

Informatics College Pokhara



A Final Report on

Furniture Shop E-commerce Web

Application “Omnifurni”

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Yours sincerely,

Aakarshan Thapa

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1. Introduction

For this final year module, I have planned to build a Furniture shop eCommerce website (web app) named **OmniFurni**, that can help small to medium furniture shops to reach out to the customers and meet the demands of both the shop and the customer. The project will be for a B2C (Business-to-Consumer) eCommerce business model.

Electronic commerce, or simply eCommerce, refers to a business transaction model that sells goods and services. Businesses use eCommerce platforms to conduct sales activities, online marketing and manage logistics and fulfilment. Ecommerce has evolved over the years to help countless businesses to grow due to the development of new technologies, improvements in internet connection, broad use of smartphones and tablets, and added security in payment gateways for secure transactions. (bigcommerce, 2021)

Ecommerce makes it easier for everyone to discover products they are searching for and make purchases with safe and secure payment. The merchant delivers the goods or provides its services after the payment confirmation.

1.1. World Scenario

The eCommerce industry saw a massive boom during the pandemic, giving business owners a significant opportunity to set up online stores and enabling them to thrive during these challenging days. Similarly, this industry is expected to witness substantial growth in demand across both developed and developing countries soon. (Thakur, 2021)

Based on the services offered, two prominent types of eCommerce business models can be described: (Thakur, 2021)

- **B2B (Business-to-Business):** Transactions between businesses
- **B2C (Business-to-Consumer):** Relationships and transactions between business and end-consumers.

Some of the updated eCommerce statistics for 2021 are given below:

- ❖ **Statistic 1:** Total global digital buyers over the years

The estimated digital global buyers in 2021 are expected to be 2.14 billion, which is about 27.2% of the total world's population.



Figure 1: Total global digital buyers over the years

Source: (Law, 2021)

❖ **Statistic 2:** Global eCommerce share of Retails Sales

The data chart below shows that the eCommerce industry is gradually taking over retail sales worldwide. The eCommerce sales are estimated to account for 18.1% of the global retail sales in 2021.

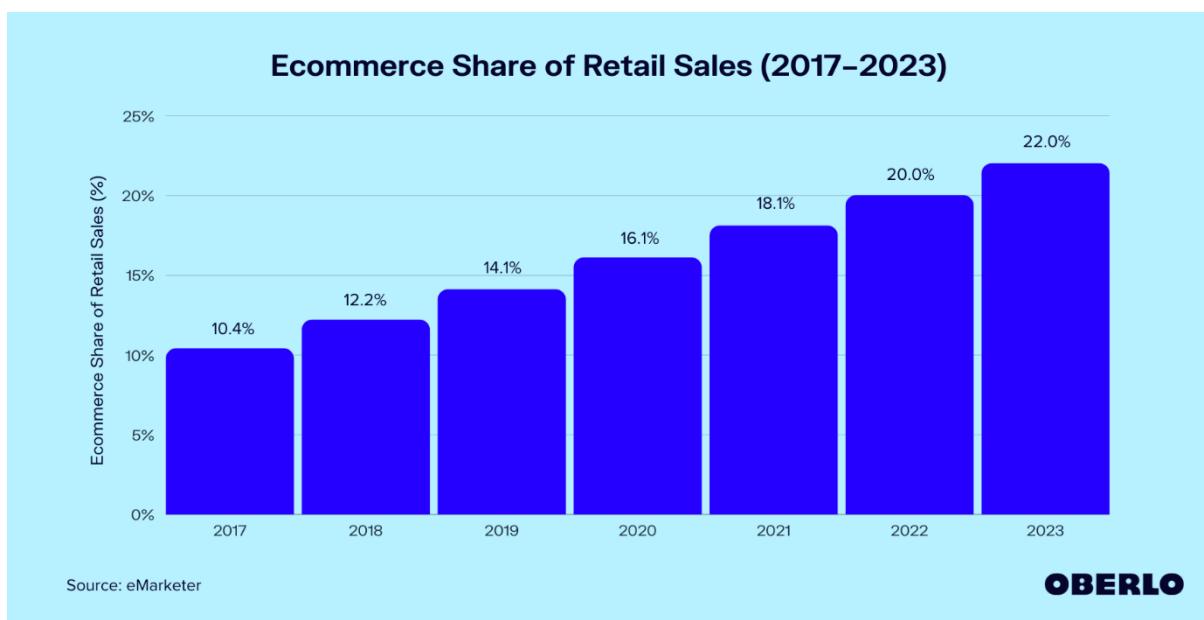


Figure 2: Global eCommerce Share of Retail Sales

Source: (Law, 2021)

1.2. In the context of Nepal

In Nepal, the eCommerce platform is in the early stage, whether it is B2B or B2C eCommerce. An increasing number of people are purchasing online from eCommerce platforms in Nepal. However, the most challenging part of the eCommerce industry in Nepal are internet connectivity, security, quality of service, and products. (Singh, 2021)

Most of the online buyers in Nepal prefer the COD (Cast on delivery) method over digital payment. Moreover, many eCommerce companies also provide COD (Case on delivery) services inside certain areas.

Similar examples of B2C eCommerce platforms in Nepal are:

❖ Daraz

Currently, Daraz is considered the most popular eCommerce platform in Nepal. Daraz is an online marketplace where merchants can sell their products. It provides its services through its mobile applications and website. An interview on Kathmandu Post (Ahlering, 2021) claimed that digital payment had been the company's main focus since 2019. Buyers can make online payments through debit/credit cards and mobile wallets (eSewa and IME Pay). Daraz also provides Cash on Delivery payment method.



Figure 3: Daraz Branding Logo

❖ Sastodeal

Sastodeal, established in 2011, is one of the leading eCommerce companies in Nepal. The company's vision is to continue being the best local example in terms of customer experience (Sastodeal, 2021). Sastodeal also provides cash on delivery service depending upon the courier services delivering to the buyer's location. Buyers can

make online payments through debit/credit cards and mobile wallets (eSewa and IME Pay, Khalti).



Figure 4: Sastodeal Branding Logo

1.3. Need of the project:

The application can be helpful for merchants who decide to sell their products online only. The importance of this project for small businesses, particularly for Furniture shops, in this case, is listed below:

- ❖ Significance of the project:
 - A rise in business reach of the shop
 - Increase in sales which results in increased business revenue
 - Decrease in operational cost, including saving on rent and staff and inexpensive digital advertising.
 - Improvement in customer satisfaction
 - More straightforward navigation on furniture products, including offers and discounts for customers
 - Direct marketing to the customer using the registered customers' email list and subscription form leads list.

1.4. Aims and Objectives

The aims and objectives of this project are listed below:

❖ **Aims:**

1. To build a well-designed custom B2C (Business-to-Consumer) eCommerce platform for a furniture shop.
2. To help a furniture shop shift its business from the restricted traditional marketplace to the online market.
3. To help the shop to stay competitive in the market.
4. To create a good UX design that helps align the user's goals with the business's goals.
5. To help the shop build an online reputation by taking advantage of customers' appreciation of the products/services to influence or attract new customers.
6. To make it easy for the shop to track products.
7. To make the business running timings flexible.
8. To facilitate instant payments for the bought products.

❖ **Objectives:**

1. To make it easier for the consumers to discover a wide range of furniture products divided into different categories.
2. To include a fully-featured shopping cart.
3. To include features such as product search and pagination when there are many products.
4. To include product review and rating section for the products.
5. To include an admin panel to manage products and customers.
6. To include server-side business logic such as user authentication, order handling, and product management.
7. To remain open for orders and customers 24/7.
8. To integrate an online wallet (Khalti) payment gateway.

1.5. Structure of the report

The overall structure of this report is summarized below along with the main headings and subheadings.

1. Introduction: Under the introduction section followings topics are present:

1.1. World Scenario: The global market presence of the eCommerce sector.

1.2. Nepal context: In this section, the opportunities and development of the eCommerce platform in Nepal have been briefly described. The big market players in eCommerce platforms in Nepal such as Daraz and Sastodeal have been presented.

1.3. Needs of the project: In this section, the needs and importance of the project are listed.

1.4. Aims and Objectives: In this section, the aims and objectives of the project are listed.

2. Background:

2.1. Features Elaboration: In this section, the features of the eCommerce system are listed.

2.2. Similar Systems: Analysis of similar systems with screenshots.

2.3. Researched Resources and articles: All the studied articles with screenshots.

2.4. Comparison with similar systems: The system is compared with other real-world systems.

3. Design and Development:

3.1. Methodology: Methodologies considered and selected methodology description

3.2. Wireframes: Wireframes of the system along with their description.

3.3. Prototypes: Prototypes of the system.

3.4. Use Case Diagram: Use Case diagram of the system

3.5. Sequence Diagram: Sequence diagram for “Add To Cart” and “Checkout” process of the system

3.6. Collaboration Diagram: Collaboration diagram for “Checkout” and “Add Product” process

3.7. Activity Diagram: Activity Diagram for “Change Password” and “Delete Category” process

3.8. Flowchart: Flowchart for Login and Register process

3.9. Internal Model Specification: Data Dictionary and ERD (Entity Relationship Diagram)

3.10. Data Flow Diagrams (DFD): Level 0 (Content Level) and Level 1 DFD.

3.11. API Endpoints: API Endpoint URLs for backend service controllers

3.12. Final Gantt Chart: The final gantt chart representing the development process based on iterative methodology.

3.13. Resource Requirement: Hardware and software requirement for the development of the application

4. Implementation: Screenshots and description of different parts of the finalized application.

5. Web Application Testing: Black box testing of the application

6. Analysis: SWOT and PEST analysis of the project

7. Conclusion: Conclusion of the project with sustainability and future scope description.

8. Reference List

This section consists of all the sources that have been referred in the report.

9. Appendix

This section consists of the following things:

- i. Preplanning (Requirement gathering, initial gantt chart, milestone listing, and work breakdown structure)

2. Background

2.1. Features Elaboration

The main features of the system are elaborated below:

- ❖ Features based on user requirements:
 1. Forms to login/register
 2. Display all the available furniture categories in a catalog
 3. Display the featured products
 4. Display all the furniture within a category
 5. Filter products based on price and rating
 6. Display all the details of a particular furniture product, such as price, description, review, and rating.
 7. Search field to search desired product
 8. Product rating and review system
 9. Fully-featured shopping cart
 10. Easy checkout process with fully integrated payment gateway.
 11. My Account page for the user to add/edit the address book, edit account details, change passwords, and view recent orders.
- ❖ Features based on business requirements:
 1. Separate admin panel
 2. Section to add/update/delete product categories
 3. Section to add/update/delete furniture products
 4. Section to manage pending orders
 5. Section to manage registered customers

2.2. Similar Systems

1. Daraz

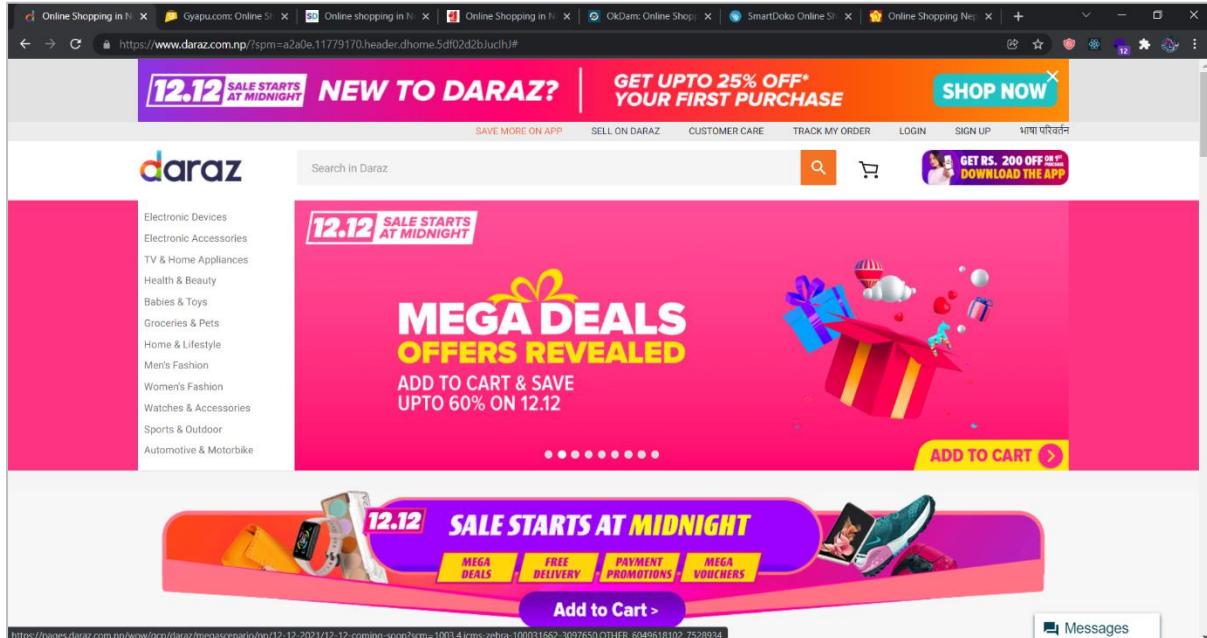


Figure 5: Daraz.com Home Page Screenshot

2. Satodeal.com

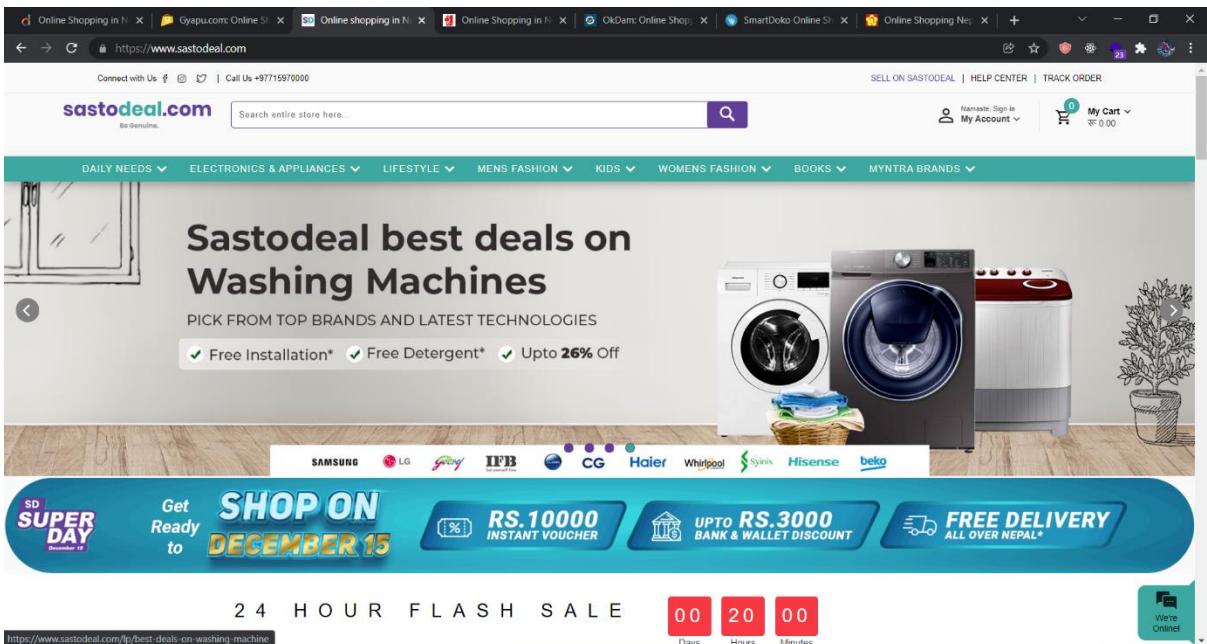


Figure 6: Sastodeal.com Home Page Screenshot

3. Gyapu.com

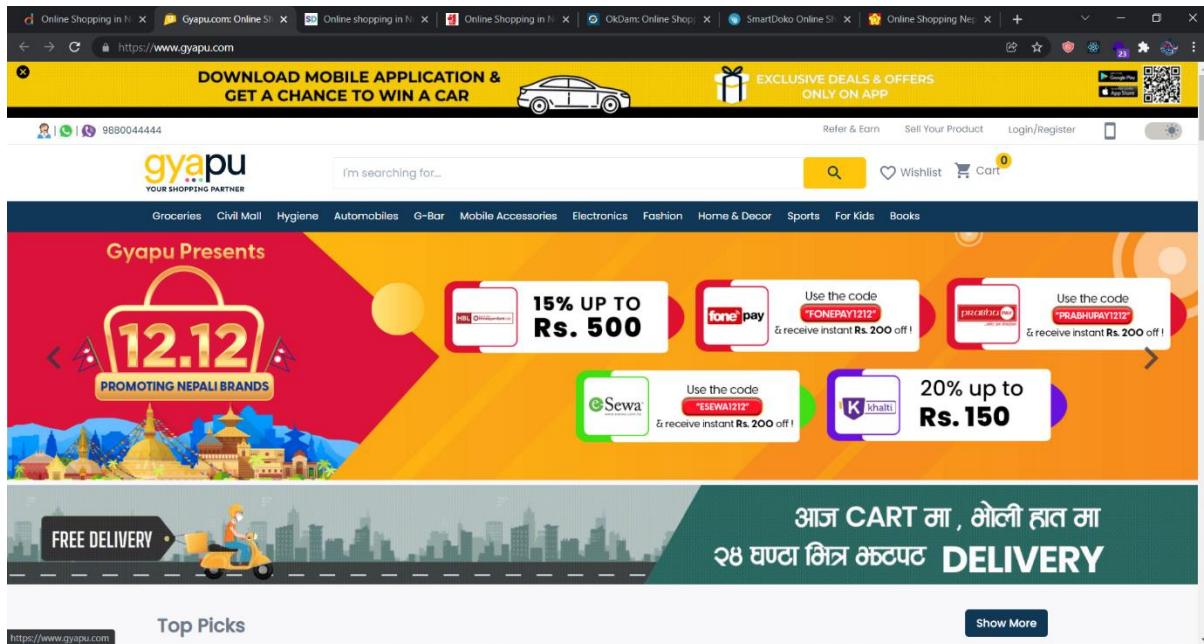


Figure 7: Gyapu.com Home Page Screenshot

4. Thulo.com

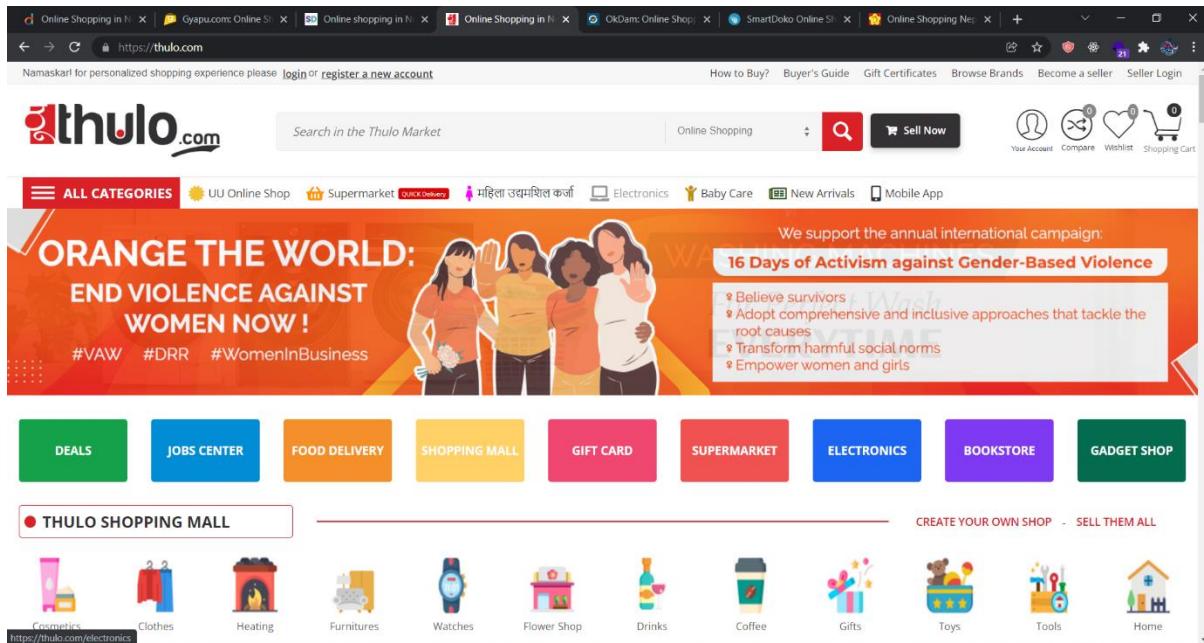


Figure 8: Thulo.com Home Page Screenshot

5. IndexFurniture

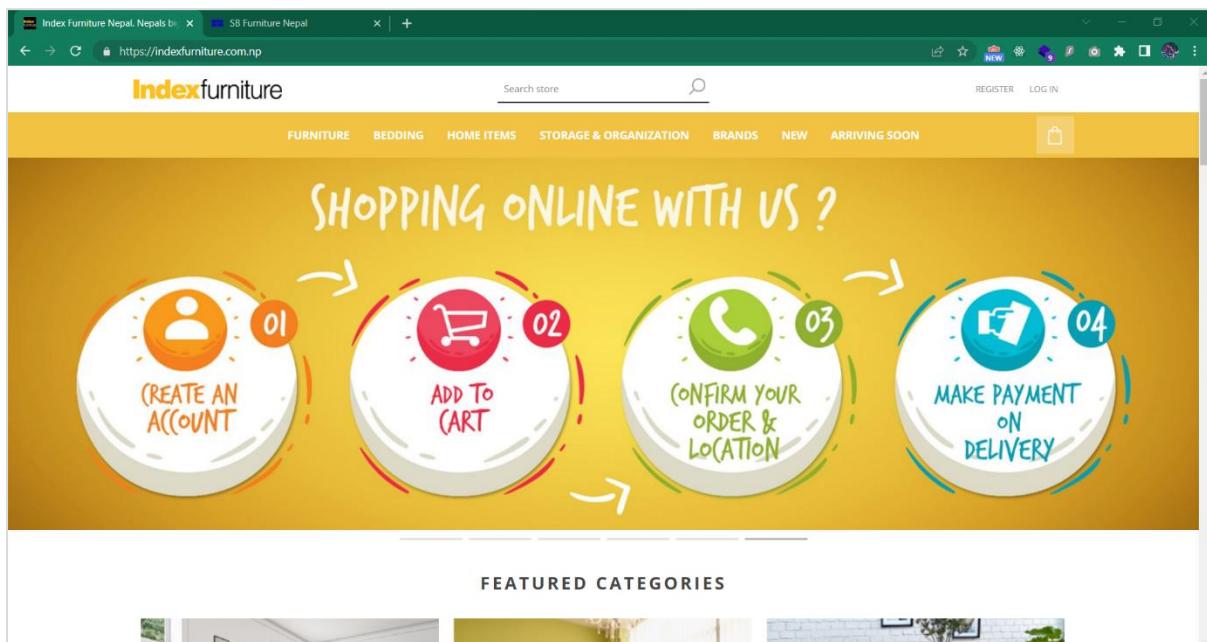


Figure 9: Index Furniture Home Page

6. SB Furniture

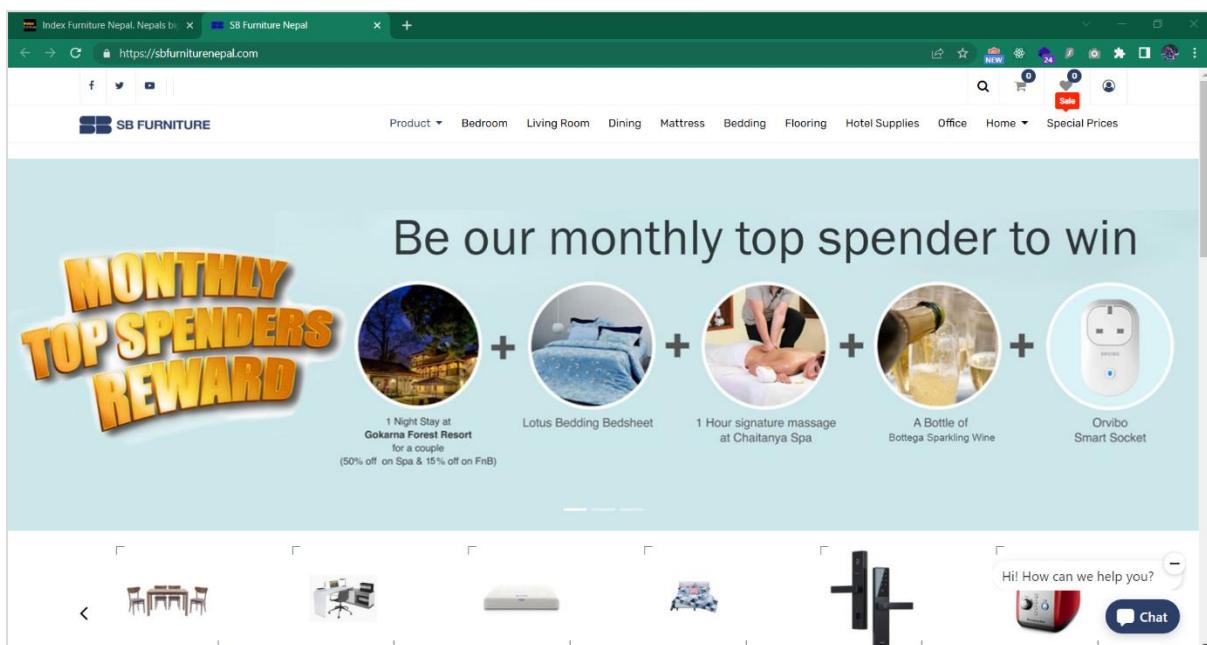


Figure 10: SB Furniture Home Page

2.3. Researched resources and articles

The resources and articles that have been used to gain knowledge on the system being built are listed below:

Research 1: “eCommerce Business Transformation by effectively linking with social networking.”

This research emphasizes how eCommerce businesses can be transformed using different social networking sites. The researcher has done a critical case study on how social networking impacts eCommerce in China. They have analyzed the total users of various social networking platforms in China.

Conclusion: We can learn feature mapping functions, which map users' attributes extracted from social networking sites onto feature representations learned from e-commerce websites, using a set of linked users from both e-commerce websites and social networking sites as a bridge.

Ecommerce Business Transformation by effectively linking with social networking

A Chinese ecommerce case study

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Abstract— Ecommerce and Social Networking are the two buzz words of the Digital world today and one cannot be seen separated from other. Linking of the Ecommerce websites with the social networking is helping the ecommerce industry reach maximum customers without hassle and better promote their products. China is one such country where a lot of people use social networking and also many ecommerce companies are using social networks to brand their business. Thus, we have chosen China as the country for this study. A detailed study of various cases is analyzed before summarizing them here in this paper. In particular studies on WeChat and Sina Weibo are explained along with some statistics.

Keywords—Ecommerce, Social Networking, China, Product Campaign, Digital Era, WeChat, Sina Weibo

I. INTRODUCTION

With major revolutions that happened in the Internet and the social networking space, the boundaries between people and business organizations are completely erased. A lot of advances took place in the mobility area which have made the entire universe just a click away. This advancement has lot of impact of every domain and e-commerce is not an exception.

II. ECOMMERCE AND SOCIAL-NETWORKING THE DUO

Ecommerce websites now-a-days are completely linked with the social networking sites. Most of them features many of the characteristics of social networks, including real-time status updates and also communications between its customers and sellers. Also, some e-commerce websites support the mechanism of social account login, which allows new users to sign in with their existing login information from social networking services such as Facebook, Twitter, Instagram or Google+.

Figure 11: Research Article 1

Source: (Yerragopu, 2017)

(https://www.researchgate.net/publication/323665670_Ecommerce_Business_Transformation_by_effectively_linking_with_social_networking_A_Chinese_ecommerce_case_study)

Research 2: “eCommerce adoption in developing countries: a model and instrument.”

This research paper highlights several studies on the eCommerce platform in developing countries. In addition, the research identifies and discusses the contextual and organizational factors that might affect the adoption of eCommerce in developing countries.

The screenshot shows the cover page of a journal article. At the top left is the Elsevier logo (a tree and the word ELSEVIER). To the right is the journal title "Information & Management" and the issue information "Volume 42, Issue 6, September 2005, Pages 877-899". On the right side is a small thumbnail of the journal cover. Below the header, the article title "eCommerce adoption in developing countries: a model and instrument" is displayed in bold. Underneath the title, the authors are listed as "Alemayehu Molla ^a✉, Paul S. Licker ^{b,1}✉". There is a "Show more ▾" link. Below the authors are social sharing and citation options: "Add to Mendeley", "Share", and "Cite". At the bottom of the page are the DOI link "https://doi.org/10.1016/j.im.2004.09.002" and a "Get rights and content" button.

Figure 12: Research Article 2

Source: (Molla & Licker, 2005)

(<https://www.sciencedirect.com/science/article/abs/pii/S0378720604001314#!>)

Research 3: "Trust, Risk, Privacy, and Security in eCommerce."

This research paper studies the theory of Trust, Risk, Privacy, and Security in the eCommerce industry. It also highlights the importance of trust between the eCommerce brand and the customer. And also the relationship between trust and risk. The different types of threats and attacks on information in eCommerce are discussed as well.

Trust, Risk, Privacy, and Security in e-Commerce

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Abstract — The concepts, Trust, Risk, Privacy and Security, are widely used in various studies done by multiple disciplines, and they are often incorrectly referred to almost as synonyms. The aim is to clarify the concepts from the consumer viewpoint in e-commerce. The findings of our qualitative study suggest several relationships between the four concepts and serves as building blocks for further research.

Keywords — trust, risk, privacy, security.

I. INTRODUCTION

E-commerce has gained wider popularity among consumers during the 20th century. The domain area is researched in many alternative ways and by multiple disciplines. However, there seems to be confusingly many studies of trust and trusted third parties, of trust and risk, of privacy and security in e-commerce. These concepts of trust, risk, privacy, and security are used for many purposes and with many meanings. It is important to understand that these concepts serve different purposes: trust and risk are human-related concepts, while security is

research based on the integration of our empirical findings and current literature. Achieving these three goals will result in an advanced understanding of the four concepts, which will provide researchers opportunities for further research.

The paper is structured as follows. Firstly, the theory of trust, risk, privacy, and security are discussed. Secondly, data collection, methodology, and the analytical approach are introduced. Thirdly, the findings of our study are presented. Lastly, the paper concludes with a theoretical discussion, indications for further research, and managerial implications.

II. THEORIES OF TRUST, PRIVACY, AND SECURITY

A. Trust

The concept of trust has been heterogeneously defined by many authors in the fields of economics, social psychology, sociology, management,

Marketing and Information Systems 11(1) 1–15
Figure 13: Research Article 3

Source: (Pennanen , et al., 2006)

Research 4: "Security and Privacy Issues as a Potential Risk for Further E-Commerce Development"

This research paper discusses important issues such as data security, privacy issues, and their potential risk to eCommerce development. The paper also highlights that possible enhancement to security measures ensures higher customer satisfaction and trust.

Conclusion: The study details security issues such as identity theft and financial fraud, their impact on e-commerce growth, the reasons, and the importance of providing secure communication networks to attract and successfully retain customers. It also discussed privacy concerns in e-commerce and the significance of well-established privacy settings that ensure the confidentiality and security of customers' information.

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IPCSIT vol.16 (2011) © (2011) IACSIT Press, Singapore*

Security and Privacy Issues as a Potential Risk for Further E-commerce Development

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Abstract. E-commerce security and privacy is an important issue that has been leading to negative or adverse effects on the further development and growth of e-commerce. In this paper, the reasons behind lack of customer security and privacy online are discussed; importance of adequate security and privacy measures is emphasized, and a few methods to implement the change are outlined. This article is based on a literature review that emphasizes the need for increased security and privacy measures and the importance of customers trust in developing online relations.

Keywords: Customer privacy, customer security, e-commerce.

1. Introduction

The utilization of the internet is increasing rapidly every year; availability of low cost peripheral devices and wider internet accessibility options are key contributing factors [1]. The progression of technology over the recent years have enabled the consumer a broader and much more enriched interactive experience.[2] The availability of a wide variety of applications and simple point and click interfaces has further contributed to this “experience” by its ease of usability.

Figure 14: Research Article 4

Source: (Yazdanifard, et al., 2011)

(<https://www.semanticscholar.org/paper/Security-and-Privacy-Issues-as-a-Potential-Risk-for-Yazdanifard-Edres/01c55d28035e91cb5882bda08cb599cc63f44578>)

Research 5: “Payment Systems in the B2C eCommerce: Are they a barrier for the online Customer?

The purpose of the research provided in this paper is to explore if payment methods may be considered a barrier to B2c eCommerce adoption. This research paper cites the lack of trust from customers in the electronic system.

Conclusion: Trust does not appear to be a critical factor driving the spread of payment systems. Compared to the one with suitability, the correlation of dispersion with trust is negligible. For example, cash on delivery and postal orders, despite their high trust, are not widely used, whereas credit cards, despite their low trust, are the most widely used payment system.

The screenshot shows the homepage of the **JOURNAL OF INTERNET BANKING AND COMMERCE**. The header includes the journal logo, search bar, and ISSN: 1204-5357. Below the header is a navigation menu with links like 'The Journal', 'Editorial Board', 'Articles', 'Authors', 'Archive', 'Special Issues', 'Indexing and Archiving', 'Citation', and 'Contact Editorial Office'. A callout box in the center states: 'All submissions of the EM system will be redirected to Online Manuscript Submission System. Authors are requested to submit articles directly to Online Manuscript Submission System of respective journal.' The main content area displays the abstract of the research article, which is identical to the one provided in the text above.

Figure 15: Research Article 5

Source: (Mangiaracina & Perego, 2009)

2.4. Comparison with similar systems

In this part of the documentation, this system is compared with similar systems on the market to evaluate how it measures up against today's requirements. The comparison has been made based on the system's features.

The table below shows the comparison between my system and some other systems:

Table 1: Comparison with similar systems

S.N.	Feature	This System	Daraz	Sastodeal	Gyapu	Thulo
1.	Add to Cart	Yes	Yes	Yes	Yes	Yes
2.	Direct product "Buy Now" Functionality	No	Yes	Yes	Yes	Yes
3.	Product Filtering	Yes	Yes	Yes	Yes	Yes
4.	Sorting Product List	No	Yes	Yes	Yes	Yes
5.	Product Search	Yes	Yes	Yes	Yes	Yes
6.	Wishlist	No	Yes	Yes	Yes	Yes
7.	Newsletter Subscription	Yes	Yes	Yes	Yes	Yes
8.	Performance	-	Fast	Slow	Relatively Fast	Relatively Fast
9.	Category wise product	Yes	Yes	Yes	Yes	Yes
10.	Subcategories Functionality	No	Yes	Yes	Yes	Yes
11.	Digital Wallet Payment	Yes	Yes	Yes	Yes	Yes

3. Design

3.1. Methodology

During various software development processes, there are a variety of SDLC models/methodologies that may be used. Each methodology has its own set of stages, and depending on the requirements, a specific methodology may be utilized to develop effective software.

3.1.1. Methodologies Considered

The following methodologies have also been analyzed and considered for this project:

Waterfall model: The waterfall is the most well-known and first published SDLC model. The special feature of this model is that it represents the software development process as several linear sequential steps. It cascades down through the phases such as requirements analysis, system, and software design, implementation and unit testing, integration and system testing, and maintenance. The stages of this model are not overlapping stages, which means each stage must be completed before starting the next stage. The requirements are documented before development, so this model works well for a system that requires high-quality control. (Alshamrani & Bahattab, 2015)

Incremental model: This software development model combines elements of the waterfall model iteratively. Each iteration in this model goes through the processes of requirements, design, implementation, and testing. Every release of the module adds functionality to the preceding iteration. The procedure is repeated until the entire system is completed. Unlike the iterative model, at the end of each linear sequence of stages, a deliverable increment of the software is produced in the incremental model.

3.1.2. Methodology Selected (Iterative Model)

The software specifications of this project are pretty complex, and the project duration is short as well. Therefore, for this project, I prefer to use the Iterative Development model. In this model, major requirements must be defined initially; however, small details and requirements can evolve during the development phase.

The project can be continuously improved during the iterative process until you are satisfied with the final deliverable. Thus, the iterative approach can be considered a

trial-and-error methodology for getting the project closer to its eventual aim. (Martins, 2021)

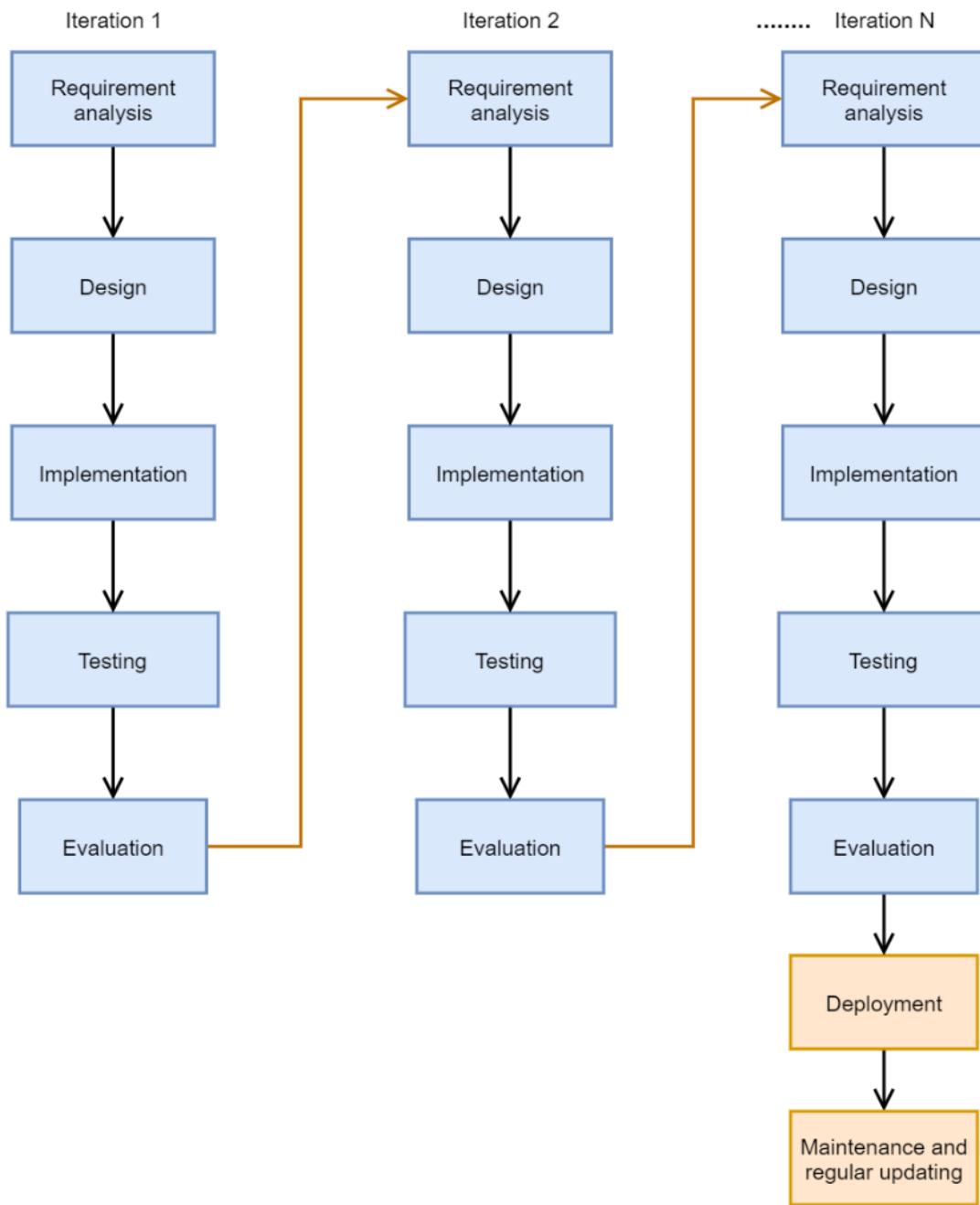


Figure 16: Iterative Model Stages

❖ **Reasons for choosing the iterative model:**

- Major requirements are already defined
- High-risk features in the project
- Use of new technologies
- Testing and debugging during each iteration is easy
- Risk can be identified and resolved during each iteration
- It is not necessary to produce a deliverable product at the end of each iteration.

❖ **Phases of iterative methodology:** (Pedamkar, 2020)

1. Requirement analysis

As with every development project, the first phase is to map out the software requirements specification documents, determine resource requirements, and prepare for the following stages of the cycle. As the complete software specification is broken down into smaller requirements pieces, this step is repeated iteratively.

2. Design

After gathering the iteration requirements, we must move on to the design step. The business needs, user requirements, database models, and technical requirements are finalized in this phase. This is a crucial phase since a good design may produce the best results later in the development.

3. Implementation

The actual implementation and coding process begins in this phase. All the planning, analysis, and design documents will be helpful in this phase.

4. Testing

After the current build iteration has been coded and implemented, the next step is to go through a set of tests to detect and locate any potential defects or issues that have arisen.

5. Evaluation

After all of the previous phases have been accomplished, it is time to assess the progress to this point. It is necessary to access where the project is now, where it needs to go, and what can or should change. A new requirement plan is created and implemented as part of the next iteration cycle based on the evaluation.

6. Deployment

Once all prior stages have been completed and there are no changes to be made to the project, the project can go live in the production environment.

7. Maintenance

Software maintenance involves application upgrades, repairs, and patches if the software breaks.

(Pedamkar, 2020)

3.2. Wireframes

1. Header and Footer Wireframe design before login

The header section contains login, and Register labeled buttons in the top right corner that open the Login form and registration form. These buttons will only be visible if the user is not logged in. The Header also consists of a categories dropdown menu that lists different categories, a product search field to search products, and a cart button to open the cart screen.

The “**Different screens**” indicate different pages (screens) of the website. This wireframe only presents the Header and footer of the website.

The footer section consists of an email subscription input field for users who want to receive an email for new products and attractive deals.

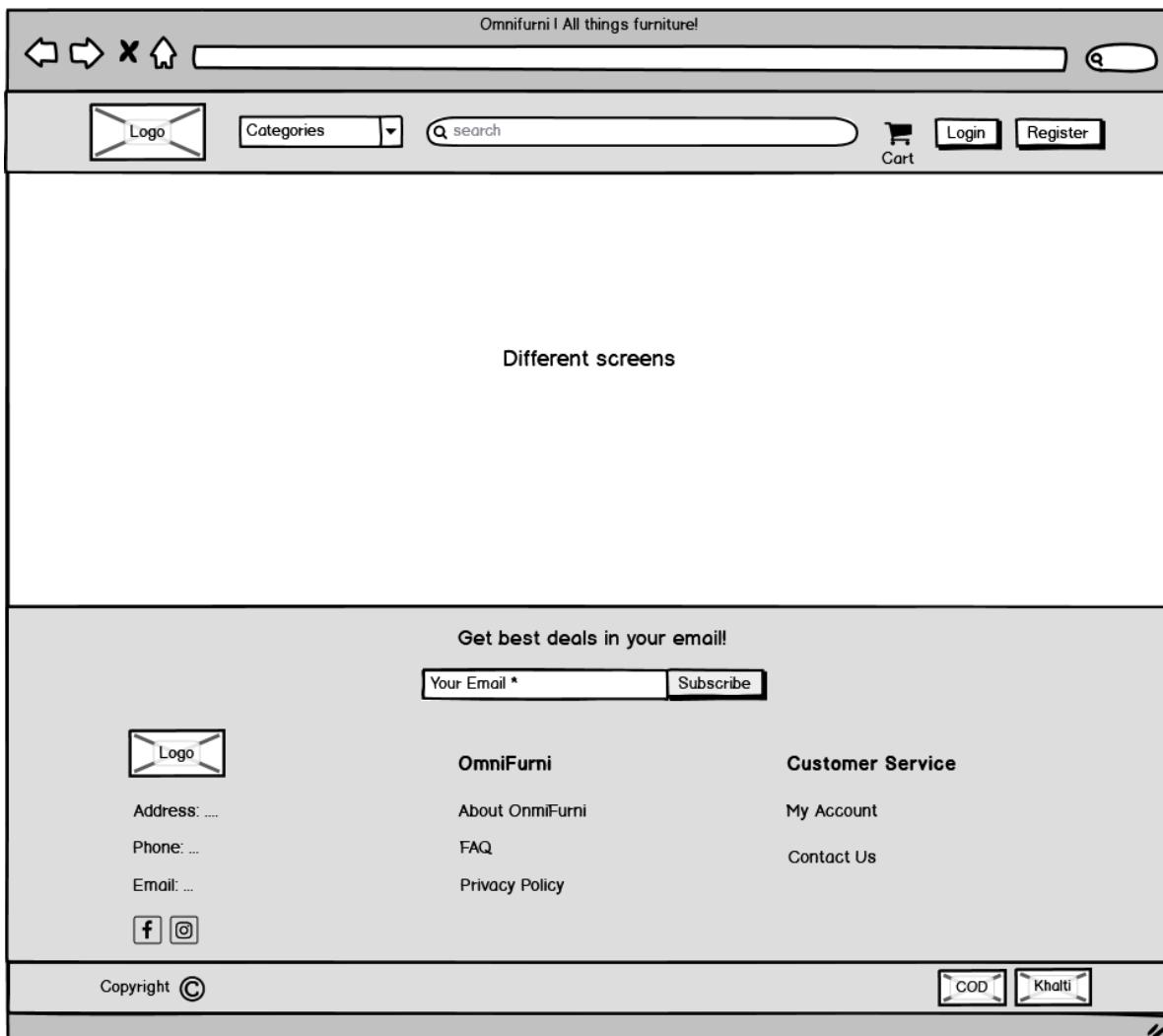


Figure 17: Header and Footer Wireframe design (before login)

2. Header and footer Wireframe design after login

The Login and Register labeled buttons disappear and are replaced by the “My Account” labeled Dropdown menu if the user is logged in.

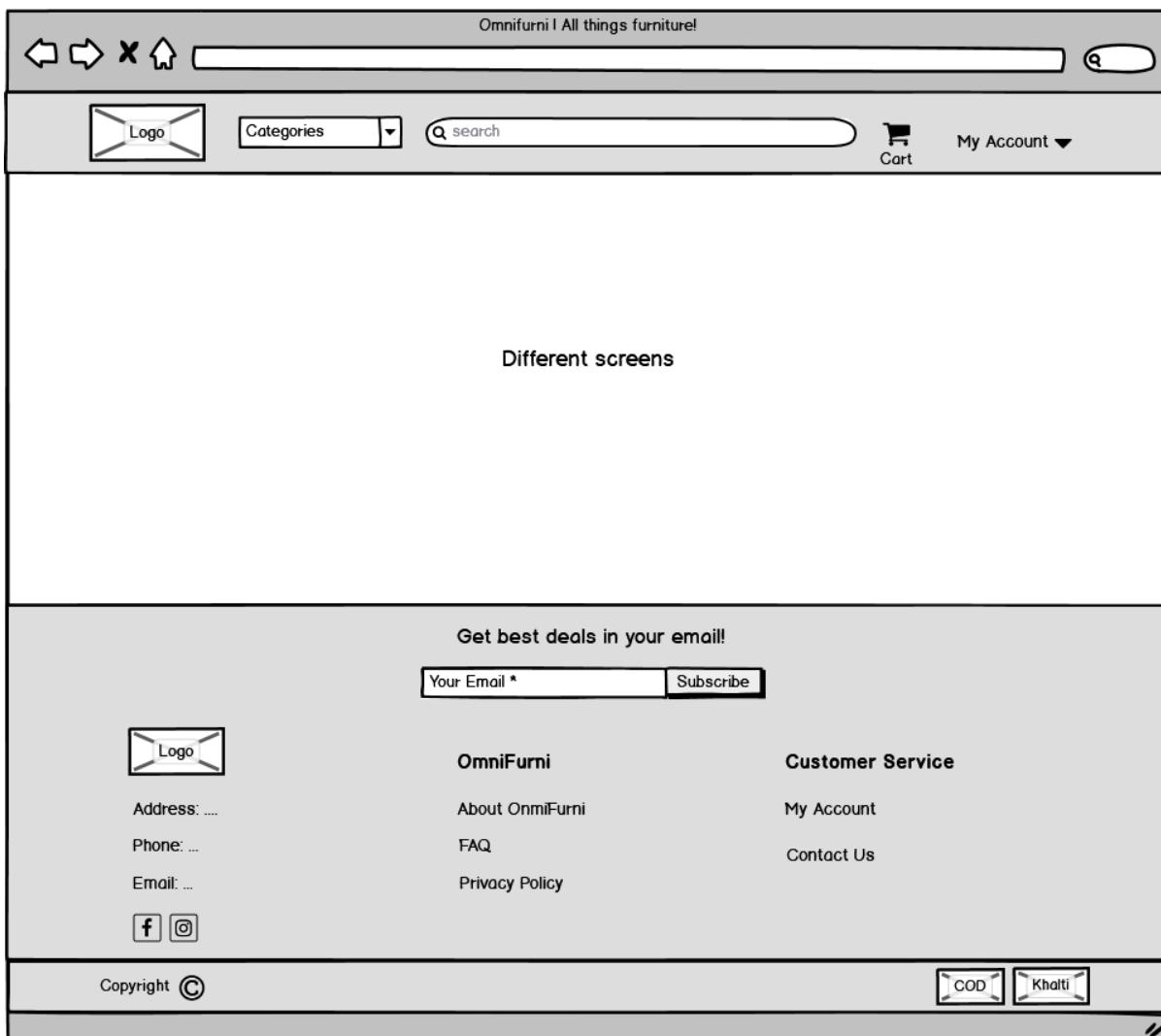
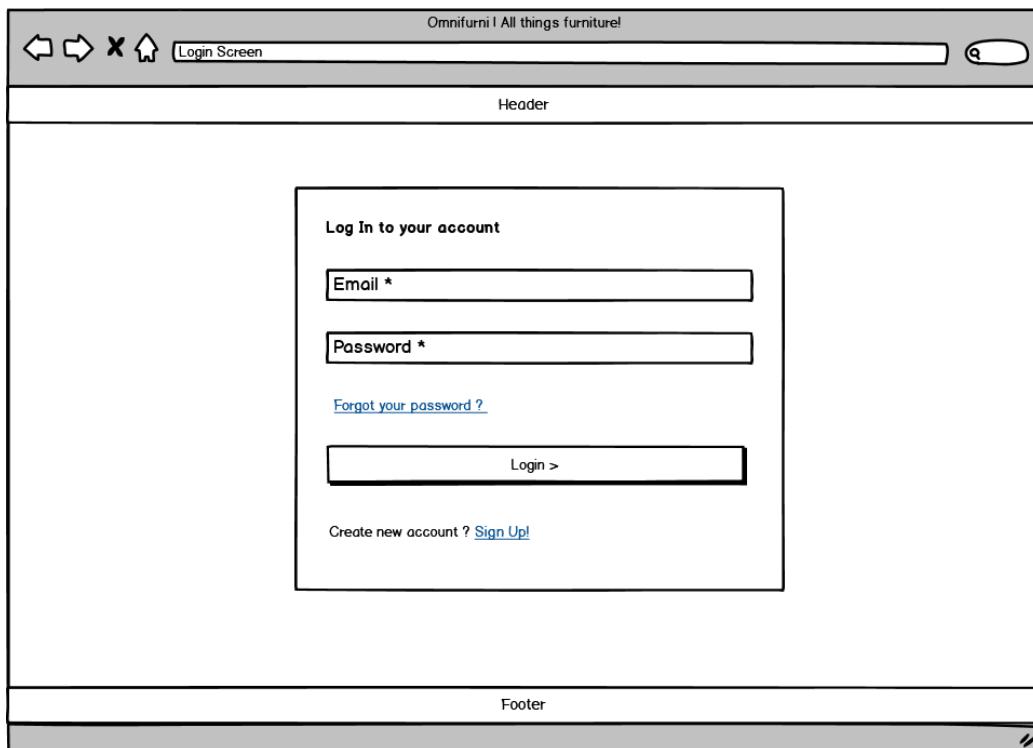


Figure 18: Header and Footer Wireframe design (after login)

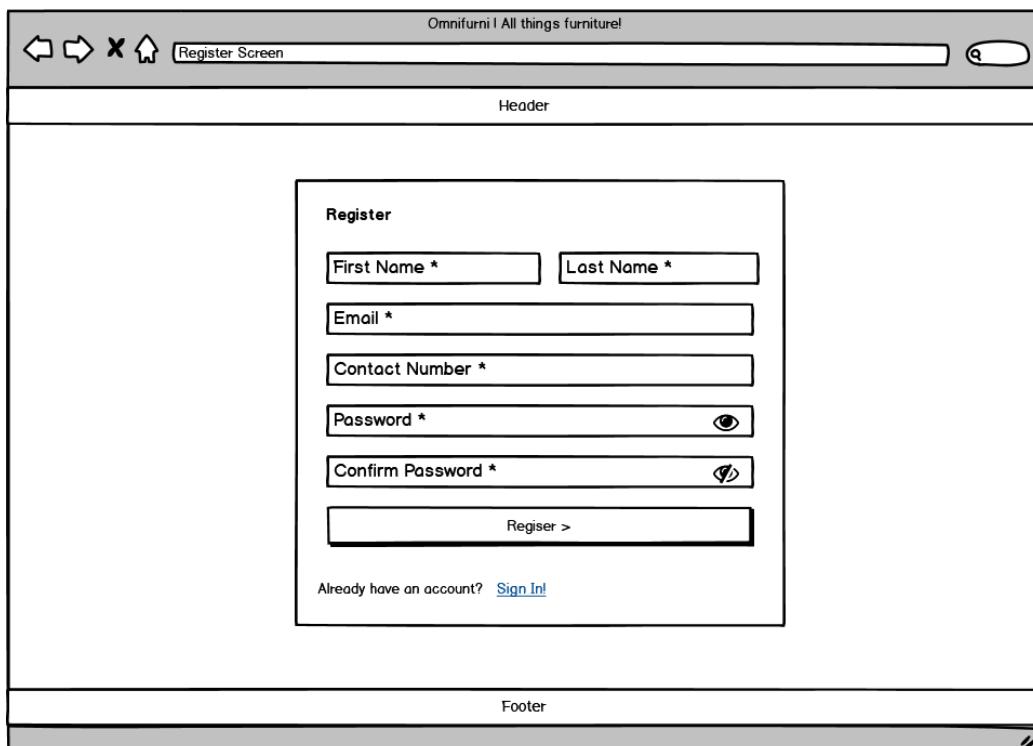
3. Login Form Screen Wireframe



The wireframe for the login screen is titled "Omnifurni | All things furniture!" at the top. It features a header bar with standard browser controls (back, forward, search, etc.). The main content area contains a form titled "Log In to your account". The form includes fields for "Email *", "Password *", and a link "Forgot your password ?". A "Login >" button is located below the password field. At the bottom of the content area, there is a link "Create new account ? [Sign Up!](#)". The footer section is present at the bottom of the page.

Figure 19: Login Form Wireframe

4. Register Form Screen Wireframe



The wireframe for the register screen is titled "Omnifurni | All things furniture!" at the top. It features a header bar with standard browser controls. The main content area contains a form titled "Register". The form includes fields for "First Name *", "Last Name *", "Email *", "Contact Number *", "Password *", and "Confirm Password *". Each password field has an "eye" icon to the right for password visibility. A "Regiser >" button is located below the password fields. At the bottom of the content area, there is a link "Already have an account? [Sign In!](#)". The footer section is present at the bottom of the page.

Figure 20: Register Form Wireframe

5. Home Page Screen Wireframe

The home screen consists of a carousel (scrolling featured products), a list of featured products, and a categories catalog.

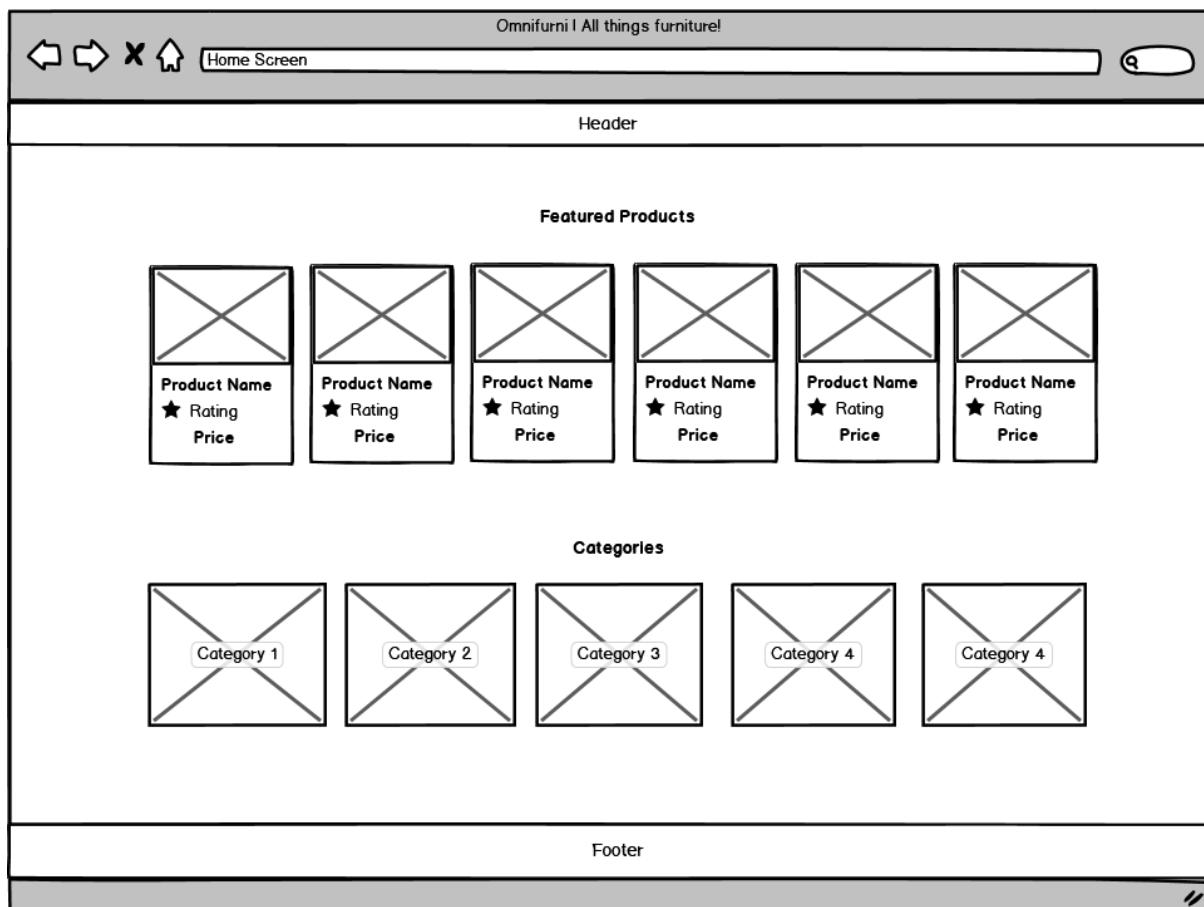
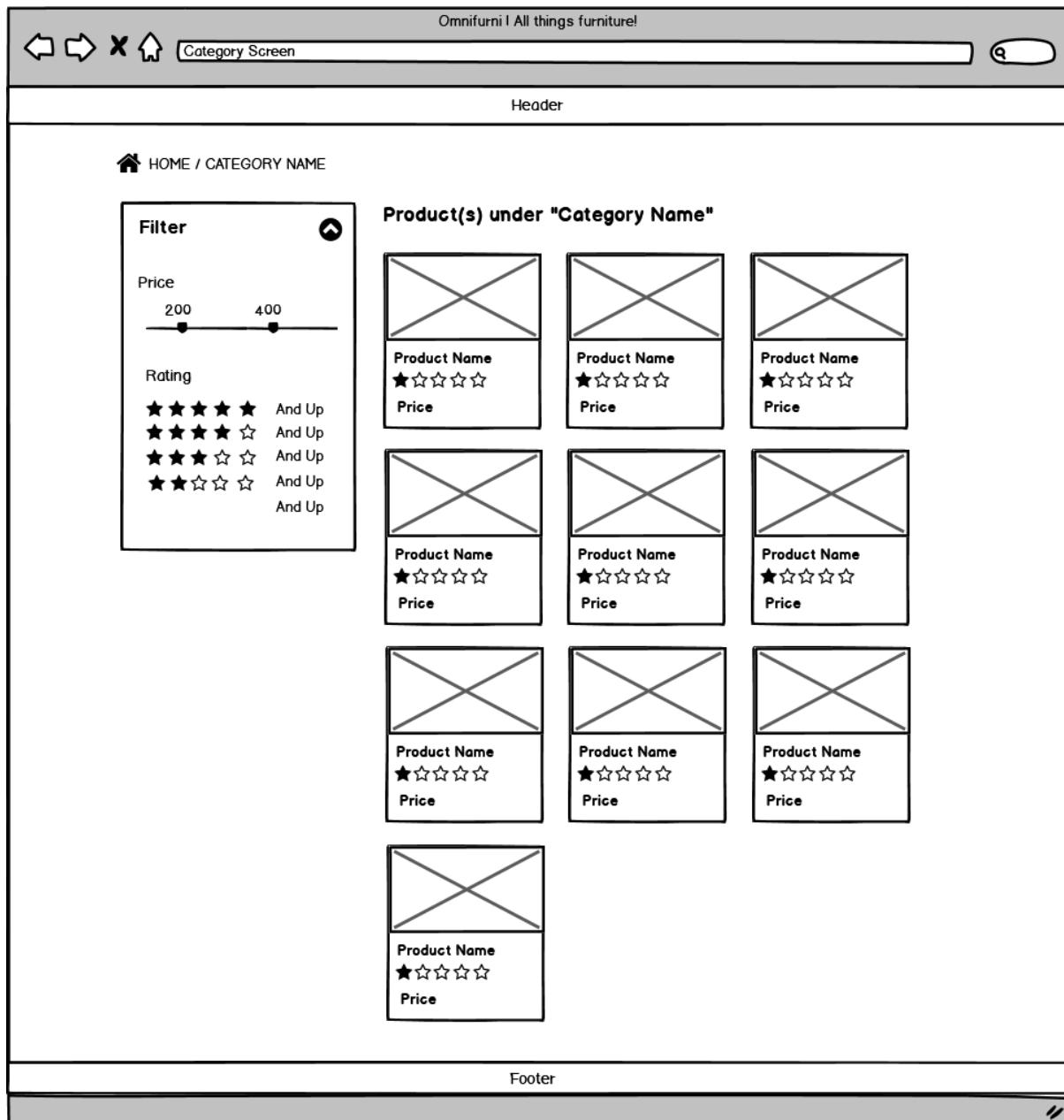


Figure 21: Home Page Body Wireframe

6. Category Products Screen

On this page, the products under the selected category are shown. The products can be filtered according to price, and rating.



7. Product details screen

This page opens when the user clicks on a particular product. On this page, users can see the details of the product such as name, price, and images. The user can also select the quantity, and add the product to the cart. The product description, reviews, and ratings can be seen on the accordion at the bottom of the page.

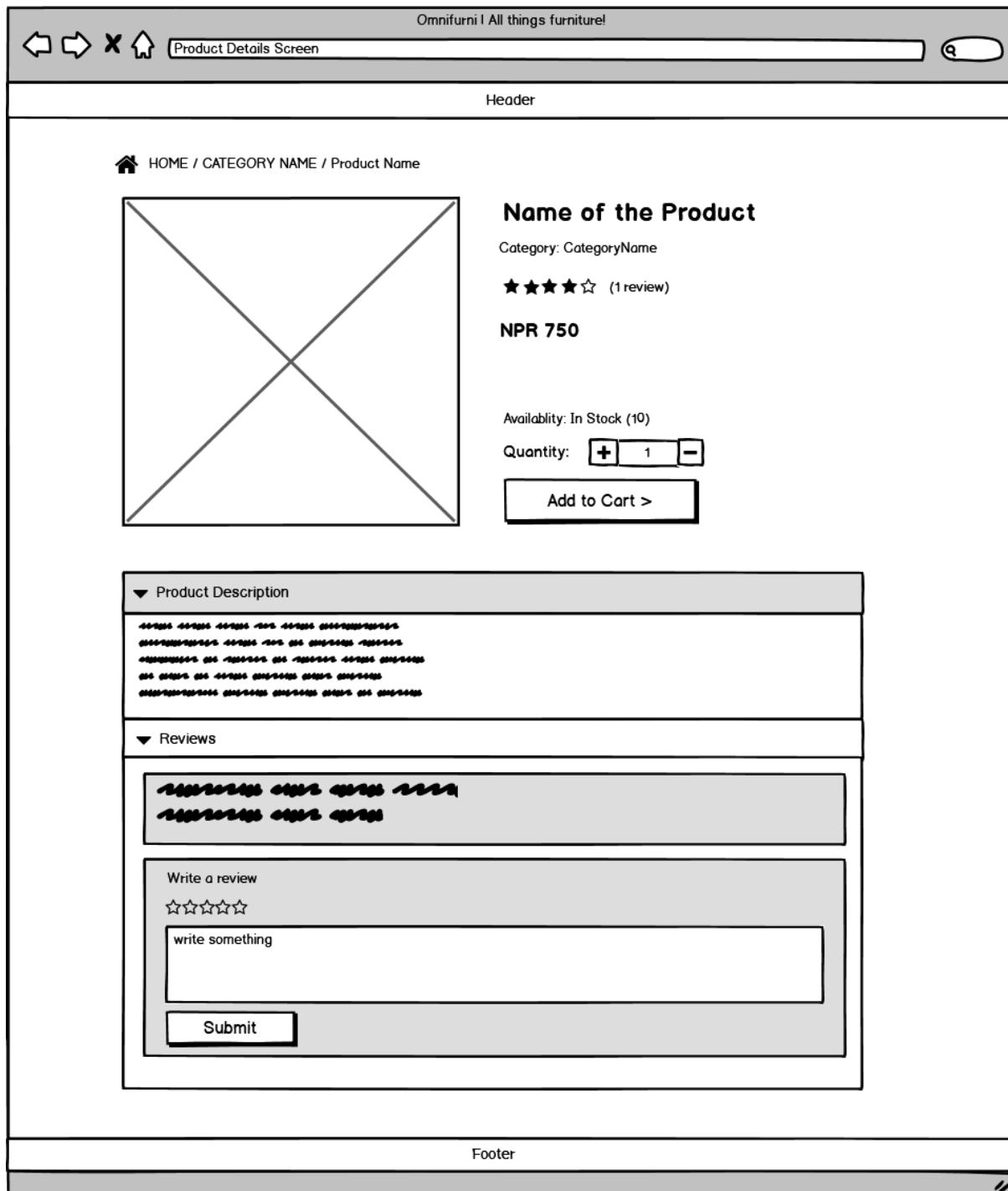


Figure 22: Product Details Screen Wireframe

8. Cart Screen

On this page, all the products that have been added to the cart can be seen. The user can remove any product, and increment or decrement the quantity of a product.

On the right side, the user can see the total price of the items in the cart. The user can click on the “Proceed to Checkout” button to proceed to the checkout screen.

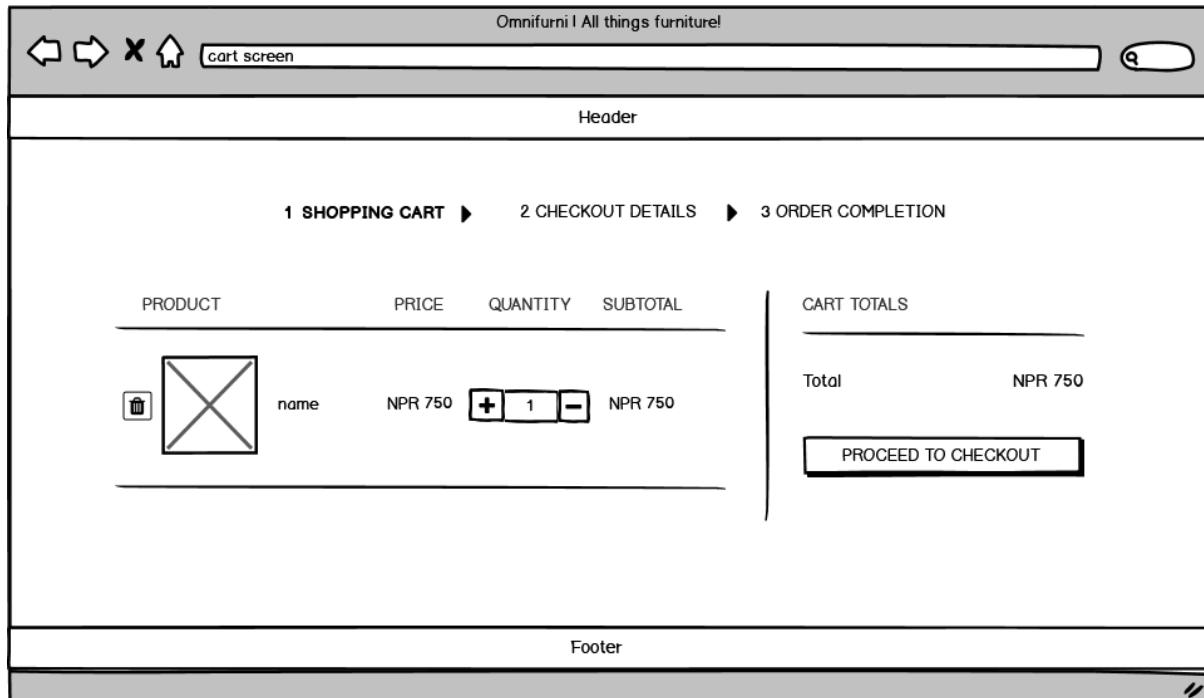


Figure 23: Cart Screen Wireframe

9. Checkout Screen

On this page, the user can add/edit the shipping address, and select the payment option (cash on delivery, or with Khalti payment gateway).

The input fields in the shipping address form are already filled with details by default. The user details and address details set by the user before are fetched by default by the system. The user can click on the “Confirm Payment” button to complete the payment and checkout process.

The wireframe illustrates the layout of the Checkout Screen. At the top, there is a header bar with the Omnifurni logo and a "Checkout Screen" title. Below the header is a "Header" section. The main content area is divided into two main sections: "Shipping Address" on the left and "Your Order" on the right. The "Shipping Address" section contains fields for Email*, First Name*, Last Name*, Street Address*, City / Town*, State*, and Phone*. The "Your Order" section displays a summary table:

Product	Sub Total
Item 1 x 2	NPR 4,000
Subtotal	NPR 4,000
Shipping	NPR 150
Total	NPR 4,150

Below the order summary is a "Pay with" section containing two radio buttons: "Cash On Delivery" and "Khalti" (represented by a Khalti logo). A "Confirm Payment" button is located at the bottom of this section. The wireframe also includes a "Footer" section at the very bottom.

Figure 24: Checkout Screen Wireframe

10. My Account Dashboard

On this “My Account” page, the user can view recent orders, manage shipping address details, edit account details, and update the password.

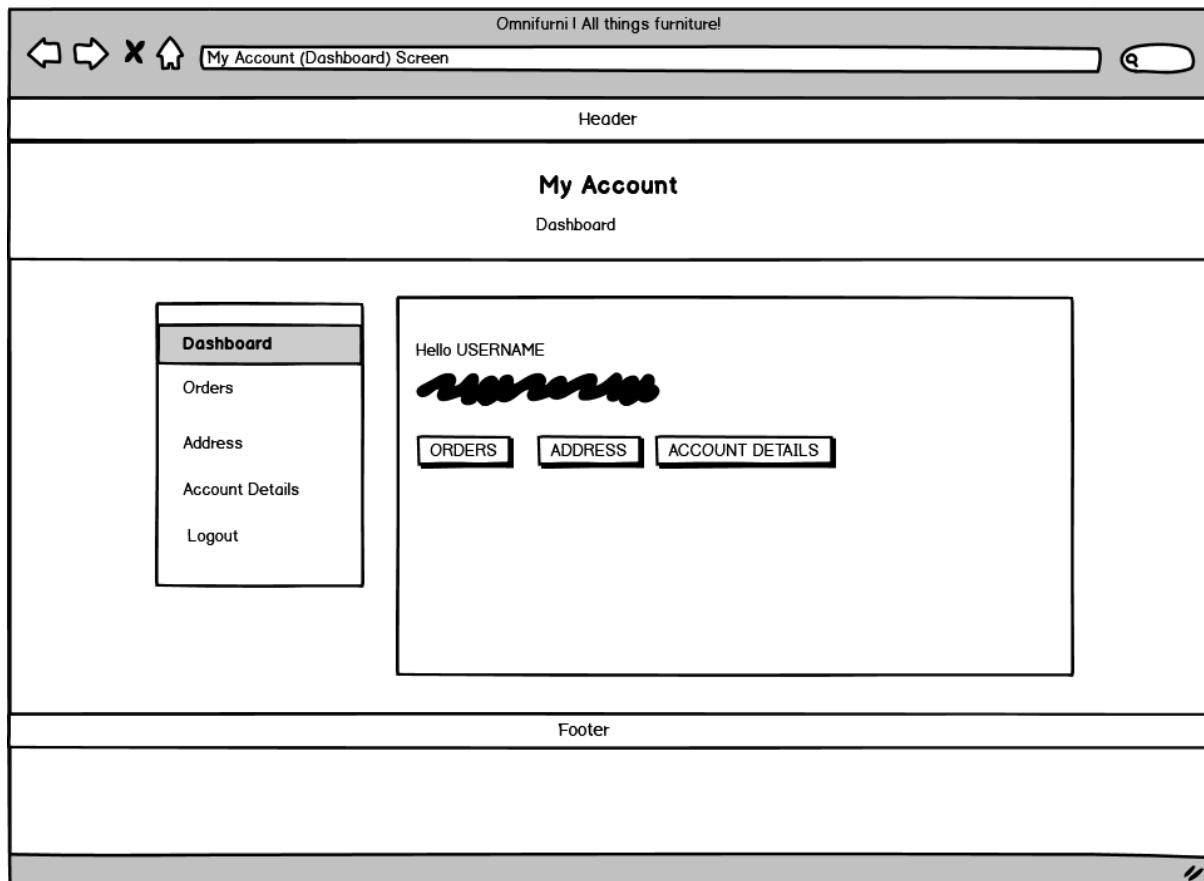


Figure 25: My Account Dashboard Screen Wireframe

11. My Account Orders Screen

In the orders section, the user can view their recent orders.

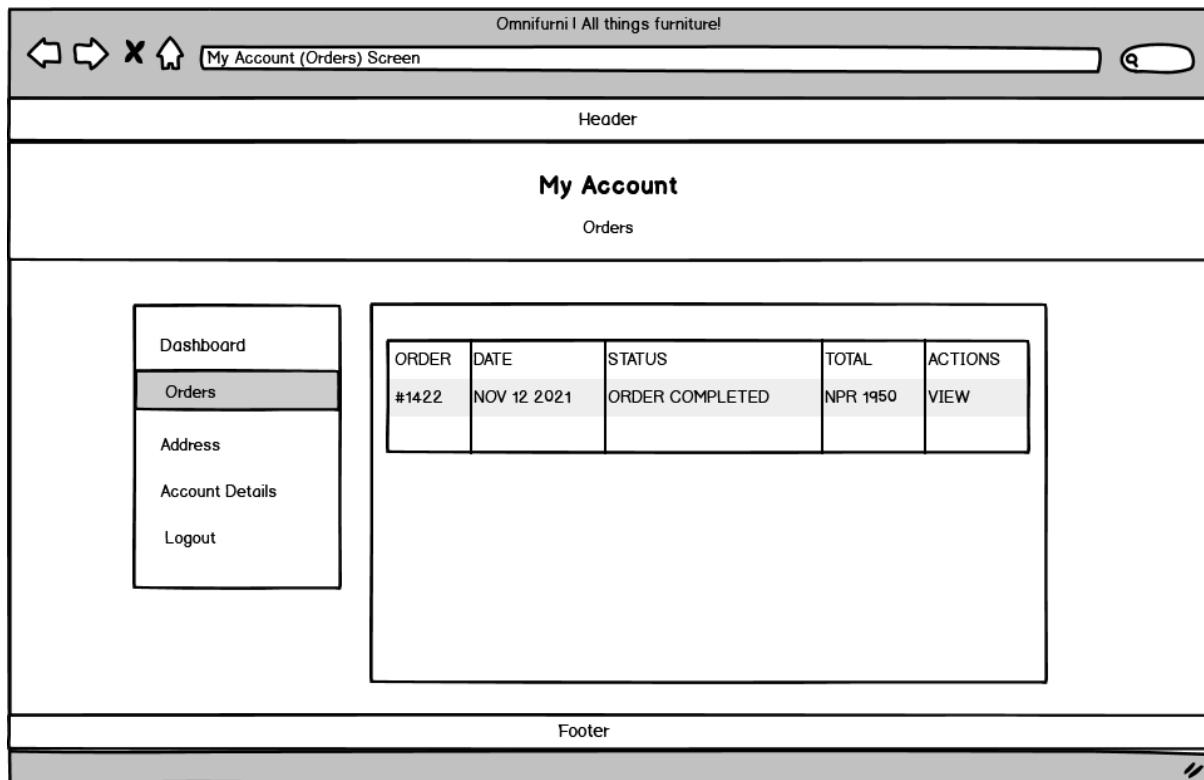


Figure 26: My Account (Orders) Screen Wireframe

12. My Account (Account Details)

In the account details sections, user can edit their details such as first name, last name, and contact number by editing the fields and clicking on the “Save Changes” button. The “Email Address” field is disabled so that it cannot be edited, as the email is verified explicitly during the registration process.

Similarly, the user can also change their password by filling in the required fields.

The wireframe illustrates the 'My Account (Account Details) Screen' layout. At the top is a header bar with icons for back, forward, refresh, and home, along with a search bar. The main content area is titled 'My Account' and 'Account Details'. On the left, there's a sidebar with 'Dashboard', 'Orders', 'Address', 'Account Details' (highlighted in grey), and 'Logout'. The main content area contains form fields for 'First Name *', 'Last Name *', 'Phone Number *', and 'Email Address *'. Below these is a 'Save Changes' button. Further down is a 'PASSWORD CHANGE' section with fields for 'Current Password', 'New Password', and 'Confirm new password', followed by an 'Update Password' button. The footer contains a standard footer bar.

Figure 27: My Account (Account Details) Screen Wireframe

13. My Account (Addresses) Screen

In this section, the user can edit their shipping address details such as street address, city/town, and province/state.

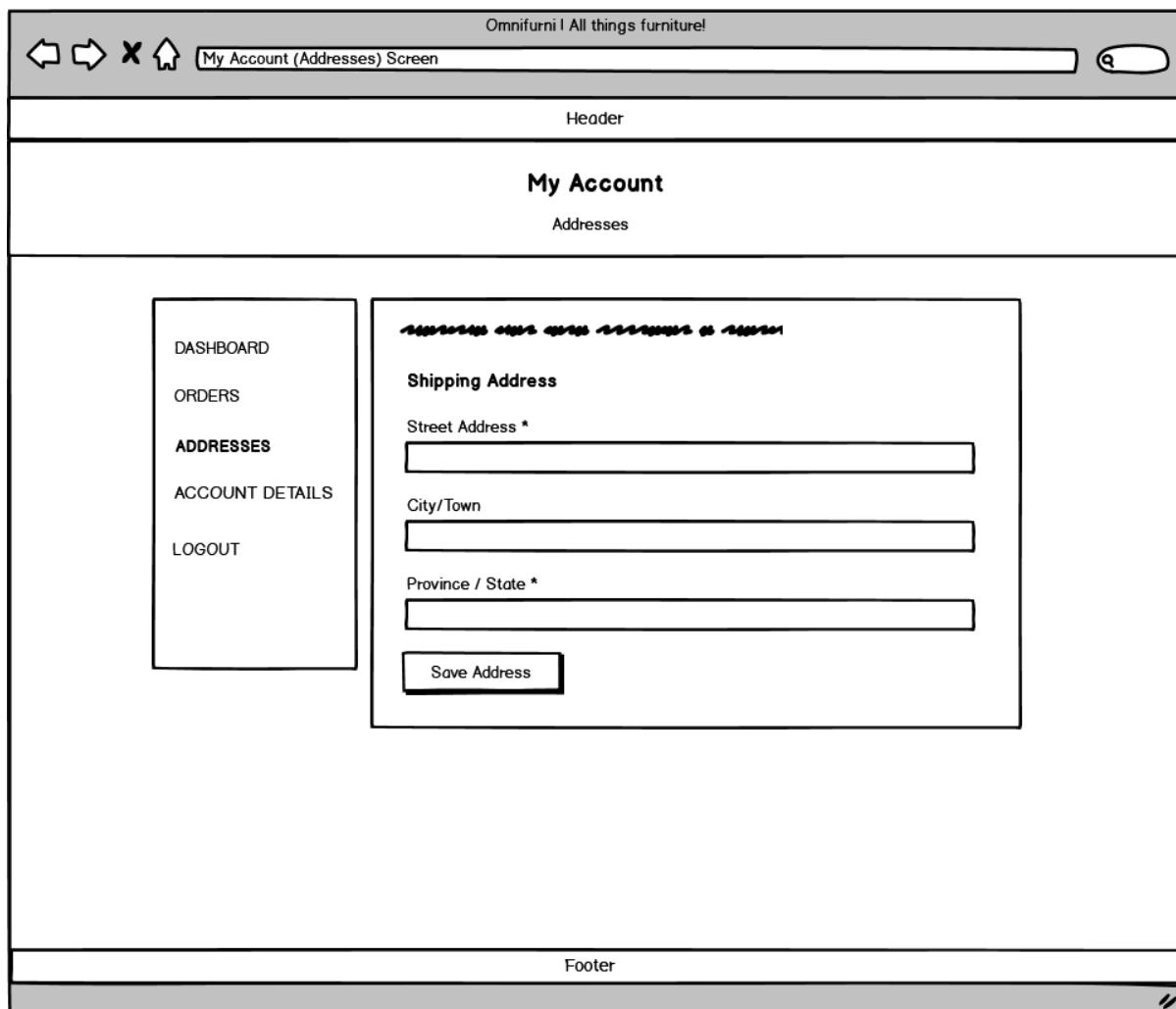


Figure 28: My Account (Addresses) Screen Wireframe

3.3. Prototypes

1. Heater and Footer Prototype Design (before login)

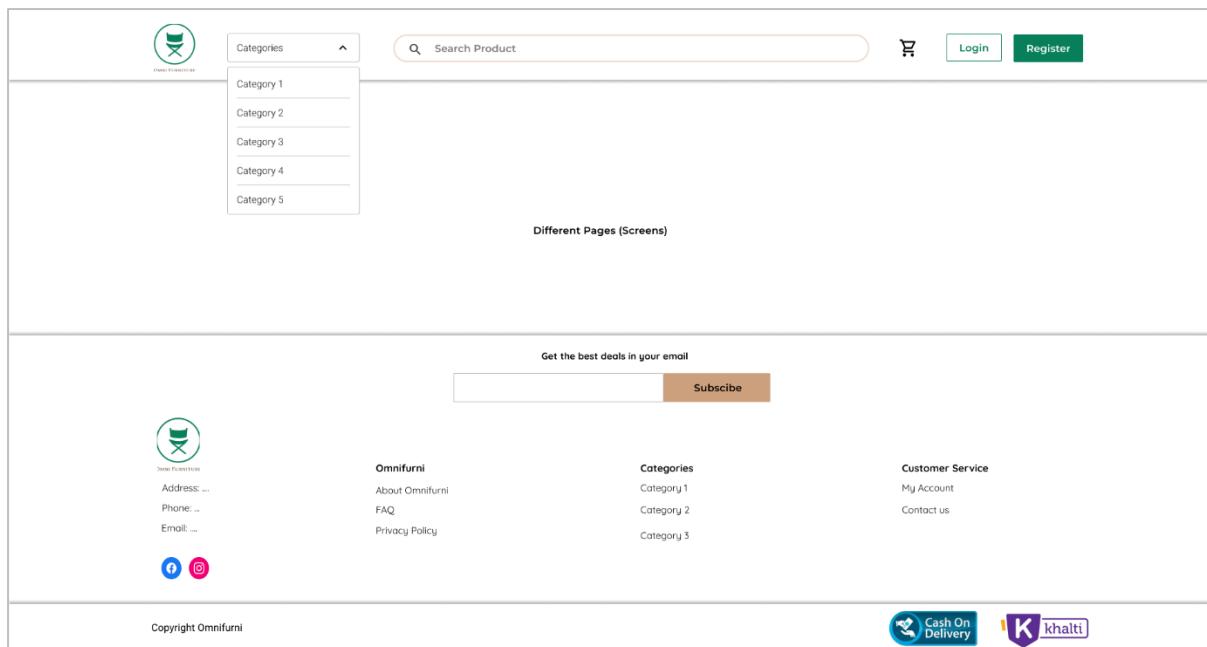


Figure 29: Header and Footer Prototype Design (before login)

2. Header and Footer Prototype Design (after login)

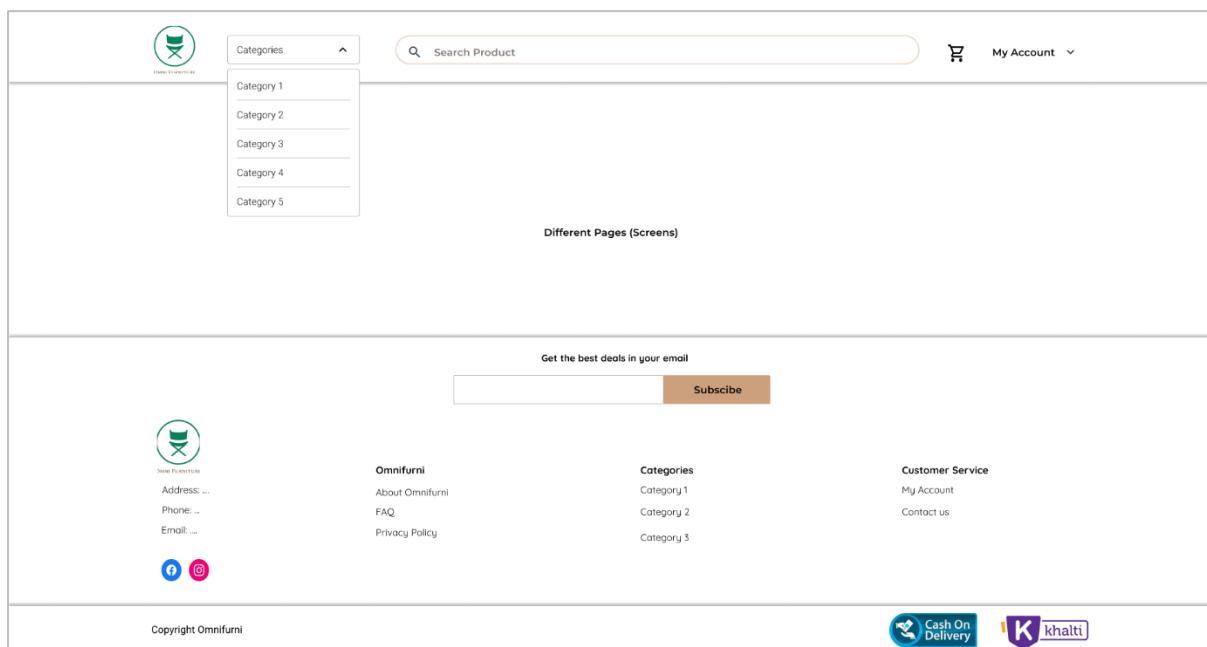
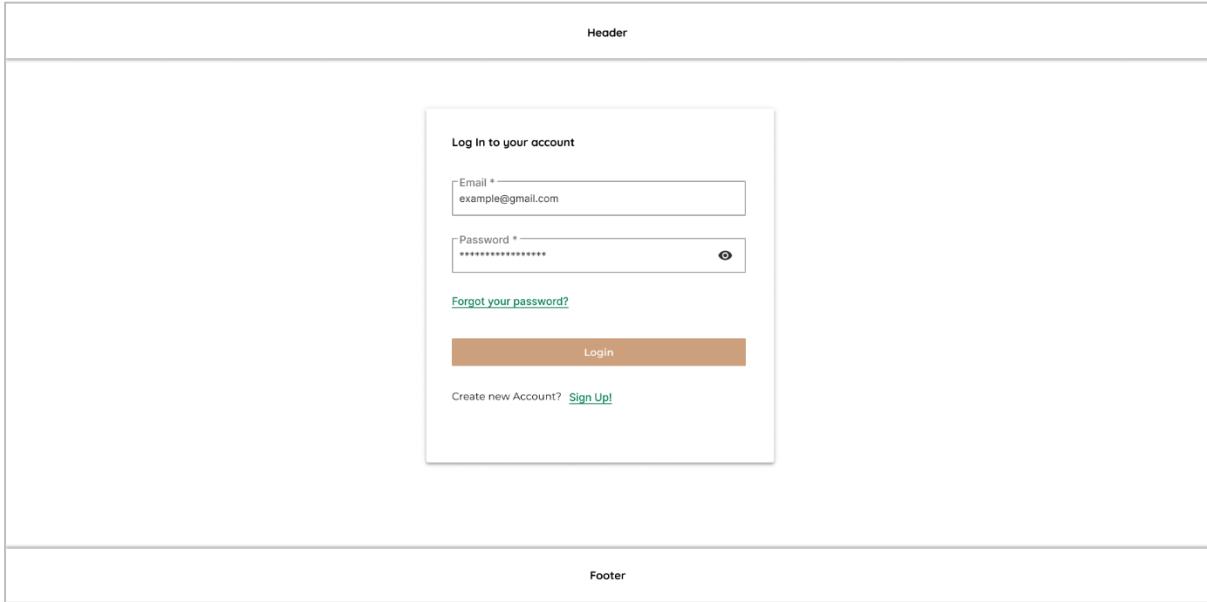


Figure 30: Header and Footer Prototype Design (after login)

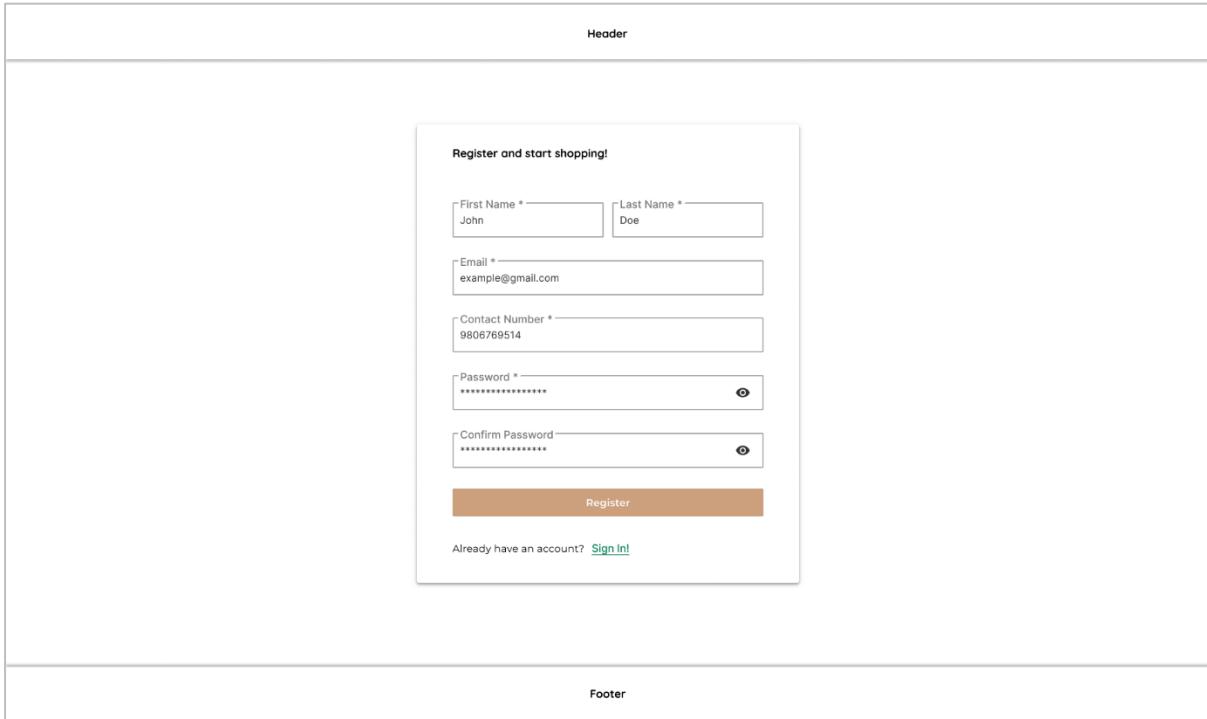
3. Login Form Screen Prototype



The image shows a wireframe prototype of a login form screen. At the top, there is a header section labeled "Header". Below it is the main content area, which contains a login form. The form has a title "Log in to your account". It includes two input fields: "Email * example@gmail.com" and "Password * ****". There is also a link "Forgot your password?". A large orange "Login" button is centered below the inputs. At the bottom of the content area, there is a link "Create new Account? [Sign Up!](#)". At the very bottom, there is a footer section labeled "Footer".

Figure 31: Login Form Screen Prototype

4. Register Form Screen Prototype



The image shows a wireframe prototype of a register form screen. At the top, there is a header section labeled "Header". Below it is the main content area, which contains a register form. The form has a title "Register and start shopping!". It includes four input fields: "First Name * John" and "Last Name * Doe", "Email * example@gmail.com", and "Contact Number * 9806769514". There are also two password fields: "Password * ****" and "Confirm Password * ****". A large orange "Register" button is centered below the inputs. At the bottom of the content area, there is a link "Already have an account? [Sign In!](#)". At the very bottom, there is a footer section labeled "Footer".

Figure 32: Register Form Screen Prototype

5. Home Page Screen Prototype

Header

Featured Products

Blue Chair .. ★★★★★ (10 reviews) NPR 15,000	Black Chair with wooden support ★★★★★ (5 reviews) NPR 12,000	Sofa ★★★★★ (1 reviews) NPR 40,000	Wide Desk .. ★★★★★ (5 reviews) NPR 25,000	White leather chair ★★★★★ (5 reviews) NPR 18,000

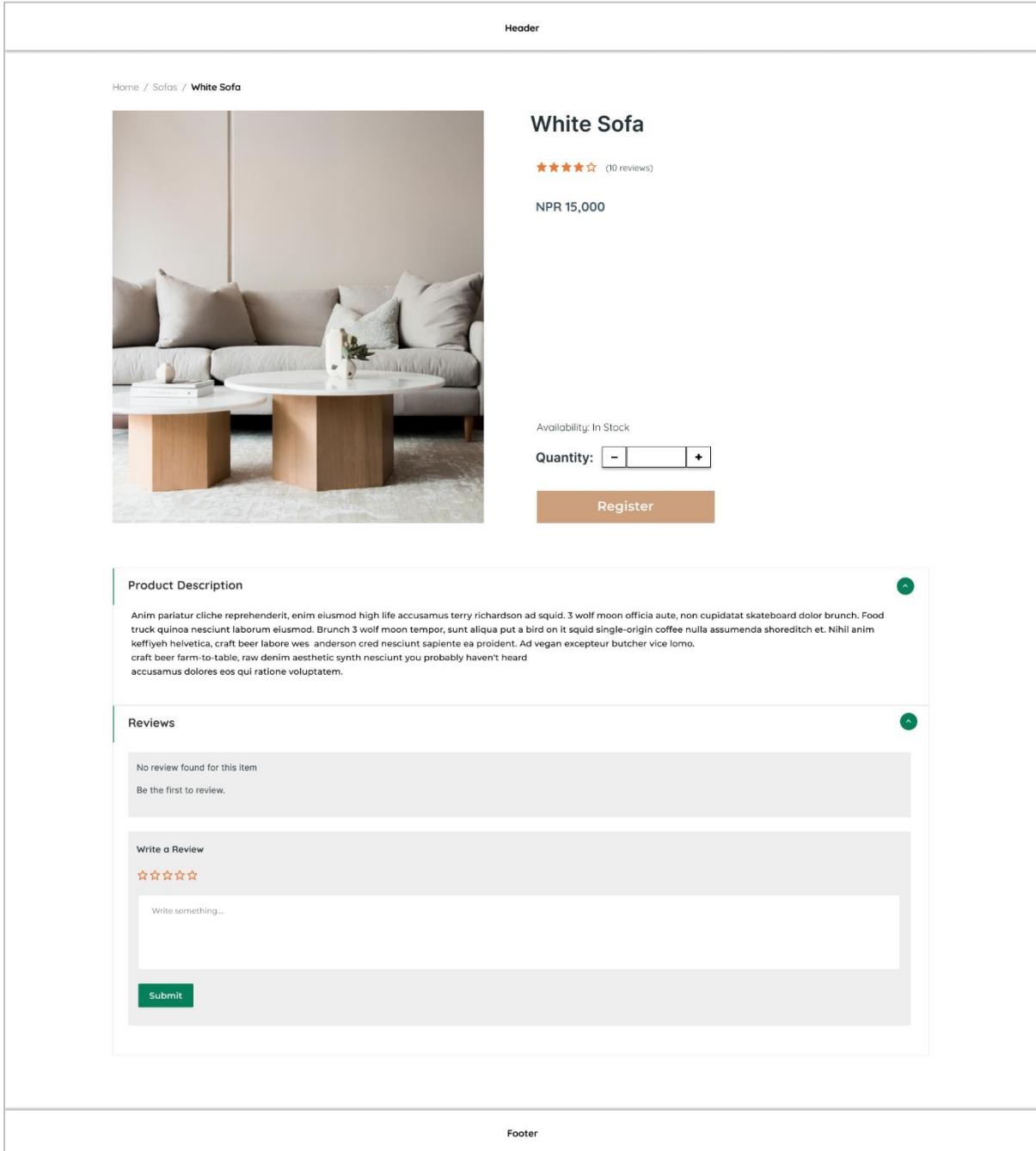
Categories

Tables	Beds	Sofas	Chairs	Wardrobes

Footer

Figure 33: Home Page Screen Prototype

6. Product details Screen Prototype



The screenshot displays a product details screen for a "White Sofa". At the top, there's a header bar with the word "Header". Below it, the breadcrumb navigation shows "Home / Sofas / White Sofa". The main content area features a large image of a light-colored sofa with several pillows, positioned behind a round white coffee table with a wooden base. To the right of the image, the product title "White Sofa" is displayed in bold. Below the title is a star rating icon followed by "(10 reviews)". The price "NPR 15,000" is shown in bold. A "Quantity" input field with a minus and plus sign is present, along with a "Register" button. Further down, a "Product Description" section contains placeholder text about food trucks and craft beer. The "Reviews" section indicates no reviews are available, with a "Write a Review" form below it featuring a star rating selector, a text input field, and a "Submit" button.

Figure 34: Product details Screen Prototype

7. Category Products Screen Prototype

The screenshot shows a product listing page for the "Beds" category. At the top left is a filter sidebar titled "Filter by" with sections for "Price" (with "min" and "max" input fields) and "Rating" (with a dropdown menu showing star ratings from 1 to 5). The main area is titled "Product under category 'Beds'" and contains six product cards arranged in two rows of three. Each card includes a small image, the product name, a rating (e.g., ★★★★★), the number of reviews (e.g., (1 reviews)), and the price (e.g., NPR 40,000). The products listed are Bed, Double Bed, Sofa, New Bed, Convertible Bed, and Daybed. Below the cards is a navigation bar with buttons for "First", "1", "2", "3", and "Next". The top and bottom of the page have thin horizontal bars labeled "Header" and "Footer".

Figure 35: Category Products Screen Prototype

8. Cart Screen Prototype

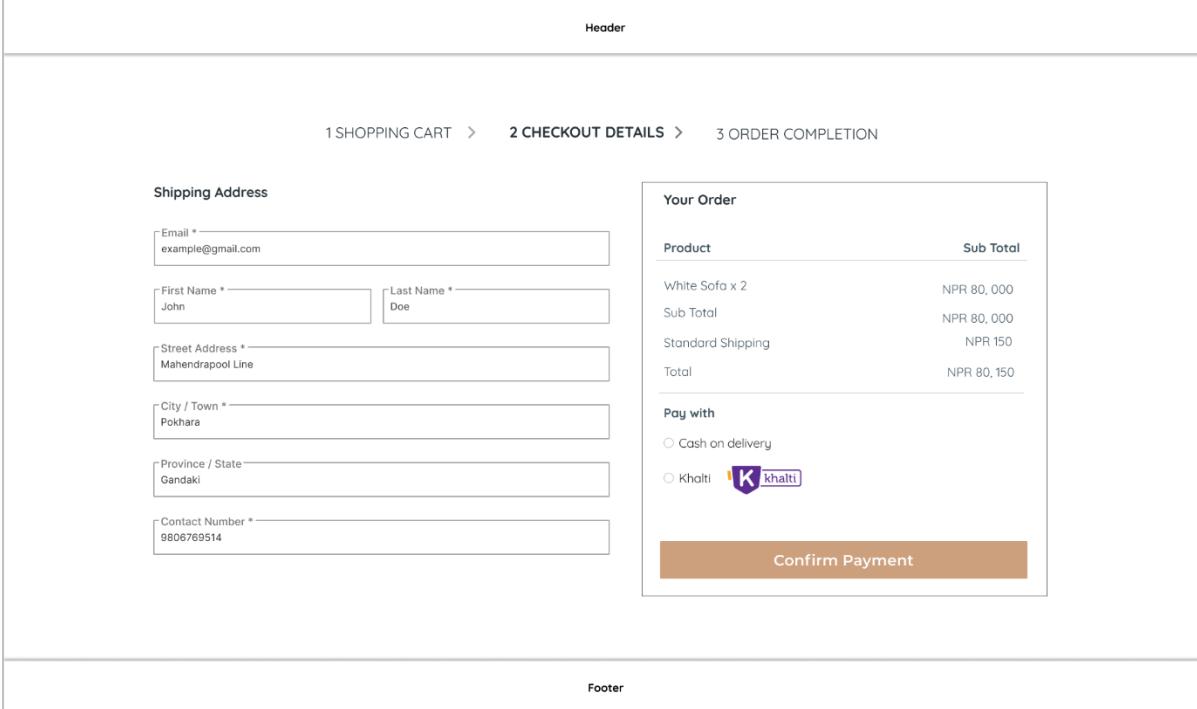
The screenshot shows a shopping cart screen. At the top center are three navigation steps: "1 SHOPPING CART > 2 CHECKOUT DETAILS > 3 ORDER COMPLETION". Below this is a table with the following data:

PRODUCT	PRICE	QUANTITY	SUBTOTAL	CART TOTALS
White Sofa	NPR 40,000	<input type="button" value="-"/> <input type="text" value="2"/> <input type="button" value="+"/>	NPR 80,000	Total NPR 80,000

At the bottom right of the table is a large orange button labeled "Proceed to Checkout". The top and bottom of the page have thin horizontal bars labeled "Header" and "Footer".

Figure 36: Cart Screen Prototype

9. Checkout Screen Prototype



The prototype for the Checkout Screen is a wireframe showing the layout of the page. It includes a header, a breadcrumb navigation (1 SHOPPING CART > 2 CHECKOUT DETAILS > 3 ORDER COMPLETION), a shipping address form, a summary of the order, payment options, and a confirmation button.

Shipping Address

- Email * example@gmail.com
- First Name * John
- Last Name * Doe
- Street Address * Mahendrapool Line
- City / Town * Pokhara
- Province / State * Gandaki
- Contact Number * 9806769514

Your Order

Product	Sub Total
White Sofa x 2	NPR 80,000
Sub Total	NPR 80,000
Standard Shipping	NPR 150
Total	NPR 80,150

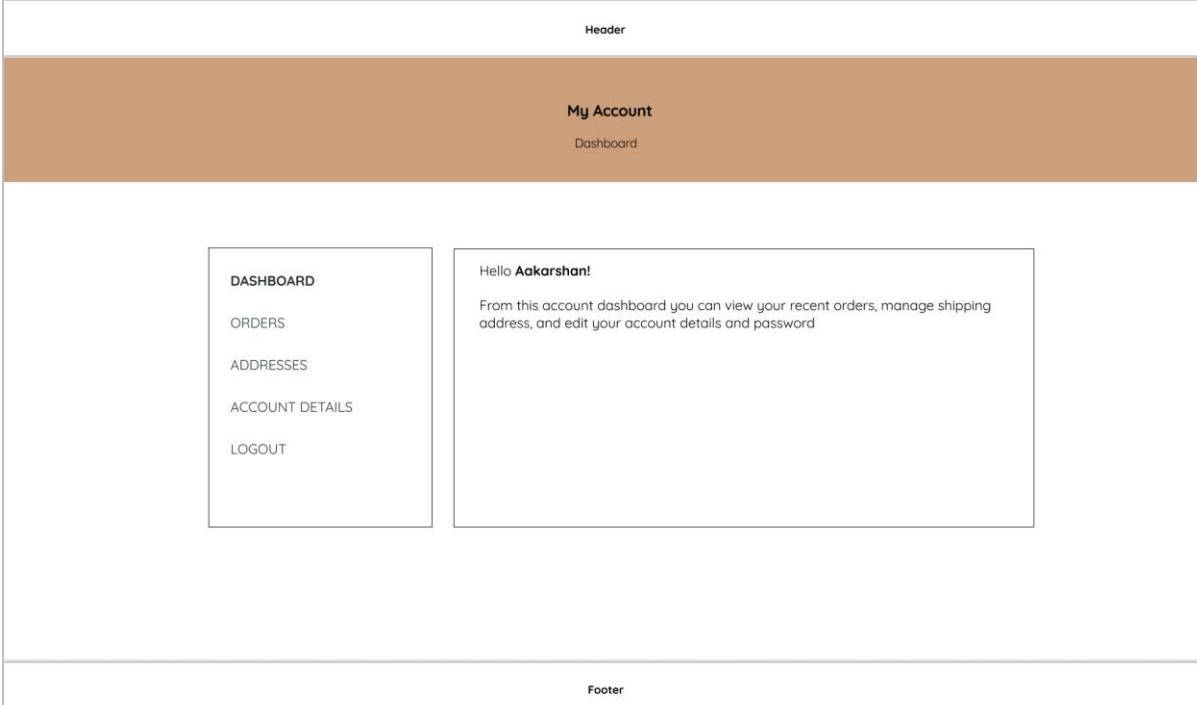
Pay with

- Cash on delivery
- Khalti 

Confirm Payment

Figure 37: Checkout Screen Prototype

10. My Account Dashboard Prototype



The prototype for the My Account Dashboard features a header with a brown background, a sidebar with navigation links, and a main content area with account information and a sidebar menu.

Header

My Account

Dashboard

Sidebar

- DASHBOARD
- ORDERS
- ADDRESSES
- ACCOUNT DETAILS
- LOGOUT

Main Content Area

Hello Aakarshan!

From this account dashboard you can view your recent orders, manage shipping address, and edit your account details and password

Footer

Figure 38: My Account Dashboard Prototype

11. My Account (Orders) Screen Prototype

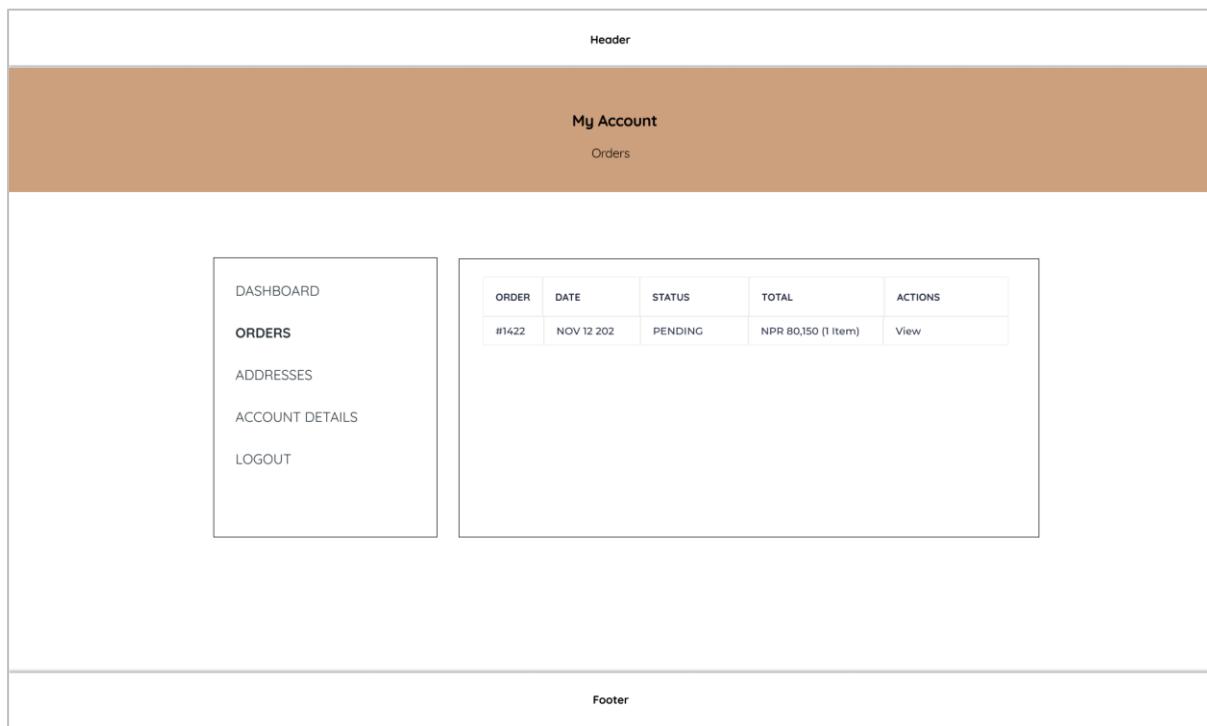


Figure 39: My Account (Orders) Screen Prototype

12. My Account (Addresses) Screen Prototype

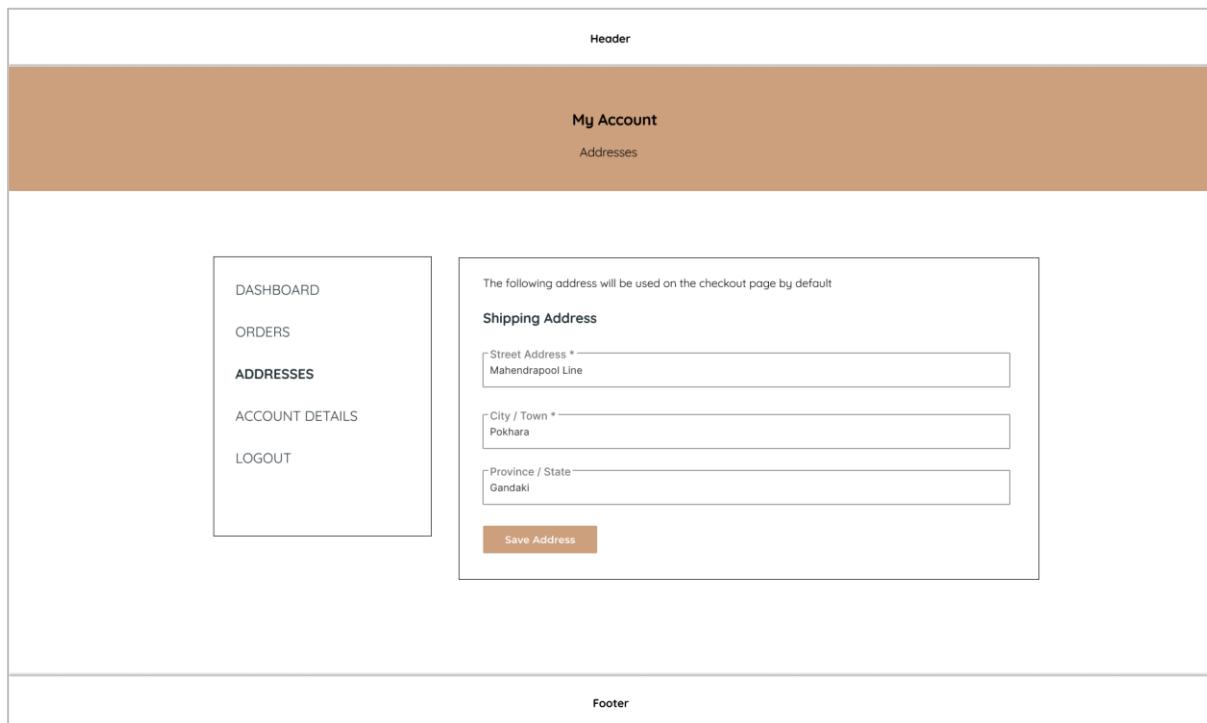
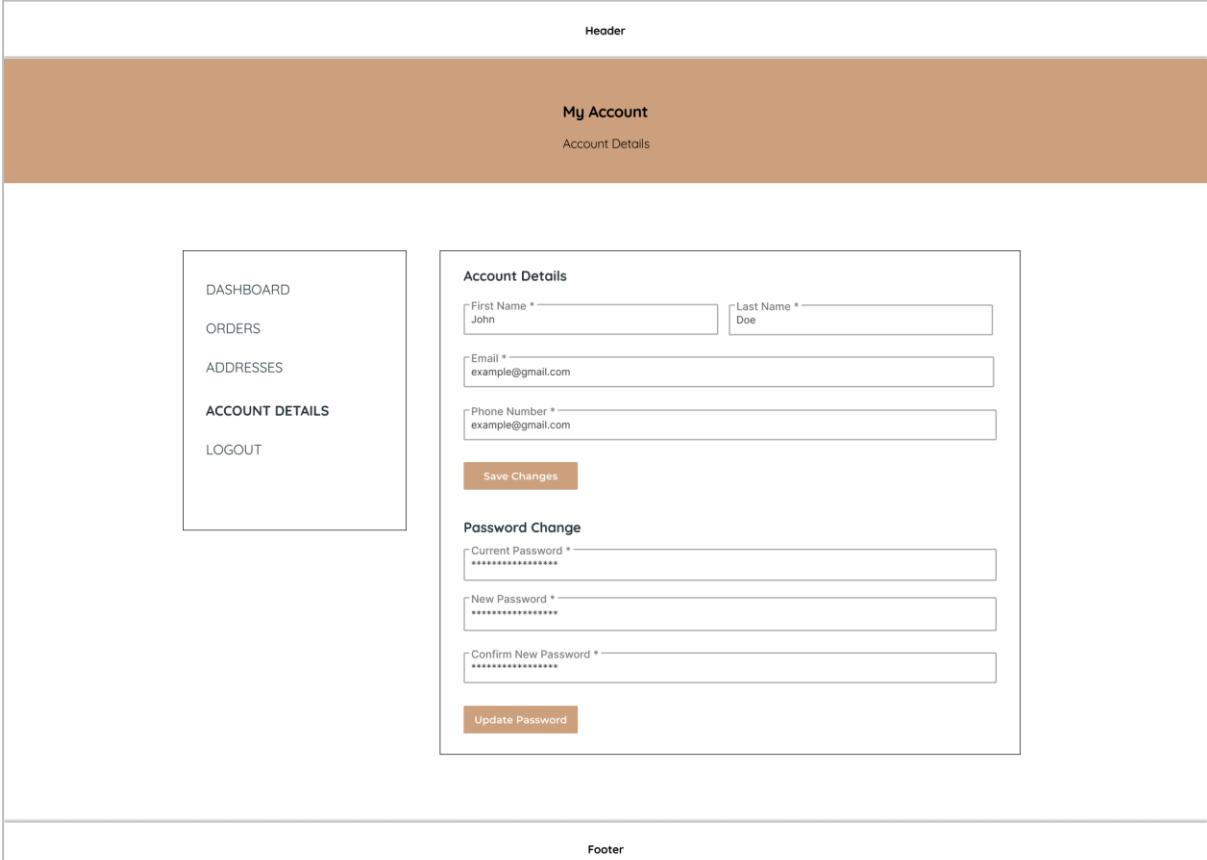


Figure 40: My Account (Addresses) Screen Prototype

13. My Account (Account Details) Screen Prototype



The figure shows a wireframe prototype of the 'My Account (Account Details)' screen. The interface is divided into several sections:

- Header:** A light gray header bar.
- Brown Bar:** A brown horizontal bar containing the title 'My Account' and the subtitle 'Account Details'.
- Left Sidebar:** A vertical sidebar on the left side with the following menu items:
 - DASHBOARD
 - ORDERS
 - ADDRESSES
 - ACCOUNT DETAILS** (This item is highlighted with a darker background)
 - LOGOUT
- Account Details Form:** A large rectangular form on the right side.
 - Account Details:** Fields for First Name (John), Last Name (Doe), Email (example@gmail.com), and Phone Number (example@gmail.com).
Save Changes button.
 - Password Change:** Fields for Current Password, New Password, and Confirm New Password, each represented by a series of asterisks.
Update Password button.
- Footer:** A light gray footer bar at the bottom.

Figure 41: My Account (Account Details) Screen Prototype

3.4. Use Case Diagram

A use case is a core concept of UML (Unified Modelling Language), which is used to model the system/sub-system of an application. It captures the dynamic behavior, which is an essential aspect of modeling a system. A significant concept of Use Case is that it describes system functionality and the system's requirements from the end user's (also known as actors) perspective. However, use cases specify the anticipated behavior but not the exact way of carrying it out. (Visual Paradigm, 2021)



Figure 42: Use Case Diagram

3.5. Sequence Diagram

3.5.1. Sequence Diagram For “Add To Cart”

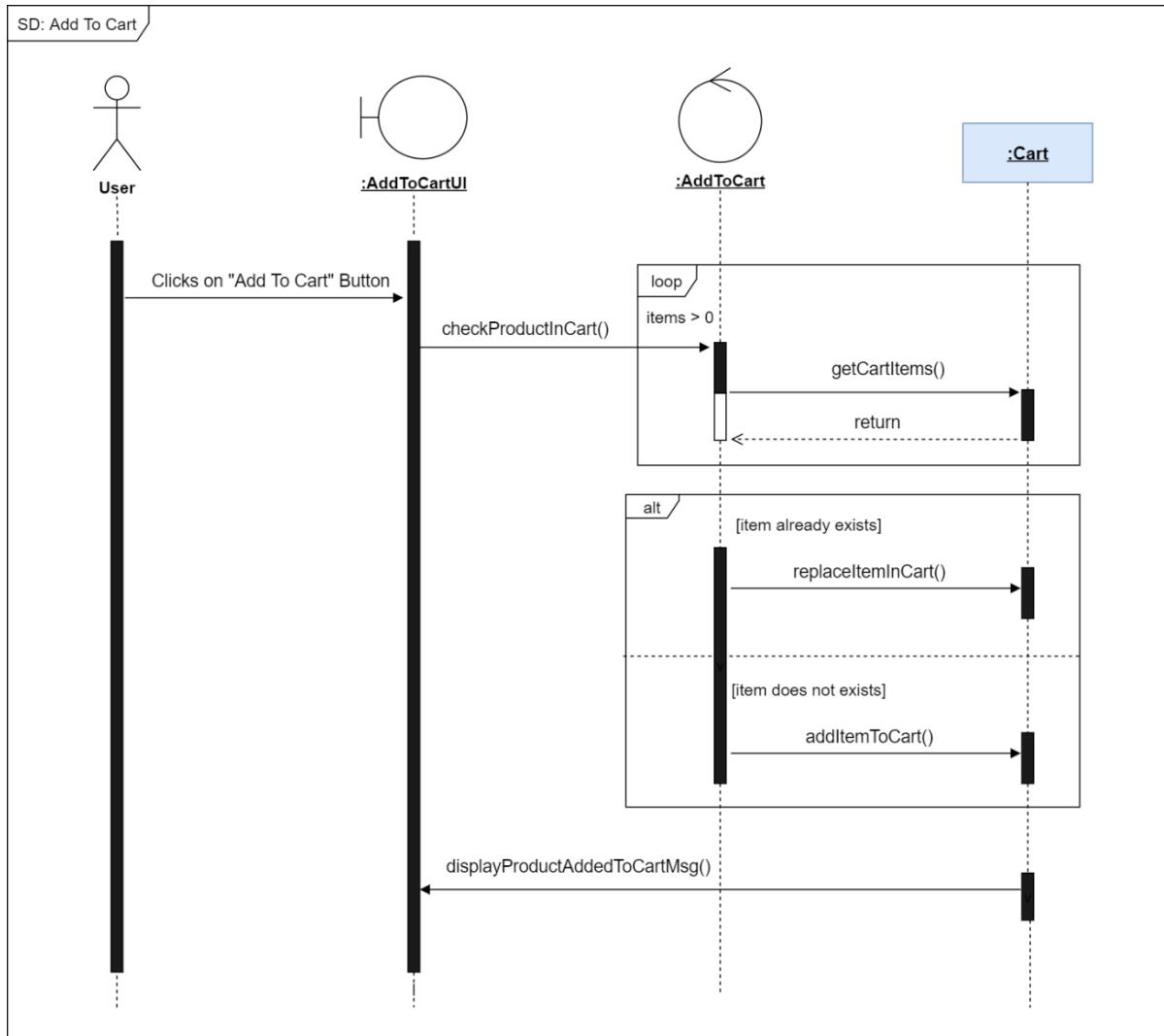


Figure 43: Sequence Diagram For "Add To Cart"

3.5.2: Sequence Diagram For “Checkout Process”

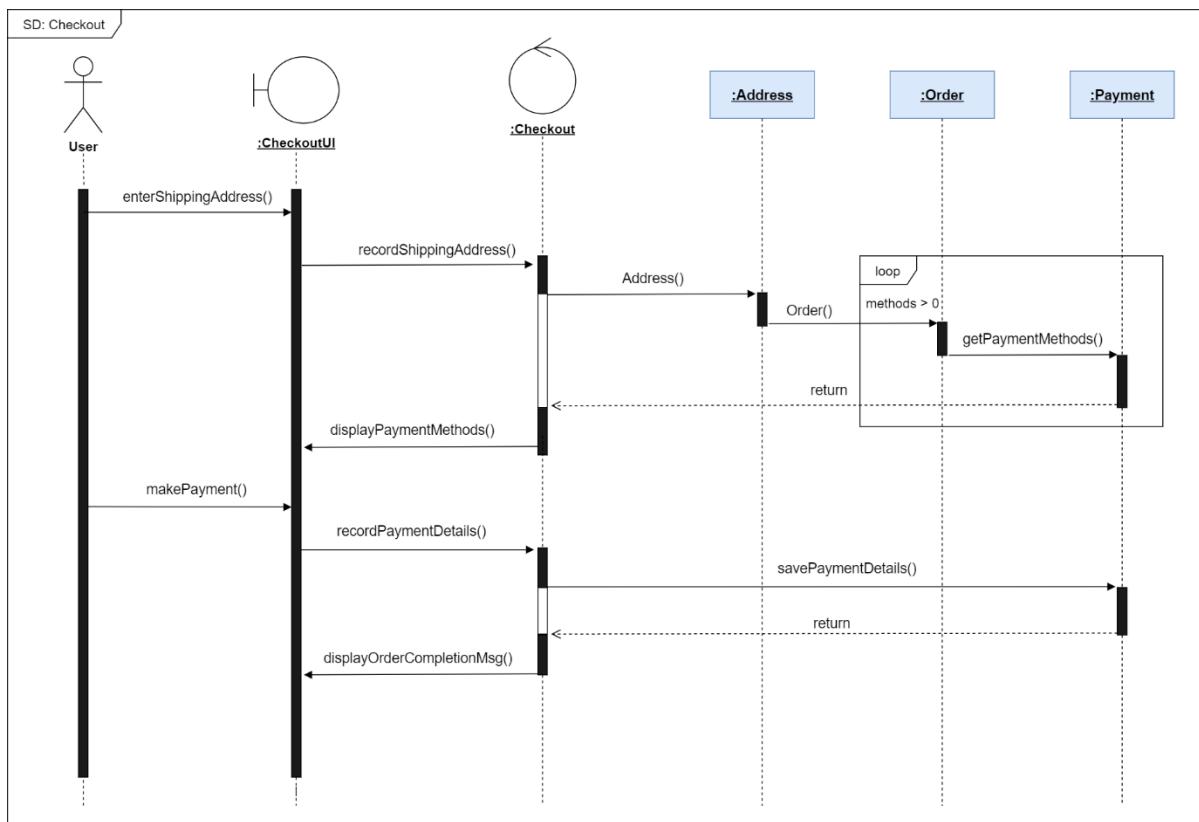


Figure 44: Sequence Diagram For Checkout Process

3.6. Collaboration Diagram

3.6.1. Collaboration Diagram For “Checkout Process”

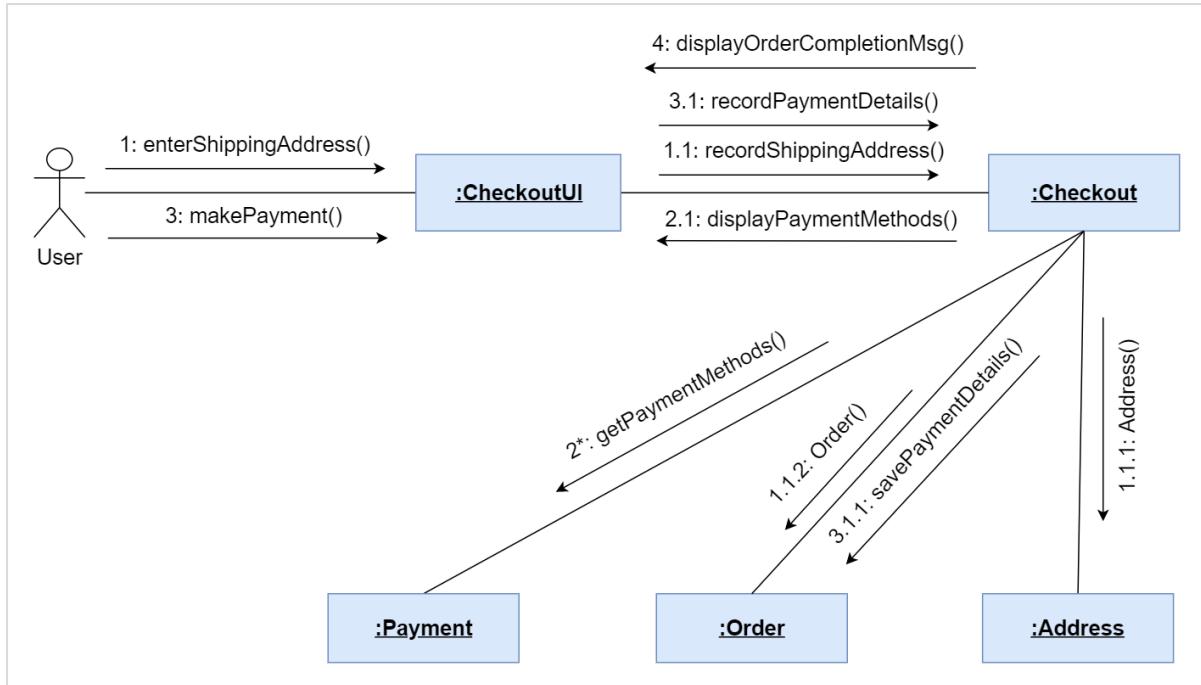


Figure 45: Collaboration Diagram For Checkout Process

3.6.2. Collaboration Diagram For “Add Product” [Admin Side]



Figure 46: Collaboration Diagram For Add Product

Other functionalities handled by admin such as edit product, add category, edit category, and edit user follow similar flow as the above collaboration diagram.

3.7. Activity Diagram

3.7.1. Activity Diagram For “Change Password”

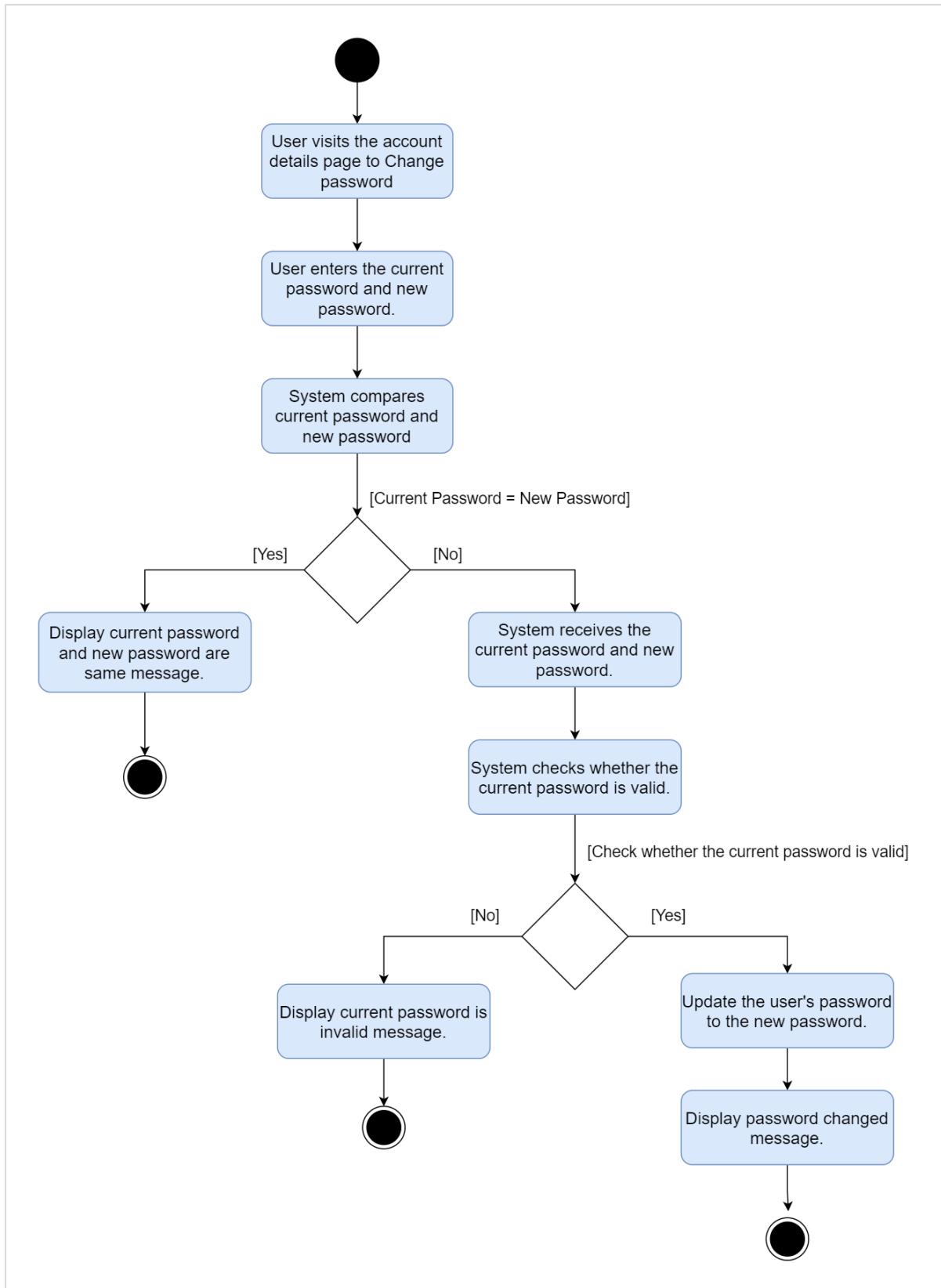


Figure 47: Activity Diagram For "Change Password"

3.7.2. Activity Diagram For “Delete Category” [Admin-Side]

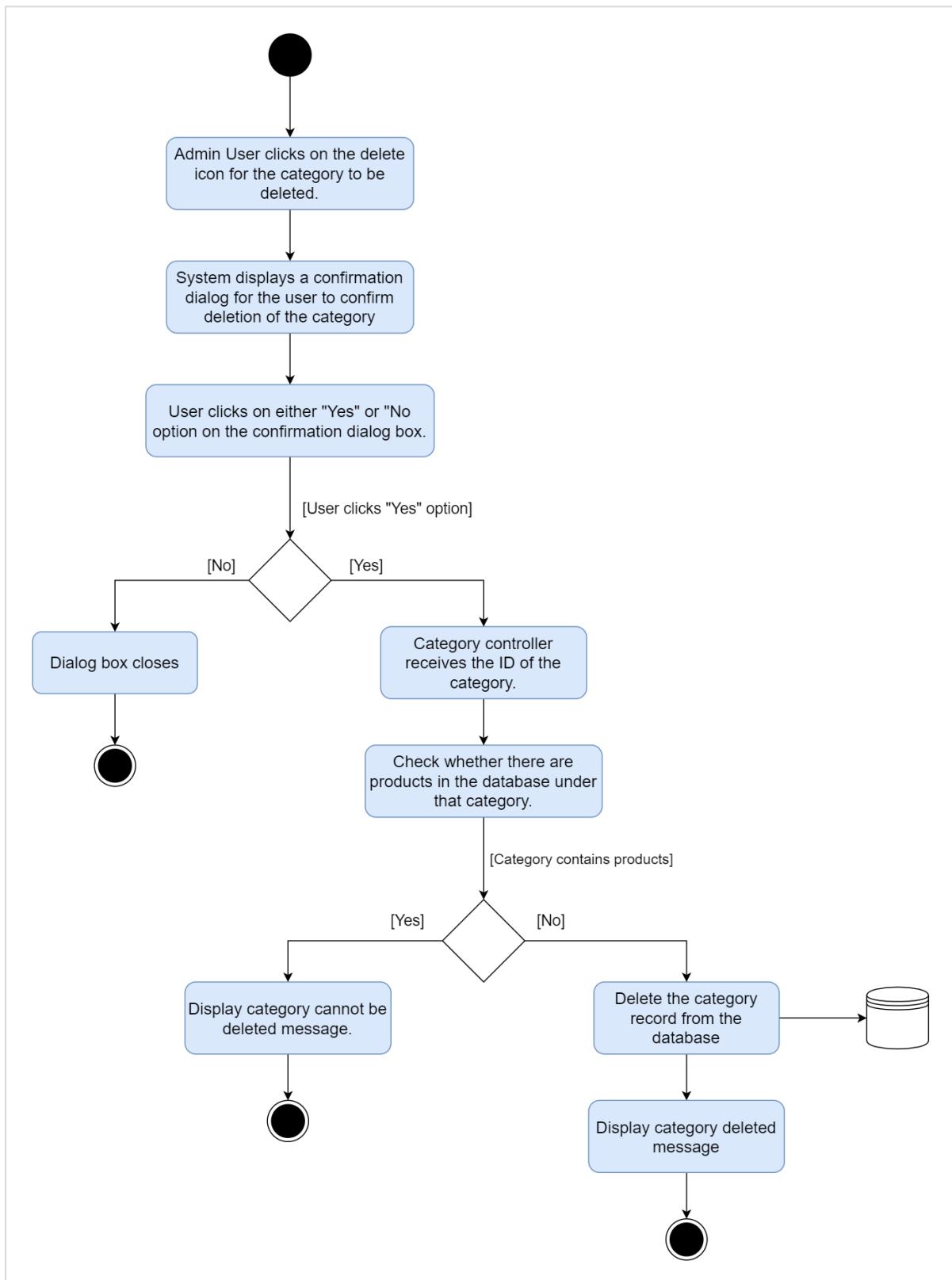


Figure 48: Activity Diagram For "Delete Category"

3.8. Flowchart

3.8.1. Login Flowchart

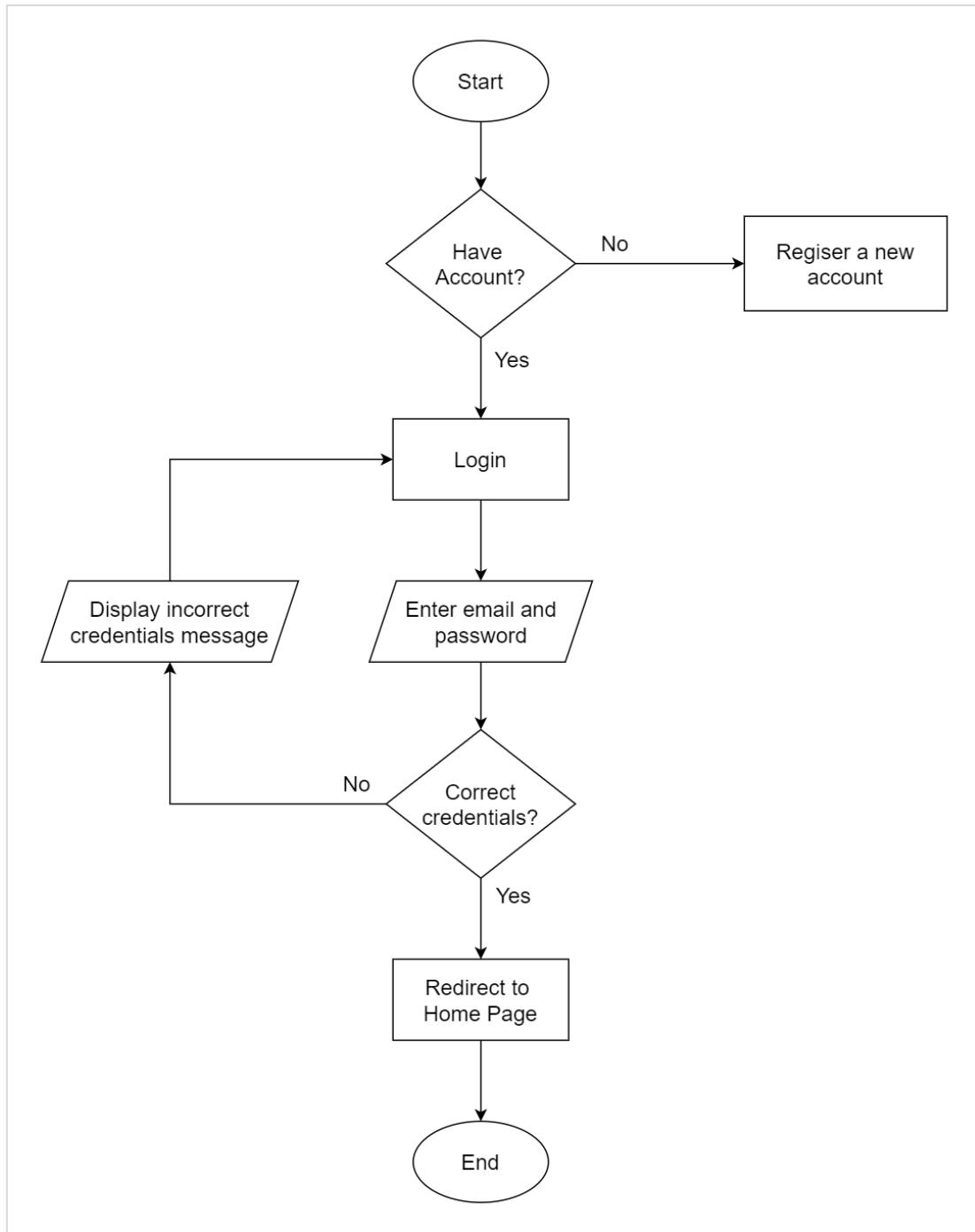


Figure 49: Login Process Flowchart

3.8.2. Register/Sign Up Flowchart

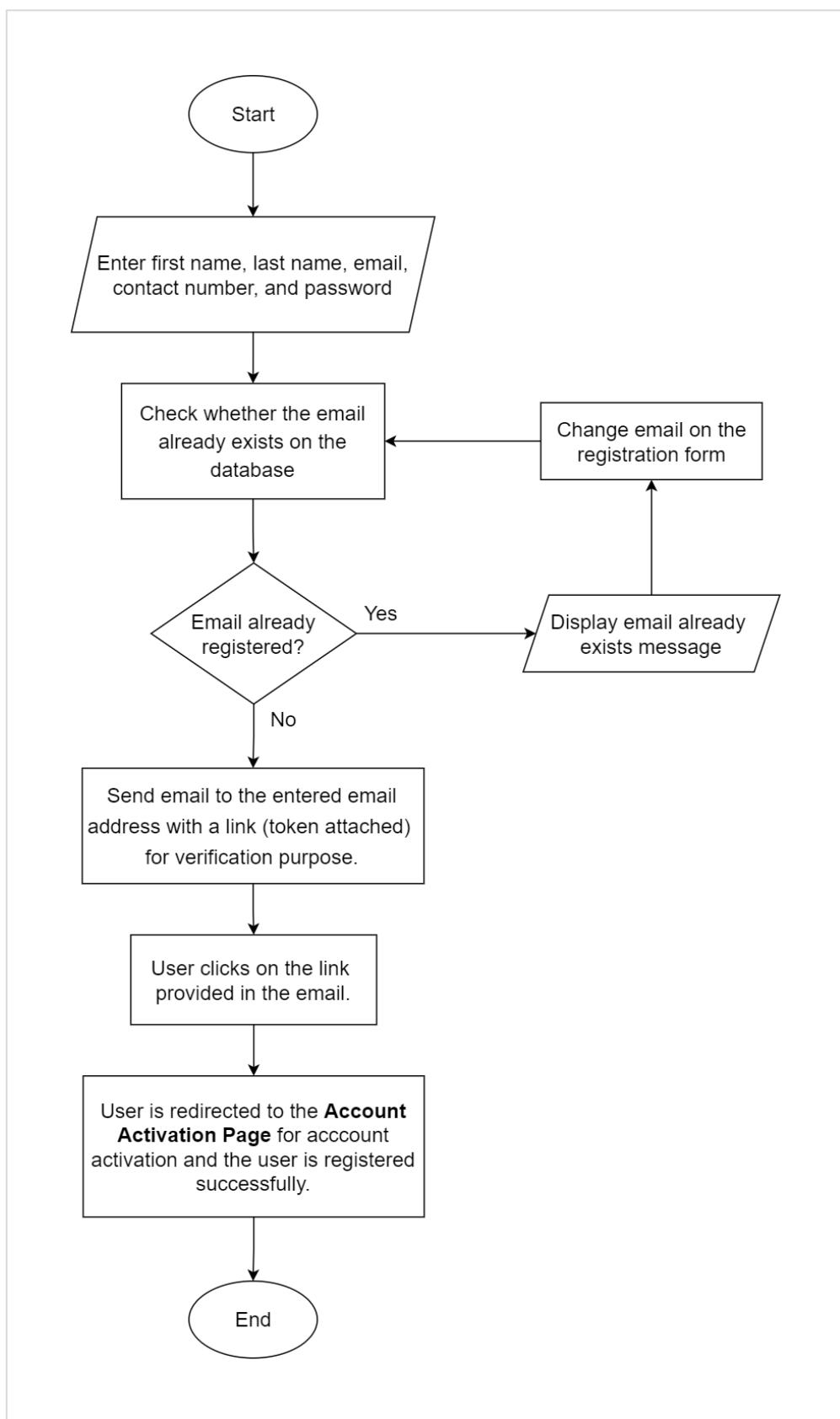


Figure 50: Register process flowchart

3.9. Internal Model Specification for the system

3.9.1. Entity Relationship Diagram

The Entity-Relationship model is one of the widely used database modeling techniques. It is a diagramming technique that shows the relationship between entities within a system and describes the logical structure for database design. In the ER Diagram, various defined sets of symbols such as rectangle, oval, diamonds, and connecting lines are used to make ER diagrams (Date, 2003).

Initial Entry Relationship Diagram:

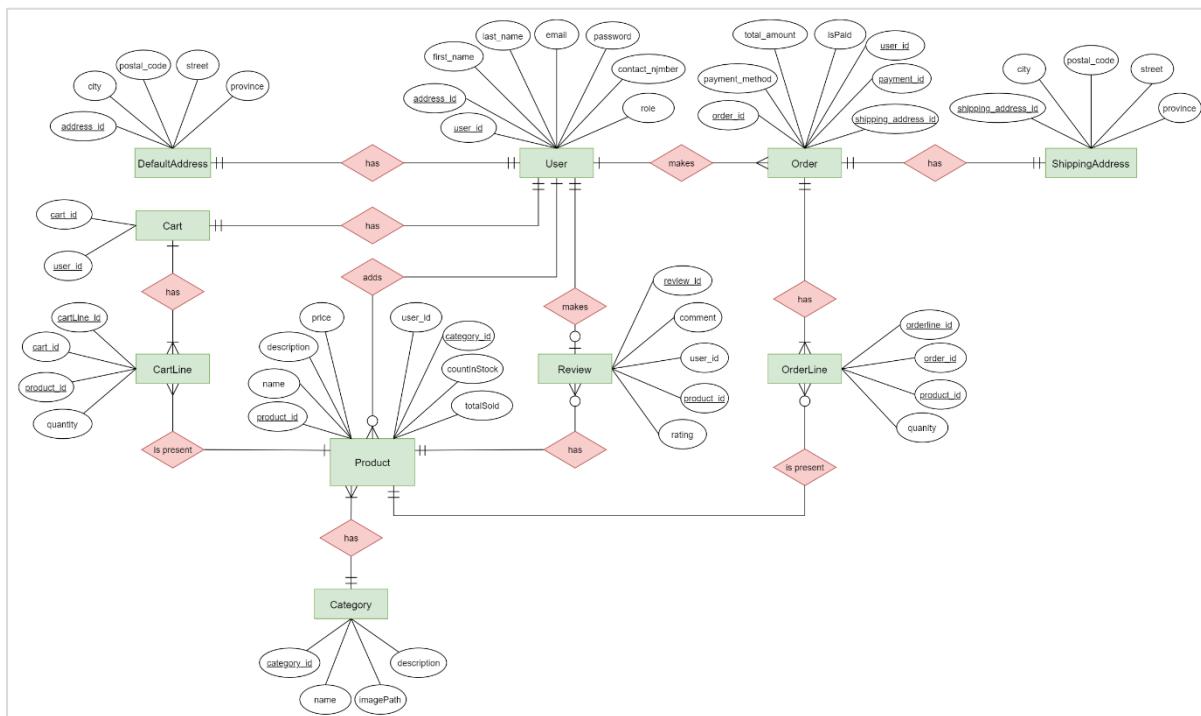


Figure 51: Initial Entity Relationship Diagram

Final Entity Relationship Diagram:

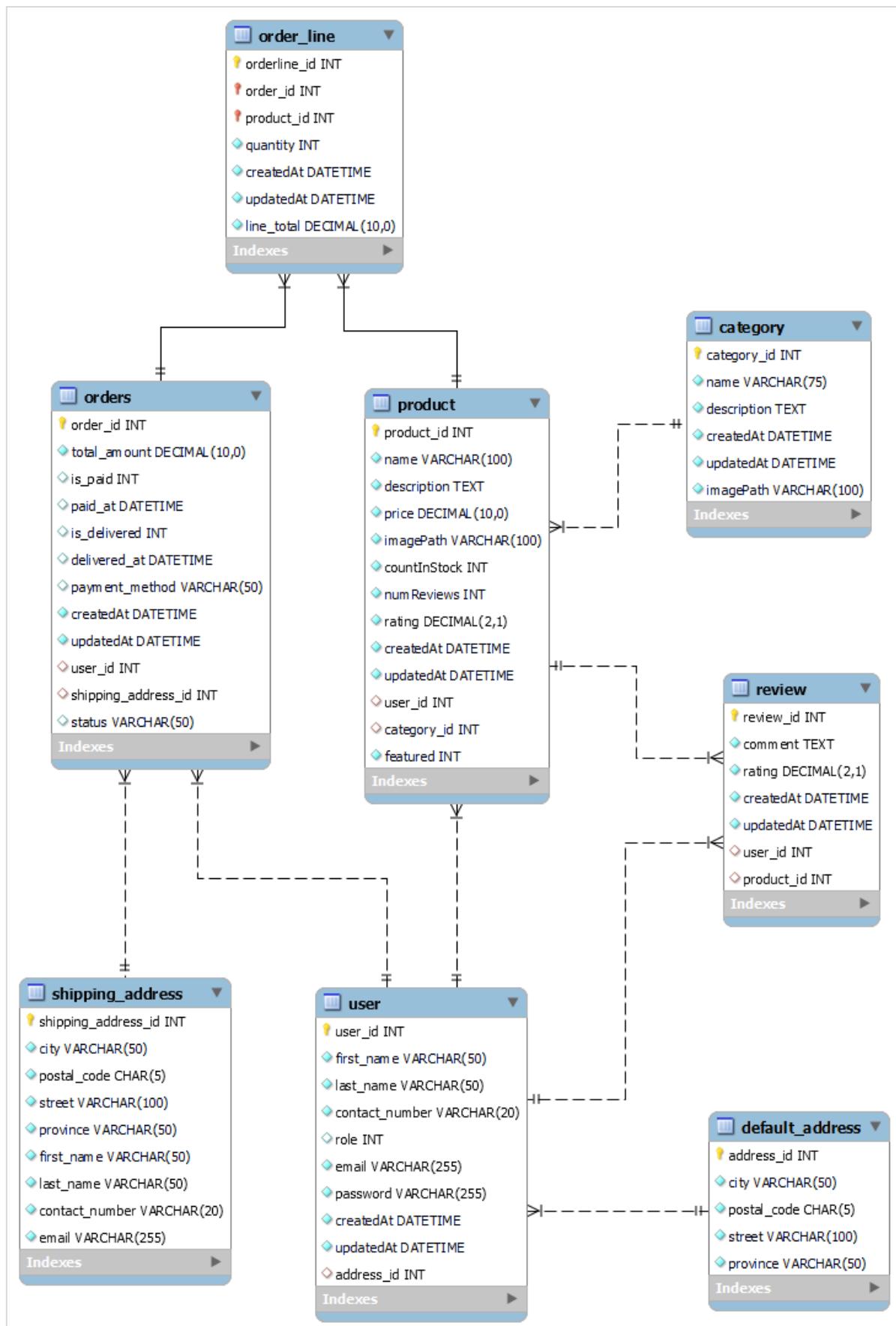


Figure 52: Final Entity Relationship Diagram

3.9.2. Data Dictionary

The data dictionary is one of the most important parts of a relational database. It is a collection of information that defines the data elements in the database. It contains all the important information about the data elements. In simple terms, it can be defined as the data of data. It contains information such as the type of data stored, the relationship between data elements of different tables (primary key and foreign key), and the description of data elements. Furthermore, the data dictionary is needed for the DBMS to access the data within a database (Guynes, et al., 2016).

Before the database is implemented, it is best practice to define the data dictionary. Information such as attributes, the data type of the attributes, field size, the constraint such as Primary key, Foreign Key, NOT NULL, UNIQUE that needs to be added to various columns (attributes) is defined in the data dictionary.

Data dictionary of all the tables formed are listed below:

1. Default Address Table Data Dictionary

Table 2: Default Address Table Data Dictionary

Attributes	Data Type	Constraints	Description
address_id	INTEGER	PK, NOT NULL	Unique ID for an address record
city	VARCHAR(50)	NOT NULL	City address
postal_code	CHAR(5)	NOT NULL	Postal Code address
street	VARCHAR(100)	NOT NULL	Street Address
province	VARCHAR(50)	NOT NULL	Province address

2. User Table Data Dictionary

Table 3: User Table Data Dictionary

Attributes	Data Type	Constraints	Description
user_id	INTEGER	PK, NOT NULL	Unique ID for the user
first_name	VARCHAR(50)	NOT NULL	First name of the user
last_name	VARCHAR(50)	NOT NULL	Last name of the user
email	VARCHAR(255)	NOT NULL	Email address of the user.
password	VARCHAR(255)	NULL	Login password of the user
contact_number	VARCHAR(20)	NOT NULL	The contact number of the user
role	INTEGER	NOT NULL	0 or 1 - 0 means normal user - 1 means admin user
address_id	INTEGER	FK, NULL	The ID of the address record in the default address table

Address_id references to address_id in Default Address Table

3. Product Table Data Dictionary

Table 4: Product Table Data Dictionary

Attributes	Data Type	Constraints	Description
product_id	INTEGER	PK, NOT NULL	Unique ID for the product
name	VARCHAR(100)	NOT NULL	Name of the product
description	TEXT	NOT NULL	Description of the product
price	DECIMAL	NOT NULL	Price of the product
user_id	INTEGER	FK, NOT NULL	The user id of the admin.
category_id	INTEGER	FK, NOT NULL	Category id of the product
countInStock	INTEGER	NOT NULL	The available quantity of the product.
imagePath	VARCHAR(100)	NOT NULL	Image path of the product.
featured	INTEGER	NOT NULL Default Value: 0	Flag for featured products. - 0 means not featured - 1 means featured
rating	DECIMAL	NOT NULL Default Value: 0	Rating obtained by the product.
numReviews	INTEGER	NOT NULL Default Value: 0	The total number of reviews submitted for the product.

user_id references to user_id in User Table

category_id references to category_id in Category Table

4. Category Table Data Dictionary

Table 5: Category Table Data Dictionary

Attributes	Data Type	Constraints	Description
category_id	INTEGER	PK, NOT NULL	Unique ID for the category
name	VARCHAR(75)	NOT NULL	Name of the category
description	TEXT	NOT NULL	Description of the category
imagePath	VARCHAR(100)	NOT NULL	Image path of the category.

5. Review Table Data Dictionary

Table 6: Review Table Data Dictionary

Attributes	Data Type	Constraints	Description
review_id	INTEGER	PK, NOT NULL	Unique ID for a review.
comment	TEXT	NOT NULL	Comment on a review
user_id	INTEGER	FK, NOT NULL	User ID of the reviewing user.
product_id	INTEGER	FK, NOT NULL	The ID of the reviewed product.
rating	DECIMAL	NOT NULL	Rating given by the reviewer.

user_id references to user_id in the user table

product_id references to product_id in the product table

6. Order Table Data Dictionary

Table 7: Order Table Data Dictionary

Attributes	Data Type	Constraints	Description
order_id	INTEGER	PK, NOT NULL	Unique ID for an order
total_amount	DECIMAL(10, 0)	NOT NULL	The total amount of an order.
payment_method	VARCHAR(50)	NOT NULL	Method of payment: COD or Wallet (Khalti)
is_paid	INTEGER	NOT NULL	0 or 1 - 0 means not paid - 1 means paid
paid_at	DATE	NULL	Paid date
is_delivered	INTEGER	NOT NULL	0 or 1 - 0 means not delivered - 1 means delivered
delivered_at	DATE	NULL	Paid date
Status	VARCHAR(50)	NULL	Status of an order (for tracking purposes)
shipping_address_id	INTEGER	FK, NOT NULL	The ID of a shipping address.
user_id	VARCHAR	FK, NOT NULL	The ID of the user who made the order.

user_id references to user_id in the user table

shipping_address_id references to shipping_address_id in Shipping Address table

7. Order Line Table Data Dictionary

Table 8: Order Line Table Data Dictionary

Attributes	Data Type	Constraints	Description
orderline_id	INTEGER	PK, NOT NULL	Unique ID for a particular order line
order_id	INTEGER	FK, NOT NULL	The ID of order.
product_id	INTEGER	FK, NOT NULL	The ID of a product in an order line.
quantity	INTEGER	NOT NULL	Quantity of a product in an order line.
line_total	DECIMAL(10, 0)	NOT NULL	Total for each product. Product times quantity (product * quantity)

order_id references to order_id in order table

product_id references to product_id in the product table

This table acts as a joining table between the Order and Product table. This table helps to break the many-to-many relationship between the Order and Product table.

8. Shipping Address Table Data Dictionary

Table 9: Shipping Address Table Data Dictionary

Attributes	Data Type	Constraints	Description
shipping_address_id	INTEGER	PK, NOT NULL	Unique ID for a shipping address record
first_name	VARCHAR(50)	NOT NULL	First name of the order recipient.
last_name	VARCHAR(50)	NOT NULL	Last name of the order recipient.

contact_number	VARCHAR(20)	NOT NULL	The contact number of the order recipient.
email	VARCHAR(255)	NOT NULL	Email address of the recipient.
city	VARCHAR(50)	NOT NULL	City address
postal_code	CHAR(5)	NOT NULL	Postal Code address
street	VARCHAR(100)	NOT NULL	Street Address
province	VARCHAR(50)	NOT NULL	Province address

3.10. Data Flow Diagrams

1. Context Diagram (Level 0 DFD)

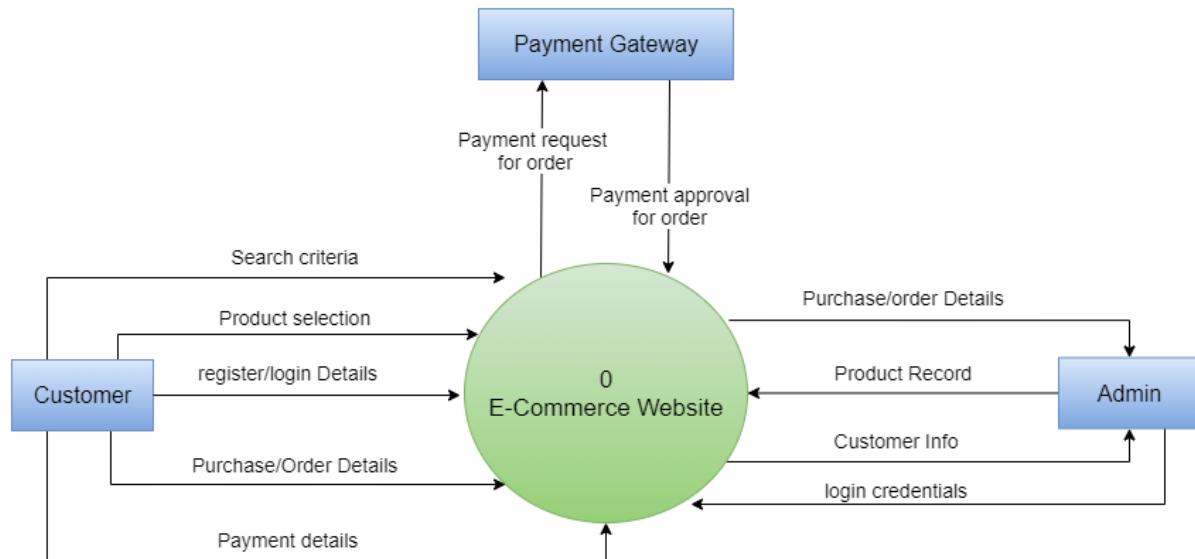


Figure 53: Context Diagram (Level 0 DFD)

2. Level 1 DFD

❖ Client-Side Level 1 DFD:

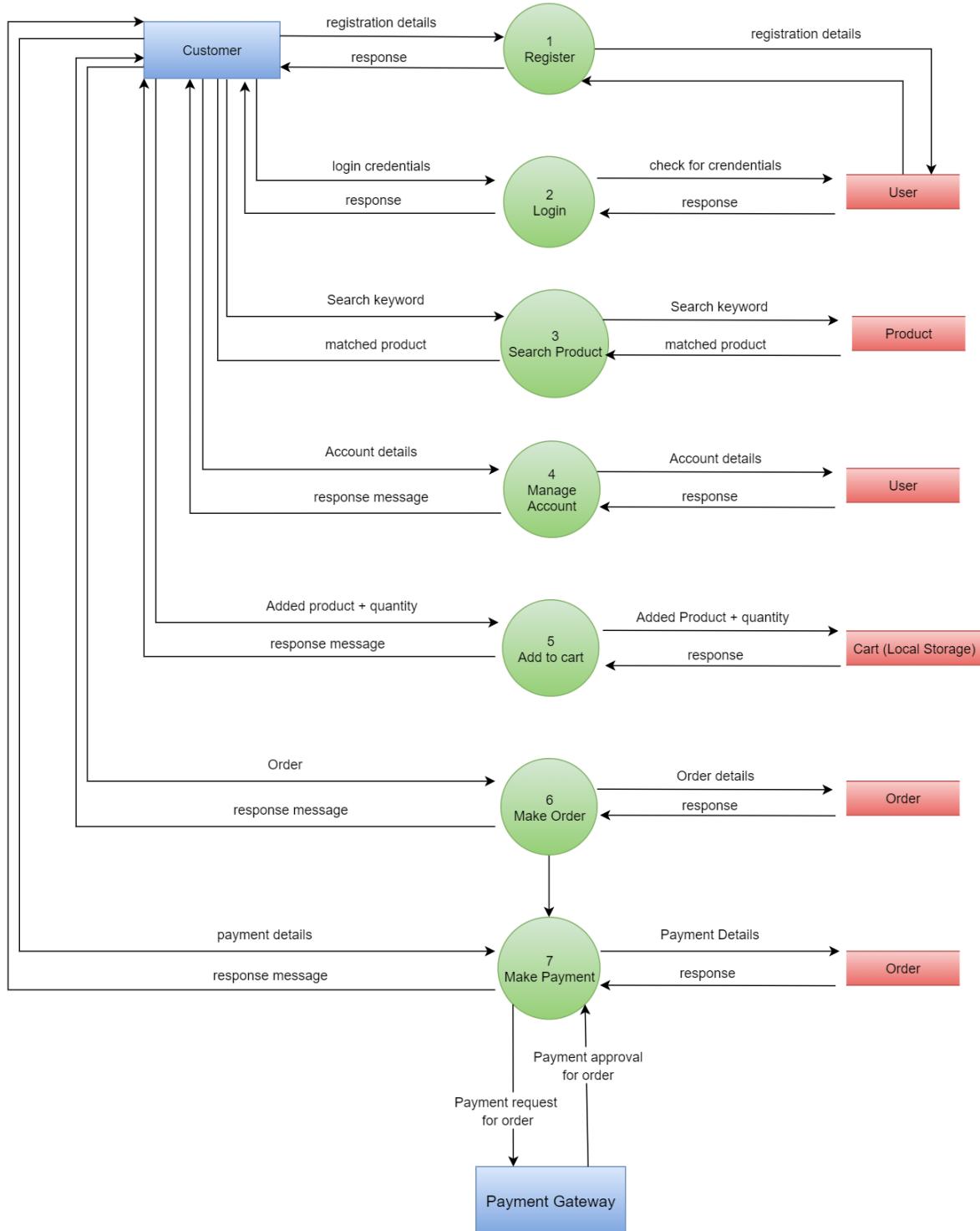


Figure 54: Client-Side Level 1 DFD

❖ Admin Side Level 1 DFD:

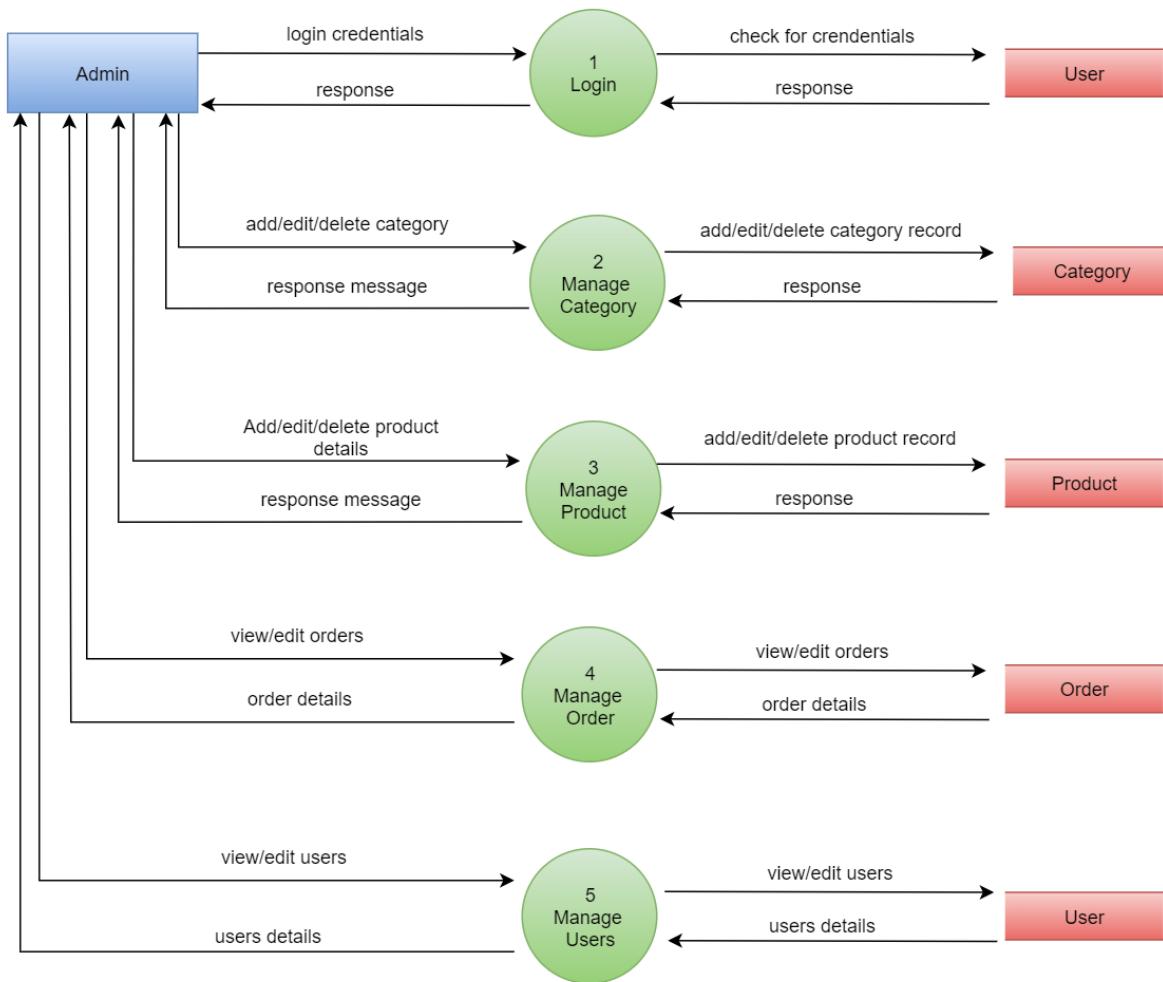


Figure 55: Admin Side Level 1 DFD

3.11. API Endpoints

It is necessary to create APIs for creating, retrieving, updating, deleting, and searching data from different tables in the database.

1. User Routes:

Table 10: User API Endpoints

Methods	Access	Endpoint URLs	Actions
POST	Public	/api/v1/user/register	Add new user
POST	Public	/api/v1/user/activation	To activate user
POST	Public	/api/v1/user/login	For login
GET	Public	/api/v1/user/logout	To logout user
POST	Public	/api/v1/user/refreshToken	Get access token
POST	Public	/api/v1/user/forgot	To handle forgot password process
POST	Protected (Authorized User only)	/api/v1/user/reset	To reset password
GET	Protected (Authorized User only)	/api/v1/user/info	To get user info
PUT	Protected (Authorized User only)	/api/v1/auth/info	To update user details (name, and contact number)
POST	Protected (Authorized User only)	/api/v1/user/address	To add user's default address.
PUT	Protected (Authorized User only)	/api/v1/user/address/:id	To update user's default address.

PUT	Protected (Authorized User only)	/api/v1/user/updatePassword	To update password
GET	Protected (Authorized + Admin Only)	/api/v1/user/allUsersInfo	To get information of all users.
PUT	Protected (Authorized + Admin Only)	/api/v1/user/:id	To edit user (by admin)

2. Product Routes:

Table 11: Product API Endpoints

Methods	Access	Endpoint URLs	Actions
GET	Public	/api/v1/products/search?keyword=[keyword]	Search product using keyword.
GET	Public	/api/v1/products/featured	Get featured products.
GET	Public	/api/v1/products/category/:id	Get products under a category.
POST	Protected (Authorized User only)	/api/v1/products/:id/reviews	Create product review
GET	Protected (Authorized + Admin Only)	/api/v1/products	Get all products

POST	Protected (Authorized + Admin Only)	/api/v1/products	Create a new product
PUT	Protected (Authorized + Admin Only)	/api/v1/products/:id	Update product by id
DELETE	Protected (Authorized + Admin Only)	/api/v1/products/:id	Delete product by id

3. Category Routes:

Table 12: Category API Endpoints

Methods	Access	Endpoint URLs	Actions
GET	Public	/api/v1/categories	Get all categories
GET	Public	/api/v1/categories/:id	Get category by id
POST	Protected (Authorized + Admin Only)	/api/v1/categories	Create a new category
PUT	Protected (Authorized + Admin Only)	/api/v1/categories/:id	Update category by id
DELETE	Protected (Authorized + Admin Only)	/api/v1/categories/:id	Delete category by id

4. Order Routes:

Table 13: Order API Endpoints

Methods	Access	Endpoint URLs	Actions
GET	Protected (Authorized User only)	/api/v1/orders/myorders	Get logged in user's orders.
GET	Protected (Authorized User only)	/api/v1/orders/:id	Get order by id
POST	Protected (Authorized User only)	/api/v1/orders	Create a new order.
PUT	Protected (Authorized User only)	/api/v1/orders/:id/pay	To update payment status.
PUT	Protected (Authorized User only)	/api/v1/orders/:id/cancel	To cancel order by user itself.
GET	Protected (Authorized + Admin Only)	/api/v1/orders/:from/:to	To get orders between the specified dates (from and to)
PUT	Protected (Authorized + Admin Only)	/api/v1/orders/:id	To update order (update status) by admin.

5. Upload Routes:

Table 14: Upload API Endpoints

Methods	Access	URLs	Actions
POST	Public	/api/v1/upload	To upload image
GET	Public	/api/v1/upload/delete	To delete image

6. Khalti Routes:

Table 15: Khalti Backend route

Methods	Access	URLs	Actions
GET	Public	/api/v1/khalti/verify/:token/:amount	To verify Khalti payment (Server to server verification). Between application server and Khalti sever.

3.12. Final Gantt Chart

The final Gantt Chart of the project is shown below.

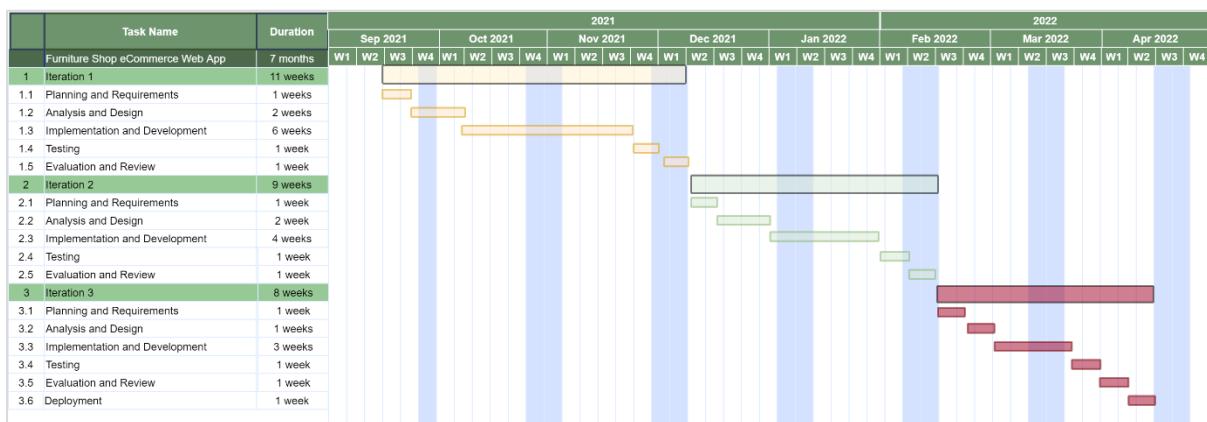


Figure 56: Final Gantt Chart

3.13. Resource requirements

- ❖ **Hardware requirements:** No specific hardware requirements for this project.
- ❖ **Software requirements:** For web design basic tools, as well as technologies, are required. The following tool and technologies will be used in the project:

Software requirements for design purposes:

1. Figma

Figma is a web-based graphics editing and user interface design app. You can use it to do everything from wireframing websites to designing mobile app interfaces, prototyping designs, crafting social media posts, and everything in between. Figma is distinct from other graphics editing software. Mostly because it works directly in your browser. This means you can access your projects and begin designing from any computer or platform without having to purchase multiple licenses or install the software. (theme-junkie, 2021)



Figure 57: Figma Logo

2. Balsamiq

Balsamiq mockup is a low-fidelity wireframing tool that is used to create wireframes. It is used to create, edit and share digital sketches of a website or any other products before starting the work. Before designing a website, a wireframe is constructed to ensure the proper implementation or alignment of the codes. We can generate the basic structure of a website using mockup applications. Balsamiq mockups user interface consists of five major areas: toolbar, UI Library, canvas, navigation panel, and properties panel (Balsamiq, 2022).

For designing the wireframe of the proposed eCommerce web application, Balsamiq wireframes are used.



balsamiq® Wireframes

Figure 58: Balsamiq wireframe logo

3. Draw.io

draw.io is a cross-platform graph drawing software written in HTML5 and JavaScript that is free and open source. Its interface allows you to create flowcharts, wireframes, UML diagrams, organizational charts, and network diagrams.

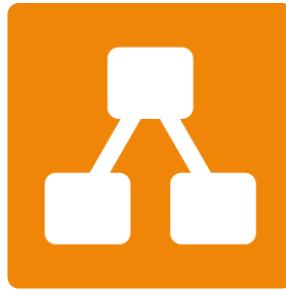


Figure 59: draw.io logo

Basic tools for web design:

1. Integrated development environment (Visual Studio Code)
2. Web Browser (Example: Google Chrome)

Web technologies:

❖ Frontend Technologies/Languages:

1. React (front-end JavaScript Library)

React is a JavaScript library for creating user interfaces or UI components that are declarative, efficient, and flexible. It allows you to build complex user interfaces out of small, isolated pieces of code known as "components." It is used by large, established companies and new, up-and-coming startups (Netflix, Airbnb, Instagram, and the New York Times, to name a few). React has many advantages that make it a better choice than other frameworks. (Facebook Open Source, 2021)

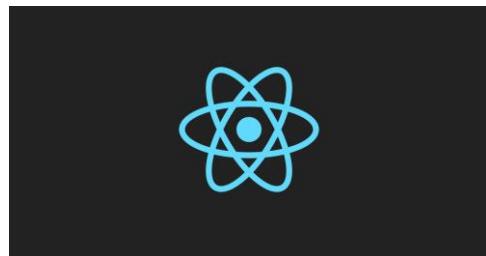


Figure 60: React JS

2. Material UI

Material-UI is simply a library that allows us to import and use various components in our React applications to create a user interface. This saves the developers a significant amount of time because they do not have to write everything from scratch.



Figure 61: Material UI Logo

3. Redux Toolkit (for app-wide state management)

Redux is an open-source JavaScript library for managing and centralizing the application state. It is most commonly used with libraries such as React or Angular for building user interfaces.



Figure 62: Redux Logo

4. Formik

Formik is a lightweight, free and open-source library for ReactJS or React Native that addresses three primary form creation pain points: The manipulation of the form state. How error messages and form validation are handled. How the submission of a form is handled. (Formium, 2022)



Figure 63: Formik Logo

5. Yup

Yup is a value parsing and validation JavaScript schema builder. Developers can use Yup to create a schema (or structure) for the expected form data, describing the data type and whether it is required. You can also use Yep to figure out the structure of data in the yup schema, including input data length, and even check the data against a regular expression (regex validation) or values from other fields in the form. (yup, 2022)

Yup is used along with Formik for form validation.



Figure 64: Formik + Yup for form validation in React JS

❖ **Backend Technologies/Languages:**

1. Express JS (Framework for Node JS)

Express.js, or simply Express, is a back-end web application framework for Node.js that was distributed under the MIT License as free and open-source software. It is intended for the development of web applications and APIs. It's been dubbed Node.js' de facto standard server framework. (OpenJS Foundation, 2022)



Figure 65: Express JS

2. Database language (MySQL)

MySQL is the most widely used open source relational SQL database management system. It is a popular relational database management system (RDBMS) for building web-based software applications.



Figure 66: MySQL

3. Sequelize ORM

Sequelize is an open-source Node.js ORM (Object-relational mapping) that makes it easier for JavaScript developers to work with relational databases like MySQL and Postgres. An ORM stands for Object Relational Mapper, and it aids data manipulation and searching by utilizing database objects. SQL queries are optimized when using an ORM, making them easier to reuse and manage. (Sequelize, 2022)

Sequelize ORM also helps in creating database through code. As a whole, it make it working with MySQL database by simplifying the querying process.



Figure 67: Sequelize ORM

4. Implementation

4.1. Login Page

User can easily login into the application using the Login Form. Same login page is used for both normal user, and admin user.

The screenshot shows a login form titled "Log In to Your Account!". It contains two input fields: "Enter Email *" and "Enter Password *". Below the password field is a small eye icon for password visibility. A "Forgot your password?" link is positioned between the two fields. At the bottom is a large orange "LOGIN >" button. Below the button is a link to "Create new account? Sign up!".

Figure 68: Login Page

Forgot Password Functionality:

- User clicks on the “Forgot your password” link on the login page

This screenshot is identical to Figure 68, but the "Forgot your password?" link has been highlighted with a thick orange border to indicate it is the target of a user click.

Figure 69: Forgot password link

- User is redirected to forgot password page

In the forgot password page, the user needs to enter the account email address, and click the “Verify Your Email” Button.

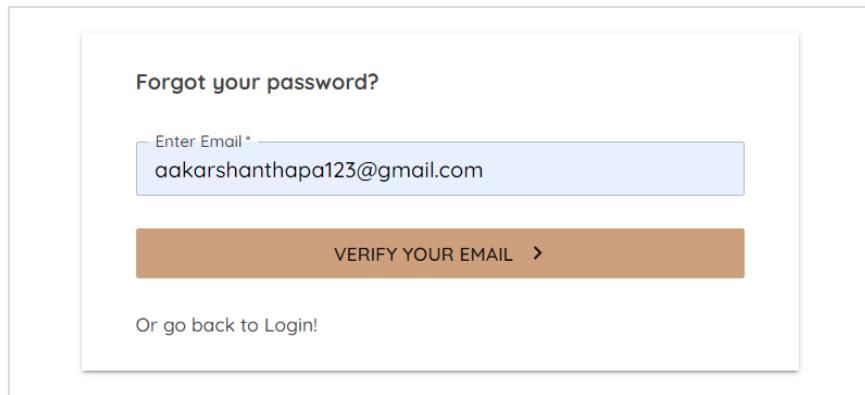


Figure 70: Forgot password page

- Email is sent to the entered email address for verification

The email consists of a “Reset Your Password” and a link. When the user clicks either of them, the user is redirected to the password change page.

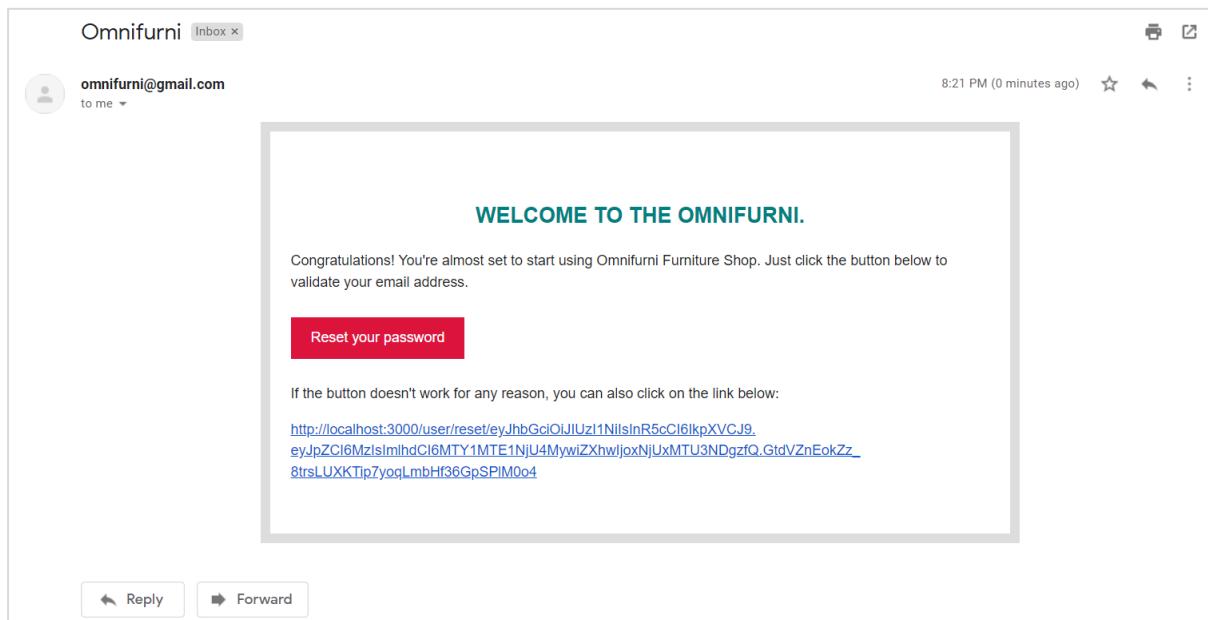


Figure 71: Email verification

- After clicking the link, the user is redirected to the password reset page

The user can enter the new password and click the “Reset Password” button to reset password.

A screenshot of a website's password reset page. At the top, there is a navigation bar with a "SHOP BY CATEGORY" dropdown, a search bar containing "Search products...", a shopping cart icon with "0" items, a "LOGIN" button, and a "REGISTER" button. The main content area has a white background with a centered form. The form title is "Reset your password!". It contains two input fields: "Password *" and "Confirm Password *". Both fields have placeholder text "*****" and eye icon password visibility toggles. Below the fields is a large orange "RESET PASSWORD >" button. At the bottom of the form, there is a link "Or go back to Login!".

Figure 72: Password reset page

- After clicking the “Reset Password” button:

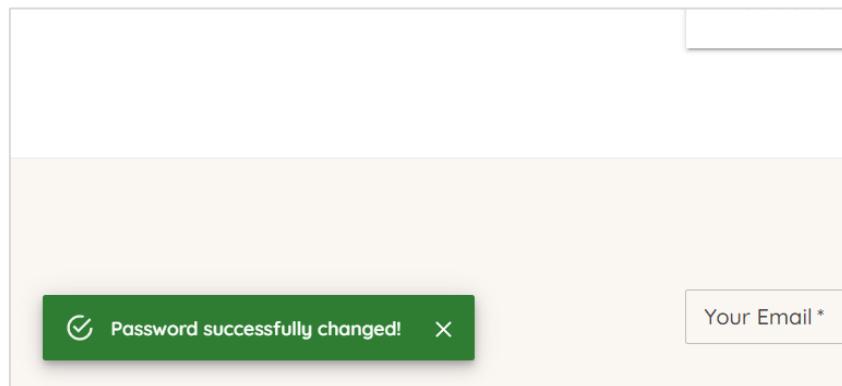


Figure 73: Password changed success message

Now the user can log in using the new password.

4.2. Register Page

User can easily create a new account using the register form. However, during the registration an email attached with a token is sent to the provided email address for email verification. Once the user clicks on the link provided in the email, the user will be redirected to the website and will be activated.

The image shows a registration form titled "Register and start shopping!". It contains the following fields:

- First Name *
- Last Name *
- Email *
- Contact Number *
- Password *
- Confirm Password *

Below the password fields are two small circular icons, likely for copy or clear functions. A large orange "REGISTER >" button is at the bottom. At the very bottom, there is a link "Already have an account? Login!"

Figure 74: Register Page

4.3. Home Page

- ❖ The home page consists of following:

1. Featured products list
2. Categories catalog

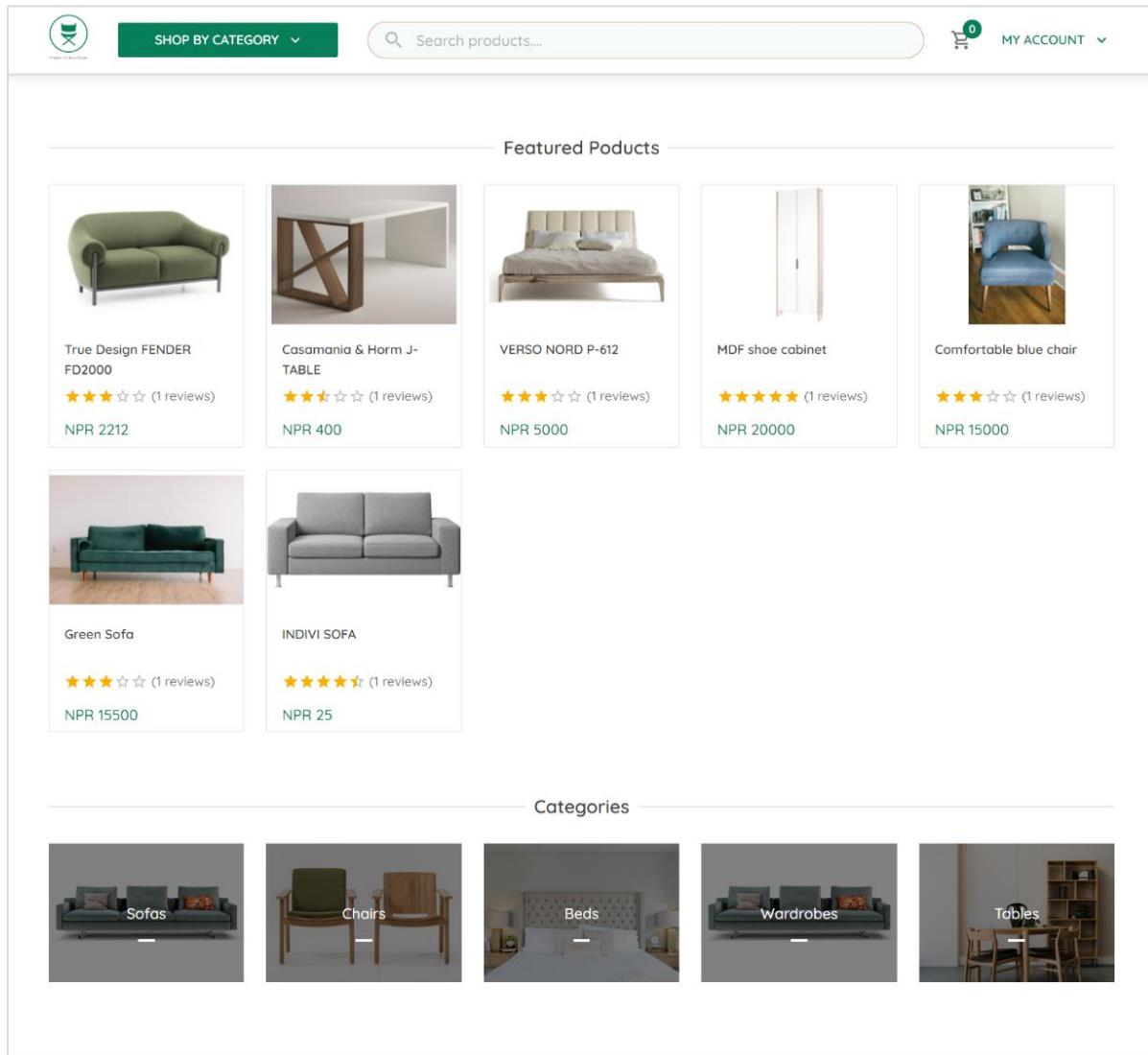


Figure 75: Home Page

4.4. Header

- ❖ The Header consists of following:
 1. Category Dropdown Menu
 2. Search Bar
 3. Cart Icon Button
 4. And different controls based on the logged in state

- ❖ There are three types of state of Header:

1. Logged out State

In logged out state, the “Login” and “Register” button are visible in the Header.

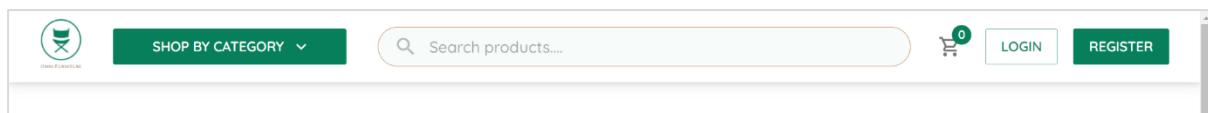


Figure 76: Header View in Logged Out State

2. Normal User Logged In state

In this state, the “My Account” drop down menu is visible beside the cart button.

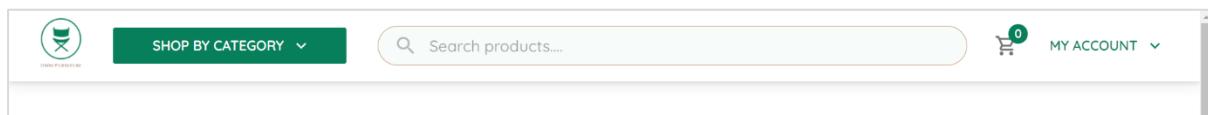


Figure 77: Header View in Normal User Logged In State

3. Admin User Logged In State

In this state, the “My Account” dropdown menu is visible along with the “Admin” drop down list.



Figure 78: Header View in Admin User Logged In State

- ❖ All the drop-down menus in the Header in open state:

1. “Shop By Category” drop-down menu

By clicking on any of the category in the drop-down menu, the user will be redirected to the Category Page, and can browse different products under the selected category.

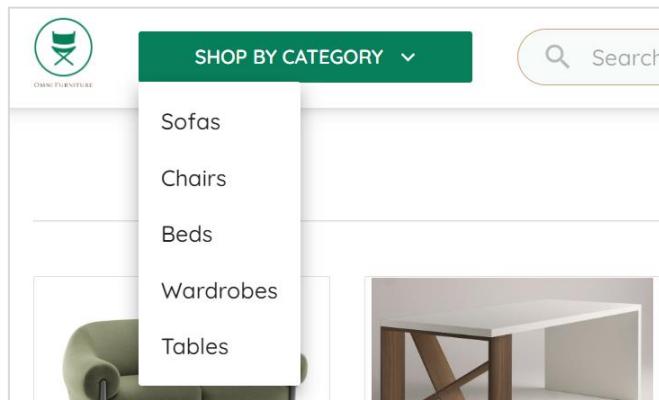


Figure 79: "Shop By Category" Dropdown List

2. “My Account” drop-down menu

The “My Account” drop-down menu const of two items: “Profile” and “Logout”. The user can visit the profile page by clicking the “Profile” menu items and logout from the application by clicking the “Logout” menu item.

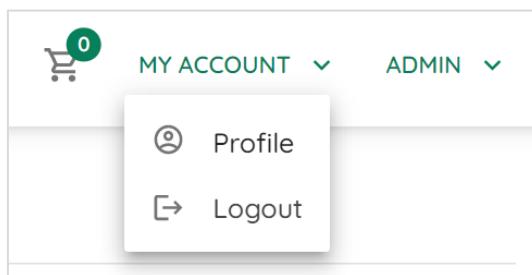


Figure 80: "My Account" Dropdown List

3. “Admin” drop-down menu

Using this drop-down menu, the Admin User can navigate to different panels of the Admin Interface. The Admin user can navigate to Dashboard, Product, Category, Order, and User Management panels.

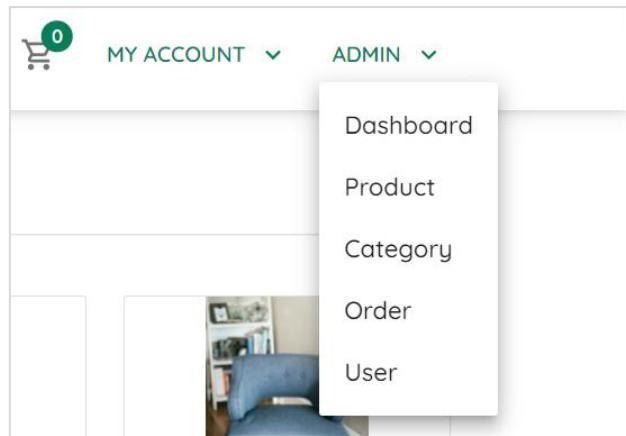


Figure 81: "Admin" Dropdown List

4.5. Footer

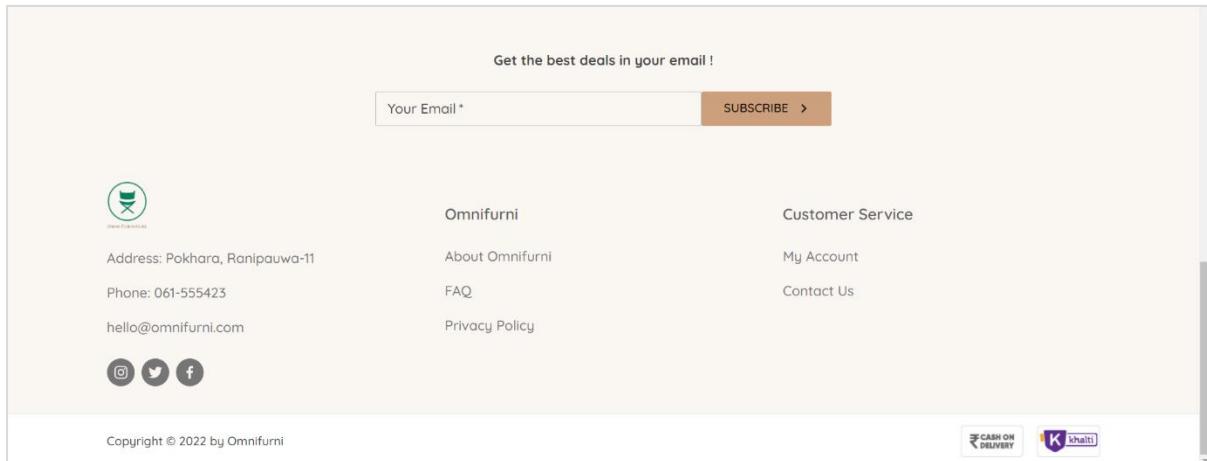


Figure 82: Footer implementation

The footer consists of the following items:

- Information about the website/company such as Logo, Address, Phone number, email address
- Navigation for “About”, “FAQ”, and “Privacy Policy” page under the heading “Omnifurni”
- Navigation to pages such as “My Account”, “Contact Us” which are related to Customer Service.

Moreover, the footer also consists of an Email (Newsletter) Subscription form. It is implemented using the Mailchimp library.

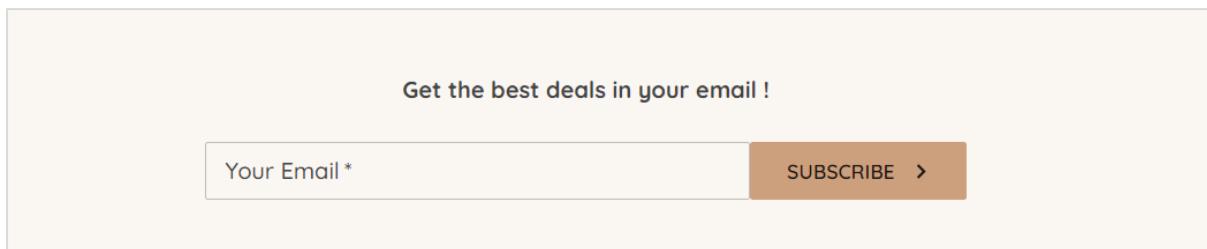


Figure 83: Email Subscription Form

Mailchimp Library:

A screenshot of the Mailchimp website. The left sidebar shows navigation options like Create, Audience, Campaigns, Automations, Website, Content Studio, Integrations, and Search. A 'Create' icon is highlighted. The main area has a heading 'Ready to make this official? Let's add your contacts' with a subtext about storing contact information. It features a 'Import Your Contacts' button and a 'Dismiss' link. To the right is a cartoon illustration of four smiling people. Below this, there's a section titled 'Here's what's happening' showing an 'Ongoing Campaign' for 'Welcome Message Automation' with 0% clicks and 14.3% opens. There are filters for 'All activity', 'Total Audience', and 'Add contacts'. A 'Total audience breakdown' section shows 2 contacts, with 1 being a subscriber (50%).

Figure 84: Mailchimp Website

A screenshot of the Mailchimp Audience management interface. The top navigation bar includes links for Overview, Manage contacts, Add contacts, Signup forms, Preferences center, Settings, Inbox, Surveys, and a search bar. Below this is a toolbar with 'Toggle Columns' and 'Export Audience' buttons. The main area shows a table of subscribers. The columns are: Email Address, First Name, Last Name, Address, Phone Number, Birthday, Tags, Email Marketing, Source, and Contact Rating. Two rows of data are visible: one for 'aakarshanthapa123@gmail.com' and another for 'akarsan.thapa@gmail.com'. Both entries show 'Subscribed' under Email Marketing, 'API - Omni' under Source, and a 4-star rating under Contact Rating. There are also 'View Segment' and 'New Segment' buttons above the table.

Figure 85: Mailchimp Subscribers list

We can keep track of subscribers using the Mailchimp website, and send targeted promotional email to the subscribed users.

Sample email Sent using Mailchimp:

Welcome Message Email sent to a new subscriber using Mailchimp. Similar kind of promotional emails can be sent to the subscribers using Mailchimp.

The screenshot shows an email inbox with a single message from 'Omnifurni via automations.mcsv.net' received on April 5, 2022, at 8:06 PM. The subject line is 'Thanks for joining us'. The email content starts with 'Hi,' followed by a message: 'We're glad you're here. We'll keep you in the loop with our latest news and special offers.' Below this is a social sharing section with Twitter, Facebook, and Mailchimp icons. At the bottom, there's a copyright notice: 'Copyright © 2022 Omnifurni, All rights reserved. You are receiving this email because you opted in via our website.' It also includes a mailing address: 'Our mailing address is: Omnifurni, Ranipauwa, Sitaladevi, Pokhara 33700, Nepal' and a link to add the sender to the address book. A footer section allows the recipient to change their email preferences or unsubscribe. Finally, a black bar at the bottom encourages growth with the text 'Grow your business with mailchimp'.

Figure 86: Welcome Message Email

Unsubscribing from the email list:

Subscribed users can unsubscribe from the mailing list by clicking the “unsubscribe from the list” link in the email sent using Mailchimp.

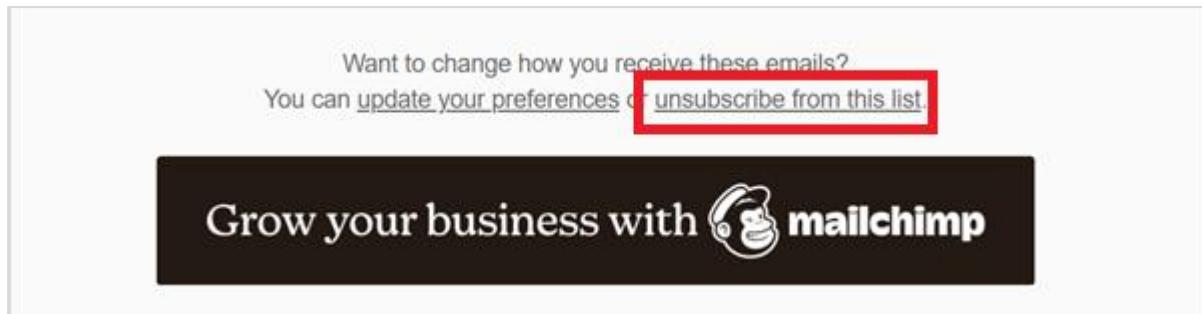


Figure 87: Unsubscribe from mailchimp mailing list

4.6. Product Details Page

This page consists of following:

1. Product information such as name, image, category, price, quantity in stock, and product reviews
2. “Add To Cart” Button and Quantity Selection Numeric up down
3. Product Description Accordion
4. Product Reviews and a Review Form

Product Details Page Screenshot:

The screenshot shows a product details page for an Indivi sofa. At the top, there's a navigation bar with a logo, a 'SHOP BY CATEGORY' dropdown, a search bar containing 'Search products....', and a shopping cart icon with '1' indicating one item. Below the navigation, the breadcrumb trail shows 'HOME / Sofas / INDIVI SOFA'. The main product image is a light gray two-seater sofa with low armrests. To the right of the image, the product title 'INDIVI SOFA' is displayed, along with its category 'Sofas' and a rating of '★★★★★ (1 reviews)'. The price is listed as 'Rs. 25'. Below the price, availability is shown as 'In Stock (5)'. A quantity selector with a minus sign, a '1' button, and a plus sign is present. An 'ADD TO CART' button is located below the quantity selector. The page is divided into sections: 'Product Description' which contains a brief text about the sofa's timeless design and functionality; 'Reviews' which includes a review from a user named Akarsan Thapa (AT) with a 5-star rating and the comment 'Nice Sofa'; and a 'Write a review:' section with a 5-star rating scale and a text input field. A 'SUBMIT' button is at the bottom of the review section.

Figure 88: Product Details Page Screenshot

❖ Product reviews Functionality:

To make a product review, following criterial must be met:

1. First and foremost, the user must be logged in.

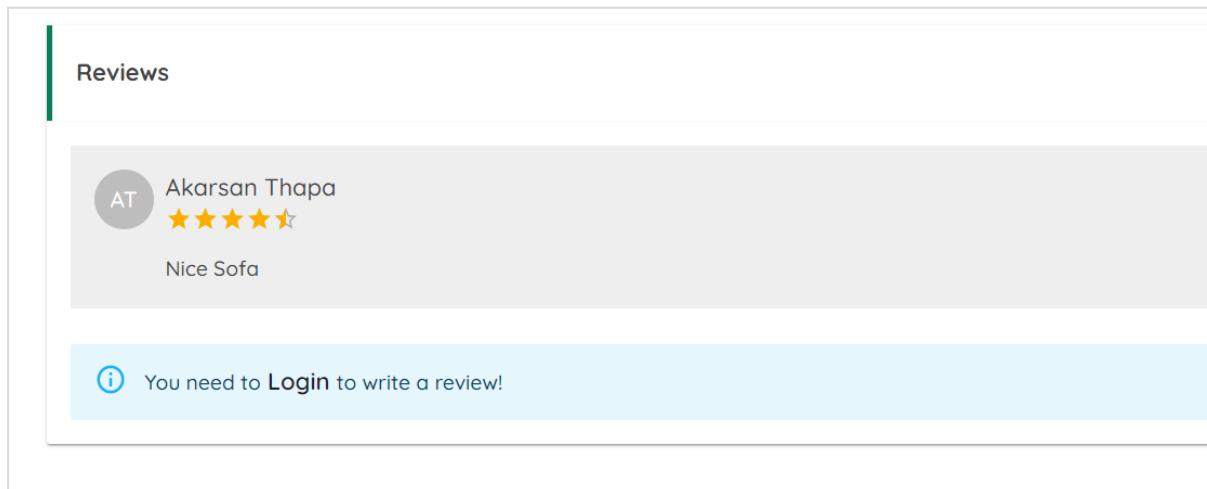


Figure 89: User must be logged in to write a review

2. The user must have bought the product before reviewing it.

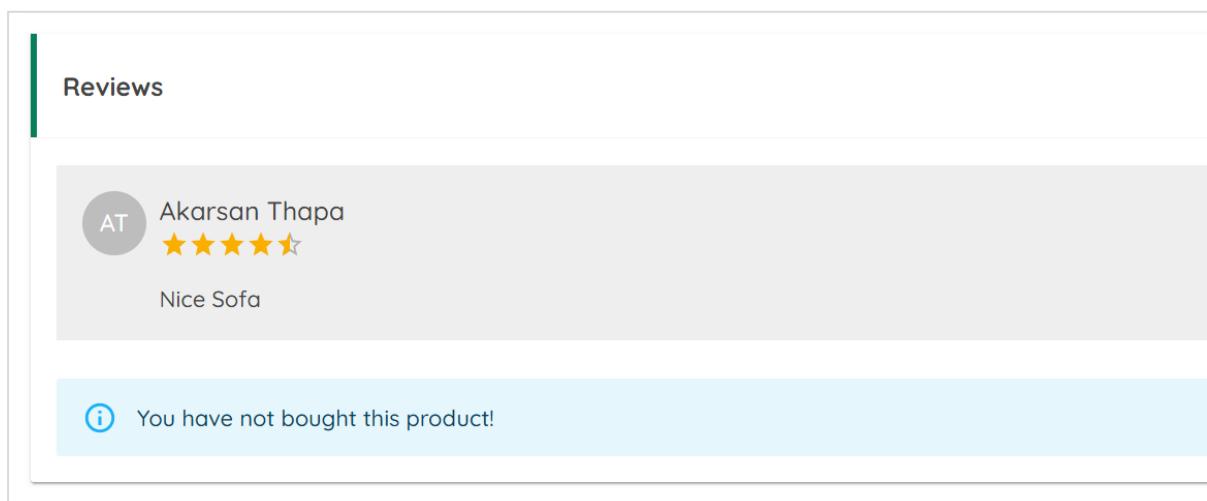


Figure 90: User must have bought the product to write a review

4.7. My Account Page

The “My Account” page consist of a menu list to navigate to different sub-sections which includes Dashboard, Orders, Address, Account Details, and Logout.

4.7.1. Dashboard

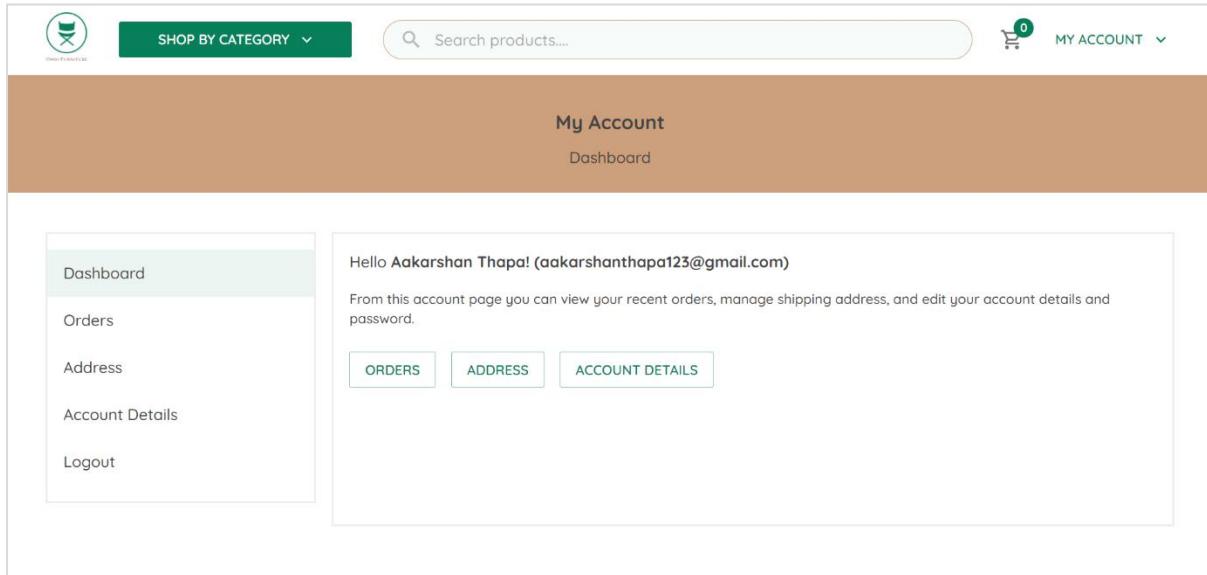


Figure 91: My Account Page (Dashboard)

4.7.2. Orders

From the Orders sub-section, the users can view their orders in a tabular format. The order list table consists of following columns:

- Order ID
- Date
- Total
- Status
- Action (View, Pay, and Cancel Buttons)

❖ Use of Action Buttons:

View Button: To view more details about the order.

Pay Button: To pay / select payment method for an order. After clicking the Pay button, the user will be redirected to the Payment Page.

Cancel Button: To cancel an order. The user can cancel an order only if payment method has not been selected for that particular order. The user has to contact the admin to cancel the order if payment method has already been selected.

ORDER ID	DATE	TOTAL	STATUS	ACTION(s)
#40	2022-04-05	NPR 125	Cancelled	<button>VIEW</button>
#41	2022-04-05	NPR 31050	Cancelled	<button>VIEW</button>
#44	2022-04-13	NPR 50	Order Completed	<button>VIEW</button>
#45	2022-04-13	NPR 30	Payment Pending	<button>VIEW</button> <button>PAY</button> <button>CANCEL</button>

Figure 92: My Account Page (Orders)

View Order Details:

User can view more details about an order by clicking the “View” Button on the order list table.

ORDER ID	DATE	TOTAL	STATUS	ACTION(s)
#40	2022-04-05	NPR 125	Cancelled	<button>VIEW</button>

Figure 93: View Button

After clicking the View Button:

The screenshot shows a web-based application for managing orders. At the top, there is a navigation bar with a logo, a "SHOP BY CATEGORY" dropdown, a search bar containing "Search products....", and a shopping cart icon with "0" items and a "MY ACCOUNT" dropdown.

The main content area has a brown header bar with the text "My Account" and a "View Order" link. On the left, a sidebar menu includes "Dashboard", "Orders" (which is selected and highlighted in green), "Address", "Account Details", and "Logout".

The main content area displays the following information:

- Order Details:** Order #44 was placed on 2022-04-13. Status: Order Completed.
- Order Details Table:**

PRODUCT	SUB TOTAL
AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE x 2	NPR 50
Total	NPR 50
- Payment Method:** Method: COD. Status: Not Paid.
- Shipping Address:** Aakarshan Thapa, aakarshantappa123@gmail.com, 9806769514, City: Pokhara, Postal Code: 32700, Street Address: Main Street, Province: 4. Status: Not Delivered.

Figure 94: Order Details

4.7.3. Address

From the Address sub-section, the user can address/edit their address. The added address is used in the Checkout page by default.

User has not added address in the beginning:

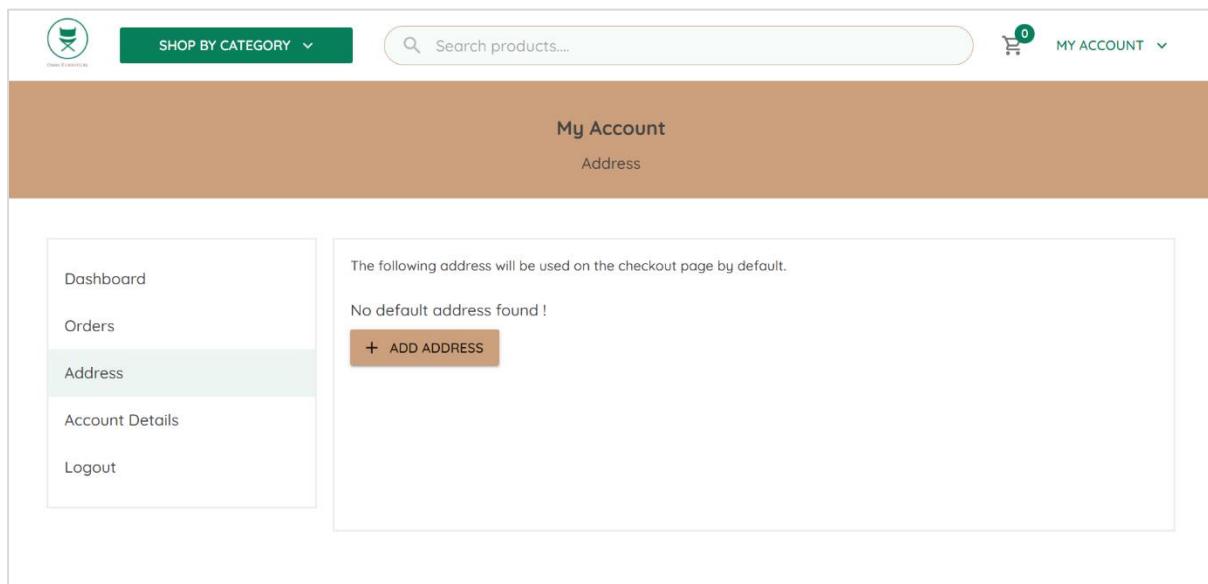


Figure 95: Address Page

Adding address:

When the “Add Address” button is clicked, a modal appears from where the user can input his/her address details such as city, zip/postal code, street address, and province.

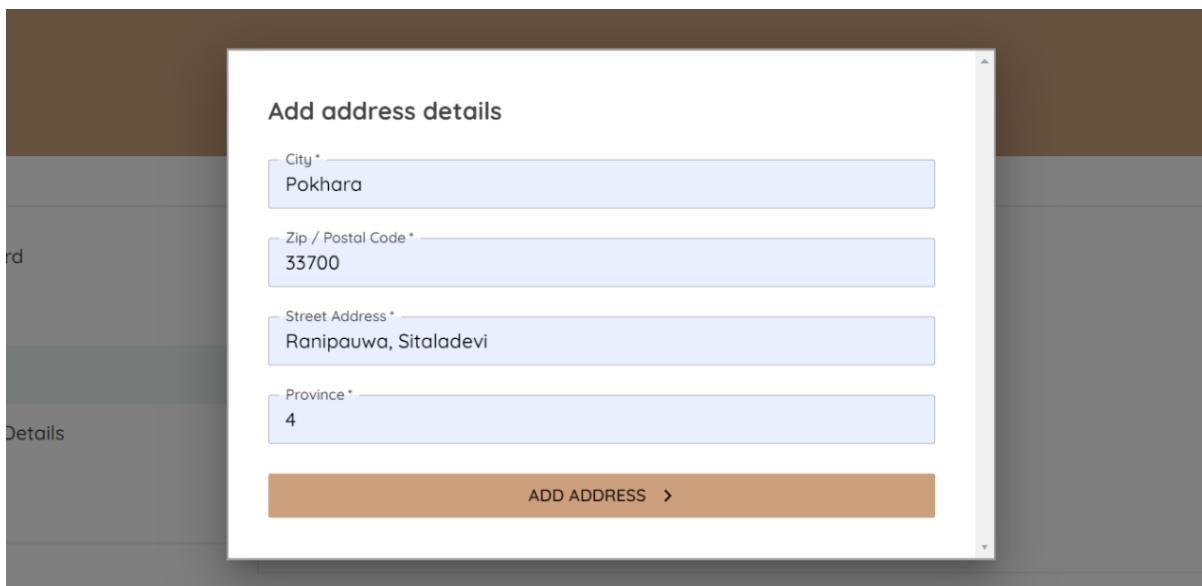


Figure 96: Add Address Modal

After address is added:

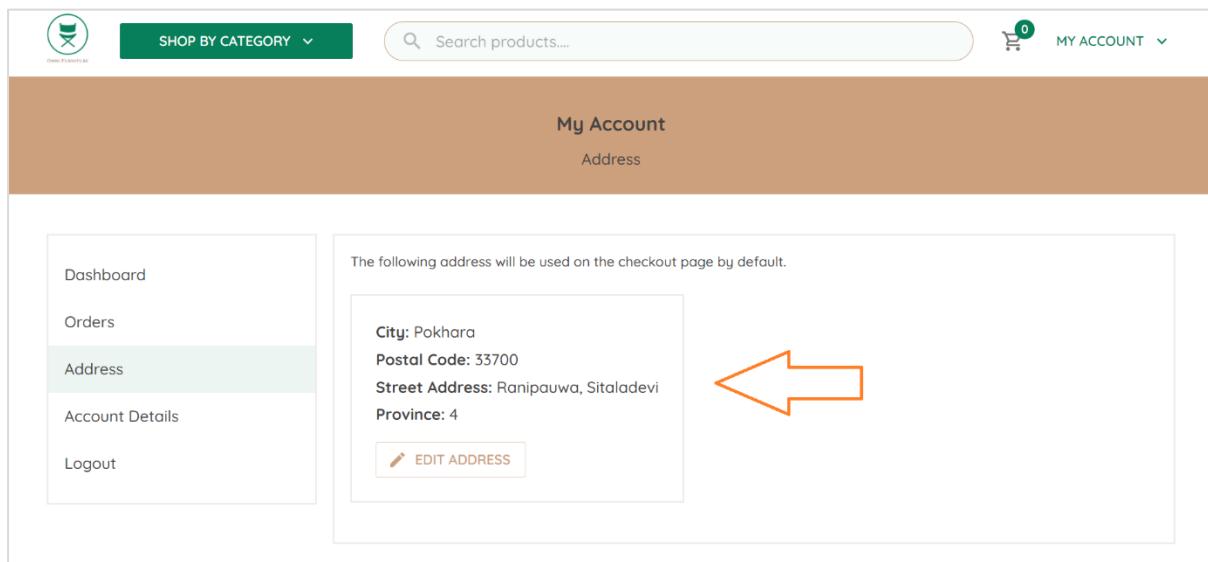


Figure 97: After Address is added

Editing Address:

When the “Edit Address” button is clicked, a modal appears from where address can edit their address details.

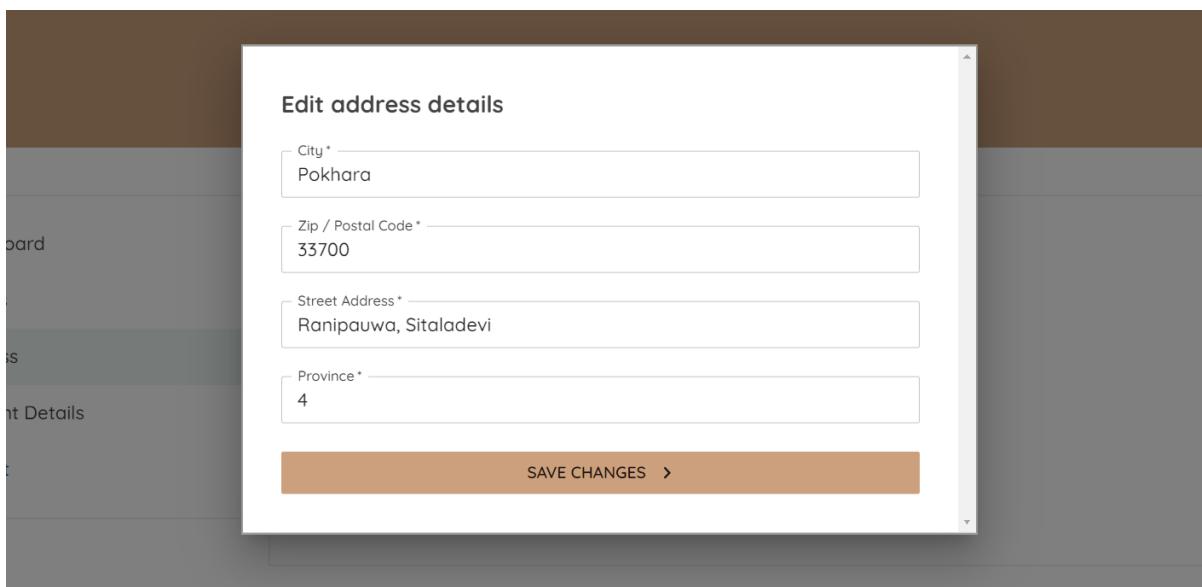


Figure 98: Edit Address Modal

4.7.4. Account Details

From the account details sub-page, the user can change their account details such as first name, last name, and contact number. The user can also update their password.

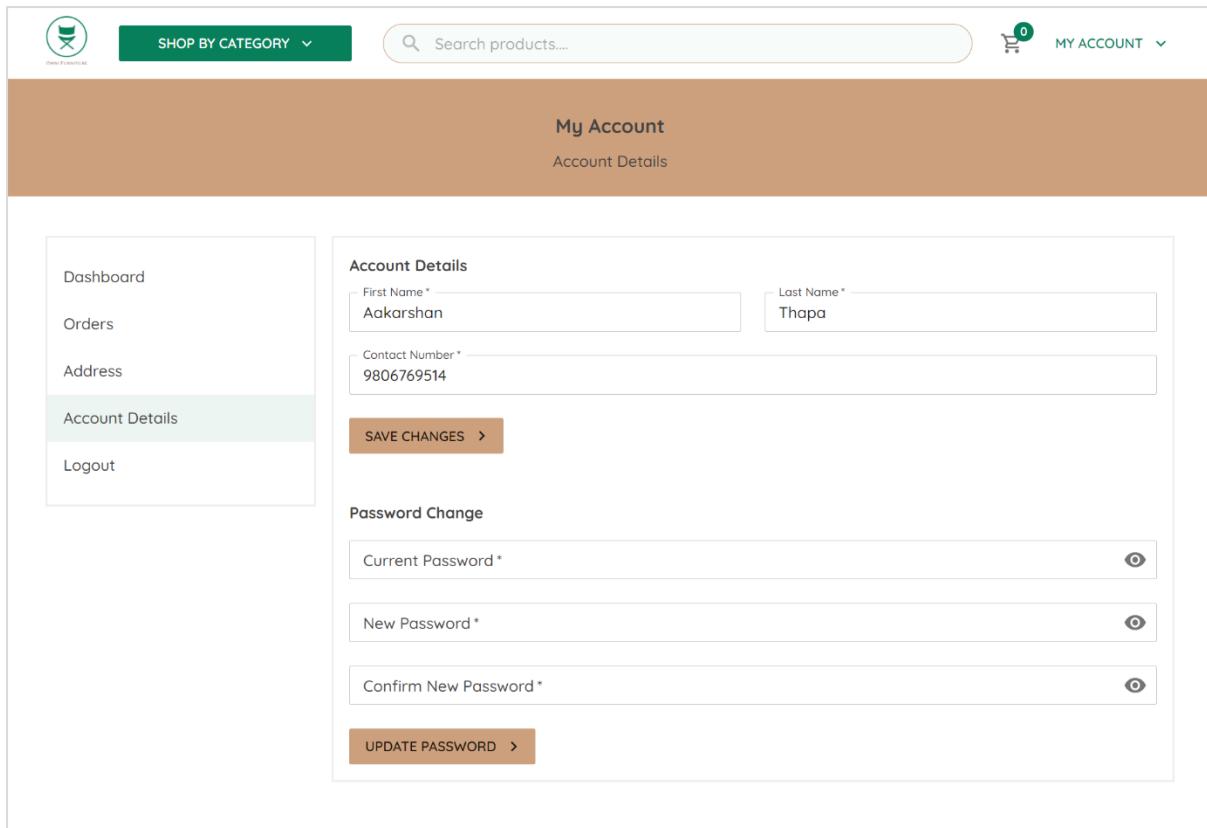


Figure 99: My Account Page (Account Details)

To update First Name, Last Name, and Contact Number:

The screenshot shows a simplified version of the 'Account Details' form. It has two input fields: 'First Name *' with value 'Aakarshan' and 'Last Name *' with value 'Thapa'. Below these is a single input field for 'Contact Number *' with value '9806769514'. At the bottom is a brown 'SAVE CHANGES >' button.

Figure 100: Update user details

To update password:

Password Change

Current Password *

New Password *

Confirm New Password *

UPDATE PASSWORD >



Figure 101: To update password

4.8. Category Page

The user can visit the Category page, by clicking the “Shop By Category” menu on the Header, or the Category List catalog in the Home page.

- ❖ The category page consists of the following:

 1. List of products under the selected category
 2. Product Filtering using Price Range Slider and Star Rating.
 3. Pagination for the user to choose the page they want to view, along with page size to specify the maximum number of records that are displayed when a page loads.

The screenshot shows a web-based e-commerce platform interface for a 'Sofas' category. At the top, there's a navigation bar with a logo, a 'SHOP BY CATEGORY' dropdown, a search bar containing 'Search products....', and a shopping cart icon with '0' items and a 'MY ACCOUNT' dropdown.

The main content area has a breadcrumb navigation 'HOME / Sofas'. On the left, a 'Filter By' sidebar includes a 'Price' range slider set between 10 and 15500, and a 'Star Rating' dropdown menu with options from 0 to 5 stars. The main area displays a grid of sofa products:

Product(s) under category "Sofas"					
	True Design FENDER FD2000 ★★★★☆ (1 reviews) NPR 2212		NATAL ALU SOFA ★★★☆☆ (1 reviews) NPR 600		Green Sofa ★★★★☆ (1 reviews) NPR 15500
	INDIVI SOFA ★★★★☆ (1 reviews) NPR 25		OSAKA SOFA, TUFTED SEAT ☆☆☆☆☆ (0 reviews) NPR 10		FARGO SOFA ☆☆☆☆☆ (0 reviews) NPR 11
	AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE ☆☆☆☆☆ (0 reviews) NPR 25		FARGO SOFA ☆☆☆☆☆ (0 reviews) NPR 13		Romeo ☆☆☆☆☆ (0 reviews) NPR 10

At the bottom, there's a pagination control with page number '1', arrows for navigation, and a dropdown for 'Show 10 per page'.

Figure 102: Category Page

Product Filtering:

The product list can be filtered using two filtering options: Price Range Slider and Star Rating.

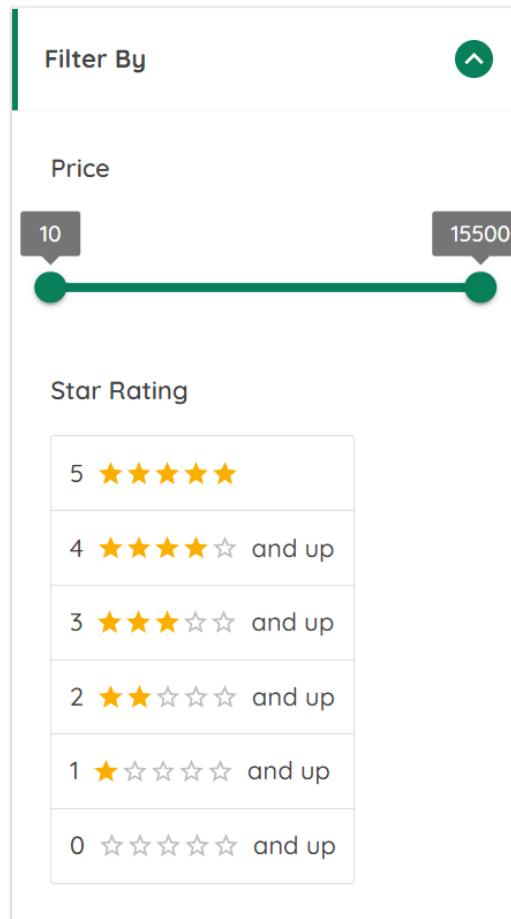


Figure 103: Product Filtering

Category Page Pagination:

Page Number: It represent the page the user currently is present in.

Page Size: It represent the maximum number of items that can be shown in a page.

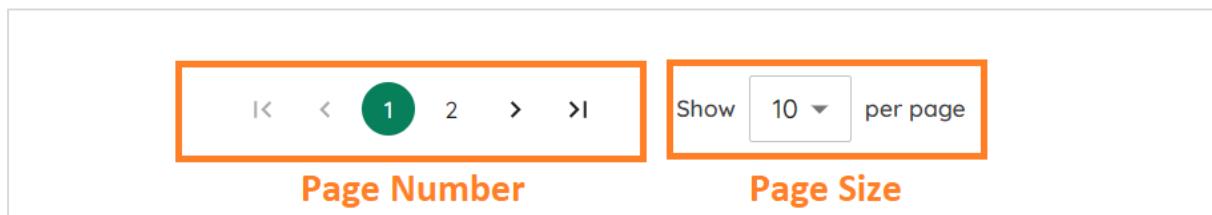


Figure 104: Category Page pagination

4.9. Search Page

This page displays the search results. The user can also filter the search result using the search filters. Like the Category Page, the user can also use the pagination functionality to choose the page number, and the page size. The layout of the Search Page is same as that of the Category Page. The filtering and pagination functionalities are implemented in the same way.

Search Bar:



Figure 105: Search Bar

Search Results:

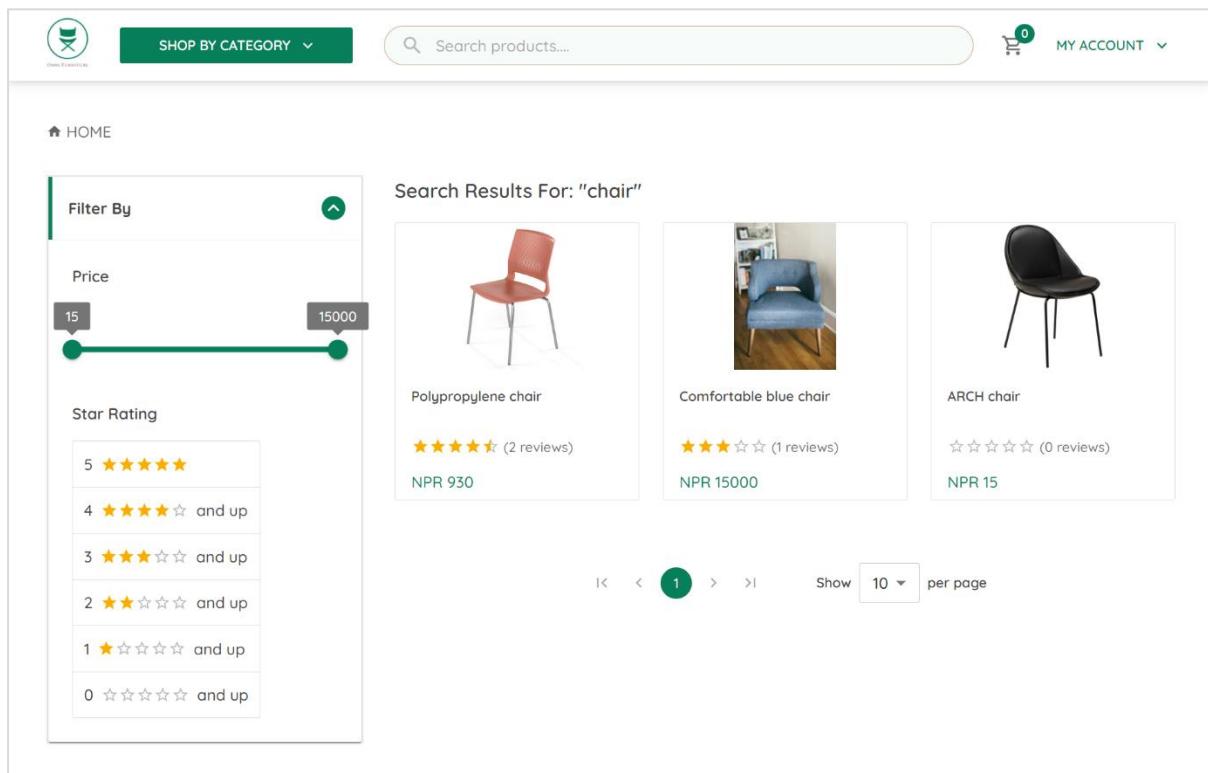
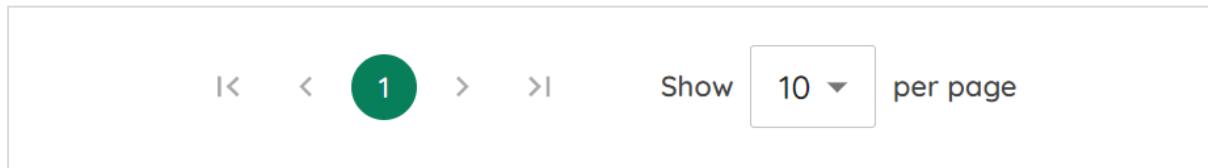
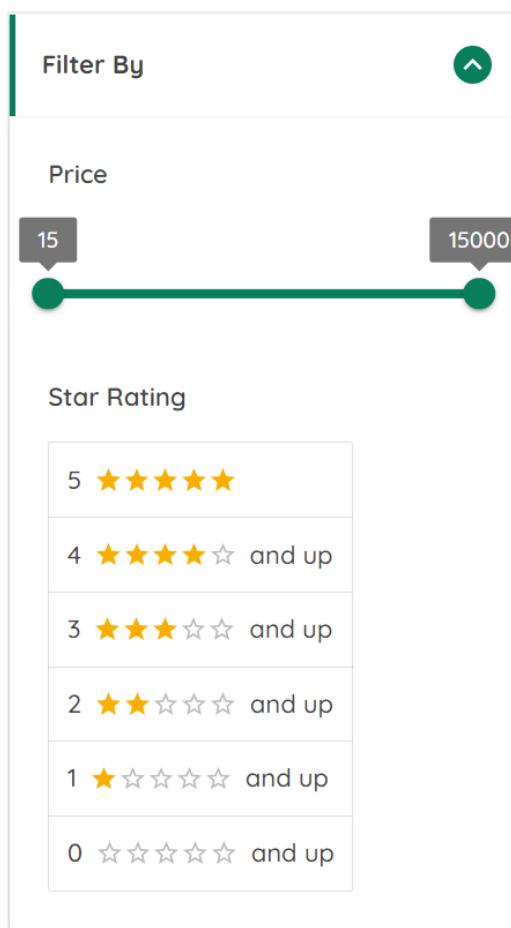


Figure 106: Search Page

Search Page Pagination:*Figure 107: Search Page Pagination***Search Result Filtering:***Figure 108: Search Results Filtering*

4.10. Cart Page

Empty Cart:

When the cart is empty, a description message “Your cart is currently empty!” is shown, along with the “Continue Shopping” button that redirects the user to the Home Page.

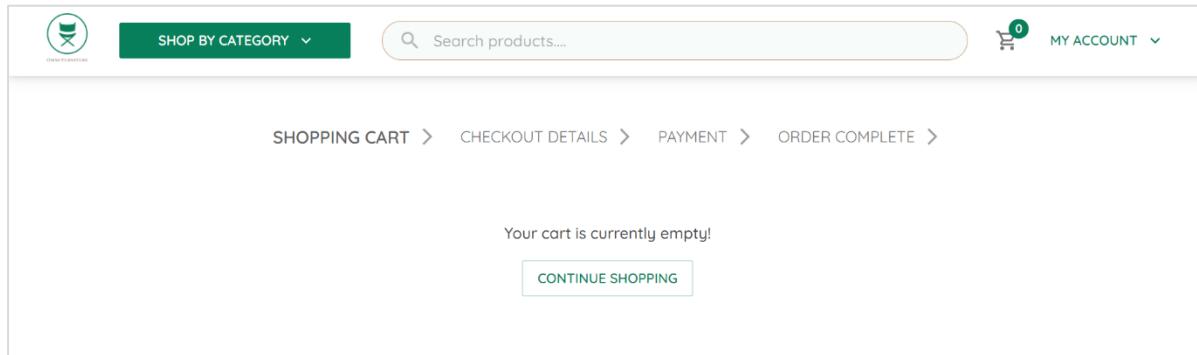


Figure 109: Empty Cart

Cart with products:

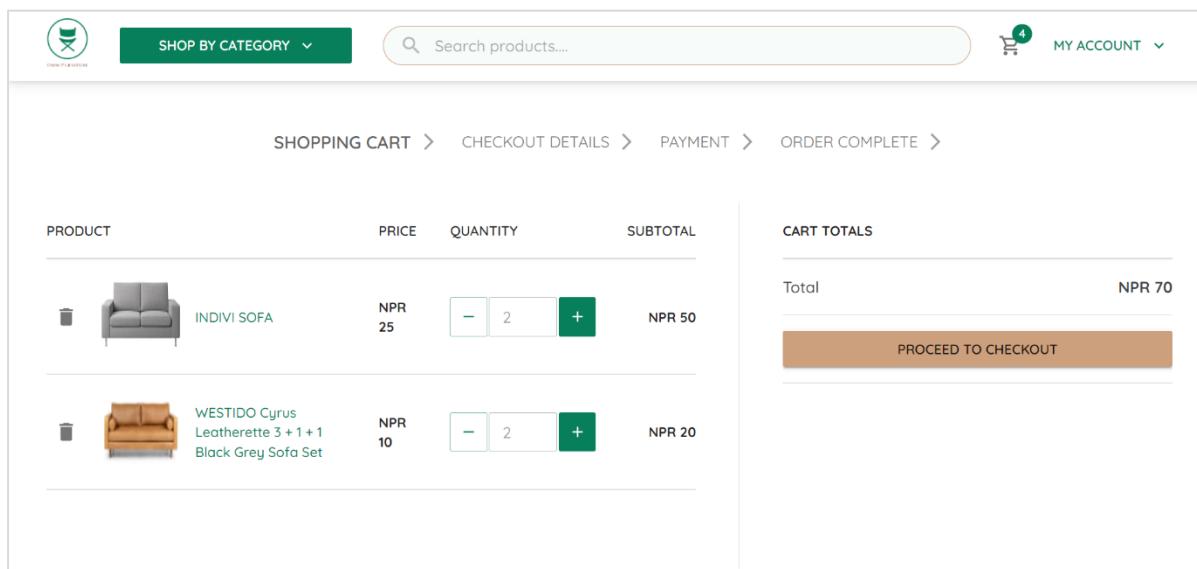


Figure 110: Cart with products

Cart Update Controls:

- Delete Button: To delete product from the cart
- Quantity Change Control: To increase or decrease quantity of a product in the cart

PRODUCT	PRICE	QUANTITY	SUBTOTAL
  Delete Button	INDIVI SOFA NPR 25	<input type="button" value="-"/> <input type="text" value="2"/> <input type="button" value="+"/>	NPR 50
  WESTIDO Cyrus Leatherette 3 +1+1 Black Grey Sofa Set	NPR 10	<input type="button" value="-"/> <input type="text" value="2"/> <input type="button" value="+"/> Quantity Change Control	NPR 20

Figure 111: Cart Product Update Controls

Proceed To Checkout Button:

This button redirects to the “Checkout” Page.

CART TOTALS	
Total	NPR 70
<input type="button" value="PROCEED TO CHECKOUT"/>	
	

Figure 112: "Proceed To Checkout" Button

4.11. Checkout Page

The Checkout Page consists of the following:

1. Shipping address input form
2. Order summary

The screenshot shows a shopping cart page with the following navigation: SHOPPING CART > CHECKOUT DETAILS > PAYMENT > ORDER COMPLETE >. On the left, there is a section for 'Shipping Address' with fields for First Name (Aakarshan), Last Name (Thapa), Email (aakarshanthapa123@gmail.com), Contact Number (9806769514), City (Pokhara), Zip / Postal Code (33700), Street Address (Ranipauwa), and Province (4). On the right, there is a 'Your Order' summary table:

PRODUCT	SUB TOTAL
INDIVI SOFA x 3	NPR 75
ARCH chair x 2	NPR 30
Total	NPR 105

A brown 'PROCEED TO PAYMENT' button is located at the bottom of the summary table.

Figure 113: Checkout Page

Order Summary:

Order summary includes name, price, and quantity of product, and order total. The user can proceed to Payment page by clicking the “Proceed To Payment” button.

The screenshot shows an 'Order Summary' table:

PRODUCT	SUB TOTAL
INDIVI SOFA x 2	NPR 50
WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set x 2	NPR 20
Total	NPR 70

A brown 'PROCEED TO PAYMENT' button is located at the bottom of the table.

Figure 114: Order Summary

Shipping Address Input Form:

This address form is filled by default using the user's default address details. The user cannot proceed to the payment page without filling all the address input fields in the form.

Shipping Address

First Name *	Aakarshan	Last Name *	Thapa
Email *	aakarshanthapa123@gmail.com		
Contact Number *	9806769514		
City *	Pokhara		
Zip / Postal Code *	33700		
Street Address *	Ranipauwa		
Province *	4		

Figure 115: Shipping Address Input Form

4.12. Payment Page

In the payment page, the user can select two payment methods (COD and Khalti).

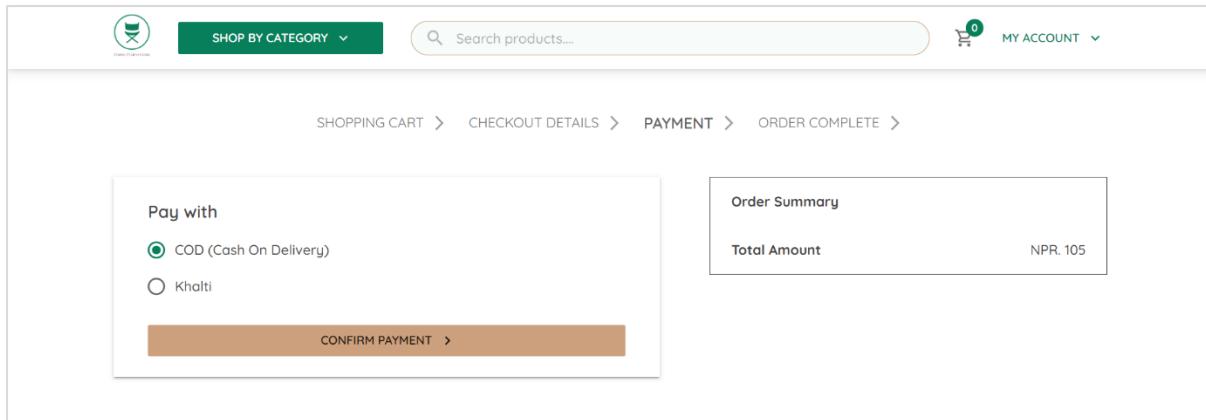


Figure 116: Payment Page

1. COD (Cash On Delivery)

After selecting the COD option, the user can click the “Confirm Payment” button to complete the order. The user will then be redirected to the Order Completion Page.

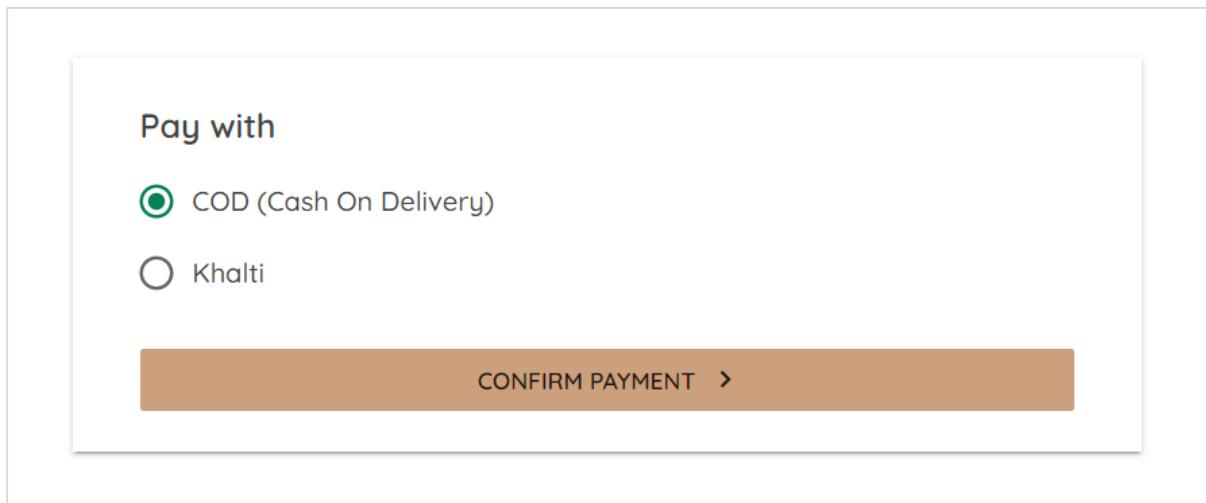


Figure 117: Payment Page (COD method selected)

2. Khalti

After the selection of Khalti Payment method, the “Pay With Khalti” Button appears. When the button is clicked a khalti payment modal appears from which the user can provide their khalti account credentials to pay for the order.

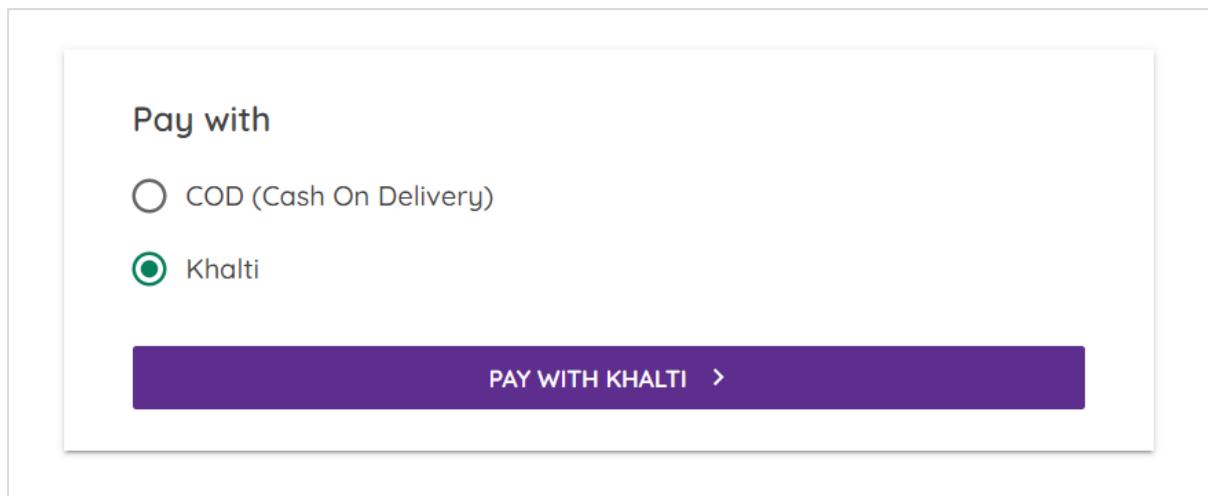


Figure 118: Payment Page (Khalti Method Selected)

Khalti Payment Modal View:

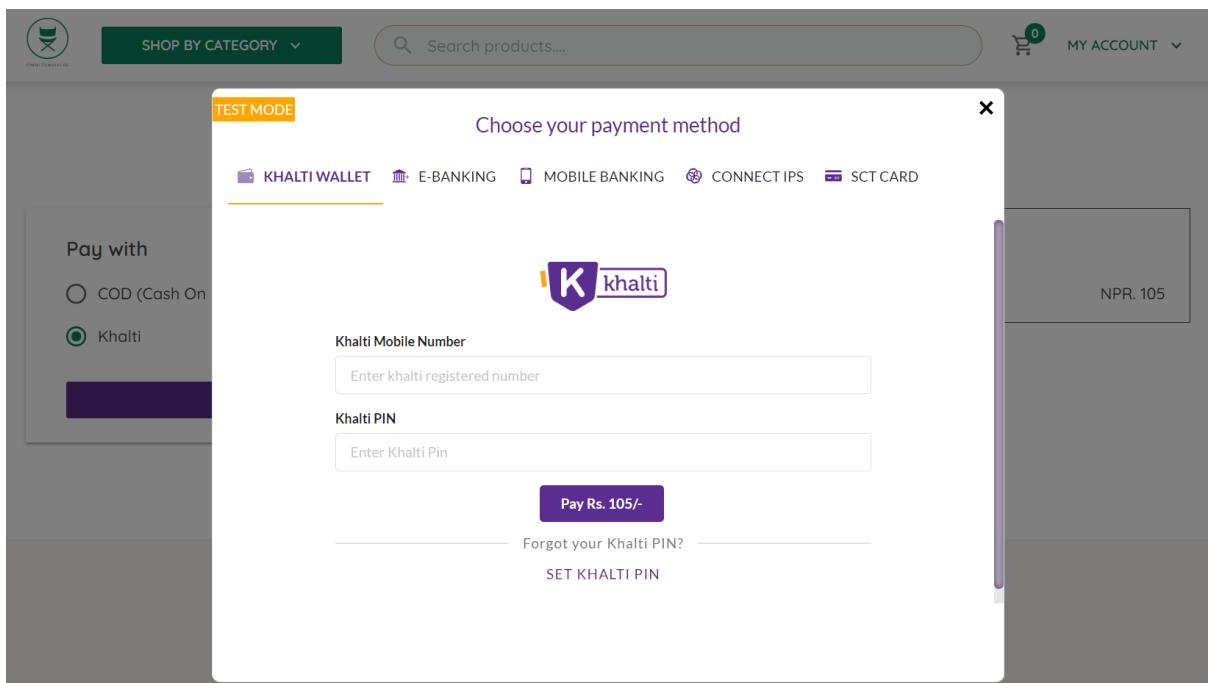


Figure 119: Khalti Payment View

After the successful payment, the user is redirected to the Order Completion page.

4.13. Order Completion Page

In this page, the user is displayed an order completion message. The user can view the order details by clicking the “View Order Details” button.

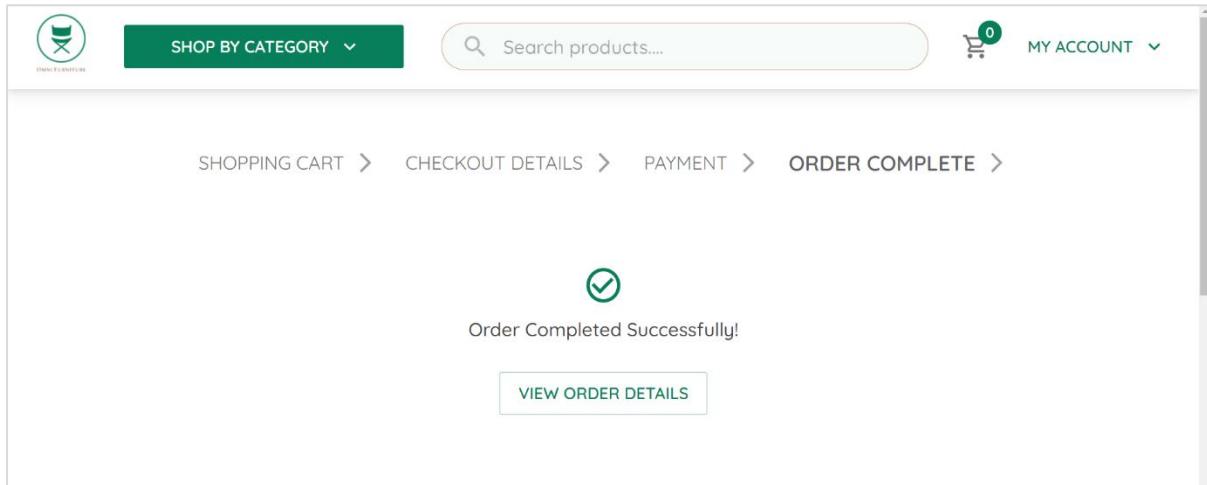


Figure 120: Order Completion Page

4.14. Admin Interface

To access the admin interface, the user must first login through the same user login page. The system identifies if the user is admin or not. If the user is admin, then the “Admin” Drop down menu is visible to the admin.

The admin user can navigate through the navigation menu to manage product, category, order, and user.

4.14.1. Dashboard

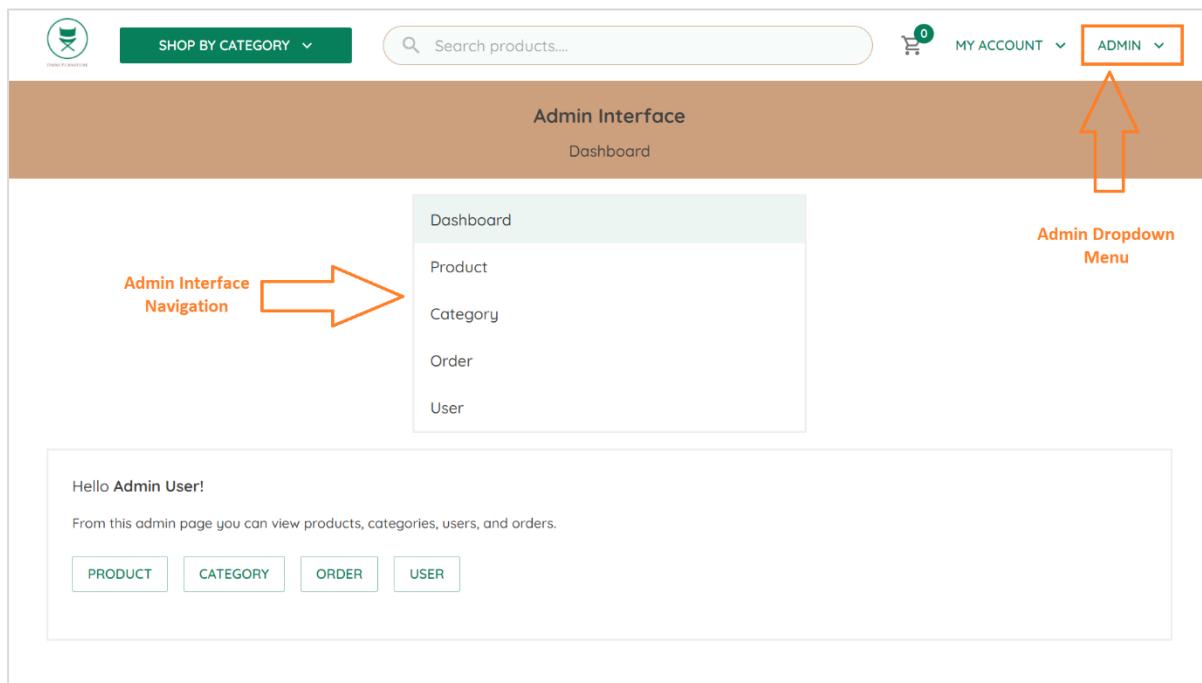


Figure 121: Admin Interface (Dashboard)

4.14.2. Product Management

The product management panel consists of following:

1. “Add Product” button to add new product.
2. Product List table

Admin Interface

Product List

Product ID	Product Name	Description	Category	Price	In Stock	Is Featured?	Actions
46	True Design FENDER FD2000	A family of sofas and armchairs, for lounges and tables, developed aro...	Sofas	NPR. 2212	10	✓	
47	NATAL ALU SOFA	Timeless and elegant, the Natal Alu Sofa is an outdoor sofa that will ...	Sofas	NPR. 600	7	✗	
48	Polypropylene chair	BEA (Beautiful, Ergonomic, Adaptable) is the new IBEBI chair to dress ...	Chairs	NPR. 930	5	✗	
49	Casamania & Horm J-TABLE	J-Table features a leg playing with asymmetric orthogonal lines that c...	Tables	NPR. 400	11	✓	
50	VERSO NORD P-612	The Verso Nord solid wood bed is well proportioned, simple and elegant...	Beds	NPR. 5000	10	✓	

Rows per page: 5 rows ▾ 1-5 of 16 | < > >>|

Figure 122: Product Management Panel

Add Product:

When the “Add Product” button is clicked a modal appears from where the user can input product details such as name, description, price, count in stock, category, image. Similarly, the featured check button is checked, the product will be saved as featured product in the database, and it will be visible in the home page.

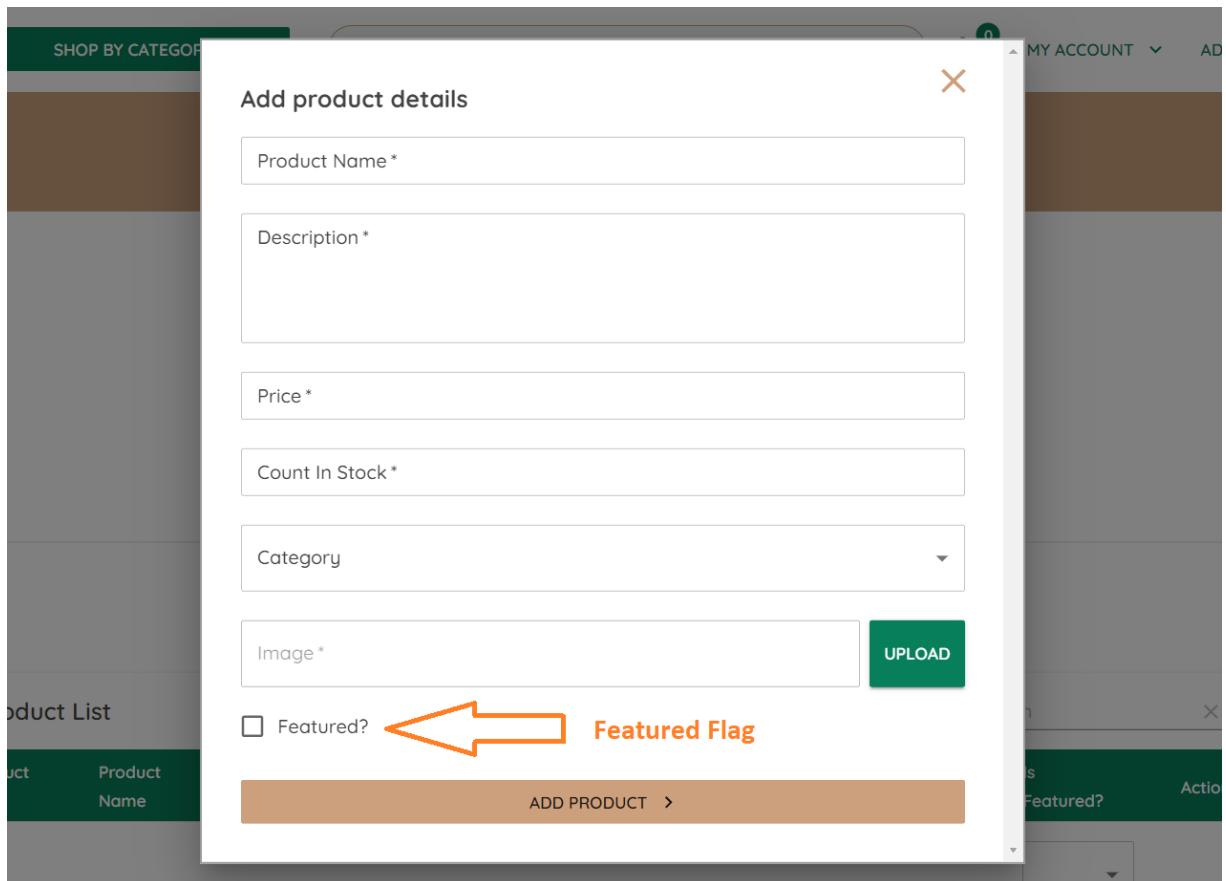


Figure 123: Add Product Modal

Product List Table:

The product list table consists of following fields:

1. Product ID
2. Product Name
3. Description
4. Category
5. Price
6. In Stock Count
7. Is Featured Flag (Featured or not featured)
8. Action Buttons (Edit Button and Delete Button)

The action buttons are highlighted in the screenshot below:

Product List							
Product ID	Product Name	Description	Category	Price	In Stock	Is Featured?	Actions
46	True Design FENDER FD2000	A family of sofas and armchairs, for lounges and tables, developed aro...	Sofas	NPR. 2212	10	✓	
47	NATAL ALU SOFA	Timeless and elegant, the Natal Alu Sofa is an outdoor sofa that will ...	Sofas	NPR. 600	7	✗	
48	Polypropylene chair	BEA (Beautiful, Ergonomic, Adaptable) is the new IBEBI chair to dress ...	Chairs	NPR. 930	5	✗	
49	Casamania & Horm J-TABLE	J-Table features a leg playing with osymmetric orthogonal lines that c...	Tables	NPR. 400	11	✓	
50	VERSO NORD P-612	The Verso Nord solid wood bed is well proportioned, simple and elegant...	Beds	NPR. 5000	10	✓	

Rows per page: 5 rows ▾ 1-5 of 16 |< < > >|

Figure 124: Product List Table

Edit Product:

When the Edit button is clicked a modal appears from where the admin user can edit product details.

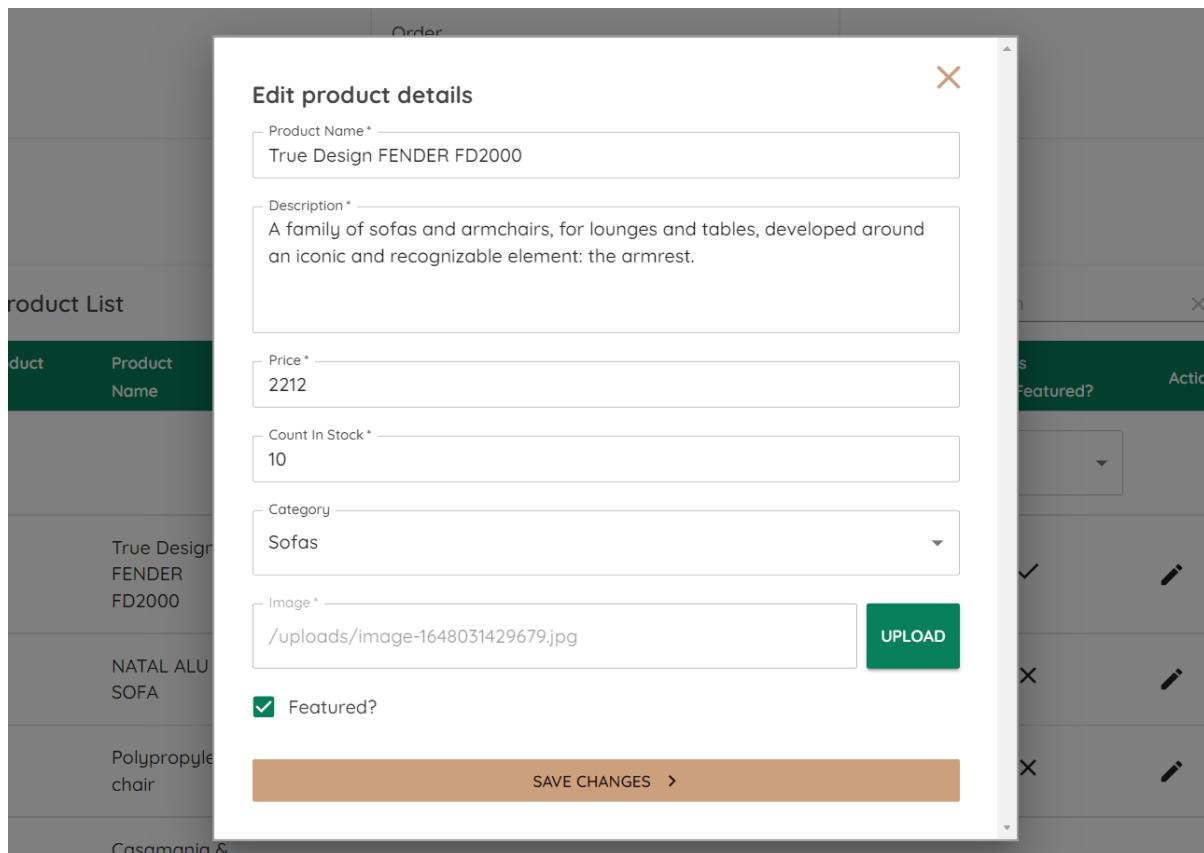


Figure 125: Edit Product Modal

Delete Product:

When the delete button is clicked, a confirmation dialog button appears. If the admin user clicks the “Yes” option, the product is deleted.

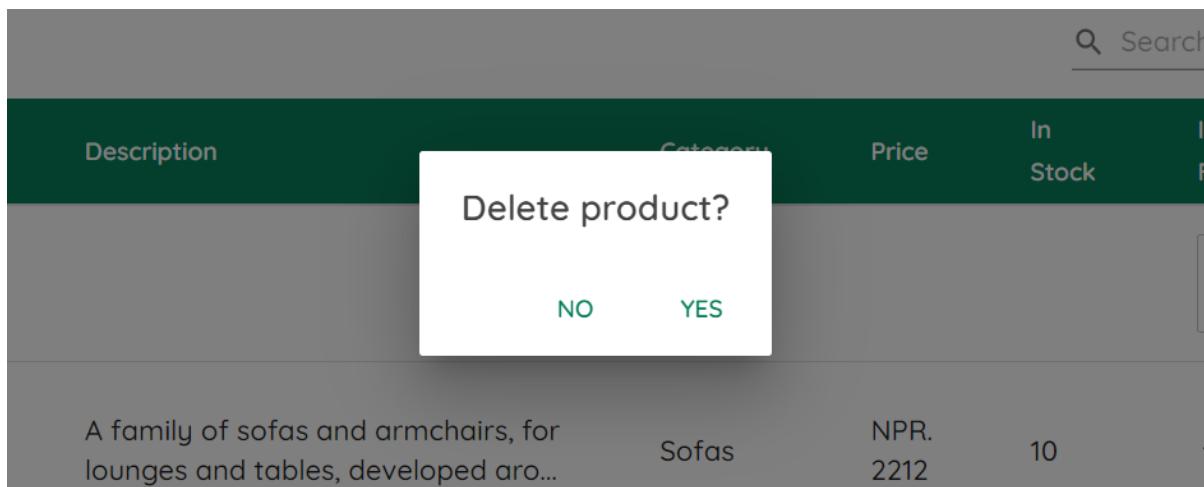


Figure 126: Product Delete Confirmation Dialog

4.14.3. Category Management

The category management panel consists of following:

1. “Add Category” button to add new category.
2. Category List table

The admin user can add/edit/delete category in the same way as the product.

Category ID	Category Name	Description	Actions
1	Sofas	Sofa description	
2	Chairs	Easy Chair description	
3	Beds	Beds Description	
4	Wardrobes	Wardrobes Description	
5	Tables	Tables Description	

Figure 127: Category Management Panel

Category List Table:

The category list table consists of following fields:

1. Category ID
2. Category Name
3. Description
4. Action Buttons (Edit Button and Delete Button)

The action buttons are highlighted in the screenshot below:

Category List			
Category ID	Category Name	Description	Actions
1	Sofas	Sofa description	
2	Chairs	Easy Chair description	
3	Beds	Beds Description	
4	Wardrobes	Wardrobes Description	
5	Tables	Tables Description	

Rows per page: 5 rows ▾ 1-5 of 5 |< < > >|

Add Category:

When the “Add Category” button is clicked a modal appears from where the user can input category details such as name, description

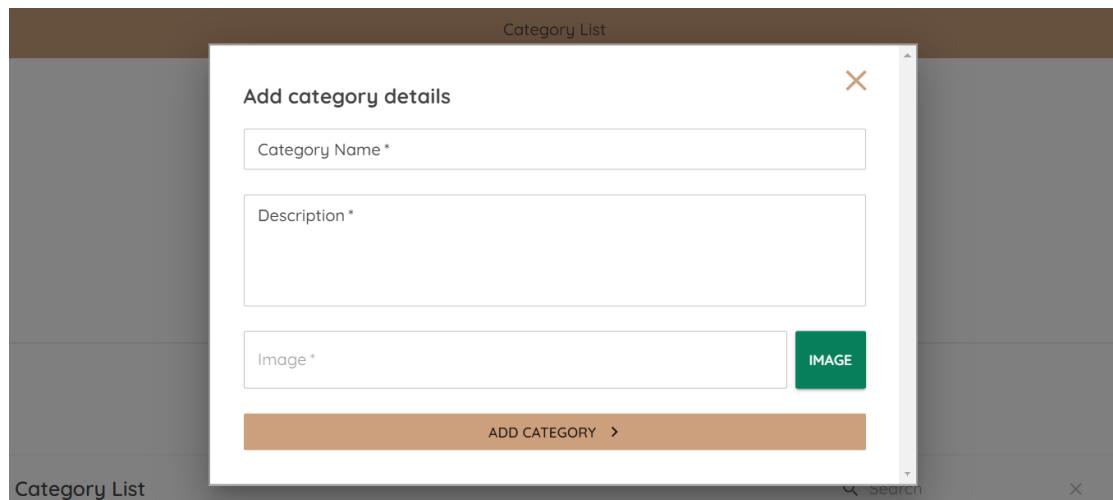


Figure 128: Add Category Modal

Edit Category:

The admin can edit category in the same way.

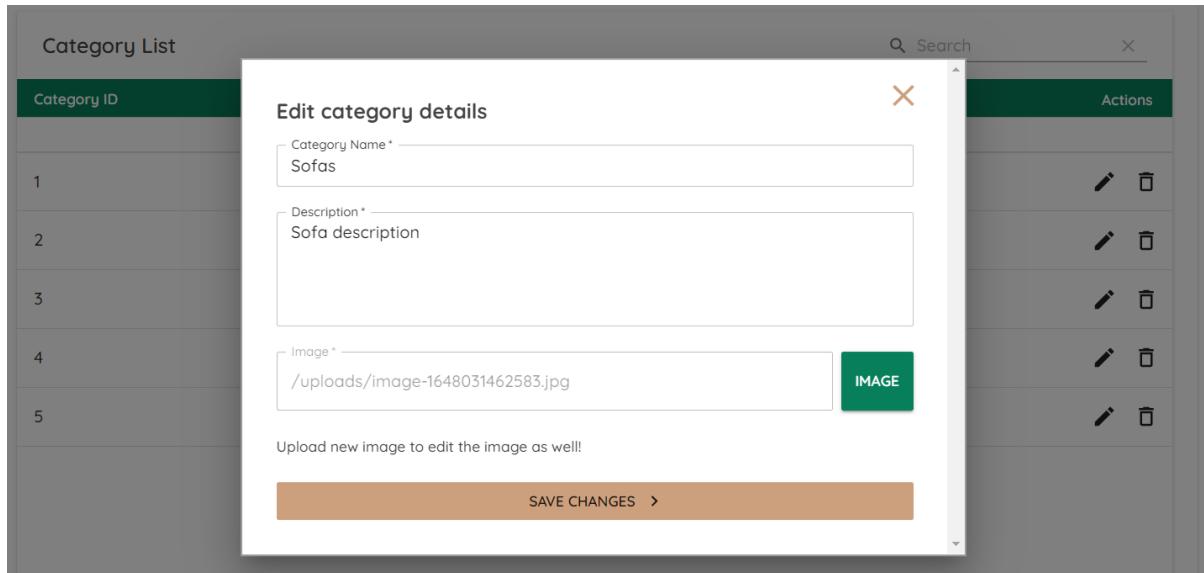


Figure 129: Edit Category Modal

Delete Category:

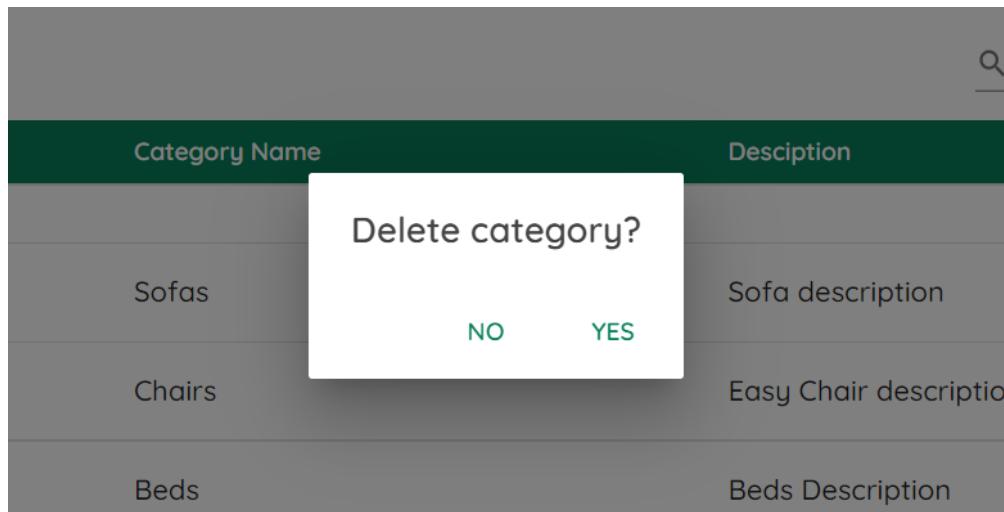


Figure 130: Category Delete Confirmation

4.14.4. Order Management

The Order management panel consists of following:

3. Two Date Selection Fields to select Date Range. And “Find Orders” button to search for orders based on the selected date range.
4. Order List table

Admin Interface

Order List

Dashboard
Product
Category
Order
User

From 04/06/2022 To 04/13/2022 FIND ORDERS

Date Range Selection to find orders

Order ID	Total Amount	Paid?	Delivered?	Payment Method	Status	Created Date
> 42	NPR. 15000	✗	✗	Not Selected	Payment Pending	2022-04-08
> 43	NPR. 25	✓	✓	Khalti	Delivered	2022-04-08
> 44	NPR. 50	✗	✗	COD	Order Completed	2022-04-13
> 45	NPR. 30	✗	✗	Not Selected	Cancelled	2022-04-13
> 46	NPR. 105	✗	✗	COD	Order Completed	2022-04-13

Rows per page: 5 rows ▾ 1-5 of 5 |< < > >|

Figure 131: Order Management Panel

Order List Table:

The Order list table consists of following fields:

1. Order ID
2. Total Amount
3. Paid? (Paid or not paid)
4. Delivered? (Delivered or not delivered)
5. Payment Method
6. Status
7. Created Date (Order Created Date)
8. Action Button (Edit Button)

Order ID	Total Amount	Paid?	Delivered?	Payment Method	Status	Created Date
> 42	NPR. 15000	✗	✗	Not Selected	Payment Pending	2022-04-08
> 43	NPR. 25	✓	✓	Khalti	Delivered	2022-04-08
> 44	NPR. 50	✗	✗	COD	Order Completed	2022-04-13
> 45	NPR. 30	✗	✗	Not Selected	Cancelled	2022-04-13
> 46	NPR. 105	✗	✗	COD	Order Completed	2022-04-13

Figure 132: Order List Table

Order Details Expanded:

When the Expand Button is clicked, the row expands, and more details of the order are shown.

Two action buttons “Mark As Delivered” and “Mark As Cancelled” is visible if the order has not been delivered.

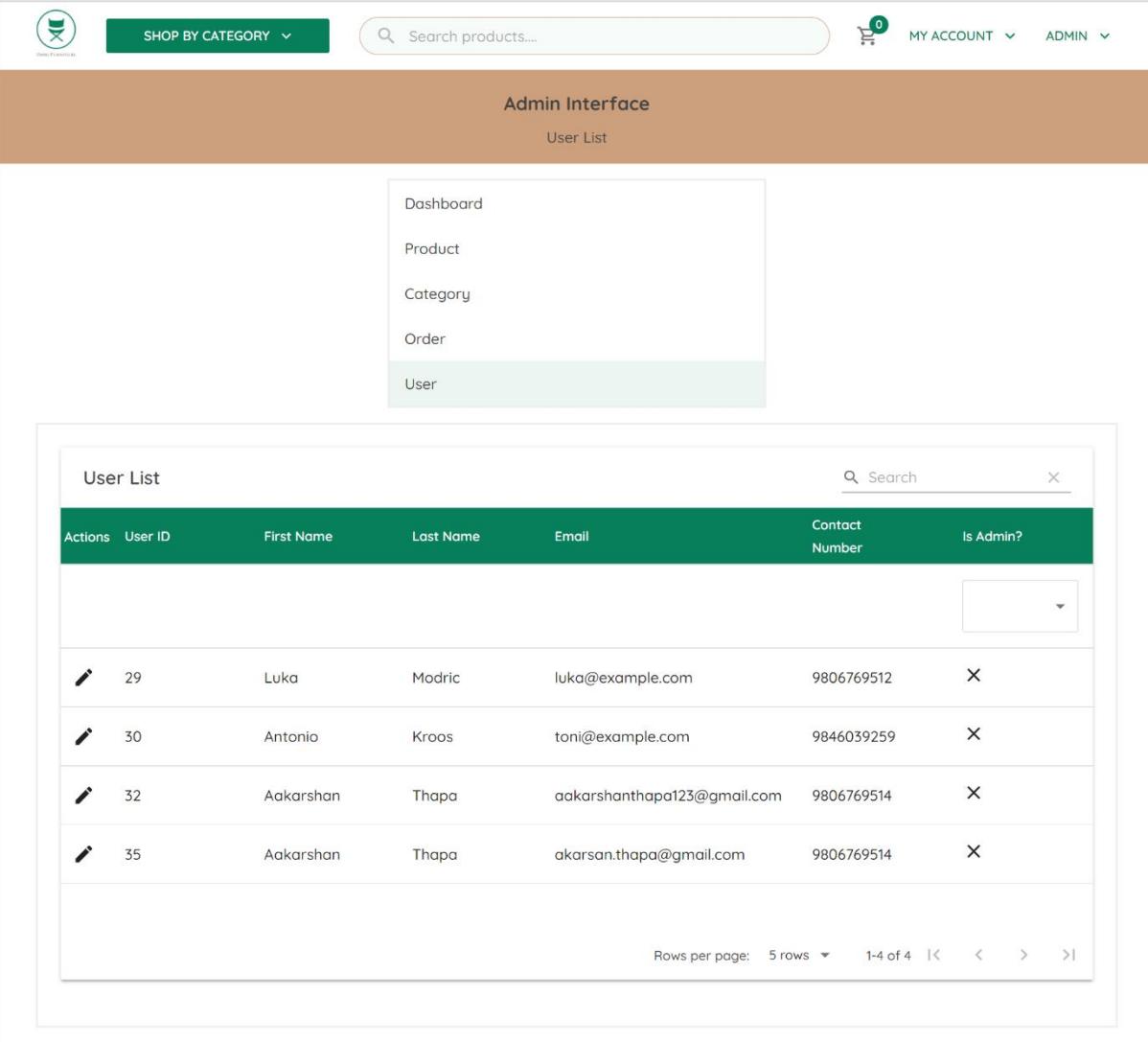
The screenshot shows an order details page with the following elements:

- Top navigation: 44, NPR. 50, COD, Order Completed, 2022-04-13.
- Buttons to change status: MARK AS DELIVERED and MARK AS CANCELLED, highlighted with an orange box and arrow.
- Section: Ordered Products
- Table: Shows one item: #185 AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE, Quantity 2, Line Total 50.
- Section: Shipping Address
- Table: Shows shipping details for Aakarshan Thapa.

First Name	Last Name	Contact Number	Email	City	Postal Code	Street	Province
Aakarshan	Thapa	9806769514	aakarshanthapa123@gmail.com	Pokhara	32700	Main Street	4

Figure 133: Order Details Expanded

4.14.5. User Management



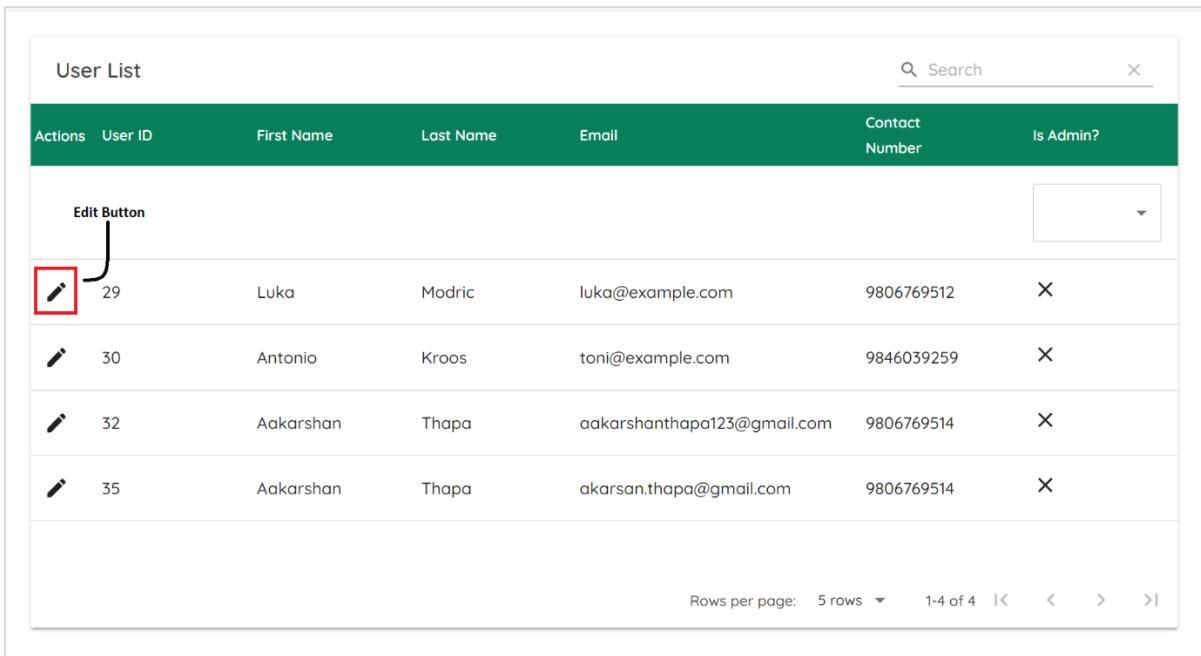
The screenshot shows the Admin Interface User List page. At the top, there is a navigation bar with a logo, a "SHOP BY CATEGORY" dropdown, a search bar containing "Search products....", a shopping cart icon with a notification of 0, "MY ACCOUNT" and "ADMIN" dropdowns. Below the navigation is a brown header bar with the text "Admin Interface" and "User List". On the left, a sidebar menu lists "Dashboard", "Product", "Category", "Order", and "User", with "User" being the active tab. The main content area is titled "User List" and contains a table with the following data:

Actions	User ID	First Name	Last Name	Email	Contact Number	Is Admin?
	29	Luka	Modric	luka@example.com	9806769512	X
	30	Antonio	Kroos	toni@example.com	9846039259	X
	32	Aakarshan	Thapa	aakarshanthapa123@gmail.com	9806769514	X
	35	Aakarshan	Thapa	akarsan.thapa@gmail.com	9806769514	X

At the bottom of the table, there are pagination controls: "Rows per page: 5 rows", "1-4 of 4", and navigation arrows.

Figure 134: User Management Panel

User List Table:



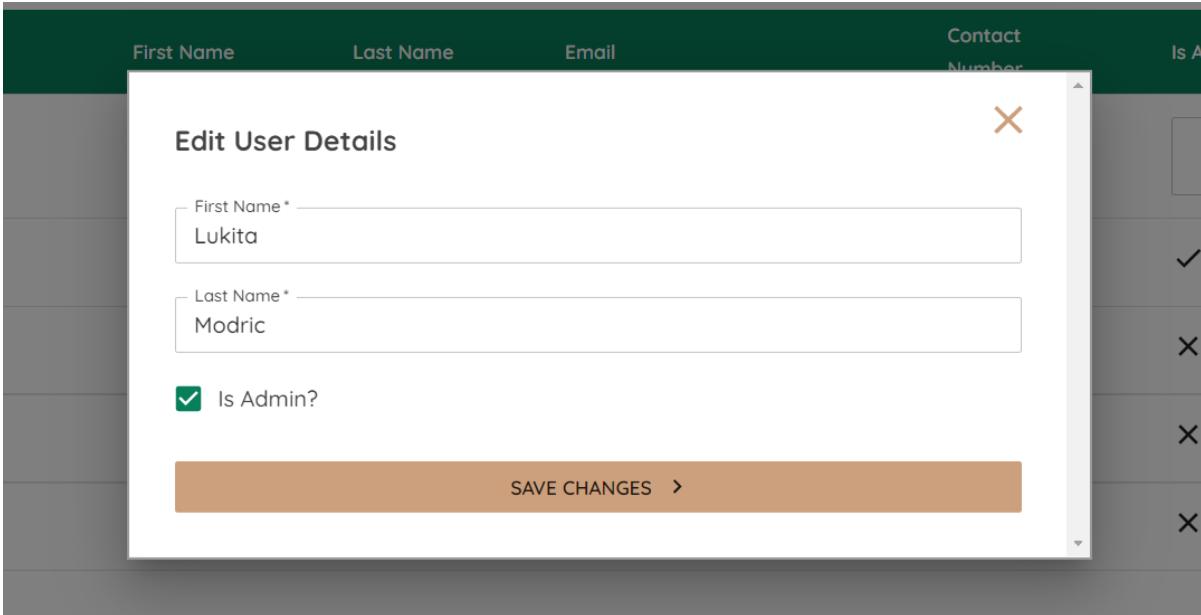
The screenshot shows a table titled "User List". The columns are: Actions, User ID, First Name, Last Name, Email, Contact Number, and Is Admin?. The data rows are:

Actions	User ID	First Name	Last Name	Email	Contact Number	Is Admin?
	29	Luka	Modric	luka@example.com	9806769512	X
	30	Antonio	Kroos	toni@example.com	9846039259	X
	32	Aakarshan	Thapa	aakarshanthapa123@gmail.com	9806769514	X
	35	Aakarshan	Thapa	akarsan.thapa@gmail.com	9806769514	X

At the bottom, there is a pagination bar: Rows per page: 5 rows ▾ 1-4 of 4 |< < > >|

Figure 135: User List Table

Edit User:



The screenshot shows an "Edit User Details" modal. It contains fields for First Name (Lukita) and Last Name (Modric). There is also a checked checkbox for "Is Admin?". At the bottom is a "SAVE CHANGES" button.

Figure 136: User Edit Modal

4.15. Contact Us Page

From the Contact Us Page, website users can send email to the company's email address.

The screenshot shows a contact form integrated into a website header. The header includes a logo, navigation links for 'SHOP BY CATEGORY', 'MY ACCOUNT', and 'ADMIN', and a search bar. The contact form itself has a light gray background and a white input area. It features a title 'Send us a message !' and four required fields: 'Name *', 'Enter Email *', 'Contact Number *', and 'Message *'. Below these fields is a large text area for the message. At the bottom is a prominent orange 'SUBMIT' button with a right-pointing arrow.

Figure 137: Contact Us Form

Email Received:

An email is received in the company's email address with the data submitted in the Contact us form.

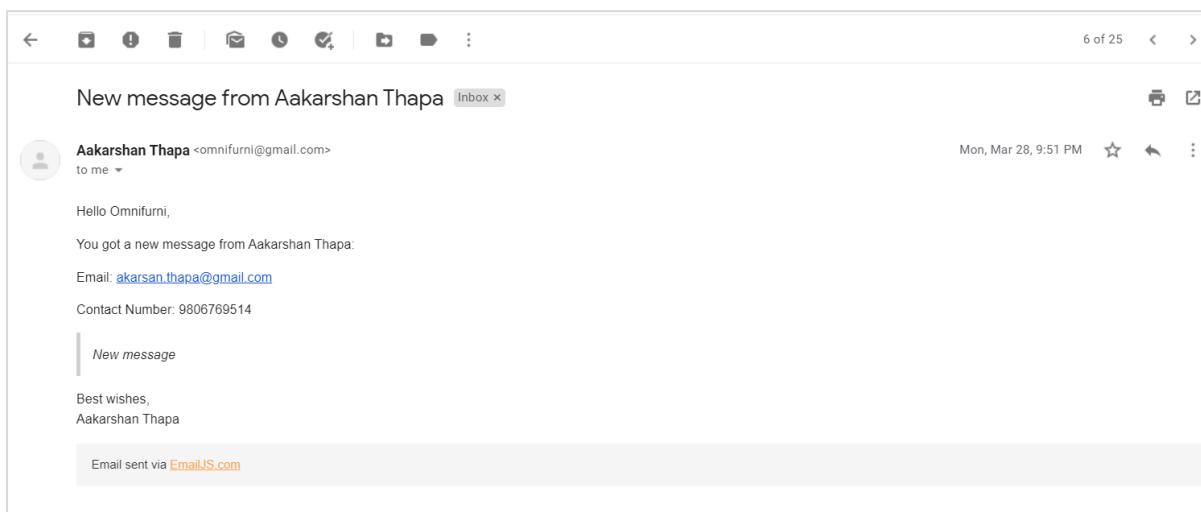


Figure 138: Email Received with the Contact Us Form data

5. Web Application Testing

The main functionalities of the web application were tested using the Black Box testing method. Black-box testing is a method of testing a system with no prior knowledge of its internal workings. Instead, a tester gives the system under test input and watches the output it produces, allowing the tester to see how the system reacts to expected and unexpected user activities and the system's reaction time, usability issues, and reliability concerns. Black box testing is a powerful technique because it exercises a system from beginning to end. A tester can replicate user activity and see if the system delivers on its promises, just as end-users "don't care" how a system is written or architected and expect to obtain a suitable response to their requests. (Impreva, 2021)

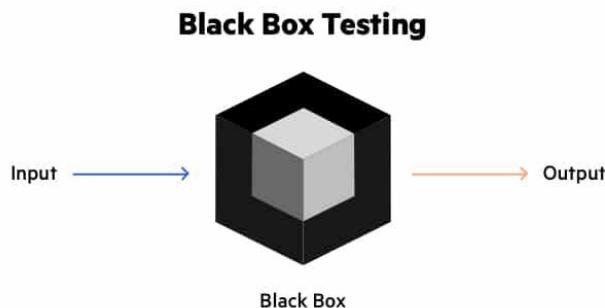


Figure 139: Black Box testing pictorial representation

The black box testing is divided into two main parts: eCommerce section testing and Admin Section Testing. Also, non-functional testing is done in another section.

5.1. ECommerce Section Testing:

5.1.1. Register Form Testing

- **Test 1:** Leaving all the fields in the register form empty

Table 16: Leaving all the fields in the register form empty

Objective	To leave all the fields in the register form empty.
Action	All the fields were left empty, and the “Register” button was clicked.
Expected Result	Error text must be shown below each text field.
Actual Result	Error texts were shown below each empty text field.
Remarks	The test was successful.

Register and start shopping!

First Name *

Last Name *

Email *

Contact Number *

Password *

Confirm Password *

REGISTER >

Already have an account? [Login!](#)

Figure 140: Leaving text field empty in the register form

- **Test 2:** Entering different passwords in the “Password” and “Confirm Password” fields.

Table 17: Entering different passwords in the “Password” and “Confirm Password” fields.

Objective	To input different passwords in the “Password” and “Confirm Password” fields.
Action	Different passwords were entered in the “Password” and “Confirm Password” fields.
Expected Result	“Password must match” error text displayed below the “Confirm Password” field.
Actual Result	“Password must match” error text was displayed below the “Confirm Password” field.
Remarks	The test was successful.

The screenshot shows a registration form titled "Register and start shopping!". The form includes fields for First Name ("Aakarshan"), Last Name ("Thapa"), Email ("aakarshanthapa123@gmail.com"), Contact Number ("9806769514"), Password ("*****"), and Confirm Password ("*****"). A red error message "Passwords must match" is displayed below the Confirm Password field. A large orange "REGISTER >" button is at the bottom, and a link "Already have an account? Login!" is at the bottom right.

Figure 141: Entering different password in "Password" and "Confirm Password" fields

➤ **Test 3:** Entering invalid data in the “Email” and “Contact Number” fields

Table 18: Entering invalid data in the “Email” and “Contact Number” fields

Objective	To enter invalid data in the “Email” and “Contact Number” fields.
Action	Invalid data were entered in the “Email” and “Contact Number” fields.
Expected Result	“Invalid email address” error message must be shown below the “Email” field. And “Must be only digits” error message must be shown below the “Contact Number” field.
Actual Result	Appropriate error messages were shown below the input fields.
Remarks	The test was successful.

The screenshot shows a registration form titled "Register and start shopping!". The form includes fields for First Name ("Aakarshan") and Last Name ("Thapa"). The Email field contains "aakarshangmail.com" and has a red border, indicating an invalid email address. Below the field, the error message "Invalid email address" is displayed. The Contact Number field contains "+9779806769514" and also has a red border, indicating that it must contain only digits. Below the field, the error message "Must be only digits" is displayed. The Password and Confirm Password fields both contain "*****" and have small eye icons to the right, indicating they are masked. A large orange "REGISTER >" button is at the bottom. At the bottom left, there is a link "Already have an account? [Login!](#)".

Figure 142: Entering invalid data in the "Email" and "Contact Number" fields

- **Test 4:** Trying to register with an already registered email.

Table 19: Trying to register with an already registered email

Objective	To test the application's response when trying to register a new account with an already registered email.
Action	In the register form, an email "aakarshanthapa123@gmail.com" was entered, already used by another account.
Expected Result	An error message should be shown.
Actual Result	An error message was shown.
Remarks	The test was successful.

The screenshot shows a registration form titled "Register and start shopping!". The form fields are as follows:

- First Name *: Aakarshan
- Last Name *: Thapa
- Email *: aakarshanthapa123@gmail.com
- Contact Number *: 9806769514
- Password *: (Redacted)
- Confirm Password *: (Redacted)

A large orange button at the bottom right is labeled "REGISTER >". Below the button, there is a link "Already have an account? Login!". At the bottom of the page, a red-bordered box contains the error message: "User 'aakarshanthapa123@gmail.com' already exists!" with an exclamation mark icon.

Figure 143: User already exists error message

➤ **Test 5:** Performing the registration process in a proper way

The registration process is presented in the screenshots below:

- **Screenshot 1:** Filling the Register Form fields with valid details.

The screenshot shows a registration form titled "Register and start shopping!". It contains the following fields with valid input:

- First Name *: Aakarshan
- Last Name *: Thapa
- Email *: aakarshanthapa123@gmail.com
- Contact Number *: 9806769514
- Password *: (Redacted)
- Confirm Password *: (Redacted)

A large orange "REGISTER >" button is at the bottom. Below it, a link says "Already have an account? [Login!](#)".

Figure 144: Register Form filled with valid data

- **Screenshot 2:** After submitting the registration form.

After the "Register" button is submitted, an email is sent to the entered email address to check if it is valid.

The screenshot shows the same registration form as Figure 144, but after the "REGISTER >" button has been clicked. The fields are now empty. A green message box at the bottom contains the following text:

Please check your email
"aakarshanthapa123@gmail.com" account for verification
link to activate your account!

Figure 145: Register Form Submitted

▪ **Screenshot 3:** Email Verification link sent to the entered email address.

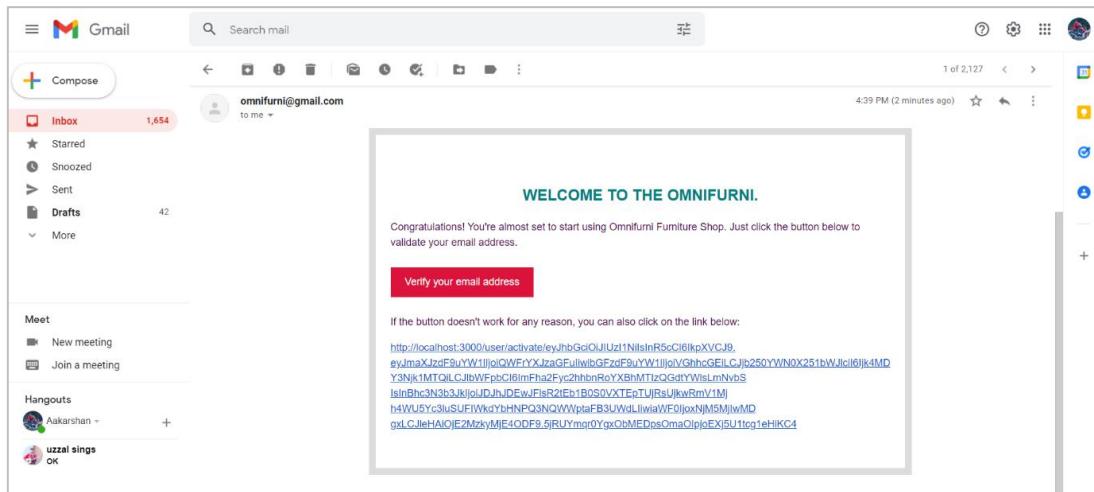


Figure 146: Email Verification Link Sent to the entered email address

▪ **Screenshot 4:** After Clicking the link (or the button) in the email.

The link provided in the email redirects to the Omnidfurni website and the account is activated.

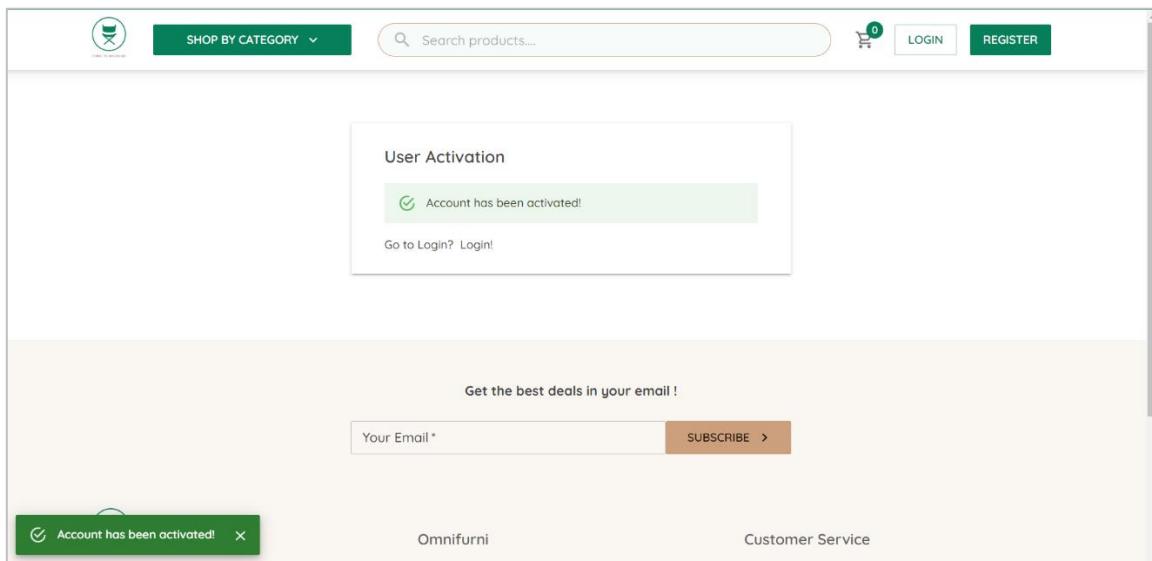


Figure 147: Account Activated Success Message

Screenshot 5: User table after successful registration and account activation.

	user_id	first_name	last_name	contact_number	role	email	password	createdAt	updatedAt	address_id
▶	28	Admin	User	9806769514	1	admin@example.com	\$2a\$10\$p3lhjG9eTQLeSWxBaUuxWe59tygwq...	2022-01-11 14:04:17	2022-02-23 03:08:42	10
29	Lukita	Modric		9806769512	1	luka@example.com	\$2a\$10\$yE26kzats8PwONsHOjDzO3tyIkz28mj...	2022-01-11 14:04:17	2022-04-13 16:09:20	7
30	Anton	Kroos		9846039259	0	ton@example.com	\$2a\$10\$ghZ8UdsuhwMPQJgrnEcndhKE6a2u...	2022-01-11 14:04:17	2022-02-17 11:00:04	8
32	Aakarshan	Thapa		9806769514	0	aakarshant Thapa123@gmail.com	\$2a\$12\$9ZD0uVhxFOo2tWPZ4H0w5B3XNh...	2022-02-15 13:44:33	2022-04-24 11:26:08	NULL
36	Aakarshan	Thapa		9806769514	0	akarsan.thapa@gmail.com	\$2a\$10\$uAKfxckas5RQZh3vIn0Qe.iRqPMhW...	2022-04-24 11:23:35	2022-04-24 11:23:35	NULL
*	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL

Figure 148: Newly registered account highlighted in the database table

5.1.2. Login Form Test Cases

- **Test 6:** Trying to log in with empty email and password fields.

Table 20: Trying to log in with empty email and password fields.

Objective	To try to log in with empty email and password fields.
Action	Both email and password fields were left empty, and the Login Button was clicked.
Expected Result	Error text should be shown below both the text fields
Actual Result	Error texts were shown below both text fields.
Remarks	The test was successful.

The screenshot shows a login form titled "Log In to Your Account!". It contains two text input fields: "Enter Email *" and "Enter Password *". Both fields have red borders, indicating they are required. Below each field, an error message is displayed: "Email is a required field" and "Password is a required field" respectively. To the right of the password field is a small circular icon with an eye symbol, likely a toggle for password visibility. Below the fields is a link "Forgot your password?". At the bottom is a large orange "LOGIN >" button. At the very bottom of the form area, there is a link "Create new account? Sign up!".

Figure 149: Leaving text field empty in the login form

- **Test 7:** Trying to log in with an invalid email pattern.

Table 21: Trying to log in with an invalid email pattern.

Objective	To test the system's response when an invalid email is entered in the email field.
Action	An invalid email pattern was entered in the email field.
Expected Result	Error text should be shown below the email text field.
Actual Result	Error text was shown below the email text field.
Remarks	The test was successful.

The screenshot shows a login form titled "Log In to Your Account!". It has two text input fields: "Enter Email *" and "Enter Password *". The "Email" field contains "aakarshangmail.com" and has a red border, indicating it is invalid. Below the field, the error message "Invalid email address" is displayed in red. The "Password" field contains "****" and has a grey border. To the right of the password field is an "eye" icon for password visibility. At the bottom of the form are links for "Forgot your password?", "LOGIN >" (which is highlighted in orange), and "Create new account? Sign up!".

Figure 150: Invalid Email Pattern in the email text field

- **Test 8:** Try to log in with the wrong email or password.

Table 22: Try to log in with the wrong email or password.

Objective	To try to login into the system using the wrong credentials.
Action	Wrong user credentials were passed into the login fields, and the Login Button was clicked.
Expected Result	The application should show an appropriate error message.
Actual Result	An error message was shown: "Email or password does not match!".
Remarks	The test was successful.

The screenshot shows a login form titled "Log In to Your Account!". It has two input fields: "Enter Email *" containing "aakarshantapa123@gmail.com" and "Enter Password *" containing "*****". Below the password field is a visibility toggle icon. A "LOGIN >" button is at the bottom. To the left of the button is the text "Forgot your password?". Below the button is "Create new account? Sign up!". A red error message box at the bottom contains the text "Email or password does not match!" with an exclamation mark icon.

Figure 151: Trying to login with wrong credentials

- **Test 9:** Trying to log in with the correct credentials.

Table 23: Trying to log in with the correct credentials.

Objective	To try to login into the system using the correct email and password.
Action	Correct user credentials were passed into the login fields, and the Login Button was clicked.
Expected Result	The application should redirect the user to the Home Page.
Actual Result	The application redirected the user to the Home Page.
Remarks	The test was successful.

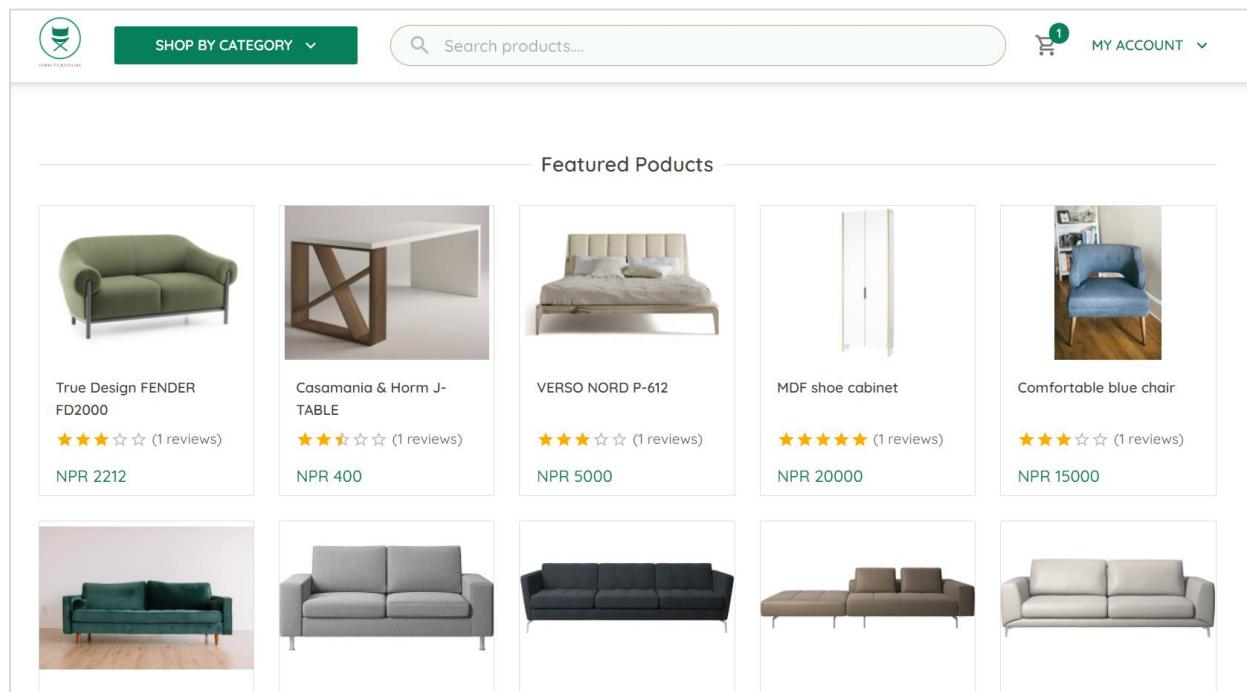


Figure 152: User redirected to the Home Page

5.1.3. Home Page Test Cases

- **Test 10:** Check if the featured products and category catalog are correctly shown on the home page.

Table 24: Check if the featured products and category catalog are correctly shown

Objective	To check if the featured products and categories catalog is shown correctly on the home page.
Action	The home page is loaded.
Expected Result	The featured products and categories catalog must be shown correctly.
Actual Result	The featured products and category catalogs were correctly shown.
Remarks	The test was successful.

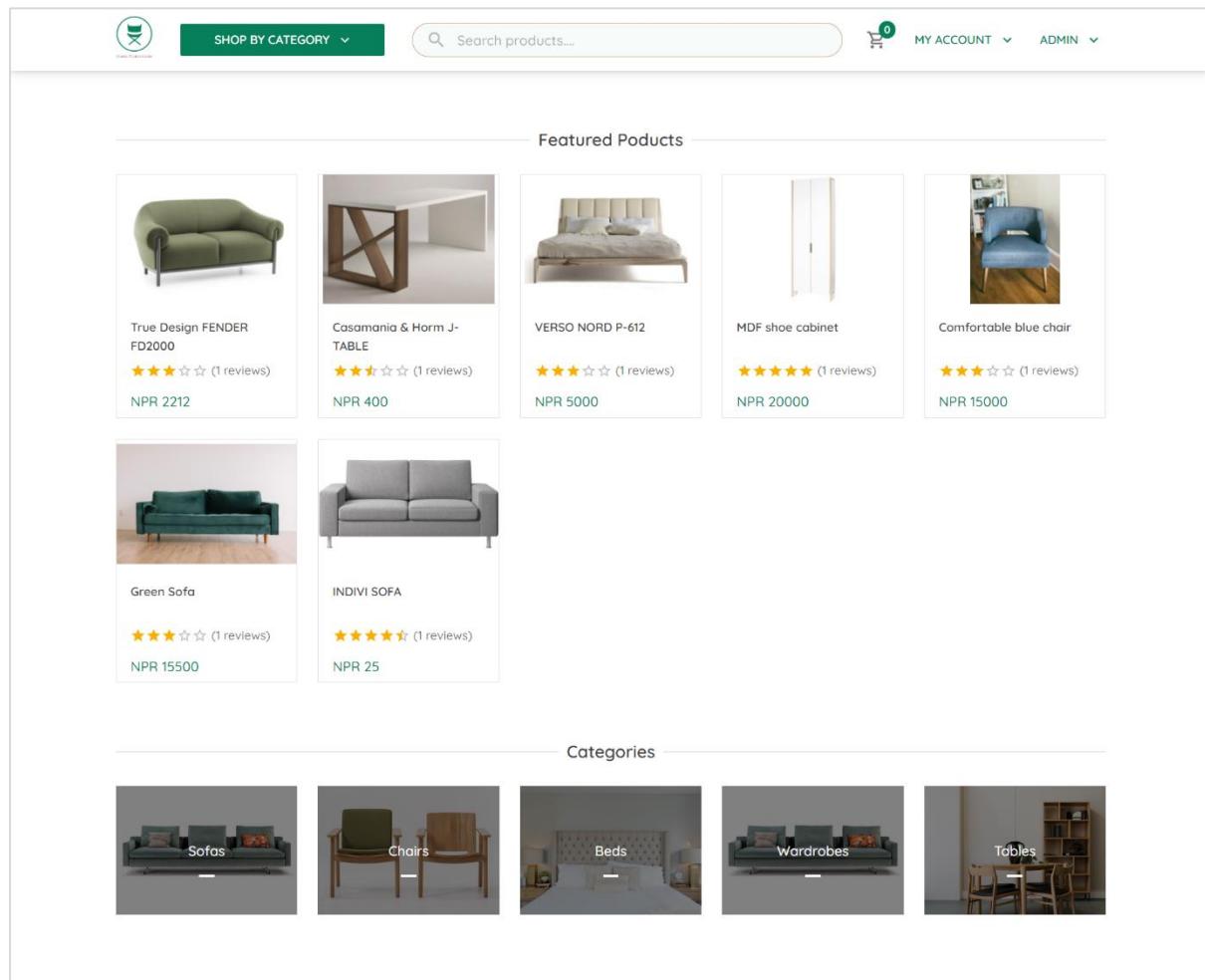


Figure 153: Home Page

5.1.4. Product Details Page Test Cases

- **Test 11:** Evaluating the product details page

Table 25: Evaluating the product details page

Objective	To check whether product details are shown correctly on the product details page.
Action	<p>Following test cases were performed on the product details page:</p> <ul style="list-style-type: none"> - Ensuring product details such as name, price, rating, review, category, and count in stock are correctly shown. - The Product Description and Reviews Section are correctly shown.
Expected Result	All the above test cases must pass without any problem.
Actual Result	The test cases passed without any problem.
Remarks	The test was successful.

Product Details Page Screenshot:

AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE

Category: Sofas

Rs. 25

Availability: In Stock (13)

Quantity:

[ADD TO CART >](#)

Product Description 

Amsterdam is sharp lines and sweeping curves. Comfort and luxury imbue every detail to make Amsterdam the perfect sofa for a soft and inviting statement in your living room. The open end will create a dynamic, welcoming atmosphere - a true blessing for the integrated areas of open-plan living.

Reviews 

No review found for this item.
Be the first to review.

Write a review:

★★★★★ Excellent

Comfortable Sofa 

[SUBMIT >](#)

Figure 154: Product Details Page Screenshot

➤ **Test 12:** Checking reviews functionality on the product details page

Table 26: To check whether the review functionality is working correctly.

Objective	To check whether the review functionality is working correctly.
Action	A new review was added for a product.
Expected Result	The product review should be added without any error, and a success message must be shown in a Snackbar (Alert Box).
Actual Result	The product review was added successfully.
Remarks	The test was successful.

Writing a review:



Figure 155: Writing a product review

Review added successfully:

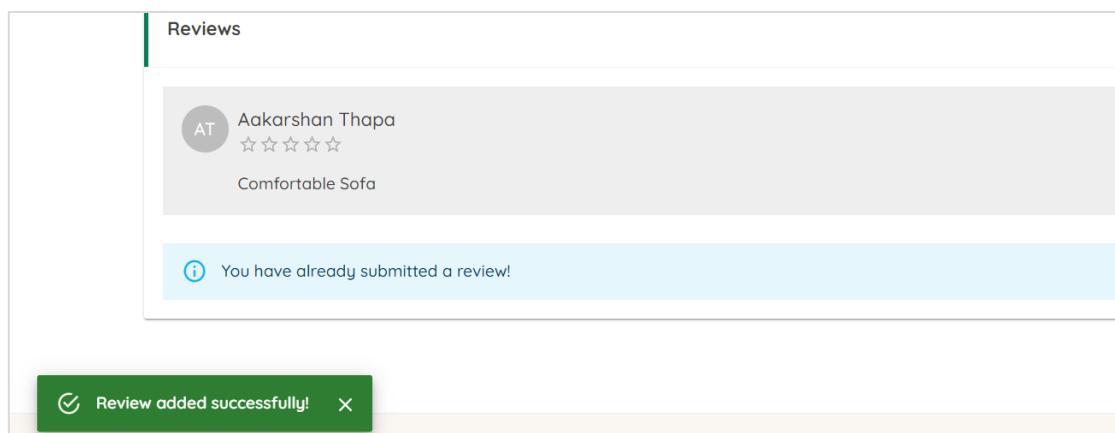


Figure 156: Product Review Added

- **Test 13:** Checking the working of the “Add To Cart” Button on the product details page

Table 27: Checking the working of the “Add To Cart” Button

Objective	To check the working of the “Add To Cart” Button.
Action	A new review was added for a product.
Expected Result	The product review should be added without any problem, and a success message must be shown on a Snackbar.
Actual Result	The product review was added successfully.
Remarks	The test was successful.

- Before adding a product to the cart:

We can see in the screenshots that the Cart Icon in the Header has a label of “0”, and there are no products on the cart page.

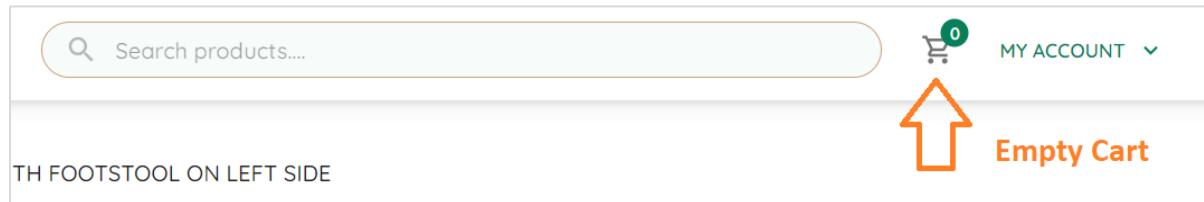


Figure 157: Empty Cart Icon

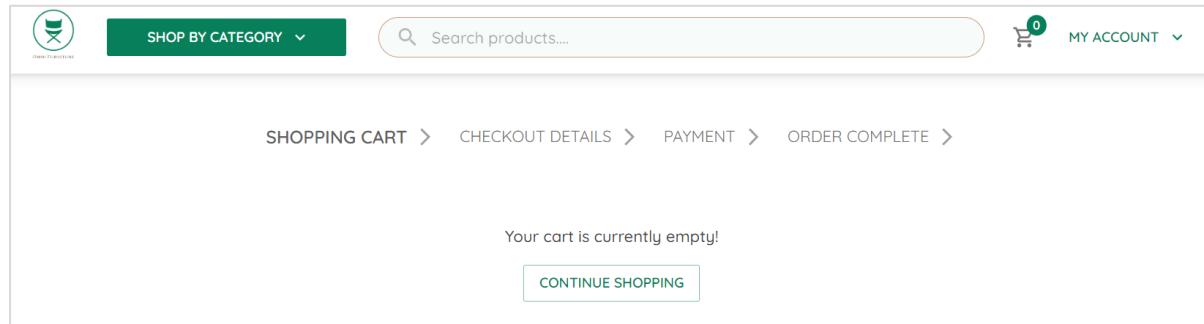


Figure 158: No product listed in the cart page

- Adding a product to the cart:

The required quantity is chosen using the numeric up-down control, and the “Add To Cart” button is clicked.

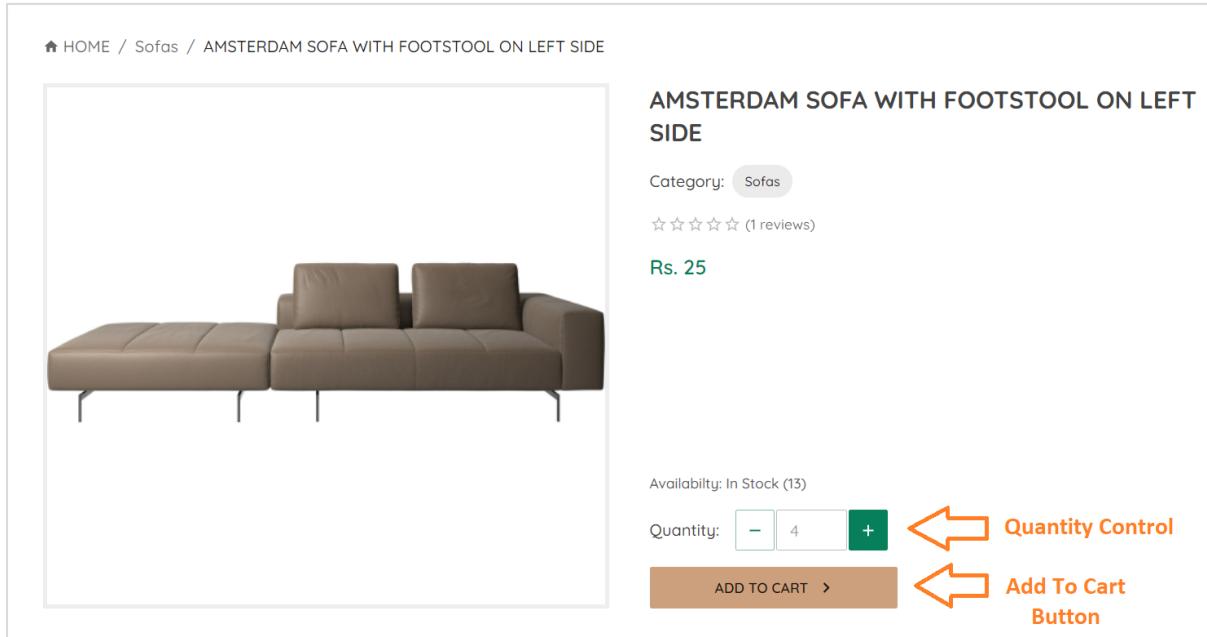


Figure 159: Product to be added to the cart

- After the product is added to the cart:

After the product is added to the cart, the quantity label in the Cart Icon increases, and the success message is shown in the Snackbar as shown in the bottom left corner.

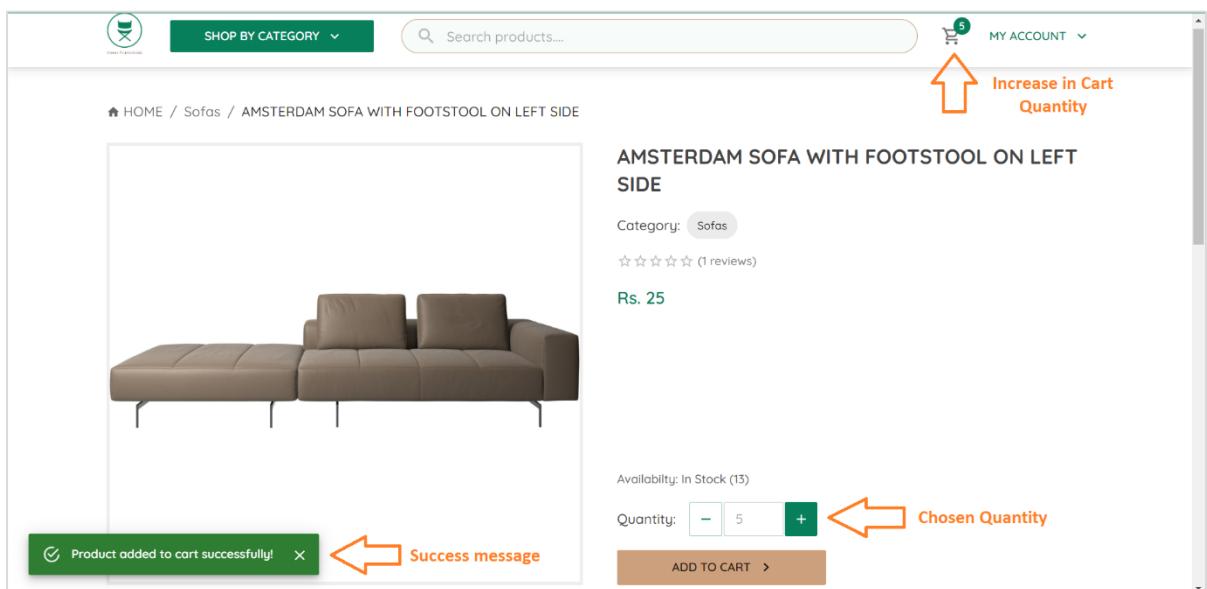


Figure 160: Success message and change in Cart Icon Label

The added product is present on the cart page as well.

PRODUCT	PRICE	QUANTITY	SUBTOTAL	CART TOTALS
AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE	NPR 25	<input type="button" value="-"/> 5 <input type="button" value="+"/>	NPR 125	Total NPR 125

[PROCEED TO CHECKOUT](#)

Figure 161: Product in cart page

5.1.5. Category Page Test Cases

- **Test 14:** Checking whether all products under the selected category are listed.

Table 28: Checking whether all products under the selected category are listed.

Objective	To check whether all the products under the selected category are correctly listed on the Category Page.
Action	The “Sofas” category was selected from the Category Menu present in the Header.
Expected Result	The products under the “Sofas” category should be listed correctly in the grid layout.
Actual Result	All the products in the “Sofas” category were listed.
Remarks	The test was successful.

Category Page Screenshot:

The screenshot shows a category page for "Sofas". A red arrow points to the "Selected Category" label next to the "Sofas" link in the sidebar. Another red arrow points to the "Pagination" area at the bottom.

Selected Category

Pagination

Product(s) under category "Sofas"

Image	Name	Rating	Price
	True Design FENDER FD2000	★★★★☆ (1 reviews)	NPR 2212
	NATAL ALU SOFA	★★★★☆ (1 reviews)	NPR 600
	Green Sofa	★★★★☆ (1 reviews)	NPR 15500
	INDIVI SOFA	★★★★☆ (1 reviews)	NPR 25
	OSAKA SOFA, TUFTED SEAT	☆☆☆☆☆ (0 reviews)	NPR 10
	FARGO SOFA	☆☆☆☆☆ (0 reviews)	NPR 11
	AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE	☆☆☆☆☆ (1 reviews)	NPR 25
	FARGO SOFA	☆☆☆☆☆ (0 reviews)	NPR 13
	HMG Fabric 3 + 1 + 1 Grey Sofa Set	☆☆☆☆☆ (0 reviews)	NPR 10
	Romeo	☆☆☆☆☆ (0 reviews)	NPR 10

Figure 162: Category Page

➤ **Test 15:** Checking whether products list filtering is working properly

Table 29: Checking whether products list filtering is working properly

Objective	To check whether the Product List Filtering is working correctly on the Category Page.
Action	The product list was filtered using two different filters: <ul style="list-style-type: none"> - Price Range - Star Rating
Expected Result	The product list should be filtered according to the applied filters.
Actual Result	Both the price range and star rating filtering were working correctly.
Remarks	The test was successful.

- Before applying any filter options:

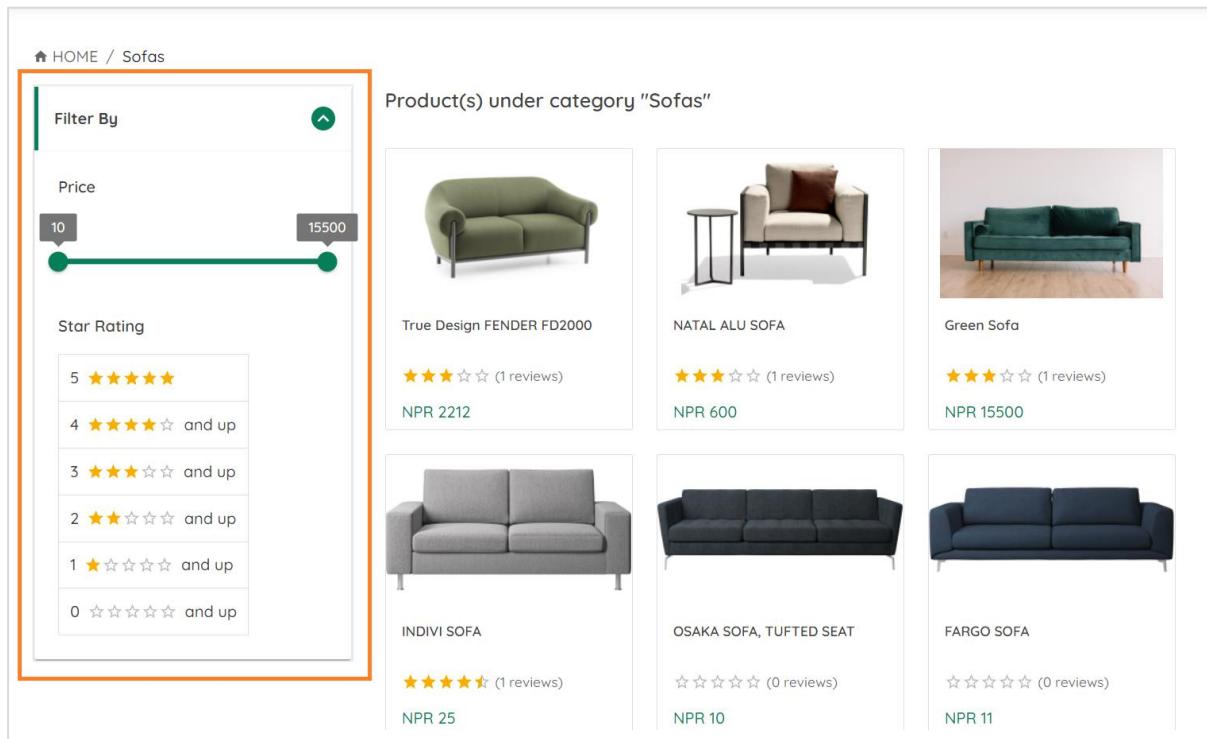


Figure 163: Before applying filter

- Applying price range filter:

The screenshot shows a product listing for 'Sofas'. On the left, there is a 'Filter By' sidebar with a 'Price' section highlighted by an orange box. The price range is set from 207 to 3634. Below it is a 'Star Rating' section with a list of options from 0 to 5 stars. The main area displays two sofa products: 'True Design FENDER FD2000' and 'NATAL ALU SOFA', each with its name, star rating (4 stars), review count (1 reviews), and price (NPR 2212 and NPR 600 respectively). At the bottom, there are navigation arrows, a page number (1), and a 'Show 10 per page' dropdown.

Figure 164: Applying price range filter on the product list

- Applying star rating filter:

The screenshot shows a product listing for 'Sofas'. On the left, there is a 'Filter By' sidebar with a 'Star Rating' section highlighted by an orange box. The 'Selected Rating' is shown as '3 ★★★★☆ and up'. The main area displays four sofa products: 'True Design FENDER FD2000', 'NATAL ALU SOFA', 'Green Sofa', and 'INDIVI SOFA'. Each product has its name, star rating (3 stars), review count (1 reviews), and price (NPR 2212, NPR 600, NPR 15500, and NPR 25 respectively). Orange arrows point from the 'Selected Rating' text in the sidebar to the 3-star row in the sidebar and to the 3-star row in the product list.

Figure 165: Applying star rating filter on the product list

5.1.6. Search Functionality Test

- **Test 16:** Testing whether the application shows the products according to the search keyword.

Table 30: Search functionality test

Objective	To test whether the application shows the products according to the search keyword.
Action	The search keyword is entered in the search bar.
Expected Result	The application should search for products matching the search keyword and display them on the Search Page. If no product is found, an appropriate message should be shown.
Actual Result	The featured products and categories catalog are correctly shown.
Remarks	The test was successful.

Search Keyword:

In the search bar, the search term “sofa” was entered.

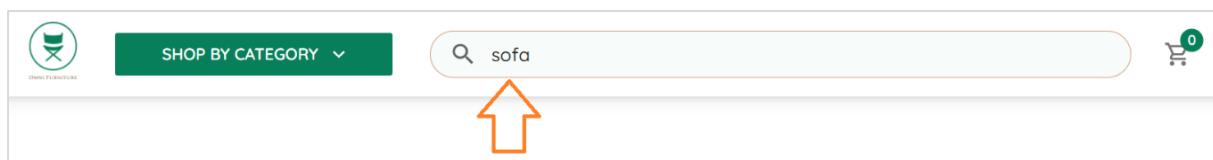


Figure 166: Search Term

Search Results:

In the search page, all the matching products are listed.

The screenshot shows a search results page for "sofa". The left sidebar contains a "Filter By" section with "Price" and "Star Rating" filters. The main area displays nine sofa products in a grid format, each with an image, name, rating, and price.

Search Results For: "sofa"								
	NATAL ALU SOFA ★★★★☆ (1 reviews) NPR 600		Green Sofa ★★★★☆ (1 reviews) NPR 15500		INDIVI SOFA ★★★★★ (1 reviews) NPR 25			
	OSAKA SOFA, TUFTED SEAT ★★★★☆ (0 reviews) NPR 10		FARGO SOFA ★★★★☆ (0 reviews) NPR 11		AMSTERDAM SOFA WITH FOOTSTOOL ON LEFT SIDE ★★★★☆ (0 reviews) NPR 25			
	FARGO SOFA ★★★★☆ (0 reviews) NPR 13		HMG Fabric 3 + 1 + 1 Grey Sofa Set ★★★★☆ (0 reviews) NPR 10		WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set ★★★★☆ (0 reviews) NPR 10			

At the bottom, there are navigation icons for page 1 of 1, a dropdown for "Show 10 per page", and a "per page" selector.

Figure 167: Search Results

5.1.7. Search Results Filtering Test

- **Test 17:** Testing the working of filter options on the Search page.

Table 31: Testing the working of filter options on the Search page

Objective	To check whether the Search Results Filtering works correctly on the Search Page.
Action	The search results were filtered using two different filters: <ul style="list-style-type: none"> - Price Range - Star Rating
Expected Result	The search results should be filtered according to the applied filters.
Actual Result	Both the price range and star rating filtering were working correctly.
Remarks	The test was successful.

Filtering the Search Results:

- Before applying any filter options:

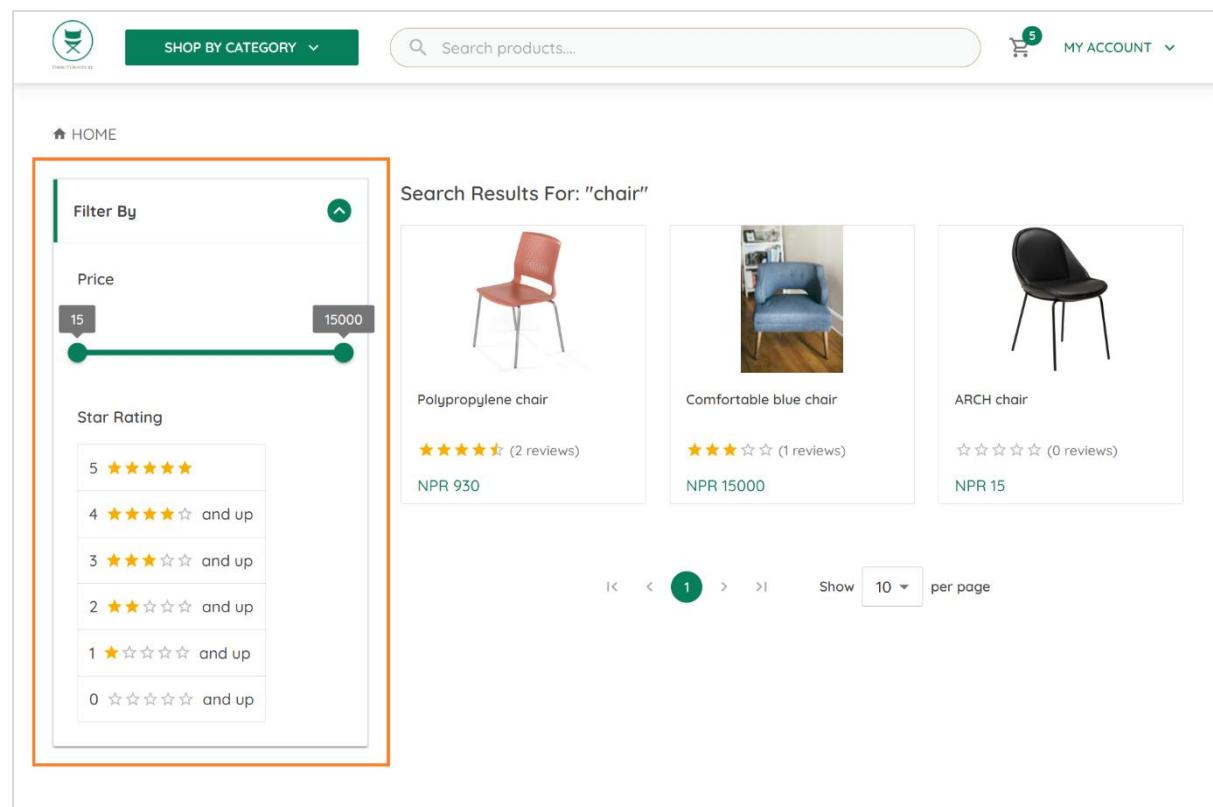


Figure 168: Before applying filtrations on the search results

- Applying price range filter:

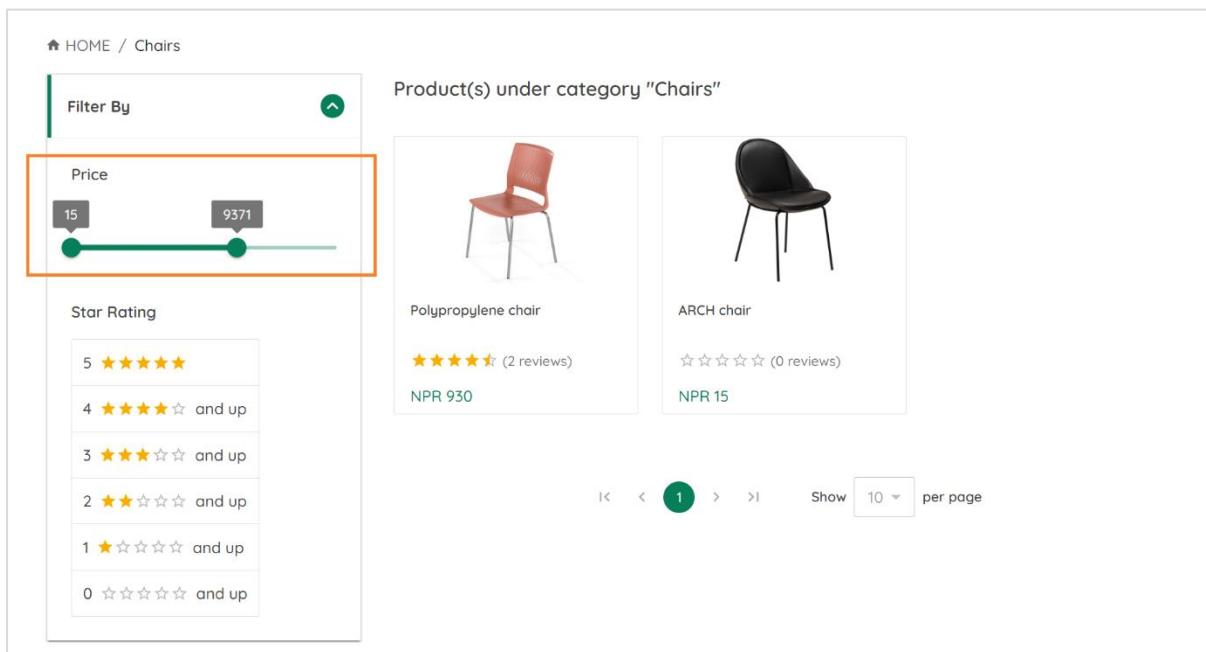


Figure 169: Filtering search results by Price Range

- Applying the star rating filter:

The "4 Star and up" option is selected in the Star Rating Filter, and the search results are filtered accordingly.

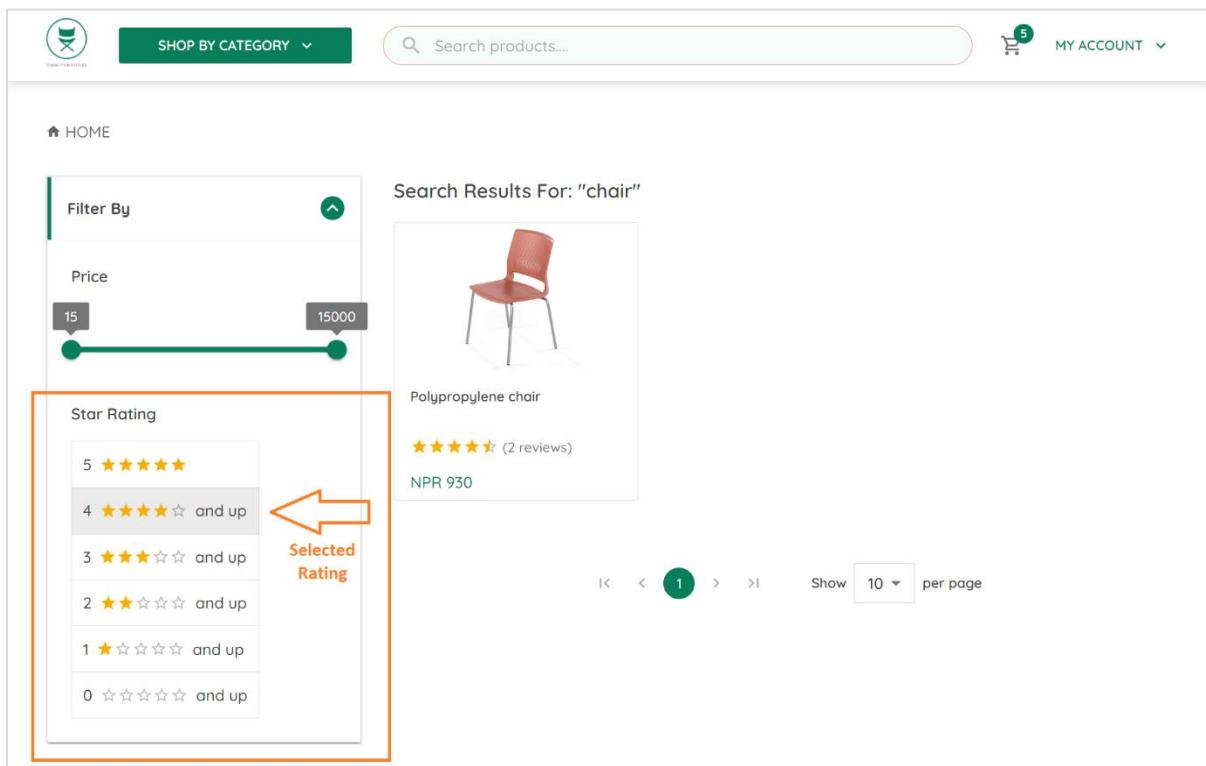


Figure 170: Filtering search results by Star Rating

5.1.8. Contact Us Form Test Cases

➤ Test 18: Contact Us Form Validation

Table 32: Contact Us Form Validation

Objective	To check the Contact Us form field validation.
Action	Following test cases were performed on the form. - Empty Fields - Invalid Email Address - Invalid Contact Number
Expected Result	The form should not be submitted until the form passes the above-listed test cases.
Actual Result	The form passed all the above test cases.
Remarks	The test was successful.

Empty Fields:

The screenshot shows a contact form with four input fields: Name, Enter Email, Contact Number, and Message. Each field has a red border and a red error message below it. A large green 'G' icon is positioned to the right of the message input field. At the bottom is a brown 'SUBMIT >' button.

Name *	Name is a required Field
Enter Email *	Email is a required Field
Contact Number *	Contact Number is a required field
Message *	Message is a required Field

SUBMIT >

Figure 171: Empty Fields in the contact us form

Invalid Email Address:

The screenshot shows a contact form with a red-bordered input field labeled "Enter Email *". Inside the field, the text "aakarshanthapa123" is entered. Below the input field, the error message "Invalid email address" is displayed in red.

*Figure 172: Invalid Email Address in Contact Us Form***Invalid Contact Number:**

The screenshots show two separate instances of a contact form. Both instances have a red-bordered input field labeled "Contact Number *". In the first instance, the number "98001" is entered, and the error message "Must be exactly 10 digits" is shown below. In the second instance, the number "98001as" is entered, and the error message "Must be only digits" is shown below.

Figure 173: Invalid Contact Number in Contact Us Form

- **Test 19:** Ensuring that the Contact Us Form is working correctly.

Table 33: Ensuring that the Contact Us Form is working correctly.

Objective	To check whether the Contact Us Form is working correctly.
Action	<p>The following actions were performed:</p> <ul style="list-style-type: none"> - The Contact Us Form was filled. - The Submit button was clicked. - And the Company's Email address was checked to ensure the email was received with the data submitted in the form.
Expected Result	A new email should be received at the company's email address.
Actual Result	An email was received with the data entered in the Contact Us Form.
Remarks	The test was successful.

Filled Contact Us Form:

Send us a message !

Name *
Aakarshan Thapa

Enter Email *
aakarshanthapa123@gmail.com

Contact Number *
9806769514

Message *
New Message

SUBMIT >

Figure 174: Filled Contact Us Form

Email Sent Successfully:

A Snackbar with the success message pops up in the bottom left corner.

Contact Number *

Message *

SUBMIT >

Email sent successfully X

Figure 175: Snackbar with the success message

Email Received:

An email is received at the company's email address with the data submitted in the Contact Us form.

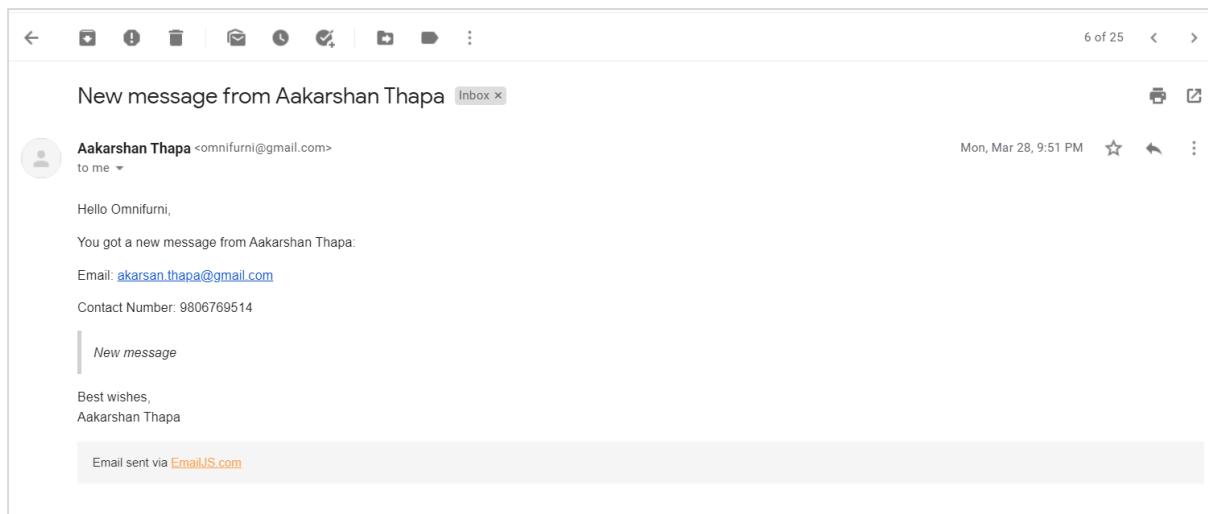


Figure 176: Email Received with the Contact Us Form data

5.1.9. My Account Page Testing

5.1.9.1. Orders Section Test Cases

- **Test 20:** Checking whether all the user orders are listed.

Table 34: Checking whether all the user orders are listed.

Objective	To check whether all the user's orders are listed correctly in the “Orders” section of the “My Account” page.
Action	Navigating to the “Orders” section of the “My Account” page.
Expected Result	All the user's Orders must be listed in a table.
Actual Result	All the Orders made by the user were listed in a tabular format.
Remarks	The test was successful.

Orders Section in “My Account” Page:

The screenshot shows the 'My Account' page with a brown header bar. In the top left, there's a logo, a 'SHOP BY CATEGORY' button, a search bar with placeholder 'Search products...', and a shopping cart icon with a notification '1'. On the right of the header is a 'MY ACCOUNT' dropdown. Below the header, the page title is 'My Account' and the sub-section is 'Orders'. On the left, a sidebar titled 'Orders Section Navigation' lists 'Dashboard', 'Orders' (which is highlighted with an orange box and has a red arrow pointing to it), 'Address', 'Account Details', and 'Logout'. The main content area is titled 'Order List' and contains a table with the following data:

ORDER ID	DATE	TOTAL	STATUS	ACTION(S)
#40	2022-04-05	NPR 125	Cancelled	<button>VIEW</button>
#41	2022-04-05	NPR 31050	Cancelled	<button>VIEW</button>
#44	2022-04-13	NPR 50	Delivered	<button>VIEW</button>
#45	2022-04-13	NPR 30	Cancelled	<button>VIEW</button>
#46	2022-04-13	NPR 105	Order Completed	<button>VIEW</button>
#47	2022-04-19	NPR 25	Delivered	<button>VIEW</button>
#48	2022-04-20	NPR 2000	Order Completed	<button>VIEW</button>
#49	2022-04-23	NPR 70	Order Completed	<button>VIEW</button>

Figure 177: Orders (My Account Page)

5.1.9.2. Address Section Test Cases

- **Test 21:** Trying to add the default address for a user

Table 35: Trying to add the default address for a user

Objective	To add a new default address for a user.
Action	The following actions were taken: - The “Add Address” Button was clicked. - The add address form was filled out and submitted.
Expected Result	A new address should be created in the database and should be visible in the address section.
Actual Result	A new address record was created in the database, and the new address was visible in the address section.
Remarks	The test was successful.

- Before adding a new Address:

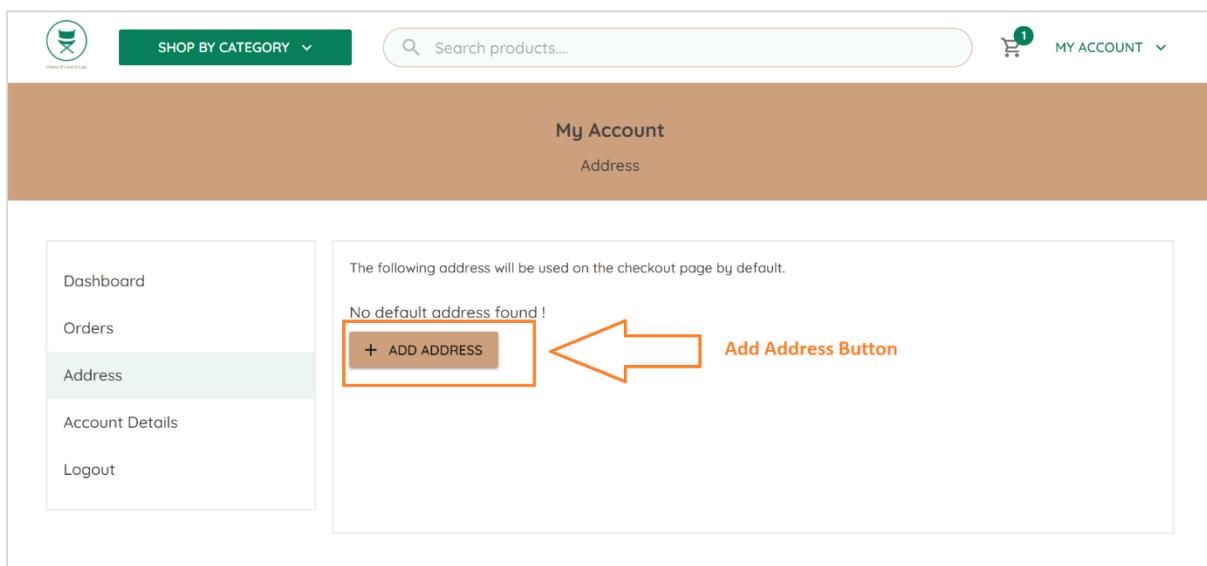


Figure 178: Before adding default address

- Filling the add address form and submitting it:

Add address details

City *
Pokhara

Zip / Postal Code *
33700

Street Address *
Chipledhunga

Province *
4

ADD ADDRESS >

Figure 179: Filling the add address form

- After adding the address:

Dashboard

Orders

Address

Account Details

Logout

Address added successfully

The following address will be used on the checkout page by default.

City: Pokhara
Postal Code: 33700
Street Address: Chipledhunga
Province: 4

EDIT ADDRESS

Figure 180: After successful addition of default address

- Checking Database:

	address_id	city	postal_code	street	province
▶	7	Pokhara Ranipauwa	33700	Mahendrapool Rd 8	Gandaki
	8	Pokhara	33700	Ranipauwa	Gandaki Province
	10	Pokhara	33700	Ranipauwa	4
	11	Pokhara	33700	Ranipauwa	4
	13	Pokhara	33700	Chipledhunga	4

Figure 181: Address added in the database table as well

➤ **Test 22:** Trying to edit the default address

Table 36: Trying to add the default address for a user

Objective	To edit the default address of a user.
Action	The following actions were taken: - The “Edit Address” Button was clicked. - The address details in the edit address form were edited, and the form was submitted.
Expected Result	The user’s address should be updated in the database and address section.
Actual Result	The address was updated in the database and the address section.
Remarks	The test was successful.

- Before editing an Address:

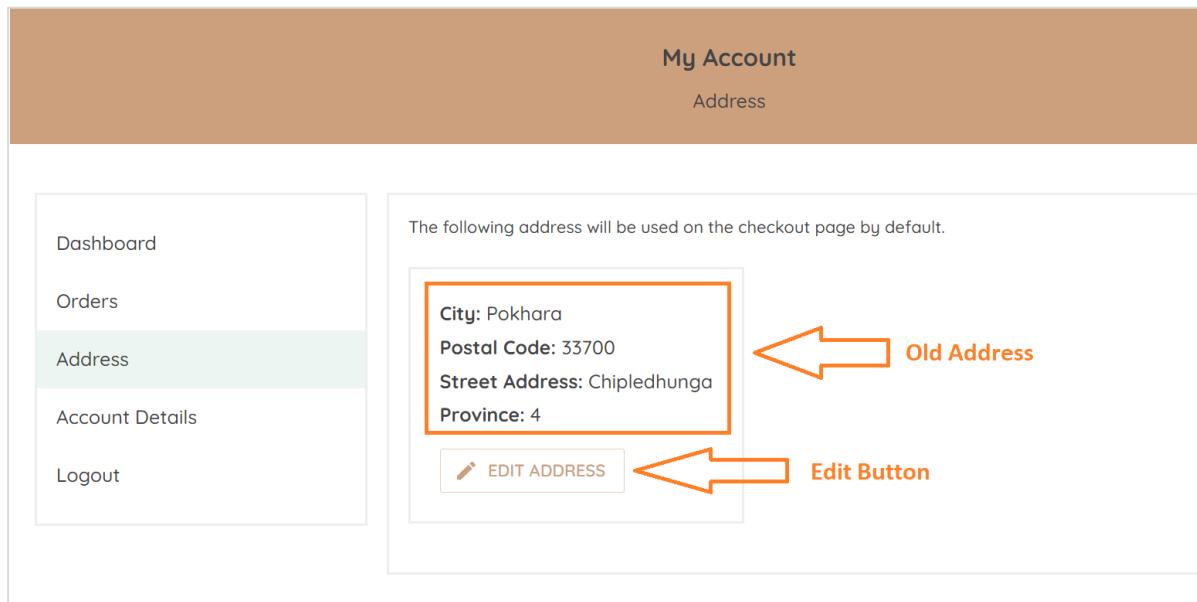


Figure 182: Before editing the address

- Editing the edit address form and submitting it:

Edit address details

City *
Pokhara

Zip / Postal Code *
33700

Street Address *
Newroad

Province *
4

SAVE CHANGES >

Figure 183: Filling the add address form

- After editing the address:

The following address will be used on the checkout page by default.

City: Pokhara
Postal Code: 33700
Street Address: Newroad
Province: 4

EDIT ADDRESS

Address updated successfully

Figure 184: After successful addition of default address

- Checking Database:

	address_id	city	postal_code	street	province
▶	7	Pokhara Ranipauwa	33700	Mahendrapool Rd 8	Gandaki
	8	Pokhara	33700	Ranipauwa	Gandaki Province
	10	Pokhara	33700	Ranipauwa	4
	11	Pokhara	33700	Ranipauwa	4
	13	Pokhara	33700	Newroad	4
*	NULL	NULL	NULL	NULL	NULL

Figure 185: Address Edited in database table as well

5.1.9.3. Account Details

- **Test 23:** Trying to edit the Account Details

Table 37: Trying to edit the Account Details

Objective	To try to edit the user account details.
Action	Try-1: Submitting the account details form with valid details. Try-2: Leaving all the fields empty and trying to submit the form
Expected Result	If the fields are filled with valid data, the form should be submitted successfully, and the user record should be updated in the database. If the fields data are invalid or empty, a validation error message should be displayed.
Actual Result	The form was submitted successfully when valid data were entered in the form. However, an error message was shown when there were validation errors.
Remarks	The test was successful.

- ❖ **Try 1:** Submitting the account details form with valid details.

- Before updating account details:

The screenshot shows a web application interface titled 'My Account' with a sub-section 'Account Details'. On the left, there's a sidebar with links: 'Dashboard', 'Orders', 'Address', 'Account Details' (which is highlighted in green), and 'Logout'. The main content area is titled 'Account Details Update Form'. It contains three input fields: 'First Name' with value 'Aakarshan', 'Last Name' with value 'Thapa', and 'Contact Number' with value '9806769514'. Below these fields is a brown rectangular button labeled 'SAVE CHANGES >'. The entire 'Account Details' section is enclosed in an orange border.

Figure 186: Account Details Form before updating account details

Database:

	user_id	first_name	last_name	contact_number	role	email	password	createdAt	updatedAt	address_id
▶	28	Admin	User	9806769514	1	admin@example.com	\$2a\$10\$p3NhjG9eTQLeSWx8aXuxWe59tygw9q...	2022-01-11 14:04:17	2022-02-23 03:08:42	10
	29	Lukita	Modric	9806769512	1	luka@example.com	\$2a\$10\$yE26kzats8PwONslOj9Dz03tyXkz28mj...	2022-01-11 14:04:17	2022-04-13 16:09:20	7
	30	Antonio	Kroos	9846039259	0	toni@example.com	\$2a\$10\$ghZ8UdisuhwMPIO/gnE.erNchKE6a2u...	2022-01-11 14:04:17	2022-02-17 11:00:04	8
	32	Aakarshan	Thapa	9806769514	0	aakarshant Thapa123@gmail.com	\$2a\$12\$9ZDOuVhXFOz2tXFZK4H0w5B3Xnh...	2022-02-15 13:44:33	2022-04-24 07:58:44	13
*	35	Aakarshan	Thapa	9806769514	0	akarshan.thapa@gmail.com	\$2a\$10\$g1gcipqj5zJiuyOumpC.ExLPiPVgF819...	2022-03-27 16:02:43	2022-04-11 15:26:44	11
*	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL

Figure 187: Database before updating account details

- Updating Account Details:

Here, the user's first name is edited to "Akku", which was "Aakarshan" before.

The screenshot shows a web-based account management interface. At the top left, it says "Account Details". Below that are several input fields: "First Name *" containing "Akku", "Last Name *" containing "Thapa", and "Contact Number *" containing "9806769514". At the bottom left is a brown "SAVE CHANGES >" button.

Figure 188: Updating account details:

- After Updating account details:

The user details were also updated in the database, as shown in the screenshot below.

user_id	first_name	last_name	contact_number	role	email	password	createdAt	updatedAt	address_id
28	Admin	User	9806769514	1	admin@example.com	\$2a\$10\$yE26kzats8PwONsHOj9DzO3tyXkz28mj...	2022-01-11 14:04:17	2022-02-23 03:08:42	10
29	Lukita	Modric	9806769512	1	luka@example.com	\$2a\$10\$yE26kzats8PwONsHOj9DzO3tyXkz28mj...	2022-01-11 14:04:17	2022-04-13 16:09:20	7
30	Antonio	Krons	9846039259	0	ttoni@example.com	\$2a\$10\$yE26kzats8PwONsHOj9DzO3tyXkz28mj...	2022-01-11 14:04:17	2022-02-17 11:00:04	8
32	Akku	Thapa	9806769514	0	aakarshanthapa123@gmail.com	\$2a\$12\$9ZDOuVhXf0z2xFZX4HoW5B3Xnh...	2022-02-15 13:44:33	2022-04-24 09:12:08	13
33	Aakarshan	Thapa	9806769514	0	aakarshan.thapa@gmail.com	\$2a\$10\$yE26kzats8PwONsHOj9DzO3tyXkz28mj...	2022-03-27 16:02:43	2022-04-11 15:26:44	11

Figure 189: Database after updating account details

- ❖ Try 2: Leaving all the fields empty and trying to submit the form.

Error messages were shown under all the text fields.

The screenshot shows the same account management interface as Figure 188. All three input fields ("First Name *", "Last Name *", and "Contact Number *") are empty and highlighted with red borders. Below each field, a red error message is displayed: "First name is a required Field", "Last Name is a required Field", and "Contact Number is a required field". At the bottom left is a brown "SAVE CHANGES >" button.

Figure 190: Empty fields in the account details form

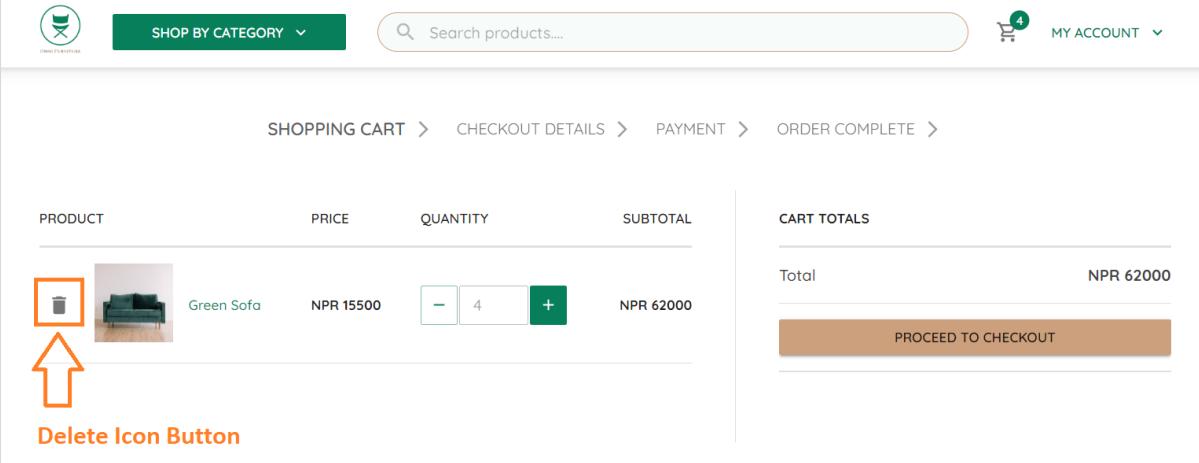
5.1.10. Cart Page Test Cases

- **Test 24:** Removing a product from the cart

Table 38: Removing a product from the cart

Objective	To try to delete a product from the cart.
Action	The Delete Icon Button was clicked.
Expected Result	The product should be removed from the cart.
Actual Result	The product was removed from the cart.
Remarks	The test was successful.

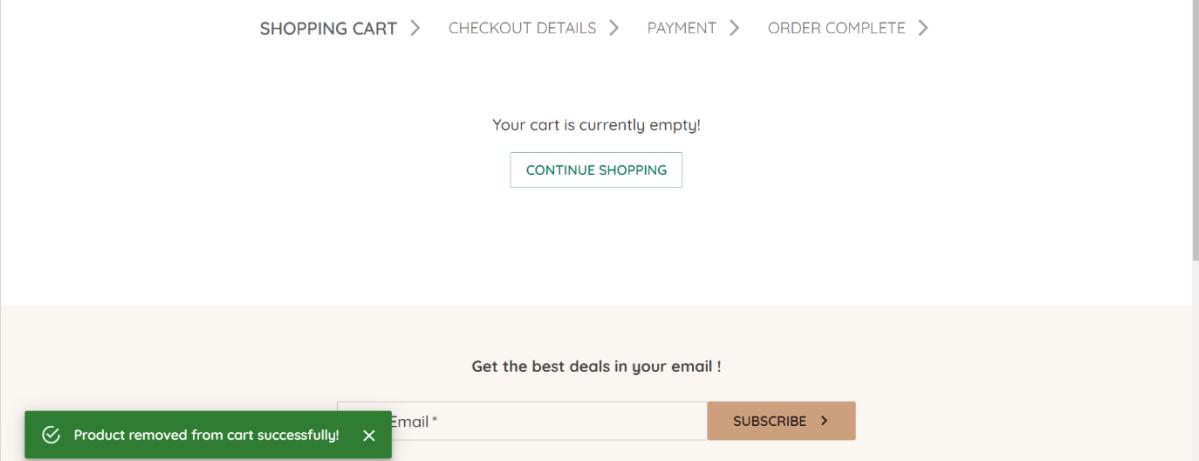
- Before removing the product from the cart:



The screenshot shows a shopping cart interface. At the top, there are navigation links: SHOP BY CATEGORY, a search bar with placeholder 'Search products...', and a shopping cart icon with a '4' indicating items. Below the header, a breadcrumb trail shows the user has navigated through SHOPPING CART, CHECKOUT DETAILS, PAYMENT, and ORDER COMPLETE. The main content area displays a table for the shopping cart. The first row of the table includes columns for PRODUCT, PRICE, QUANTITY, and SUBTOTAL. A product row for a 'Green Sofa' is shown with a price of NPR 15500, a quantity of 4, and a subtotal of NPR 62000. To the left of the sofa's image is a delete icon button, which is highlighted with an orange arrow. On the right side of the table, there is a 'CART TOTALS' section showing a total of NPR 62000. A large orange 'PROCEED TO CHECKOUT' button is located below the totals.

Figure 191: Product present in the cart before removing

- After clicking the delete icon button, the product is removed from the cart:



The screenshot shows the same shopping cart page after the product has been removed. The main content area now displays a message: 'Your cart is currently empty!'. Below this message is a 'CONTINUE SHOPPING' button. At the bottom of the page, there is a success message: 'Product removed from cart successfully!' with a close button. There is also a field for entering an email address and a 'SUBSCRIBE' button. Additionally, there is a promotional message: 'Get the best deals in your email !'

Figure 192: Product not present in the cart after removing

- **Test 25:** To test the working of the “Proceed To Checkout” Button

Table 39: To test the working of the “Proceed To Checkout” Button

Objective	To test whether the “Proceed To Checkout” button redirects to the Checkout Page.
Action	The “Proceed To Checkout” button is clicked.
Expected Result	After clicking the button, the website should redirect to the Checkout Page.
Actual Result	The website redirected to the Checkout Page
Remarks	The test was successful.

- Clicking the “Proceed To Checkout” button

The screenshot shows a shopping cart interface. At the top, there are navigation links: SHOPPING CART > CHECKOUT DETAILS > PAYMENT > ORDER COMPLETE >. Below this, there's a table for the shopping cart items. The first item is a sofa named "WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set". It has a quantity of 2, with a minus button, a plus button, and a current value of 2. The price is listed as NPR 10 and the subtotal as NPR 20. To the right of the cart table is a "CART TOTALS" section showing a total of NPR 20. Below the cart totals is a large orange rectangular button labeled "PROCEED TO CHECKOUT". An orange arrow points upwards from the bottom of this button towards the "PROCEED TO CHECKOUT" text.

Figure 193: "Proceed To Checkout" Button in Cart Page

- Redirected to the Checkout Page

The screenshot shows a redirected checkout page. At the top, there are navigation links: SHOPPING CART > CHECKOUT DETAILS > PAYMENT > ORDER COMPLETE >. On the left side, there are fields for "Shipping Address": First Name * (Aakarshan), Last Name * (Thapa), Email * (aakarshanthapa123@gmail.com), Contact Number * (9806769514), City *, Zip / Postal Code *, Street Address *, and Province *. On the right side, there is a "Your Order" summary table. It shows one item: WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set x 2 - NPR 20. Below the summary is a large orange rectangular button labeled "PROCEED TO PAYMENT".

Figure 194: Redirected to the Checkout Page

5.1.11. Checkout Page Test Cases

- **Test 26:** Trying to proceed to the payment page without filling out the shipping address form.

Table 40: Trying to proceed to the payment page without filling out the address form

Objective	To test whether the “Proceed To Payment” button redirects to the Payment Page without correctly filling the Shipping Address Form.
Action	The text fields in the Shipping Address Form were left empty, and the “Proceed To Payment” Button was clicked.
Expected Result	The website should not redirect to the Payment Page, and error text should be displayed below all the empty text fields.
Actual Result	The website did not redirect to the Payment Page, and error texts were displayed below all the empty text fields.
Remarks	The test was successful.

SHOPPING CART > CHECKOUT DETAILS > PAYMENT > ORDER COMPLETE >

Shipping Address

First Name *

Last Name *

Email *

Contact Number *

City *

Zip / Postal Code *

Street Address *

Province *

Your Order

PRODUCT	SUB TOTAL
WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set x 2	NPR 20
Total	NPR 20

PROCEED TO PAYMENT

Figure 195: Shipping Address Form text fields left empty

- **Test 27:** Trying to proceed to the payment page after filling all the fields in the Shipping Address Form.

Table 41: Trying to proceed to the payment page after filling the address form properly

Objective	To test whether the “Proceed To Payment” button redirects to the Payment Page after filling the shipping form correctly.
Action	The text fields in the Shipping Address Form were filled, and the “Proceed To Payment” Button was clicked.
Expected Result	The website should redirect to the Payment Page.
Actual Result	The website redirected to the Payment Page.
Remarks	The test was successful.

▪ Filling the Shipping Address Form

The screenshot shows two side-by-side panels. On the left, under 'Shipping Address', there are seven input fields: First Name * (Aakarshan), Last Name * (Thapa), Email * (aakarshanthapa123@gmail.com), Contact Number * (9806769514), City * (Pokhara), Zip / Postal Code * (33700), Street Address * (Ranipauwa), and Province * (4). On the right, under 'Your Order', it displays a single item: WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set x 2 with a SUB TOTAL of NPR 20. A large orange 'PROCEED TO PAYMENT' button is centered below the order summary.

Figure 196: Filled Shipping Address Form

▪ Redirected to Payment Page after clicking the “Proceed To Payment” Button

The screenshot shows a payment page. At the top, a navigation bar lists: SHOPPING CART > CHECKOUT DETAILS > PAYMENT > ORDER COMPLETE >. Below this, on the left, there's a 'Pay with' section with two radio buttons: COD (Cash On Delivery) (selected) and Khalti. At the bottom of this section is a large orange 'CONFIRM PAYMENT >' button. On the right, there's an 'Order Summary' section showing a Total Amount of NPR. 20.

Figure 197: Redirected to the Payment Page

5.1.12. Payment Page Test Cases

- **Test 28:** Choosing COD (Cash On Delivery) as Payment Method

Table 42: Choosing COD (Cash On Delivery) as Payment Method

Objective	To choose COD as the payment method on the Payment Page.
Action	The following actions were performed: - COD was selected as the payment method - The “Confirm Payment” Button was Clicked
Expected Result	The order status should be updated to “Order Completed”, and a success message should be shown on a Snackbar.
Actual Result	The order was completed
Remarks	The test was successful.

- COD selected as the payment method

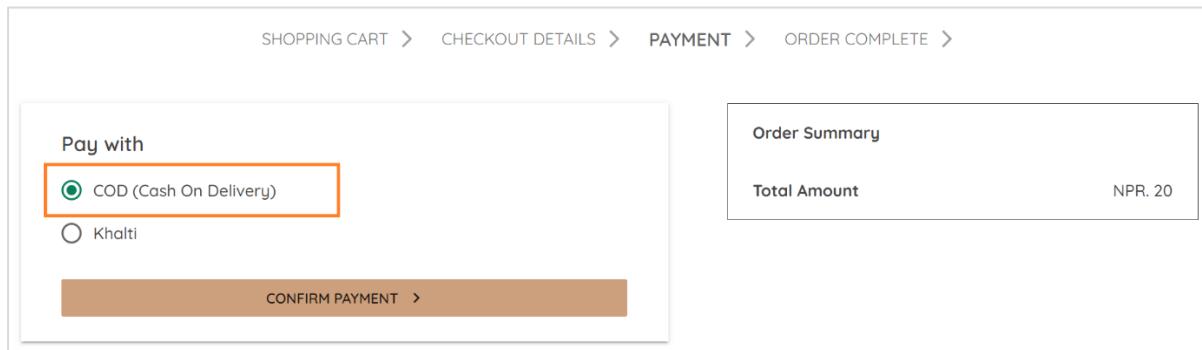


Figure 198: COD Selected as Payment Method

- After clicking the “Confirm Payment” button

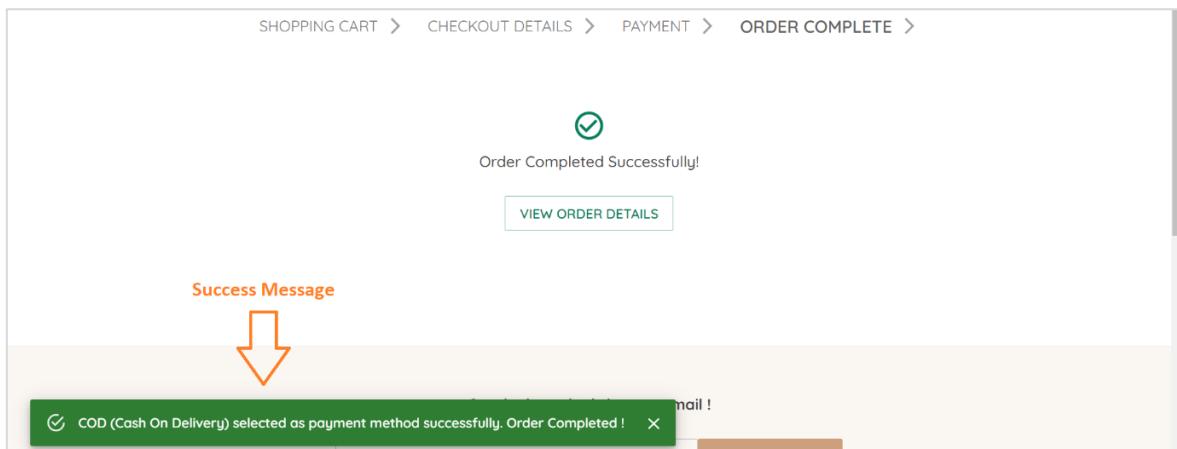


Figure 199: Success Message after selection of payment method

➤ **Test 29:** Choosing Khalti as Payment Method

Table 43: Choosing Khalti as the Payment Method

Objective	To choose Khalti as the payment method on the Payment Page.
Action	The following actions were performed: - Khalti was selected as the payment method - The “Pay With Khalti” Button was clicked, and the Khalti payment process was completed.
Expected Result	The order status should be updated to “Order Completed”, and a success message should be shown on a Snackbar.
Actual Result	The order was completed
Remarks	The test was successful.

- Khalti selected as the payment method

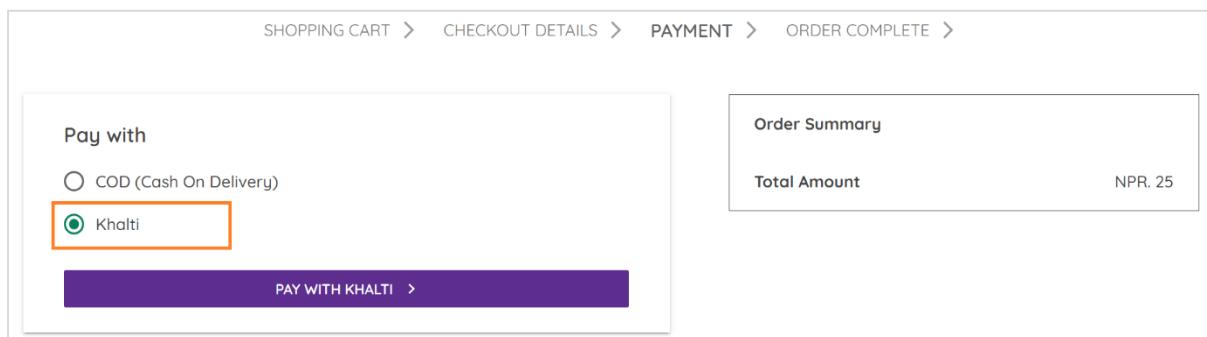


Figure 200: Khalti selected as the payment method

- Completing the khalti payment process

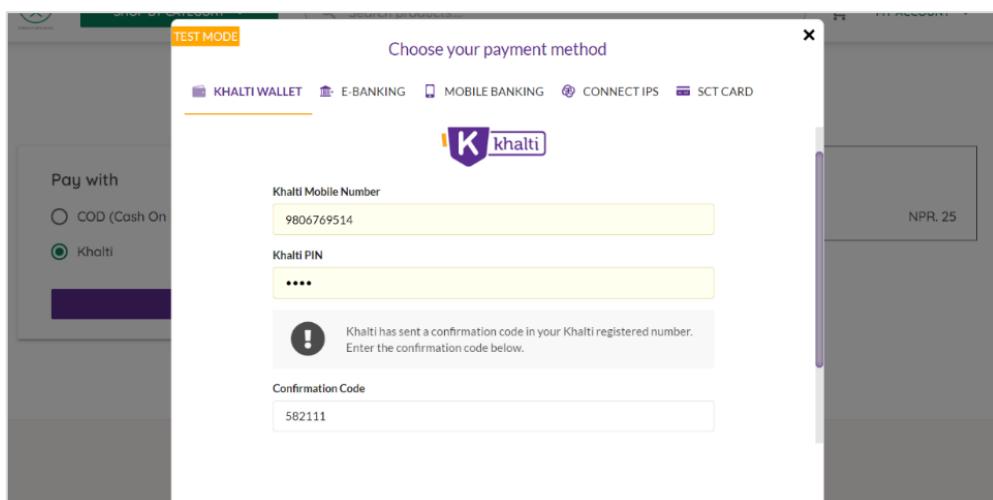


Figure 201: Completing the khalti payment process

- After completion of the Khalti payment process

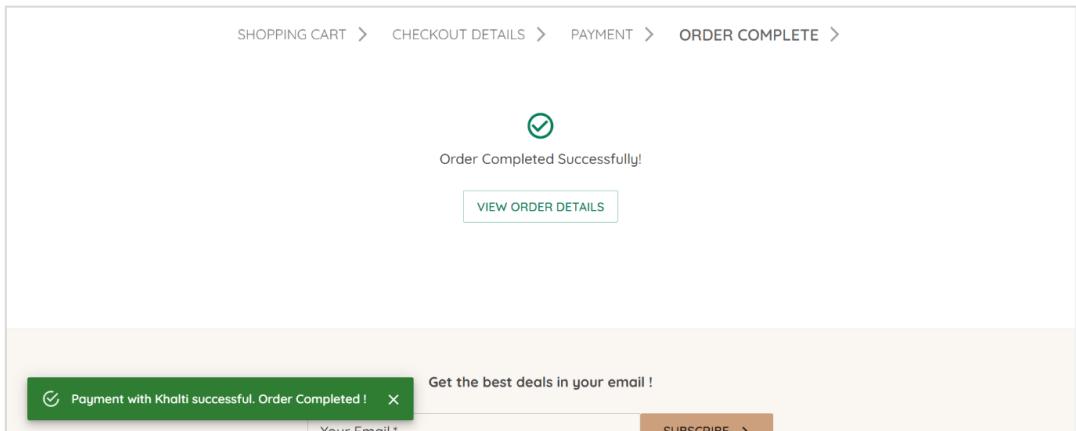


Figure 202: Success Message after successful payment

- Response received from the Khalti server printed on the browser's console.

The successful payment response with the status code of “200” was received from the khalti server.

```

payment_gateway... | Filter
▼ {data: {...}, status: 200, statusText: "OK", headers: {...}, config: {...}, ...} ⓘ
  ► config: {transitional: {...}, transformRequest: Array(1), transformResponse: Array(1), timeout: 0, adapter: f, ...}
  ► data: {idx: 'AvMwNNqAbhwLSgS6ar3qzi', type: {...}, state: {...}, amount: 2500, fee_amount: 75, ...}
  ► headers: {access-control-allow-headers: '*', access-control-allow-methods: '*', access-control-allow-origin: '*'}
  ► request: XMLHttpRequest {onreadystatechange: null, readyState: 4, timeout: 0, withCredentials: false, upload: XMLHttpRequest}
    status: 200
    statusText: "OK"
  ► [[Prototype]]: Object
  >

```

Figure 203: Khalti server response

5.1.13. Email (Newsletter) Subscription Form Test

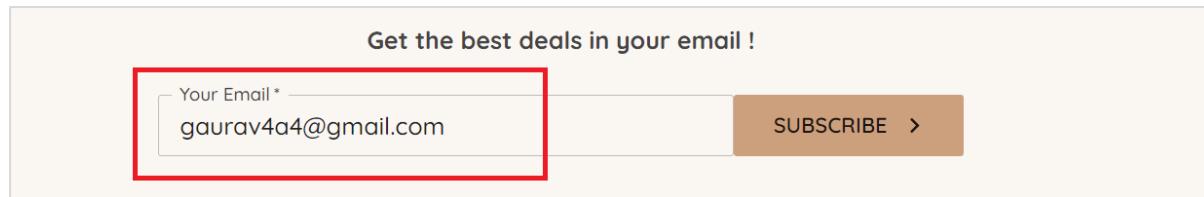
- **Test 30:** Trying to enter a new email in the Email Subscription Form

Table 44: Trying to enter a new email in the Email Subscription Form

Objective	To test whether the Email Subscription Form is working correctly.
Action	The following actions were performed: - A new email address was entered.

	<ul style="list-style-type: none"> - Mailchimp account was checked to ensure that the entered email address was present in the mailing subscription list.
Expected Result	The new email address should be added to the mailing subscription list of the Mailchimp account. After the successful addition of the email address, a success message should also be displayed in a Snackbar (Alert Box)
Actual Result	The new email address was added to the mailing subscription list, and the success message was also shown.
Remarks	The test was successful.

- Entering a new email address in the Email field.



A screenshot of a web-based Mailchimp subscription form. At the top, it says "Get the best deals in your email !". Below is a text input field labeled "Your Email *". Inside the input field, the email "gaurav4a4@gmail.com" is typed. To the right of the input field is a brown "SUBSCRIBE >" button.

Figure 204: Email entered in the Subscription Form

- Success Message shown

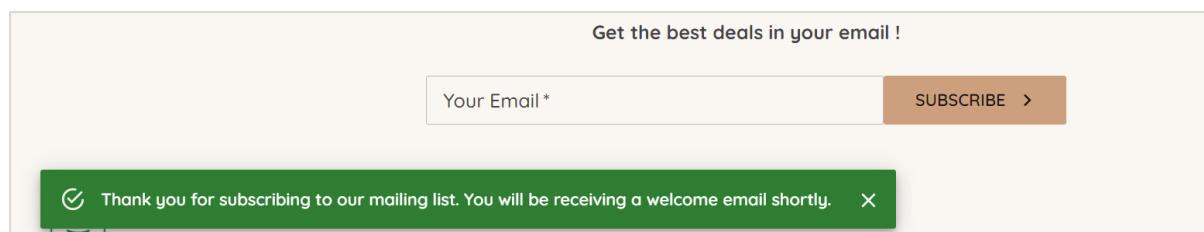


Figure 205: Success Message

- Email Address present in the Mailchimp account's subscribers list.

Filter by Tags ▾		View Segment ▾		New Segment						
	Email Address	First Name	Last Name	Address	Phone Number	Birthday	Tags	Email Marketing	Source	Contact Rating
<input type="checkbox"/>	gaurav4a4@gmail.com >						Subscribed		API - Omni	
<input type="checkbox"/>	aakarshanthapa123@gmail.c... >						Subscribed		API - Omni	
<input type="checkbox"/>	akarsan.thapa@gmail.com >						Subscribed		API - Omni	

Figure 206: Mailchimp subscribers list

5.2. Admin Interface Testing

5.2.1. Product Management Test Cases

- **Test 31:** Adding a new product

Table 45: Adding a new product

Objective	To test the “Add Product” functionality of the admin panel and check the validation of the “Add Product” form.
Action	<p>Try 1: All the fields were left empty, and the “Add Product” Button was clicked.</p> <p>Try 2: To submit the form without uploading the Product image.</p> <p>Try 3: To submit the form by filling all the fields.</p>
Expected Result	Error messages should be shown if any of the fields are left empty. Otherwise, the product should be added to the database successfully.
Actual Result	Validation errors were displayed when the fields were left empty, but the product was successfully added when there were no errors.
Remarks	The test was successful.

- **Try 1:** All the fields were left empty, and the “Add Product” Button was clicked.

The screenshot shows a modal window titled "Add product details". The form contains five required fields: "Product Name", "Description", "Price", "Count In Stock", and "Category". Each field has a red border and a corresponding error message below it: "Product name is a required Field", "Product description is a required Field", "Price is a required Field", "Count In Stock is a required Field", and "Category is a required Field". Below the form is a file upload section with a placeholder "Image" and a green "UPLOAD" button. At the bottom is a large orange "ADD PRODUCT >" button. The background shows a dark sidebar with "SHOP BY CAT" and a list of products.

Figure 207: Empty Fields with error texts

- **Try 2:** To submit the form without uploading the Product image.

Figure 208: Submitting form without uploading the product image

- **Try 3:** To submit the form by filling all the fields.

The new product can be seen on the product list table and the product database table.

Figure 209: Product Added in the product list table Successfully

Figure 210: Product added in the database table

➤ **Test 33:** Editing a product

Table 46: Editing a product

Objective	To edit a product.
Action	<p>The following actions were performed:</p> <ul style="list-style-type: none"> - Edit Icon Button was clicked for the product to be edited. - The Edit Product form was edited. - The Edit Product form was submitted
Expected Result	The product details should be updated in the database table and be reflected in the product list table.
Actual Result	The product details were updated in the database table and were reflected in the product list table.
Remarks	The test was successful.

- Before editing the product:

Product List table before editing:

Product List							
Product ID	Product Name	Description	Category	Price	In Stock	Is Featured?	Actions
191	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set description	Sofas	NPR. 10	6	✓	Edit Button  
190	HMG Fabric 3 + 1 + 1 Grey Sofa Set	HMG Fabric 3 + 1 + 1 Grey Sofa Set description	Sofas	NPR. 10	10	✗	 

Figure 211: Product in the product list table before editing

Product database table before editing:

185	AMSTERDAM SOFA WITH F...	Amsterdam is sharp lines and sweeping curves. ...	25	/uploads/image-1649781815286.jpg	13	1
186	FARGO SOFA	The feminine look and curvy features of the exc...	13	/uploads/image-1649781886836.jpg	0	0
187	Romeo	The Romeo sofa's delicate lines, proportions an...	10	/uploads/image-1649781972440.jpg	12	0
190	HMG Fabric 3 + 1 + 1 Gre...	HMG Fabric 3 + 1 + 1 Gre Sofa Set description	10	/uploads/image-1650694429565.jpg	10	0
191	WESTIDO Cyrus Leatherett...	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Gr...	10	/uploads/image-1650694538592.jpg	6	0

Figure 212: Product in the database table before editing

- Updating the product:

The screenshot shows a modal window titled "Edit product details". Inside, there are several input fields: "Product Name*" containing "WESTIDO Cyrus Leatherette", "Description*" containing "Description of Cyrus Leatherette", "Price*" containing "10", "Count In Stock*" containing "6", "Category" dropdown set to "Sofas", "Image*" showing the path "/uploads/image-1650694538592.jpg" with an "UPLOAD" button, and a checked "Featured?" checkbox. At the bottom is a "SAVE CHANGES >" button.

Figure 213: Editing product details in the product edit form

- After updating the product:

Product List table after updating:

Product ID	Product Name	Description	Category	Price	In Stock	Is Featured?	Actions
191	WESTIDO Cyrus Leatherette	Description of Cyrus Leatherette	Sofas	NPR. 10	6	✓	
190	HMG Fabric 3 + 1 + 1 Grey Sofa Set	HMG Fabric 3 + 1 + 1 Grey Sofa Set description	Sofas	NPR. 10	10	✗	
187	Romeo	The Romeo sofa's delicate lines, proportions and details - like the ta...	Sofas	NPR. 10	12	✓	
186	FARGO SOFA	The feminine look and curvy features of the exc...	Sofas	NPR. 13	0	✓	

Product updated successfully

Figure 214: Product in the product list table after updating

Product Database table after updating:

186	FARGO SOFA	The feminine look and curvy features of the exc...	13	/uploads/image-1649781886836.jpg	0	0
187	Romeo	The Romeo sofa's delicate lines, proportions an...	10	/uploads/image-1649781972440.jpg	12	0
190	HMG Fabric 3 + 1 + 1 Grey ...	HMG Fabric 3 + 1 + 1 Grey Sofa Set description	10	/uploads/image-1650694429565.jpg	10	0
191	WESTIDO Cyrus Leatherette	Description of Cyrus Leatherette	10	/uploads/image-1650694538592.jpg	6	0
*	NULL	NULL	NULL	NULL	NULL	NULL

Figure 215: Product in the database table after updating

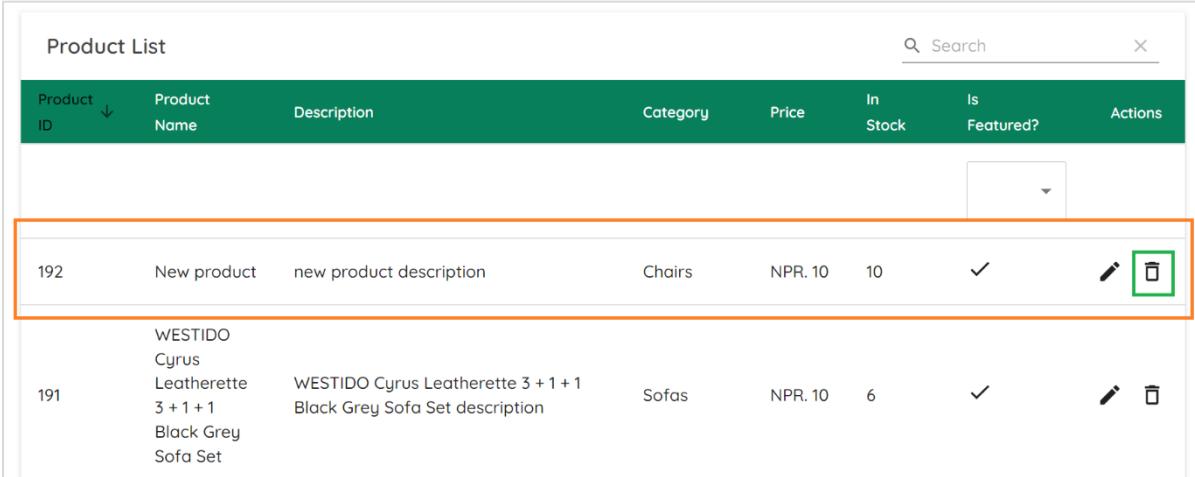
➤ **Test 34:** Deleting a product

Table 47: Deleting a product

Objective	To delete a product.
Action	<p>The following actions were performed:</p> <ul style="list-style-type: none"> - Delete Icon Button was clicked for the product to be deleted. - The “Yes” option was selected on the confirmation dialog.
Expected Result	The product should be removed from the product list table and product database table.
Actual Result	The product was removed from the product list table and product database table.
Remarks	The test was successful.

- Before deleting the product:

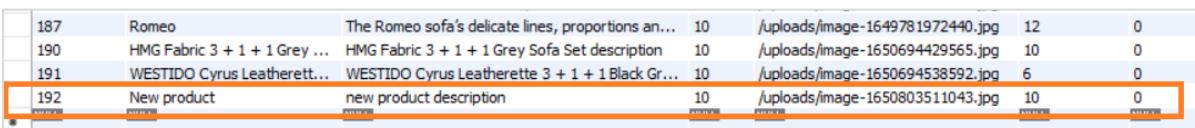
Product List table:



Product List							
Product ID	Product Name	Description	Category	Price	In Stock	Is Featured?	Actions
192	New product	new product description	Chairs	NPR. 10	10	✓	
191	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Grey Sofa Set description	Sofas	NPR. 10	6	✓	

Figure 216: Product in the product list table before deletion

Database table:



187	Romeo	The Romeo sofa's delicate lines, proportions an...	10	/uploads/image-1649781972440.jpg	12	0
190	HMG Fabric 3 + 1 + 1 Grey ...	HMG Fabric 3 + 1 + 1 Grey Sofa Set description	10	/uploads/image-1650694429565.jpg	10	0
191	WESTIDO Cyrus Leatherett...	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Gr...	10	/uploads/image-1650694538592.jpg	6	0
192	New product	new product description	10	/uploads/image-1650803511043.jpg	10	0

Figure 217: Product in the database table before deletion

- Deleting the product:

Product delete confirmation dialog:

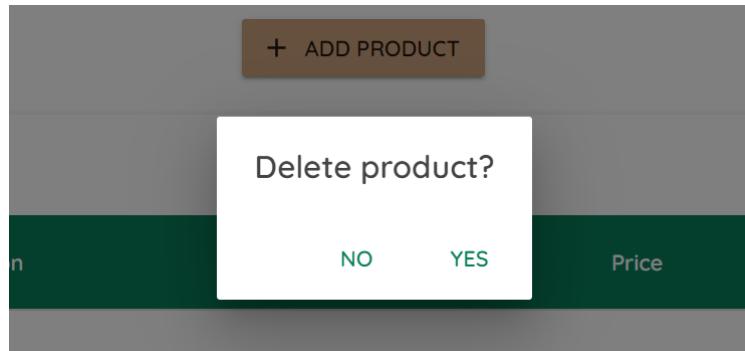


Figure 218: Product Delete Confirmation Dialog

Product deletion success message:

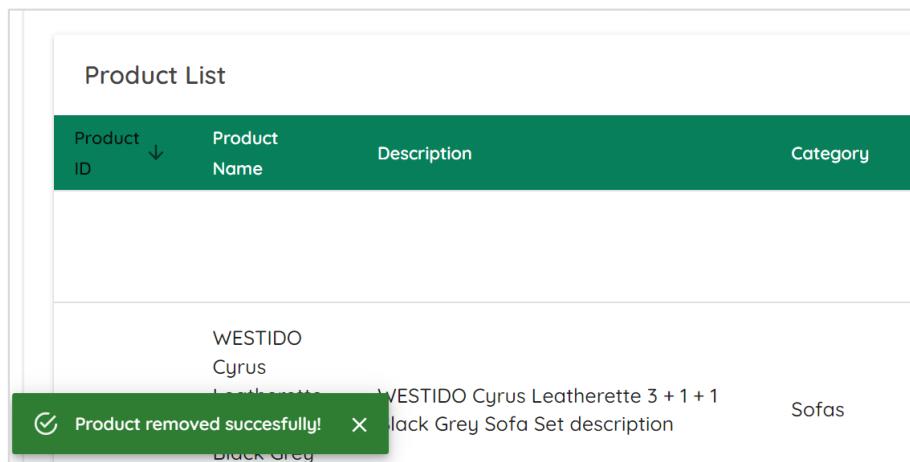


Figure 219: Product deletion success message

- After deletion of the product:

Here, we can see that the product with the ID of 192 is not present in the product database table.

186	FARGO SOFA	The feminine look and curvy features of the exc...	13	/uploads/image-1649781886836.jpg	0	0
187	Romeo	The Romeo sofa's delicate lines, proportions an...	10	/uploads/image-1649781972440.jpg	12	0
190	HMG Fabric 3 + 1 + 1 Grey ...	HMG Fabric 3 + 1 + 1 Grey Sofa Set description	10	/uploads/image-1650694429565.jpg	10	0
191	WESTIDO Cyrus Leatherett...	WESTIDO Cyrus Leatherette 3 + 1 + 1 Black Gr...	10	/uploads/image-1650694538592.jpg	6	0
*	HULL	NULL	NULL	HULL	HULL	NULL

Figure 220: Product absent in the product database table

5.2.2. Category Management Test Cases

➤ **Test 35:** Adding a new category

Table 48: Adding a new category

Objective	To test the “Add Category” functionality of the admin panel and check the validation of the “Add Category” form.
Action	<p>Try 1: All the fields were left empty, and the “Add Category” Button was clicked.</p> <p>Try 2: To submit the form without uploading the Category image.</p> <p>Try 3: To submit the form by filling all the fields.</p>
Expected Result	Error messages should be shown if any of the fields are left empty. Otherwise, the category should be added to the database successfully.
Actual Result	Validation errors were displayed when the fields were left empty, but the category was successfully added when there were no errors.
Remarks	The test was successful.

- **Try 1:** All the fields were left empty, and the “Add Category” Button was clicked.

The screenshot shows a modal window titled "Add category details". It contains three input fields: "Category Name *", "Description *", and "Image *". The "Category Name *" field has a red border and a placeholder "Category name is a required Field". The "Description *" field also has a red border and a placeholder "Category description is a required Field". The "Image *" field has a red border and a placeholder "Image is a required Field". Below the fields is a large orange "ADD CATEGORY >" button. To the right of the "Image *" field is a green "IMAGE" button.

Figure 221: Empty Fields with error texts

- **Try 2:** To submit the form without uploading the Category image.

The screenshot shows a web-based form for adding a category. At the top right is a green circular icon with a white letter 'G'. Below it is a red 'X' button. The main area contains a form field labeled 'Image *' with a placeholder 'Choose a image!'. To the right of this field is a green button labeled 'IMAGE'. At the bottom is a large orange button with the text 'ADD CATEGORY >'. The entire interface is set against a dark grey background.

Figure 222: Submitting form without uploading the category image

- **Try 3:** To submit the form by filling all the fields.

The new category can be seen on the category list table and the category database table.

Category List			
Category ID	Category Name	Description	Actions
1	Sofas	Sofa description	
2	Chairs	Easy Chair description	
3	Beds	Beds Description	
4	Wardrobes	Wardrobes Description	
5	Tables	Tables Description	
103	New Category	Category description	

Category created Successfully

Figure 223: Category Added in the product list table Successfully

	category_id	name	description	createdAt	updatedAt	imagePath
▶	1	Sofas	Sofa description	2022-01-11 14:04:17	2022-04-06 08:46:52	/uploads/image-1648031462583.jpg
▶	2	Chairs	Easy Chair description	2022-01-11 14:04:17	2022-03-23 10:31:13	/uploads/image-1648031472884.jpg
▶	3	Beds	Beds Description	2022-01-11 14:04:17	2022-03-23 10:31:24	/uploads/image-1648031483967.jpg
▶	4	Wardrobes	Wardrobes Description	2022-01-11 14:04:17	2022-03-23 10:31:35	/uploads/image-1648031495155.jpg
▶	5	Tables	Tables Description	2022-01-11 14:04:17	2022-03-23 10:31:44	/uploads/image-1648031504152.jpg
*	103	New Category	Category description	2022-04-26 02:08:39	2022-04-26 02:08:39	/uploads/image-1650938919134.jpg

Figure 224: Category added in the database table

➤ **Test 36:** Editing a category

Table 49: Editing a category

Objective	To edit a category.
Action	<p>The following actions were performed:</p> <ul style="list-style-type: none"> - Edit Icon Button was clicked for the category to be edited. - The Edit Category form was edited. - The Edit Category form was submitted
Expected Result	The category details should be updated in the database table and be reflected in the category list table.
Actual Result	The category details were updated in the database table and were reflected in the category list table.
Remarks	The test was successful.

- Before editing the category:

Category List table before editing:

Category List			
Category ID	Category Name	Description	Actions
1	Sofas	Sofa description	 
2	Chairs	Easy Chair description	 
3	Beds	Beds Description	 
4	Wardrobes	Wardrobes Description	 
5	Tables	Tables Description	 
103	New Category	Category description	Edit Button  

Figure 225: Category in the category list table before editing

Category database table before editing:

	category_id	name	description	createdAt	updatedAt	imagePath
▶	1	Sofas	Sofa description	2022-01-11 14:04:17	2022-04-06 08:46:52	/uploads/image-1648031462583.jpg
	2	Chairs	Easy Chair description	2022-01-11 14:04:17	2022-03-23 10:31:13	/uploads/image-1648031472884.jpg
	3	Beds	Beds Description	2022-01-11 14:04:17	2022-03-23 10:31:24	/uploads/image-1648031483967.jpg
	4	Wardrobes	Wardrobes Description	2022-01-11 14:04:17	2022-03-23 10:31:35	/uploads/image-1648031495155.jpg
	5	Tables	Tables Description	2022-01-11 14:04:17	2022-03-23 10:31:44	/uploads/image-1648031504152.jpg
	103	New Category	Category description	2022-04-26 02:08:39	2022-04-26 02:08:39	/uploads/image-1650938919134.jpg

Figure 226: Category in the database table before editing

- Updating the Category:

The screenshot shows a modal window titled "Edit category details". Inside, there are two input fields: "Category Name *" containing "Bench" and "Description *" containing "Bench Description". Below these is a file input field for "Image *" showing the path "/uploads/image-1650938919134.jpg". To the right of this input field is a green "IMAGE" button with a white "G" icon. At the bottom of the modal is a brown "SAVE CHANGES" button with a right-pointing arrow.

Figure 227: Editing category details in the product edit form

- After updating the product:

Category List table after updating:

Category List				Search	X
Category ID	Category Name	Description	Actions		
1	Sofas	Sofa description			
2	Chairs	Easy Chair description			
3	Beds	Beds Description			
4	Wardrobes	Wardrobes Description			
5	Tables	Tables Description			
103	Bench	Bench Description			

Category updated successfully X

Figure 228: Category in the category list table after updating

Category Database table after updating:

	category_id	name	description	createdAt	updatedAt	imagePath
▶	1	Sofas	Sofa description	2022-01-11 14:04:17	2022-04-06 08:46:52	/uploads/image-1648031462583.jpg
▶	2	Chairs	Easy Chair description	2022-01-11 14:04:17	2022-03-23 10:31:13	/uploads/image-1648031472884.jpg
▶	3	Beds	Beds Description	2022-01-11 14:04:17	2022-03-23 10:31:24	/uploads/image-1648031483967.jpg
▶	4	Wardrobes	Wardrobes Description	2022-01-11 14:04:17	2022-03-23 10:31:35	/uploads/image-1648031495155.jpg
▶	5	Tables	Tables Description	2022-01-11 14:04:17	2022-03-23 10:31:44	/uploads/image-1648031504152.jpg
▶	103	Bench	Bench Description	2022-04-26 02:08:39	2022-04-26 02:21:51	/uploads/image-1650938919134.jpg

Figure 229: Category in the database table after updating

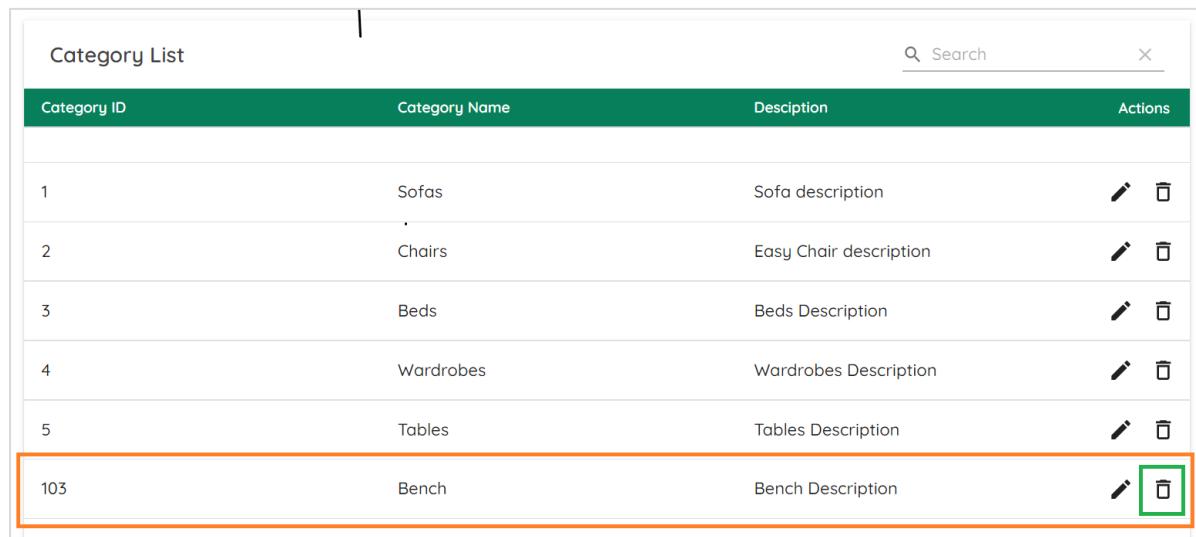
➤ **Test 37:** Deleting a category

Table 50: Deleting a category

Objective	To delete a category.
Action	<p>The following actions were performed:</p> <ul style="list-style-type: none"> - Delete Icon Button was clicked for the category to be deleted. - The “Yes” option was selected on the confirmation dialog.
Expected Result	The category should be removed from the category list table and category database table.
Actual Result	The category was removed from the category list table and category database table.
Remarks	The test was successful.

- Before deleting the category:

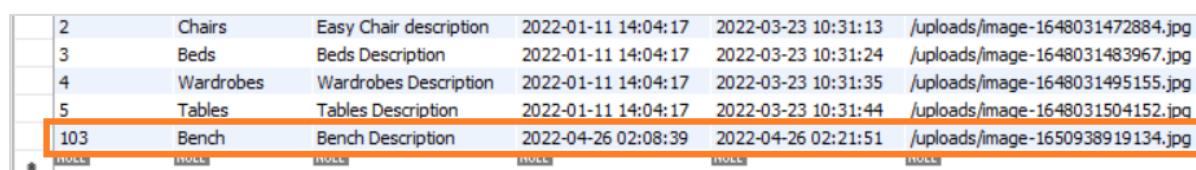
Category List table:



Category List			
Category ID	Category Name	Description	Actions
1	Sofas	Sofa description	 
2	Chairs	Easy Chair description	 
3	Beds	Beds Description	 
4	Wardrobes	Wardrobes Description	 
5	Tables	Tables Description	 
103	Bench	Bench Description	 

Figure 230: Category in the category list table before deletion

Database table:



2	Chairs	Easy Chair description	2022-01-11 14:04:17	2022-03-23 10:31:13	/uploads/image-1648031472884.jpg
3	Beds	Beds Description	2022-01-11 14:04:17	2022-03-23 10:31:24	/uploads/image-1648031483967.jpg
4	Wardrobes	Wardrobes Description	2022-01-11 14:04:17	2022-03-23 10:31:35	/uploads/image-1648031495155.jpg
5	Tables	Tables Description	2022-01-11 14:04:17	2022-03-23 10:31:44	/uploads/image-1648031504152.jpg
103	Bench	Bench Description	2022-04-26 02:08:39	2022-04-26 02:21:51	/uploads/image-1650938919134.jpg

Figure 231: Category in the database table before deletion

- Deleting the category:

Category delete confirmation dialog:

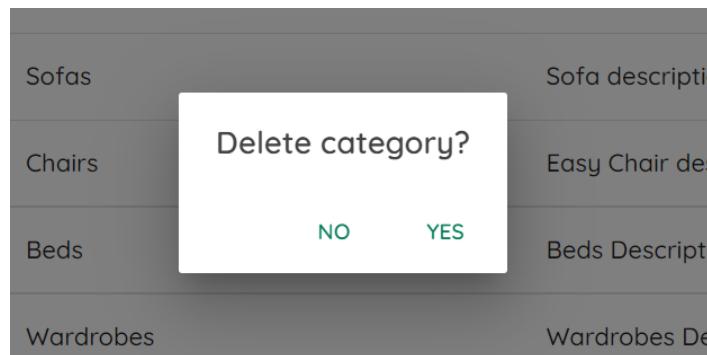


Figure 232: Category Delete Confirmation Dialog

Deletion success message:

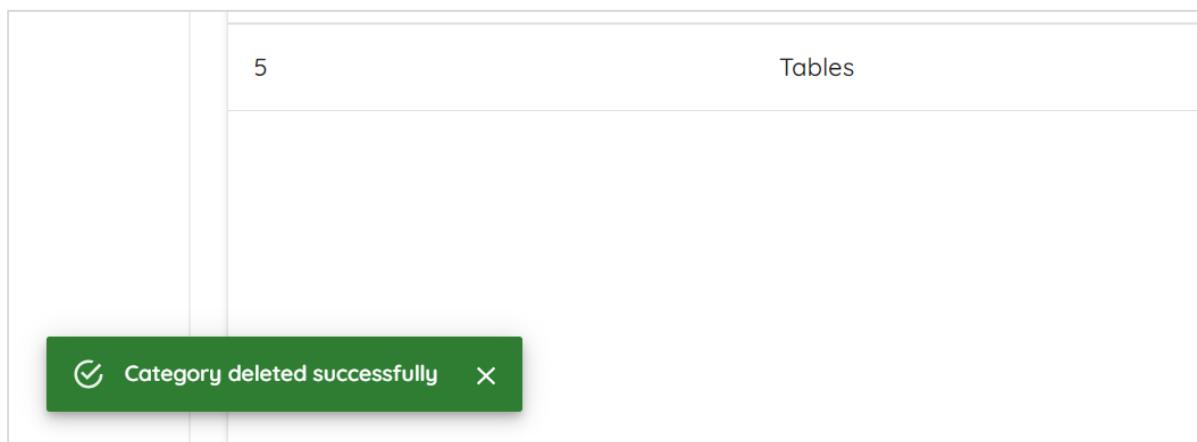


Figure 233: Category deletion success message

- After deletion of the category:

Here, we can see that the category with the ID of 103 is not present in the category database table.

	category_id	name	description	createdAt	updatedAt	imagePath
▶	1	Sofas	Sofa description	2022-01-11 14:04:17	2022-04-06 08:46:52	/uploads/image-1648031462583.jpg
▶	2	Chairs	Easy Chair description	2022-01-11 14:04:17	2022-03-23 10:31:13	/uploads/image-1648031472884.jpg
▶	3	Beds	Beds Description	2022-01-11 14:04:17	2022-03-23 10:31:24	/uploads/image-1648031483967.jpg
▶	4	Wardrobes	Wardrobes Description	2022-01-11 14:04:17	2022-03-23 10:31:35	/uploads/image-1648031495155.jpg
▶	5	Tables	Tables Description	2022-01-11 14:04:17	2022-03-23 10:31:44	/uploads/image-1648031504152.jpg
●	HULL	HULL	HULL	HULL	HULL	HULL

Figure 234: Category absent in the category database table

5.2.3. User Management Test Cases

- **Test 38:** Editing user details

Table 51: Editing user details

Objective	To edit user details from the user management panel.
Action	<p>The details of user with the user id of 30 is updated. Updated Information:</p> <ul style="list-style-type: none"> - First Name: Changed from “Antonio” to “Toni” - Role (is Admin?): Changed from 0 to 1
Expected Result	The updated details should be reflected on the User List table as well as the database table.
Actual Result	The updated details were reflected on the User List table as well as the database table.
Remarks	The test was successful.

- Before Updating the user details:

User List table:

User List						
Actions	User ID	First Name	Last Name	Email	Contact Number	Is Admin?
	29	Lukita	Modric	luka@example.com	9806769512	
	30	Antonio	Kroos	toni@example.com	9846039259	
	32	Aakarshan	Thapa	aakarshanthapa123@gmail.com	9806769514	
	36	Aakarshan	Thapa	akarsan.thapa@gmail.com	9806769514	

Figure 235: User details in user list table before updating

User database table:

#	user_id	first_name	last_name	contact_number	role	email	password	createdAt	updatedAt	address_id
▶	28	Admin	User	9806769514	1	admin@example.com	\$2a\$10\$u3NhjG9eTQLeSWxBaLxUwE59tygw9q...	2022-01-11 14:04:17	2022-02-23 03:08:42	10
▶	29	Lukita	Modric	9806769512	1	luka@example.com	\$2a\$10\$yE26kzats8PvONsHOI90z03TyXkz8m...	2022-01-11 14:04:17	2022-04-13 16:09:20	7
▶	30	Antonio	Kroos	9846039259	0	toni@example.com	\$2a\$10\$ghZ8UDsuhwMPQ/gnE.erNdhKE6q2u...	2022-01-11 14:04:17	2022-02-17 11:00:04	8
▶	32	Aakarshan	Thapa	9806769514	0	aakarshanthapa123@gmail.com	\$2a\$12\$9ZDOuVhxfoOz2txFPZX4H0w5B3xNh...	2022-02-15 13:44:33	2022-04-24 11:26:08	NULL
▶	36	Aakarshan	Thapa	9806769514	0	akarsan.thapa@gmail.com	\$2a\$10\$uAKHXcxSRQZH3vIn00Qe.iRqPMhW...	2022-04-24 11:23:35	2022-04-24 11:23:35	NULL
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 236: User details in database table before updating

- Updating user details:

The screenshot shows a modal window titled "Edit User Details". Inside, there are input fields for "First Name" (containing "Toni") and "Last Name" (containing "Kroos"). A checkbox labeled "Is Admin?" is checked and highlighted with an orange border. At the bottom is a brown "SAVE CHANGES" button.

Figure 237: Updating user details

- After Updating:

User List table:

The screenshot shows a table titled "User List" with columns: Actions, User ID, First Name, Last Name, Email, Contact Number, and Is Admin?. The table contains four rows. The fourth row, corresponding to user ID 30 (Toni Kroos), has its "First Name" field ("Toni") and "Is Admin?" column ("✓") highlighted with green boxes. A success message at the bottom left says "User details updated successfully".

Figure 238: User details in user list table after updating

User Database table:

The screenshot shows a database table with columns: user_id, first_name, last_name, contact_number, role, email, password, createdAt, updatedAt, and address_id. The table contains several rows, with the fourth row (user ID 30, Toni Kroos) having its "first_name" ("Toni") and "role" ("1") highlighted with green boxes.

Figure 239: User details in database table after updating

5.3. Other Testings

- **Test 39:** Compatibility Testing in different browsers

Objective	To check the compatibility of the website in different browsers.
Action	The website was evaluated in the following web browsers: <ul style="list-style-type: none"> - Google Chrome - Opera - Microsoft Edge
Expected Result	The website UI layout should be consistent between all browsers. The functionality of the web application should run without any problem in all the browsers.
Actual Result	The website layout was consistent, and the functionalities of the application ran without any problem in all the browsers.
Remarks	The test was successful.

Google Chrome sample:

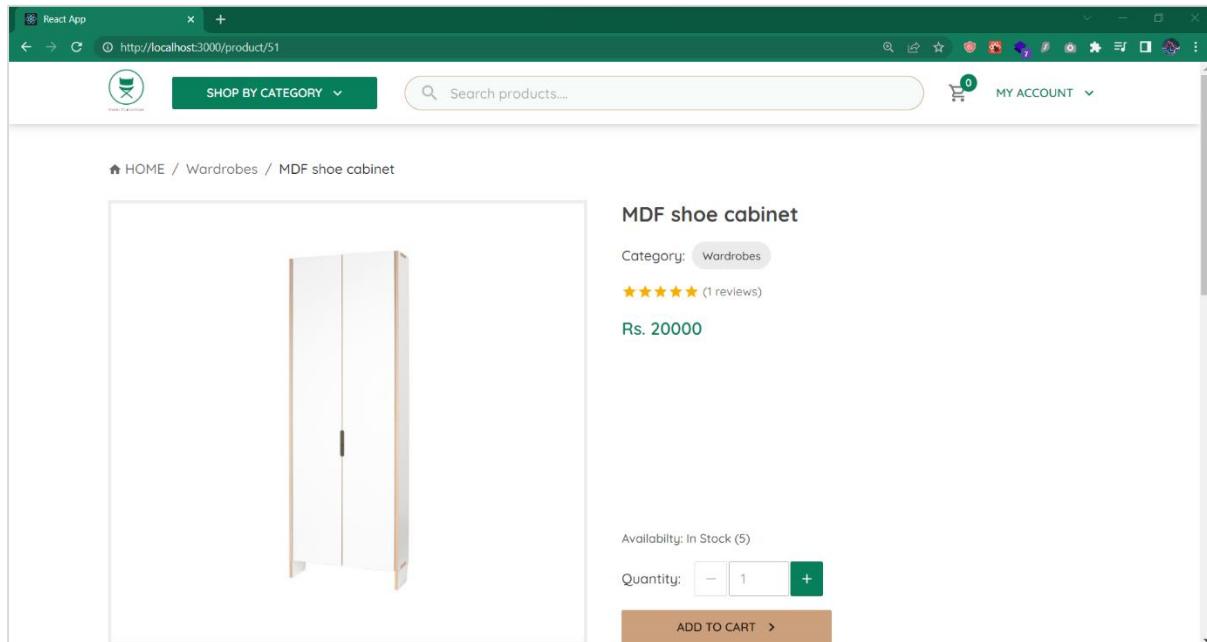


Figure 240: Running the application in Google Chrome

Opera sample:

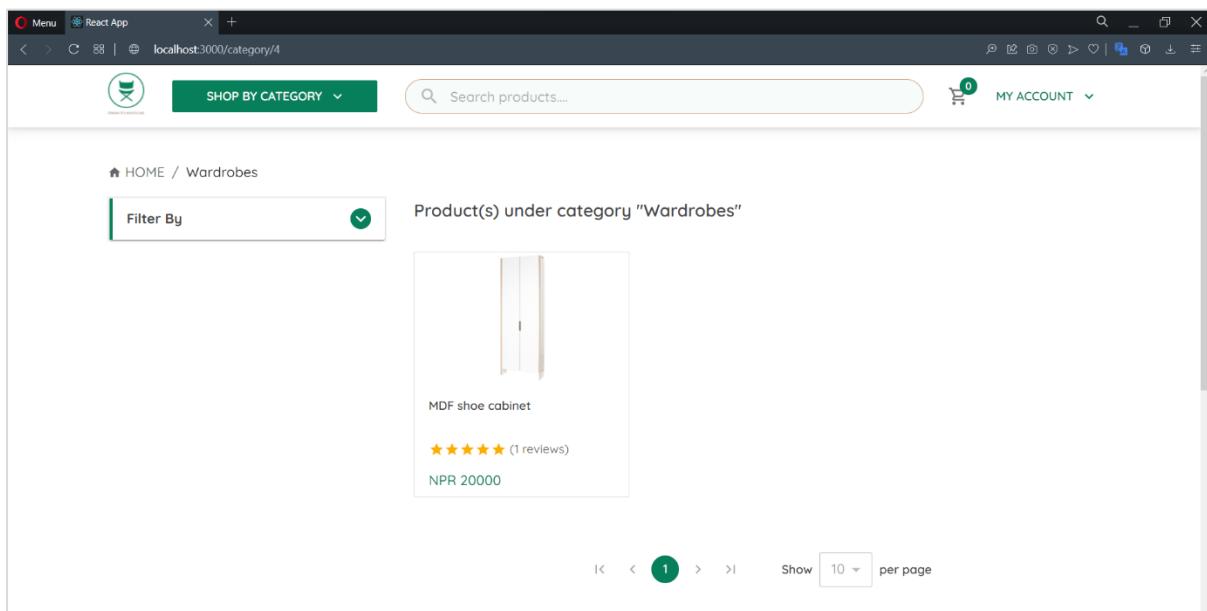


Figure 241: Running the application in Opera

Microsoft Edge:

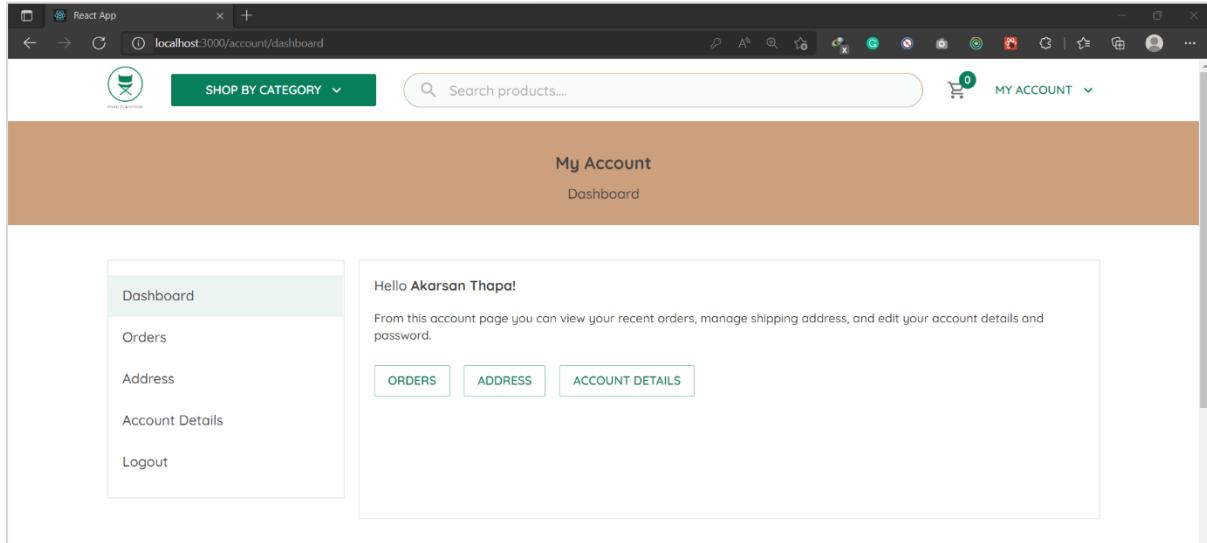


Figure 242: Running the application in Microsoft Edge

➤ **Test 40:** Website Responsiveness Testing

Table 52: Testing website responsiveness

Objective	To test the responsiveness of the website in different screen sizes.
Action	The website was tested in the Google Chrome device toolbar using small size devices.
Expected Result	The website UI layout should be consistent between all screen sizes.
Actual Result	The website UI layout was consistent between all screen sizes.
Remarks	The test was successful.

Sample Screenshots:

- Home Page

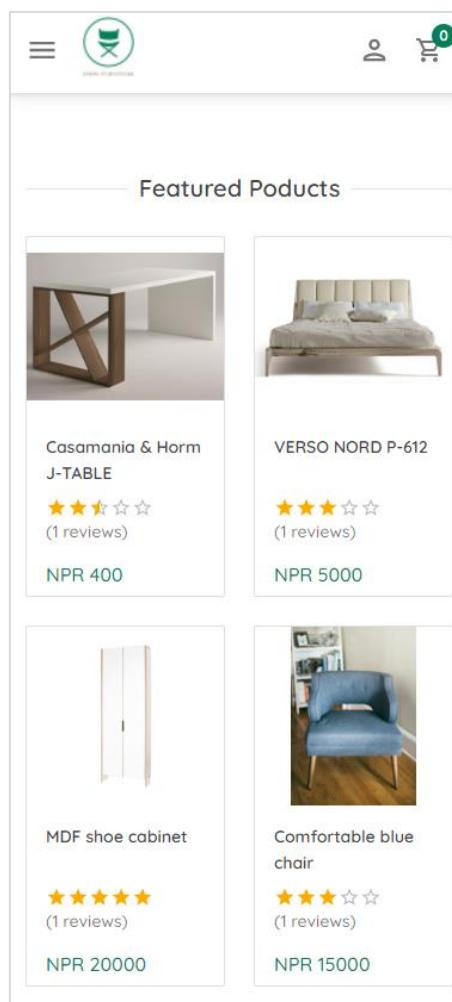


Figure 243: Home Page in mobile view

- Sidebar Navigation Menu

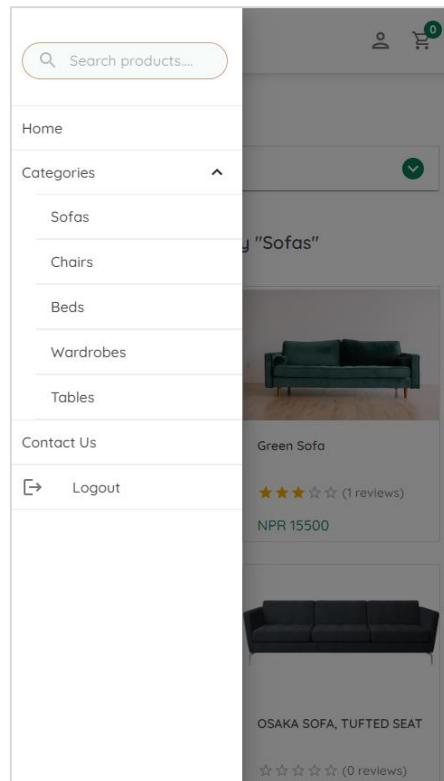


Figure 244: Sidebar Navigation Menu in small devices

- Cart Page

The screenshot shows a shopping cart page. At the top, there are navigation links: SHOPPING CART > CHECKOUT DETAILS > PAYMENT > ORDER COMPLETE >. Below this is a table with columns: PRODUCT, PRICE, QUANTITY, and SUBTOTAL. There is one item listed: 'INDIVI SOFA' at 'NPR 25' with a quantity of '1'. The subtotal is also 'NPR 25'. At the bottom, there is a 'CART TOTALS' section showing a total of 'NPR 25'. A large orange button at the very bottom is labeled 'PROCEED TO CHECKOUT'.

Figure 245: Cart Page in (iPad Mini) View

6. Analysis

The final year module required us to develop a fully working software system. As the final year project, I have developed a working version of a furniture shop eCommerce web application. The web application has been designed as a furniture shop eCommerce application, but it is fully compatible with selling/adding other types of goods/products. The final year module is year-long, so we all have gone through a long journey to develop the proposed software system. Throughout the application development process, I learned a lot of different tools and technologies, which helped to complete the development of the project. However, new features can be added to improve the application's usability and practicality. The software artifact's UI was developed using React JS's front-end JavaScript framework, which helped build clean user interfaces. In addition, react JS framework helped build the system using its widely popular component-based approach, which divided the application interface into small reusable components. One of the essential skills I have learned while doing the project is Form Validation.

Moreover, the web application is a SPA (Single Page Application) different from traditional websites. The SPA design is crucial to building an engaging, unique, and seamless experience for the users. SPA applications are made of a single page that continuously interacts with the user by dynamically rendering the current page rather than loading entire new pages from the server.

Express JS was used for the back-end of the system, which is a back-end web application framework for Node.js. Express JS was easy to set up and highly customizable, even for beginners like me who had no prior experience in backend technologies. Moreover, MySQL RDBMS (Relational database management system) is used for the application database. Any data or information displayed in the application is retrieved from the database, enhancing its robustness and dynamic nature. The backend API receives all HTTP requests, and the controllers handle the requests by performing CRUD (Create, Read, Update, Delete) operations and sending a response back. Most of the backend routes are protected using authentication middleware so that unauthorized users cannot access the controllers and manipulate the database and operations.

The software development methodology, Iterative methodology, was used to break the life cycle of the software development into different phases. The project followed the Iterative methodology, and the development process was divided into three iterations: the first and second iterations included the design and implementation of eCommerce sections (end users) functionality, while the third iteration was for the design and implementation of the admin interface functionalities. The iterative methodology was perfect for the project journey as there were many changes in the system's requirements.

Furthermore, we should be aware of the internal and external aspects that may impact the project. Therefore, the project's analysis based on two popular analysis methods, SWOT and PEST analysis, are described below:

6.1. SWOT analysis:

The SWOT analysis evaluates the Strengths, Weaknesses, Opportunities, and Threats of/to the project or business.

- S (Strength)
 - ✓ It has an attractive and user-friendly user interface, making the user experience better.
 - ✓ It has highly secure payment gateway integration (Khalti) for order payment.
 - ✓ It has embedded product review functionality that helps the users evaluate the quality of the products.
 - ✓ It lets the user see the featured products and search for desired products.
 - ✓ It can be used in devices ranging from mobile phones, tablets, laptops, and big monitors due to its responsive design.
 - ✓ Use of SPA (Single Page Application) approach for seamless user experience.
- W (Weakness)
 - ✓ It needs an internet connection to work.
 - ✓ It lacks a recommendation system due to which targeted products cannot be displayed on the user's interface.
 - ✓ Furniture goods must be delivered to customers, which can be bulky, heavy, and expensive to ship.

- ✓ The application lacks advertisement, due to which it is not easy to reach more users.
- O (Opportunities)
 - ✓ A mainstream payment gateway like eSewa can be integrated, which has the largest number of users among the digital wallet in Nepal.
 - ✓ The demand for furniture products is very high in the market.
 - ✓ Free or low-cost product promotions through social media sites such as Facebook, Instagram, and now widely popular TikTok.
- T (Threats)
 - ✓ Already established furniture shop eCommerce companies as competitors.
 - ✓ The security system of the application is fragile.
 - ✓ Advertising platforms such as Facebook ads may pose different threats, so staying up-to-date with eCommerce news and developments is necessary.

6.2. PEST analysis:

The PEST analysis evaluates the external factors such as Political, Economic, Social, and Technological that influence the business operation.

- P (Political)
 - ✓ Political decisions regarding tax laws can impact the prices of furniture products.
 - ✓ New laws could be implemented that would prevent our products from being sold in certain areas.
- E (Economical)
 - ✓ Inflation negatively affects the business while income growth positively.
 - ✓ Rise in the global market and helps in urbanization and globalization.
- S (Social)
 - ✓ The eCommerce industry is seen as a form of westernization in several societies in Nepal and other parts of the world, due to which the industry has seen slow growth.

- T (Technological)
 - ✓ Everything in the eCommerce industry is based on technology, so all eCommerce businesses are racing to be technologically ahead of their competitors.
 - ✓ The technologies used to develop this application are up to date and quite popular, but if the used technologies get changed or better technologies arrive in the future, it will be challenging to manage the application.

7. Conclusion

The rapid advancement of technology and the popularity of modern technology-related products has had a massive impact on people's livelihoods. This market has become highly competitive and volatile, with new and creative ideas for making people's daily lives easier appearing every minute. This has compelled inventors, creators, and developers to devise novel methods of presenting their products and services. With the digitization of nearly every tangible and intangible benefit, the demand for application development has risen to the highest point in its history. Following this, I have developed a stable version of a Furniture Shop eCommerce Web Application named "OmniFurni". This system acts as a tool to help the furniture shop maximize its efficiency, track the shop's progress, and help increase profit and customers.

Different SDLC methodologies were analyzed before implementing the project, and the Iterative methodology was selected in the end. Gantt chart was also developed based on the iterative methodology for better project management. And wireframes and prototypes were designed to help in the UI development. Moreover, different UML diagrams such as use case, sequence, collaboration, activity, and data flow diagrams were designed to help implement the system's internal workings. For database implementation data dictionary and Entity Relationship diagram were developed.

During creating and developing the project, I learned about key concepts, technologies, and tools that I used to build the application. For completing the overall project, essential skills such as project management, time management, technical skills, and development skills were required. Developing and completing this project taught me about these scenarios and aspects. I learned about these concepts,

technologies, and methods through thorough research. The application is built using popular frontend and backend technologies. React JS and React component library (Material UI) is used to create the application's user interfaces.

Similarly, Express JS (Node JS framework) is used for the back-end development, and MySQL is used as a database. The widely popular Formik Library and Yup library have been used for form validation. These form validation libraries helped a lot in advanced level form validation for all the forms present in the application. While creating and developing this project, my knowledge of the technologies, as mentioned earlier, improved massively. I also learned about other aspects of application development, such as the creation and integration of backend APIs and the Khalti payment gateway API. Similarly, the user passwords are hashed (encrypted) using the bcrypt js library before storing them in the database.

7.1. Sustainability

Sustaining a business in today's competitive and dynamic tech market is difficult. Every year, millions of applications fail due to a lack of self-sufficiency. However, everyone, including developers, can take various steps and precautions to keep their application and business in the tech market. In addition, many technology-related and unrelated companies experienced significant market changes, and those unable to adapt and sustain themselves failed. Therefore, I conducted extensive market research and a survey in light of these scenarios.

The following steps can be taken to sustain the eCommerce application. These steps are summarized in the following points:

- **Improving the scalability of design and features:**

Updates are critical for long-term viability and success in any application or other software. Because these updates are unavoidable, creating scalable design and functionalities is critical while developing the initial project. Therefore, the designs and features of this project are scalable and can adapt and evolve in the future.

- **Putting a greater emphasis on solving genuine problems:**

Many applications on the market are ineffective for the current user base. Applications that do not solve real-world problems or improve users' lives are more likely to fail in the technological market. While building this application project, I considered how the

application could help users make the product purchasing process more seamless, accessible, faster, effective, and efficient while developing it. These elements can boost user engagement and feature acceptance while meeting user expectations.

- **Valuing and incorporating user feedback:**

The developer might have created an exceptional application, but users determine the application's fate at the end of the day. So, it is crucial to value and focus on the user's feedback. It is highly challenging for the developers to be on the same page as the users without user feedback. To focus on the user's feedback, I have done a survey based on the eCommerce market in the pre-planning section.

- **Implement sustainable shipping and return policy**

Fast shipping is in high demand in eCommerce. Reduced returned merchandise is another way to make shipping practices more sustainable. To ensure that customers know what they are getting, provide clear product descriptions and sizing information. It is also suggested that the return policy be modified to discourage customers from purchasing multiple sizes of an item to see which one fits best.

7.1.1. Business Plan

The main business plan is to capitalize on the massive and growing market of the eCommerce industry, specifically furniture eCommerce. The global furniture market reached USD 545.78 billion in 2020 and is expected to grow at 5.4 percent through 2027, driven by consistent demand from residential applications. The integration of technology improvements in the industry has enabled this tremendous growth of the eCommerce business.

The company's most important strategic document will be the business plan. Writing it down allows for clarifying goals and identifying potential problems ahead of time. The business plan for this project will be as follows:

- **Identifying the resources needed to run the business:**

The company should look into three resource categories: financial, physical, and human. The first thing to look for will be the financial side. Most businesses start with limited funds and build their capital along the business journey. However, there are options like taking a loan and searching for investors in case of a lack of funds. Another is human resources which include talented and dedicated employees to perform essential tasks of the company.

- **Evaluating competitors:**

One of the essential things in business is evaluating how well your business measures up against the competition. The aspects of competitors that will be evaluated are the competitor's strengths and weaknesses and their product qualities.

7.1.2. SRS (Software Requirements Specification) document

Project Title: "OmniFurnii" Furniture Shop eCommerce Web Application

Category: Web Application

Purpose: The purpose of developing this web application is to provide the facility to buy furniture products online.

Project Scope: This project aims to provide users with the means to buy furniture products through a fully-featured eCommerce platform.

Introduction:

Existing System: There is a tradition of buying furniture products by going to the store in real. This affects the buyers in the following conditions:

- ✓ People have to rush from one store to another, searching for desired furniture products.
- ✓ Local stores do not offer the massive discounts that most people hope to receive.
- ✓ People do not have the ability to browser thousands of collections.
- ✓ It is hard to find comparable items in the store.

Proposed System: The proposed system is a furniture shop application that is an online platform, and it has many benefits compared to buying furniture in-store.

- ✓ Purchasing furniture online is easier and more comfortable than rushing store to store.
- ✓ People can search for items simply from the comfort of their living room.
- ✓ It is easier to find comparable furniture products. For example, a person may love a product that is out of their budget, but he/she can find something affordable that looks similar.
- ✓ The store will offer more discounts on the products.

Functional Requirements:

- ✓ **Login:** Users must be registered to log in to the system.
- ✓ **Browse products:** Users must be able to browse products under different furniture categories. Proper product search, filtering, and pagination features should be embedded into the system.
- ✓ **Manage Profile:** Users must be able to update their account details, change passwords, add an address, and view their orders.
- ✓ **Review and rating:** Users must be able to review products they have bought.
- ✓ **Business Rule:** Admin must be able to add/edit/delete products and categories. Admin must also be able to manage orders and edit users. The design personality of the website should reflect nature and furniture. i.e. (green and brown colors should be used for website components). The font family of the website should be “Quicksand”.

Non-Functional Requirements:

- ✓ **Performance:** The performance of the application should be acceptable. The application's performance should not hinder users' experience in any way. The response of the application should be high for every user action.
- ✓ **Capacity:** The system should be able to store all the data related to users, products, categories, and orders in the database.
- ✓ **Availability:** The system should not face critical failures that hinder its availability. As for the platform, as it is a web application, it will be available to users of all devices.
- ✓ **Usability:** Users of the system should be able to use the website to achieve their goals easily. The website should be easy to navigate and efficient from the user's point of view.
- ✓ **Maintainability:** The content of the application should be maintainable. The admin should have a separate interface to manage products, categories, users, and orders. Moreover, the functionalities and securities of the system should be maintained and updated every month.

Software tools and technologies:

Following are the software requirements for the development process:

- ✓ **IDE: Visual Studio Code**

- ✓ **Programming Language (libraries):** JavaScript, React JS, Express JS, HTML, CSS, Material UI
- ✓ **Database:** MySQL (and MySQL Workbench as a database design tool)
- ✓ **Prototyping:** Figma
- ✓ **Draw.io:** For designing UML diagrams (use case, sequence, collaboration, activity), flowchart, Gantt Chart, ER diagram.

Deployment (Device specification required for user): Any device that can run web browsers.

Hardware Specification (Device specification for developer): RAM: 8GB, Processor: Intel Core i7, Hard Disk: 256GB

7.2. Future Scope

Nepal's internet penetration rate stood at 38.4 percent of the total population at the start of 2022, due to which it has become easy to buy and sell online. In Nepal, there is a massive potential for eCommerce. New technology, digital stores, and interactive apps are being used in Nepal, which is a significant boost for the eCommerce sector. Numerous shopping portals and online portals are being launched. As a result, there have been many successful eCommerce businesses. Furthermore, numerous eCommerce companies are expanding and expanding their reach. All these factors conclude that an eCommerce application should constantly evolve so that it can thrive in the market.

Even though the application is functional and fully-featured, many other features can be added to improve it. A few additions and changes can improve the application's overall usability and functionality. The following are a few additions and improvements that can be made:

- Add sub-category feature to further structure furniture products.
- Add other payment gateways such as eSewa, and IME Pay.
- Add advanced-level product searching functionality.
- Provide users with real-time order status updates for tracking orders they have placed.
- Add social login (Facebook, Google) feature.
- Integrate the recommendation system into the system.

- Improve the user address input form so that users can choose their location from the provided district, province, or city rather than inputting them manually.

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Appendix

8. Preplanning

8.1. Requirement Gathering

Requirements gathering refers to determining all of a project's requirements, also known as requirements elicitation. The two primary types of project requirements are business and technical requirements. As with most development projects, the first phase is an initial planning stage to map out the specification papers, determine software or hardware requirements, and prepare for the following stages of the cycle. The requirements and needs are gathered and carefully examined during the requirement gathering phase to plan for the subsequent stages. In iterative methodology, requirements can change from one iteration to another. (Landau, 2022)

Requirements gathering was a critical stage in the development of my project. Because my project was developed using an iterative methodology, it was the first and one of the essential phases in determining the project's outcome. Prior to the design and development phases, requirements were gathered and analyzed about their relevance. Requirements for the application were gathered from research on similar systems, friends' surveys, and supervisors' consulting.

Research / Requirement Gathering through the survey:

Because a survey form is an essential part of gathering requirements, I conducted an online survey of my friends and relatives on OmniFurni eCommerce:

My survey's overall response report is shown below:

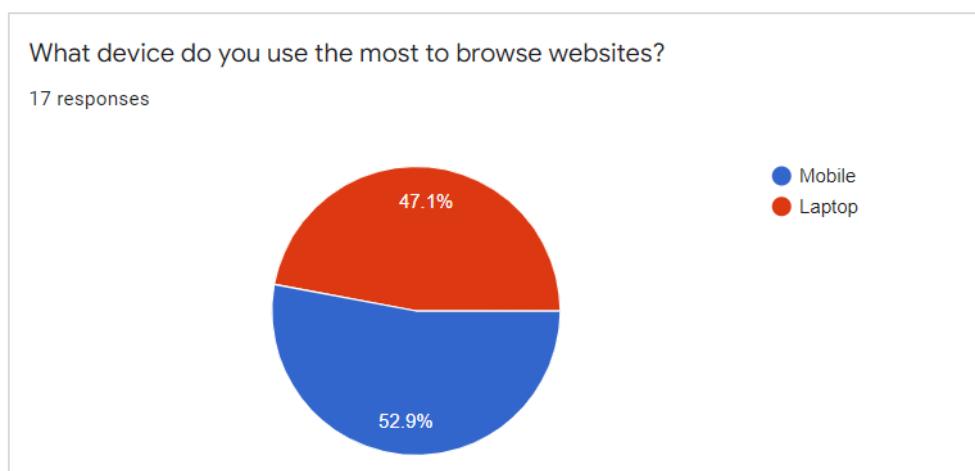


Figure 246: Survey question 1

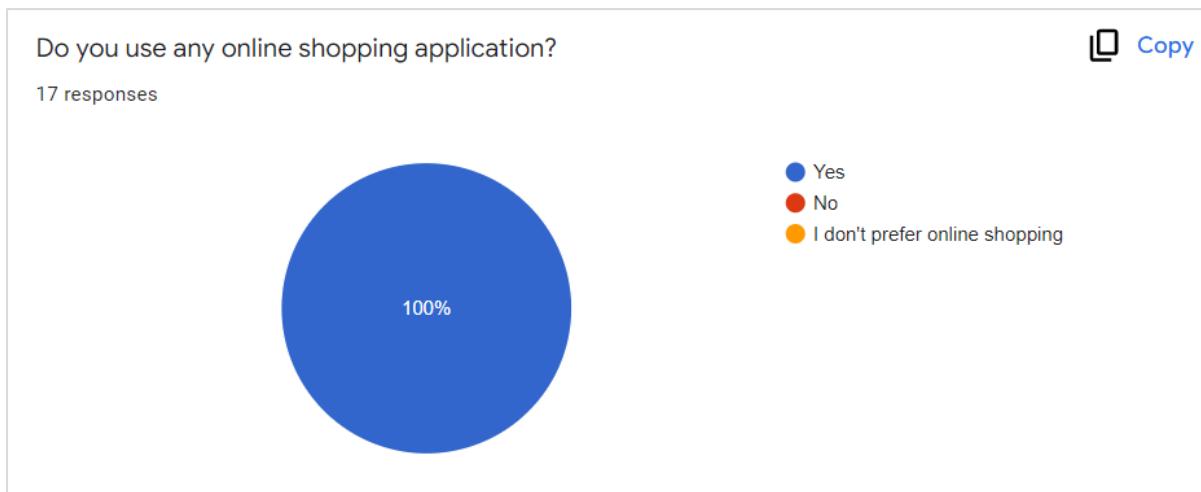


Figure 247: Survey question 2



Figure 248: Survey question 3

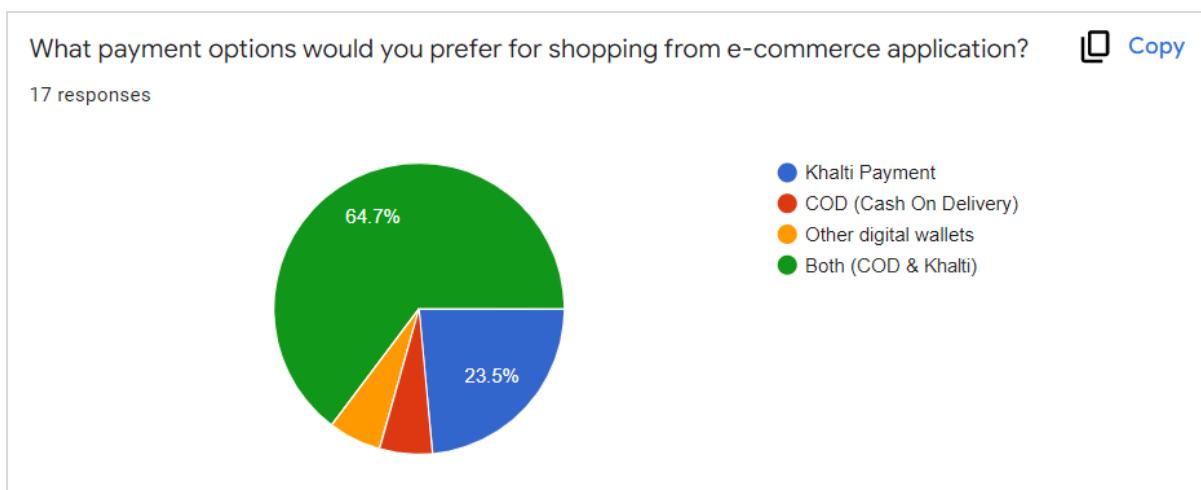


Figure 249: Survey question 4

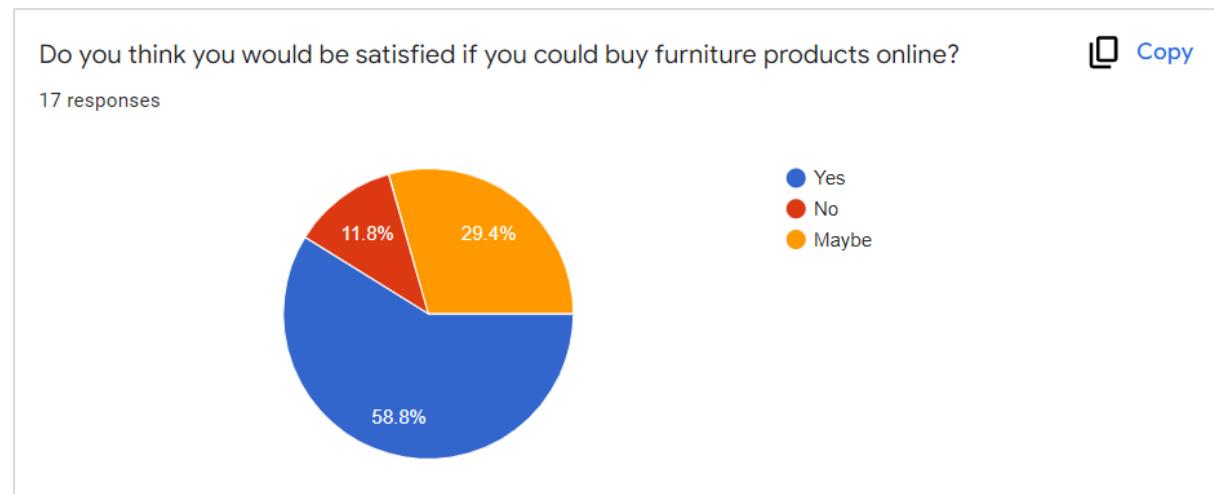


Figure 250: Survey question 5

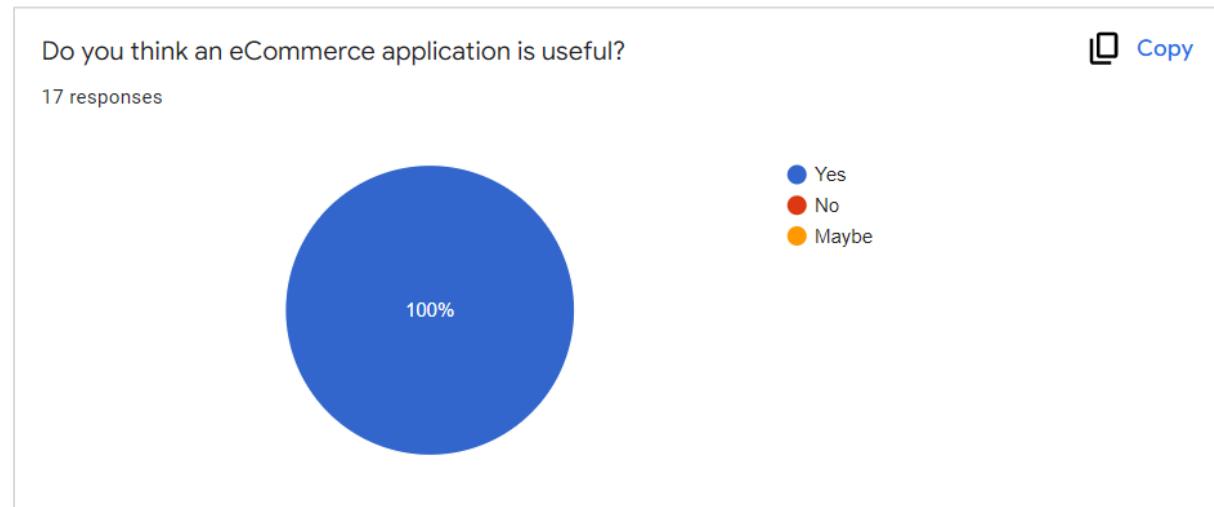


Figure 251: Survey question 6

Any feedback you would like to give.

4 responses

return policy must be easy under certain terms and condition

E-commerce is future

I would hope to see order tracking in future.

Figure 252: Survey question 7

8.2. Initial Gantt Chart

A Gantt chart, commonly used as a project management tool, is one of the most desired and useful ways of showing tasks or events presented against time. In other words, a Gantt chart shows what tasks or events (activities) have to be done and when it has to be done (schedule). It also helps determine the task that needs to be done in parallel and the tasks that need to be done sequentially. The phases/sub-phases are listed on the left of the chart, and suitable time scale along the top. Moreover, each task is represented by a horizontal bar; and the length and position of the bar reflect the duration, start date, and end date of the particular task. (Gantt, 2021)

The following Gantt chart indicates how the work of developing the system was scheduled. The Gantt chart is based on the iterative methodology.

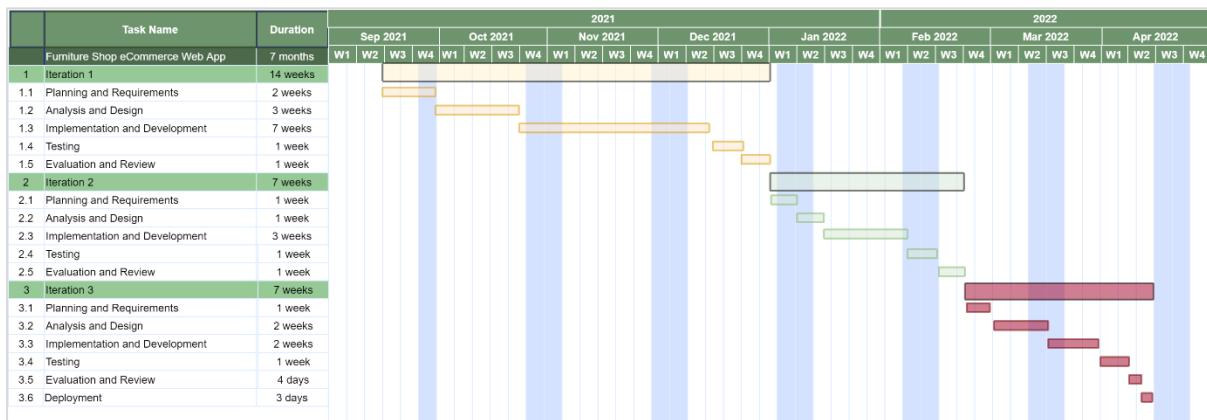


Figure 253: Initial Gantt Chart

8.3. Milestone Listing

A project milestone refers to an important event or activity that marks a significant achievement in a project. The milestones should indicate a logical progression of events leading up to the completion of your project. (Bunner, 2020)

Project milestones are represented in a table with the expected end date:

Table 53: Milestone Listing

S.N.	Milestone	Expected end date
1.	Project Start	12 th September 2021
2.	Database design and creation	15 th October 2021
3.	Complete User authentication (Login/Register)	14 th November 2021
4.	Home Page with Featured Products List and Category List catalog	20 th December 2021
5.	Category Page completion (including product filtering and pagination)	25 th January 2022
6.	Add To Cart Functionality	30 th January 2022
7.	Checkout Page	5 th February 2022
8.	Contact Us Form	9 th February 2022
9.	My Account Page	14 th February 2022
10.	Product Review Functionality	20 th February 2022
11.	Product Search Functionality	28 th February 2022
12.	Payment Page (With Khalti Payment Integration)	5 th March 2022
13.	Content Management System (Admin Side) Functionalities complete	28 th March 2022
14.	Project Complete	13 th April 2022

Milestone Listing representation in graph:

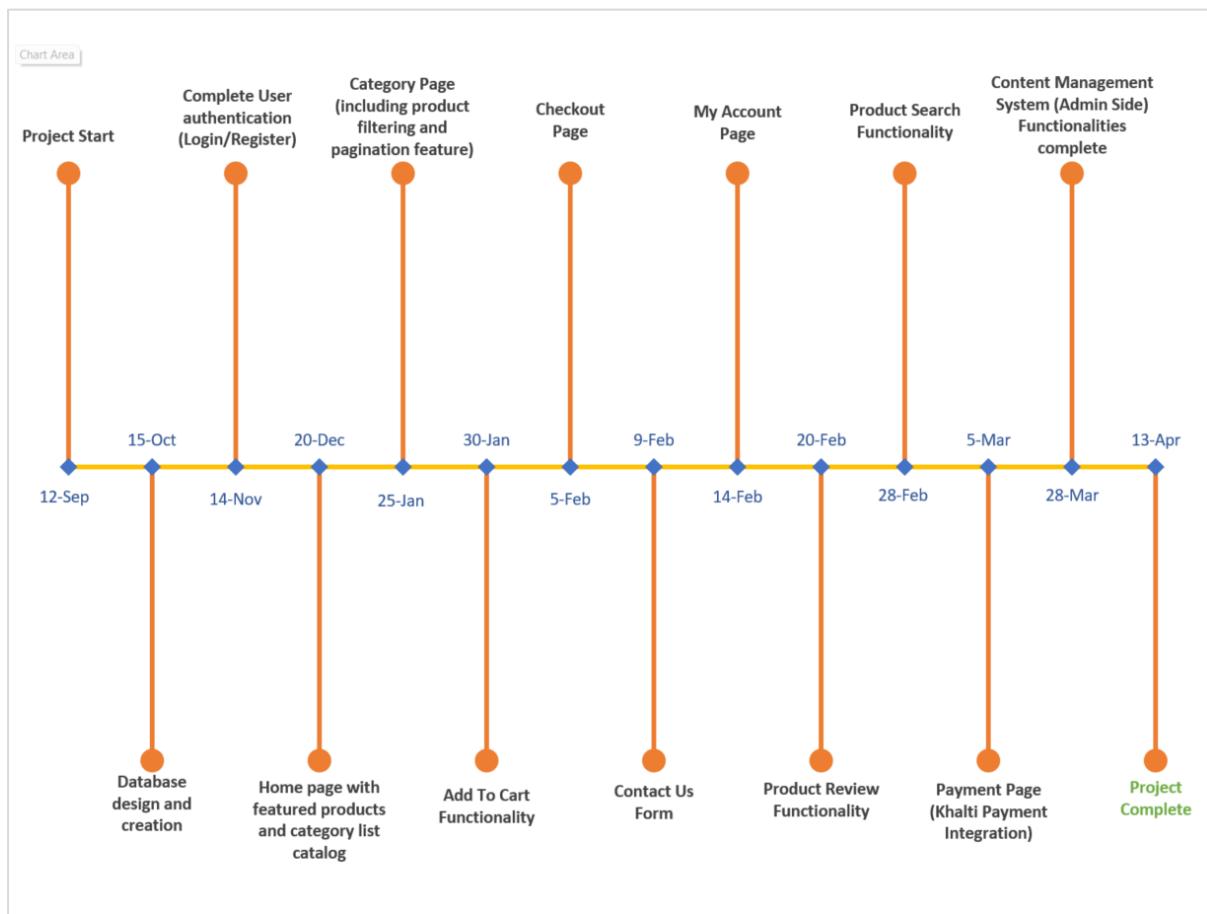


Figure 254: Milestone Listing Graphical Representation

8.4: WBS (Work breakdown structure)

Work breakdown structure (WBS) is a technique used for project management to complete a complex, multi-step project. It is a method to divide large tasks into multiple sub-tasks to get things done in time and more efficiently. It helps in accomplishing the project objectives and producing the required deliverables. The main goal of WBS is to make the project more manageable. (wrike, 2021)

It is essential to always start by breaking down the project into small parts before building any project in the real world. Otherwise, many problems and confusion will be encountered during the development phase.

Work breakdown structure for the project:

1. Gathering Information

Purpose:

- Define who the project is for
- Define what the project is for. To put it another way, define the business and user goals.
- Define the target audience

Gathering requirements: Description of the application's functionality based on the user's and business perspective.

❖ User requirements:

1. To log in/register into the system
2. To see all the available furniture categories
3. To see all the featured products
4. To see all the furniture products within a category
5. To see the details of a particular furniture product
6. To search for desired furniture product
7. To add products to the cart
8. To make checkouts with secure payment.
9. To see order history

- ❖ Business requirements:
 1. Admin panel where staff can handle all the activities
 2. To add/update/delete categories
 3. To add/update/delete furniture products
 4. To manage pending orders
 5. To manage registered customers.
 6. To manage email marketing based on subscribe form email and registered users email list.

Features based on requirements: All the user and business requirements put together make up the website's features.

- ❖ Features based on user requirements:
 1. Forms to login/register
 2. Display all the available furniture categories in a catalog
 3. Display the featured products
 4. Display all the furniture within a category
 5. Display all the details of a particular furniture product, such as name, price, category, description, review, and rating.
 6. Search field to search desired product
 7. Fully-featured shopping cart
 8. Easy checkout process with fully integrated payment gateway.
 9. Section to display order history
- ❖ Features based on business requirements:
 1. Separate admin panel
 2. Section to add/update/delete product categories
 3. Section to add/update/delete furniture products
 4. Section to manage pending orders
 5. Section to manage registered customers
 6. Section to manage email marketing through a third-party library (E.g., Mailchimp)

Similarly, these functionalities require a database in the back-end to work.

2. Planning

This stage involves planning all the aspects of the web application, including designing sitemap, uses of the technologies, and many more.

- Choosing the technologies (Already done – in Resource Requirements)
- Resource allocation
- Decide on the branding of the website
- Defining the website personality for design purposes.

3. Designing

The designing phase involves the following:

- Thinking about the required components and how they can be combined into layouts using common layout patterns.
- Sketching and wireframing the ideas.
- Designing different UML diagrams.

4. Coding and development

This phase involves the actual development of the web application. Both the front-end and back-end of the website are developed in this stage.

Front-end Development (client-side development)

In this development process, a Graphical user interface (GUI) is developed so that users can view and interact with the web app.

- Using decisions, component ideas, sketching, and wireframing from previous stages to design the website.
- Use HTML, CSS, JavaScript, and JavaScript library react.js for designing.
- Using responsive design ingredients such as fluid layouts, responsive units, flexible images, and media queries.

Back-end Development (server-side development)

In this development process, the features of the web app are developed. Back-end development deals with the coding instructions that make the front-end elements perform the necessary functionalities. MySQL database and back-end JavaScript runtime environment, Node JS, are used for the back-end development.

- Creation of database
- Coding the application logic
- Connecting client-side with the server-side

5. Testing, Review, and Launch

Testing is one of the most important stages in web app development, as many things can go wrong in the application. The following aspects need to be checked in the testing phase:

- Working of all functionalities on all platforms (devices)
- Performance
- Usability
- Compatibility

After the final review, the application will be launched in the production environment.

6. Maintenance and Regular Updating

The application will need regular maintenance and updates to add enhancements and fix problems after launch. Moreover, new categories and products need to be added frequently to attract new customers and retain the existing ones.

Work Breakdown Structure represented in a diagram:

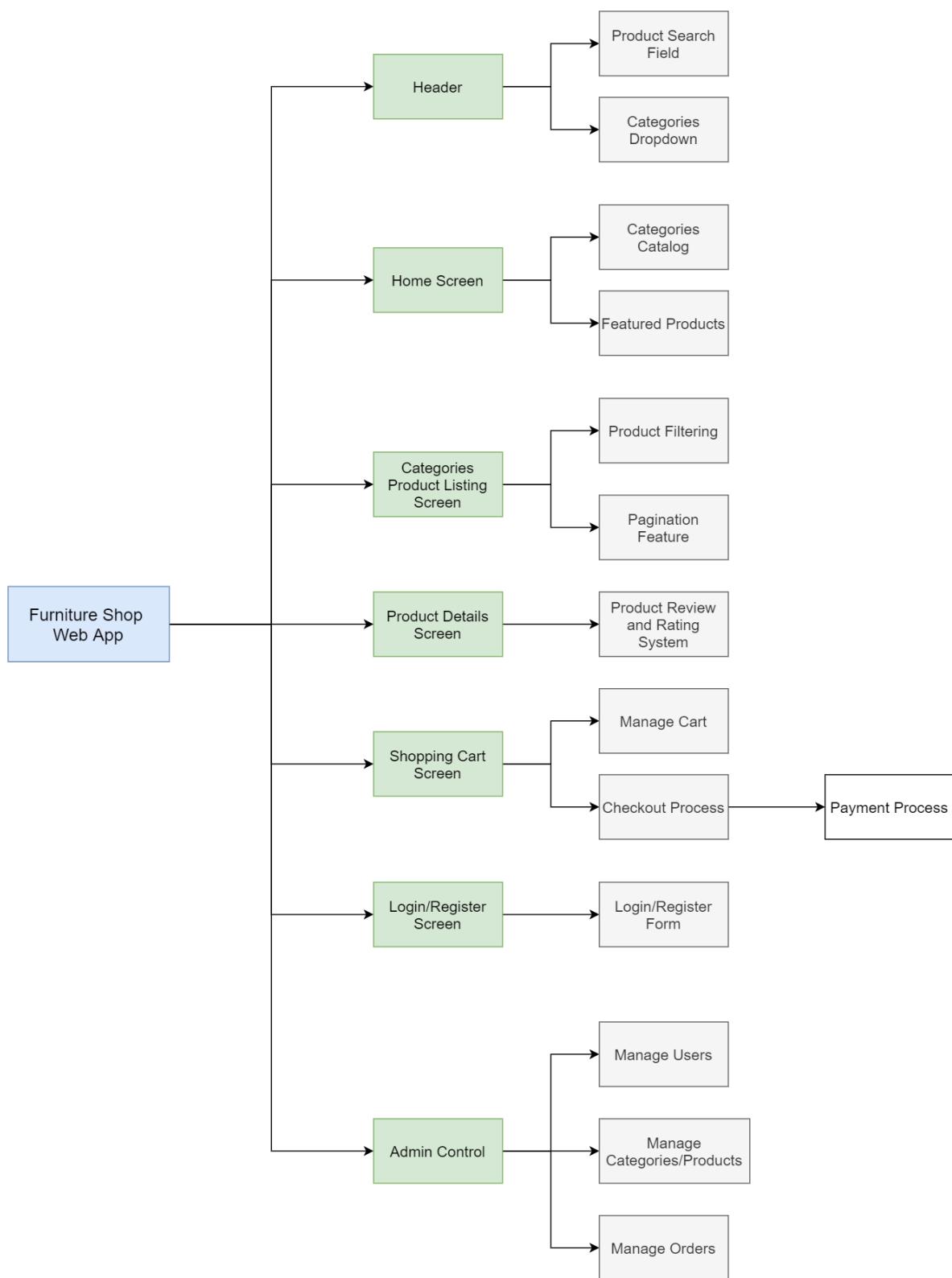


Figure 255: Work breakdown structure