Actor	Buyer and Seller
Short Description	This use case describes the process through which a user can reset their password if they forget it.
Pre-Condition	The user must have a registered account in the system.
Basic Flow	1. The user navigates to the login page and clicks the "Forget Password". 2. The system prompts the user to enter their registered email and submits the form. 3. If the email valid, the system generates a temporary password and sends it to the user's registered email. 4. The user retrieves the temporary password from their email or phone. 5. The user returns to the login page, enters their registered and uses the temporary password to log in. 6. Upon successful login, the system prompts the user to create a new password for security purposes. 7. The user enters and confirms the new password, then submits the form.
Alternative Flow	The system displays an error message indicating that the account could not be found if the user provides an unregistered email.
Exception Flow	If the system down, the user is notified that the reset password operation could not be made at the moment.
Post-Condition	The user's password is successfully reset, and they can log in with their new password.

Table 3.21: Use Case Specification of Update Password

Use Case ID	UC19
Use Case Name	Update Password

Actor	Admin
Short Description	This use case describes how the admin can update user account password.
Pre-Condition	The user must have a registered account in the system.
Basic Flow	1. The admin navigates to the "User List" page and selects a specific user account. 2. The admin clicks the "Change Password" option for the selected user. 3. The admin enters and confirms the new password, then submits the form. 4. The system validates the new password for security 5. Upon successful update, the admin is redirected to the "User List" page, where the updated account details are displayed.
Alternative Flow	Admin failed to update user's password.
Exception Flow	If the system down, the user is notified that the operation could not be made at the moment.
Post-Condition	The user's password is successfully updated in the system by admin.

3.3.2 Activity Diagram

In the proposed system, after the customer successfully log in or registers, they can browse through available products, view detailed information about each product, and add items to their shopping cart. The customer can also view and update the shopping cart before proceeding to checkout and making the payment. Meanwhile, admin can manage products and user accounts by adding, updating, or deleting records. Additionally, they can handle orders by updating their status or cancelling them if necessary. These activities are captured in the system's activity diagrams, as illustrated in Figure 3.19 and Figure 3.20, providing a clear depiction of customer and admin interactions with the platform.

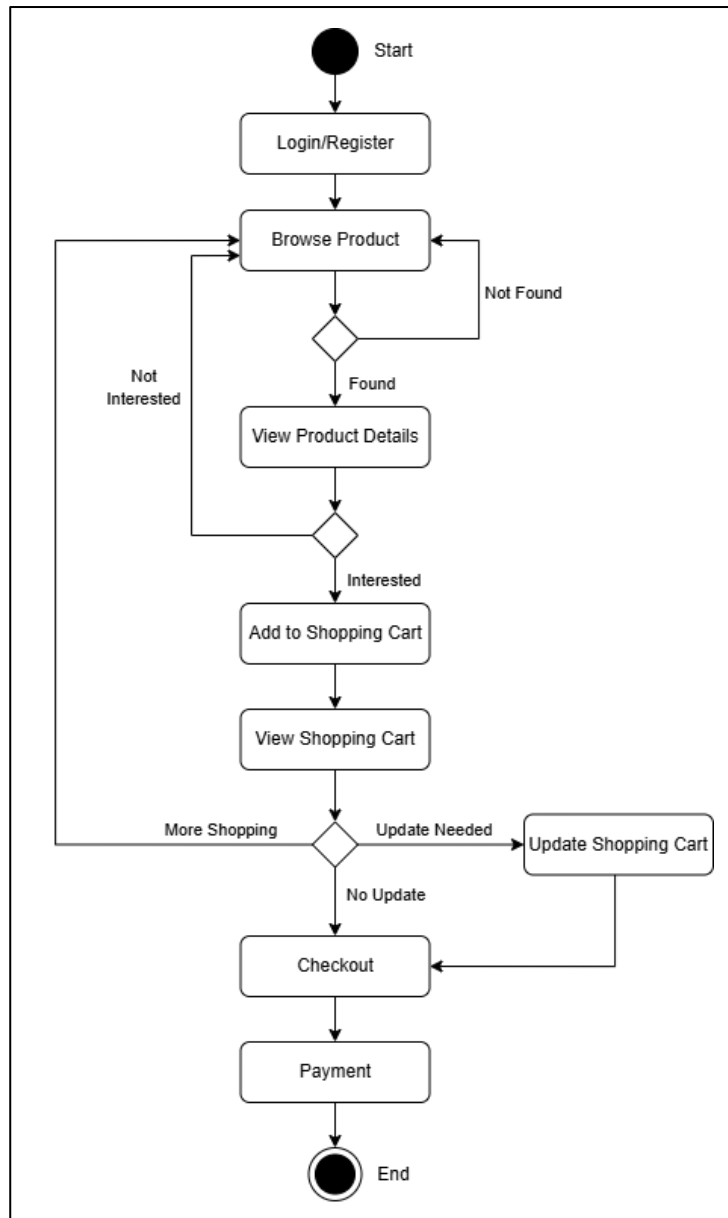


Figure 3.19: Activity Diagram for Customer

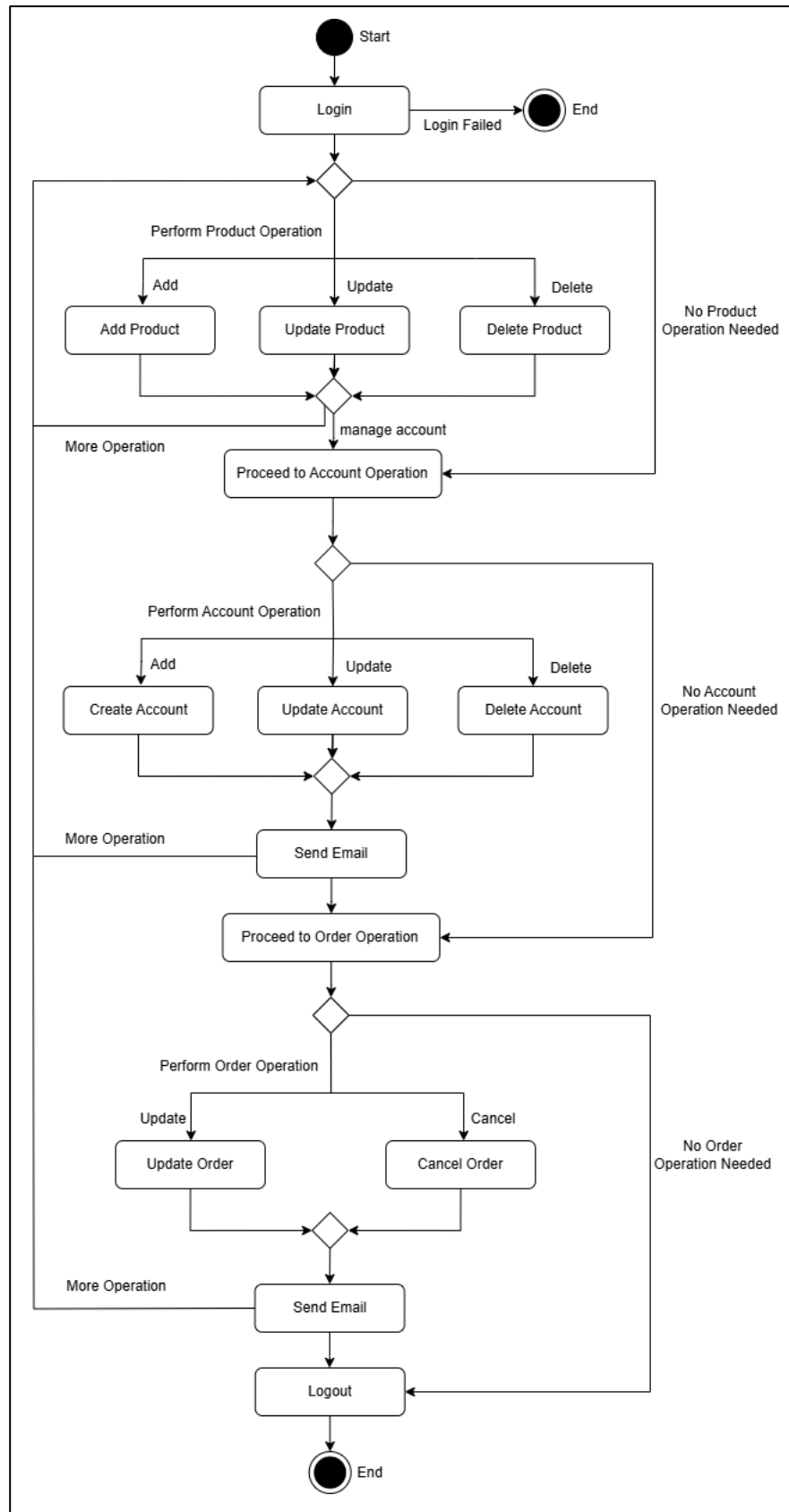


Figure 3.20: Activity Diagram for Admin

3.3.3 Sequence Diagram

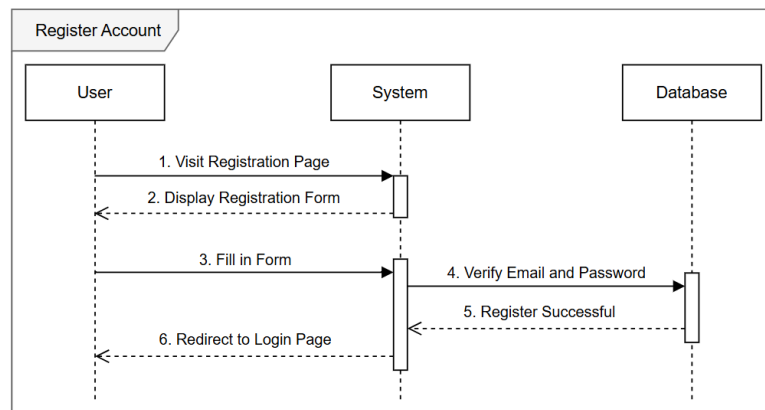


Figure 3.21: Sequence Diagram of Register Account

Figure 3.21 illustrates the sequence diagram for account registration. The process starts when the user visits the registration page and fills out their email and password. Upon clicking the register button, the system verifies the email and password, then saves them to the database. Once registration is successful, the user is redirected to the login page.

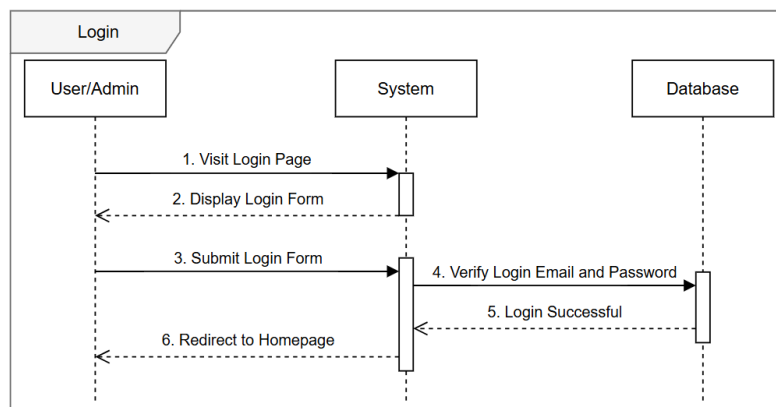


Figure 3.22: Sequence Diagram of Login

Figure 3.22 illustrates the sequence diagram for the login process. It begins with the user or admin visiting the login page and entering their registered email and password. Upon clicking the login button, the system verifies the email and password. If the verification is successful, the user is logged in and redirected to the homepage.

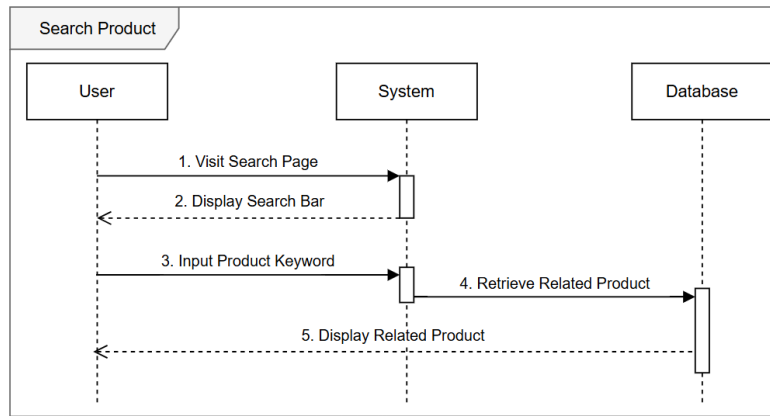


Figure 3.23: Sequence Diagram of Search Product

Figure 3.23 illustrates the sequence diagram for the product search process. The process starts when the user visits the homepage where the search bar is displayed at top of it. The user inputs a product keyword, prompting the system to retrieve related products. Finally, the system displays the relevant products to the user.

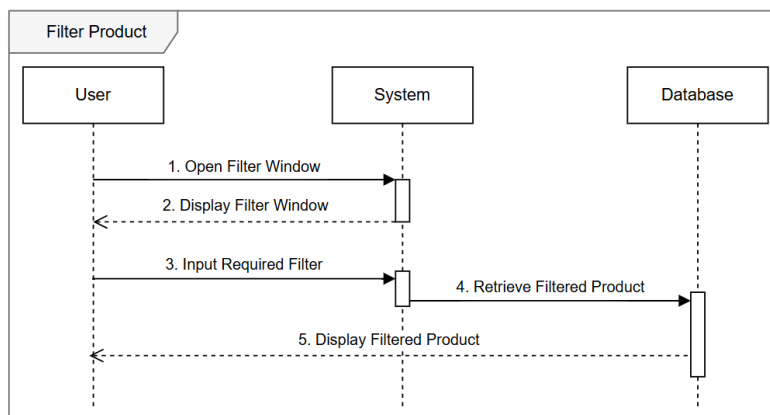


Figure 3.24: Sequence Diagram of Filter Product

Figure 3.24 illustrates the sequence diagram for the product filtering process. The process begins when the user opens the filter window. After the user inputs the required filter criteria, the system retrieves the filtered products list and displays them to the user.

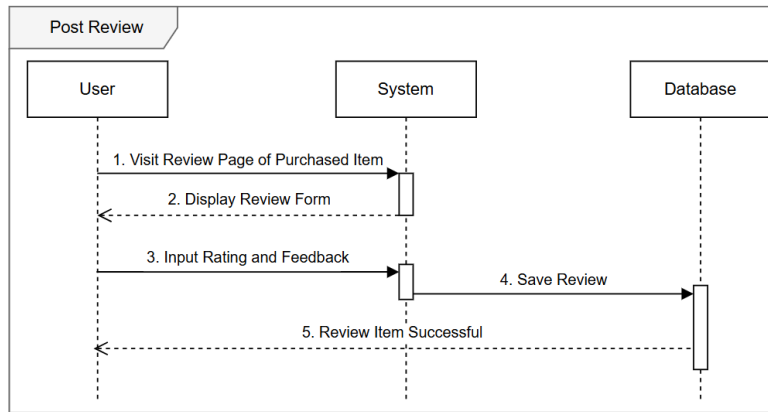


Figure 3.25: Sequence Diagram of Post Review

Figure 3.25 shows the sequence diagram for posting a review. The process starts when the user visits the review page for the purchased item. The system will present the review form to let user enters their rating and feedback of the purchased item. After clicking "Save", the system confirms that the review has been successfully submitted.

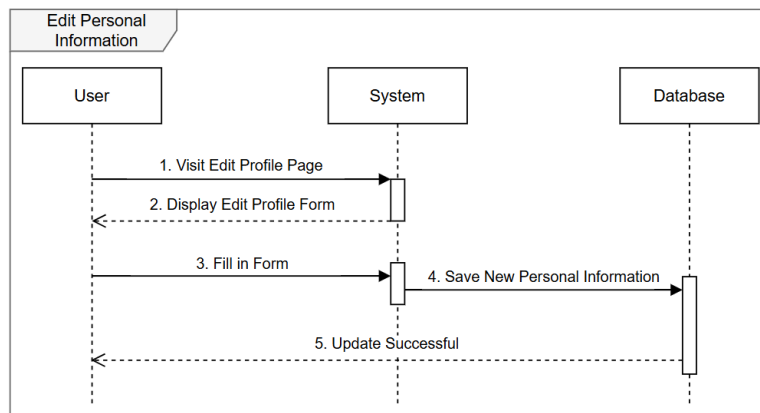


Figure 3.26: Sequence Diagram of Edit Personal Information

Figure 3.26 shows the sequence diagram for editing personal information. The process begins when the user visits the edit profile page. The user then updates the existing information in the edit profile form with the new personal details. After clicking "Save", the system confirms that the personal information has been successfully updated.

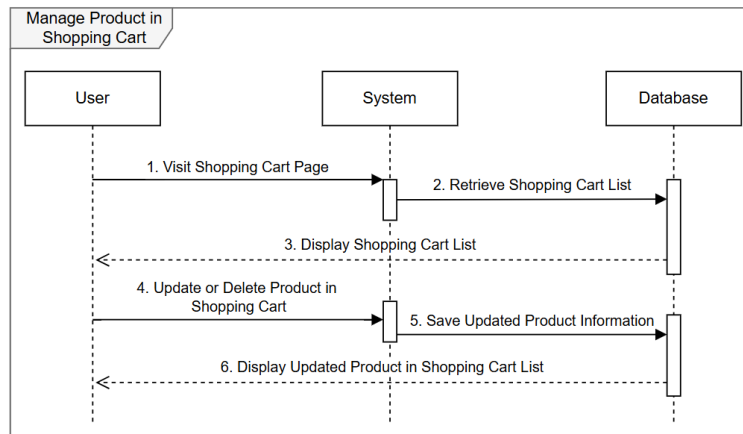


Figure 3.27: Sequence Diagram of Manage Product in Shopping Cart

Figure 3.27 shows the sequence diagram for managing products in the shopping cart. The process begins when the user visits the shopping cart page. The system will display the shopping cart list to user. Then, user can then update or delete products in the cart. After saving the changes, the system will display the updated shopping cart list.

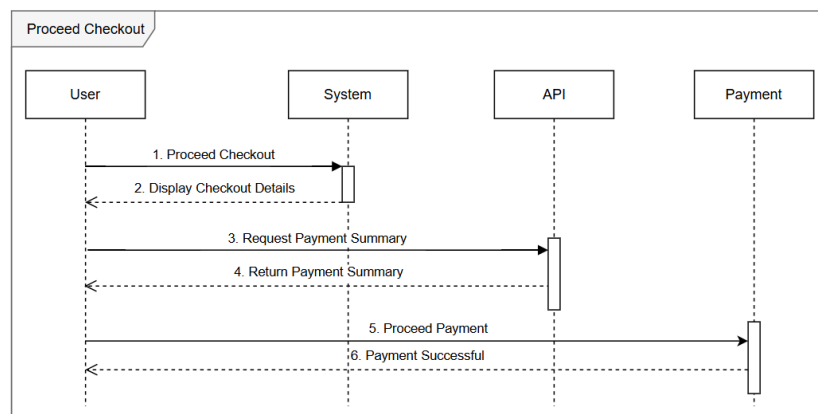


Figure 3.28: Sequence Diagram of Proceed Checkout

Figure 3.28 shows the sequence diagram for proceed checkout. The process starts when the user click proceed checkout button in the shopping cart page. The system displays the checkout details and payment summary. Then, the user proceeds with the payment by choosing a payment method. Upon successful payment, the transaction is completed.

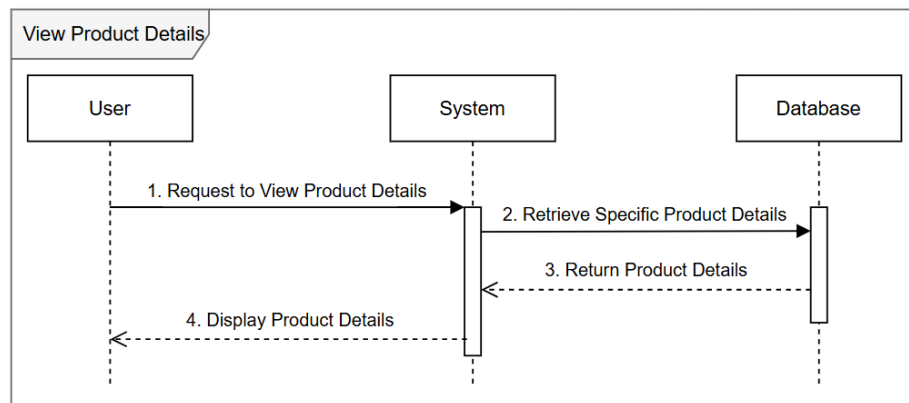


Figure 3.29: Sequence Diagram of View Product Details

Figure 3.29 shows the sequence diagram for viewing product details. The process begins when the user requests to view specific product details. The system retrieves the relevant product details from the database and displays them to the user.

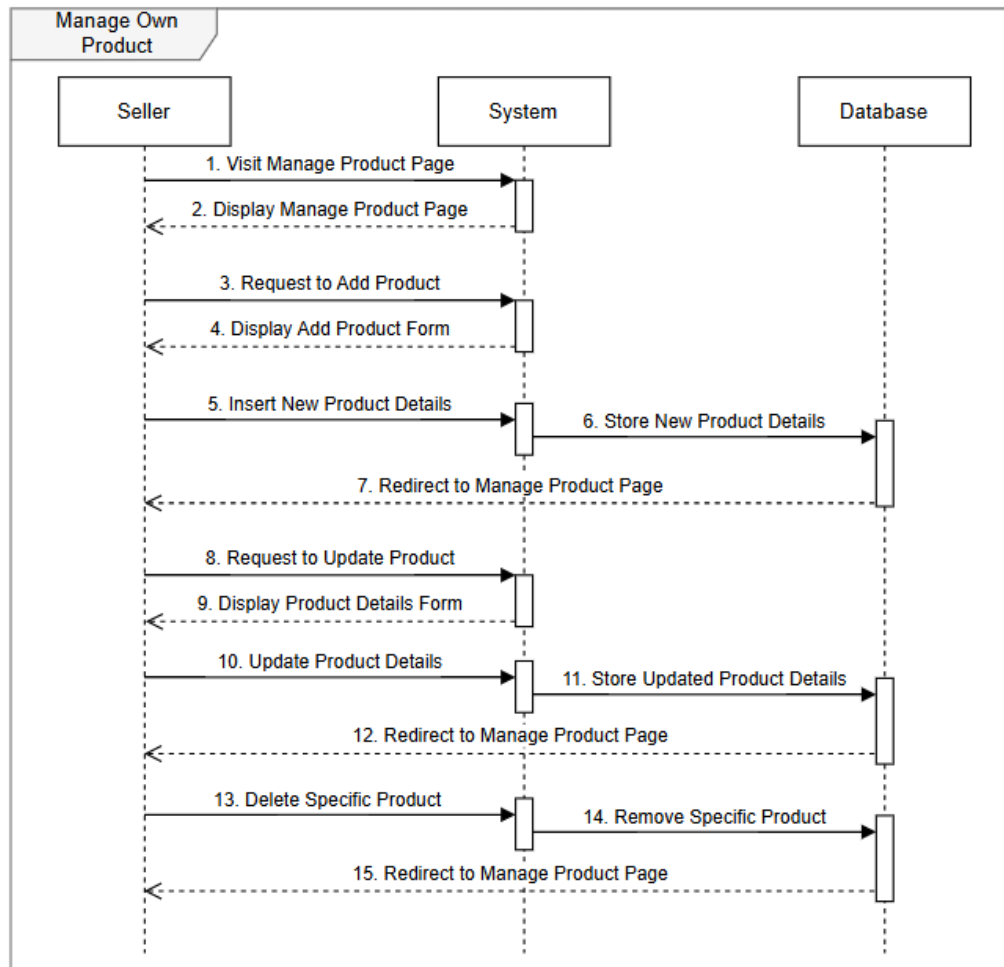


Figure 3.30: Sequence Diagram of Manage Own Product

Figure 3.30 shows the sequence diagram for manage own product. The process begins when the user visits the manage product page. The user can then request to add a new product by filling out the product form. The new product details are saved into the database, and the user is redirected back to the manage product page.

The user can also update an existing product. After clicking the edit button, the system displays the prefilled product details form. The user can then make the necessary changes to the product. Once the changes are made, the system stores the updates and redirects the user back to the manage product page.

The user can also delete a specific product. After clicking the delete button, the product will be removed from the database and redirects the user back to the manage product page.

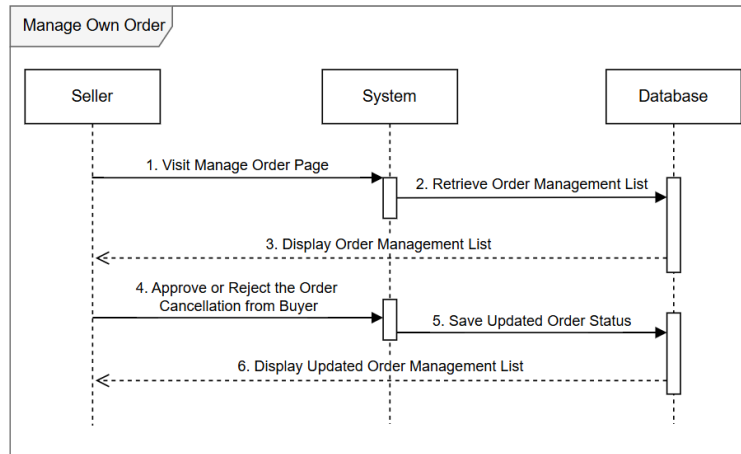


Figure 3.31: Sequence Diagram of Manage Own Order

Figure 3.31 shows the sequence diagram for managing orders. The process begins when the seller visits the Manage Order page. The system retrieves the order information from the database and displays the Order Management List to the seller. The seller can then approve or reject the order cancellation requests from buyers. After saving the changes, the system updates the order status and displays the updated Order Management List.

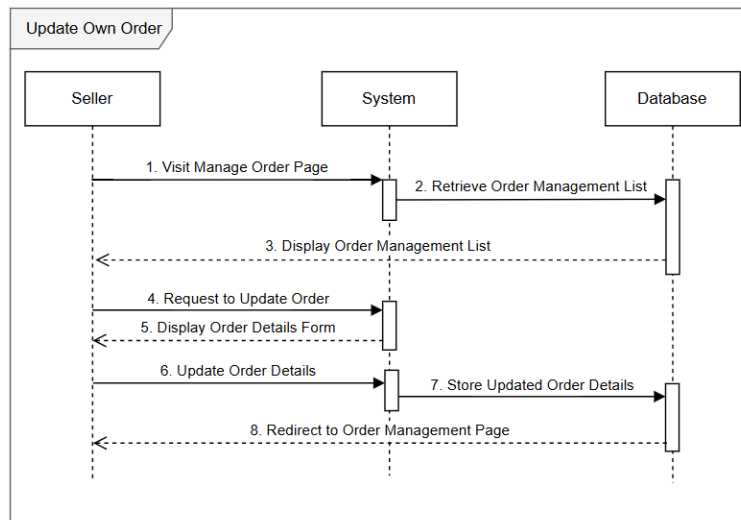


Figure 3.32: Sequence Diagram of Update Own Order

Figure 3.32 shows the sequence diagram for managing updates to orders. The process begins when the seller visits the Manage Order page. The system retrieves the order information from the database and displays the Order Management List to the seller. The seller

can then request to update an order, and the system displays the Order Details Form for the selected order. After the seller updates the order details, the system stores the changes and redirects the seller back to the Order Management Page, where the updated list is displayed.

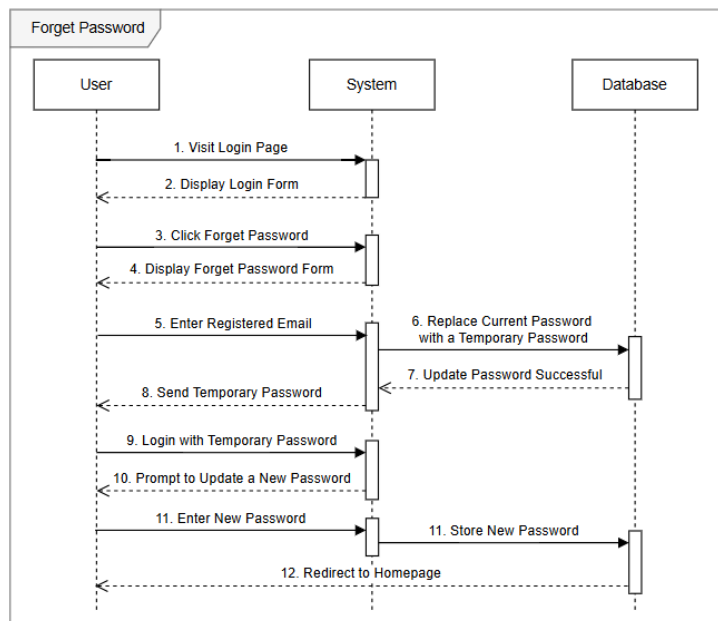


Figure 3.33: Sequence Diagram of Forget Password

Figure 3.33 shows the sequence diagram for the forgot password process. The process starts when the user visits the login page. The user then clicks on "Forgot Password", prompting the system to display the forgot password form. The user enters their registered email, and the system will replace the current password with a temporary one. Once the password is updated, the system sends the temporary password to the user via email. The user can then log in using the temporary password. After logging in, the system prompts the user to update their password. Once the user enters a new password, the system stores the new password and redirects the user to the homepage.

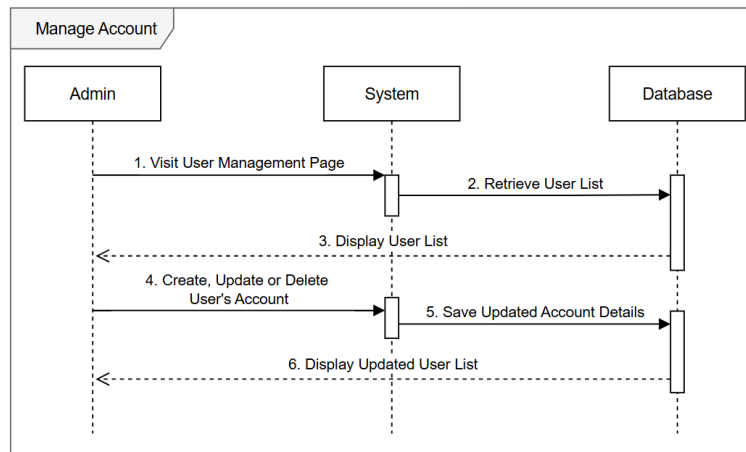


Figure 3.34: Sequence Diagram of Manage Account

Figure 3.34 shows the sequence diagram for managing account. The process starts when the admin visits the user management page. The system retrieves the user list from the database and displays it to the admin. The admin can then add, update, or delete a user account. After the admin makes the necessary changes, the system saves the updated user details and displays the updated user list to the admin.

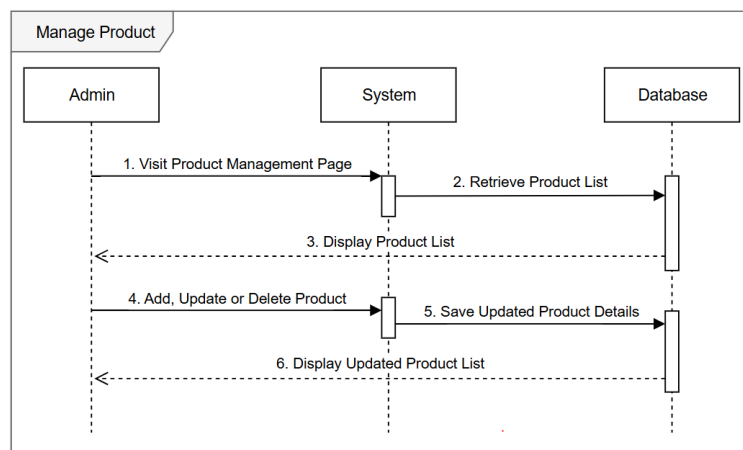


Figure 3.35: Sequence Diagram of Manage Product

Figure 3.35 shows the sequence diagram for managing products. The process starts when the admin visits the product management page. The system retrieves the product list from the database and displays it to the admin. The admin can then add, update, or delete a product.

After the admin makes the necessary changes, the system saves the updated product details and displays the updated product list to the admin.

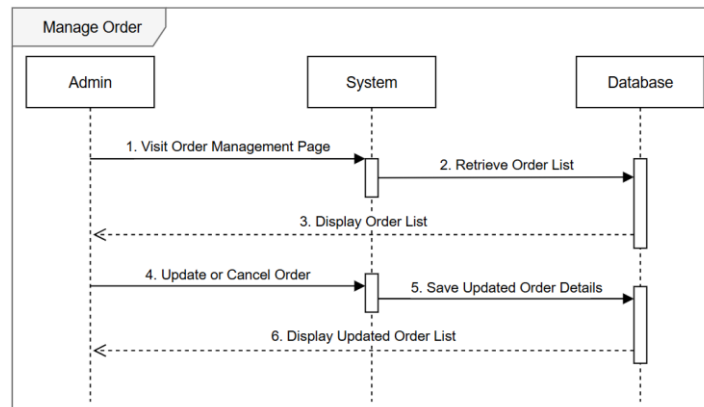


Figure 3.36: Sequence Diagram of Manage Order

Figure 3.36 shows the sequence diagram for managing order. The process starts when the admin visits the order management page. The system retrieves the order list from the database and displays it to the admin. The admin can then update or cancel an order. After the admin makes the necessary changes, the system saves the updated order details and displays the updated order list to the admin.

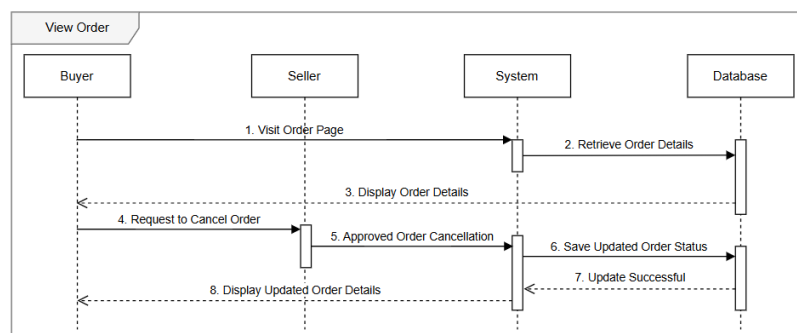


Figure 3.37: Sequence Diagram of View Order

Figure 3.37 shows the sequence diagram for view order. The process starts when the buyer visits the order page. The system retrieves and displays the order details to the buyer.

The buyer can then request to cancel the order. Once the cancellation request is approved by seller, the system updates the order status accordingly. After the order status is updated, the system saves the changes and displays the updated order details to the buyer, confirming the successful update.

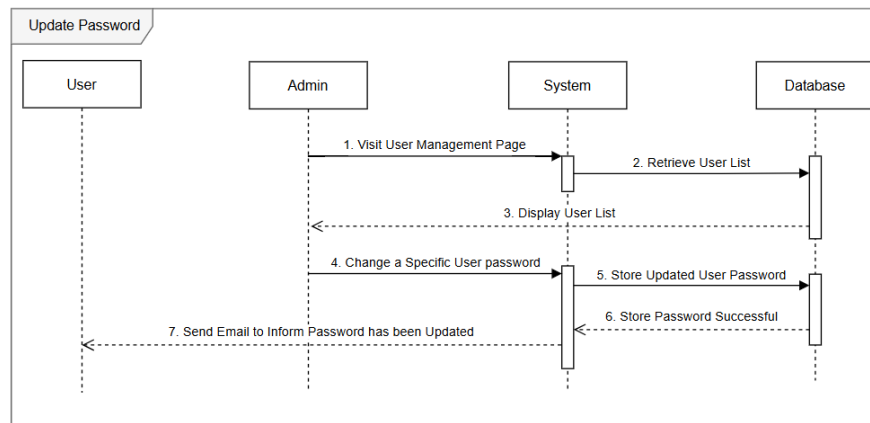


Figure 3.38: Sequence Diagram of Update Password

Figure 3.38 shows the sequence diagram for admin updating a user password. The process starts when the admin visits the user management page. The system will retrieve the user list from database and displays the user list to admin. The admin then selects a specific user to change their password. After the admin updates the password, the system stores the updated password and sends an email notification to inform the user that their password has been updated. The system confirms the password update was successful.

3.3.4 Class Diagram

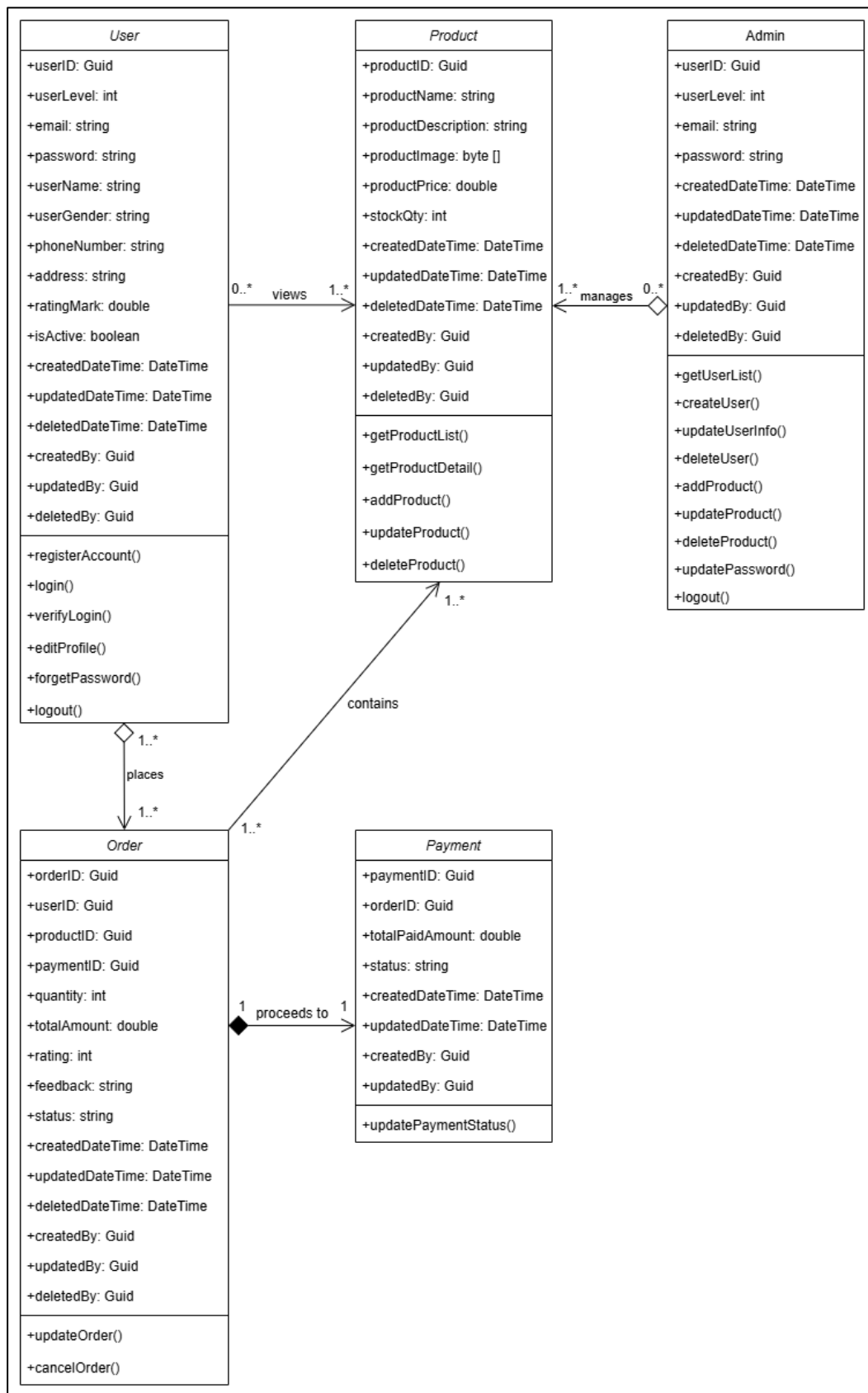
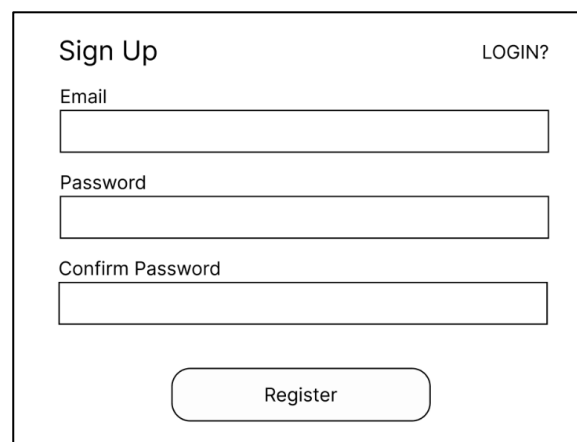


Figure 3.39: Class Diagram

3.3.5 Wireframe

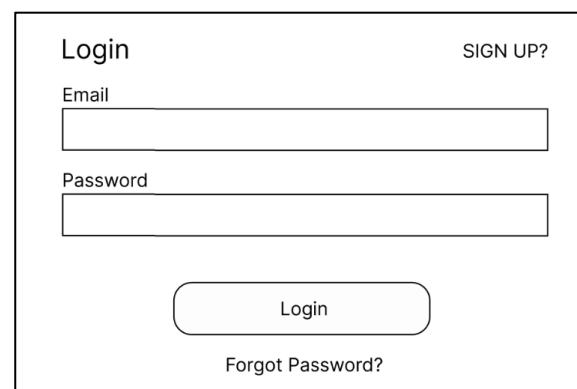
3.3.5.1 Sign Up/Log In

Figure 3.40 shows sign-up page which allows new users to register by entering their email and password, while Figure 3.41 displays login page that provides access for existing users to log in. Figure 3.42 shows forgot password page where users can reset their password by entering their registered email, prompting the system to send a temporary password for logging in.



The wireframe for the Sign Up page is enclosed in a rectangular border. At the top left, the text "Sign Up" is displayed. At the top right, the text "LOGIN?" is displayed. Below "Sign Up", there are three input fields: "Email", "Password", and "Confirm Password". Each input field is a simple rectangle. Below the "Confirm Password" field, there is a rounded rectangular button labeled "Register".

Figure 3.40: Wireframe for Sign Up



The wireframe for the Login page is enclosed in a rectangular border. At the top left, the text "Login" is displayed. At the top right, the text "SIGN UP?" is displayed. Below "Login", there are two input fields: "Email" and "Password". Each input field is a simple rectangle. Below the "Password" field, there is a rounded rectangular button labeled "Login". Below the "Login" button, the text "Forgot Password?" is displayed.

Figure 3.41: Wireframe for Login

< Forget Password

Email

A temporary password will be sent to your email address shortly.

Send

Figure 3.42: Wireframe for Forget Password

3.3.5.2 Homepage

Figure 3.43 displays the homepage with a list of products and a search bar at the top, allowing users to enter keywords to search for specific items.

SecondLife
UNIMAS

Product
Images

Product
Description

Product
Images

Product
Description

Product
Images

Product
Description

Product
Images

Product
Description

Product
Images

Product
Description

Product
Images

Product
Description

Figure 3.43: Wireframe for Homepage

Figure 3.44 shows the homepage with a filter dropdown, enabling users to filter their search by product categories such as kitchenware, electronics, furniture, books, food and so on.

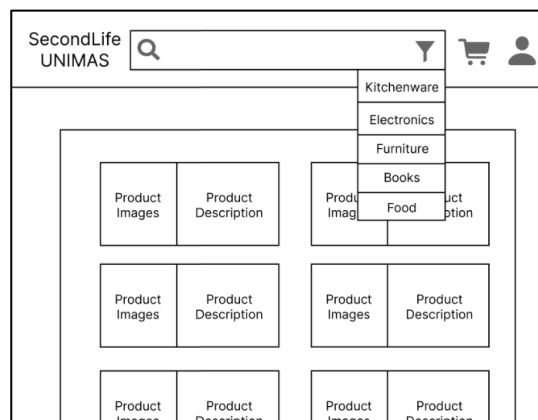


Figure 3.44: Wireframe of Homepage with a Filter Dropdown

3.3.5.3 Edit Personal Information Page

Figure 3.45 shows the wireframe of the edit personal information page, where users can update their personal details such as name, email, phone number, gender and address.

The wireframe shows a header for 'SecondLife UNIMAS' with a search bar, a filter icon, a shopping cart icon, and a user profile icon. Below the header is a section titled 'My Profile'. Inside this section is a form with the following fields: Name (text input with 'Ali'), Email (text input with 'abc123@gmail.com'), Phone Number (text input with '0161234567'), Gender (radio buttons for 'Male' and 'Female', with 'Male' selected), and Address (text input with 'No.100, Taman Sahabat, Sarawak'). A 'Save' button is located below the address field.

Figure 3.45: Wireframe for Edit Personal Information

3.3.5.4 Shopping Cart Page

Figure 3.46 shows the wireframe of the product details page. This page provides detailed information about a specific product, including its name, description, price, and images. Additionally, there is an "Add to Cart" button that allows users to add the product to their shopping cart.

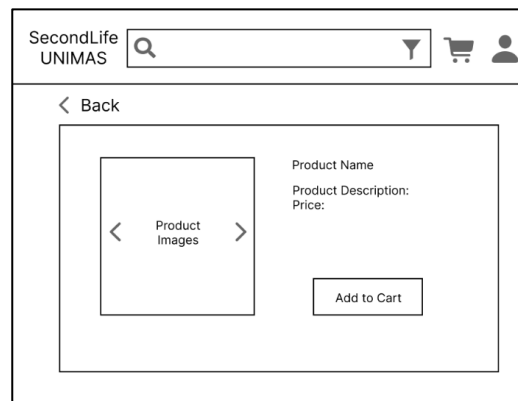


Figure 3.46: Wireframe for Product Details Page

Furthermore, Figure 3.47 shows the wireframe of the shopping cart page. The product quantity can be adjusted by clicking the plus or minus icons. A cross button is also available, enabling users to remove items from their shopping cart. Additionally, a 'Checkout' button is provided, allowing users to proceed with the checkout process.

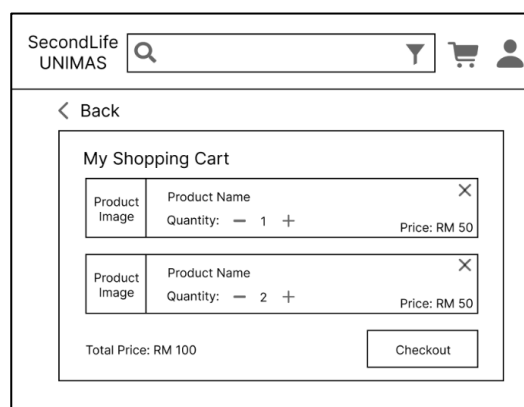


Figure 3.47: Wireframe for Shopping Cart Page

3.3.5.5 Payment Page

Figure 3.48 shows the wireframe of the payment summary page, which displays all the payment details. There is a payment method section where users can choose their preferred payment method, along with a button to proceed with the payment.

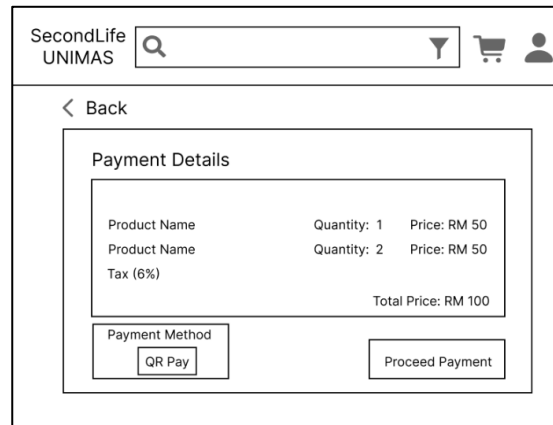


Figure 3.48: Wireframe for Payment Summary Page

Figure 3.49 presents the wireframe of the payment page, which displays a QR code for users to scan in order to complete the payment.



Figure 3.49: Wireframe for Payment Page

3.3.5.5 My Order Page

Figure 3.50 shows the wireframe of the My Order Page, where buyers can view their orders. Each order has a button that allows buyers to request a cancellation if needed.

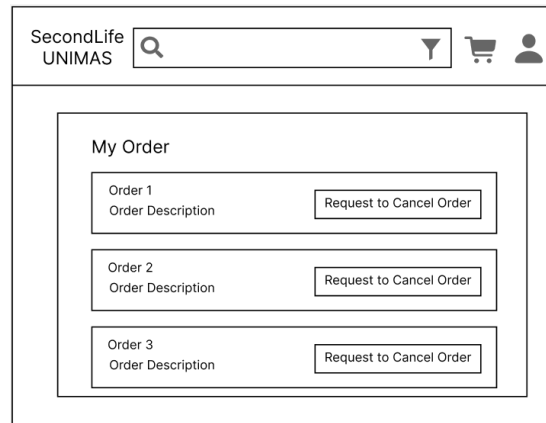


Figure 3.50: Wireframe for My Order Page

3.3.5.6 Manage Own Product Page

Figure 3.51 shows the wireframe of the manage product page, designed for sellers who wish to sell products. From this page, sellers can add new products, update existing product details, or delete products that are no longer for sale.

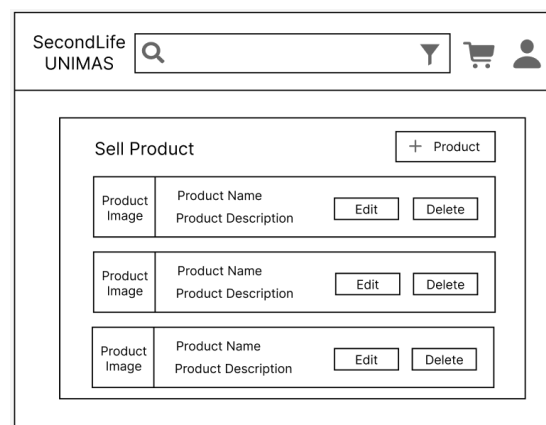
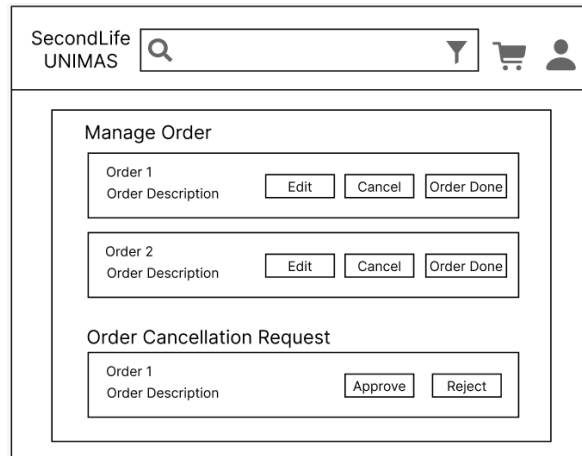


Figure 3.51: Wireframe for Manage Own Product Page

3.3.5.7 Manage Own Page

Figure 3.52 shows the wireframe of the Manage Own Order Page. Sellers can view their orders, with options to edit, cancel, or mark orders as done. Below the order list, sellers can also manage buyer cancellation requests by choosing to approve or reject them.

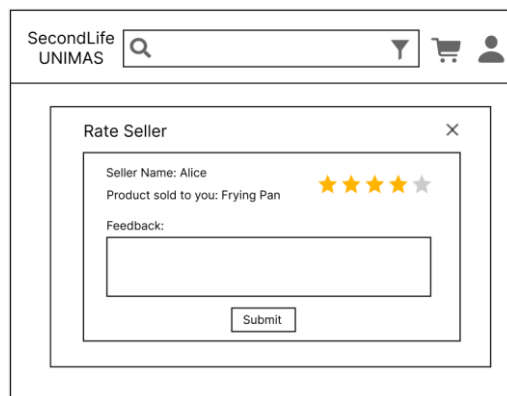


The wireframe shows a header for 'SecondLife UNIMAS' with a search bar, a filter icon, a shopping cart icon, and a user profile icon. The main content area is titled 'Manage Order' and contains two sections. The first section, 'Manage Order', lists two orders. Each order has a label 'Order 1' and 'Order 2', followed by 'Order Description'. To the right of each description are three buttons: 'Edit', 'Cancel', and 'Order Done'. The second section, 'Order Cancellation Request', lists one order with 'Order 1' and 'Order Description'. To the right of the description are two buttons: 'Approve' and 'Reject'.

Figure 3.52: Wireframe for Manage Own Order Page

3.3.5.8 Post Review Page

Figure 3.53 shows the wireframe of the post review page, designed for buyers to provide feedback on their purchasing experience. This page includes a rating system where buyers can rate the seller using a 1 to 5-star scale. Additionally, a feedback message box is provided, allowing buyers to leave comments or suggestions regarding the seller or the product.

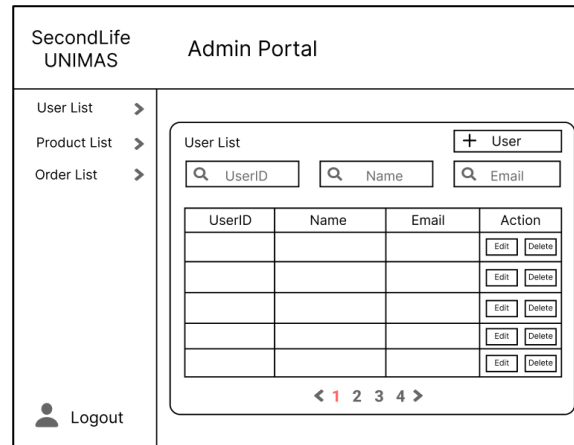


The wireframe shows a header for 'SecondLife UNIMAS' with a search bar, a filter icon, a shopping cart icon, and a user profile icon. The main content area is titled 'Rate Seller' and contains a form. The form has a title 'Rate Seller' with a close button 'X'. Below the title, there is a section for 'Seller Name: Alice' and 'Product sold to you: Frying Pan'. To the right of the product name is a 5-star rating system with four yellow stars and one grey star. Below the rating is a 'Feedback:' label and a text input box. At the bottom of the form is a 'Submit' button.

Figure 3.53: Wireframe for Post Review Page

3.3.5.9 Admin Management Page

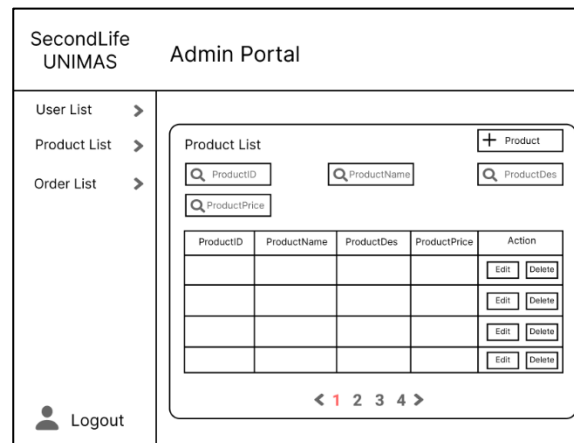
Figure 3.54, Figure 3.55, and Figure 3.56 display the admin management pages, where the admin can manage user accounts, products, and orders.



The wireframe shows the 'Admin Portal' for 'SecondLife UNIMAS'. On the left is a sidebar with 'User List', 'Product List', and 'Order List', each with a right-pointing arrow. At the bottom of the sidebar is a 'Logout' button with a user icon. The main content area is titled 'User List' and includes a '+ User' button. Below this are three search filters: 'UserID', 'Name', and 'Email', each with a magnifying glass icon. A table follows with columns 'UserID', 'Name', 'Email', and 'Action'. The 'Action' column contains 'Edit' and 'Delete' buttons for each row. There are five data rows. At the bottom of the table is a pagination control showing '< 1 2 3 4 >'.

UserID	Name	Email	Action
			Edit Delete
			Edit Delete
			Edit Delete
			Edit Delete
			Edit Delete

Figure 3.54: Wireframe for Manage User's Account



The wireframe shows the 'Admin Portal' for 'SecondLife UNIMAS'. On the left is a sidebar with 'User List', 'Product List', and 'Order List', each with a right-pointing arrow. At the bottom of the sidebar is a 'Logout' button with a user icon. The main content area is titled 'Product List' and includes a '+ Product' button. Below this are four search filters: 'ProductID', 'ProductName', 'ProductDes', and 'ProductPrice', each with a magnifying glass icon. A table follows with columns 'ProductID', 'ProductName', 'ProductDes', 'ProductPrice', and 'Action'. The 'Action' column contains 'Edit' and 'Delete' buttons for each row. There are five data rows. At the bottom of the table is a pagination control showing '< 1 2 3 4 >'.

ProductID	ProductName	ProductDes	ProductPrice	Action
				Edit Delete
				Edit Delete
				Edit Delete
				Edit Delete
				Edit Delete

Figure 3.55: Wireframe for Manage Product

SecondLife
UNIMAS

Admin Portal

User List >
Product List >
Order List >

Order List

Order ID

UserID

ProductID

OrderStatus

OrderID	UserID	ProductID	OrderStatus	Action
				Edit Cancel
				Edit Cancel
				Edit Cancel
				Edit Cancel

< 1 2 3 4 >

Logout

Figure 3.56: Wireframe for Manage Order

3.4 Summary

In summary, this chapter emphasizes the requirement analysis and design phases of the Waterfall Model, which are crucial for the successful development of the project in the subsequent chapter. As part of the requirement analysis, a questionnaire was conducted to gather valuable information, including respondents' demographic profiles, current practices and preferences, opinions on key features, and challenges and expectations. This data provided crucial insights to guide the design process. The necessary software and hardware for the proposed project have also been identified and prepared to ensure a smooth and effective development process. Furthermore, visual representations, such as use case, activity, sequence, and class diagrams, provide a clear depiction of the system's functionality, workflows, interactions, and structure, enabling a better understanding of the system before implementation phase.

CHAPTER 4: IMPLEMENTATION AND TESTING

4.1 Introduction

This chapter presents the implementation and testing processes involved in developing the e-commerce website for preloved items. It explains how the system was built based on the requirements and design specifications outlined in the previous chapter. The implementation section focuses on how the system components were developed and integrated, while the testing section highlights the methods used to ensure the functionality, reliability, and usability of the system through various test cases and user feedback.

4.2 Implementation of System Features

To build the UNIMAS e-commerce website for preloved items among students, Vue.js has been used for the frontend development, while C# with .NET 8 has been used for the backend development. CSS is applied for styling the user interface, and JavaScript is used to control client-side interactivity and behaviour. The database used for this system is MySQL, which is responsible for storing and managing data.

4.2.1 Main Page

Figure 4.1 illustrates the top section of the main page of the system, named "Preloved." At the top of the interface, a navigation bar provides quick access to key features. The Home button directs users to the main product listing page, while the Sell button redirects them to the product posting page where they can list their own preloved items. The search box allows users to enter keywords to quickly locate specific products. The shopping cart icon leads to the cart page for users to review their selected items before proceeding to checkout. Lastly, the user profile icon opens a dropdown menu with four options: My Profile, My Order, Reset Password, and Logout which allowing users to manage their account, track orders, change their password, or sign out of the system. On the left-hand side, a filter panel enables users to narrow down product listings by category, making it easier to locate specific preloved items. The main section of the page displays the preloved items in a scrollable grid layout, allowing users to conveniently browse through the available preloved items.

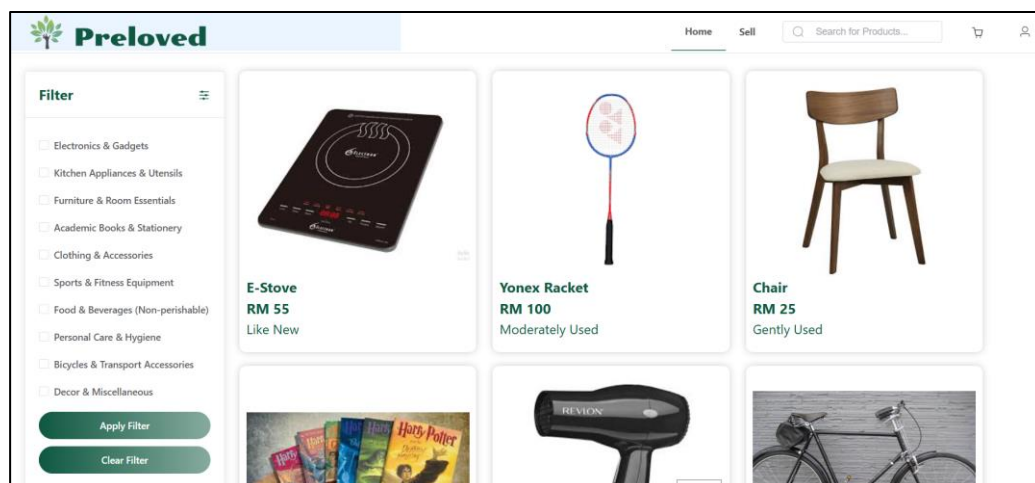


Figure 4.1: Main page (Top Section)

Figure 4.2 shows the bottom section of the homepage, where pagination controls are located. These controls allow users to navigate through multiple pages of product listings, with nine products displayed per page for an organized and manageable viewing experience.

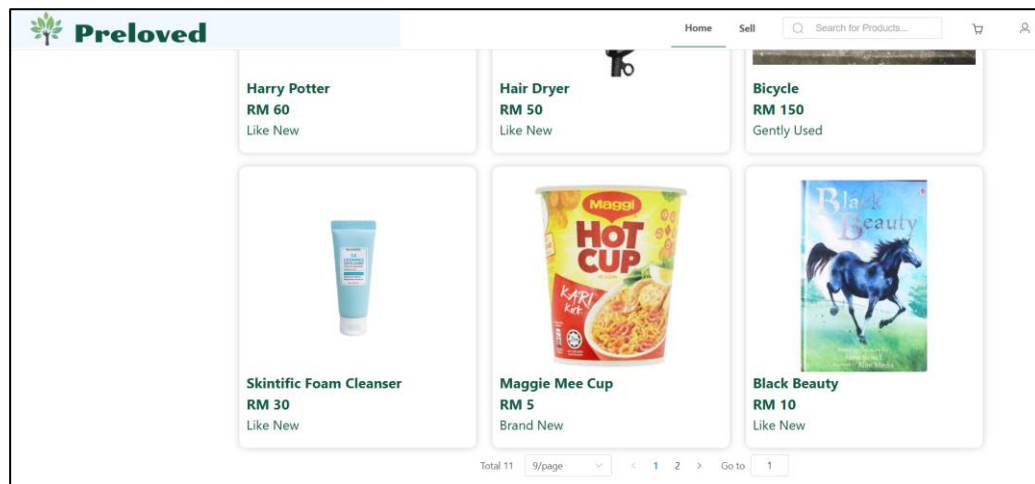


Figure 4.2: Main page (Bottom Section)

4.2.2 Login and Signup

Figure 4.3 displays the login page, where registered users can log in by entering their email and password. If a user has not registered yet, they can navigate to the signup page by clicking the button on the right.

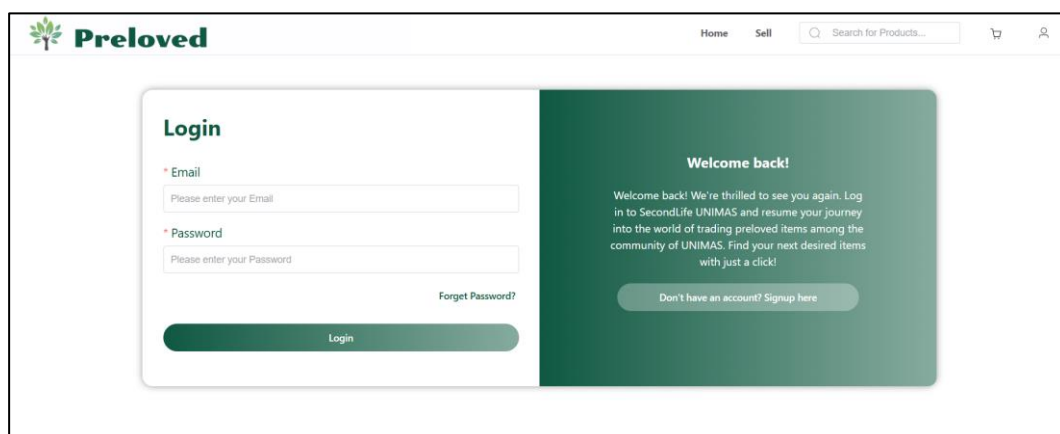


Figure 4.3: Login Page

Figure 4.4 illustrates Step 1 of the signup process. In this step, users are required to enter their email, password, and confirm the password. The password must be at least 8 characters long and include uppercase, lowercase, and a special character.

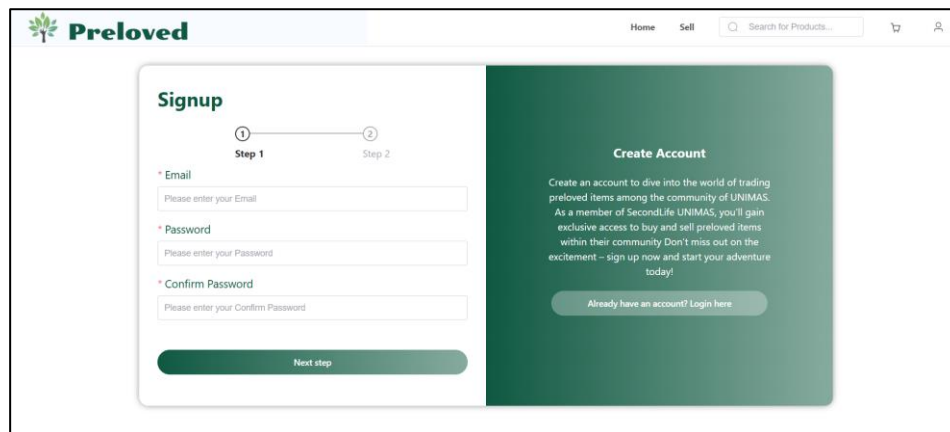
The screenshot shows the Preloved website's Signup page for Step 1. The header includes the Preloved logo, navigation links for Home and Sell, a search bar, and icons for a shopping cart and user profile. The main content area is divided into two sections. On the left, a 'Signup' form is displayed with a progress indicator showing 'Step 1' as the active step and 'Step 2' as the next. The form contains three input fields: 'Email' (placeholder: 'Please enter your Email'), 'Password' (placeholder: 'Please enter your Password'), and 'Confirm Password' (placeholder: 'Please enter your Confirm Password'). A green 'Next step' button is at the bottom of the form. On the right, a green sidebar titled 'Create Account' contains text encouraging users to join the UNIMAS community for exclusive access to buy and sell preloved items. It includes a link 'Already have an account? Login here'.

Figure 4.4: Step 1 of Signup Page

Figure 4.5 shows Step 2 of the signup process. After completing Step 1, users can click the "Next" button to proceed to Step 2, where they fill in their personal information, including username, phone number, gender, address, residential college, and an optional QR code. Uploading a QR code is recommended for those who wish to become sellers on the platform.

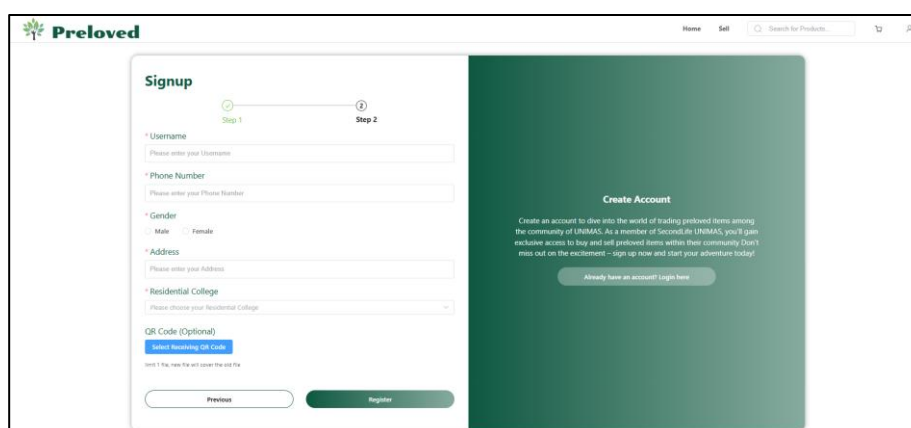
The screenshot shows the Preloved website's Signup page for Step 2. The header is identical to Figure 4.4. The main content area is divided into two sections. On the left, a 'Signup' form is displayed with a progress indicator showing 'Step 1' as completed and 'Step 2' as the active step. The form contains several input fields: 'Username' (placeholder: 'Please enter your Username'), 'Phone Number' (placeholder: 'Please enter your Phone Number'), 'Gender' (radio buttons for 'Male' and 'Female'), 'Address' (placeholder: 'Please enter your Address'), and 'Residential College' (placeholder: 'Please choose your Residential College'). There is also a section for 'QR Code (Optional)' with a 'Select Existing QR Code' button and a note: 'Note: If you have a QR code, please upload it here.' At the bottom of the form are 'Previous' and 'Register' buttons. On the right, a green sidebar titled 'Create Account' contains the same text as in Figure 4.4, including the 'Already have an account? Login here' link.

Figure 4.5: Step 2 of Signup Page

4.2.3 Forget Password and Reset Password

Figure 4.6 displays the Forgot Password page, where users can enter their registered email address. Upon submission, an email containing a temporary password will be sent to their inbox, allowing them to log in.

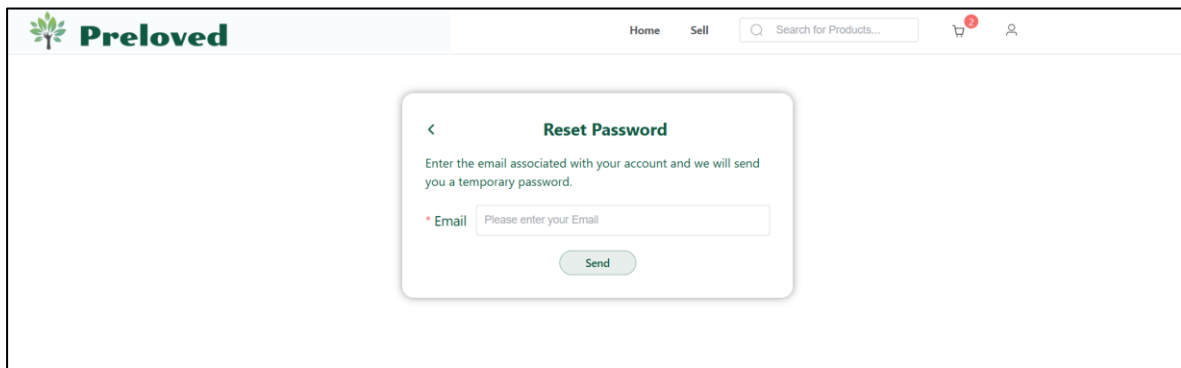


Figure 4.6: Forget Password Page

After logging in with the temporary password, users can navigate to the Reset Password dialog under the profile dropdown in Figure 4.7 to reset a new password for their account.

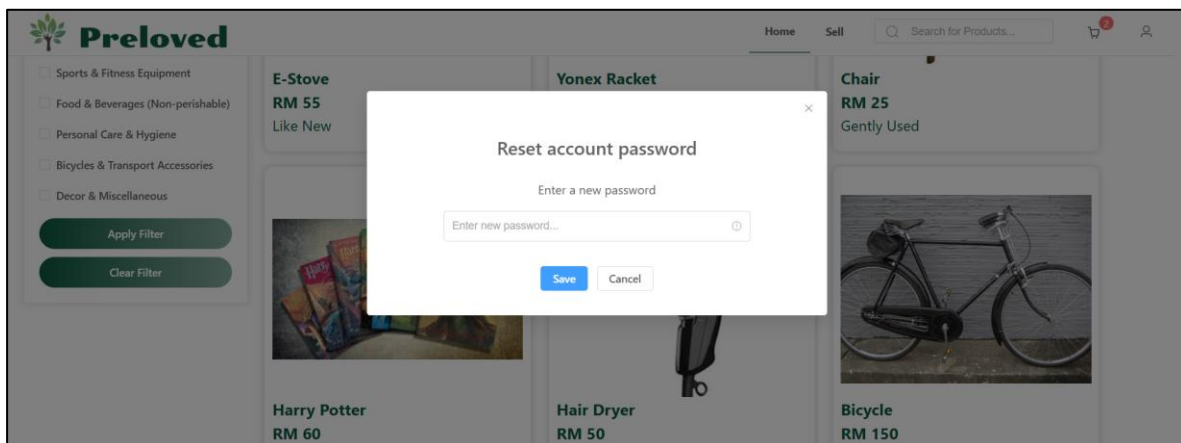


Figure 4.7: Reset Password Dialog

4.2.4 Search box

Figure 4.8 shows the search box, which allows users to enter keywords to search for specific preloved items they are interested in.

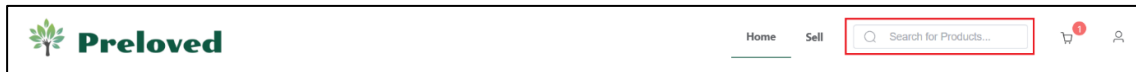


Figure 4.8: Search Box for Product Search

4.2.5 Filter Panel

Figure 4.9 displays the filter panel, which allows users to narrow down product listings by category. Each category is presented with a checkbox beside it. All these categories were derived from the findings presented in Figure 3.8 under Section 3.2.1.2 on current practices and preferences. Users can select one or more categories by checking the boxes. Below the list, there are two buttons: "Apply Filter" to display products based on the selected categories, and "Clear Filter" to reset all selected options and show all available items.

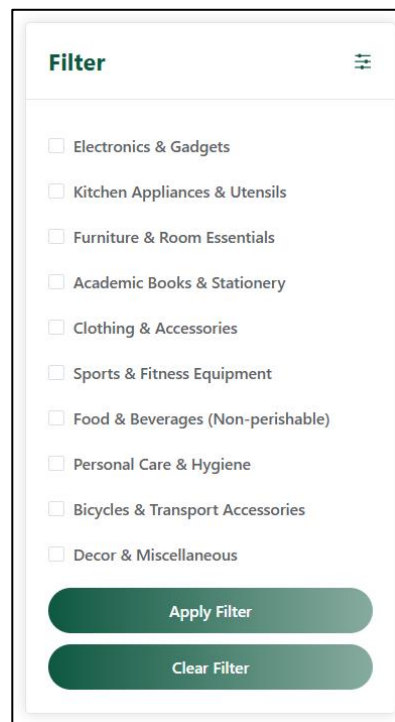


Figure 4.9: Category Filter Panel

4.2.6 Product Details

Figure 4.10 presents the product details page, where users can view key information about a selected item, including the image, name, price, condition, category, stock, and description. It also features an interactive section with a quantity selector and two main action buttons, "Buy Now" and "Add to Cart" that allowing users to proceed to checkout or save the item for later.

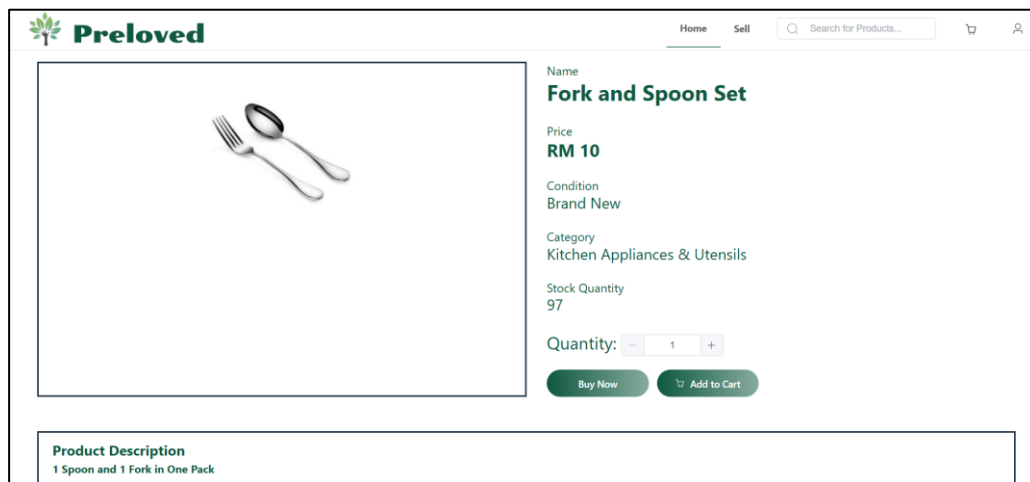


Figure 4.10: Product Details

Figure 4.11 shows the remaining sections of the product details page, including the seller's information and product reviews provided by other users.

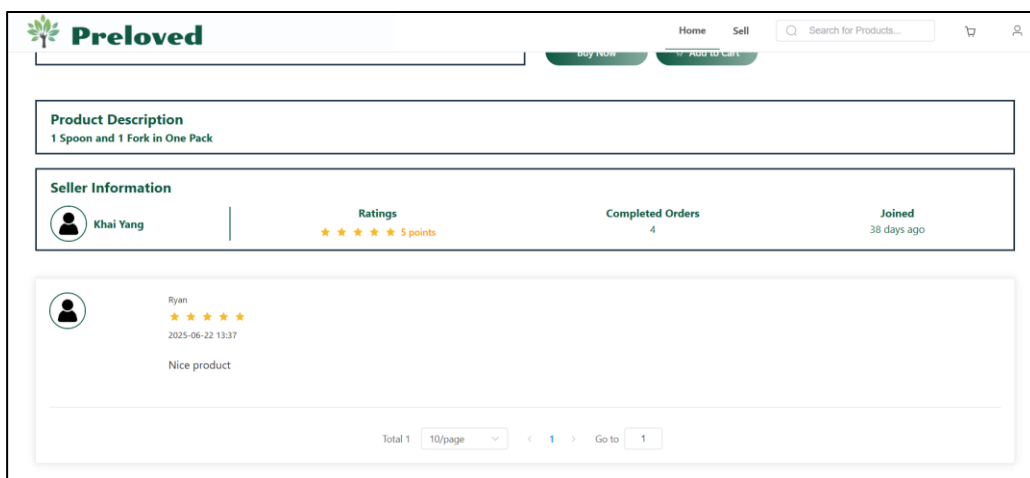
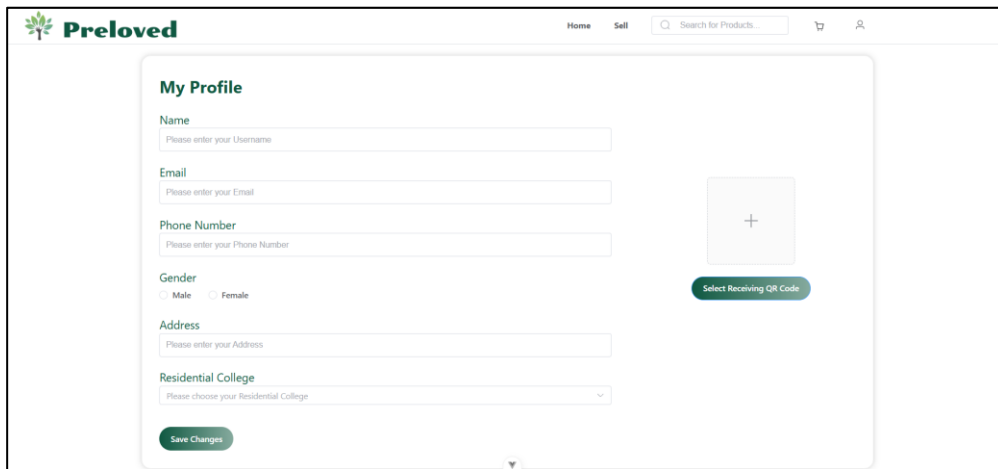


Figure 4.11: Seller Information and Customer Reviews

4.2.7 User Profile

Figure 4.12 shows the user profile page, where users can update their personal information, including their name, email, phone number, gender, address, and residential college. There is also a section to upload a receiving QR code, which will be used by buyers to transfer payment directly to the seller. After filling in the necessary details, users can click the "Save Changes" button to update their profile.



The screenshot displays the 'My Profile' page on the Preloved website. The page features a header with the 'Preloved' logo, navigation links for 'Home' and 'Sell', a search bar, and icons for a shopping cart and user profile. The main content area is titled 'My Profile' and contains several input fields: 'Name' (with placeholder 'Please enter your Username'), 'Email' (with placeholder 'Please enter your Email'), 'Phone Number' (with placeholder 'Please enter your Phone Number'), 'Gender' (with radio buttons for 'Male' and 'Female'), 'Address' (with placeholder 'Please enter your Address'), and 'Residential College' (a dropdown menu with placeholder 'Please choose your Residential College'). To the right of these fields is a large square area for a QR code, marked with a plus sign and a 'Select Receiving QR Code' button. At the bottom of the form is a 'Save Changes' button.

Figure 4.12: User Profile Page

4.2.8 Shopping Cart

Figure 4.13 displays the Shopping Cart page, where users can view the preloved items they have added for purchase. Each item is shown with key details such as the product image, name, unit price, quantity, and subtotal. Users can update the quantity using plus and minus buttons or remove items from the cart entirely. At the right of the cart, a cart summary is provided to show the overall cost, along with a “Proceed to Checkout” button that directs users to the order summary page.

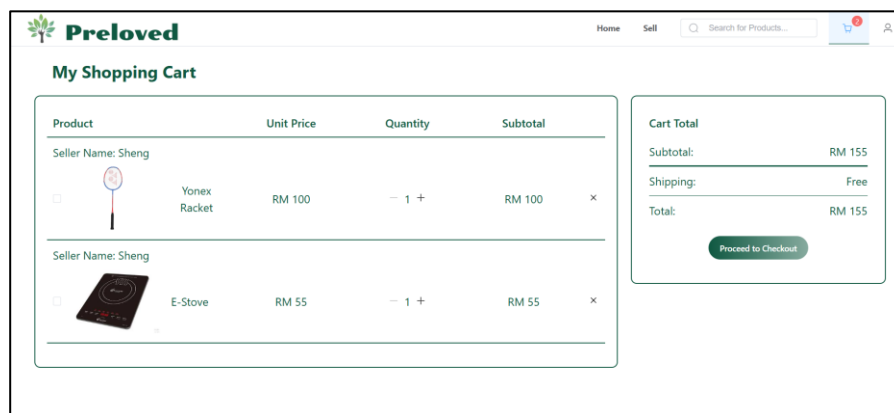


Figure 4.13: Shopping Cart

4.2.9 Checkout

Figure 4.14 displays the Order Summary page, which appears after the user clicks the “Proceed to Checkout” button. This page presents a summary of the selected items, including the product image, name, quantity, price, and subtotal. It also shows the total order amount clearly at the bottom. Below the summary, users can select their preferred payment method, such as QR code or Cash on Delivery (COD). Once a payment method is selected, the user can proceed by clicking the “Place Order” button to confirm order. If Cash on Delivery (COD) is selected as the payment method, a confirmation message will appear. Click 'Confirm' to proceed.

Product Ordered	Unit Price	Quantity	Subtotal
 Yonex Racket	RM 100	2	RM 200
 E-Stove	RM 55	2	RM 110
Subtotal:			RM 310
Shipping:			Free
Total:			RM 310

Shipping Option

☒ Self Pickup / Meet Up

Payment Method

☒ Cash on Delivery (COD) ☐ QR Code

Place Order

Figure 4.14: Order Summary Page

Figure 4.15 shows the Payment Dialog that appears when the user selects QR code as the payment method. In this dialog, the user is required to transfer the exact amount shown by scanning the provided QR code. After completing the transfer, the user must upload the payment receipt as proof of payment for the seller's reference.



Figure 4.15: Payment Dialog

4.2.10 View Order

Figure 4.16 displays the Buyer Order Page, where buyers can track the status of their orders. In this figure, the order is currently shown under the Processing status, indicating that the seller has received the order and is preparing it for completion. Buyers can view product details, monitor the order's progress, check the uploaded payment receipt, request to cancel individual items or the entire order, and contact the seller directly if needed.

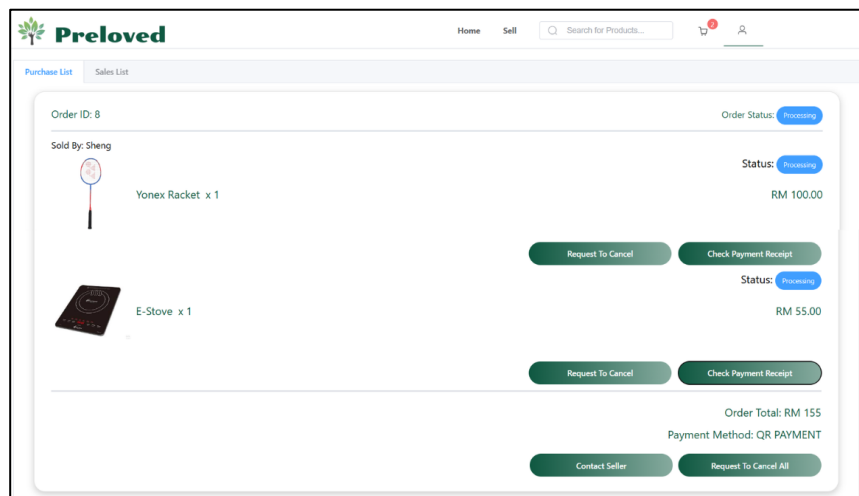


Figure 4.16: Buyer Order Page (Order Status: Processing)

Figure 4.17 shows the seller's view of an order that is currently in the Processing stage. At this point, the seller has received the order and is preparing it for fulfilment. The page displays key details such as the product name, quantity, buyer's name, and address. From this page, the seller can verify the payment receipt, update the order status to Completed, and contact the buyer if necessary.

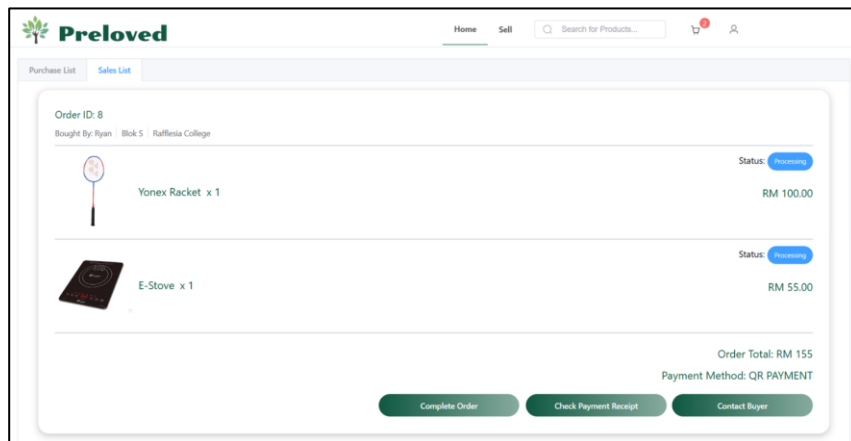


Figure 4.17: Seller Order Page (Order Status: Processing)

4.2.11 Check Payment Receipt

Figure 4.18 displays the Payment Receipt View, which appears after the seller clicks the “Check Payment Receipt” button for an order paid via QR code. This page shows the uploaded payment receipt image submitted by the buyer as proof of payment. Both buyer and seller side can check the payment receipt. If the order was made using Cash on Delivery (COD), this button is not available, as no payment receipt is required.

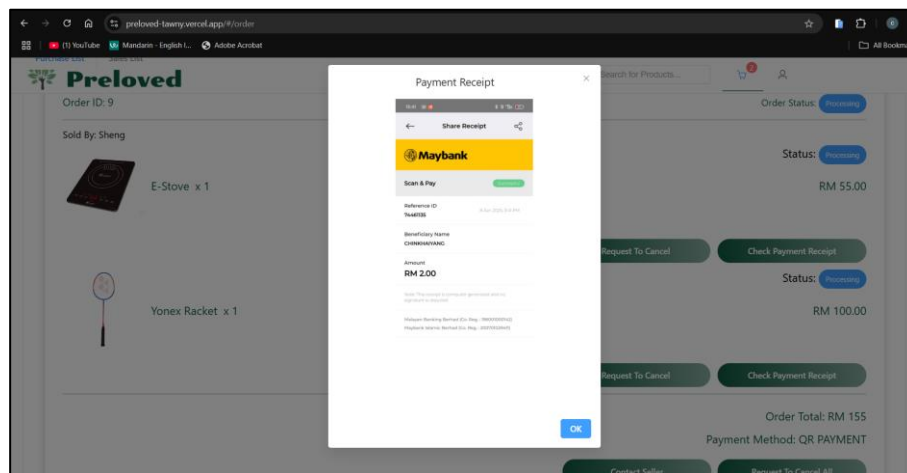


Figure 4.18: Payment Receipt Dialog

4.2.12 Request to Cancel (Single Item)

Figure 4.19 shows the Buyer's view when requesting to cancel a single item from an order. After clicking the "Request Cancel" button, the system prompts the buyer to enter a cancellation reason. Once submitted, a message is displayed: "Seller will receive an email to verify your cancellation request." The order status changes to Partially Request Cancel, and the specific item status becomes Request Cancel.

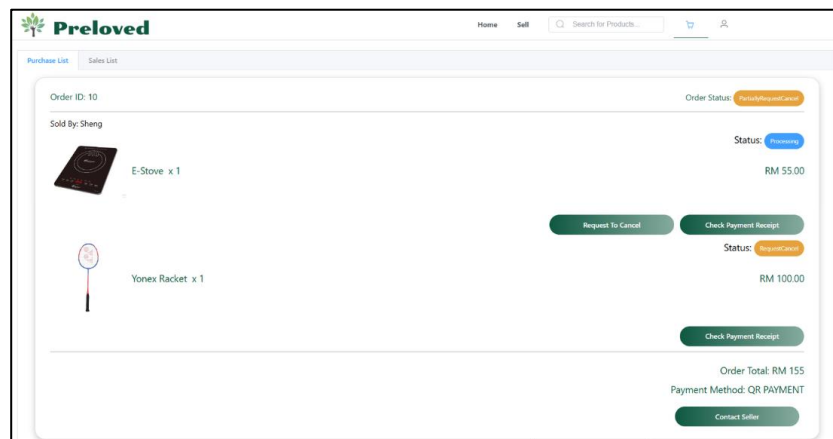


Figure 4.19: Buyer Order Page (Order Status: Partially Request Cancel)

Figure 4.20 shows the Seller's view of the same order after receiving the cancellation request. The cancellation reason provided by the buyer is displayed, and the seller is given options to either approve or reject the request.

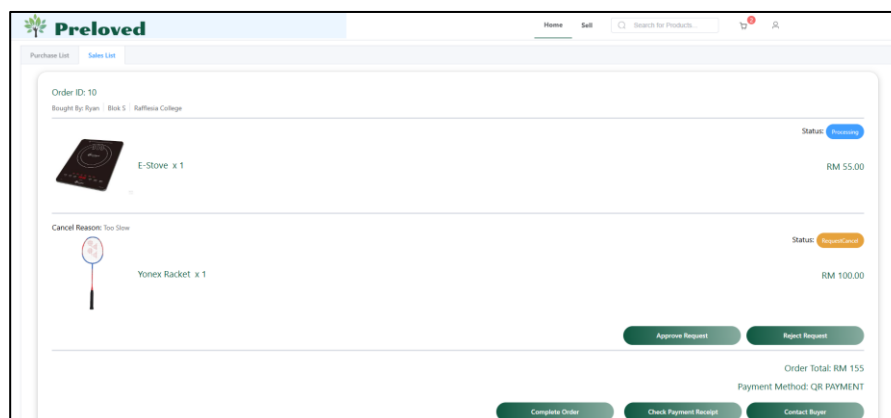


Figure 4.20: Seller Order Page (Item Status: Request Cancel)

4.2.13 Request to Cancel All (Whole Order)

Figure 4.21 shows the Buyer Order Page where the buyer requests to cancel the entire order. By clicking the “Request Cancel All” button, the user is prompted to provide a cancellation reason. After submission, a message appears: “Seller will receive an email to verify your cancellation request.” The order status updates to Request Cancel, and all item statuses are marked as Request Cancel.

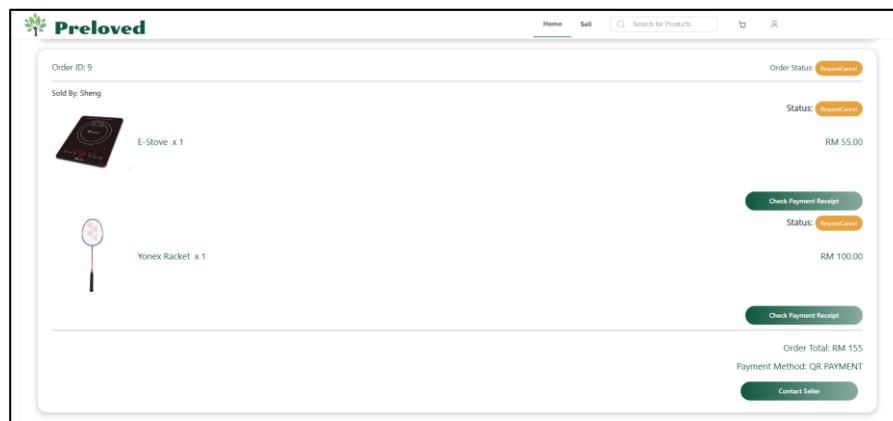


Figure 4.21: Buyer Order Page (Order Status: Request Cancel)

Figure 4.22 displays the Seller Order Page where the seller views the full cancellation request. The system shows the cancellation reason provided by the buyer, and the seller can choose to approve or reject the entire cancellation.

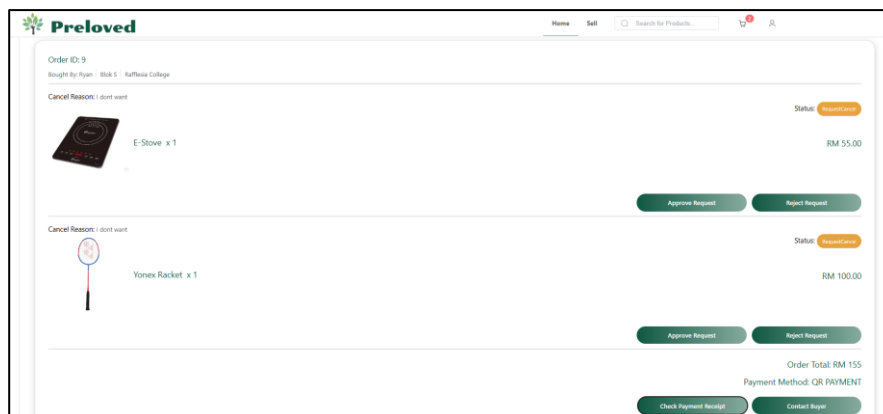


Figure 4.22: Seller Order Page (Items Status: Request Cancel)

4.2.14 Complete Order

Figure 4.23 displays the Buyer Order Page after the seller has marked the order as Completed. From this page, the buyer can also proceed to rate the product based on their experience.

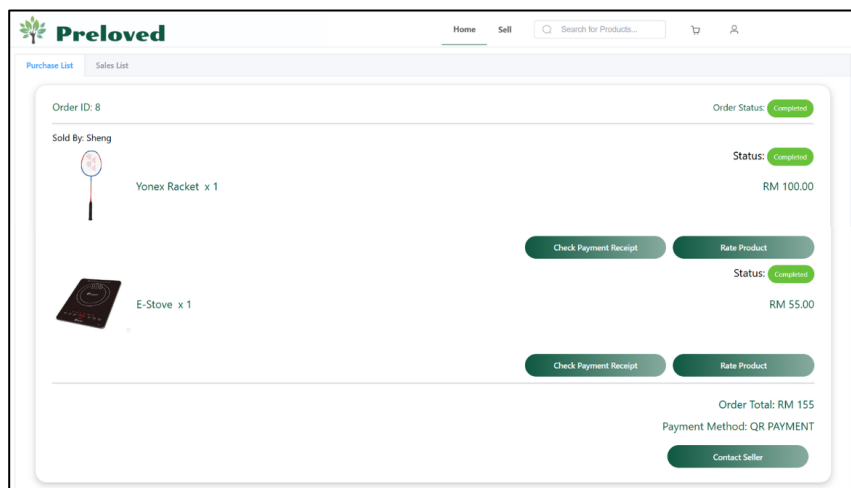


Figure 4.23: Buyer Order Page (Order Status: Completed)

4.2.15 Post Review (Rate Product)

Figure 4.24 shows how a user can rate a product after completing an order. Once the user clicks the "Rate Product" button, a dialog box pops up prompting the user to provide a review. The dialog displays the seller's name, product image, and product name, along with a rating component and a feedback input box for the user to write their comments.

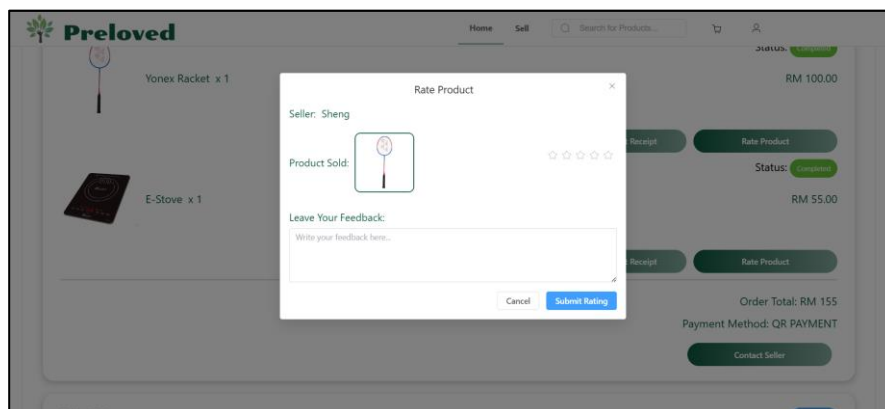


Figure 4.24: Rate Product Dialog

4.2.16 Seller Page

Figure 4.25 displays the Seller Selling List Page, where the seller can view a list of all the products they are currently offering. Each item is shown with essential details such as the product image, name, price, and stock quantity. From this page, the seller has the option to edit or delete any existing product using the action buttons provided.

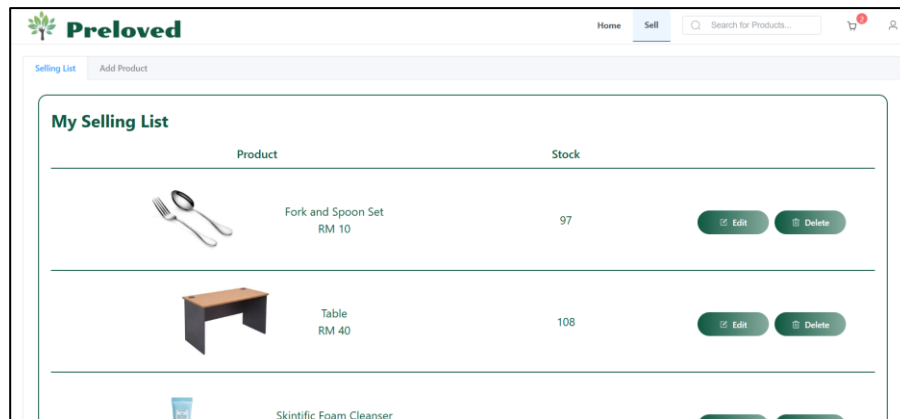


Figure 4.25: Selling List

Figure 4.26 shows the Add Product Page, where the seller can upload a new item to sell on the platform. The seller needs to provide details such as product image, name, price, stock quantity, condition, category, and a description. Once all fields are filled in, clicking the “Add Product” button will list the item for sale.

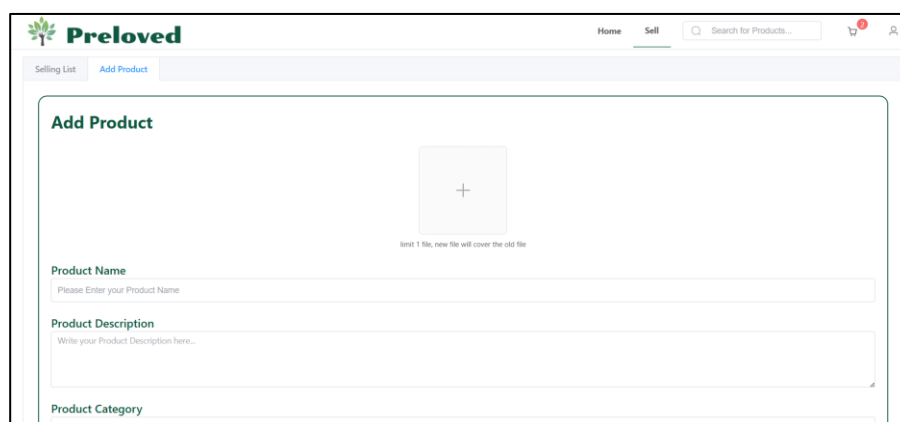


Figure 4.26: Add Product Page

4.2.17 Admin (Dashboard)

Figure 4.27 displays the Admin Dashboard, which offers a comprehensive overview of the system's performance. It features two main sections: the Sales Overview and the User Overview. The Sales Overview presents key financial metrics such as total sales, total orders, and last month's total sales, allowing the admin to monitor revenue trends. The User Overview provides insights into user activity by showing the number of new users, active users, and the total number of registered users. Additionally, a visual chart is included to illustrate monthly sales and order trends, giving the admin a clear understanding of the system's overall activity.

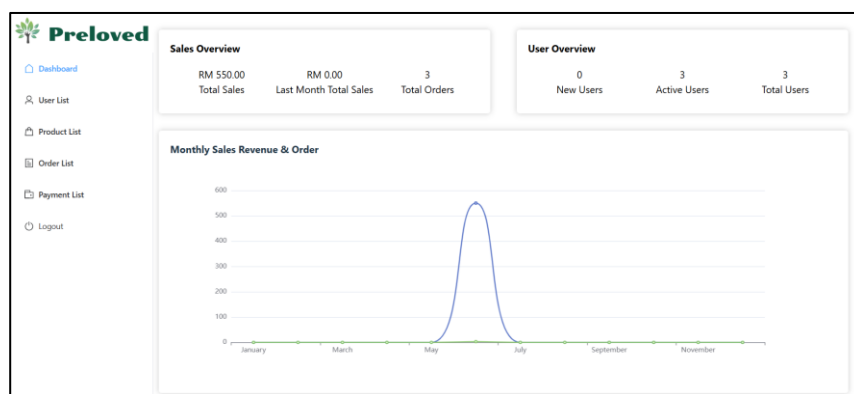


Figure 4.27: Admin Dashboard

4.2.18 Admin (User List)

Figure 4.28 shows the User List page, where the admin can view all registered users in the system. This page allows the admin to perform actions such as searching users by name or email, adding new users, editing user details, banning or reinstating users, and resetting user passwords.

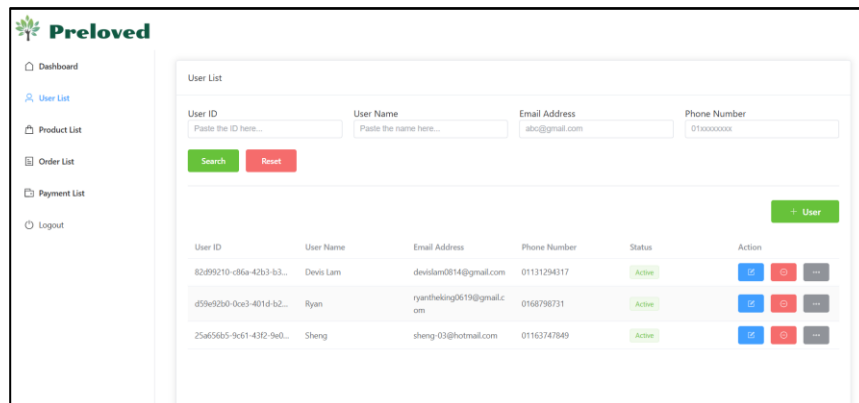


Figure 4.28: User List

Figure 4.29 shows the reset password dialog displayed on the user list page. This dialog allows the admin to reset the password for a selected user.

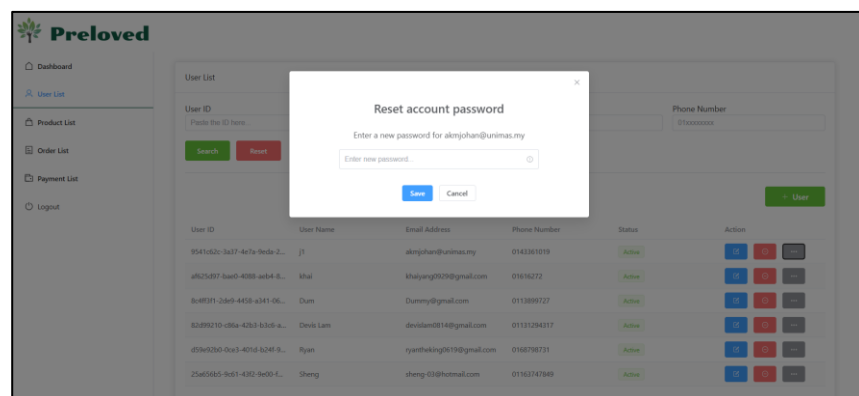


Figure 4.29: Reset Password Dialog

4.2.19 Admin (Product List)

Figure 4.30 presents the Product List page, enabling the admin to manage all listed products. From this interface, the admin can search for products, edit product details, and change product visibility by publishing or unpublishing them. The product status (active/inactive) is also displayed.

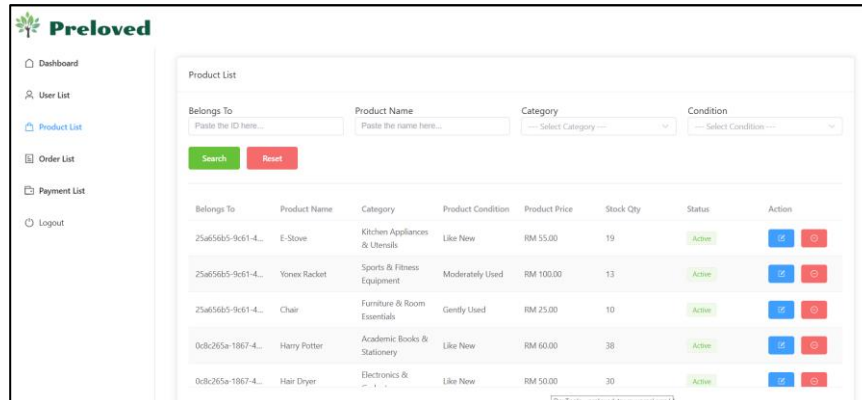


Figure 4.30: Product List

4.2.20 Admin (Order List)

Figure 4.31 shows the Order List page available to the admin, where they can view a complete list of customer orders. Each order record displays essential details such as order ID, payment ID, total amount, and status. A search function is provided to filter orders based on keywords or status.

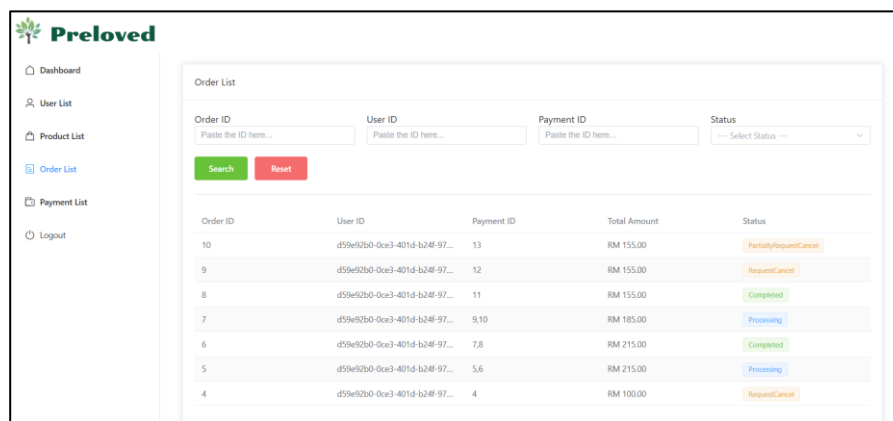
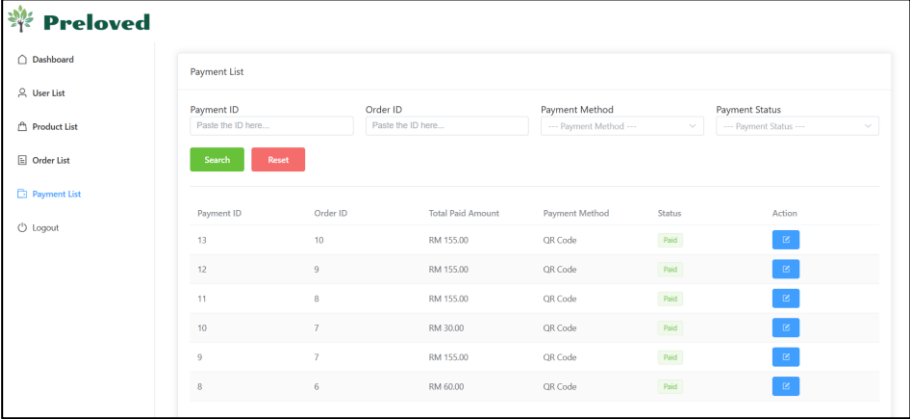


Figure 4.31: Order List

4.2.21 Admin (Payment List)

Figure 4.32 illustrates the Payment List page, which allows the admin to monitor all payment records. The admin can search for payments based on various attributes and update payment status if needed. This ensures that all transactions are tracked and verified properly.



Payment ID	Order ID	Total Paid Amount	Payment Method	Status	Action
13	10	RM 155.00	QR Code	Paid	Edit
12	9	RM 155.00	QR Code	Paid	Edit
11	8	RM 155.00	QR Code	Paid	Edit
10	7	RM 30.00	QR Code	Paid	Edit
9	7	RM 155.00	QR Code	Paid	Edit
8	6	RM 60.00	QR Code	Paid	Edit

Figure 4.32: Payment List

4.3 System Testing

The objective of this section is to evaluate the overall functionality and quality of the system through systematic testing. Testing plays a crucial role in identifying any defects or unexpected behaviours, ensuring that the system performs smoothly and meets user expectations. It helps verify that the system is stable, reliable, and ready for deployment.

Section 4.3.1 focuses on functionality testing, where test cases are designed and executed to validate whether each function delivers the correct output based on the given input. Section 4.3.2 presents the user acceptance testing (UAT), which involves gathering feedback from 10 selected UNIMAS students and residents to assess usability and overall satisfaction with the system.

4.3.1 Functionality Test

This section outlines the functionality testing conducted to validate that the UNIMAS Preloved E-Commerce Website performs as intended. The main objective of this test is to verify that all core features of the system work reliably and fulfil the defined functional requirements. A series of structured test cases have been designed and executed to simulate real user actions, covering essential modules such as registration, login, product listing, cart management, checkout, and order tracking.

To carry out the test, a group of 10 UNIMAS students was selected to interact with the system. Each participant was assigned tasks that reflect typical user behaviour to ensure that every part of the platform operates smoothly. The outcomes of these tests are recorded and presented in table format to provide a clear overview of the system's functionality.

1. Users sign up, login and logout their account.

Table 4.1: User account (sign up, sign in and sign out)

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CA.1	Create new account	Verify that a new user can successfully register.	Email: sheng-03@hotmail.com Password: Sheng123\$ Confirm Password: Sheng123\$ Username: Sheng Phone Number: 01163747849 Gender: Male Address: Blok B3 Residential College: Dahlia College QR Code (optional): 	Successfully to create a new account. A message "Register Success! Please Log in to Continue." are displayed	Pass
CA.2	Create new account	Verify that the system prevents registration of an existing user.	Email: sheng-03@hotmail.com Password: Sheng123\$ Confirm Password: Sheng123\$ Username: Sheng Phone Number: 01163747849 Gender: Male Address: Blok B3 Residential College: Dahlia College QR Code (optional):	"Register Failed" and "User already exists." messages are displayed.	Pass

CB.1	User Login	Login with valid credentials.	Email: sheng-03@hotmail.com Password: Sheng123\$	Authentication is successful and the user is redirected to the homepage.	Pass
CB.2	User Login	Login with invalid email format	Email: sheng-03 Password: Sheng123\$	Error message displayed: "Please enter a valid email address."	Pass
CB.3	User Login	Attempt to log in with unregistered credentials	Email: notregistered@example.com Password: Test123\$	Error message displayed: "User not found"	Pass
CB.4	User Logout	Verify user can log out of the system.	N/A	A message "Logged out successfully" is displayed, and the user is redirected to the login page.	Pass

2. User can click 'Forgot Password' to reset their password by entering their registered email address.

Table 4.2: Forgot Password Functionality

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CC.1	Forgot Password	User resets their password by requesting a temporary password via email	Registered Email: sheng-03@hotmail.com	A success message "Email was sent! Please check your mailbox and reset password" is displayed. User receives an email with a temporary password and can use it to log in.	Pass

3. Users reset their user password.

Table 4.3: Reset User Password Functionality

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CD.1	Reset User Password	User resets their password using a valid new password	New Password: @Sheng567	Password is successfully reset. Displays success message: "Your password was reset!"	Pass
CD.2	Reset User Password	User reset password using an invalid password.	New Password: sheng	Error message displayed: "Password must be at least 8 characters and include uppercase, lowercase, and special character."	Pass

4. Users update their user profile.

Table 4.4: User Profile Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CE.1	Update Profile of Customer	Update profile with valid user information	Email: sheng-03@hotmail.com Name: Sheng Phone Number: 01163747849 Gender: Male Address: Blok B3 Residential College: Dahlia College QR Code (optional): 	Customer profile is successfully updated. Displays success message: "Update Successfully!"	Pass

5. User can view the homepage to look through the available preloved items.

Table 4.5: Homepage Browsing and Product Interaction

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CF.1	Scroll & Paginate Products	Scroll through the list of available preloved items and navigate to the next	N/A	Users can scroll to view up to 10 products per page, and when there are more, numbered	Pass

		page if more than 10 items exist		pagination (e.g., 1, 2) appears below to navigate between pages.	
CF.2	Filter Products	Apply filters to narrow down the displayed products based on specific category.	Selected filters: Electronics & Gadgets, Sports & Fitness Equipment	Products matching the selected filter options are shown	Pass
CF.3	Search Products	Search for a product using the search bar	Keyword: Chair	Products matching the keyword are shown	Pass
CF.4	View Product Details	View details of a selected preloved item	N/A	The product details page displays the product image, name, price, condition, category, stock quantity, product description, seller information, and product reviews.	Pass

6. User can add the preloved item to shopping cart, update preloved item quantity and delete the preloved item from the cart.

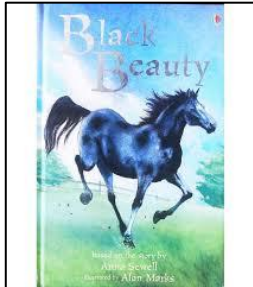
Table 4.6: Shopping Cart Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CG.1	Add to Cart	User adds a preloved item to the shopping cart from the product details page.	N/A	A message “Item has been added to your shopping cart.” is displayed and the item appears in the shopping cart.	Pass
CG.2	Update Cart Quantity	User updates the quantity of an item in the shopping cart	N/A	Shopping cart is updated and shows the new quantity.	Pass
CG.3	Remove Item from Cart	User deletes a preloved item from the shopping cart	N/A	Item is removed from the cart.	Pass

CG.4	View Cart Overview	View details of a selected product	N/A	All added items are listed with details (name, image, price, quantity, subtotal), and the total cost is correctly displayed.	Pass
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7. User who wish to sell preloved items can navigate to sell page to add product, and manage (update, delete) them.

Table 4.7: Selling Feature: Add, Update, and Delete Product

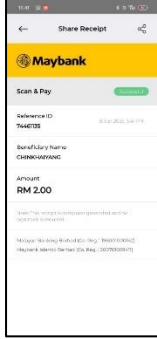
Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CH.1	Add product Without QR	User tries to add a product without uploading receiving QR code in profile	N/A	A message "Please upload the QR Code before add product!" is displayed, and the user is redirected to the profile page.	Pass
CH.2	Add Product	Seller adds a new preloved item with valid information.	Product Image:  Product Name: Black Beauty Product Description: 50 Pages Product Category: Academic Books & Stationary Product Condition: Like New Product Price: 10	Product is successfully added and listed under the user's selling list. Displays success message: "Add Successfully."	Pass

			Product Stock: 2		
CH.3	Update Product	Seller updates the details of an existing preloved item	Product Price: 15	Product information is updated. Displays success message: "Update Successfully."	Pass
CH.4	Delete Product	Seller deletes a listed preloved item from their selling list.	N/A	Product is removed from the list. Displays success message: "Delete Successfully!".	Pass

8. After completing shopping, the user can proceed to checkout and payment process.

Table 4.8: Checkout and Payment Process

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CI.1	Proceed to Checkout	User proceeds to checkout after selecting at least one item in the shopping cart.	N/A	An order summary is displayed with the selected item(s), total price, and payment method section.	Pass
CJ.1	Place Order via COD	User selects Cash on Delivery (COD) as payment method.	N/A	Order is placed successfully without requiring payment upload. Displays success message: "Order Placed Successfully!" and redirects user to the homepage. The seller of the product will also receive an email notification about the new order.	Pass
CJ.2	Place Order via QR Code	User selects QR Code as payment method.	Payment Receipt:	A QR code is displayed. User must scan it and transfer the exact amount. Then, the user is prompted	Pass

				to upload the payment receipt for the seller to verify. Displays success message: “Order Placed Successfully!” and redirects user to the homepage. The seller of the product will also receive an email notification about the new order.	
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9. Buyer can track their order status, check payment receipt, request to cancel, request to cancel all, contact seller and rate product at my order page.

Table 4.9: Buyer Order Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CK.1	View Orders as Buyer	Buyer checks their order list to track items they have purchased	N/A	List of all purchased items is displayed with key details (product, quantity, total, payment method, status).	Pass
CK.2	Check Payment Receipt	Buyer views the uploaded payment receipt for a QR code order	N/A	Payment receipt image opens successfully for buyer to view.	Pass
CK.3	Request to Cancel (Single item)	Buyer requests to cancel one specific item from an order.	Cancel Reason: The delivery is too slow.	A message “Seller will receive an email to verify your cancellation request” is displayed. Order status becomes Partially Request Cancel. Item status becomes Request Cancel. An email is sent to the seller notifying them of the cancellation request.	Pass

				The cancel reason is shown in the seller's order page.	
CK.4	Request to Cancel All (Whole Order)	Buyer requests to cancel the whole order	N/A	A message "Seller will receive an email to verify your cancellation request" is displayed. Order status and Item status becomes Request Cancel. An email is sent to the seller notifying them of the cancellation request. The cancel reason is shown in the seller's order page.	Pass
CK.5	Contact Seller	Buyer can contact the seller in case of any questions or misunderstandings.	N/A	The buyer is redirected to WhatsApp with the seller's number pre-filled, allowing them to start a chat directly.	Pass
CK.6	Rate Product	Buyer rates a product after the order is completed	Rating: 5 Stars Feedback: Great quality	A success message "Thanks for your rating!" is displayed. The product rating and feedback are saved and shown on the Product Details page.	Pass

10. Seller can check payment receipt, approve and reject cancellation request, mark order as completed and contact buyer at my order page

Table 4.10: Seller Order Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CL.1	View Orders as Seller	Seller checks order list to view orders from buyers	N/A	Seller sees a list of orders received for their listed products, including buyer info and order details.	Pass

CL.2	Check Payment Receipt	Seller views the uploaded payment receipt for a QR code order	N/A	Payment receipt image opens successfully for seller to view.	Pass
CL.3	Approve Cancellation Request	Seller approves a buyer's cancellation request	N/A	The item status is updated to Cancelled. A message "Cancellation Confirmed" is displayed. The buyer receives an email notification that the order has been cancelled.	Pass
CL.4	Reject Cancellation Request	Seller rejects a buyer's cancellation request	Reject Reason: I will deliver today	The item status changes from Request Cancel to Processing. A message "Cancellation Rejected" is displayed. The buyer receives an email notification that the cancellation request has been rejected. The reject reason is shown in the buyer's order page.	Pass
CL.5	Mark Order as Completed	Seller marks the order as completed after successful delivery or handover	N/A	The order status is updated to Completed. A message "Order "7" marked as completed" is displayed. The buyer receives an email notification that the order has been completed.	Pass
CL.6	Contact Buyer	Seller can contact the buyer in case of any questions or misunderstandings.	N/A	The seller is redirected to WhatsApp with the buyer's number pre-filled, allowing them to start a chat directly.	Pass

11. Admin can log in to the admin portal to view the dashboard overview.

Table 4.11: Admin Dashboard Overview

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CM.1	View Dashboard Overview	Admin logs into the portal and navigates to the dashboard overview	N/A	Dashboard displays: • Sales Overview (Total Sales, Last Month Sales, Total Orders) • User Overview (New Users, Active Users, Total Users) • Monthly Sales Revenue & Order chart showing sales trends by month	Pass

12. Admin can log in to the admin portal to manage user

Table 4.12: Admin User Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CN.1	Search User	Admin searches for a user by name	Username: Sheng	Matching user(s) displayed in the user list	Pass
CN.2	Reset User Search	Admin resets the search field in the user list	N/A	All user records are reloaded and displayed without any filters.	Pass
CN.3	Add New User	Admin adds a new user to the system	Email: Dummy@gmail.com Password: @Dummy123 Confirm Password: @Dummy123 Username: Dummy	New user is created and appears in the user list. A message “User Created Successfully” is displayed.	Pass

			Phone Number: 0161234567 Gender: Male Residential College: Cempaka College Address: Blok B		
CN.4	Edit Existing User	Admin updates existing user's details	Residential College: Rafflesia College	User information is successfully updated in the user list. A message "User Updated Successfully" is displayed.	Pass
CN.5	Ban User	Admin bans a specific user from accessing the system	N/A	User status changes from "Active" to "Inactive" and access is restricted. A message "User has been revoked" is displayed.	Pass
CN.6	Reinstate User	Admin reinstates a previously banned user	N/A	User status is updated to "Active," and the user regains access to the system. A message "User has been reinstated" is displayed.	Pass
CN.7	Reset User Password	Admin resets password for a selected user	Password: @Sheng999	User's password is updated successfully. A message "Password Reset Successfully" is displayed.	Pass

13. Admin can log in to the admin portal to manage products.

Table 4.13: Admin Product Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CO.1	Search Product	Admin searches for a product by name	Product Name: Chair	Matching product(s) are displayed in the product list	Pass
CO.2	Reset Product Search	Admin resets the search field in the product list	N/A	All product records are reloaded and displayed without any filters	Pass
CO.3	Edit Product	Admin edits product details.	Price: 30	Product details are successfully updated and reflected in the product list. A message “Update Successfully” is displayed.	Pass
CO.4	Unpublish Product	Admin unpublishes a product to hide it from users	N/A	Product becomes hidden from buyers. Product status is updated to “Inactive”. A message “Product has been unpublished” is displayed.	Pass
CO.5	Publish Product	Admin republishes an unpublished product	N/A	Product becomes visible again to users in the homepage. Product status is updated to “Active”. A message “Product has been published” is displayed.	Pass

14. Admin can log in to the admin portal to view the list of customer orders.

Table 4.14: Admin Order Viewing

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CP.1	Search Order	Admin searches for a specific order in the order list by status.	Status: Completed	Only orders with status "Completed" are displayed in the order list	Pass
CP.2	Reset Order Search	Admin resets the search field or filters in the order list	N/A	All order records are reloaded and displayed without any filters	Pass

15. Admin can log in to the admin portal to manage the payment list.

Table 4.15: Admin Payment Management

Test Case No	Test Case	Test Case Description	Input Data	Expected Result	Result (Pass/Fail)
CQ.1	Search Payment	Admin searches for a payment using payment method.	Payment Method: Cash on Delivery	Matching payment record(s) are displayed in the payment list.	Pass
CQ.2	Reset Payment Search	Admin resets the payment search field to view all records again	N/A	All payment records are reloaded and displayed without any filters.	Pass
CQ.3	Edit Payment	Admin edits payment details.	Payment Method: Cash on Delivery	Payment method is updated successfully. A message "Payment updated successfully" is displayed.	Pass

4.3.2 User Acceptance Testing (UAT)

User Acceptance Testing (UAT) was conducted to evaluate the functionality and user satisfaction of the e-commerce website for preloved items. This testing involved 10 UNIMAS residential students, who were selected to explore the system and provide feedback based on their experience.

After interacting with the website, each participant completed a questionnaire consisting of two sections. Section A focused on collecting the participants' demographic profiles, while Section B assessed their user experience, including layout, navigation, product browsing, category relevance, and the overall buying and selling process. The questionnaire used for this evaluation is included in Appendix C, and the results are presented below.

4.3.2.1 Demographic Profile

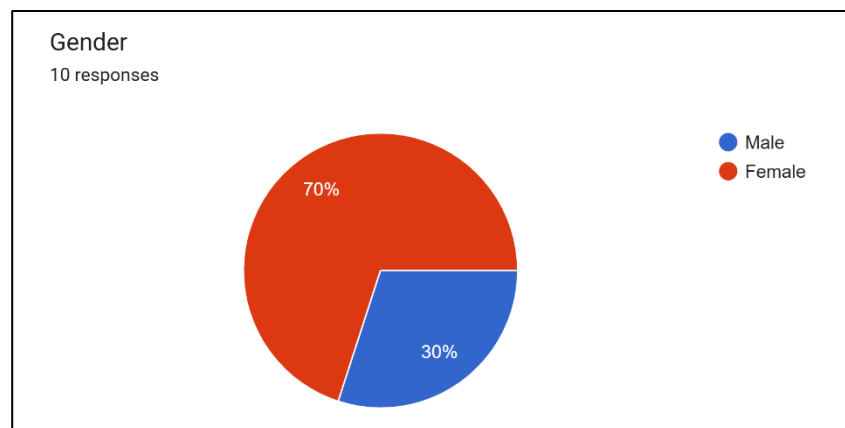


Figure 4.33: Gender Distribution of Respondents

Figure 4.33 illustrates the gender distribution of the respondents, where 7 respondents (70%) being female while 3 respondents (30%) being male.

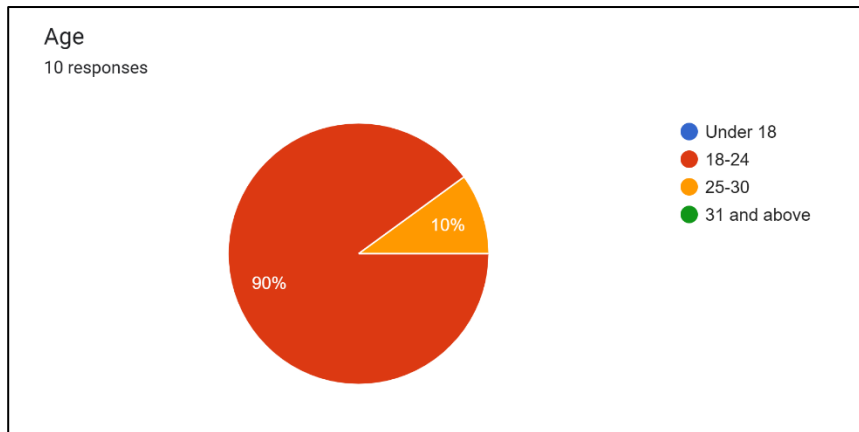


Figure 4.34: Age Distribution of Respondents

Figure 4.34 highlights the age range of the participants, with 9 respondents (90%) falling within the 18-24 age group and 1 respondent (10%) within the 25-30 age group.

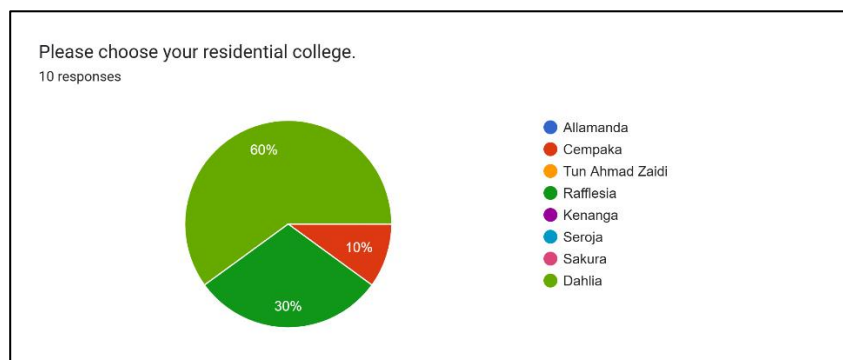


Figure 4.35: Residential Status of Respondents

Lastly, Figure 4.35 examines the respondents' residential status. All respondents are college residents, with 6 respondents (60%) from Dahlia, 3 respondents (30%) from Rafflesia, and 1 respondent (10%) from Cempaka. These figures provide a demographic overview of the surveyed participants.

4.3.2.2 User Experience

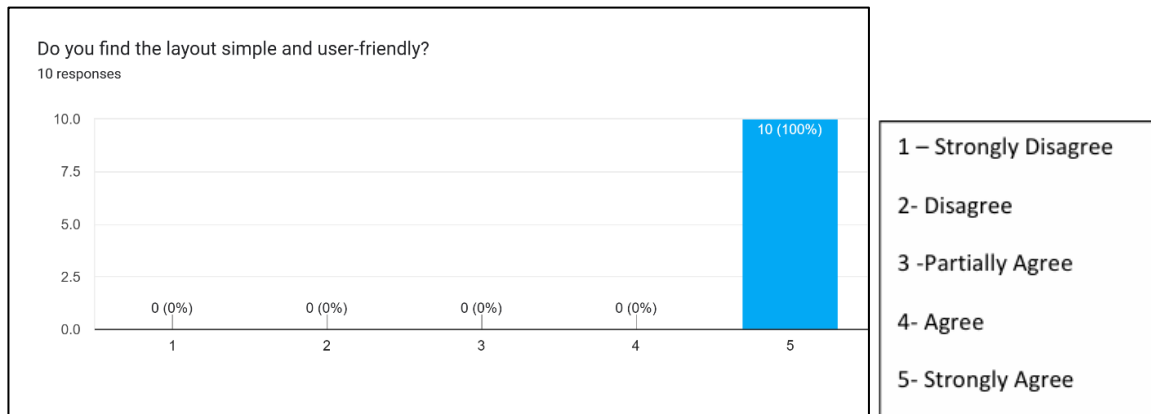


Figure 4.36: User Feedback on Website Layout Simplicity and User-Friendliness

Figure 4.36 shows 100% of users strongly agree that the layout of the website is simple and user-friendly. This indicates that the interface design is intuitive and accessible even for first-time users.

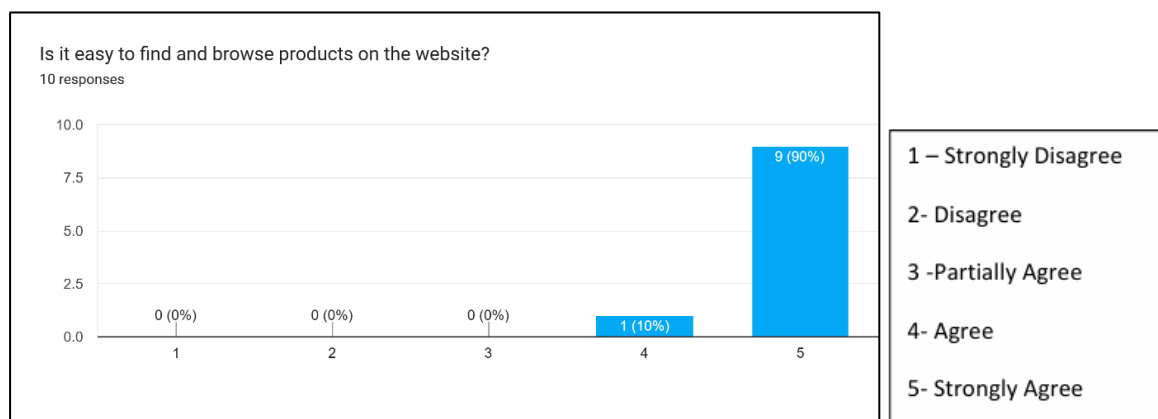


Figure 4.37: User Feedback on Ease of Finding and Browsing Products

Figure 4.37 shows 90% of users strongly agree and 10% of users agree that it is easy to find and browse products on the website. This reflects a well-structured product listing and navigation system, which makes it convenient for users to explore and locate desired items.

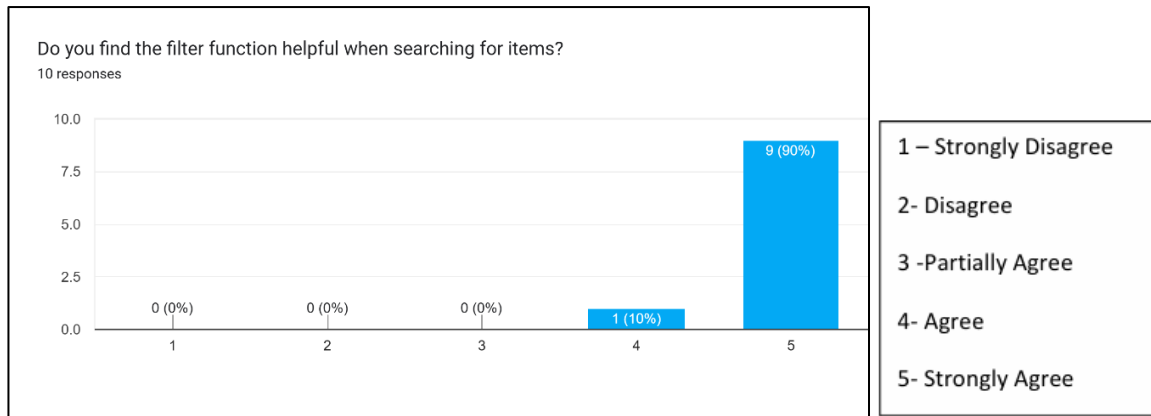


Figure 4.38: User Feedback on Helpfulness of Filter Function

Figure 4.38 shows 90% of users strongly agree and 10% of users agree that the filter function is helpful when searching for items. This highlights the effectiveness of the filter panel in refining search results, allowing users to narrow down options efficiently according to their preferences.

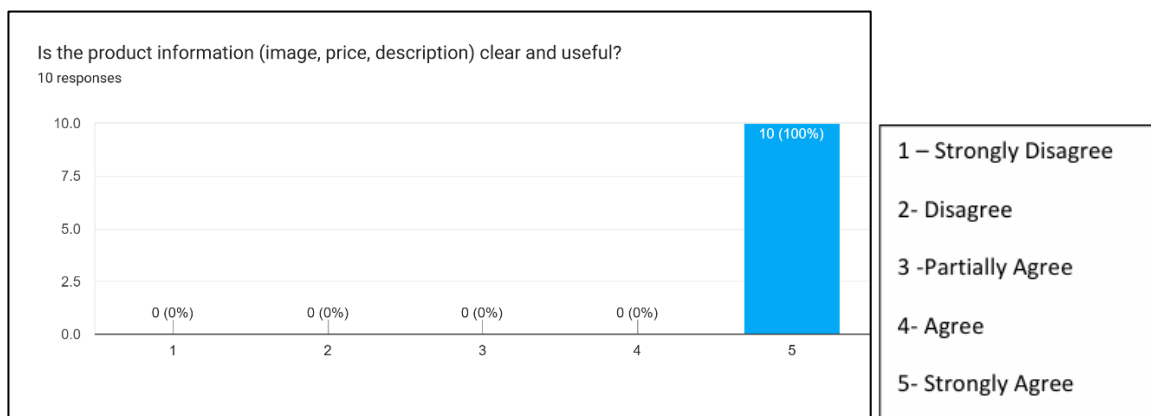


Figure 4.39: User Feedback on Usefulness of Product Information

Figure 4.39 shows 100% of users strongly agree that the product information such as image, price and description is clear and useful. This ensures that users can make informed decisions before purchasing preloved items.

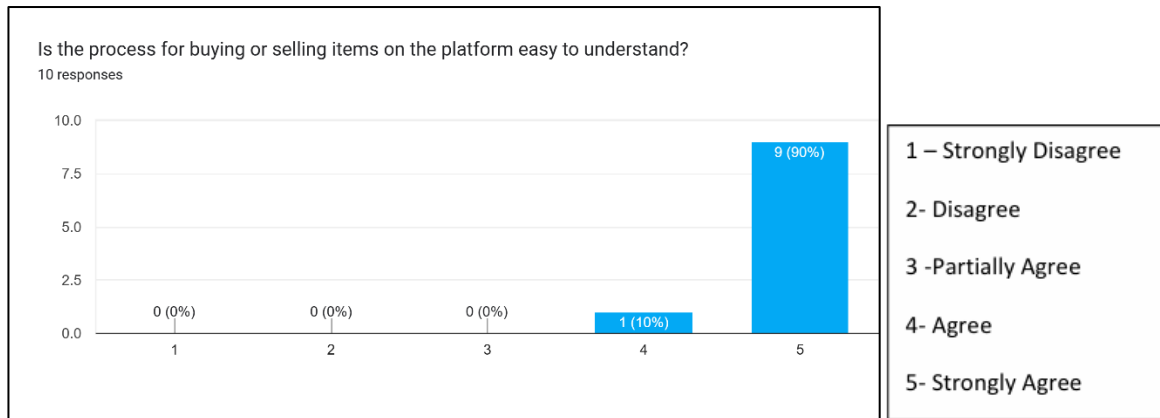


Figure 4.40: User Feedback on Ease of Buying and Selling Process

Figure 4.40 shows 90% of users strongly agree and 10% of users agree that the process for buying or selling items on the platform is easy to understand. This suggests that the transactional flow is smooth and easy to follow.

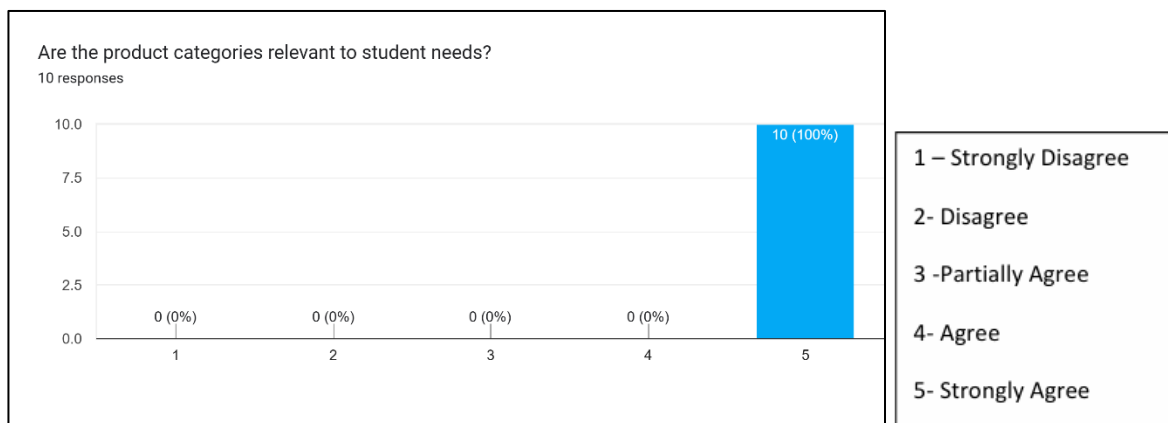


Figure 4.41: User Feedback on Relevance of Product Categories to Students

Figure 4.41 shows 100% of users strongly agree that the product categories are relevant to students' needs. This confirms that the platform is well-aligned with its target audience, offering categories that reflect real student lifestyles and demands, such as electronics & gadgets, furniture & room essentials, and academic books & stationary.

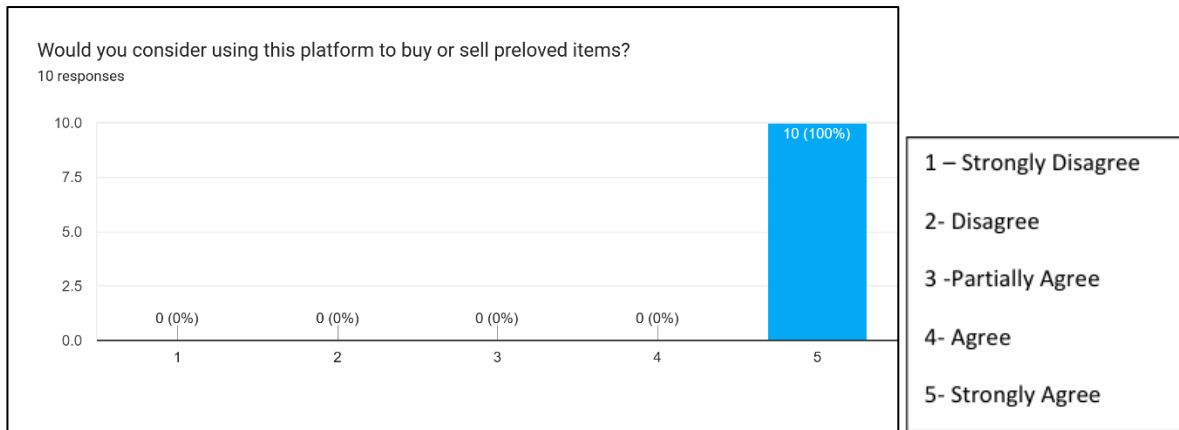


Figure 4.42: User Willingness to Use the Platform for Buying and Selling

Figure 4.42 shows 100% of users strongly agree that they will consider using this platform to buy and sell preloved items. This demonstrates strong overall satisfaction and potential for sustained engagement and adoption.

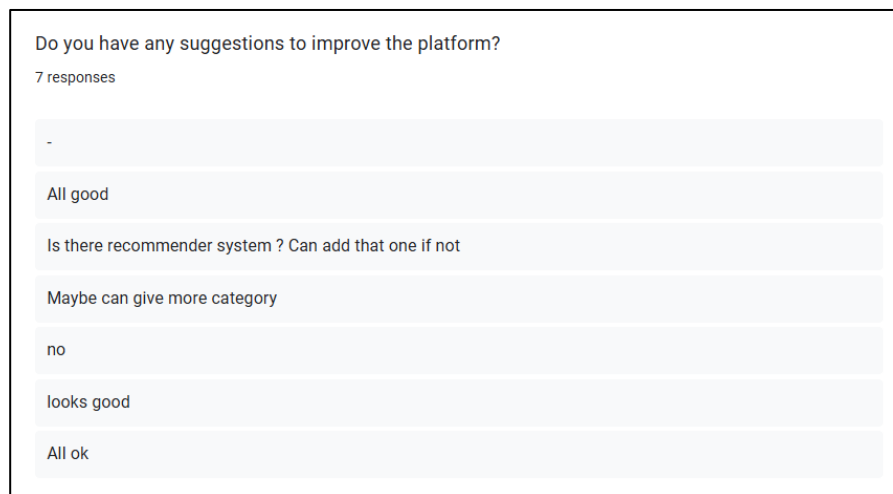


Figure 4.43: User Suggestions for Website Improvement (Open-Ended Responses)

Figure 4.43 shows the open-ended question asking users for suggestions to improve the website. Most responses were positive, indicating overall satisfaction with the platform, with comments such as “all good,” “looks good,” and “all ok.” A few constructive suggestions were also provided, including adding a recommender system and introducing more product categories to enhance the browsing experience.

4.4 Conclusion

In conclusion, this chapter has detailed the successful implementation of the system's core functionalities and modules that support a fully functional e-commerce platform tailored for UNIMAS students. The system was developed to provide a user-friendly and efficient solution for buying and selling preloved items within the campus community.

To ensure the reliability and usability of the platform, two essential types of testing were conducted which are functionality testing and user acceptance testing (UAT). Functionality testing verified that each feature performs as expected under different conditions, while UAT provided valuable insights into user satisfaction and experience. The positive feedback and high satisfaction rates gathered during testing confirm that the system meets user needs and project objectives effectively. Overall, the system is now ready to be deployed and used in a real-world environment.

CHAPTER 5: CONCLUSION AND FUTURE WORKS

5.1 Introduction

This chapter summarizes the achievements of the project in meeting its objectives, outlines the limitations encountered, and suggests possible future improvements for the e-commerce website.

5.2 Achievement

Table 5.1 outlines the project accomplishments based on the initial objectives set at the beginning of the project.

Table 5.1: Achievement of the Objectives

Objective	Achievement
To design a web-based system for facilitating the purchase and sale of preloved items among UNIMAS students.	A functional website was successfully designed with features that support product listing, user registration, and browsing, specifically for UNIMAS students.
To develop an e-commerce platform that supports the listing, browsing, and transactions of preloved items.	Users can list items, browse categories, view product details, add to cart, and complete transactions using QR code or COD methods.
To evaluate the e-commerce system using User Acceptance Testing (UAT) to ensure functionality and a positive user experience before launch.	UAT was conducted with 10 users from UNIMAS. Feedback was gathered through a structured questionnaire, and results showed high satisfaction in layout, usability, and system clarity.

5.3 Limitation

Although the system successfully delivers core e-commerce features, several limitations remain. Firstly, the payment process is limited to manual upload of receipts for QR code transactions and does not integrate with actual payment gateways, which may reduce user convenience. Secondly, product delivery and logistics are not handled by the system, requiring buyers and sellers to manage this externally. Lastly, the system does send email notifications after an order is placed, but it lacks a real-time in-system notification feature, which may delay ongoing communication between users.

5.4 Future Enhancement

To improve the system, several features could be added in future development. Integrating an online payment gateway would enhance transaction efficiency and trust. Additionally, implementing a payment authentication mechanism, such as holding the payment temporarily until the buyer confirms they have received the item, could help reduce risks like sellers failing to deliver after payment. This approach would strengthen transaction reliability. A recommender system can be implemented to personalize user experience based on browsing or purchase history. Additionally, enabling real-time notifications or chat between buyers and sellers would improve communication.

5.5 Conclusion

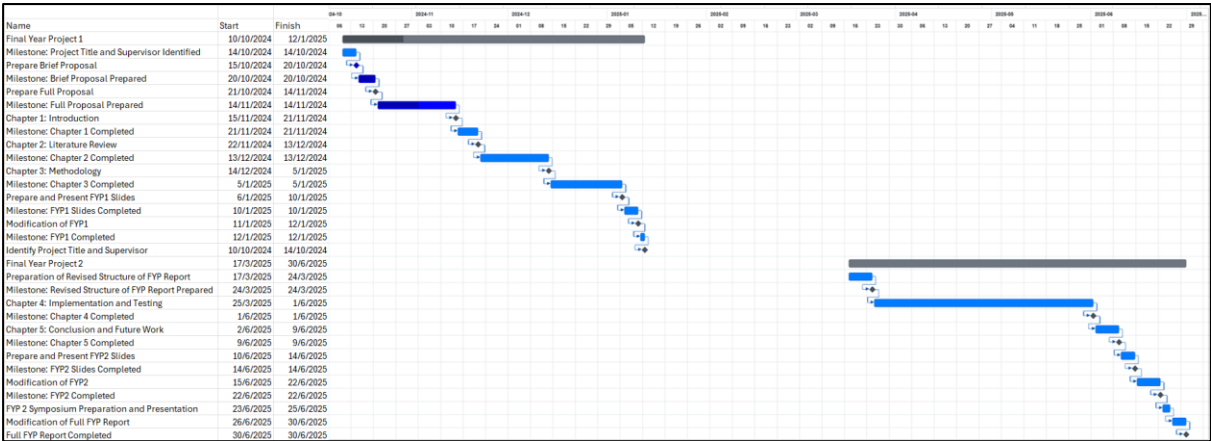
In conclusion, the project has successfully achieved its objectives by developing a functional e-commerce platform tailored for UNIMAS students. Through both functionality testing and user acceptance testing, the system proved to be user-friendly and effective in facilitating the buying and selling of preloved items. While some limitations were identified, future enhancements have been outlined to further improve usability, efficiency, and overall user experience.

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APPENDIX A: PROJECT SCHEDULE



APPENDIX B: QUESTIONNAIRE FOR REQUIREMENTS OF ANALYSIS

UNIMAS E-commerce Website for Preloved Items Among Students

Hello everyone,

My name is Chin Khai Yang. I'm a final-year student majoring in **Bachelor of Computer Science with Honours (Information Systems)** at the Faculty of Computer Science and Information Technology (FCSIT), University Malaysia Sarawak (UNIMAS).

I'm conducting a survey for my Final Year Project (FYP) to study the perception of student-to-student e-commerce platforms and how such a platform can improve the experience of buying and selling preloved items among UNIMAS students.

This survey is divided into four (4) sections:

- **Section A:** Demographic Profile
- **Section B:** Current Practices and Preferences
- **Section C:** Opinions on Features
- **Section D:** Challenges and Expectations

This survey will take approximately **5–10 minutes** to complete. All responses will be kept **CONFIDENTIAL** and used solely for academic purposes. Your feedback is incredibly valuable to this project, and I truly appreciate your time and input!

If you have any questions or need further information, feel free to email me at **81688@siswa.unimas.my**.

Thank you!

Sincerely,
Chin Khai Yang

khaiyangchin@gmail.com

Switch account

Not shared

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Section A: Demographic Profile

Gender *

☐ Male

☐ Female

Age *

☐ Under 18

☐ 18~24

☐ 25~30

☐ 31 and above

Are you currently a residential college student? If yes, please select your college. *

☐ No, I am a non-residential student

☐ Allamanda

☐ Cempaka

☐ Tun Ahmad Zaidi

☐ Rafflesia

☐ Kenanga

☐ Seroja

☐ Sakura

☐ Dahlia

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Section B: Current Practices and Preferences

Do you have any prior experience with using online platforms for buying or selling ^{*} preloved items?

- ☐ Yes
- ☐ No

How often do you engage with online platforms for buying or selling preloved items? ^{*}

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Rarely
- ☐ Never

Which tools or platforms do you currently use for buying or selling preloved items? ^{*}

- ☐ Carousell
- ☐ Mudah
- ☐ Barnything
- ☐ Whatsapp
- ☐ Other: _____

What types of preloved items do you typically buy or sell online? ^{*}

- ☐ Electronics
- ☐ Furniture
- ☐ Clothing
- ☐ Books
- ☐ Beauty and Personal Care Items
- ☐ Sports Equipment
- ☐ Kitchenware
- ☐ Food and Beverages
- ☐ Other: _____

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Section C: Opinions on Features

Would you find it useful to have advanced search filters to help you find preloved items more easily? *

	1	2	3	4	5	
Not Helpful	☐	☐	☐	☐	☐	Extremely Helpful

Would you find it useful to have a feature that allows sellers to upload multiple photos or videos of the item being sold? *

	1	2	3	4	5	
Not Helpful	☐	☐	☐	☐	☐	Extremely Helpful

Would you find it useful to have a rating or review system for sellers and buyers on the platform? *

	1	2	3	4	5	
Not Helpful	☐	☐	☐	☐	☐	Extremely Helpful

Would you find it useful to have a "Shopping Cart" feature to save items you want to purchase later? *

	1	2	3	4	5	
Not Helpful	☐	☐	☐	☐	☐	Extremely Helpful

What is your preferred payment method for buying or selling preloved items? *

☐ QR code

☐ Cash on Delivery (COD)

☐ Bank Transfer

☐ E-Wallets

☐ Credit/Debit Card

☐ Other:

What additional features would enhance your experience with a marketplace for buying and selling preloved item?

Your answer

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Section D: Challenges and Expectations

What are the main challenges you face with using online platforms for buying or selling preloved items? *

- ☐ Lack of trust or security
- ☐ Inadequate product descriptions or images
- ☐ Difficult to navigate
- ☐ Difficulty in communication with buyers/sellers
- ☐ Difficulty with payment methods
- ☐ Limited product selection or variety
- ☐ Other: _____

What are your expectations for a tool or platform designed for buying or selling preloved items? *

- ☐ User-Friendly Interface
- ☐ Secure and Reliable Payment Options
- ☐ Effective Communication Channels
- ☐ Comprehensive Search and Filter Features
- ☐ Transparency and Trustworthiness
- ☐ Affordable Fees
- ☐ Efficient Delivery and Pickup Options
- ☐ Other: _____

Would you recommend such a platform/tool to others if it met your expectations? *

- ☐ Yes
- ☐ No

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APPENDIX C: QUESTIONNAIRE FOR UAT

Preloved User Acceptance Test (UAT)

Hello, my name is Chin Khai Yang, here conducting a User Acceptance Test(UAT) to those who have tested my Final Year Project - Preloved, an E-commerce website targetted for UNIMAS students who resides within UNIMAS's campus. This form will gather feedbacks from testers to get more insights to identify areas for improvement, and help enhance the overall usability and functionality of the platform.

Feedbacks will be collected for analysis purposes.

khaiyangchin@gmail.com [Switch account](#)

 Not shared 

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Section A: Demographic Profile

Gender *

☐ Male

☐ Female

Age *

☐ Under 18

☐ 18-24

☐ 25-30

☐ 31 and above

Please choose your residential college. *

☐ Allamanda

☐ Cempaka

☐ Tun Ahmad Zaidi

☐ Rafflesia

☐ Kenanga

☐ Seroja

☐ Sakura

☐ Dahlia

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Section B: User Experience

Do you find the layout simple and user-friendly? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Is it easy to find and browse products on the website? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Do you find the filter function helpful when searching for items? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Is the product information (image, price, description) clear and useful? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Is the process for buying or selling items on the platform easy to understand? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Are the product categories relevant to student needs? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Would you consider using this platform to buy or sell preloved items? *

	1	2	3	4	5	
Strongly Disagree	☐	☐	☐	☐	☐	Stongly Agree

Do you have any suggestions to improve the platform?

Your answer

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