Modeling an E-Bookstore

Objective: The goal of this project is to demonstrate your ability to model an e-business website using the Use Case, Class, and Sequence Diagram techniques we studied in class.

Background:

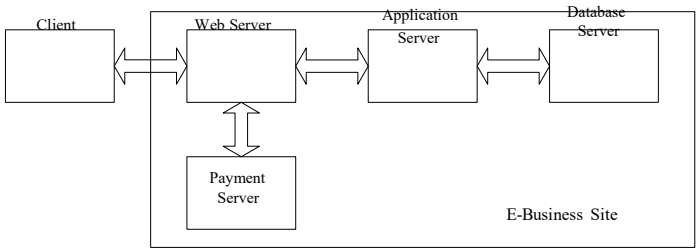

Figure 1: Servers for an E-Business website

An e-business function is performed by several servers in an e-business website. Figure 1 illustrates a typical architecture of an e-business website.

The front-end server is a **Web server**. This server supports the HTTP protocol. It serves the homepage of the website, retrieves static HTML pages and launches programs (e.g., CGI scripts, servlets) that generate dynamic contents. These programs are functionalities implemented by the **application server**. Examples of these functionalities include searching for items in a catalog by keywords. In many cases, the application may need data stored in persistent storage (e.g., disk). Database management systems are used to provide efficient access to data in persistent storage. Thus, the application server may need to interact with the **database server** to obtain the data it needs to execute the requested operation. The response of a functionality is typically formatted as an HTML page that is returned by the Web server to the requesting client. Some of the functions provided by an e-business website require authentication. For example, an online trading website must ensure that a customer who logs into the site is providing accurate identification (authentication). A payment server accepts payments online and transfers monetary funds from the customer's financial institution to the merchant's financial institution.

Consider an online bookstore using the architecture depicted in Figure 1. Customers can perform the following functions:

1. Connect to the homepage and browse the website by following links to bestseller books and promotions of the week per book category.

2. Search for titles according to various criteria including keywords, author name, and ISBN.
3. Select a book from a list returned by a search and view additional information about the book such as a brief description, price, shipping time, ranking, and reviews.
4. Register as a new customer of the virtual bookstore. This allows the user to provide a user name and a password, payment information, mailing address, and e-mail address for notification of order status and books of interest.
5. Login with a user name and password.
6. Add items to the shopping cart.
7. Checkout items in the shopping cart.

Deliverables: You need to submit a report that includes the following:

- A use-case diagram for the e-Bookstore system that supports the list of functions shown above.
- A class diagram for the e-Bookstore system that illustrates the choices of the main classes and appropriate relationships among them.
- Choose one non-trivial use case, design the corresponding sequence diagram to show the interaction among classes collaborating in this scenario.