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Design and Implementation of the Front End of Online Bookstore

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Abstract

With the rapid development of the Internet, e-commerce will gradually become the mainstream business model of this century. Online bookstores are a new type of book sales channel that has emerged with the development of these network technologies. It combines human and electronic communication methods, relies on computer networks, and is based on communication technology to achieve online transactions for book sales. Compared with traditional storefront bookstores, online bookstores have new business modes and sales channels; Its 24-hour and all-round service is unmatched by physical bookstores; The main reason for opening an online bookstore is its low cost. Compared with other products, book transportation is almost not afraid of collision and breakage, and has no timeliness; At the same time, books have unique advantages of single function, simple form, easy judgment and selection, and are most suitable for online transactions; Once again, the low unit price has lowered the threshold for consumers to shop online for the first time, making online bookstores the pioneers of e-commerce. This online bookstore mainly includes two parts: front-end customer operation and back-end administrator management. The front-end mainly implements user registration and login, browsing books by category, commenting on books, viewing shopping carts, placing orders, viewing book purchase records, modifying user personal information, changing user passwords, etc. The backend administrator mainly maintains the book information and user information in the database.

Keywords

JSP, Visual Code, Electronic Commerce, Online Bookstore.

1. Requirement Analysis

Requirement analysis is the first and most important step in the development of e-commerce systems. The requirements analysis stage involves describing the system's requirements and establishing a model by defining the classes of key areas within the system. The fundamental purpose of analysis is to establish a channel of understanding and communication between developers and those who propose requirements. [1,2]Therefore, the requirement analysis of the system should be completed jointly by developers and users or customers. Requirement analysis can be completed using object-oriented methods, which specify which users the system should serve and what services it should provide to these users.

1.1. Functional Requirements Analysis

This system is an e-commerce system, and our goal is to endow it with basic e-commerce functions. We should make the operation of this website as simple as possible to attract more online customers. So we strive to analyze the functions that are valuable to customers in theory. In addition to the basic storefront functions and essential website functions, we also provide a shopping cart, which allows customers to put the items they want to buy into the shopping cart like shopping in a supermarket. If customers find other items they don't want to buy, they can

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clear them from the shopping cart and add new items. Provide customers with the maximum selection space through shopping carts. For system administrators, we also strive to make it as convenient as possible for them to operate[3,4].

In summary, we divide the functionality of the online bookstore system into two parts: customer demand for functionality and administrator demand for functionality. Their needs are listed as follows:

(1) Customer requirements for functions: customer registration, login to obtain permissions, revoke current permissions, browse the latest books, browse popular books, browse book comments, post book comments, view announcement notifications, recommend books by readers, evaluate books by readers, browse sales books by category, search books by combination criteria, browse shopping cart information, modify shopping cart information, purchase books.

(2) Administrator's functional requirements: browse all user information, delete illegal users, add books, discard books, modify book information, sales statistics, publish announcements, delete announcements, process orders, delete messages, manage publishers.

(3) The implementation of shopping cart functions: adding books to the shopping cart, modifying the number of books in the shopping cart, deleting books in the shopping cart, confirming the purchase of books in the shopping cart, and displaying the prices of books in the shopping cart.

1.2. Division of System Functional Modules

The basic design idea of the system is to decompose the entire system into implementation modules. Based on the analysis of the system's functional requirements above, we have divided the online bookstore system into two main modules: the front-end sales module and the back-end management module. Under the two major modules, it is further divided into several small functional modules,

1.3. Participants in the System

Through the analysis of the functional requirements for the online bookstore system above, we have identified three participants: "customers", "shopcar", and "admin" (system administrator). The participants are described as follows:

(1) Customers

Description: Customers can browse bookstores, register, log in, browse books, leave comments, search for books, recommend books, rate books, and use shopping carts.

Example: Internet users, people who enjoy reading and shopping.

(2) Admin (system administrator)

Description: The maintainer of this online bookstore system can browse all users' information, add books, discard books

Modify book information, conduct sales statistics, process orders, publish notifications and other management operations.

Example: Website maintenance personnel.

1.4. Analysis of Bookstore Business Process[5]

The main business process of our bookstore's front desk facing customers is described in the activity diagram below (see Figure 2-4). Users (including logged in and unregistered tourists) can browse various books on various pages (including detailed information about books and corresponding customer messages), and users can also enter the message board to browse customer messages. The user selects a book they want to purchase and clicks the "Add to Cart" button. If the user has already logged into the system, add the books selected by the user to the shopping cart; Next, you will be prompted whether you want to continue purchasing books or

ISSN: 2710-0588

proceed to checkout. If the user has not logged into the system yet, the system prompts the user to enter their username and password. Registered users enter their own user information and submit, and the system verifies whether the username and password are correct. If they are correct, the selected books will be added to the shopping cart. If they are incorrect, the system prompts the user to re-enter. Then the information in the shopping cart is displayed, and customers (who have logged in) can edit (increase or decrease) the number of books in the shopping cart, whether to clear books from the shopping cart, and other operations. When the customer presses the "checkout" button, the system automatically generates an order. The next step is to have customers fill in the necessary mailing information. This book transaction is basically completed. Of course, during this period, customers can also perform various operations on various operation pages, such as modifying their user information, leaving their own messages on the message board, entering book evaluations, or recommending books to administrators.

1.5. Database Requirements Analysis[6]

The specific needs of users are reflected in the provision, storage, updating, querying, and deletion of various information, which requires the database structure to fully meet the input and output of various information. Collect basic data, data structures, and the process of data processing to form a detailed data dictionary. To lay the foundation for future specific designs.

Based on the analysis of the functions of the above system, there are the following requirements information:

(1) Users (customers): Regular users and administrators

(2) Orders: Order list and orders (one order list can contain multiple orders)

(3) Books: Subordinate Types of Books

(4) Shopping cart: Adding, modifying, and deleting books in the shopping cart

(5) User and Order: One user corresponds to one total order

(6) Users and messages: Users leave messages (administrator manages messages)

Based on the above analysis, there are mainly the following data items and data structure designs:

(1) User (Customer): User ID, username, password, etc

(2) Book: Book number, title, publisher, price, type, etc

(3) Book type: classification number, class name

(4) Publisher: Publisher number, publisher name, contact phone number, etc

(5) Order: Order number, user ID, order time

(6) Message: Message ID, Message Subject, Message Content, etc

(7) Notice and Announcement: Announcement Number, Title, Content

2. Design of Functional Modules

2.1. User Registration Module

The primary purpose of establishing this website is to promote and sell books to a large number of customers and users. Therefore, in order to achieve this goal, we must set up the legal identity of customers on this website. Therefore, the registration and login modules can achieve the functions we need. When registering, basic information such as user ID number, username, password, phone number, address, email, etc. automatically generated by the system are included. Some information must be filled in, otherwise registration is not allowed. When the registration is successful, the user's registration information is stored in the customers table of

ISSN: 2710-0588

the bookstore database. After successful registration, you will enter the login page, where you can view book information, leave messages, purchase books, and other operations.

2.2. User Login Module

Users (administrators) can enter their user ID and password on the homepage or login page, and the system will verify the username and password. If the user enters an incorrect user ID or password, the system will display an error message; If the verification is correct, the login is successful, and a successful login message is assigned to the user. At the same time, the user is connected to the "homepage" interface.

2.3. User Management Module

This module is responsible for managing user information of all online bookstores. The main functions include adding, deleting, modifying, and searching for user information. The system requires encryption of customer account passwords to protect their private information. Meanwhile, users who have successfully logged in can modify and maintain their personal information. Users who have successfully logged in can enter the "change. jpg" interface to change their login password and various personal information. If the user directly enters the "modify personal information" page or enters the interface without successful login, they will be prompted to log in again on the "error page. jpg" page. After successful login, they can then change their password.

2.4. Book Search Module

Customers can enter the desired search criteria in the "Book Search" column to search for books. At the same time, we also provide customers with more convenient query conditions. We offer multiple combination queries, including by book title, by category, by publishing house, by publication time, by field, by category, and more. Users can input one or more query criteria, enter corresponding keywords, click the "Search" button, and query from the database, submitting it to the "books_select_stave. js" page for displaying book information.

2.5. Book Browsing Function

In order to encourage customers to purchase books, the first step is to provide them with information about the books. On the "homepage", we provide limited information on "latest books" and "popular books". If readers need to understand book information by category, the system is required to provide pagination for each type of book. Customers can choose to expand the links by category, and they can view more detailed information for a specific book to decide whether to purchase or add it to their shopping basket for future reference. If customers enter "Browse Books by Category", they can have a more detailed understanding of the various books they need and the corresponding types of books.

2.6. Reader Feedback

In this module, customers can vote and evaluate their favorite books, and the voting results will be recorded and counted on the page. Voting and evaluation is also beneficial for other customers to easily understand the sales situation of each book. Book recommendation can recommend the books that customers need to the administrator, increasing communication on books and book types.

2.7. Message Board Module Functions

Customers who have successfully logged in can leave messages in this module to express their opinions on a certain book, view messages from other customers, etc. This module consists of two pages. Members enter the message title, content, and other information in the message main interface, and then click "submit message" to submit. This is where the Servlet receives an HTTP request, performs a database connection operation, and then dispatches the attempt

ISSN: 2710-0588

to display the JSP page. As an administrator, you can also manage the message board by deleting message information on the message board interface. The main purpose of this module is for customers to leave comments on books based on their previous understanding of the book while browsing. At the same time, customers can also understand what kind of book they want through the comments. In order to enable customers to make accurate comments and evaluations on books after understanding their information when viewing or purchasing them. At the same time, when customers cannot truly understand the true content of a book, they can determine which type of book is appropriate to buy by understanding other people's comments about the book. In this module, customers can leave messages and view them, and administrators can delete some outdated or useless messages.

2.8. Notification and Announcement Module

This is mainly for publishing notices and announcements about our website, which are placed on the homepage for customers to browse through; Mainly to release some latest event information. The latest and more important form can be made into a scrollbar to display notification information in a scrolling manner. When the mouse hovers over a certain title, the scrollbar stops scrolling, click on the title to browse the body of the notification announcement. When users see the topic of the announcement and want to further understand its detailed content, they can go to the "news. js" page for detailed reading. Secondly, the backend administrator manages notifications and announcements.

2.9. Shopping Cart Module

This is the core module of an e-commerce website. Login users can create their orders here by selecting various books they need and adding them to their pre order information bar (shopping cart). Of course, it is also necessary to provide the function of deleting and modifying the quantity of purchased books. The books in the shopping cart (shopcar.jsp) will display their corresponding prices and basic information. When the customer confirms the purchase, they can click "Confirm checkout" to transfer to "account. js" to complete the settlement, and then enter the third step of shopping, filling in the recipient's detailed information. Complete one online shopping operation at this time.

3. Implementation of Functional Modules

3.1. Establishment of Database Connection

In this website, we use SQL Server as the backend database, so we use database connection pool technology for database connection. Firstly, configure the database connection pool in the Tomcat server and name it "Bookshop" with a value of "java: comp/env/jdbc/BookShop"; Then, create a MyDb class in the system and use the "public Connection getCon ()" function to obtain the configured data source in Tomcat; In this way, the pre-set database connection can be retrieved from this data source. The specific code required for referencing in the program is as follows:

```
Public class MyDb//database connection pool class
{
Public MyDb() {//Define a constructor without parameters
}
private Context ctx=null; //Define context type
private DataSource ds=null; //Define data source
private static Connection conn=null; //Define interface connections
private Statement stmt=null; //Define the functional object for executing SQL statements
private ResultSet rs=null; //ResultSet can obtain the query result set
```

ISSN: 2710-0588

```
public Connection getCon()
{
try
{
ctx = new InitialContext(); //Initialize context, can read configuration files
ds = (DataSource)ctx.lookup("java:comp/env/jdbc/BookShop");
//JDBC/BookShop "is a method of reading context from configuration files
conn = ds.getConnection(); //Get the connection to the data source
}
Catch (Exception e)
{
e.printStackTrace(System.err);
}//Capture exceptions
return conn; //Return database connection
}…….
Public void close()//Close database connection
{
try
{
if (rs!=null) rs.close(); //When the query result is empty, the data connection is closed
}
catch(Exception e)
{
e.printStackTrace(System.err);
}
try
{
if(stmt!=null) stmt.close(); //Close data connection when executing SQL statement empty
}
catch(Exception e)
{
e.printStackTrace(System.err);
}
try
{
if(conn!=null)
{
conn.close(); //Close data connection when there is no object representing the connection to
the database
}
}
catch(Exception e)
{
e.printStackTrace(System.err);
```

ISSN: 2710-0588

```
}
}
}
```

In this way, we can compile the MyDb class to generate a ". class" file. In terms of database connections, the use of database connection pooling technology and the ability to call "JavaBean" directly from the database during program execution have significantly improved efficiency compared to obtaining connections directly from the database each time.

3.2. Program Design for Each Module

The homepage is the facade of a website, and there is a saying: 'A good start is half the battle.'. The same goes for website design. The homepage is like a magnet, and the size of the magnetic field of this magnet is like the homepage of a website. The design of the homepage is the key to the success or failure of a website. People often have an overall impression of your site from the first page. Whether it can encourage visitors to continue clicking and whether it can attract visitors to stay on the site depends entirely on the "skill" of homepage design. After careful design, the homepage layout of this website is shown in the following figure.

At the top of the homepage is the navigation bar (header) for the main functions of this system, including: "Homepage", "My Shopping Cart", "My Orders", "Administrator Entrance", etc And I divided the main space in the middle of the page into three parts: the middle part includes "new books on sale", "popular books", and "book comments"; On the left side, there are mainly functional options such as "Announcement and Notification Bar", "User Login and Registration Bar", "Book Search Bar", and "User Profile Modification Bar" after user login; On the right side are mainly the "Book Classification Viewing Entrance", "Book Evaluation Column", "Reader Recommended Book Column", etc.

3.2.1. User Registration Page

Customers need their user ID and password when purchasing books online. Users can only purchase books and enjoy personalized services after registration. On the homepage, click the "Register" hyperlink to bring up the user registration page. The system will assign a "user ID" to each customer just like registering for "QQ". In various services in the future, we will use the "user ID" used during registration as the primary key. We will then enter our name, password, E-Mail, and other information in the corresponding location and click the "submit" button. If the registration is successful, the "registration successful!" page will be displayed. Otherwise, the corresponding error message will be displayed.

3.2.2. User Login Page

Users (administrators) can enter their user ID and password on the homepage or login page, and the system will verify the username and password. If the user enters an incorrect user ID or password, the system will display an error message; If the verification is correct, the login is successful, and a successful login message is assigned to the user and connected to the "homepage" interface.

3.2.3. User Information Data Management Module

The main function of this module is to provide users with the ability to modify and maintain their personal information. To strengthen the protection of user information.

3.2.4. Book Browsing Function

Click on the title of a book such as "Flash Basics" on the homepage to open a page for viewing detailed information about the book, as shown in the following figure. At the bottom of the page, users can post their own comments. Of course, if you are satisfied with the book, you can click on the "shopping cart" icon to add the book to your cart.

ISSN: 2710-0588

3.2.5. Book Search Module

In order to facilitate customers to quickly find the products they need, a book search function based on subset query has been implemented in the bookstore. Users can quickly find books of interest based on known book information. Users can click the 'Search' button on the homepage to access the 'Find Books' page.

3.2.6. Book Purchase (Shopping Cart) Module

Buying books is the most important module in our design. It is the core module of the whole website. Step 1: After logging in, users can purchase books by selecting various books they need and adding them to their shopping cart. Users can check the book information in their shopping cart at any time. Of course, the shopping cart also needs to provide the function of deleting and modifying the quantity of books added to the shopping cart. The books in the shopping cart (shopcar.jsp) will display their corresponding prices and basic information.

3.2.7. Missing Book Prompt Module

When you select the 'Add to Cart' button on the book purchase homepage, if the book in the bookstore has already been sold out or the quantity of the book is not enough for you, you will be redirected to the missing book prompt page.

3.2.8. Viewing the Order Page

After the above analysis, we can know that every customer should leave a record of their book purchase on this website. Therefore, at the top of each page, simply click the "My Orders" button to open the "View Orders" page. In each order, simply click "View" to see the detailed content of each book purchase.

3.2.9. Viewing and Posting Message Module

Firstly, the system displays the latest messages from customers in the "Latest Messages" section on the homepage, where customers can click to directly view detailed content. Customers who have successfully logged in can leave messages in this module to express their opinions on a certain book, view messages from other customers, etc. As an administrator, you can also manage the message board by deleting message information on the message board interface. The main purpose of this module is for customers to leave comments on books based on their previous understanding of the book while browsing. At the same time, customers can also understand how to choose the book they want through the comments.

3.2.10. Book Evaluation Module

In this module, customers can vote and evaluate their favorite books, and the voting results will be recorded and counted on the page. Voting and evaluation is also beneficial for other customers to easily understand the sales situation of each book. Book recommendation can recommend the books that customers need to the administrator, increasing communication on books and book types.

3.2.11. Notification and Announcement Viewing Module

We will place the general idea of the notices and announcements on our website in a prominent location on the homepage for customers to browse; The latest and more important form can be made into a scrollbar to display notification information in a scrolling manner. When the mouse hovers over a certain title, the scrollbar stops scrolling, and when customers want to know more details, they can click on the title to browse the body of the notification announcement.

4. Conclusion

After the aforementioned design and coding, the front-end functions have been fully implemented. Subsequent testing has shown that the front-end functions operate stably and reliably.

ISSN: 2710-0588

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