

**CẦN THƠ UNIVERSITY
COLLEGE OF INFORMATION AND COMMUNICATION
TECHNOLOGY**



**SPECIALIZED THESIS IN
INFORMATION TECHNOLOGY**

Topic:

Online Bookstore Website – MyBookStore

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Course: 47

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Chapter 1: Overview of the Website

1. Introduction

The Online Bookstore Website is a centralized and comprehensive platform that serves as the primary hub for connecting readers with a wide range of books from various genres and categories. Designed to function as a fully operational e-commerce system, it integrates essential features such as product browsing, book filtering, advanced search, adding book to cart and cart management. Customers can easily find detailed information about each book, including descriptions, authors, prices, and availability, ensuring a smooth and informed shopping experience.

In addition to providing a user-friendly interface for customers, the website includes a dedicated administrative panel for store managers. Through this panel, administrators can efficiently manage the inventory, update product details, process orders, monitor sales reports, and handle customer inquiries. This functionality ensures smooth operations and real-time synchronization between the store's offerings and customer needs.

2. Main features

The Online Bookstore Website has 5 main pages with following functions:

- Main page:
 - Showing list of books in store
 - Book filtering by category and price range
 - Sorting books by their names or prices
- Book detail page:
 - Showing book detail
 - Adding book to personal cart
- Cart page:
 - Increase or decrease quantity of a book
 - Deleting book from cart
 - Order payment
- Order Information page:
 - Showing order information
- Admin Dashboard page:

- Book management (CRUD)
- Search book by title, author, and category
- Order management (RD)
- Filter order in date range

3. Technologies used in project

- Backend:
 - Environment: NodeJs, Express
 - Programming language: Javascript
 - Database: MongoDB
 - User management: Clerk
 - Image storing: Cloudinary
- Frontend:
 - Library: ReactJs
 - Programming language: Typescript
 - CSS framework: Tailwind CSS, Shadcn/ui
 - State management library: Zustand

4. User classification

Normal user: This user is able to browse the list of books currently available for purchase in the store, search for specific titles using the search bar, and filter the selection by category or price range. In addition, the user can sort the book listings by title or by price, in either ascending or descending order.

Admin user: In addition to the functionalities available to a regular user, an admin user can access the admin dashboard to manage the store's inventory, specifically handling books in stock and customer orders. The admin user can add new books, update information for existing books, or remove any book from the store. Within the book management interface, it is also possible to search for specific books by title, author, or category. For order management, the admin user can view the list of orders and delete specific orders, as well as filter orders created within a specified date range.

Chapter 2: Website Description

1. Website requirements:

1.1. Software requirements:

- Node.js: 18.0+ (LTS)
- NPM: 9.0+
- MongoDB: 6.0+
- IDE: VS Code

1.2. Browser requirements:

- Chrome: 112+
- Firefox: 117+
- Edge: 112+
- Safari: 16.5+

1.3. Functional Requirements

- User-Friendly Interface: The website must provide an intuitive and visually appealing interface that ensures a positive user experience.
- Easy Navigation: Users must be able to browse and access all main features of the website without unnecessary complexity.
- Highlighted New Arrivals: Newly added books should be prominently displayed to attract customer attention.
- Clear Categorization: Book categories must be well-structured so that users can easily understand and access the main sections the website offers.
- Efficient Search Function: Users must be able to quickly find books through a search feature that supports filtering by title, author, category, or price.
- Admin Management Tools: Administrators must be able to add, update, or remove books from the inventory, as well as manage orders efficiently without long downtime.
- Backup and Recovery: The website must support regular backups and be able to restore data promptly in case of unexpected incidents.

1.4. Non-Functional Requirements

- **Performance:** The website should load within 3 seconds under normal network conditions and handle at least X concurrent users without significant performance degradation.
- **Scalability:** The system must be capable of scaling to accommodate an increasing number of users, books, and transactions in the future.
- **Availability:** The website should maintain a minimum uptime of 99% to ensure uninterrupted access for users.
- **Compatibility:** The system must be compatible with modern browsers (latest versions of Chrome, Firefox, Edge, and Safari) and responsive on various devices, including desktops, tablets, and smartphones.
- **Security:** All sensitive data, such as passwords and payment details, must be encrypted and transmitted via secure protocols (e.g., HTTPS).
- **Maintainability:** The system should be structured and documented in a way that allows developers to quickly update, fix bugs, or add new features.
- **Usability:** The design should follow accessibility standards (e.g., WCAG) to ensure it is usable by individuals with different abilities.
- **Backup and Disaster Recovery:** The system must perform automated backups daily and have a tested disaster recovery plan to restore services within a predefined time frame.

2. Project description:

The backend of the Online Bookstore is built using Node.js and Express, providing a fast, scalable, and lightweight server environment for handling API requests and business logic. JavaScript serves as the core programming language, enabling seamless integration between backend and frontend development. Data is stored in MongoDB, a flexible NoSQL database that allows efficient handling of large and dynamic book inventories. For user management and authentication, the system integrates Clerk, which offers secure, customizable, and modern authentication flows. Images, such as book covers, are stored in Cloudinary, allowing optimized image delivery, automatic format conversion, and responsive display across devices. Together, these technologies ensure a secure, high-performance, and easily maintainable backend infrastructure.

The frontend is developed with React.js, a powerful JavaScript library for building dynamic and interactive user interfaces, ensuring a smooth and responsive browsing experience. The application is written in TypeScript, adding static type-

checking to enhance code reliability and reduce runtime errors. Styling is implemented with Tailwind CSS, a utility-first CSS framework that accelerates UI development, and Shadcn/ui, which provides elegant, pre-built UI components for a consistent design system. State management is handled by Zustand, a lightweight yet powerful library that simplifies state handling without unnecessary complexity. This combination of technologies allows the website to deliver a visually appealing, highly responsive, and user-friendly shopping experience while maintaining ease of development and scalability.

Chapter 3: Website Diagrams

1. Usecase diagrams

Normal user:

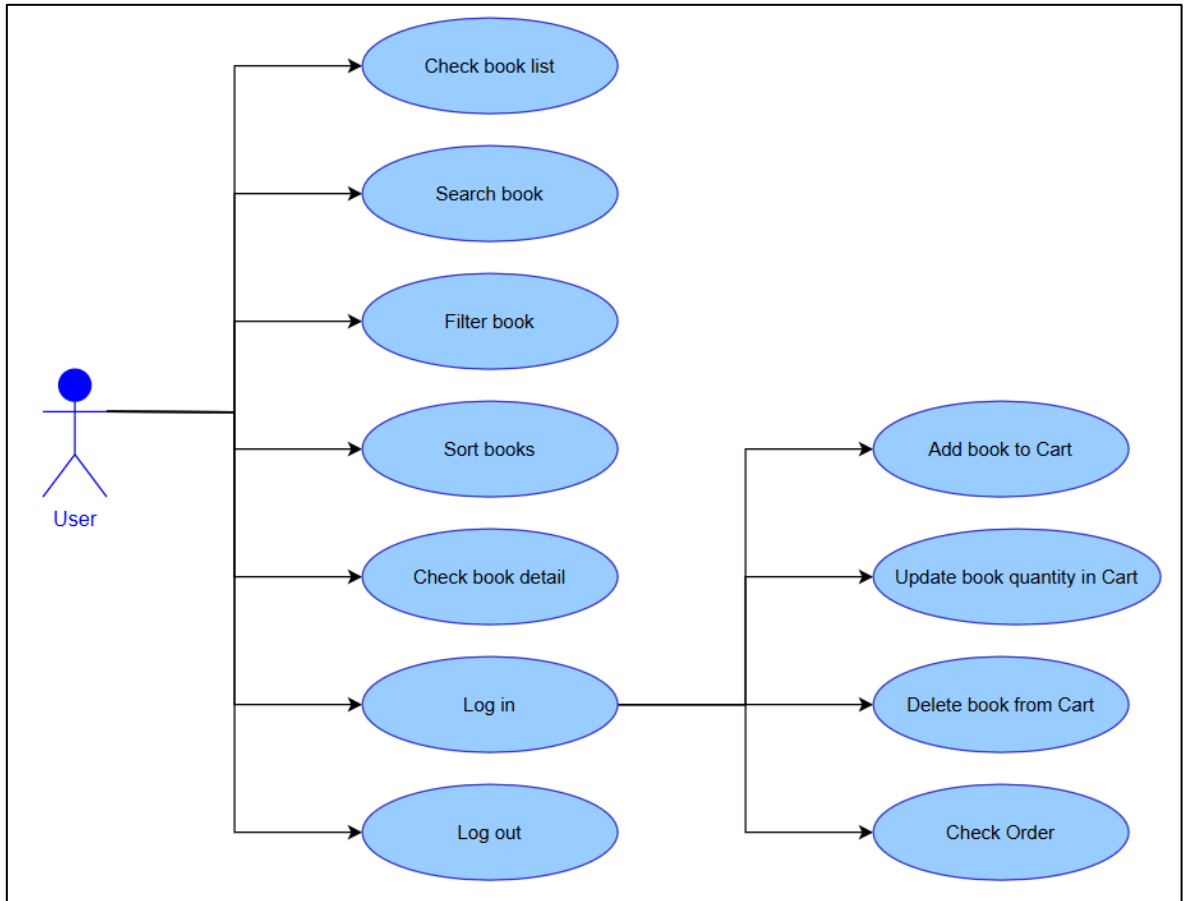


Image 3.1.1. Normal user usecase diagram

Admin user:

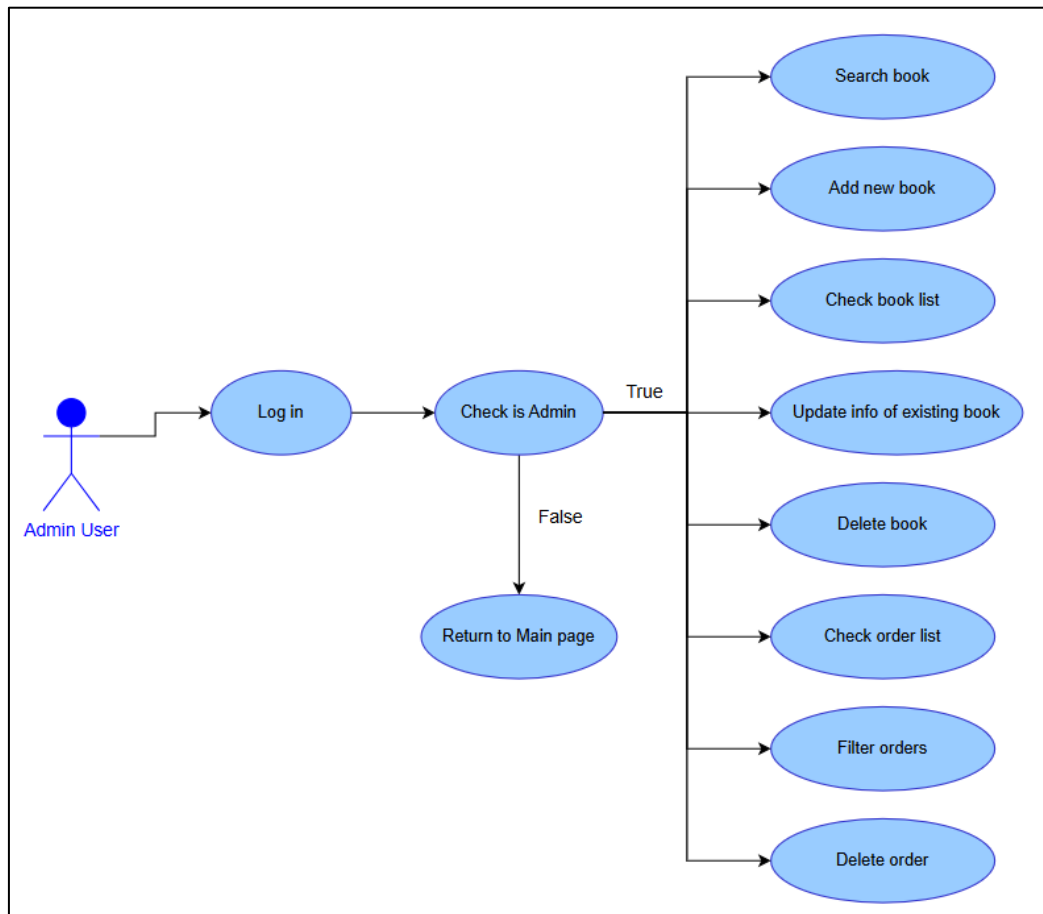


Image 3.1.2. Admin user usecase diagram

2. Database diagram

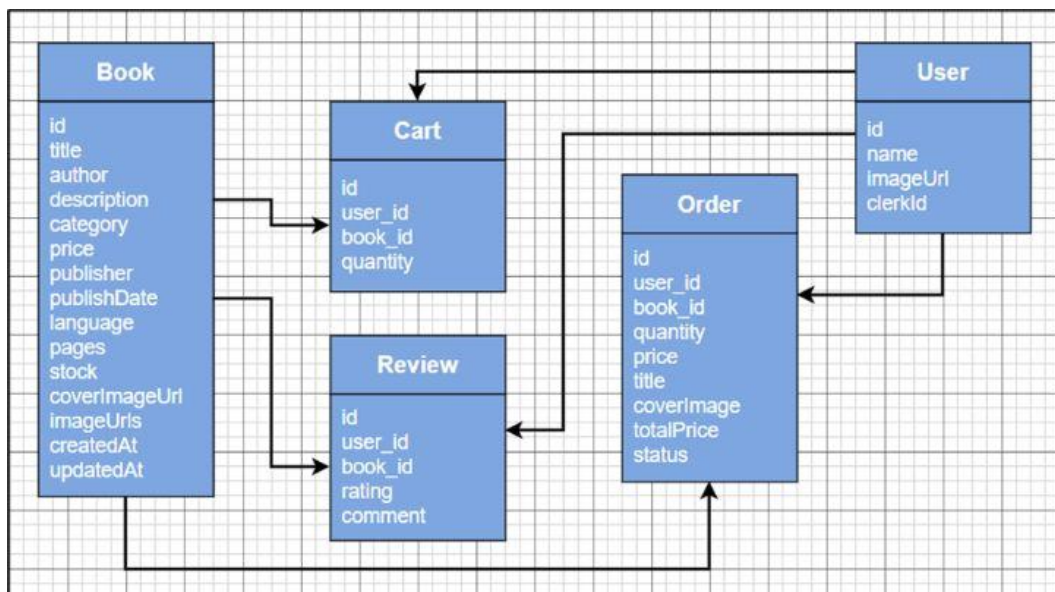


Image 3.2. Database diagram

Database Schema Description:

- Book:
 - Fields: id, title, author, description, category, price, publisher, publishDate, language, pages, stock, coverImageUrl, imageUris, createdAt, updatedAt
 - Purpose: Stores detailed information about each book, including metadata (title, author, description), pricing, publication details, available stock, and related images.
- Cart:
 - Fields: id, user_id, book_id, quantity
 - Purpose: Represents books that a user has added to their shopping cart, including the quantity for each item.
- Review:
 - Fields: id, user_id, book_id, rating, comment
 - Purpose: Stores user reviews for books, including ratings and comments, linked to both the user and the book.
- Order:
 - Fields: id, user_id, book_id, quantity, price, title, coverImage, totalPrice, status
 - Purpose: Represents a purchase transaction, recording which books were bought by which user, quantities, prices, and order status.
- User:
 - Fields: id, name, imageUrl, clerkId
 - Purpose: Stores user profile information and authentication data.

Chapter 4: User Interfaces

1. Homepage

The homepage displays the main features of the website, including a search bar at the top for finding books by title, author, or category, along with options for user login via Google and a shopping cart icon showing the number of selected items. On the left side, there is a search filter section where users can narrow results by category – such as novels, comics, horror stories, inspirational books, or knowledge-based books – and by price range. The central area presents the product list with book cover images, titles, and prices. Users can sort the displayed products and navigate between pages using the pagination controls at the bottom. This layout allows visitors to quickly browse, locate, and select books of interest in an intuitive and visually appealing manner.

Homepage before logging in:

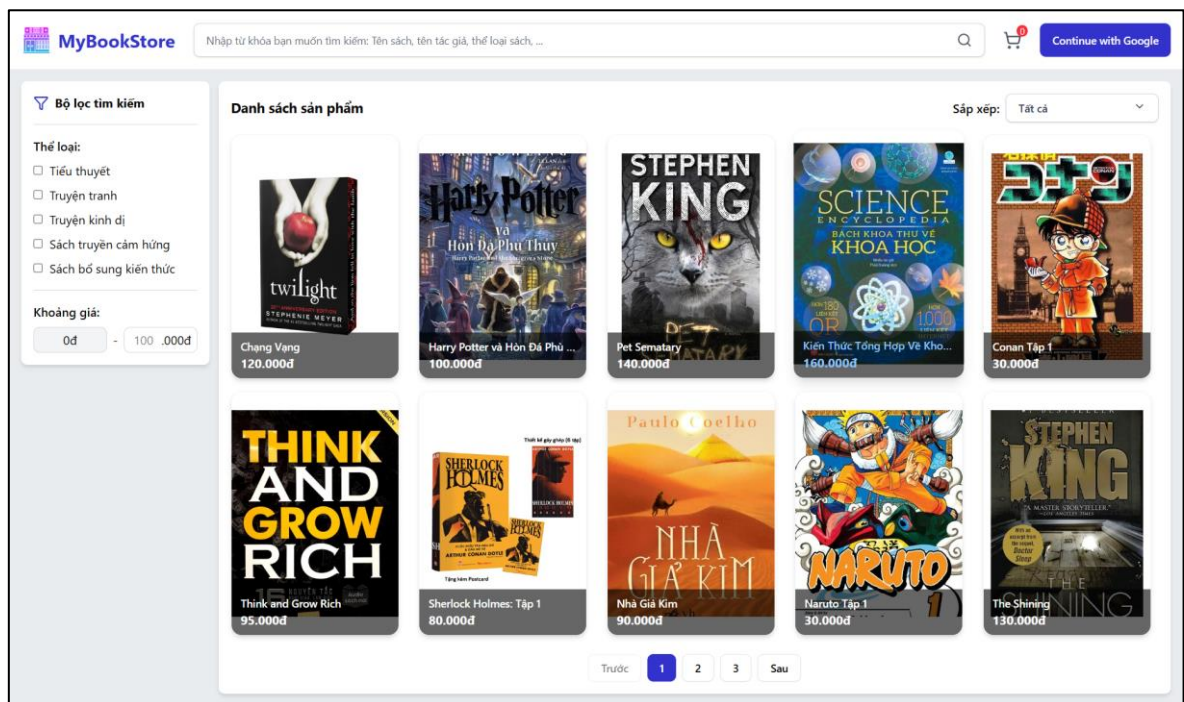


Image 4.1.1. Homepage without logging in

Homepage after logging in:

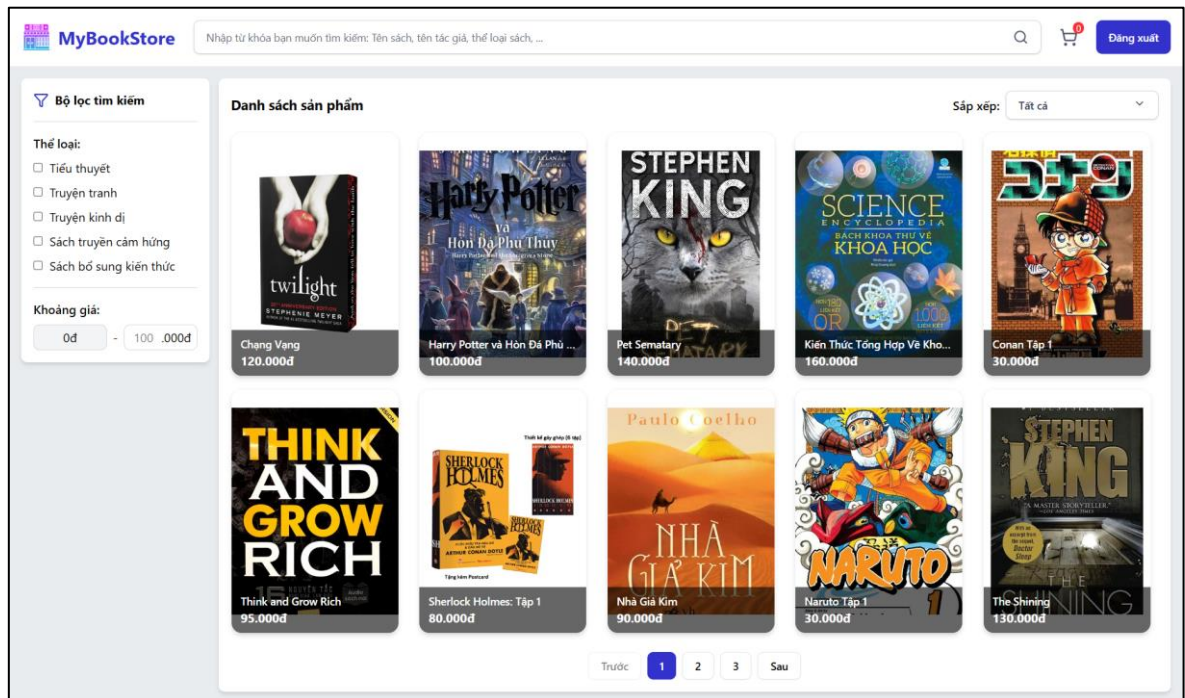


Image 4.1.2. Homepage after logging in

Homepage after searching for a book by its name or author:

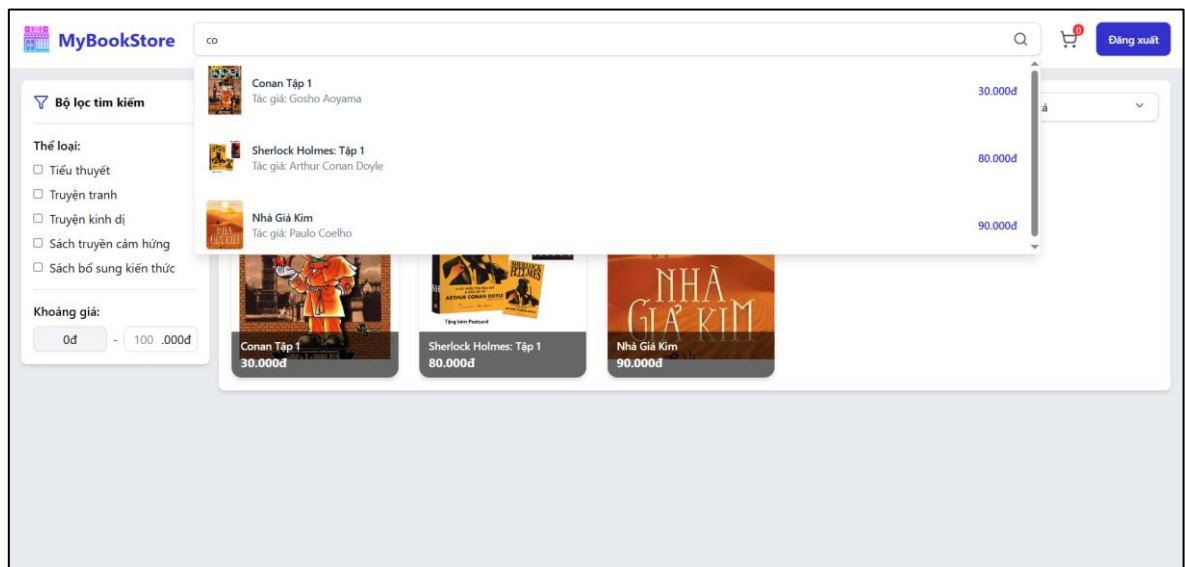


Image 4.1.3. Homepage after searching for a book

Homepage after filtering books by their category:

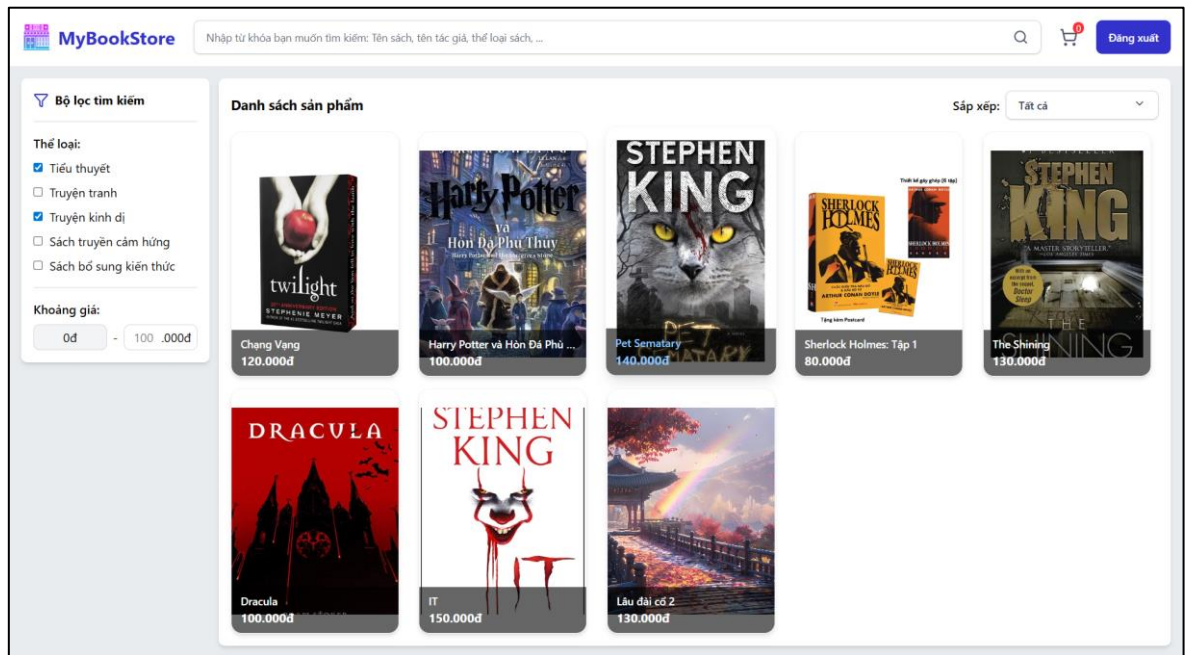


Image 4.1.4. Homepage after filtering books by category

Homepage after filtering books in price range:

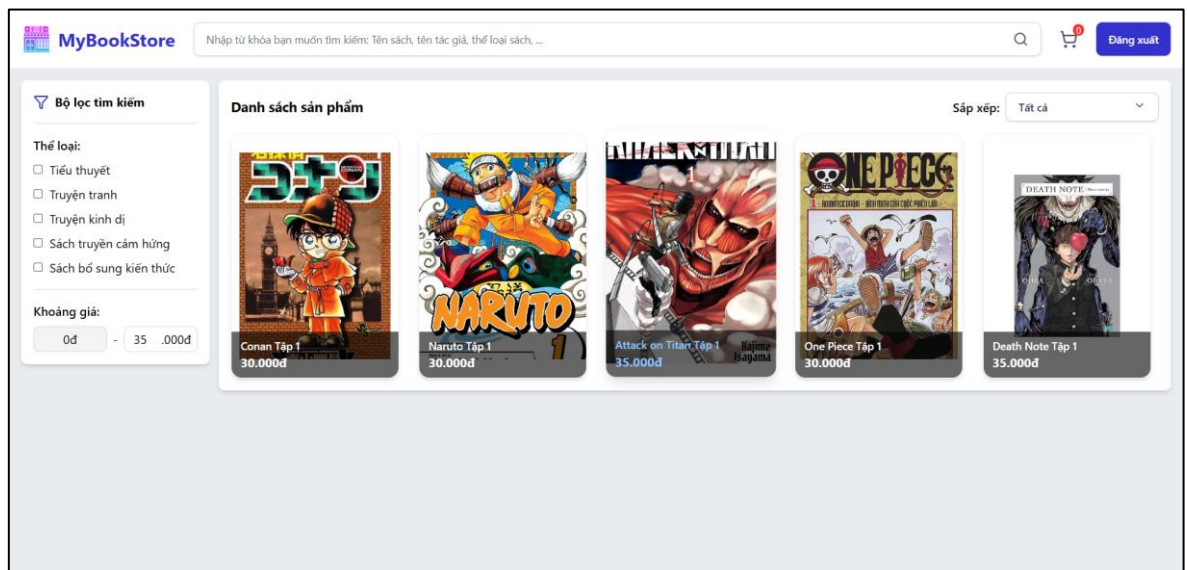


Image 4.1.5. Homepage after filtering books in price range

Homepage after sorting books by title in ascending (A–Z) and descending (Z–A) order, as well as by price from lowest to highest and vice versa:

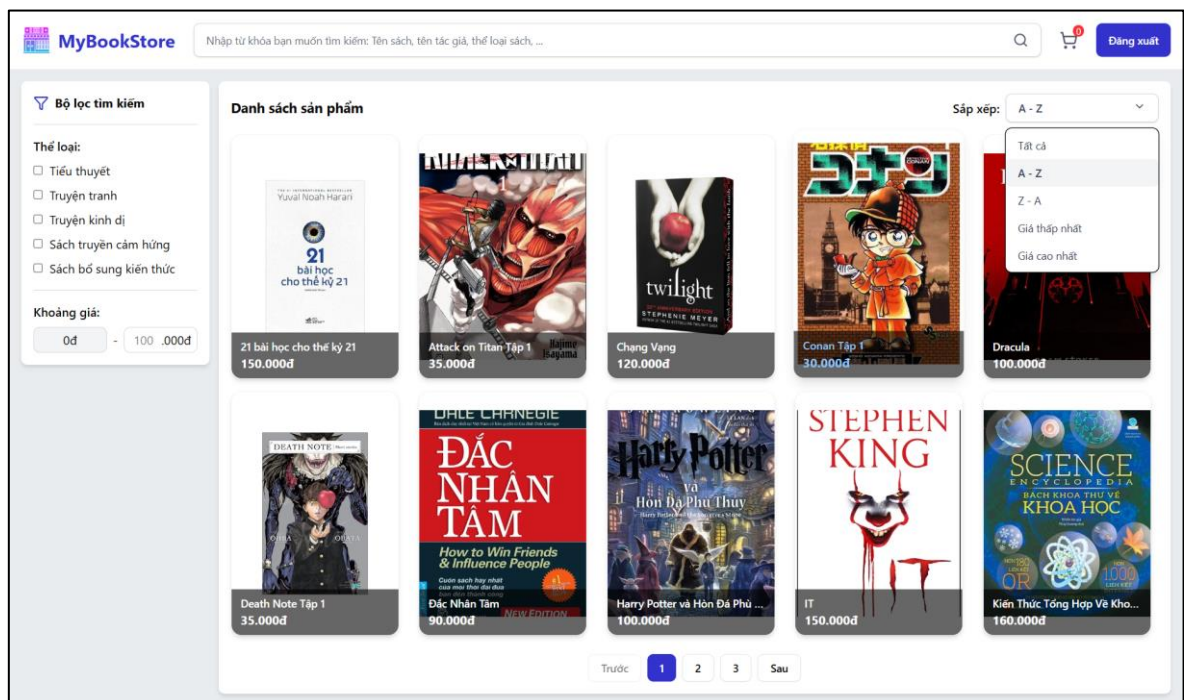


Image 4.1.6. Homepage after sorting books by their names from A-Z

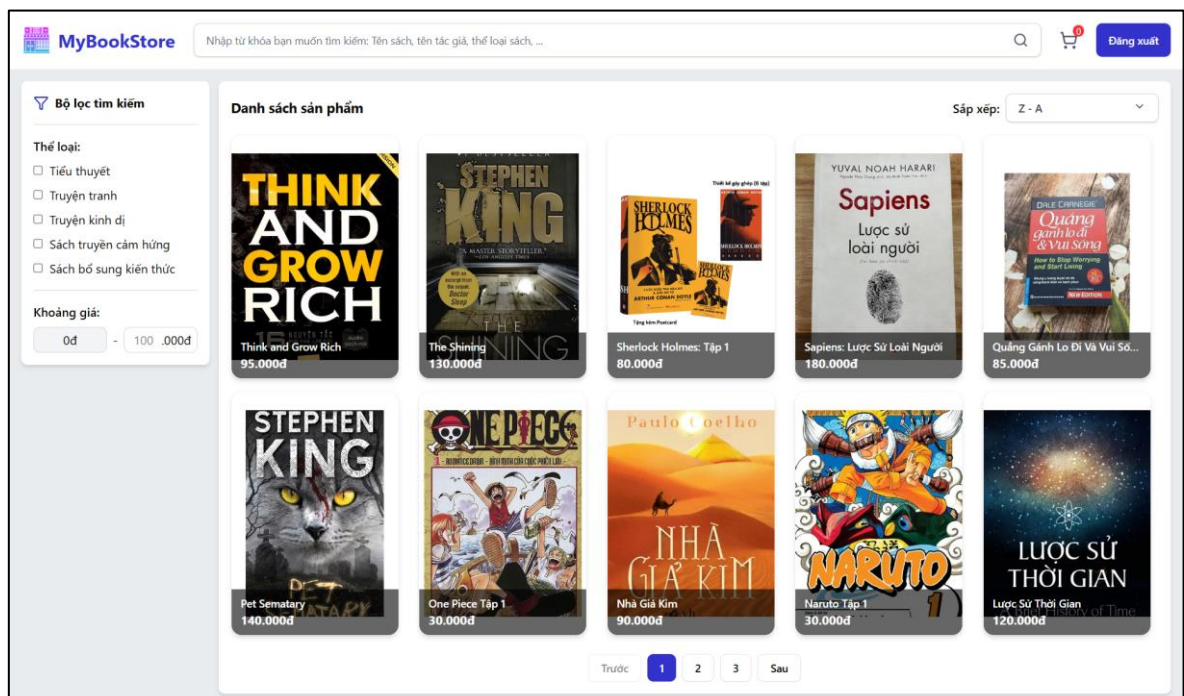


Image 4.1.7. Homepage after sorting books by their names from Z-A

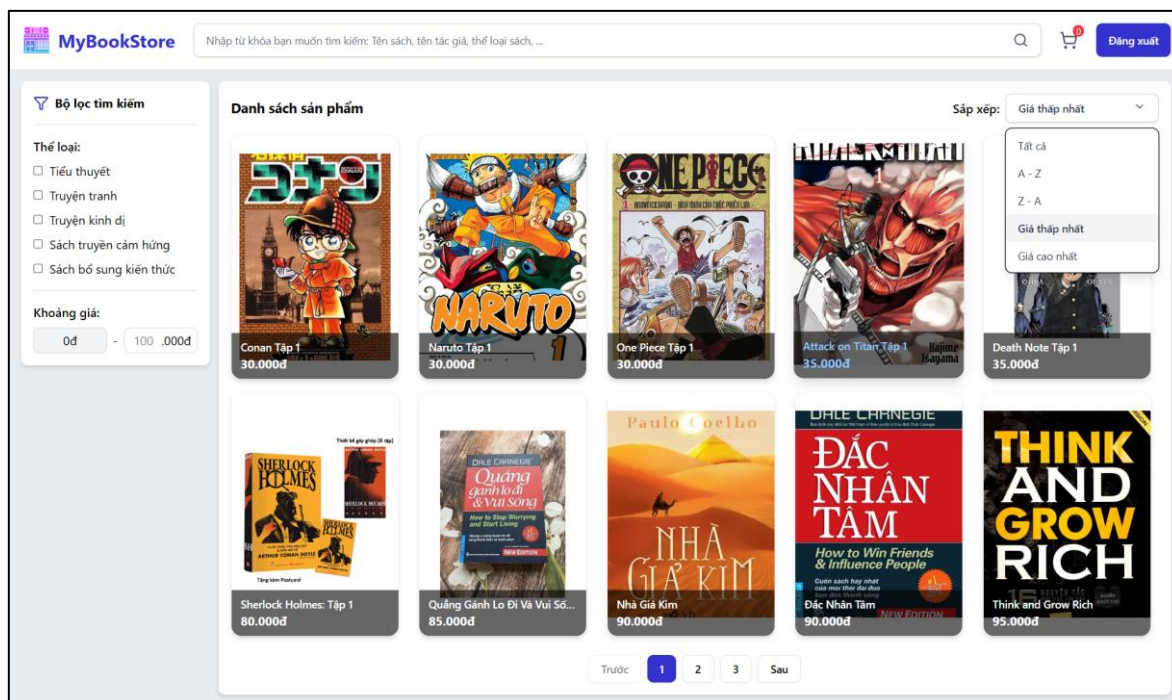


Image 4.1.8. Homepage after sorting books from lowest to highest price

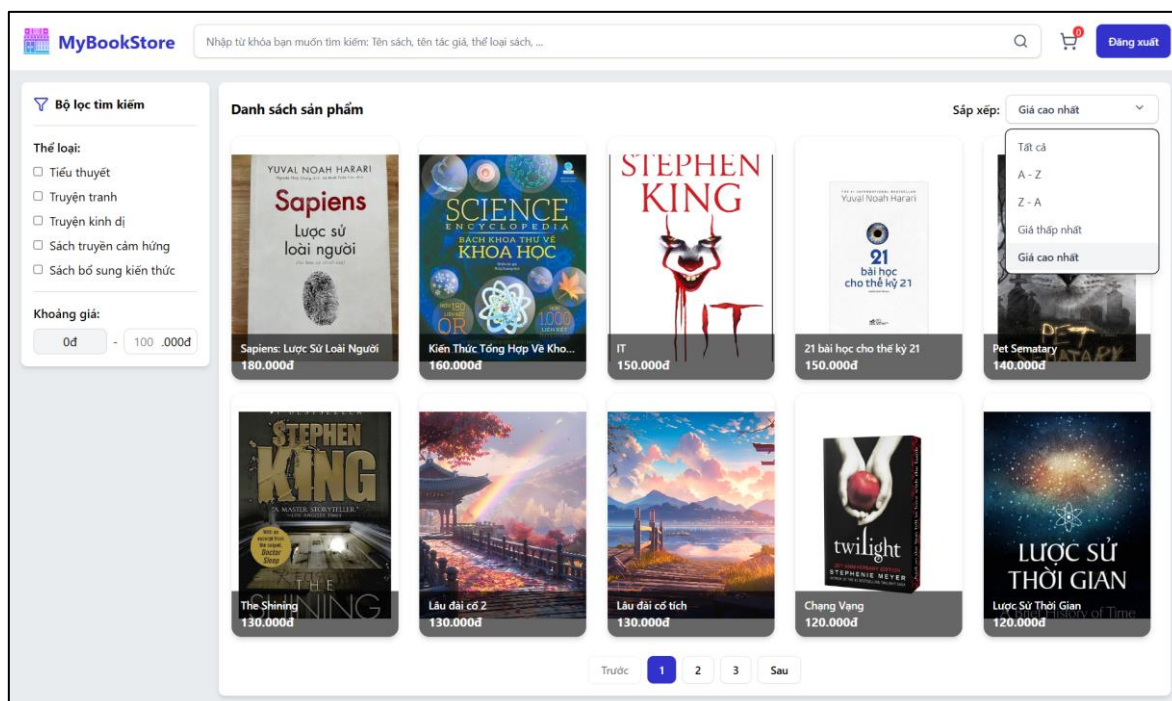


Image 4.1.9. Homepage after sorting books from highest to lowest price

Homepage with full filtering and searching options:

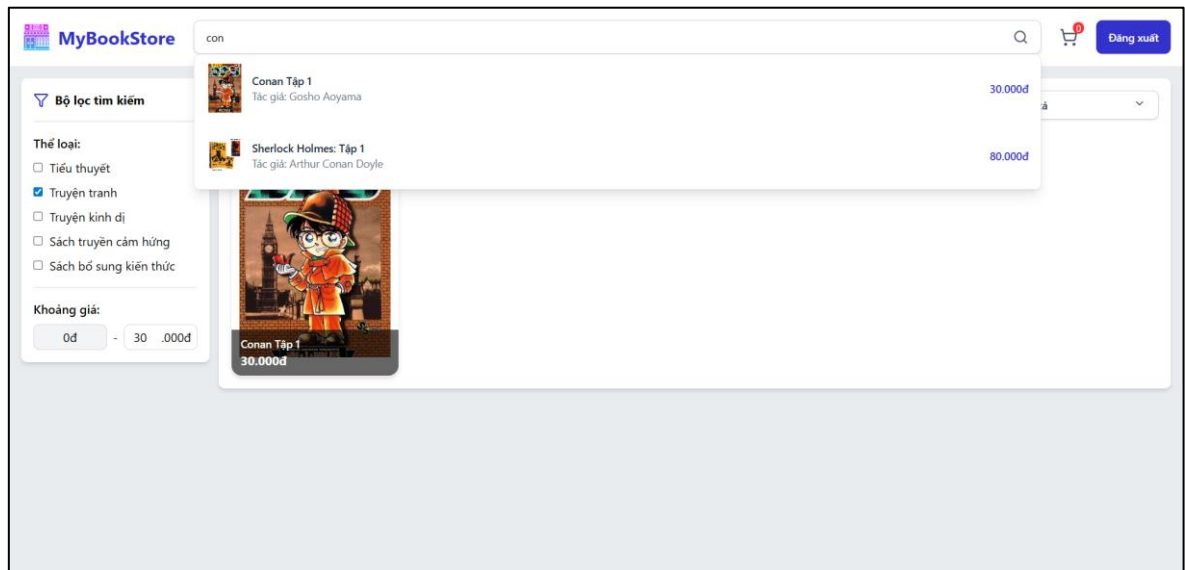


Image 4.1.10. Homepage with full filtering options

Homepage when no book is found:

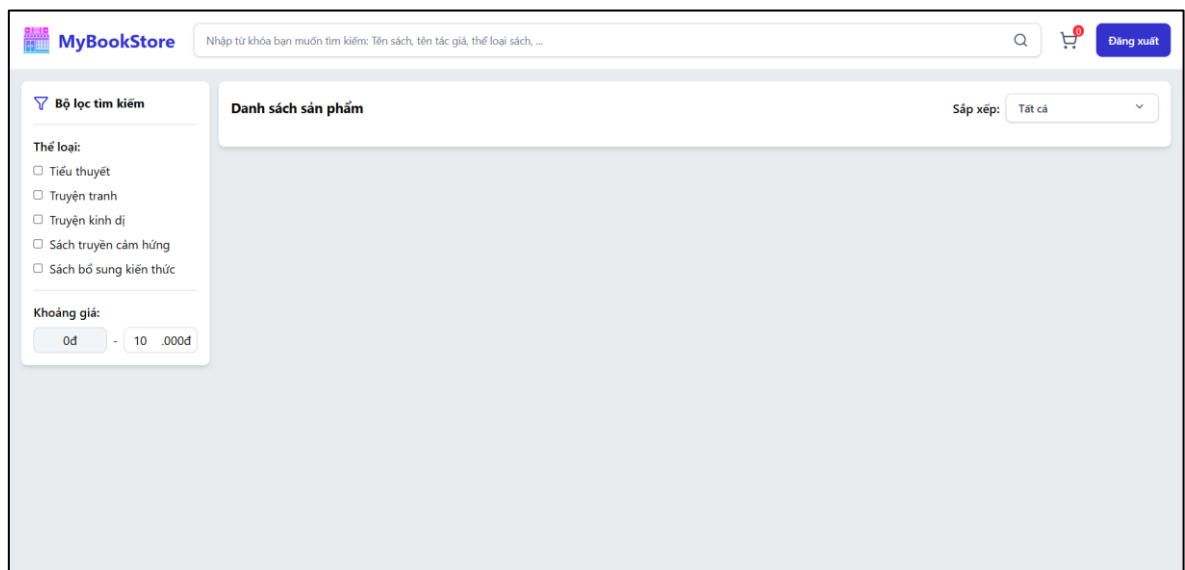


Image 4.1.11. Homepage when no book is found

2. Book detail page

When user select a specific book by clicking onto its image, user will be navigated to the book detail page.

The book detail page provides users with a clear and organized view of essential information about a selected title. The layout is divided into two main sections: a large display of the book's cover image on the left, and detailed information on the right. Key elements include the book's price, an easily accessible “Add to Cart” button for quick purchasing, and a structured table of details such as author, publisher, language, genre, publication date, and number of pages. A dedicated description section offers a concise summary of the book's content. This design ensures that users can quickly review important information, make purchasing decisions efficiently, and enjoy a clean, visually appealing interface.

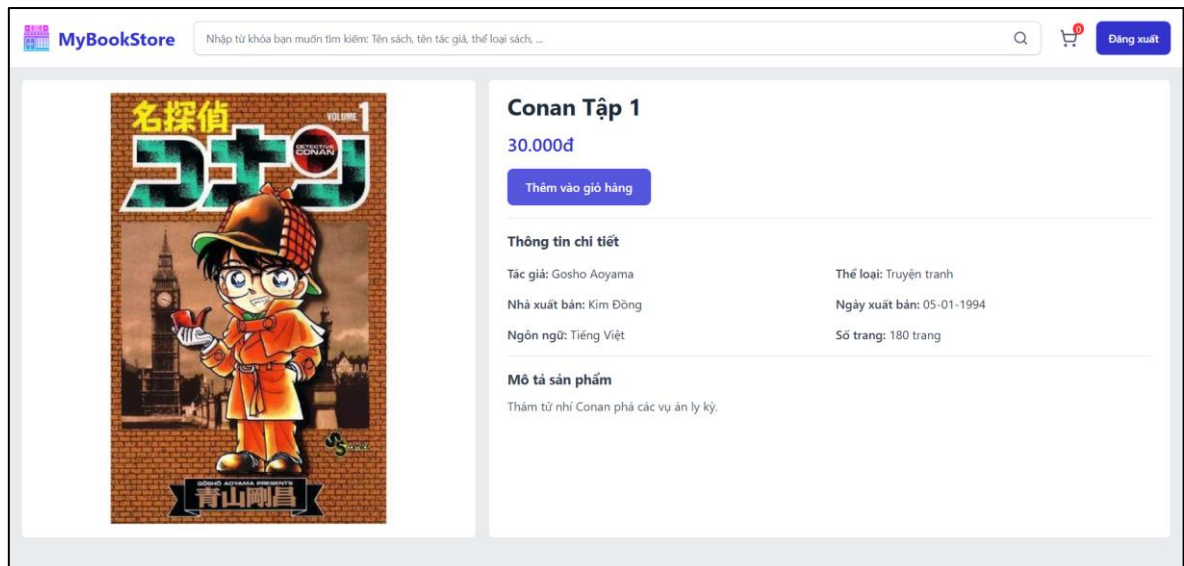


Image 4.2. Book detail page

3. Cart page

The shopping cart page offers users a clear and streamlined overview of the items they intend to purchase. The layout is divided into two primary sections: the left panel displays product details including the cover image, title, category, unit price, quantity controls, and stock availability; the right panel summarizes the order's cost breakdown with the subtotal, shipping fee, and the total amount due. Users can easily adjust item quantities, remove products, and proceed directly to checkout via a prominently placed button. The design emphasizes usability and efficiency, ensuring a smooth transition from product selection to payment.

When user click Add to Cart (“Thêm vào giỏ hàng”) button, a notification will appear and the number on cart icon will be updated:

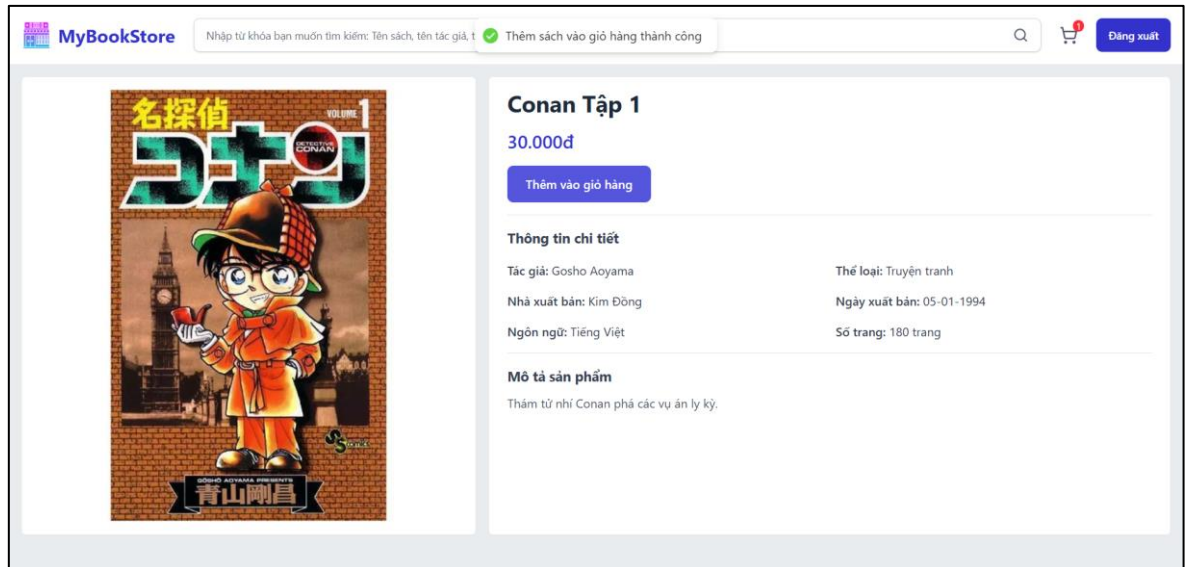


Image 4.3.1. Notification appears when user click Add to Cart button

And this is the UI of Cart page:

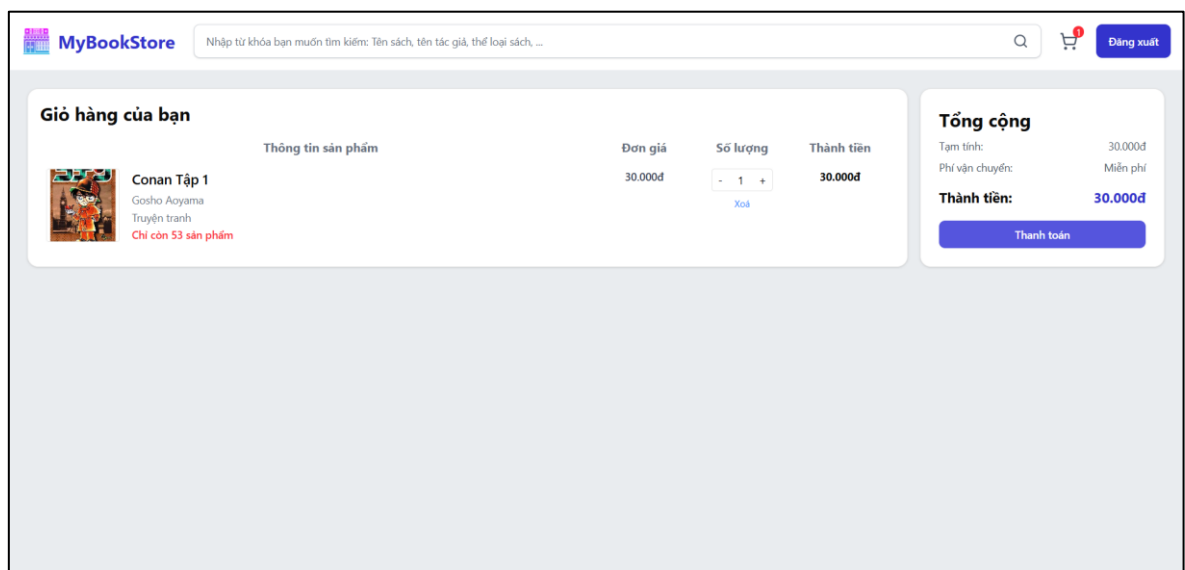


Image 4.3.2. Cart page

User can add another book to cart, increase or decrease the quantity of a book and the according information such as total price will be updated automatically:

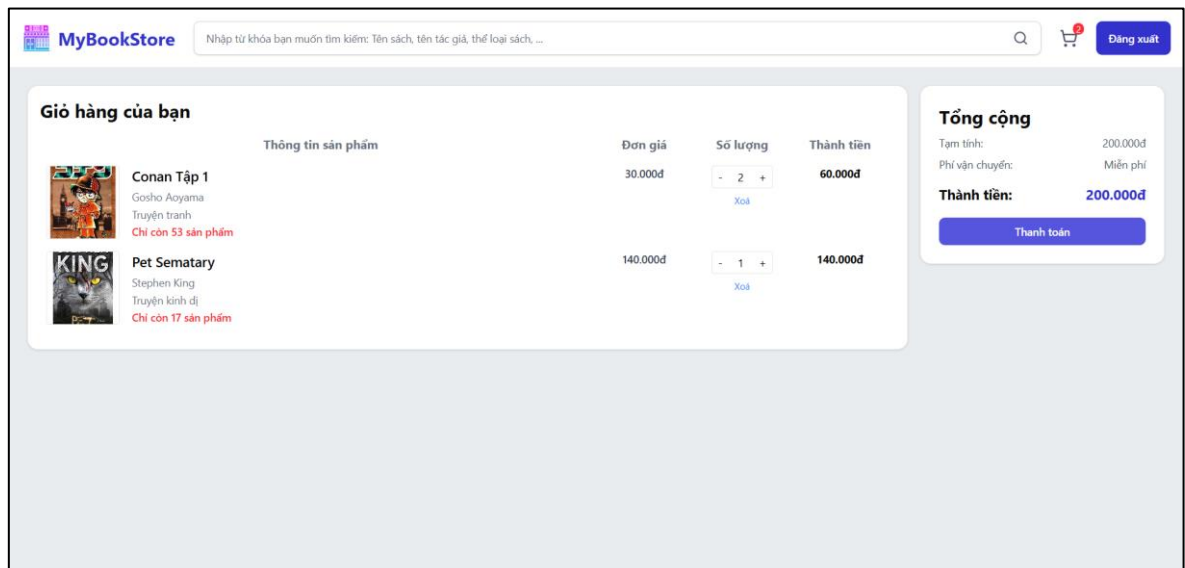


Image 4.3.3. Cart page information is automatically updated

User can also delete a book from cart by clicking the Delete (“Xóa”) button if they do not want to by it anymore:

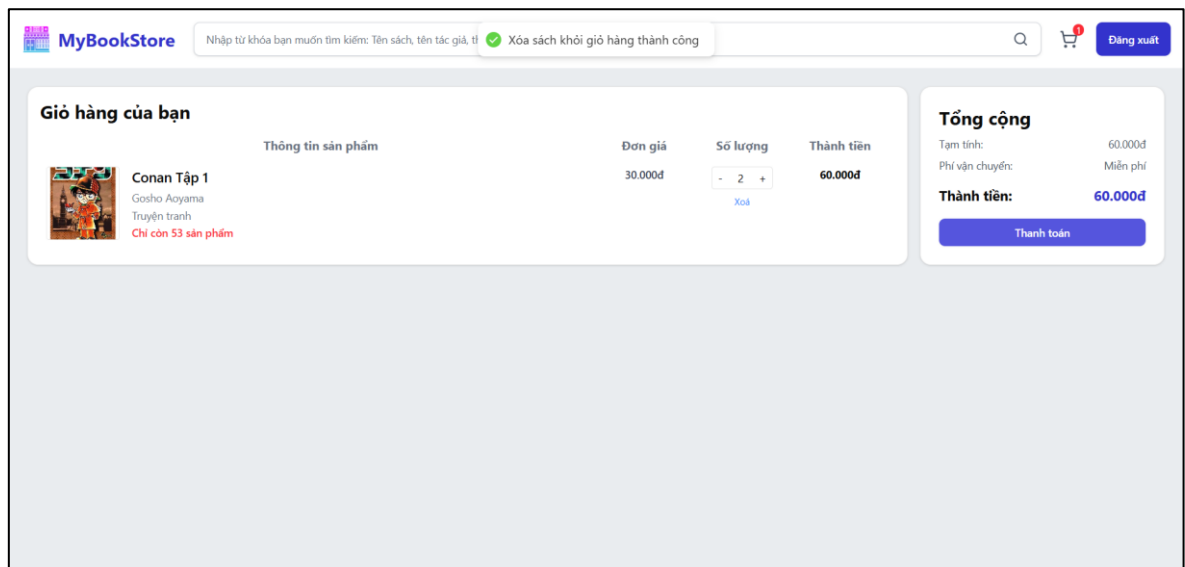


Image 4.3.4. Cart page after user delete a book from cart

However, user need to log in before using cart, or else the cart page will show an error like this:

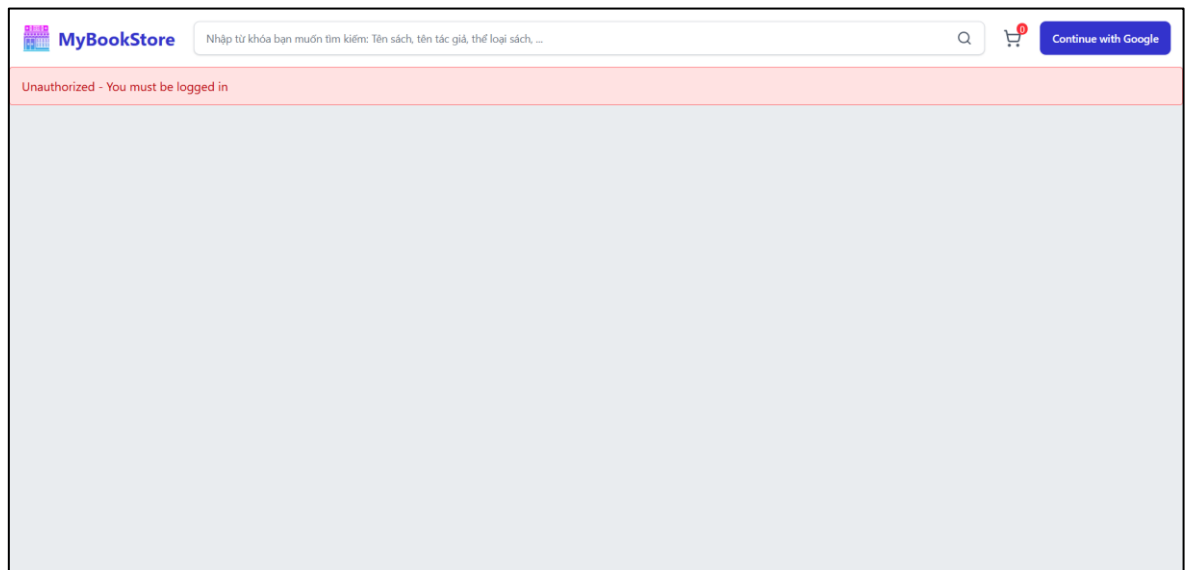


Image 4.3.5. Cart page shows error if user has not logged in

4. Order page

The order details page provides a comprehensive summary of a customer's purchase. At the top, it displays the order number, order date, and current status, enabling users to track their transaction easily. The customer's name and the total order value are clearly presented. Below, a structured table lists each purchased item, including its image, title, unit price, quantity, and subtotal. At the bottom, the page reiterates the overall order total alongside a confirmation button, ensuring customers can review and verify their purchase before proceeding. The clean and organized layout enhances readability and improves the post-purchase experience.

When user click the Payment (“Thanh toán”) button on Cart page, user will be navigated to Order page:

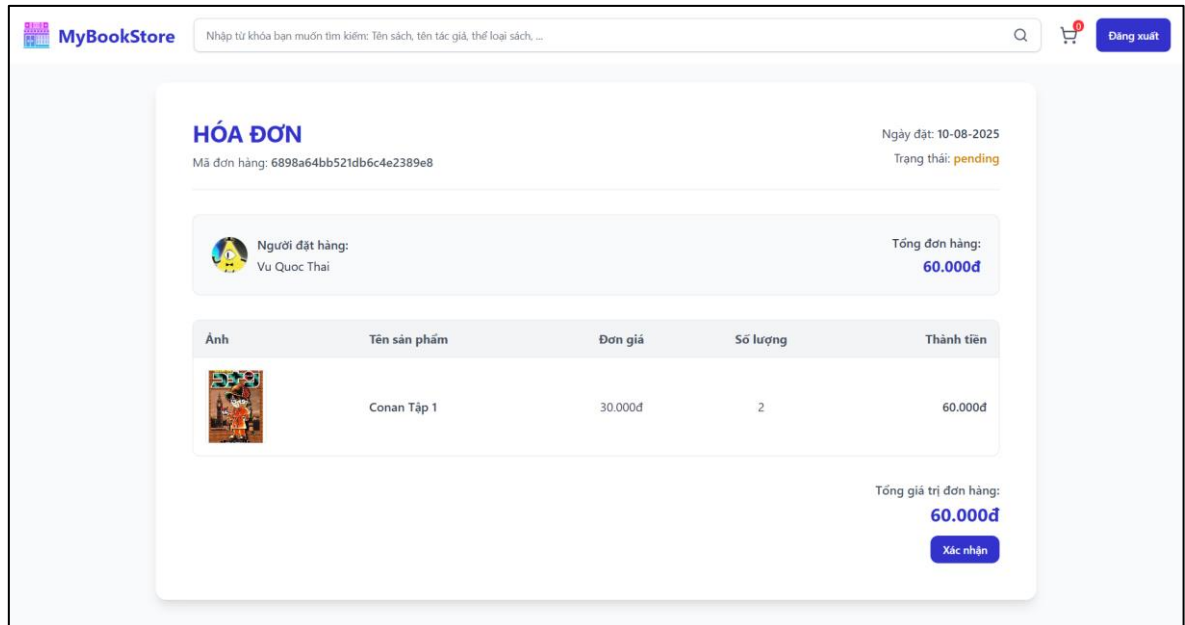


Image 4.4. Cart page shows error if user has not logged in

5. Admin Dashboard page

In order to access Admin Dashboard page, user need to log in as Admin user and the Homepage this time will have a new button on top bar, allowing user to navigate to Admin Dashboard page.

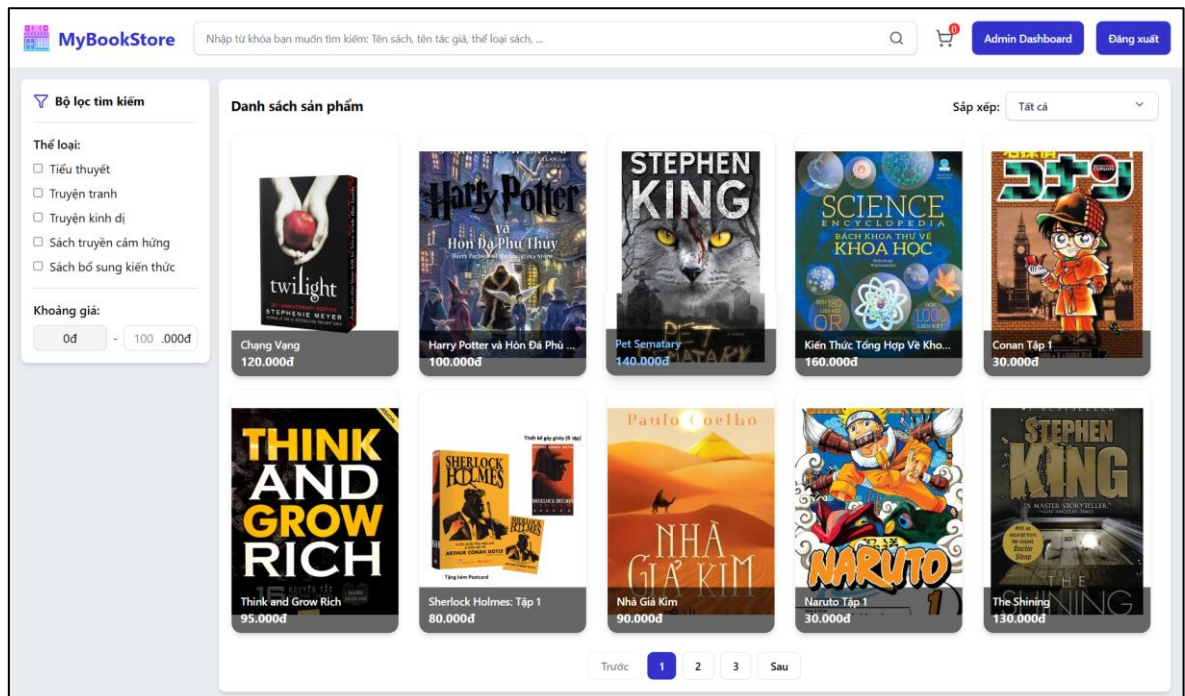


Image 5.5.1. Homepage after logging in as Admin user

And this is the UI of Admin Dashboard page:

Quản lý Sách

Quản lý Đơn hàng

Book Store Admin Dashboard

Quản lý Sách

Quản lý Đơn hàng

Thêm mới

Xóa tất cả

Tìm kiếm...

Anh	Tên sách	Tác giả	Thể loại	Giá	Số lượng	Quản lý
	Chàng Vang	Stephenie Meyer	Tiểu thuyết	120.000đ	30	<div><div></div><div></div></div>
	Harry Potter và Hòn Đá Phù Thủy	J.K. Rowling	Tiểu thuyết	100.000đ	48	<div><div></div><div></div></div>
	Pet Sematary	Stephen King	Truyện kinh dị	140.000đ	17	<div><div></div><div></div></div>
	Kiến Thức Tổng Hợp Về Khoa Học	National Geographic	Sách bổ sung kiến thức	160.000đ	10	<div><div></div><div></div></div>
	Conan Tập 1	Gosho Aoyama	Truyện tranh	30.000đ	51	<div><div></div><div></div></div>
	Think and Grow Rich	Napoleon Hill	Sách truyền cảm hứng	95.000đ	35	<div><div></div><div></div></div>
	Sherlock Holmes: Tập 1	Arthur Conan Doyle	Tiểu thuyết	80.000đ	29	<div><div></div><div></div></div>
	Nhà Giả Kim	Paulo Coelho	Sách truyền cảm hứng	90.000đ	18	<div><div></div><div></div></div>
	Naruto Tập 1	Masashi Kishimoto	Truyện tranh	30.000đ	45	<div><div></div><div></div></div>
	The Shining	Stephen King	Truyện kinh dị	130.000đ	15	<div><div></div><div></div></div>

Trước

1

2

3

Sau

Image 5.5.2. Admin Dashboard page, Book management section

The book management page within the admin dashboard enables administrators to efficiently view, search, and manage the store's inventory. At the top, a search bar allows for quick filtering of titles, while dedicated buttons provide options to add new books or remove all records. The main table presents each book's image, title, author, category, price, available quantity, and management actions. Edit and delete controls are provided for individual entries, ensuring precise updates or removals. Pagination at the bottom allows easy navigation through large inventories, maintaining smooth performance and clear organization. This structured interface streamlines administrative workflows and ensures accurate catalog maintenance.

Admin user can search for book by typing its name, author, or category into the search bar:

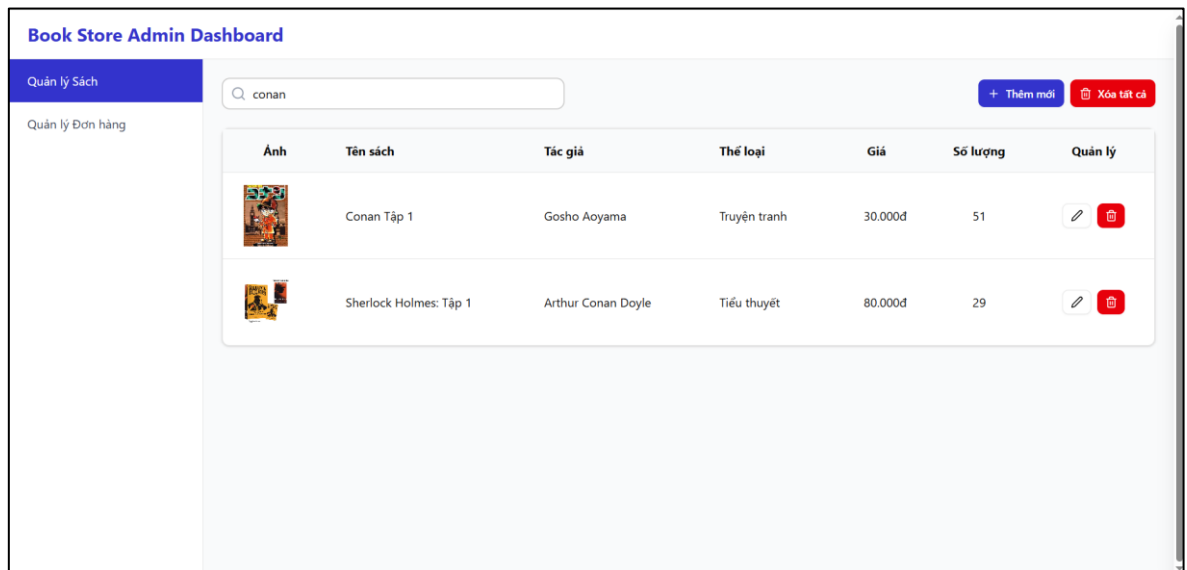


Image 5.5.3. Admin Dashboard page, searching for book

Or adding a new book by clicking the Add (“Thêm mới”) button:

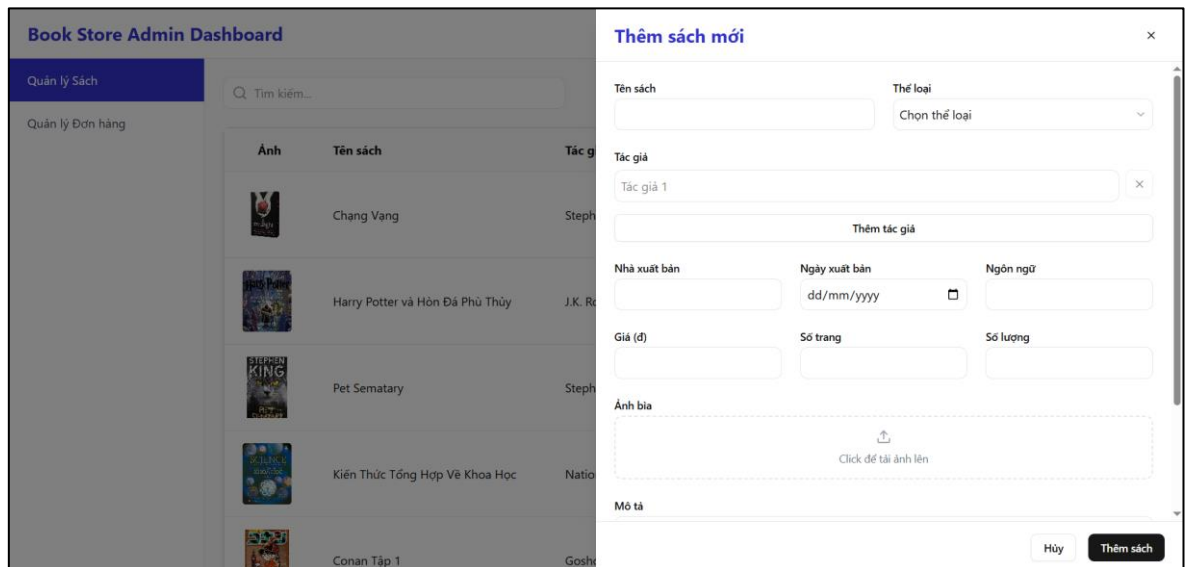


Image 5.5.4. Admin Dashboard page, adding a new book form

Or updating information of an existing book by clicking the pen icon of that book on the table:

Book Store Admin Dashboard

Quản lý Sách

Quản lý Đơn hàng

Tìm kiếm...

Ảnh	Tên sách	Tác giả
	Chang Vang	Steph...
	Harry Potter và Hòn Đá Phù Thủy	J.K. R...
	Pet Sematary	Steph...
	Kiến Thức Tổng Hợp Về Khoa Học	Natio...
	Conan Tập 1	Gosho...

Cập nhật sách

Tên sách: Conan Tập 1

Thể loại: Truyện tranh

Tác giả: Gosho Aoyama

Nhà xuất bản: Kim Đồng

Ngày xuất bản: 05/01/1994

Ngôn ngữ: Tiếng Việt

Giá (đ): 30000

Số trang: 180

Số lượng: 51

Ảnh bìa:

Click để tải ảnh lên

Hủy Cập nhật

Image 5.5.5. Admin Dashboard page, updating book information form

Or delete a book by clicking the trash bin icon of that book on the table.

Another section of Admin Dashboard page is Order management section:

Book Store Admin Dashboard

Quản lý Sách

Quản lý Đơn hàng

Từ ngày: 01/01/1970 Đến ngày: 10/08/2025

Mã đơn	Người mua	Số sách	Tổng tiền	Ngày đặt	Trạng thái	Quản lý
689372893a24af1220226c21	Vũ Trần Quốc Thái	2	200.000đ	6/8/2025	Pending	
689372bf3a24af1220226c43	Vũ Trần Quốc Thái	2	200.000đ	6/8/2025	Pending	
6893730b3a24af1220226c67	Vũ Trần Quốc Thái	2	200.000đ	6/8/2025	Pending	
689373383a24af1220226c8e	Vũ Trần Quốc Thái	2	200.000đ	6/8/2025	Pending	
6893753b3a24af1220226cb6	Vũ Trần Quốc Thái	2	200.000đ	6/8/2025	Pending	
689375843a24af1220226ce0	Vũ Trần Quốc Thái	2	200.000đ	6/8/2025	Pending	
689375e83a24af1220226d14	Vũ Trần Quốc Thái	1	100.000đ	6/8/2025	Pending	
689376713a24af1220226d3a	Vũ Trần Quốc Thái	1	100.000đ	6/8/2025	Pending	
68937aaf3a24af1220226da3	Vũ Trần Quốc Thái	1	100.000đ	6/8/2025	Pending	
68937bef3a24af1220226dde	Vũ Trần Quốc Thái	1	100.000đ	6/8/2025	Pending	

Trước 1 2 3 4 Sau

Image 5.5.6. Admin Dashboard page, Order management section

The order management page in the admin dashboard provides a centralized interface for monitoring and processing customer orders. A date range filter at the top allows administrators to quickly locate orders placed within a specific period.

The main table displays detailed information for each order, including order ID, customer name, number of books purchased, total amount, order date, and current status. Status labels clearly indicate pending orders, while management controls enable administrators to view order details or delete entries directly. Pagination at the bottom ensures smooth navigation across large datasets. This structured and intuitive layout supports efficient order tracking, timely processing, and accurate record-keeping.

Admin user can filter the orders created in specific date range by selecting the start date and end date on the action bar:

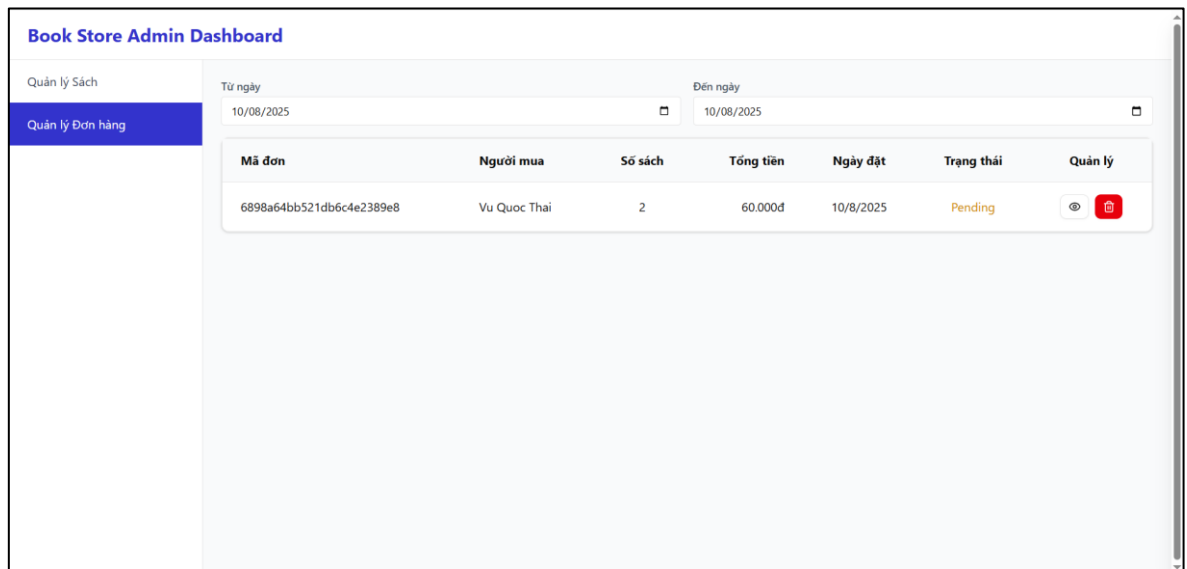


Image 5.5.7. Admin Dashboard page, filtering order by date range

Admin user can also check the detail of an order by clicking the eye icon on the table:

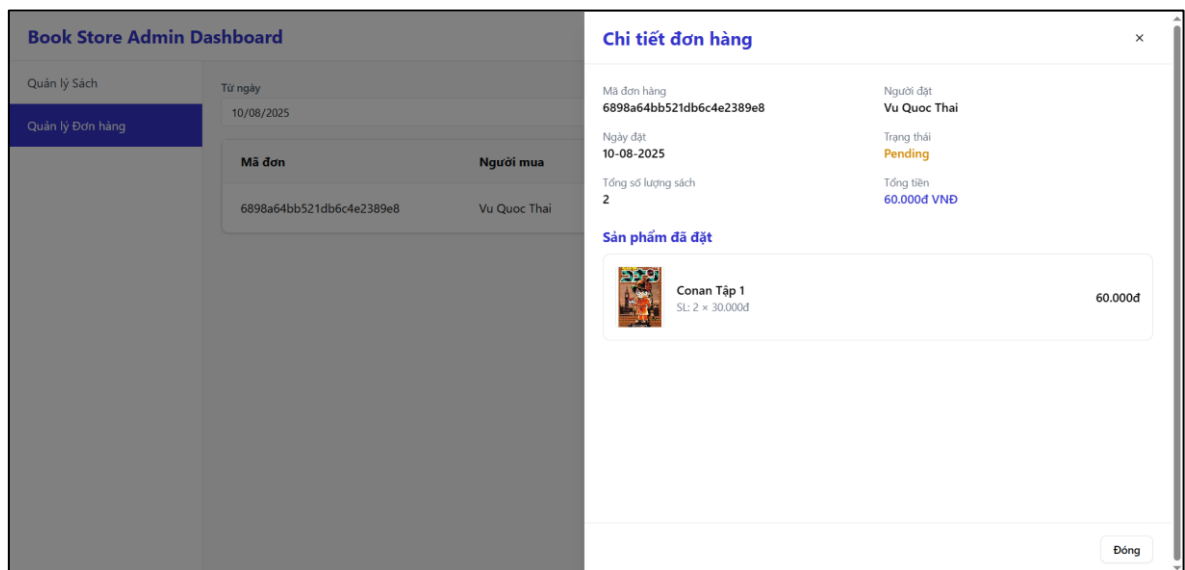


Image 5.5.8. Admin Dashboard page, checking order detail

Or delete an order by clicking the trash bin icon of that order on the table.

Chapter 5: Conclusion

1. Achieved Results

The Online Bookstore website has successfully implemented a number of core features essential for an e-commerce platform. Developed with modern web technologies, the system ensures secure transactions, a user-friendly interface, and responsive design for smooth browsing across devices. The website allows customers to easily search, filter, and sort books, view detailed product information, and place orders efficiently. It also includes an intuitive management dashboard for administrators to handle inventory and process orders. Overall, the website has been completed to a good standard. However, there are still some limitations. Firstly, in terms of interface customization, the current design relies partly on pre-built UI frameworks, which may cause certain constraints when tailoring the layout to specific business needs. Secondly, if a significant redesign is required in the future, additional costs and development time may be necessary to ensure compatibility with existing features.

2. Future Development Directions

In the future, the website can be enhanced with more advanced features, such as personalized book recommendations, customer reviews and ratings, and promotional campaigns to increase user engagement. Improvements can also be made to highlight featured books more effectively on the homepage, creating a stronger impression on visitors. Additionally, integrating modern payment gateways, real-time order tracking, and multilingual support would further improve the customer experience. As web technologies evolve, updating to newer frameworks and libraries will enable the system to remain secure, efficient, and easy to manage for administrators.

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