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## UNIVERSITY OF GREENWICH COMP1682 – Final Year Project

Project: An e-commerce system for  
selling and recommending school  
supplies.

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## **Abstract**

The project, titled "An E-commerce System for Selling and Recommending School Supplies," endeavors to create a cutting-edge platform tailored to the specific needs of students and parents in procuring essential educational materials. Traditionally, individuals would frequent physical stores or supermarkets to acquire these items. However, the emergence of online commerce has transformed consumer behavior, making e-commerce platforms the preferred choice for many. Recognizing this shift, the project aims to develop a robust web application that adapts to evolving market trends. By leveraging the power of technology, users will have access to a wide range of school supplies conveniently from their devices, eliminating the need for in-person shopping trips. The platform will offer numerous advantages, including competitive pricing, transparent product listings, and a diverse selection tailored to individual preferences. Additionally, a sophisticated recommendation system will enhance the user experience by providing personalized suggestions based on user behavior. Through seamless integration of e-commerce functionalities and innovative features, the project seeks to redefine the school supply shopping experience. By streamlining the process and offering tailored recommendations, it aims to increase user satisfaction and drive sales for suppliers and merchants. In essence, the project represents a forward-thinking approach to e-commerce in the education sector, promising convenience, efficiency, and personalization for users. With its commitment to innovation and user-centric design, it aspires to set a new standard for online shopping in the digital age.



## **Acknowledgements**

Completing this project has been a journey filled with dedication and perseverance, and I would like to express my deepest appreciation to all those who have afforded me the opportunity to finalize this report.

Furthermore, I wish to extend my sincere gratitude to my advisor, Associate Professor Dr. Thai-Nghe Nguyen, for their invaluable support and guidance throughout the entirety of my graduation project. Despite my best efforts, there are still areas where my research may be lacking. Moving forward, I am committed to addressing these shortcomings and improving upon my work to further enhance the quality of this project.

# **1. Introduction**

## **1.1 Background**

The e-commerce system for selling and recommending school supplies addresses a critical need within the education sector. With the widespread accessibility of the internet and the growing demand for convenient and varied options in purchasing school supplies, our platform aims to provide students, parents, and teachers with a seamless shopping experience. By leveraging recommendation algorithms, we aim to assist users in making informed decisions when selecting school supplies. Our goal is to streamline the purchasing process, enhance user satisfaction, and promote responsible consumption habits. This initiative underscores the importance of utilizing technology to cater to the unique requirements of the education community while facilitating efficient and dependable procurement of school supplies.

## **1.2 Aim and Objectives**

The primary aims and objectives of the "e-commerce system for selling and recommending school supplies" are centered around enhancing the school supply purchasing experience for students, parents, and teachers. Firstly, the platform endeavors to simplify the process by providing a straightforward interface for users to browse, order, and access a wide array of high-quality school supplies, thereby saving them considerable time and effort. By incorporating features such as a user-friendly layout, efficient search functions, and secure payment options, the website aims to facilitate a seamless online shopping experience.

Secondly, the platform aims to harness technology to personalize recommendations for school supplies based on individual user preferences, academic requirements, and grade levels. Through the implementation of intelligent algorithms and data-driven insights, the platform seeks to offer tailored suggestions that aid students and parents in making informed decisions regarding the most suitable and cost-effective supplies. This personalized approach not only simplifies the shopping process but also encourages efficient resource allocation, thereby reducing waste and unnecessary expenses.

Ultimately, the overarching goal is to establish a comprehensive, ethical, and user-centric e-commerce platform that caters to the diverse needs of its customers while promoting academic excellence and responsible consumption. To achieve these objectives, the platform is guided by a strategic plan aimed at leveraging technology effectively to meet the specific demands of users and ensure a seamless and dependable supply of school essentials.

# **2. Approach methodology**

## **2.1 Framework and Methodology used**

Among the various methodologies available for system development, I've opted for the waterfall methodology, considering its compatibility with my project's needs. According to (Eason, 2016), the waterfall methodology is a traditional and linear approach to software development, progressing through defined stages sequentially. Its structured nature makes it particularly suitable for projects such as an e-commerce website aimed at selling and showcasing school supplies. This methodology follows a systematic series of steps, including requirement definition, solution building, testing, and deployment which is shown in figure 1.

For my e-commerce system project focusing on selling and introducing school supplies, I've implemented the waterfall model. The initial phase involves comprehensive requirement gathering and planning to ensure a thorough understanding of the target audience's needs and the project's scope. Following this, the emphasis shifts to system design, where meticulous planning of the platform's architecture, database structure, and user interface takes place. Once the design is finalized, the project progresses to implementation, involving coding and development activities. Subsequently, a rigorous testing phase ensues, evaluating various aspects such as recommendation algorithms and e-commerce functionality. Deployment marks the penultimate step, and the project concludes with a maintenance phase to ensure the website remains updated, reliable, and aligned with users' needs. The waterfall model proves advantageous for my project as it facilitates meticulous tracking of each process, minimizes risks, and mitigates the possibility of project failure. Furthermore, during the requirements analysis phase, I applied the MoSCoW rules to prioritize project features. This categorization into Must Have, Should Have, Could Have, and Won't Have features allows for efficient allocation of the development budget. By adhering to the principle of completing higher-priority tasks before lower-priority ones, the method ensures a 40% buffer for Must Have features and 20% for Should Have features. Such allocation enhances project predictability and optimizes resource utilization, ultimately contributing to successful project outcomes (Miranda, 2022).

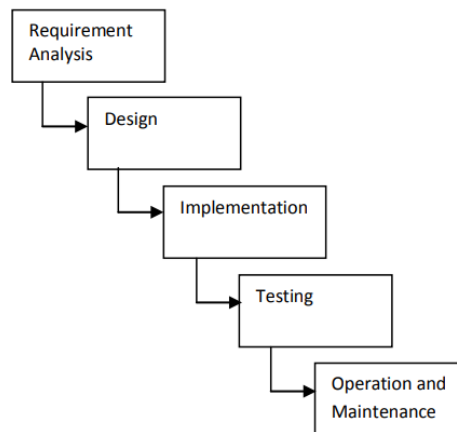


Figure 1: Waterfall Methodology

## 2.2 Planning

Figures 2, 3, and 4 present the detailed Gantt chart outlining the development timeline for my final project. Spanning a duration of 180 days, the project is set to begin on Saturday, August 12, 2023, and is scheduled for completion by Friday, April 19, 2024.

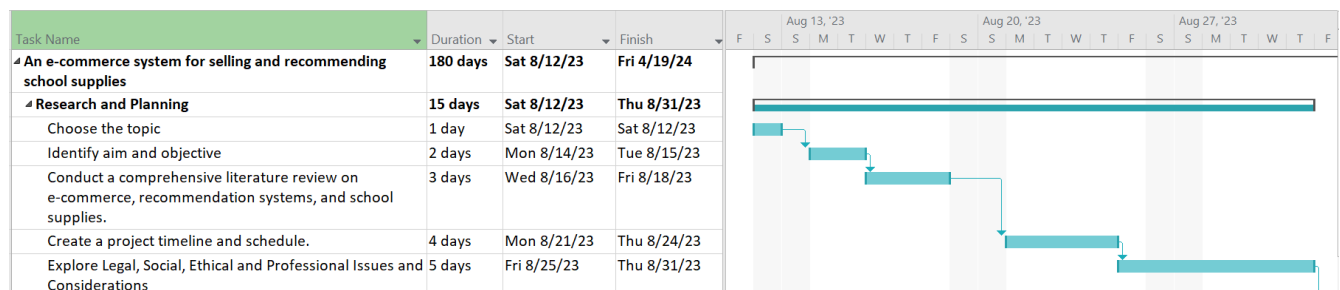


Figure 2: Gantt chart for the research and planning process

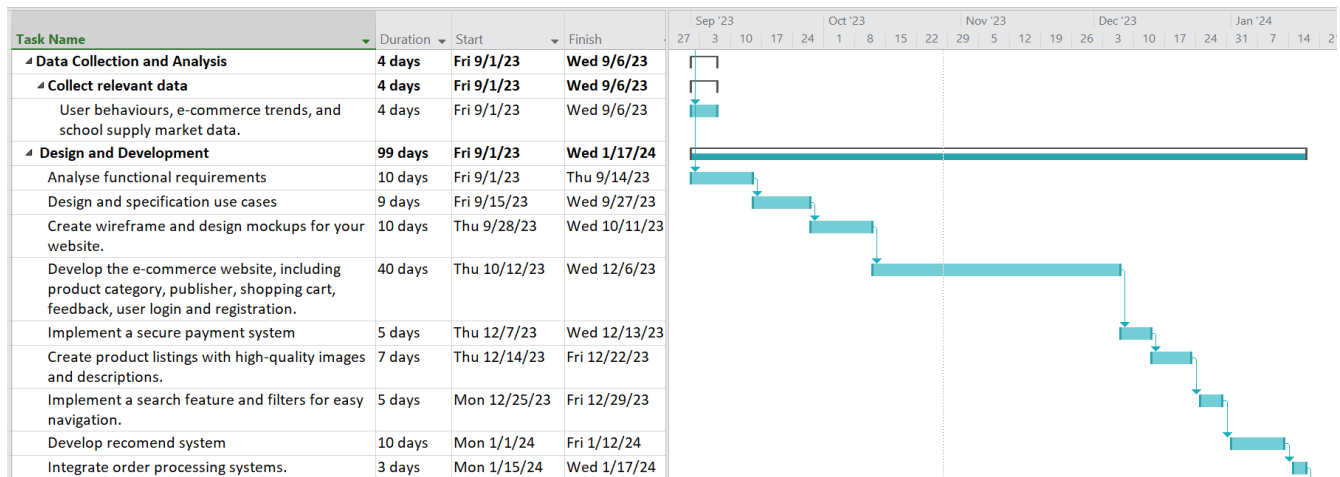


Figure 3: Gantt chart for Data Collection, Analysis and Design, Development process

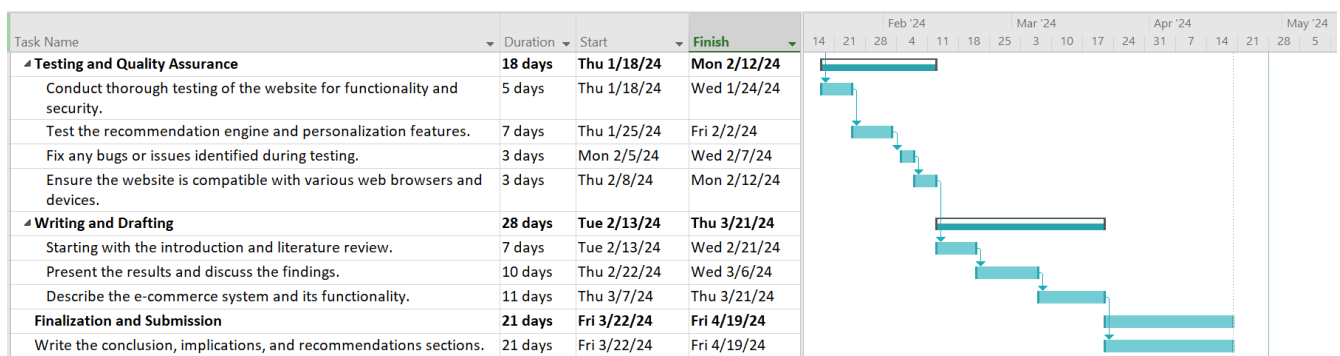


Figure 4: Gantt chart for testing, quality assurance, writing, drafting and submission

## 3. Literature review

### 3.1 Approach to literature searching

In my literature search, I primarily utilized theoretical research materials from sources like Google Scholar. Google Scholar offers a wide range of research documents, including books, journal articles, and book sections, some of which are freely accessible while others require payment. In addition to theoretical research, I also examined existing internet systems, particularly e-commerce platforms, to gather insights for my own project. This approach provided me with valuable information and facilitated the development of my system. By utilizing resources from Google Scholar, I gained access to a variety of scholarly works, helping me understand the theoretical aspects relevant to my project. Additionally, studying existing internet systems, especially e-commerce platforms, gave me practical insights into functionalities and user experiences, which were beneficial for my project. This combined approach to literature searching enabled me to blend theoretical knowledge with practical insights, laying a strong foundation for my project's development.

### 3.2 Identifying the problem

Following the literature review, the next step in my project was identifying the core problem to be addressed. Through extensive research and analysis, I pinpointed several key issues within the realm of e-commerce platforms for school supplies. One primary challenge was the lack of a dedicated platform tailored specifically to the needs of students, parents, and teachers seeking school supplies. Existing e-

commerce platforms often lacked features essential for efficiently browsing, selecting, and purchasing school supplies, resulting in a disjointed and frustrating user experience. Moreover, the absence of personalized recommendation systems meant that users were overwhelmed by the sheer volume of available options, making it difficult for them to make informed decisions based on their preferences, academic requirements, and budget constraints. Overall, these identified problems served as the driving force behind the development of my e-commerce system for selling and recommending school supplies. By addressing these issues head-on, I aimed to create a comprehensive and user-centric platform that meets the specific needs of students, parents, and teachers while promoting academic excellence and responsible consumption behaviors.

### **3.3 Recommendation techniques**

In the "Recommendation Techniques" section, I'll explore methods for suggesting school supplies. This includes collaborative filtering, which uses user behavior to suggest items similar to others' choices, and content-based filtering, which suggests products based on item attributes and user profiles. Hybrid approaches combine these methods for more robust recommendations.

Additionally, I will integrate Algolia Recommend<sup>1</sup> and my own recommendation system via API connectivity to develop recommendations grounded in machine learning technology. This integration aims to enhance the system's simplicity and flexibility by utilizing machine learning technology trained on my dataset. Moreover, I will employ filtering techniques to reduce search time. Overall, by combining various methods and algorithms, I aim to create a more diverse and accurate array of recommendations for school supplies, thereby enriching the user experience.

### **3.4 The impact of the recommendation system on e commerce system**

According to (Shani & Gunawardana, 2011), recommender systems have gained popularity both in commercial settings and within the research community. Numerous approaches have been proposed to offer recommendations, presenting system designers with a range of options to consider. When selecting an algorithm for a recommendation system, the initial step is to determine the key properties of the application to prioritize. These properties can significantly impact user experience and may include factors like accuracy, robustness, scalability, and more. By understanding these properties and their implications, designers can make informed decisions about which approach best suits their needs.

According to (Schafer, et al., 2001), the recommendation system plays a vital role in determining the effectiveness and success of an e-commerce platform, influencing various aspects of the user experience and business outcomes. Through personalized product suggestions tailored to individual preferences, browsing history, and purchase behavior, the system significantly enhances user engagement and satisfaction. This personalized approach streamlines the shopping process and fosters trust and loyalty towards the platform. Furthermore, the recommendation system drives increased sales and revenue for e-commerce businesses by presenting users with targeted suggestions. By promoting cross-selling and upselling opportunities, the system encourages users to explore additional products and make additional purchases, thereby boosting average order value and maximizing revenue generation. Additionally, the recommendation system aids in improved inventory management and product visibility. By highlighting specific items based on popularity, trends, or user preferences, the system helps retailers effectively

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<sup>1</sup> <https://www.algolia.com/products/ai-recommendations/>

showcase their offerings and optimize product placement. This enhances the discoverability of products and increases the likelihood of conversion.

Overall, the recommendation system serves as a cornerstone of success for e-commerce platforms, driving enhanced user experiences, increased sales, and improved business outcomes. Its strategic implementation and continuous refinement are essential for staying competitive in today's dynamic digital landscape.

### **3.5 Challenges of the recommender system**

These challenges span across several critical areas, including data quality, algorithm selection, user privacy, and system scalability. Ensuring the quality and relevance of data is a primary challenge for recommender systems. This entails managing vast amounts of diverse data, including user preferences, item attributes, and interaction history. Maintaining data accuracy and freshness is essential to generate precise recommendations and prevent algorithmic bias.

User privacy is also a significant concern in recommender system implementation. The collection and analysis of user data for personalized recommendations raise privacy implications, necessitating compliance with privacy regulations to maintain user trust and confidence. Additionally, achieving scalability poses a challenge as data volumes and user interactions increase. Ensuring that the recommender system can efficiently handle growing data loads without sacrificing performance is vital for delivering a seamless user experience. According to (Shen, 2014) several leading service firms have invested in proprietary recommender systems to engage customers and enhance satisfaction. However, personalized recommendations do not always guarantee customer satisfaction. They may sometimes lead to dissatisfaction, annoyance, or irritation among users.

To address these challenges, a comprehensive understanding of underlying technologies, meticulous planning and design, and ongoing monitoring and optimization are essential. Proactively tackling these challenges will enable recommender systems to continue delivering value and enhancing user experiences across various domains.

## **4. Legal, Social, Ethical and Professional Issues and Considerations**

When embarking on the development of an e-commerce platform designed for the sale and recommendation of school supplies, it is imperative to meticulously consider various legal, social, ethical, and professional aspects. This includes adherence to data protection regulations, such as the General Data Protection Regulation (GDPR) in the European Union and the Children's Online Privacy Protection Act (COPPA) in the United States, particularly if the website collects personal information from minors. Strict regulation of copyrighted materials, including photographs and content, is also paramount.

Of particular importance is the recommendation system, which relies heavily on user data for its effectiveness. Thus, the collection and analysis of user data must be conducted with utmost care, ensuring compliance with data protection rights regarding privacy and security.

Compliance with consumer protection laws and regulations concerning refunds, returns, warranties, and the provision of explicit terms and conditions for the e-commerce site is essential. Additionally, understanding and adhering to online sales regulations, especially those governing taxes, product labeling, and shipping, are vital for legal compliance.

Equally important is ensuring equal access to the website without discrimination and establishing fair and reasonable pricing for school supplies to prevent exploitation, particularly during peak back-to-school seasons. Upholding professionalism in customer contacts and support, promptly addressing inquiries and concerns, fosters customer satisfaction and trust.

Furthermore, maintaining product quality and accurate representation on the website is essential for both customer satisfaction and legal compliance. Finally, commitment to fair competition practices and avoidance of unethical strategies uphold integrity within the marketplace.

## 5. Product Research

### 5.1 Staples.com<sup>2</sup>

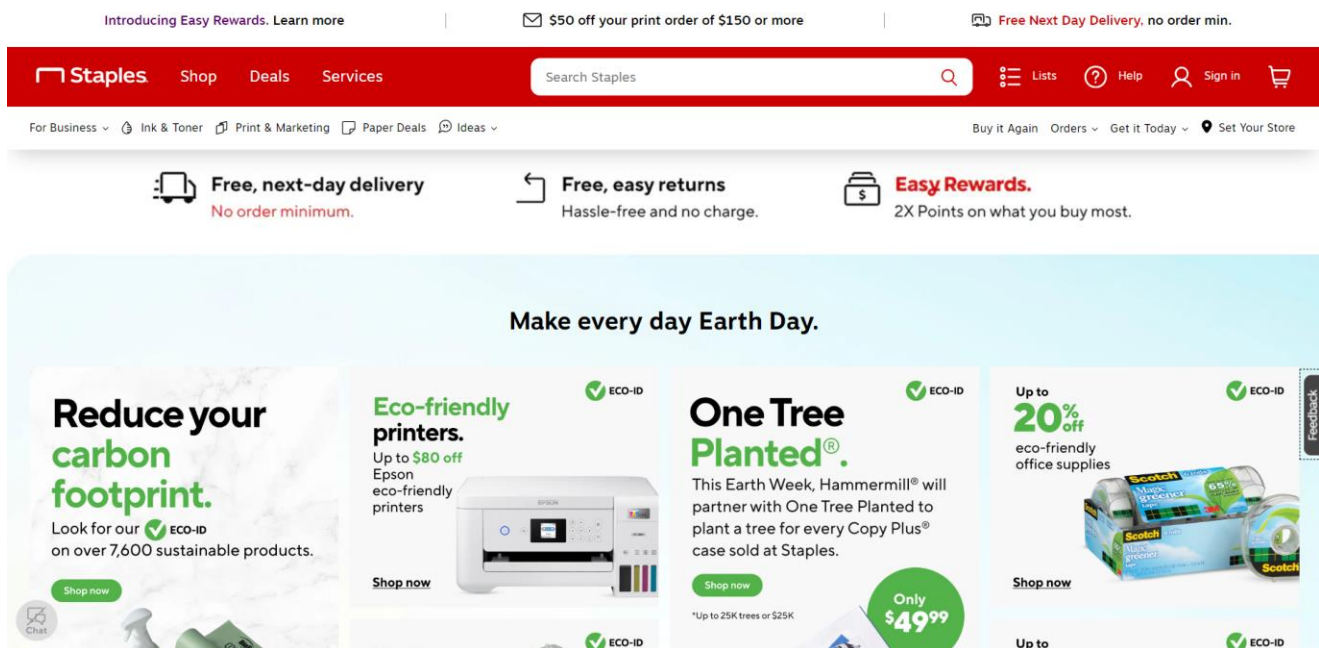


Figure 5: Staples.com system

During my product research, Staples.com has emerged as a notable e-commerce platform that offers a diverse range of products while maintaining a user-friendly interface. Here are some key aspects that stand out:

**Recommendation System:** Staples.com employs a sophisticated recommendation system that tailors product suggestions based on user preferences, purchase history, and browsing behavior. This personalized approach enhances the overall shopping experience by presenting users with relevant items, thereby increasing the likelihood of successful transactions.

**E-commerce Platform:** With its well-established presence in the market, Staples.com provides an extensive selection of products, spanning categories such as office supplies, technology, furniture, and more. Its intuitive interface and seamless navigation contribute to a hassle-free shopping experience for customers.

<sup>2</sup> <https://www.staples.com/>



**Rating Data:** Staples.com integrates customer ratings and reviews into its platform, offering valuable insights to potential buyers. These ratings serve as a helpful resource for other users, aiding them in making informed decisions when contemplating a purchase.

**User Personalization:** The platform places a strong emphasis on user personalization, tailoring product recommendations and promotions to match individual preferences and interests. By analyzing user interactions and behavior, Staples.com delivers customized content that resonates with each user, thereby enhancing engagement and overall satisfaction.

In summary, Staples.com excels in leveraging recommendation systems, maintaining a robust e-commerce platform, effectively utilizing rating data, and prioritizing user personalization to optimize the shopping experience for its customers. Figure 5 is an image of the Staples website.

## 5.2 Amazon.com<sup>3</sup>

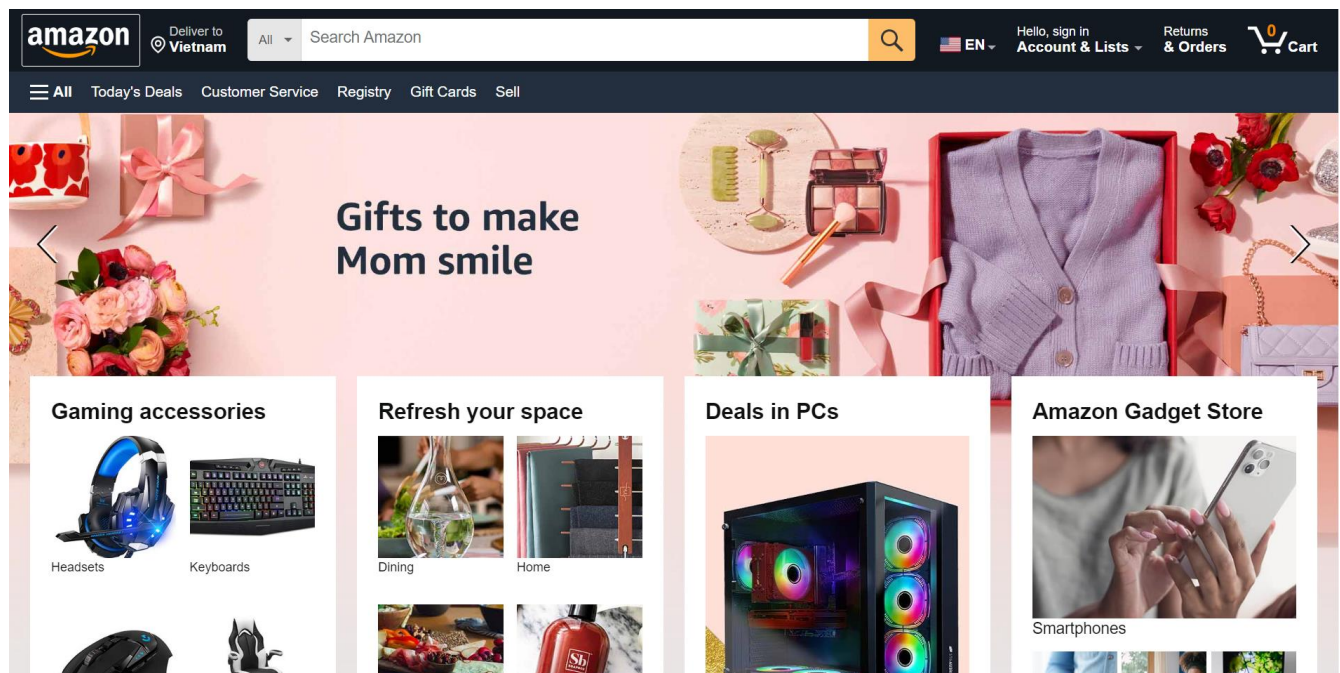


Figure 6: Amazon.com system

During my product research, Amazon.com stands out as a leading e-commerce platform renowned for its exemplary features across various aspects, including recommendation systems, e-commerce platform functionalities, rating data utilization, and user personalization:

**Recommendation System:** Amazon.com employs a sophisticated recommendation system powered by advanced algorithms that analyze user behavior, purchase history, and browsing patterns. This enables the platform to provide tailored product recommendations to users, enhancing their shopping experience and increasing the likelihood of successful transactions.

**E-commerce Platform:** As one of the largest and most comprehensive e-commerce platforms globally, Amazon.com offers an extensive range of products across diverse categories, including electronics,

<sup>3</sup> <https://www.amazon.com/>



apparel, books, and more. Its user-friendly interface, streamlined checkout process, and efficient search functionality contribute to a seamless shopping experience for customers.

**Rating Data:** Amazon.com integrates extensive customer rating and review data into its platform, allowing users to make informed purchasing decisions based on the experiences of others. These ratings and reviews provide valuable insights into product quality, performance, and customer satisfaction, enhancing trust and credibility within the platform.

**User Personalization:** Amazon.com prioritizes user personalization by delivering tailored recommendations, customized product offerings, and personalized marketing messages based on individual preferences and past interactions. Through sophisticated data analysis and machine learning algorithms, the platform continually refines its user personalization efforts to provide a highly curated shopping experience.

Overall, Amazon.com excels in leveraging advanced recommendation systems, offering a comprehensive e-commerce platform, effectively utilizing rating data, and prioritizing user personalization to deliver unparalleled shopping experiences for its customers. Figure 6 is an image of the Amazon website

## 6. Requirements

In Table 1, we have compiled a comprehensive list of requirements outlining the functional and non-functional aspects of the e-commerce system for selling and recommending school supplies. Each requirement is carefully defined to ensure clarity and completeness in system specifications.

Moving on to Table 2, we present the analysis of requirements, where each requirement from Table 1 is thoroughly examined and evaluated. This analysis involves assessing the feasibility, relevance, and priority of each requirement to determine its impact on the overall system design and functionality.

Finally, in Table 3, we provide a comparative analysis between our proposed e-commerce system and existing systems such as Staples and Amazon.

*Table 1: List of requirements*

ID	Requirements
<b>RQ1</b>	Users should be able to create accounts and log in to access personalized features.
<b>RQ2</b>	Users must have the option to log out securely from their accounts.
<b>RQ3</b>	Users should be able to browse and view different product categories.
<b>RQ4</b>	Users must be able to access and review website services and policies.
<b>RQ5</b>	Users should have access to detailed information about products.
<b>RQ6</b>	Users should be able to search for specific products based on their preferences.
<b>RQ7</b>	Users should have the ability to ask questions about products and provide answers.
<b>RQ8</b>	The system should provide personalized product recommendations based on user preferences.
<b>RQ9</b>	Users should be able to rate products based on their experiences.
<b>RQ10</b>	Users should be able to leave comments about products.

<b>RQ11</b>	Users should be able to filter products based on categories.
<b>RQ12</b>	Users should be able to filter products based on price ranges.
<b>RQ13</b>	Users should be able to create orders for purchasing products.
<b>RQ14</b>	Users should be able to view details of their orders.
<b>RQ15</b>	Users should be able to track the status of their orders.
<b>RQ16</b>	Users should be able to manage items in their shopping carts.
<b>RQ17</b>	Users should be able to view their list of favorite products.
<b>RQ18</b>	Staff members should have access to a dashboard for monitoring system activities.
<b>RQ19</b>	Staff members should be able to log in and log out of the staff management page securely.
<b>RQ20</b>	Staff members should be able to view, create, update, and delete all products.
<b>RQ21</b>	Staff members should be able to view, create, update, and delete all categories.
<b>RQ22</b>	Staff members should be able to view, create, update, and delete all brands.
<b>RQ23</b>	Staff members should be able to view, create orders, and view order details.
<b>RQ24</b>	Staff members should be able to view all feedback from users.
<b>RQ25</b>	Staff members should be able to view all comments and reply to them.
<b>RQ26</b>	Store owners should be able to log in and log out securely.
<b>RQ27</b>	Store owners should be able to manage their accounts securely.
<b>RQ28</b>	Store owners should have access to reports on best-selling products, sales revenue, and other statistics related to product sales within a specified period.
<b>RQ29</b>	Ensuring compatibility with various devices enhances accessibility
<b>RQ30</b>	Encrypting personal data like passwords enhances security, safeguarding user information from unauthorized access and potential breaches

- Based on the above requirements RQ1, RQ2, RQ19, RQ26 There are similarities, so I will combine them into 2 requirements into RQ31 and RQ32 and remove RQ1, RQ2, RQ19, RQ26

<b>RQ31</b>	User should be able to log in and log out securely.
<b>RQ32</b>	Users should be able to create accounts.

## 6.1 Analysis of requirements

Table 2: Table list analysis of requirements

<b>ID</b>	<b>Role</b>	<b>Justification</b>
<b>RQ3</b>	Guest	Browsing product categories enables users to explore a wide range of products and find items relevant to their needs and preferences.
<b>RQ4</b>	Guest	Users must be able to access and review website services and policies to understand terms of service, privacy policies, and other important guidelines.

		Access to website services and policies promotes transparency and builds trust with users by providing clear guidelines for using the platform.
<b>RQ5</b>	Guest	Users should have access to detailed information about products to make informed purchasing decisions. Detailed product information enhances user confidence and reduces uncertainty by providing comprehensive details about product specifications, features, and benefits.
<b>RQ6</b>	Guest	Users should be able to search for specific products based on their preferences, simplifying the product discovery process and improving usability. Product search functionality enables users to quickly find products of interest by entering keywords or using filters to refine search results.
<b>RQ7</b>	Guest	The system should allow users to ask questions about products and provide answers, fostering community interaction and facilitating decision-making. Product Q&A functionality enables users to seek clarification, gather additional information, and share insights about products, enhancing the overall shopping experience.
<b>RQ8</b>	Guest	The system should provide personalized product recommendations based on user preferences, purchase history, and browsing behavior to enhance user engagement and promote relevant product discovery. Personalized recommendations increase the likelihood of successful transactions by presenting users with tailored suggestions aligned with their interests and needs.
<b>RQ9</b>	Guest	Product rating functionality provides valuable insights into product quality and user satisfaction, influencing purchasing behavior and fostering trust in the platform.
<b>RQ10</b>	Guest	Product comment functionality facilitates user engagement and community interaction, enabling users to express opinions, ask questions, and provide feedback on products.
<b>RQ11</b>	Guest	Users should be able to filter products based on categories to narrow down search results and find products within specific product categories.
<b>RQ12</b>	Guest	Product filtering by price ranges enhances user experience by allowing users to identify products that align with their budget preferences and affordability.
<b>RQ13</b>	Guest	Order creation functionality streamlines the purchasing process by allowing users to add desired products to their shopping carts and proceed to checkout to complete the order.
<b>RQ14</b>	Guest	Users should be able to view details of their orders, including order status, itemized lists of purchased products, and delivery information.

<b>RQ15</b>	Guest	Order tracking functionality enhances user experience by providing users with timely updates on the status of their orders, reducing uncertainty and increasing satisfaction
<b>RQ16</b>	Guest	Shopping cart management functionality enables users to review and modify their selected items before proceeding to checkout, ensuring accuracy and completeness of their orders.
<b>RQ17</b>	Guest	Favorite products viewing functionality enhances user engagement and loyalty by allowing users to save and revisit products they are interested in, facilitating future purchasing decisions.
<b>RQ18</b>	Staff	Access to a staff dashboard enhances operational efficiency by allowing staff members to monitor system performance, track orders, and address any issues or discrepancies in real-time.
<b>RQ20</b>	Staff	Staff members should have the capability to view, create, update, and delete all products within the e-commerce platform, enabling them to manage the product catalog effectively.
<b>RQ21</b>	Staff	Staff members should be able to view, create, update, and delete all product categories to organize and classify products systematically.
<b>RQ22</b>	Staff	Staff members should have the capability to view, create, update, and delete all brands associated with products to manage brand affiliations and partnerships effectively.
<b>RQ23</b>	Staff	Staff members should have the capability to view, create orders, and view order details to oversee and manage the order fulfillment process.
<b>RQ24</b>	Staff	Feedback viewing functionality enables staff members to gather insights from user feedback, address customer concerns, and enhance overall service quality and customer experience.
<b>RQ25</b>	Staff	Staff members should have the capability to view all comments provided by users and reply to them as needed to engage with customers and address inquiries or feedback.
<b>RQ27</b>	Store owners	Store owners should have the capability to manage their accounts securely, including updating account information, changing passwords, and configuring account settings.
<b>RQ28</b>	Store owners	Store owners should have access to reports on best-selling products, sales revenue, and other statistics related to product sales within a specified period to track performance and make informed business decisions.
<b>RQ29</b>	User	This requirement focuses on ensuring that the e-commerce system can be accessed and used seamlessly across different devices such as desktop computers, laptops, tablets, and smartphones.
<b>RQ30</b>	User	This requirement involves encrypting sensitive user data, such as passwords, during storage and transmission to prevent unauthorized access and protect

		user privacy. Encrypting personal data enhances the security of the e-commerce system by reducing the risk of unauthorized access, data breaches, and identity theft, thereby fostering trust and confidence among users.
<b>RQ31</b>	User	Store owners should be able to securely log in and log out of the e-commerce platform to access and manage their accounts securely.
<b>RQ32</b>	User	Users should be able to create accounts to access personalized features, enhancing user engagement and enabling personalized experiences.

## 6.2 Comparison of systems

Table 3: Table comparison My Systems with Staples and Amazon System

Function	My System	Staples	Amazon
Login and Account Creation	Yes	Yes	Yes
Logout	Yes	Yes	Yes
View Product Categories	Yes	Yes	Yes
View Website Services and Policies	Yes	Yes	Yes
View Detailed Product Information	Yes	Yes	Yes
Search Products	Yes	Yes	Yes
Ask and Answer Questions	Yes	Yes	Yes
Product Recommendation System	Yes	Yes	Yes
Product Rating	Yes	Yes	Yes
Product Comments	Yes	Yes	Yes
Category-based Filtering	Yes	Yes	Yes
Price-based Filtering	Yes	Yes	Yes
Order Creation	Yes	Yes	Yes
View Order Details	Yes	Yes	Yes
Order Tracking	Yes	Yes	Yes
Manage Cart	Yes	Yes	Yes
View Wishlist	Yes	Yes	Yes
Dashboard View	Yes	Yes	Yes
Product Management	Yes	Yes	Yes
Category Management	Yes	Yes	Yes
Brand Management	Yes	Yes	Yes
Order Management	Yes	Yes	Yes
Feedback Management	Yes	Yes	Yes
Comment Management	Yes	Yes	Yes
Login and Account Creation	Yes	Yes	Yes

Logout	Yes	Yes	Yes
View Product Categories	Yes	Yes	Yes
View Website Services and Policies	Yes	Yes	Yes
View Detailed Product Information	Yes	Yes	Yes
Search Products	Yes	Yes	Yes
Ask and Answer Questions	Yes	Yes	Yes
Product Recommendation System	Yes	Yes	Yes
Product Rating	Yes	Yes	Yes
Product Comments	Yes	Yes	Yes
Category-based Filtering	Yes	Yes	Yes
Price-based Filtering	Yes	Yes	Yes
Order Creation	Yes	Yes	Yes
View Order Details	Yes	Yes	Yes
Order Tracking	Yes	Yes	Yes
Manage Cart	Yes	Yes	Yes
View Wishlist	Yes	Yes	Yes
Dashboard View	Yes	Yes	Yes
Product Management	Yes	Yes	Yes
Category Management	Yes	Yes	Yes
Brand Management	Yes	Yes	Yes
Order Management	Yes	Yes	Yes
Feedback Management	Yes	Yes	Yes
Comment Management	Yes	Yes	Yes
Login and Account Creation	Yes	Yes	Yes
Logout	Yes	Yes	Yes
View Product Categories	Yes	Yes	Yes
View Website Services and Policies	Yes	Yes	Yes
View Detailed Product Information	Yes	Yes	Yes
Search Products	Yes	Yes	Yes
Ask and Answer Questions	Yes	Yes	Yes
Product Recommendation System	Yes	Yes	Yes
Product Rating	Yes	Yes	Yes
Product Comments	Yes	Yes	Yes
Category-based Filtering	Yes	Yes	Yes
Price-based Filtering	Yes	Yes	Yes

Order Creation	Yes	Yes	Yes
View Order Details	Yes	Yes	Yes
Order Tracking	Yes	Yes	Yes
Manage Cart	Yes	Yes	Yes
View Wishlist	Yes	Yes	Yes
Dashboard View	Yes	Yes	Yes
Product Management	Yes	Yes	Yes
Category Management	Yes	Yes	Yes
Brand Management	Yes	Yes	Yes
Order Management	Yes	Yes	Yes
Feedback Management	Yes	Yes	Yes
Comment Management	Yes	Yes	Yes
Account Management	Yes	Yes	Yes
Reporting Statistics	Yes	Yes	Yes
International Shipping	No	Yes	Yes
Loyalty Program	No	Yes	Yes
Shipping/Logistics	No	Yes	Yes
Customer Support	No	Yes	Yes

## 7. Business Requirements

### 7.1 Overall Picture

The purpose of developing an e-commerce system for selling and recommending school supplies is to provide a convenient and efficient platform for students, parents, and educators to access high-quality educational materials. This system aims to streamline the process of acquiring school supplies by offering a diverse range of products, personalized recommendations based on user preferences, and user-friendly functionalities such as easy navigation, secure transactions, and order tracking. By leveraging technology and data-driven insights, the e-commerce system seeks to enhance the overall shopping experience, promote academic success, and contribute to the educational journey of students. Additionally, the system aims to foster trust and loyalty among users through transparent pricing, reliable product information, and exceptional customer service, thereby establishing itself as a trusted resource for school supplies.

### 7.2 Functional Requirements with MoSCoW prioritization

ID	NFR/FR	MoSCoW	Reason
RQ3	FR	Should	Users should be able to browse and view different product categories.

<b>RQ4</b>	FR	Must	Users must be able to access and review website services and policies.
<b>RQ5</b>	FR	Should	Users should have access to detailed information about products.
<b>RQ6</b>	FR	Should	Users should be able to search for specific products based on their preferences.
<b>RQ7</b>	FR	Should	Users should have the ability to ask questions about products and provide answers.
<b>RQ8</b>	FR	Must	The system should provide personalized product recommendations based on user preferences.
<b>RQ9</b>	FR	Should	Users should be able to rate products based on their experiences.
<b>RQ10</b>	FR	Could	Users should be able to leave comments about products.
<b>RQ11</b>	FR	Should	Users should be able to filter products based on categories.
<b>RQ12</b>	FR	Should	Users should be able to filter products based on price ranges.
<b>RQ13</b>	FR	Must	Users should be able to create orders for purchasing products.
<b>RQ14</b>	FR	Must	Users should be able to view details of their orders.
<b>RQ15</b>	FR	Must	Users should be able to track the status of their orders.
<b>RQ16</b>	FR	Should	Users should be able to manage items in their shopping carts.
<b>RQ17</b>	FR	Should	Users should be able to view their list of favorite products.
<b>RQ18</b>	FR	Could	Staff members should have access to a dashboard for monitoring system activities.
<b>RQ20</b>	FR	Could	Staff members should be able to view, create, update, and delete all products.
<b>RQ21</b>	FR	Could	Staff members should be able to view, create, update, and delete all categories.
<b>RQ22</b>	FR	Could	Staff members should be able to view, create, update, and delete all brands.
<b>RQ23</b>	FR	Could	Staff members should be able to view, create orders, and view order details.
<b>RQ24</b>	FR	Could	Staff members should be able to view all feedback from users.
<b>RQ25</b>	FR	Could	Staff members should be able to view all comments and reply to them.



<b>RQ27</b>	FR	Must	Store owners should be able to manage their accounts securely.
<b>RQ28</b>	FR	Should	Store owners should have access to reports on best-selling products, sales revenue, and other statistics related to product sales within a specified period.
<b>RQ31</b>	FR	Must	Users should be able to log in and log out securely.
<b>RQ32</b>	FR	Must	Users should be able to create accounts.

### 7.3 Non-functional Requirements

ID	NFR/FR	Reason
<b>RQ29</b>	NFR	This is a function that requires adaptability to many devices to increase user experience.
<b>RQ30</b>	NFR	This is a requirement to ensure the security of personal information.

## 8. Analysis and Design

### 8.1 Architecture

- Client-server architecture
- Backend using ASP.NET core MVC
- SQL server for the database
- Frontend using Bootstrap HTML CSS JavaScript and Razor page
- MVC pattern.

### 8.2 High Level Design

#### 8.2.1 Assumptions

- The system assumes that users will adhere to the terms of service and privacy policies outlined by the platform, promoting responsible usage and respecting the rights of other users.
- The system assumes that users will provide accurate and genuine information when creating accounts or engaging with various features, ensuring the integrity of user-generated data.
- The system assumes that users possess basic computer skills and familiarity with navigating websites, enabling them to interact with the platform effortlessly.
- The system assumes that users have access to a stable internet connection to ensure uninterrupted browsing and interaction with the website's features.
- The system assumes that the database will consistently remain available and accessible, allowing seamless retrieval and storage of data critical to the system's functioning.

#### 8.2.2 Endpoints

- User Authentication Endpoints:
  - /login: Endpoint for user authentication.
  - /logout: Endpoint for user logout.
  - /register: Endpoint for user registration.
- Product Endpoints:
  - /products: Endpoint to retrieve a list of all products.
  - /products/{id}: Endpoint to retrieve details of a specific product.

- /products/categories: Endpoint to retrieve product categories.
- /products/search: Endpoint to search for products based on user input.
- /products/{category}: Endpoint to retrieve products belonging to a specific category.
- /products/{price\_range}: Endpoint to retrieve products within a specific price range.
- Order Endpoints:
  - /orders: Endpoint to create a new order.
  - /orders/{id}: Endpoint to retrieve details of a specific order.
  - /orders/{id}/status: Endpoint to update the status of an order.
  - /orders/{user\_id}: Endpoint to retrieve orders associated with a specific user.
  - /cart: Endpoint to manage items in the shopping cart.
- User Interaction Endpoints:
  - /comments: Endpoint to leave comments on products.
  - /ratings: Endpoint to rate products.
  - /favorites: Endpoint to manage a user's list of favorite products.
  - /questions: Endpoint to ask questions about products.
  - /answers: Endpoint to provide answers to questions about products.
- Admin/Staff Endpoints:
  - /admin/dashboard: Endpoint for accessing the admin dashboard.
  - /admin/products: Endpoint to manage products (CRUD operations).
  - /admin/categories: Endpoint to manage categories (CRUD operations).
  - /admin/users: Endpoint to view user information and manage user accounts.
  - /admin/orders: Endpoint to view and manage orders.
  - /admin/reports: Endpoint to generate reports on sales, revenue, etc.
  - Miscellaneous Endpoints:
    - /policies: Endpoint to view website policies and terms of service.
    - /recommendations: Endpoint to receive personalized product recommendations.
    - /feedback: Endpoint to view and manage user feedback.
    - //

### 8.2.3 3rd party Services

Incorporating third-party services is essential to enhance the functionality and effectiveness of our e-commerce system. One such service utilized is Algolia.com, which specializes in providing advanced search and recommendation solutions (Algolia, 2023). By leveraging Algolia's capabilities, we aim to optimize our product recommendation system by sending CSV files containing relevant data and training the recommendation engine based on user behavior. Algolia's robust infrastructure and expertise in search algorithms enable us to deliver personalized recommendations to users, thereby enhancing their shopping experience. Additionally, Algolia's comprehensive analytics and monitoring tools empower us to track system performance and continually refine our recommendation strategies. Integrating Algolia into our platform underscores our commitment to providing cutting-edge solutions and delivering exceptional value to our users.

## 9. Technology choices

### 9.1 Front End

HTML5, CSS3, JavaScript, and Bootstrap 5 are the technologies and frameworks I use for front-end development. These technologies are chosen for their robust capabilities and widespread usage in modern web development. HTML5 serves as the foundation for structuring web pages. It enables developers to

create clean, organized, and accessible web content (Garg, et al., 2023). CSS3 enhances HTML5 by offering styling and layout options, enabling developers to customize the appearance and presentation of web pages (Janne, 2024). JavaScript enhances web pages by introducing interactivity and dynamic functionality, enabling capabilities like form validation, DOM manipulation, and asynchronous data fetching (Keith & Sambells, 2011). Bootstrap 5 is a popular front-end framework that streamlines the development process by providing pre-designed components, utilities, and responsive grid system. It facilitates rapid prototyping and ensures consistency and responsiveness across different devices and screen sizes (Whaiduzzaman, et al., 2023).

By leveraging HTML5, CSS3, JavaScript, and Bootstrap 5 for the front end of the e-commerce system, we ensure a modern, responsive, and user-friendly interface that meets the needs of both users and developers. These technologies enable the creation of visually appealing, interactive, and accessible web applications that enhance the overall user experience.

## **9.2 Back End**

For the "Technology choices: Back End" section, I'll focus on the selection of ASP.NET Core as the preferred technology. ASP.NET Core stands out among various options like NodeJS, PHP, and Spring Boot due to its versatility and capabilities.

ASP.NET Core is an open-source, cross-platform framework specifically designed for developing modern, cloud-optimized online applications. Its lightweight and modular architecture, coupled with built-in dependency injection support, greatly enhances testability and maintainability. Moreover, ASP.NET Core's integration with the MVC pattern allows for the creation of contemporary web applications alongside traditional view-based programs. By choosing ASP.NET Core for the back end of the e-commerce system, we leverage its robust features to build scalable and efficient business applications. Its cross-platform compatibility ensures flexibility, while its support for modern development practices facilitates the creation of highly functional and responsive online platforms (Microsoft, 2022).

## 10. Design

### 10.1 Low fidelity wireframes

Figures 7 through 13 are low fidelity wireframes of the system

#### 10.1.1 Home page

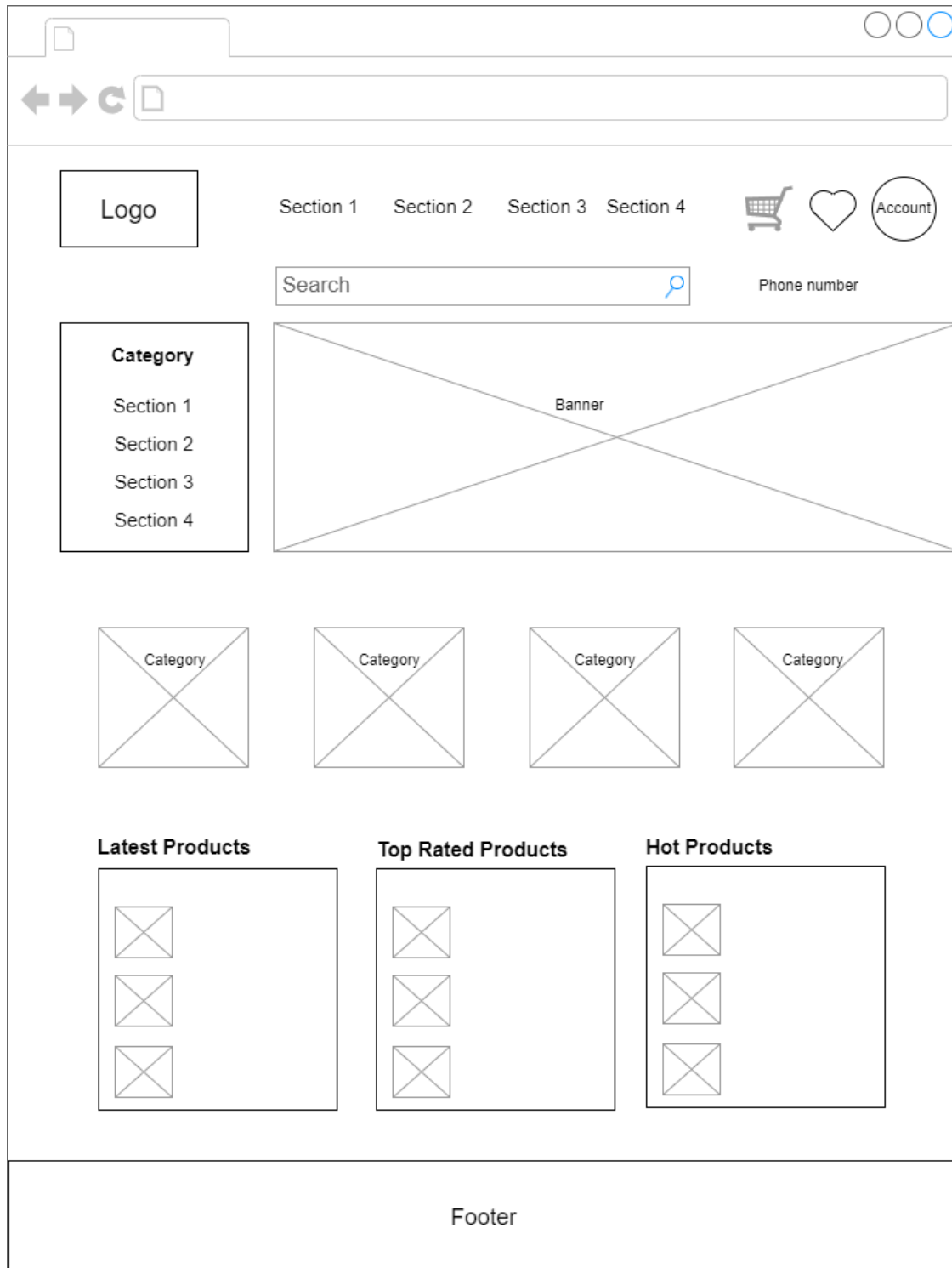


Figure 7: Home page

### 10.1.2 Product page

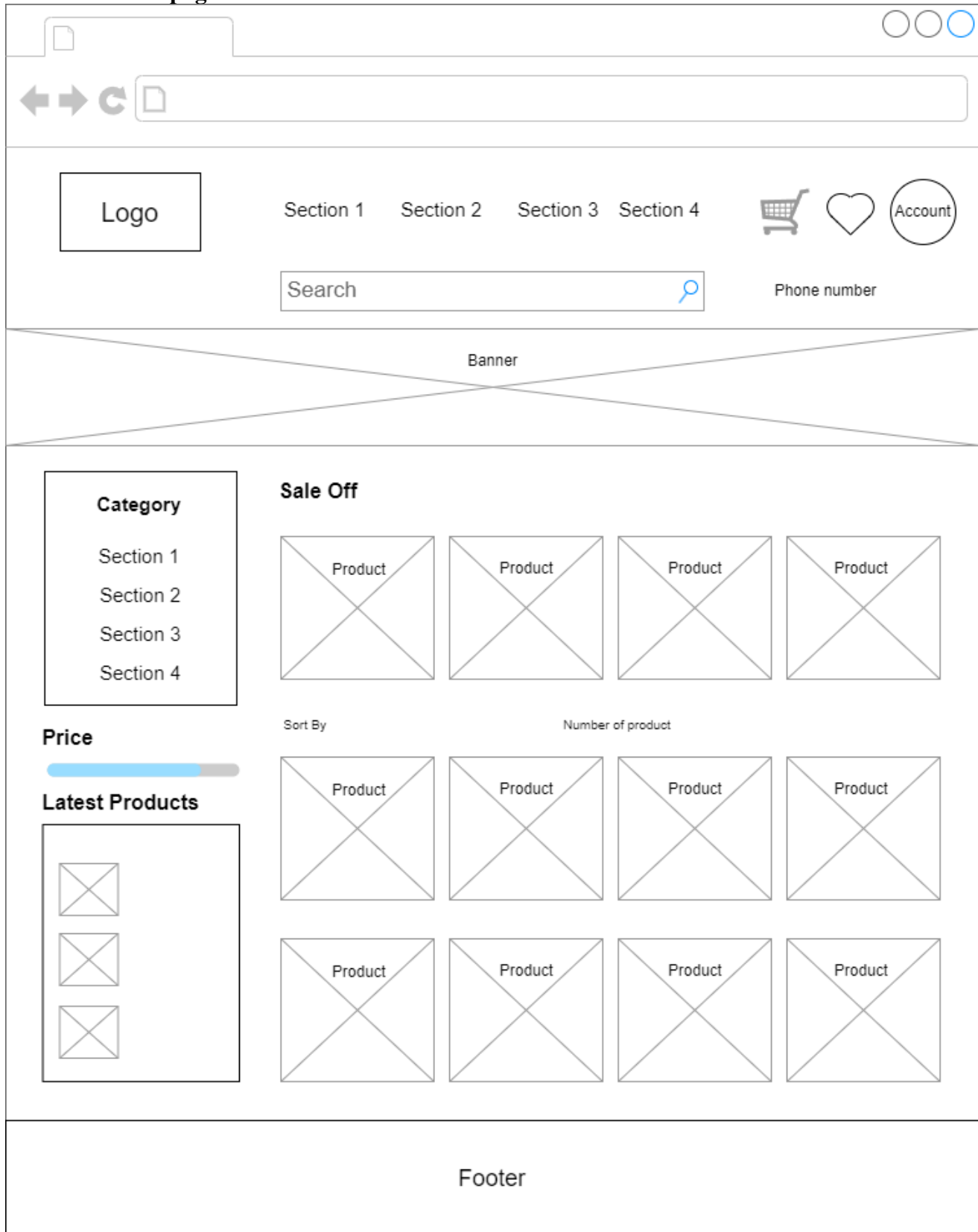


Figure 8: Product page

### 10.1.3 Product detail page

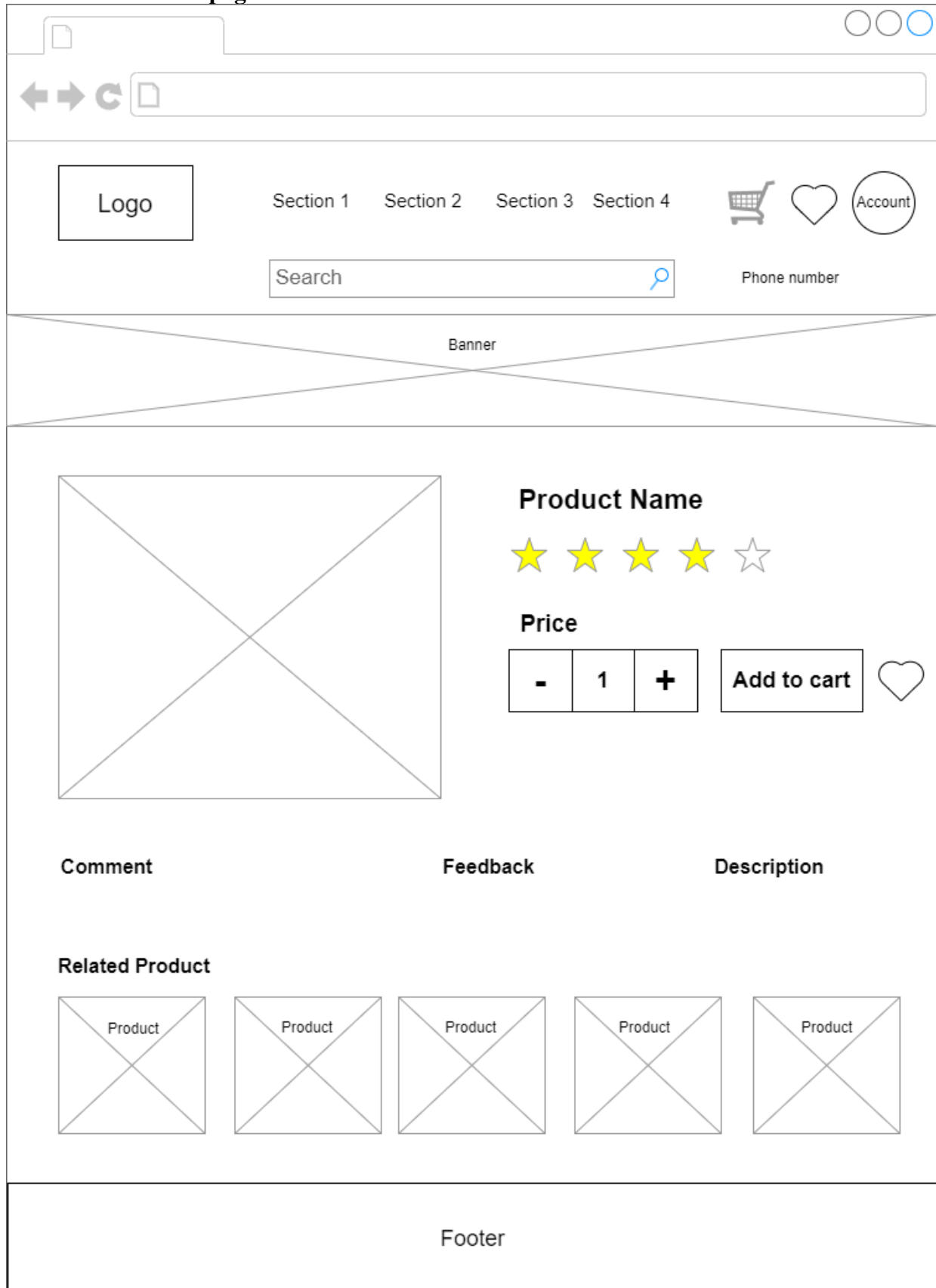


Figure 9: Product detail page

### 10.1.4 Cart page

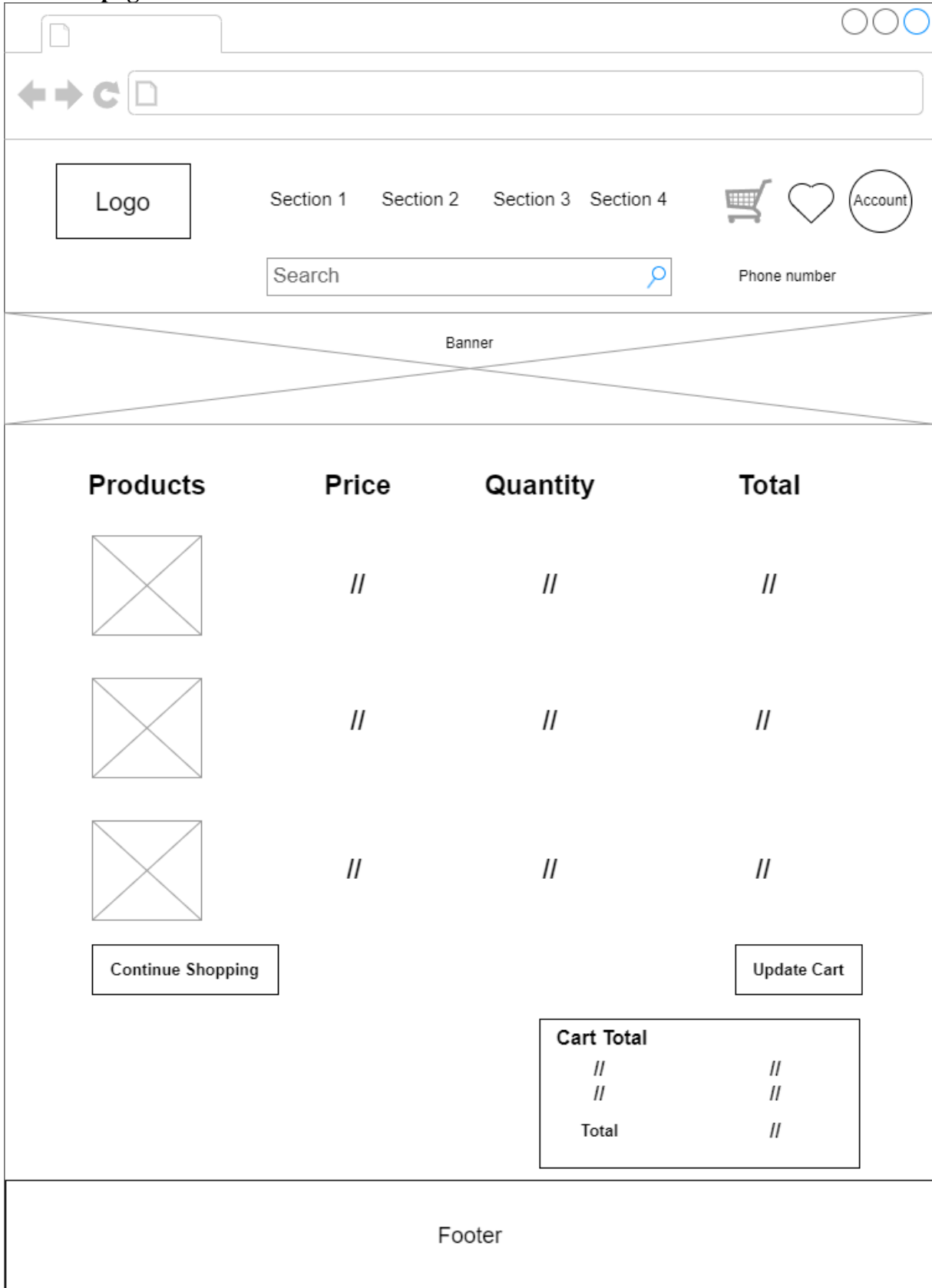


Figure 10: Cart page

### 10.1.5 Check out page

← → ↺

Logo

Section 1Section 2Section 3Section 4

Account

Search

Phone number

Banner

**Billing Details**

Line 1

Line 1

Line 1

Line 1

Line 1

**Your Order**

Product	Total
//	//
//	//
//	//
<b>Subtotal</b>	//
<b>Total</b>	//
<div>Place Order</div>	

Footer

Figure 11: Check out page



### 10.1.6 Contact page

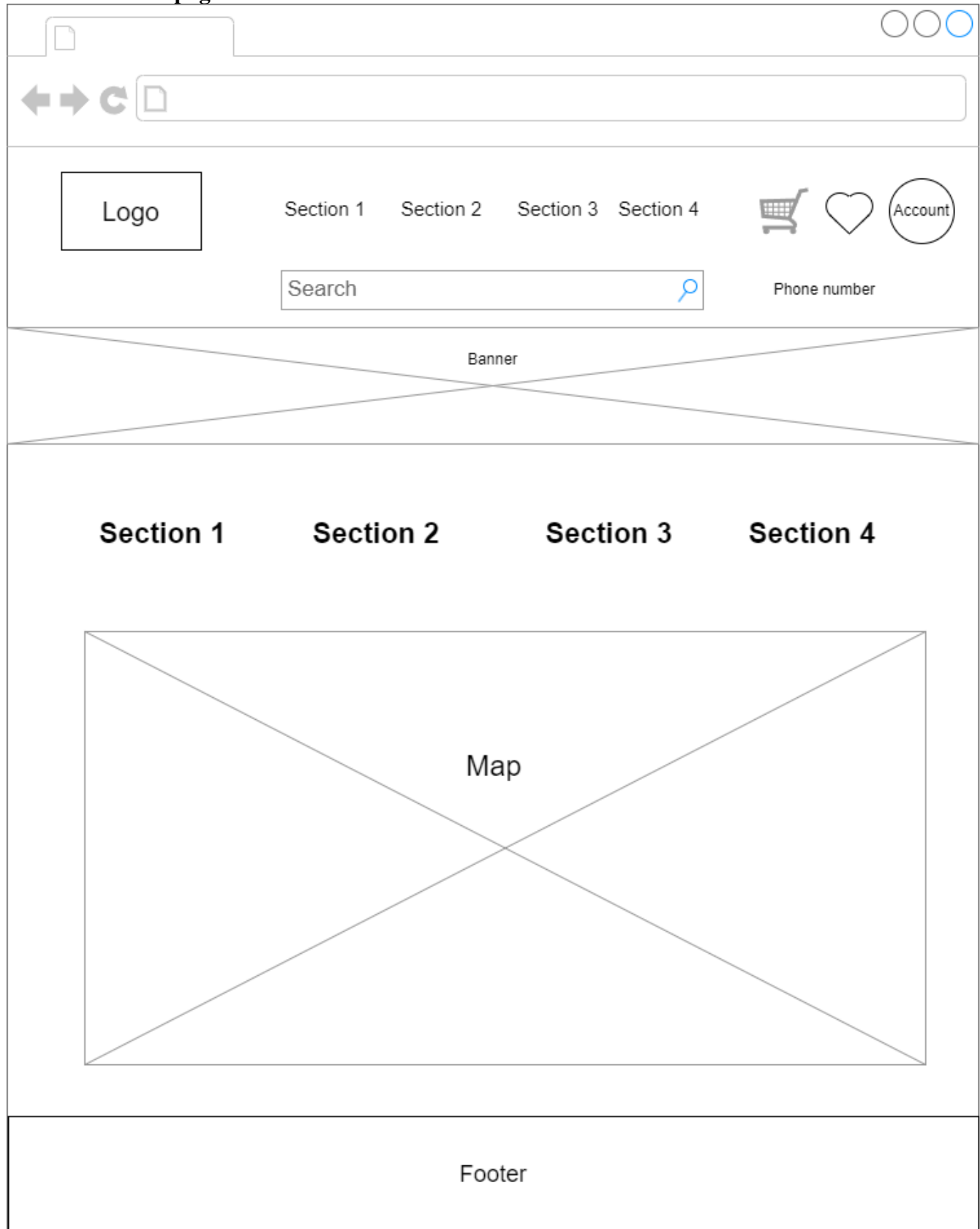


Figure 12: Contact page

### 10.1.7 Staff/Owner shop page

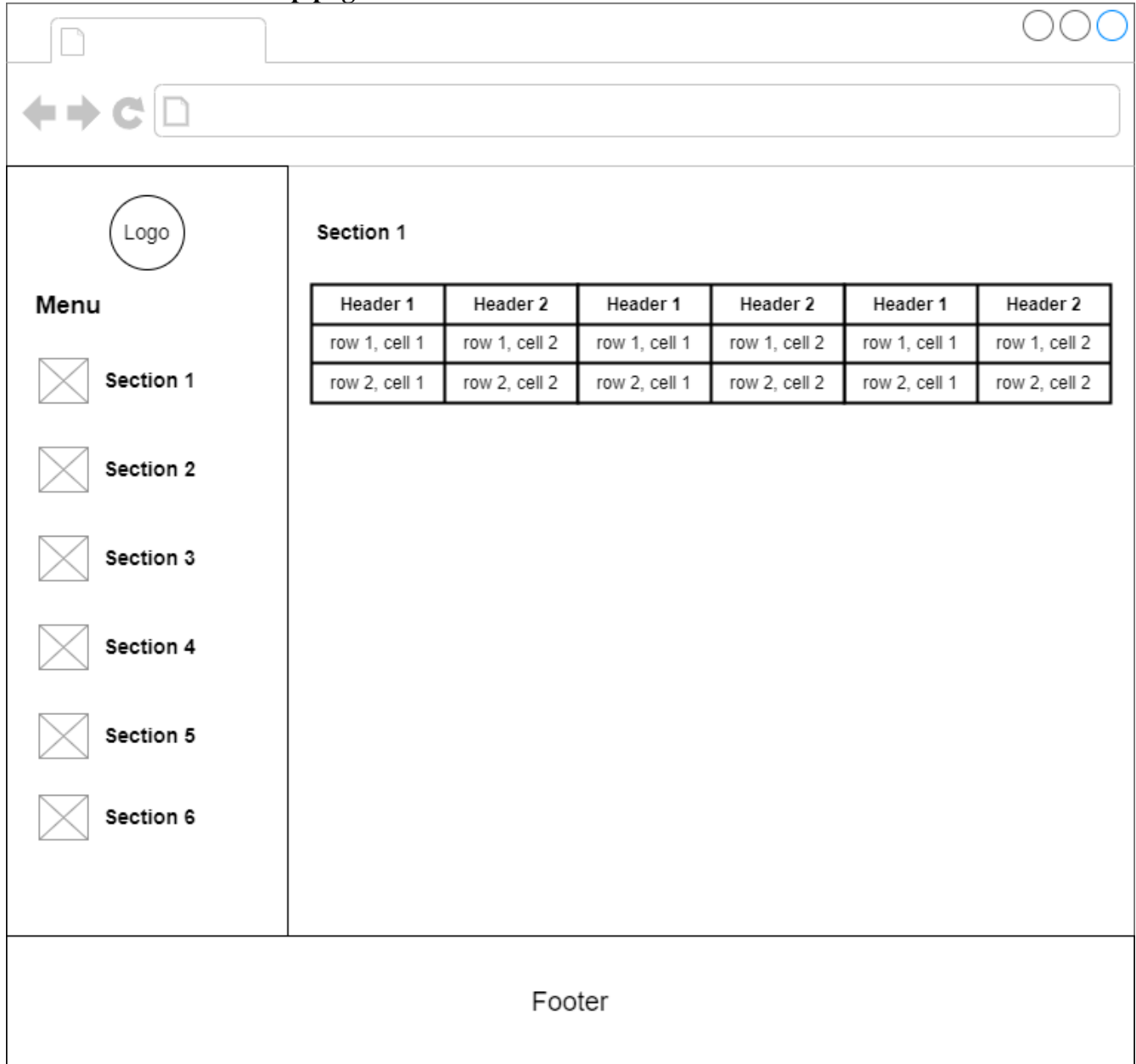


Figure 13: Staff/Owner shop page

## 10.2 Use case diagram

Figures 14 and 15 present the Use Case diagrams, which depict the various functions of the system in relation to the actors involved. These diagrams provide a visual representation of how different actors interact with the system and the functionalities available to them. By outlining the possible actions and behaviors of both users and system components, these diagrams offer a comprehensive overview of the system's capabilities and help ensure that all user requirements are adequately addressed.

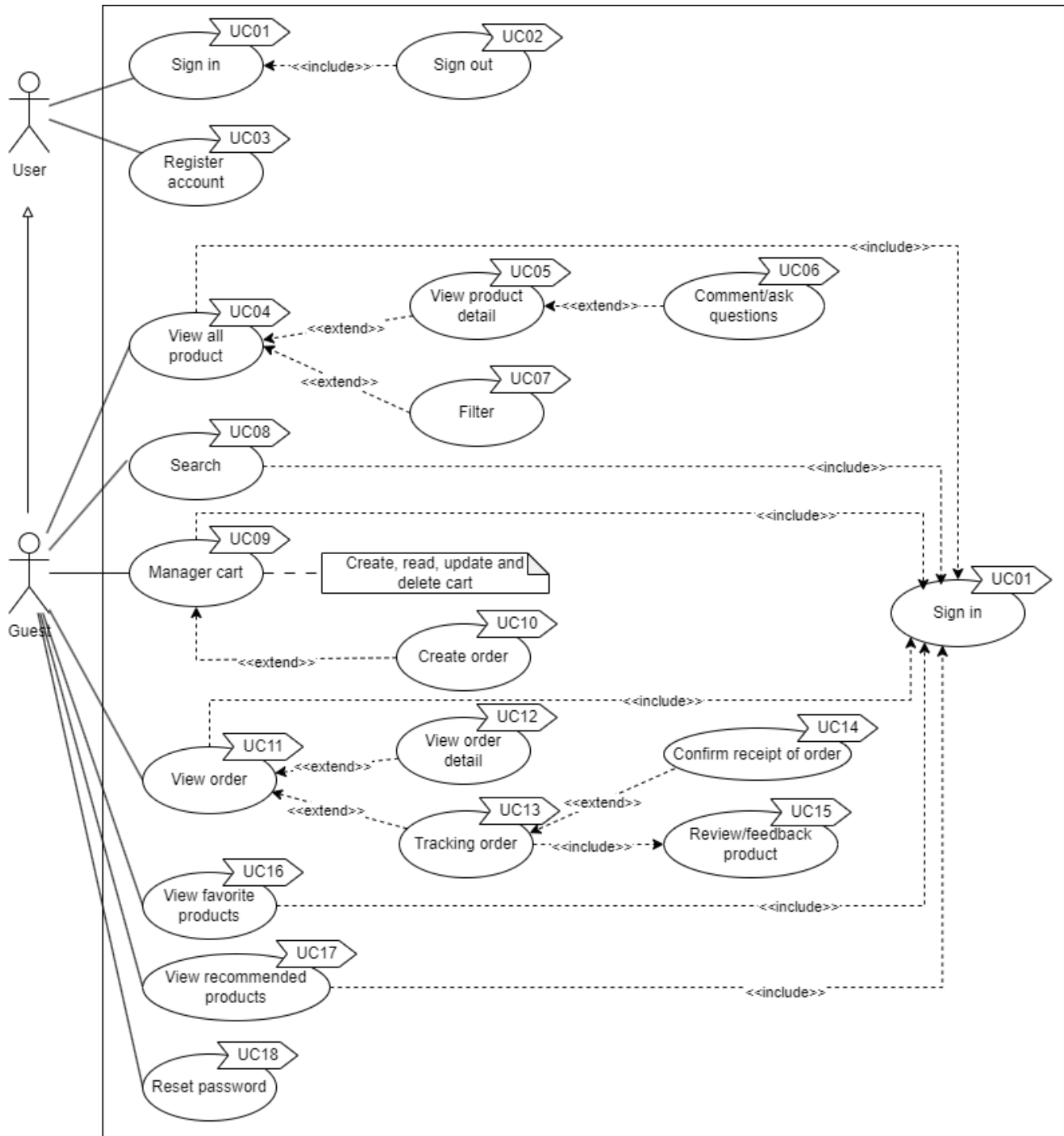


Figure 14: Use case diagram (1)

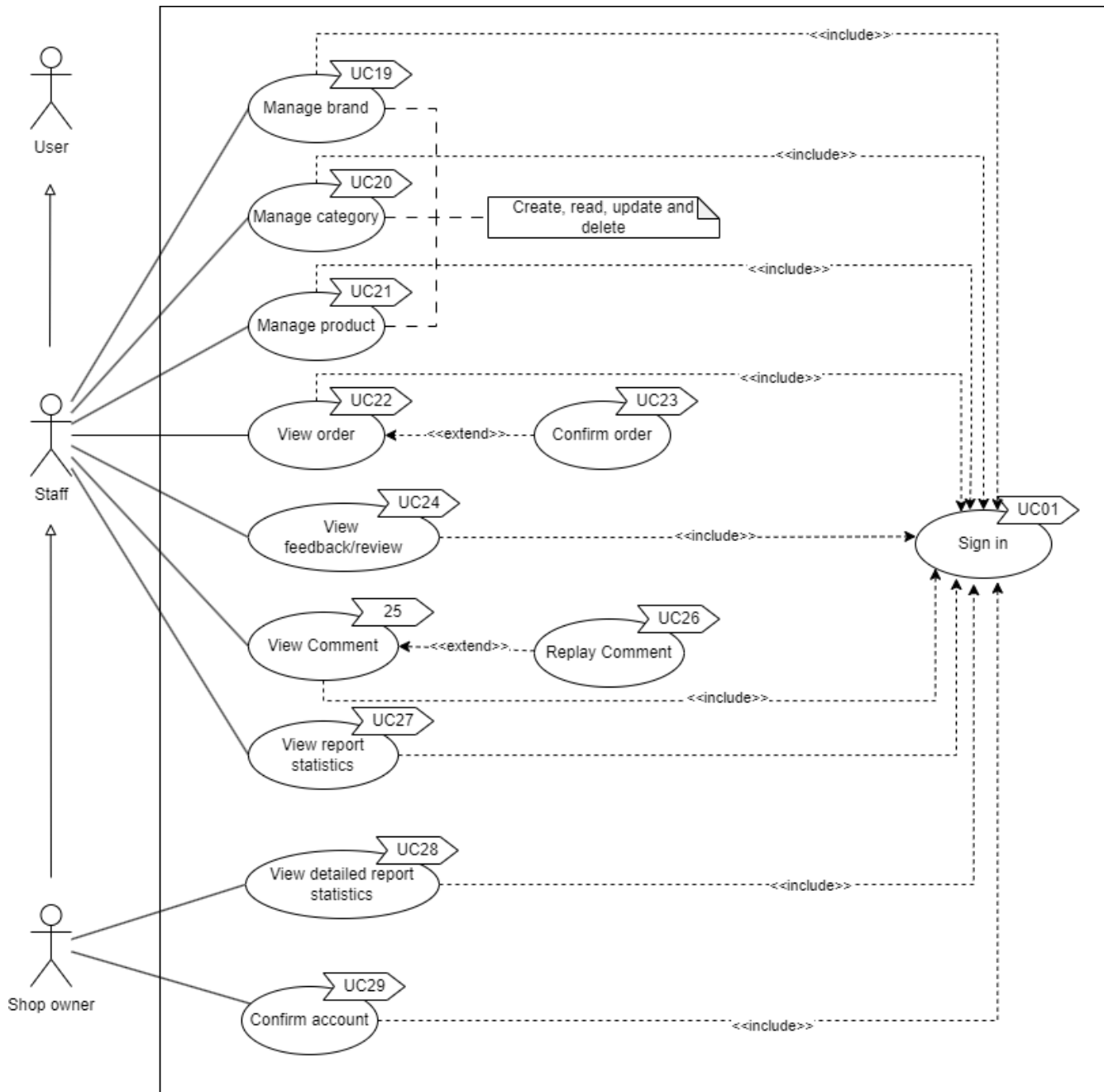


Figure 15: Use case diagram (2)

### 10.3 Entity relationship diagram

The Entity-Relationship Diagram (ERD) illustrates the database structure of our system, comprising tables such as User, Role, Image, Brand, Category, Product, Feedback, Order, Order Detail, Comment, Reply, and Cart. Each table represents a distinct entity within the system, storing relevant information essential for system functionality and user interactions. This ERD serves as a foundational framework for organizing data effectively, facilitating seamless data management, and ensuring smooth system operation.

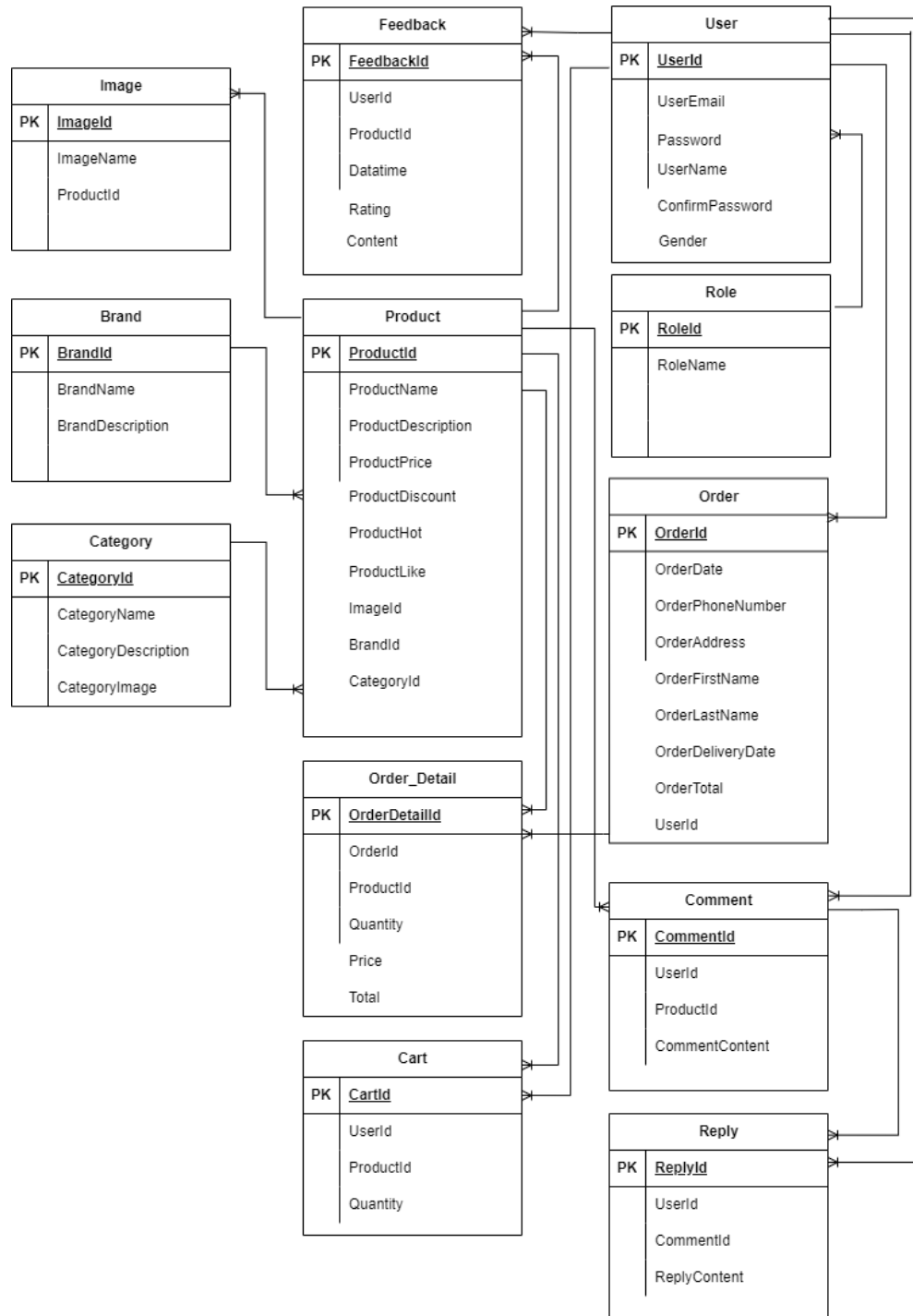


Figure 16: Entity relationship diagram of the system

## 10.4 Data flow diagram

Figure 17 represents the data flow diagram at level 0, Figure 18 illustrates the data flow diagram at level 1 with the role user. Figure 19 illustrates the data flow diagram at level 1 with the role of guest. Figure 20 illustrates the data flow diagram at level 1 with the role of Shop owner. Figure 21 illustrates the data flow diagram at level 1 with the role of Staff. These diagrams are crucial for identifying the flow of data within the system. They provide a visual representation of how information moves between different processes, entities, and data stores. By analyzing these diagrams, stakeholders can gain insights into how data is processed, transformed, and stored throughout the system, helping to ensure efficient data management and accurate information flow.

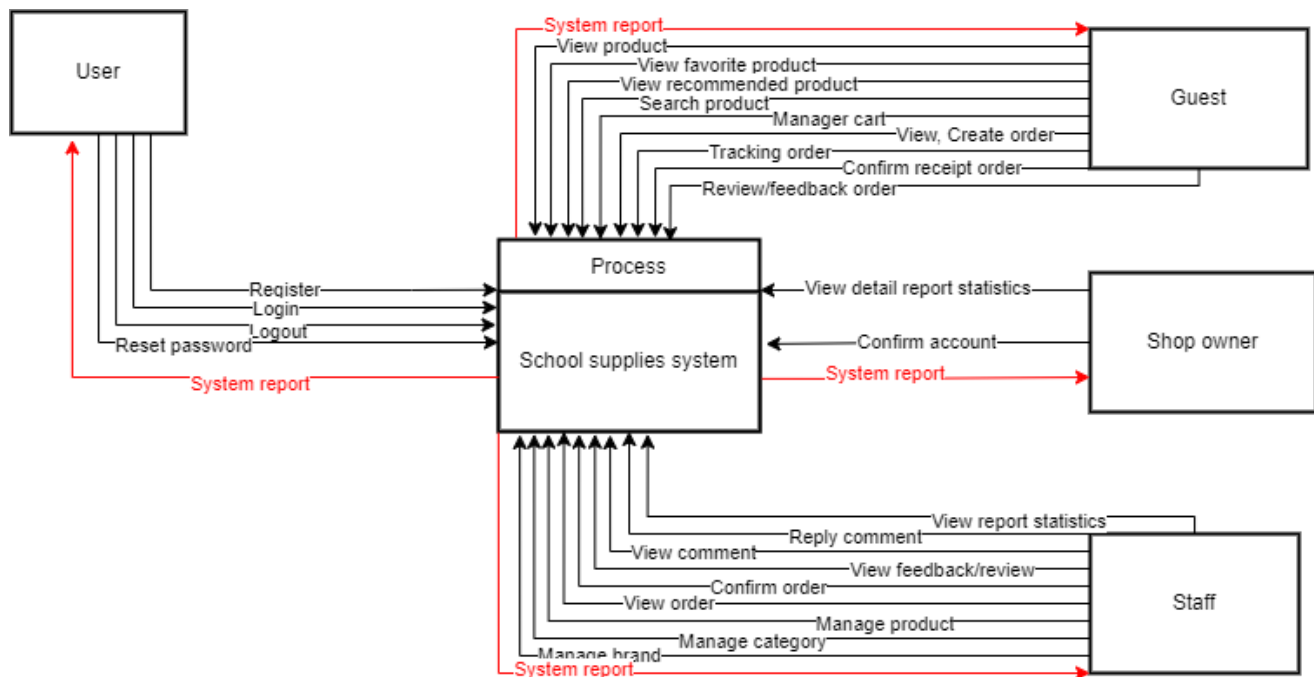


Figure 17: Data flow diagram level 0

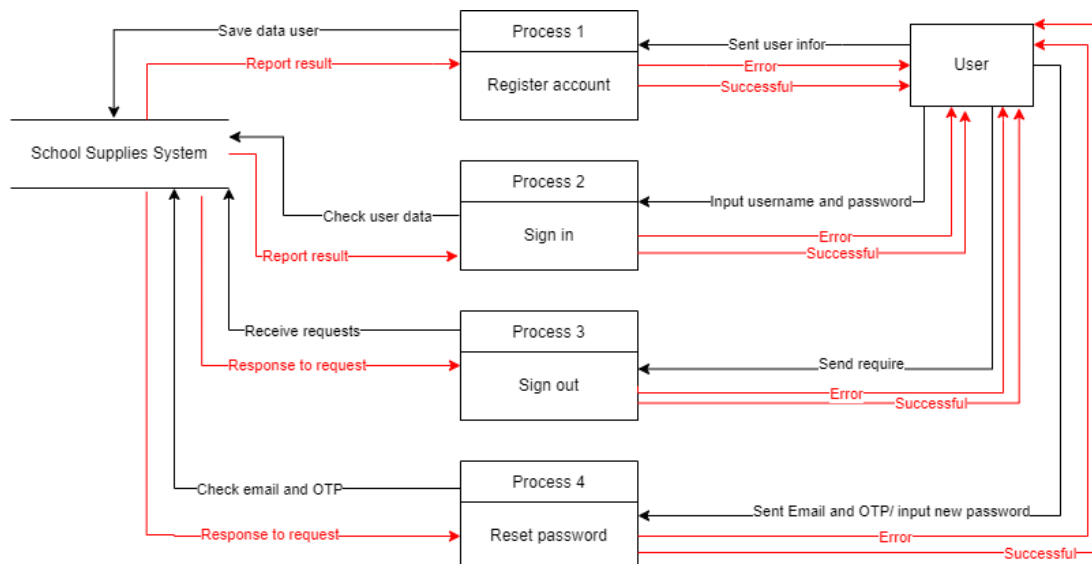


Figure 18: Data flow diagram level 1 with the role user

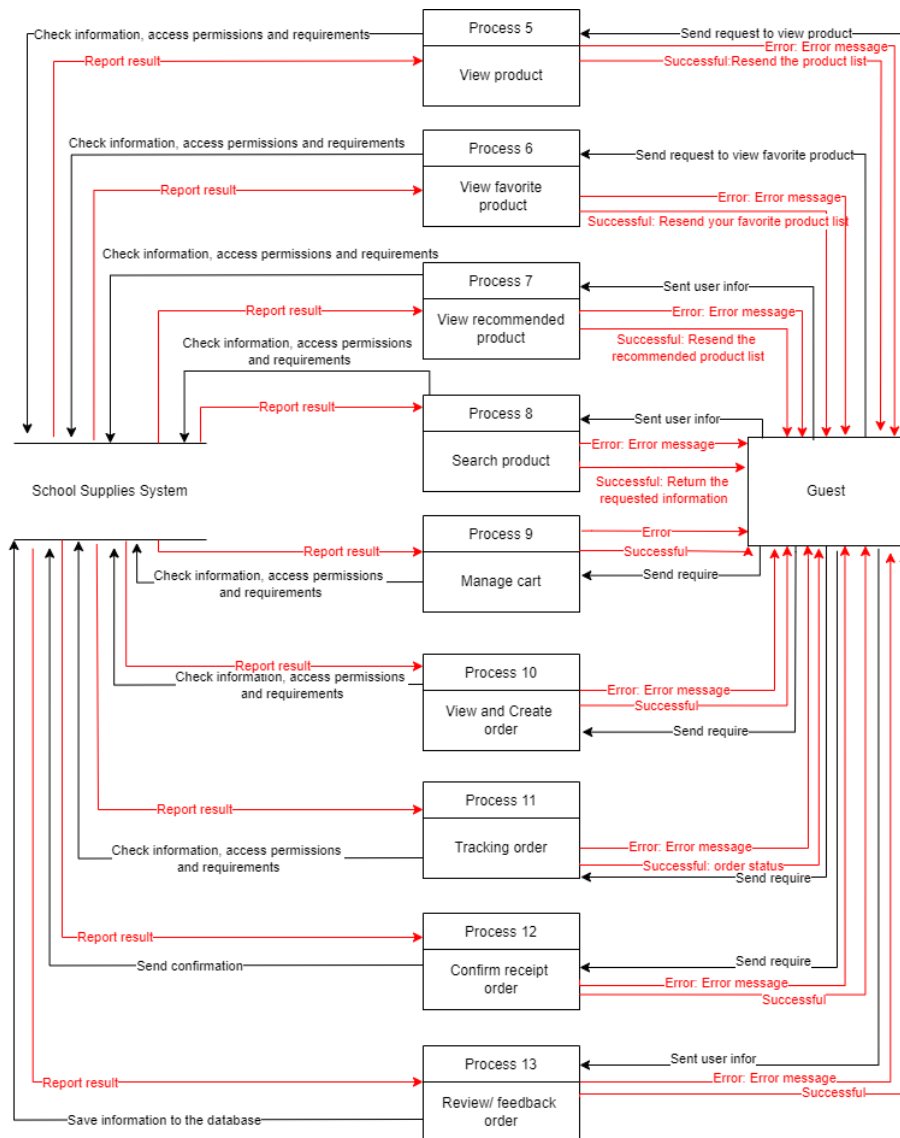


Figure 19: Data flow diagram level 1 with the role guest

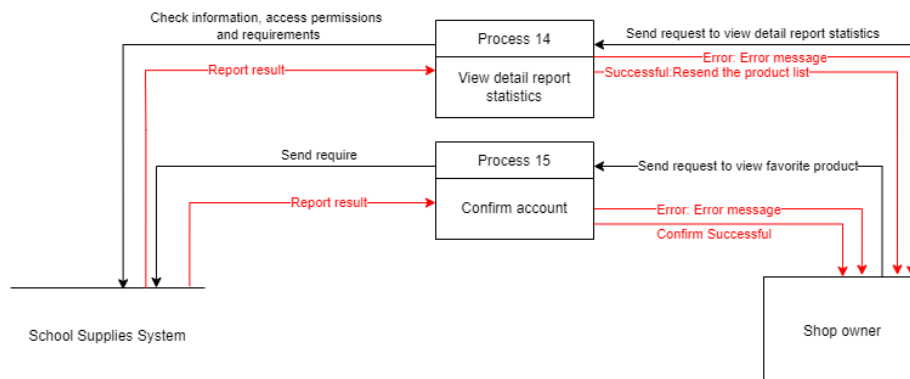


Figure 20: Data flow diagram level 1 with the role owners

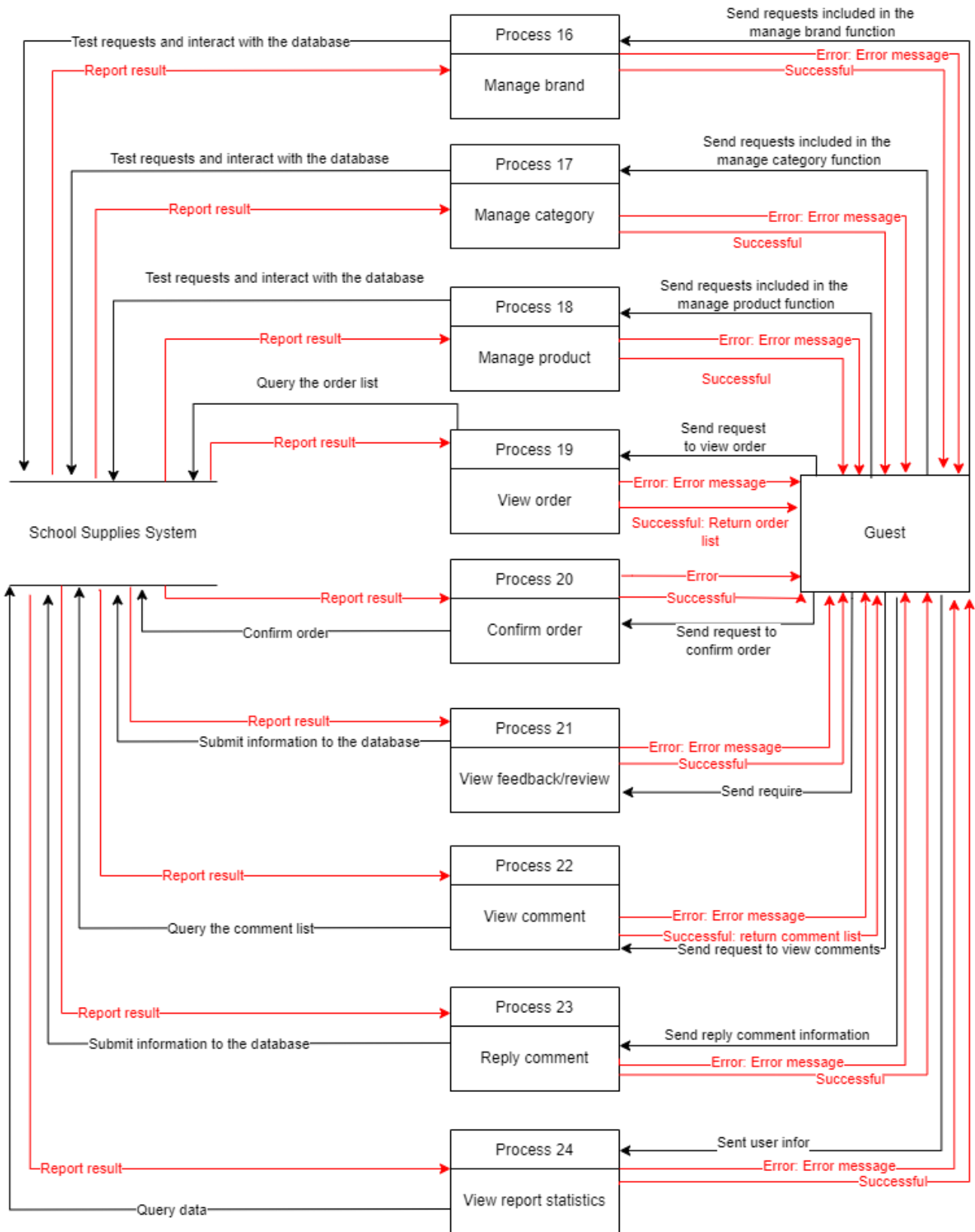


Figure 21: Data flow diagram level 1 with the role shop staff



## 10.5 Illustrate all your findings on how to use these by drawing the overview

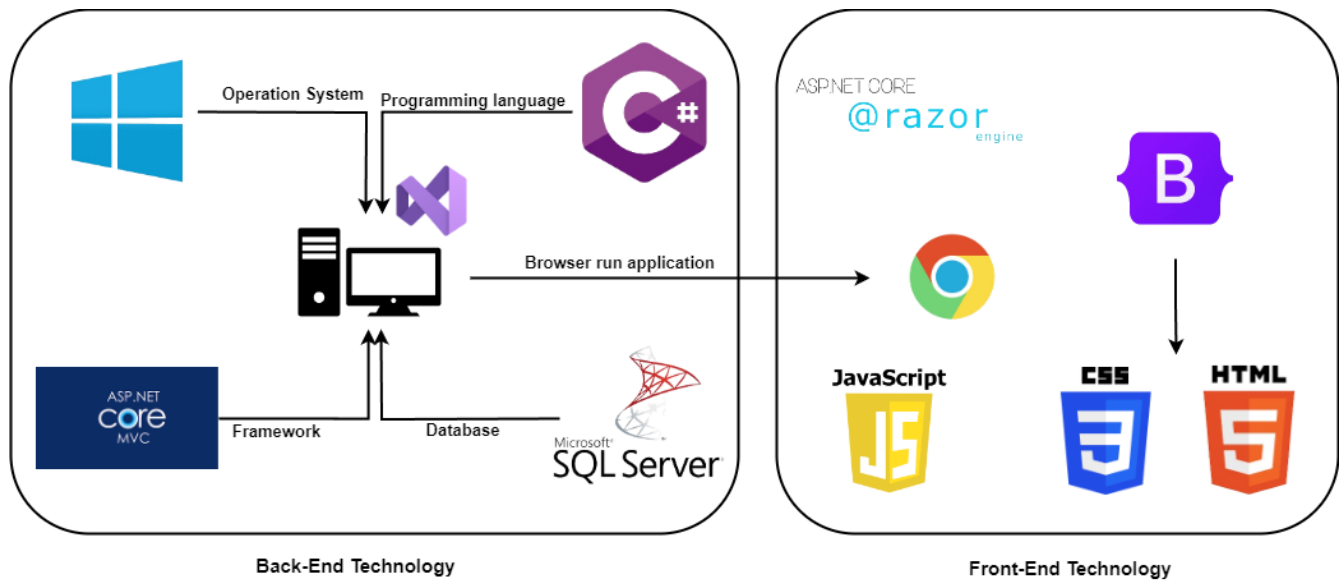


Figure 22: Illustration of general system geometry.

## 11. Implementation

### 11.1 Feature Demonstrations

Figure 23 displays a variety of notification types utilized within the system. These notifications serve to provide users with important updates, reminders, or alerts regarding their interactions with the platform. From notifying users about order status changes to reminding them of upcoming events or deadlines, the different notification types aim to enhance user engagement, improve communication, and ensure a seamless user experience.

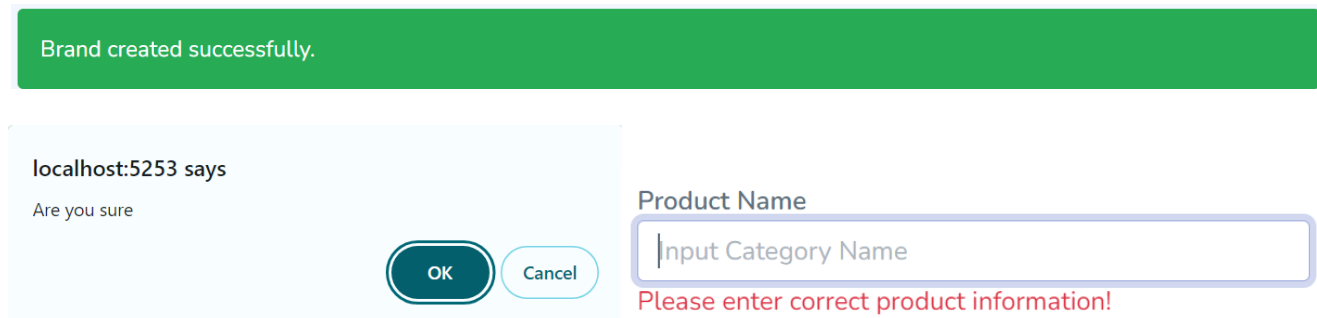


Figure 23: A number of notification types.

### 11.1.1 Home page

On the homepage, users can easily navigate through various sections, including viewing the list of categories, latest products, top-rated products, and hot products, as depicted in Figures 24, 25, and 26. These sections provide users with quick access to different product categories and allow them to stay updated on the newest, most popular, and trending items available on the platform.

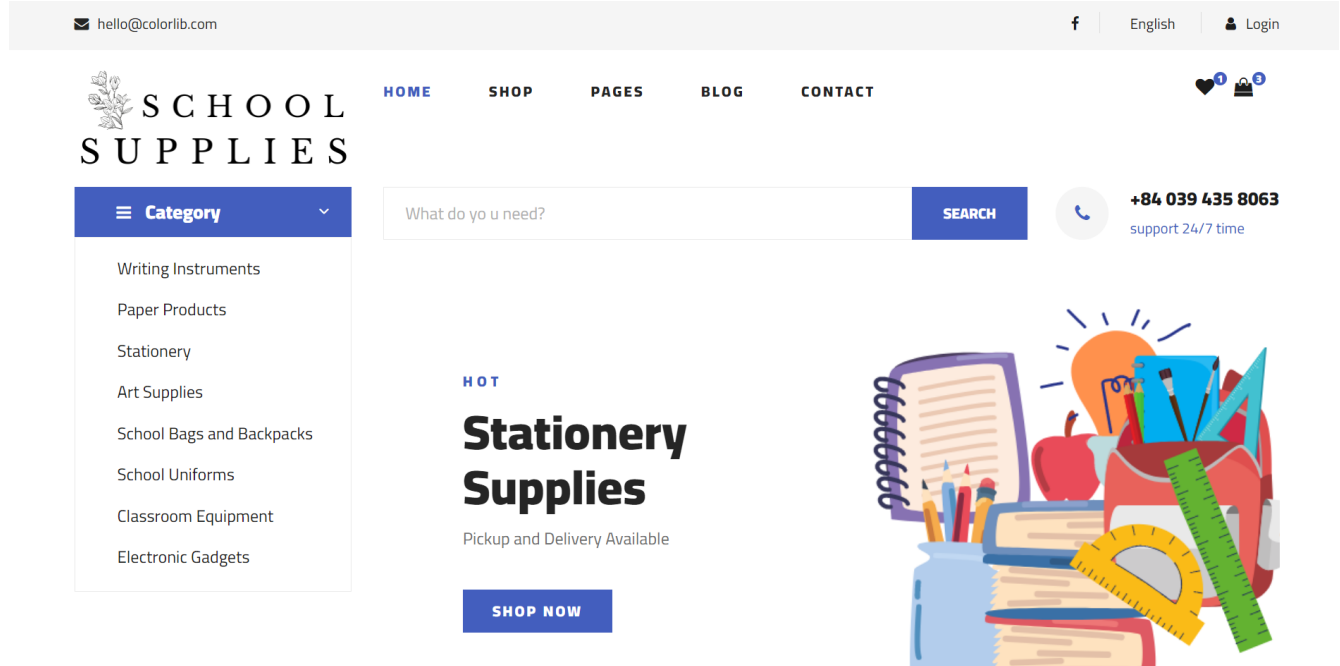


Figure 24: Home page



Figure 25: Category list

### Latest Products



### Top Rated Products



### Hot Products



Figure 26: List of latest products, top rated products, and hot products.

## 11.1.2 Product page

On the product page, users have access to a comprehensive product list, along with the ability to filter products based on category and price range. Additionally, users can easily identify products that are on sale, ensuring they can make informed purchasing decisions. These functionalities are illustrated in Figures 27, 28, and 29, providing users with a seamless browsing experience and helping them find the products that best suit their needs and preferences.

## Sale Off

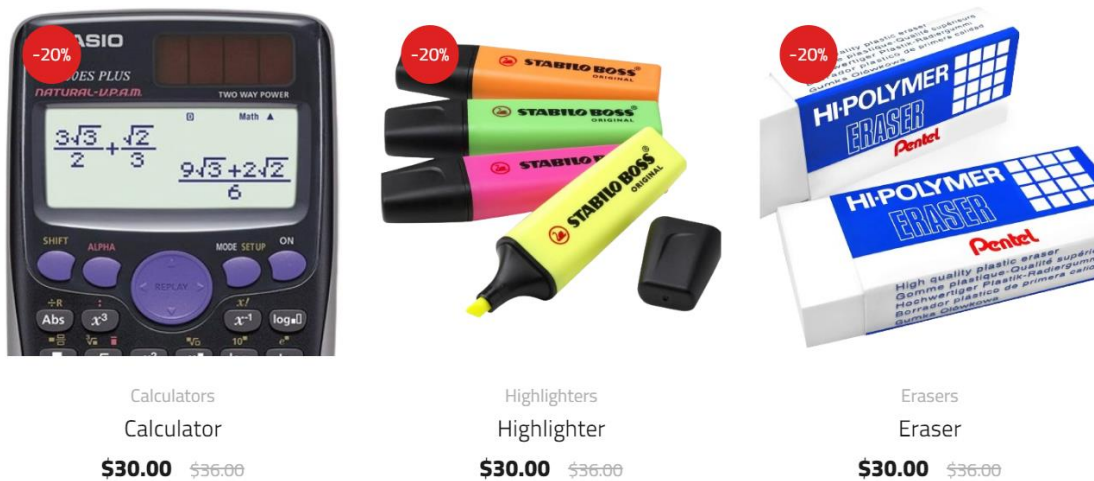


Figure 27: List of sale off products

## Price



Figure 28: Filter based on price

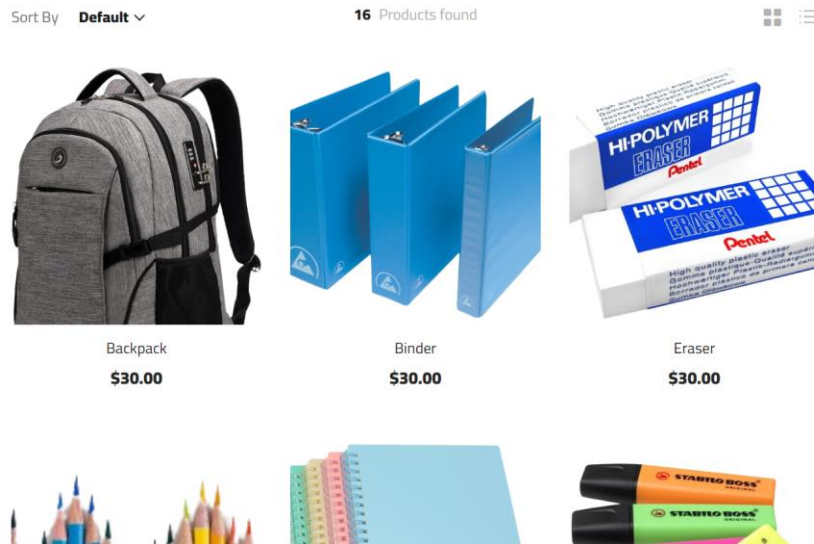


Figure 29: List product

### 11.1.3 Product detail page

On the product detail page, users can access comprehensive information about the product, including its name, reviews, descriptions, and comments from other users. Additionally, users have the option to adjust the quantity they wish to purchase and add the item to their shopping cart. Furthermore, below the product details, users can find a list of related products, providing them with additional options to explore and potentially find similar items of interest. This layout ensures that users have all the necessary details at their fingertips and facilitates a seamless shopping experience. It is presented in pictures 30, 31

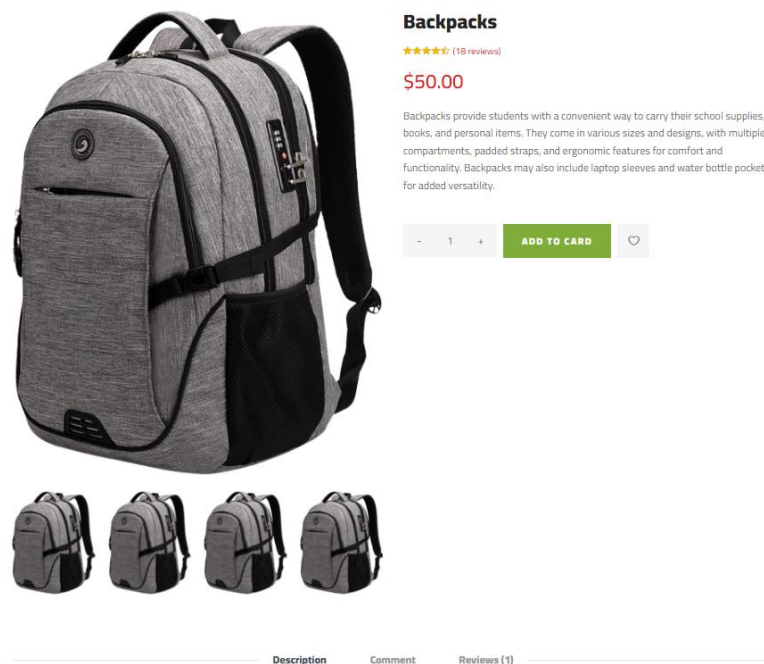


Figure 30: Product detail page



Figure 31: Related Product

### 11.1.4 Cart page

On the cart page, users can review the details of the products added to their cart, including the name, price, and quantity of each item. They have the option to continue shopping by clicking the "Continue Shopping" button or update the cart by clicking the "Update Cart" button. Additionally, the total amount to be paid is displayed below the product list, providing users with a clear overview of their shopping expenses. This layout ensures that users can easily manage their cart contents and proceed with their purchase smoothly. It is presented in pictures 32




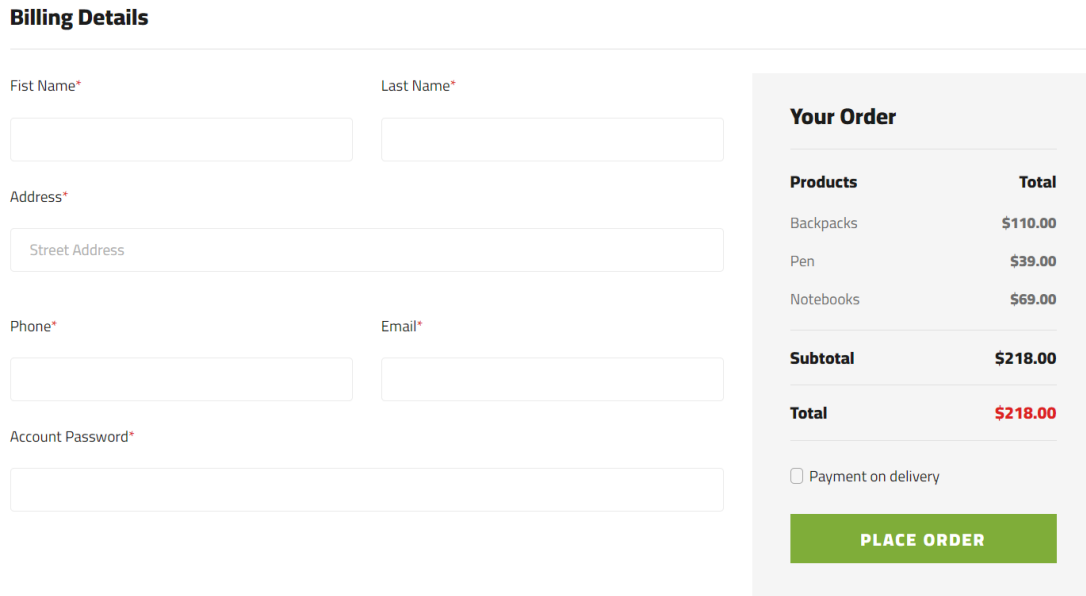
Products	Price	Quantity	Total	
 <div>Backpacks</div>	\$110.00	- 1 +	\$110.00	×
 <div>Pen</div>	\$39.00	- 1 +	\$39.00	×
 <div>Notebooks</div>	\$69.00	- 1 +	\$69.00	×
<div> <div>CONTINUE SHOPPING</div> <div>UPDATE CART</div> </div>				
<div> <div>Cart Total</div> <div> <div>Subtotal</div> <div>\$218.00</div> </div> <div> <div>Total</div> <div>\$218.00</div> </div> <div>PROCEED TO CHECKOUT</div> </div>				

Figure 32: Cart page

### 11.1.5 Check out page

On the cart page, when users click "Proceed to Checkout," they are directed to the Checkout page. Here, users are prompted to fill in their complete information and select a payment method. This page serves as the final step before completing the purchase, ensuring that users provide the necessary details for shipping and billing and choose their preferred payment method for the transaction. It is presented in pictures 33



**Billing Details**

First Name\* Last Name\*

Address\*

Phone\* Email\*

Account Password\*

**Your Order**

Products	Total
Backpacks	\$110.00
Pen	\$39.00
Notebooks	\$69.00
<b>Subtotal</b>	<b>\$218.00</b>
<b>Total</b>	<b>\$218.00</b>

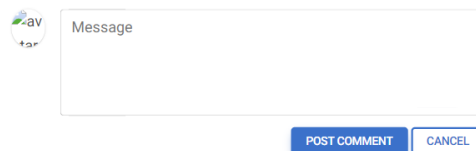
☐ Payment on delivery

**PLACE ORDER**

Figure 33: Check out page

### 11.1.6 Comment/ Feedback product

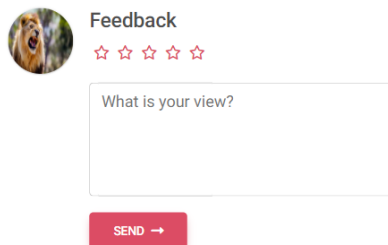
Users have the option to provide comments and feedback regarding the product. This feature allows them to share their opinions, experiences, and suggestions, contributing to the overall user engagement and product improvement. Users can access this functionality through the interface, as in figure 34 and 35, enabling them to express their thoughts and insights on the product in a convenient manner.



Message

**POST COMMENT** **CANCEL**

Figure 34: Comment



**Feedback**

☆☆☆☆

What is your view?

**SEND →**

Figure 35: Feedback

### 11.1.7 Management brand

Staff members have the authority to manage brands by performing actions such as reading, creating, updating, and deleting brand information. This functionality empowers staff to oversee and maintain the brand data effectively. As depicted in figures 36, 37, and 38, staff can access dedicated interfaces where they can interact with brand-related data, ensuring accuracy and relevance in the system's brand management process.

DataTable Brand

Dashboard / DataTable Brand

Create new Brand

Show

10

entries

Search:

Brand ID	Brand Name	Brand Description	Action
08625be3-9521-4337-f563-08dc6820d7d2	Sharpie	Sharpie is famous for its permanent markers, highlighters, and other writing instruments that are widely used for labeling, writing, and drawing.	<div></div> <div></div>
3f20907f-36f4-45a6-f566-08dc6820d7d2	Five Star	Five Star offers durable and functional notebooks, binders, planners, and folders designed to withstand the rigors of daily school use.	<div></div> <div></div>
4172125b-6375-4f4f-f567-08dc6820d7d2	JanSport	JanSport is a leading brand for backpacks, known for their durability, comfort, and stylish designs, making them ideal for carrying school supplies and textbooks.	<div></div> <div></div>
5532b11a-d580-4ca1-f568-08dc6820d7d2	Targus	Targus offers a range of laptop bags and cases designed to protect and transport electronic devices, such as laptops and tablets, to and from school or work.	<div></div> <div></div>
7a52b28b-0cc5-489e-f561-08dc6820d7d2	Crayola	Known for its colorful crayons, markers, colored pencils, and other art supplies, Crayola offers a wide range of creative tools for students of all ages.	<div></div> <div></div>
86da7f40-0925-4db2-f562-08dc6820d7d2	Mead	Mead produces a variety of notebooks, planners, binders, and other paper products designed for students and professionals alike.	<div></div> <div></div>
931d541e-cb9c-4db1-f565-08dc6820d7d2	Ticonderoga	Ticonderoga manufactures high-quality pencils favored by students and teachers for their smooth writing, durability, and erasability.	<div></div> <div></div>
b5d01a94-2f99-4d08-f564-08dc6820d7d2	Pilot	Pilot is a popular brand for pens, including gel pens, ballpoint pens, and fountain pens, known for their smooth writing and reliability.	<div></div> <div></div>

Showing 1 to 8 of 8 entries

Previous

1

Next

Figure 36: List brand

Create new brand

Dashboard / Create new brand

Brand Name

Brand Description

Input Brand Name

Input Brand Description

Submit

Reset

Back to list

Figure 37: Create new brand

Update a brand

Dashboard / Update a brand

Update a brand

Brand ID

Brand Name

Brand Description

08625be3-9521-4337-f563-08dc6820d7d2

Sharpie

Sharpie is famous for its permanent markers, highlight

Update

Back to list

Figure 38: Update a brand



### 11.1.8 Management category

Staff members have the capability to perform various actions related to categories, including reading, creating, updating, and deleting category information. These functionalities empower staff to manage the categories effectively, ensuring that the system's category data remains accurate and up-to-date. As illustrated in figures 39, 40, and 41, staff can access dedicated interfaces where they can interact with category-related data, facilitating seamless category management within the system.

**DataTable Category** Dashboard / DataTable Category

[Create new Category](#)

Show 10 entries Search:

Category ID	Category Name	Category Description	Action
31caa662-d945-4669-5259-08dc681f7e70	Writing Instruments	This category includes writing and drawing tools such as ballpoint pens, pencils, markers, fountain pens, highlighters, and colored pencils. These are essential tools for note-taking and writing during study sessions.	<a href="#">Edit</a> <a href="#">Delete</a>
5656fb59-aabf-4ed4-525c-08dc681f7e70	Art Supplies	Art supplies include tools and materials for artistic expression such as watercolors, acrylic paints, oil paints, drawing pens, sketchbooks, and canvases. These products are used for creative projects and art activities.	<a href="#">Edit</a> <a href="#">Delete</a>
6a629aaf-9859-4736-525f-08dc681f7e70	Classroom Equipment	Classroom equipment includes devices and supplies used in the classroom such as interactive whiteboards, projectors, speakers, desks, chairs, and student name tags. These items support teaching and learning activities in the classroom.	<a href="#">Edit</a> <a href="#">Delete</a>
a23fd63b-360f-4bbd-525b-08dc681f7e70	Stationery	Stationery items encompass office supplies like envelopes, stationery paper, notepads, notebooks, and pencil cases. These items help organize and store documents and writing instruments.	<a href="#">Edit</a> <a href="#">Delete</a>
b7970b04-2f87-4884-525a-08dc681f7e70	Paper Products	This category consists of various paper products including writing paper, sticky notes, drawing paper, notebooks, and printer paper. These types of paper are used for writing, drawing, note-taking, and printing in academic and office settings.	<a href="#">Edit</a> <a href="#">Delete</a>
c932aff4-4a1c-4af7-525d-08dc681f7e70	School Bags and Backpacks	This category includes school bags, backpacks, messenger bags, and crossbody bags. These are convenient means of transportation for students to carry textbooks and everyday school essentials.	<a href="#">Edit</a> <a href="#">Delete</a>
dcd37e83-0037-463c-5260-08dc681f7e70	Electronic Gadgets	Electronic gadgets encompass electronic devices such as laptops, tablets, desktop computers, scientific calculators, and smartwatches. These devices support research, studying, and entertainment for students both in and out of the classroom.	<a href="#">Edit</a> <a href="#">Delete</a>
feb1400-e47b-4b14-525e-08dc681f7e70	School Uniforms	School uniforms comprise items like uniform shirts, uniform pants, uniform skirts, jackets, and uniform accessories. Uniforms promote uniformity and provide identification for students within the school environment.	<a href="#">Edit</a> <a href="#">Delete</a>

Showing 1 to 8 of 8 entries Previous 1 Next

Figure 39: List category

**Create new category** Dashboard / Create new category

Category Name

Category Description

[Submit](#)
[Reset](#)
[Back to list](#)

Figure 40: Create category

**Update a Category** Dashboard / Update a category

Update a category

Category ID

Category Name

Category Description

[Update](#)
[Back to list](#)

Figure 41: Update a category






### 11.1.9 Management product

Staff members possess the authority to perform a range of actions concerning products, specifically school supplies, within the system. This includes reading, creating, updating, and deleting product information. Through the interfaces depicted in figures 42, 43, and 44, staff can efficiently manage product data, ensuring the accuracy and relevance of the products offered on the platform. This comprehensive control allows staff to promptly respond to changes in inventory, pricing, or product details, ultimately enhancing the overall management of school supplies within the e-commerce system.

**DataTable Product** Dashboard / DataTable Product

[Create new Product](#)

Show  entries Search:

Product ID	Product Name	Product Image	Product Description	Product Price	Product Discount	Category Name	Brand Name	Action
025a8663-cd74-464d-5b8e-08dc68246214	Pencils		Pens and pencils are essential writing instruments for students. Pens come in different types, such as ballpoint, gel, and felt-tip, offering smooth and reliable ink flow. Pencils, available in graphite or mechanical form, provide a versatile tool for writing, drawing, and sketching.	20	0	Art Supplies	Pilot	<a href="#">Edit</a> <a href="#">Delete</a>
8f305f0b-77c5-4ec1-5b8d-08dc68246214	Pens		Pens and pencils are essential writing instruments for students. Pens come in different types, such as ballpoint, gel, and felt-tip, offering smooth and reliable ink flow. Pencils, available in graphite or mechanical form, provide a versatile tool for writing, drawing, and sketching.	20	0	Writing Instruments	Mead	<a href="#">Edit</a> <a href="#">Delete</a>
961d4caf-05ad-4fb2-5b8c-08dc68246214	Notebooks		Notebooks come in various sizes and styles, including spiral-bound, composition, and pocket-sized. They provide students with blank or ruled pages for writing notes, jotting down ideas, and completing assignments. Some notebooks feature perforated pages for easy tearing, while others come with durable covers for long-lasting use.	10	0	Writing Instruments	Crayola	<a href="#">Edit</a> <a href="#">Delete</a>

Showing 1 to 3 of 3 entries Previous **1** Next

Figure 42: List product

**Create new Product** Dashboard / Create new product

Product Name

Product Price

Product Image  
 No file chosen

Brand Name

Category Name

Product Description

Product Discount

Figure 43: Create new product

Figure 44: Update a product

### 11.1.10 View report statistics

Figure 45 displays a comprehensive report statistics section, encompassing various essential metrics for the e-commerce system. These metrics include the number of orders processed, the total count of user accounts registered on the platform, the number of products sold, as well as the remaining products in inventory. Additionally, the report provides insights into the system's monthly revenue, allowing for effective financial monitoring and planning. Moreover, it highlights the top 10 most sold products, aiding in identifying popular items and informing inventory management decisions. Furthermore, the report incorporates the latest comments from users, facilitating engagement and feedback analysis. Lastly, it offers insights into the visitors' profile, providing valuable demographic information for targeted marketing strategies and user experience enhancements. Overall, this report section serves as a vital tool for monitoring system performance and making informed business decisions.

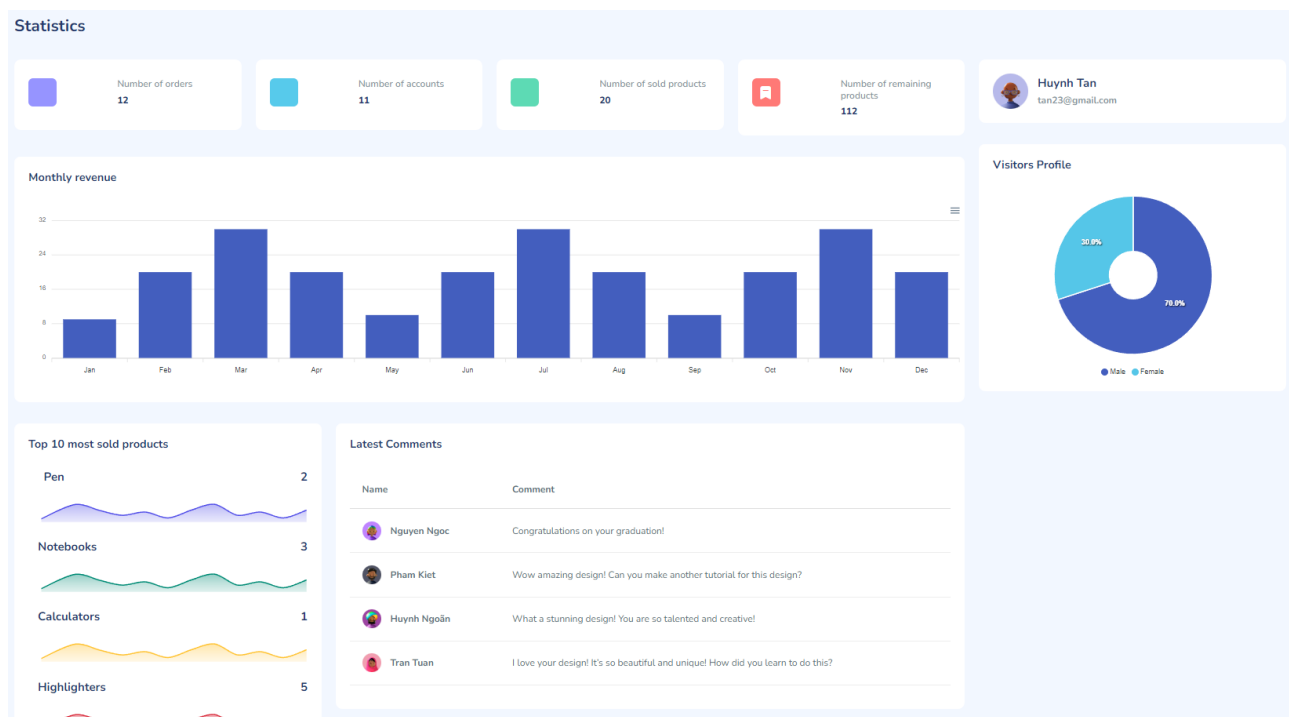


Figure 45: Report statistics

## 11.2 Testing

Creator: Huynh Nhat Tan

No.	Test case	Function	Testing data	Expected	Actual output	Evaluation
1	Verify that “Home page will be displayed” when user clicks Logo	Test home link	Click Logo	Home page will be displayed	Home page will be displayed	Pass
2	Verify that “Home page will be displayed” when user clicks Home on the navigation bar	Test home link	Click Home on the navigation bar	Home page will be displayed	Home page will be displayed	Pass
3	Verify that “Category product will be displayed” when click on category product	Category product link	Click on category product	Category product will be displayed	Category product will be displayed	Pass
4	Verify that “Contact content will be displayed” when clicked contact on the navigation bar	Contact link	Click Contact	Contact content is show	Contact content is show	Pass
5	Verify that “Please login to view your shopping cart will be displayed” when clicked cart on the navigation bar but not logged in	Show notification	Click cart on the navigation bar	Please login to view your shopping cart will be displayed	Please login to view your shopping cart will be displayed	Pass

6	Verify that “Login page will be displayed” when clicked Login on the navigation	Login link	Click Login on the navigation	Login page will be displayed	Login page will be displayed	Pass
7	Verify that “Register page will be displayed” when clicked Register on the navigation	Register link	Click Register on the navigation	Register page will be displayed	Register page will be displayed	Pass
8	Verify that “Username must not be empty!!” will be displayed when input information is incorrect	Login	Username: Password:	“Username must not be empty!!” will be displayed	“Username must not be empty!!” will be displayed	Pass
9	Verify that “Password must not be empty!!” will be displayed when input information in incorrect	Login	Username: customer123 Password:	“Password must not be empty!!” will be displayed	“Password must not be empty!!” will be displayed	Pass
10	Verify that “Login failed” will be displayed when input information incorrect	Login	Username: customer123 Password: haenedd33	“Login failed” will be displayed	“Login failed” will be displayed	Pass
11	Verify that “Login successfully” will be displayed when input information corrects	Login	Username: customer123 Password: 123123	Login successfully will be displayed	Login successfully will be displayed	Pass
12	Verify that “Enter field with mark (*), please “will be	Register customer	Username: Password: Confirm password: Full name: Email: Address:	“Enter field with mark (*), please “will be displayed	“Enter field with mark (*), please “will be displayed	Pass

	displayed when input information incorrects		Telephone: Gender: Date: Month: Year:			
13	Verify that “Create account successfully” will be displayed when input information correctly	Register customer	Username: tancv22233 Password: td23455 Confirm password: td23455 First name: Nhat Tan Last name: Huynh Email: tancv23@gmail.com	“Create account successfully” will be displayed when input information correctly	“Create account successfully” will be displayed when input information correctly	Pass
14	Verify that “Email” will be displayed when login successful	Show Email	Login successful	“Email” will be displayed	“Email” will be displayed	Pass
15	Verify that “Logout successfully” will be displayed when click logout on the navigation	Logout link	Click logout on the navigation	“Logout successfully” will be displayed	“Logout successfully” will be displayed	Pass
16	Verify that “Information detail product’s” will be displayed when clicked details on information product	Show detail product’s	Click details on information product	“Information detail product’s” will be displayed	“Information detail product’s” will be displayed	Pass
17	Verify that “Product will be added to shopping cart” when clicked Add to cart	Add products to the shopping cart	Click add to cart	“Product will be added to shopping cart”	“Product will be added to shopping cart”	Pass
18	Verify that “Information product” will be displayed in shopping	Show product	click add to cart	“Information product” will be displayed in shopping cart	“Information product” will be displayed in shopping cart	Pass

	cart when clicked Add to cart					
19	Verify that “Product will be deleted form shopping cart” when clicked delete in shopping cart	Delete shopping cart	Click delete in shopping cart	“Product will be deleted form shopping cart”	“Product will be deleted form shopping cart”	Pass
20	Verify that “User can edit quantity product” when clicked Edit in the shopping cart	Edit quantity product	Clicked Edit in the shopping cart	“User can edit quantity product”	“User can edit quantity product”	Pass
21	Verify that “Quantity product will be updated” when clicked update in the shopping cart	Update shopping cart	Click update in the shopping cart	“Quantity product will be updated”	“Quantity product will be updated”	Pass
22	Verify that “Please enter Telephone” will be displayed when input information incorrect	Add Information Order	Name: Date: Phone: Address: Email:	“Please enter Telephone” will be displayed	“Please enter Telephone” will be displayed	Pass
23	Verify that “Please enter Address” will be displayed when input information incorrect	Add Information Order	Name: Date: Phone: Address: Email:	“Please enter Address” will be displayed	“Please enter Address” will be displayed	Pass
24	Verify that “Please enter Email” will be displayed when input information incorrect	Add Information Order	Name: Date: Phone: Address: Email:	“Please enter Email” will be displayed	“Please enter Email” will be displayed	Pass

25	Verify that “Add information successful” will be displayed when input information successfully	Add Information Order	Name: Huynh Nhat Tan Phone: 0399999999 Address: Can Tho Email: tancv23@gmail.com	“Add information successful” will be displayed	“Add information successful” will be displayed	Pass
26	Verify that “Go to Admin home page” When input information admin account correctly	Login	Username: admin123 Password: 123123	“Go to Admin home page”	“Go to Admin home page”	Pass
27	Verify that “Go to category page” when clicked Category on the navigation bar	Category link	Click Category	“Go to category page”	“Go to category page”	Pass
28	Verify that “Go to brand page” when clicked Brand on the navigation bar	Brand link	Click Brand	“Go to brand page”	“Go to brand page”	Pass
29	Verify that “Go to Product page” when clicked Product on the navigation bar	Product link	Click Product	“Go to Product page”	“Go to Product page”	Pass
30	Verify that “Go to Create a new category” when clicked New Category	New Category link	Click New Category	“Go to Create a new category”	“Go to Create a new category”	Pass
31	Verify that “Please enter description” will be	Create a new category	ID: Name: Description:	“Please enter description” will be displayed	“Please enter description” will be displayed	Pass

	displayed when input information incorrect					
32	Verify that “Are you sure?” will be displayed when clicked Delete category	Delete category	Click delete category	“Are you sure?” will be displayed	“Are you sure?” will be displayed	Pass
33	Verify that “Category will be deleted” when clicked “OK” on the notification “Are you sure?” after clicked delete category	Delete category	Click “OK” on the notification “Are you sure?”	“Category will be deleted”	“Category will be deleted”	Pass
34	Verify that “Category will not be deleted” when clicked “Cancel” on the notification “Are you sure?” after clicked delete category	Delete category	Click “Cancel” on the notification “Are you sure?”	“Category will not be deleted”	“Category will not be deleted”	Pass
35	Verify that “Go to Update category” when clicked Edit in category page	Edit link	Click Edit	“Go to Update category”	“Go to Update category”	Pass
36	Verify that “Go to Create a new product page” when clicked new product	Click link	Click new product	“Go to Create a new product page”	“Go to Create a new product page”	Pass
37	Verify that “Are you sure?” will be	Delete product	Click delete in product page	“Are you sure?” will be displayed	“Are you sure?” will be displayed	Pass



	displayed when clicked delete in product page					
38	Verify that “Are you sure?” will be displayed when clicked delete in user page	Delete user	Click delete in user page	“Are you sure?” will be displayed	“Are you sure?” will be displayed	Pass
39	Verify that “Are you sure?” will be displayed when clicked delete in order page	Delete order	Click delete in order page	“Are you sure?” will be displayed	“Are you sure?” will be displayed	Pass

## 12 Evaluation

### 12.1 Recommendations for future development

For future development, there are several recommendations to further enhance the e-commerce system for selling and recommending school supplies. Firstly, investing in continuous improvement of recommendation algorithms can refine the personalization aspect, leading to more accurate and relevant product suggestions tailored to individual user preferences. Additionally, expanding the range of interactive features such as live chat support or virtual shopping assistants can elevate the user experience and foster better engagement.

Furthermore, integrating advanced analytics and reporting tools for staff and store owners can provide valuable insights into sales trends, customer behavior, and inventory management, enabling more informed decision-making and strategic planning. Moreover, exploring emerging technologies such as artificial intelligence and augmented reality for enhancing product visualization and interactive shopping experiences could set the system apart and attract more users.

Lastly, prioritizing mobile optimization and responsive design to ensure seamless access and navigation across various devices is essential for catering to the increasing trend of mobile shopping. By embracing these recommendations, the e-commerce system can stay competitive and continue to evolve to meet the evolving needs and expectations of users and stakeholders alike.

### 12.2 Project Evaluation

The development of the e-commerce system for selling and recommending school supplies has been a challenging yet rewarding project. Throughout the process, we have successfully implemented a wide range of features and functionalities to meet the diverse needs of users, staff, and store owners. From browsing and filtering products to personalized recommendations and order management, the system offers a seamless and user-friendly experience.

One of the notable achievements of the project is the emphasis on data security and user privacy. By encrypting personal data and ensuring secure logins, we have prioritized the protection of user information, fostering trust and confidence among our users. Additionally, the implementation of robust recommendation algorithms has enhanced the quality of product suggestions, improving user engagement and satisfaction.

However, like any project, there are areas for improvement. Enhancements in user interaction features and recommendation algorithms could further personalize the shopping experience, while additional reporting and analytics tools for staff and store owners would facilitate better business management and decision-making.

Overall, the e-commerce system represents a significant step forward in providing a comprehensive platform for purchasing school supplies. It not only meets the immediate needs of users but also lays the foundation for future enhancements and innovations in the e-commerce space.

### **12.3 Personal Evaluation**

After developing the e-commerce system for selling and recommending school supplies, I feel satisfied with the achieved results. The system has been designed and implemented to meet a variety of requirements from end-users to staff and store owners. Features such as product search and filtering, personalized recommendations, order management, and user interaction have been effectively deployed. Moreover, the system ensures data security for personal information and provides a safe and convenient online shopping experience.

However, there are still improvements that can be made to enhance user experience and system performance. For example, developing user interaction features and improving recommendation algorithms could enhance interaction and generate more accurate product recommendations. Additionally, enhancing product management and reporting features for staff and store owners would help them manage and monitor business activities more effectively.

In conclusion, while achieving significant success in developing the system, I recognize that there is always room for improvement and ongoing development to meet the increasingly diverse needs of users and businesses.

### **12.4 Conclusion**

Overall, the development of the e-commerce system for selling and recommending school supplies had its successes and challenges.

The project successfully implemented essential features such as user account management, product browsing, ordering, and recommendation systems. The incorporation of personalized recommendation algorithms proved effective in enhancing the user experience, leading to increased engagement and satisfaction. Additionally, the system's intuitive interface and responsive design contributed to seamless navigation across various devices, ensuring accessibility for a wide range of users.

Despite its achievements, there were challenges encountered during the project. Delays in the development timeline and unexpected technical issues hindered progress at times, impacting the initial project schedule. Furthermore, while efforts were made to ensure data security and privacy, there were instances where vulnerabilities were identified, highlighting the importance of robust cybersecurity measures.

This project provided valuable insights into the complexities of e-commerce system development, including the significance of thorough planning, effective communication, and continuous testing and iteration. It underscored the importance of adaptability and problem-solving skills when facing unforeseen challenges. Moreover, it deepened my understanding of user-centric design principles and the importance of incorporating feedback to drive iterative improvements.

Looking ahead, future development efforts should focus on refining the recommendation algorithms to further enhance personalization and accuracy. Strengthening cybersecurity measures to safeguard user data and addressing any identified vulnerabilities is paramount. Additionally, exploring opportunities to integrate emerging technologies such as artificial intelligence and augmented reality can elevate the system's functionality and user experience. Continued user testing and feedback collection should guide ongoing improvements, ensuring the system remains competitive and aligned with user expectations.

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