

Software Architecture & Design Assignment #6

Software Design using Use case, Component n Connector, & High-Level system Diagrams

Assignment#6 Detail System Design -Part3: Group 1

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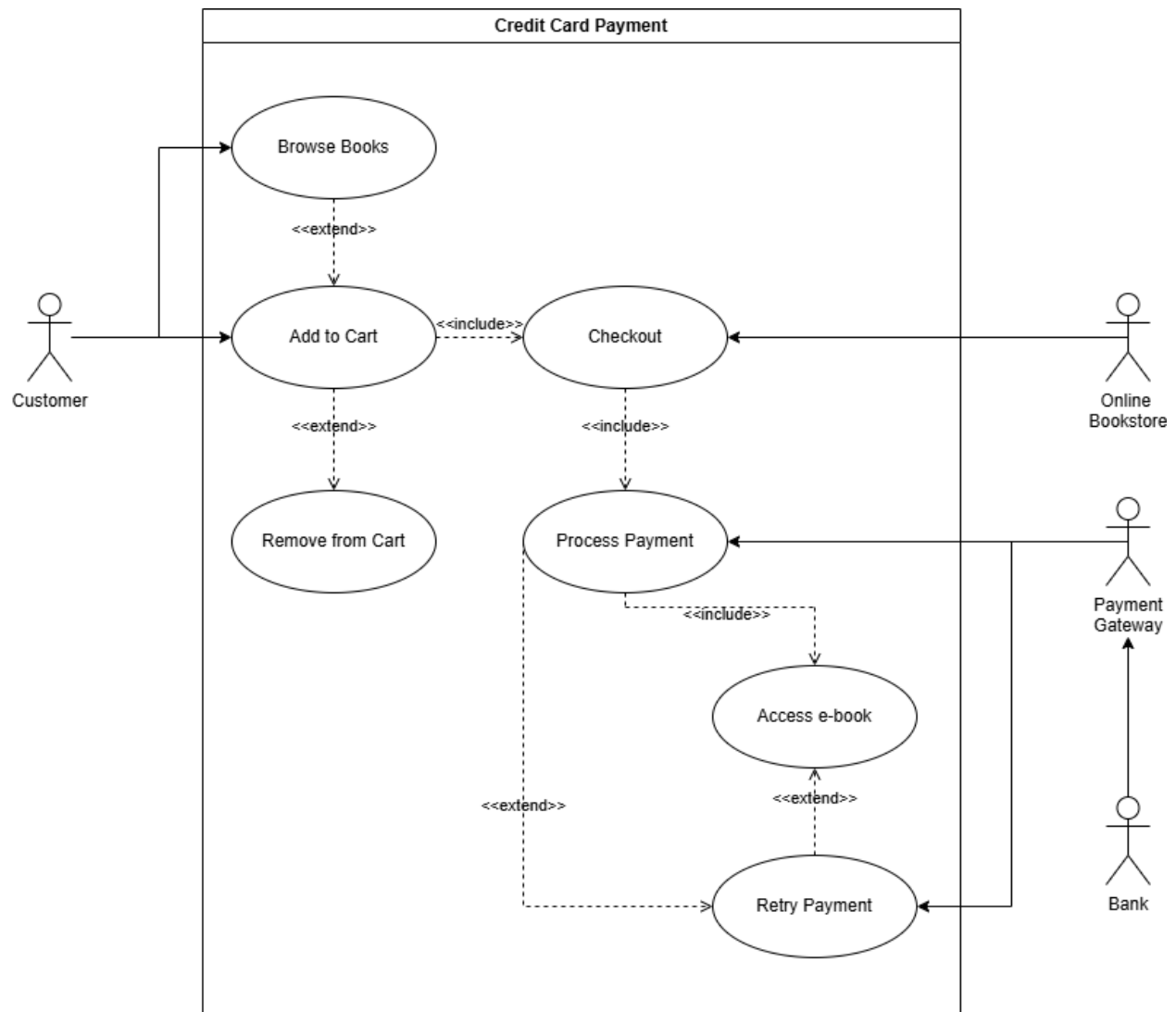
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CEN 4065 - Software Architecture & Design

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Software Architecture & Design Assignment #6

Question 1. Create a 1-2 use case diagram that describes the steps required to purchase an e-book online using a credit-card.



Description:

Our use case diagram shows a system where customers browse books, manage their shopping cart, proceed to checkout, and complete the purchase through payment processing. Depending on if the payment goes through, they either can access their e-book or retry the payment process. External actors like the payment gateway and the bank handle the payment process, since this would be outside the scope of a bookstore.

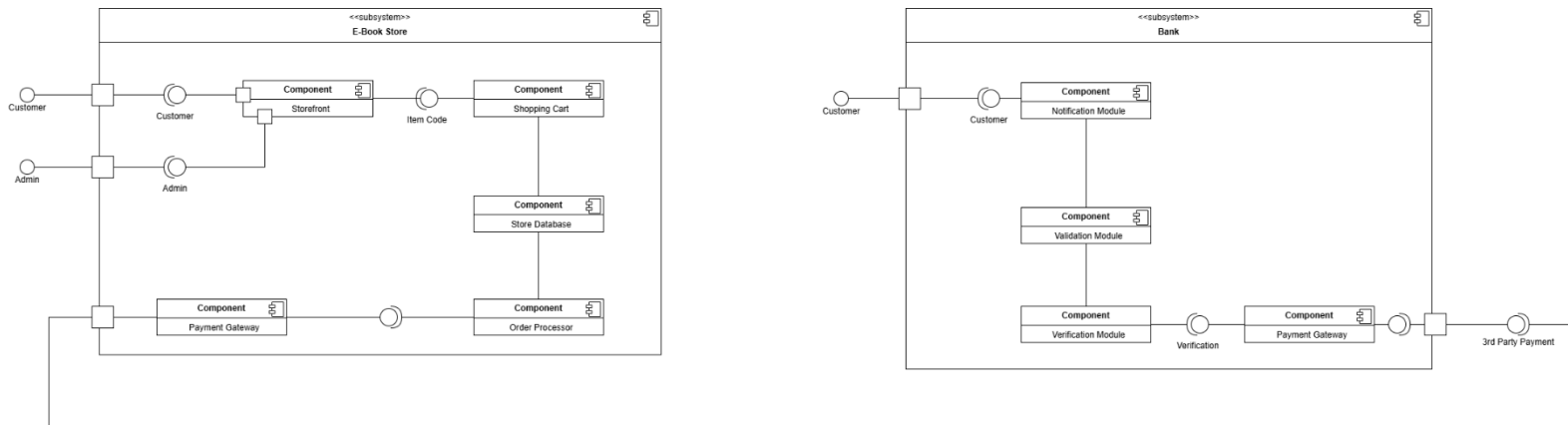
Actors:

1. **Customer:** The primary user who interacts with the bookstore system to browse, add, or remove books from the cart, checkout, and process payments.
2. **Online Bookstore:** The system helps the user with book browsing, cart management, checkout, and access to e-books upon successful payment.
3. **Payment Gateway:** A third-party system used for processing payments.
4. **Bank:** The external entity responsible for verifying and approving credit card transactions.

Main Use Cases:

1. **Browse Books:** Allows the customer to view available books. This use case extends to adding books to the cart.
2. **Add to Cart:** Customers can add selected books to their shopping cart. This use case can be followed by checking out.
3. **Remove from Cart:** Customers can remove books from their cart. This extends the functionality of cart management.
4. **Checkout:** Starts the purchase process and includes the **Process Payment** use case.
5. **Process Payment:** Handles the payment transaction through the payment gateway and involves interactions with the bank for approval.

Question 2. Create a UML component and connector diagram that describes the components for purchasing an e-book online using a credit-card.



Description:

This is our component-connector diagram. It shows the architecture and the components for purchasing an e-book online using a credit-card.

E-Book Store Subsystem

1. Actors:

- **Customer:** Represents the user who browses, selects, and purchases items.
- **Admin:** Represents the system admin responsible for managing the store.

2. Components:

- **Storefront:** The main interface for customers to browse and search for items (books).
- **Shopping Cart:** Allows customers to add and manage items for purchase.
- **Order Processor:** Handles the processing of customer orders.
- **Payment Gateway:** Manages the payment transactions, interacting with the bank subsystem.
- **Store Database:** holds data of all the transactions in store and online, also has inventory management.

3. Connectors:

- The **Customer** interacts with the **Storefront** to browse items and uses the **Shopping Cart** to manage their selection.
- The **Shopping Cart** sends item codes to the **Order Processor**, which communicates with the **Payment Gateway** for payment handling.

Bank Subsystem

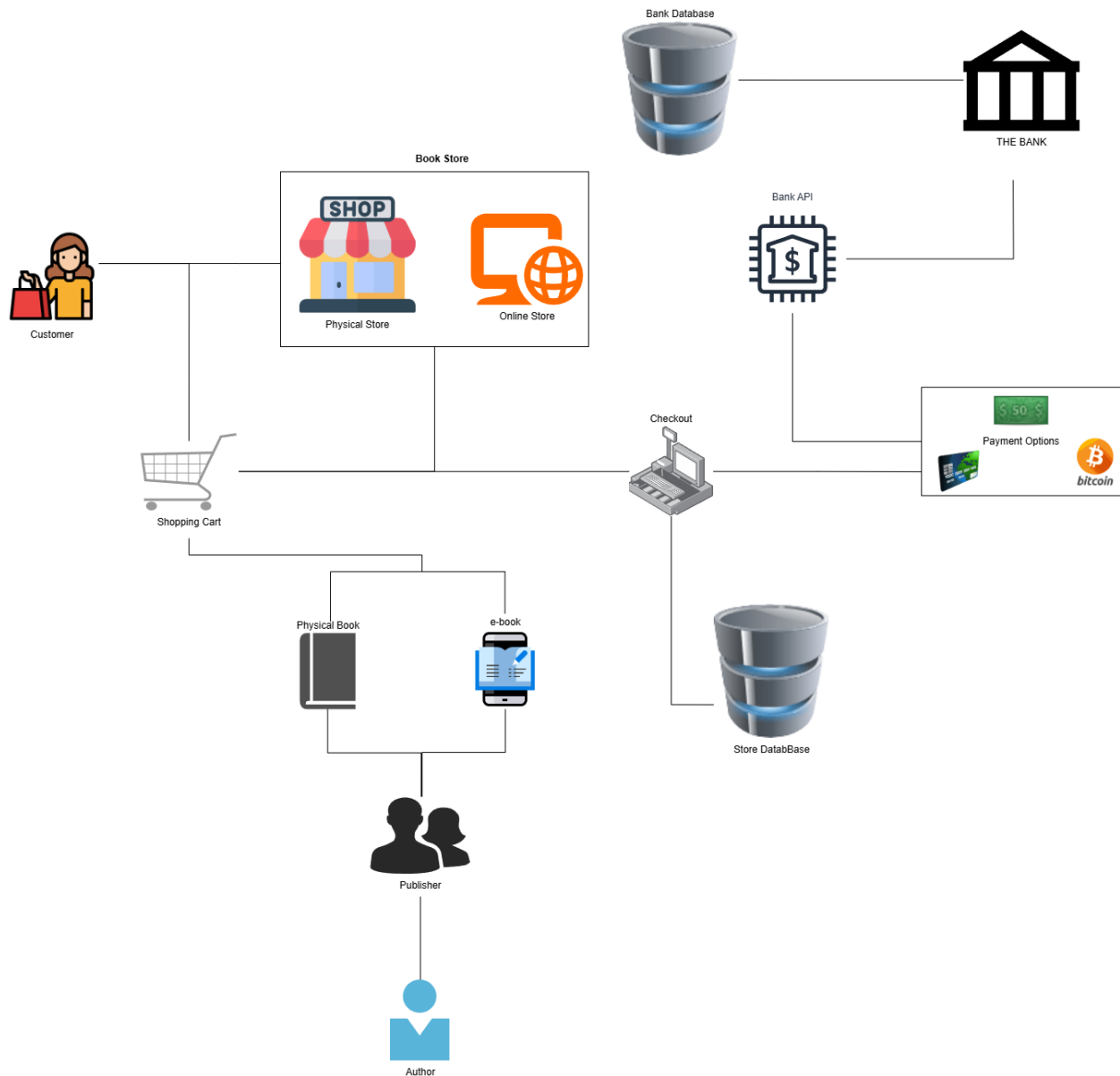
1. Actors:

- **Customer:** Represents the same user interacting with the payment process.

2. Components:

- **Notification Module:** Sends confirmation msg or updates to the customer regarding transactions.
- **Validation Module:** Validates the payment details and makes sure to comply with banking protocols.
- **Verification Module:** Verifies the payment request before completing the transaction.
- **Payment Gateway:** Serves as the bridge between the e-book store and the bank for completing financial transactions.

Question 3. Create a high-level system diagram of the bookstore architecture, refer to the class diagram in question#1 of assignment#1



Description:

Our high-level system diagram shows the architecture and structure of a Book Store system that allows for both physical and online sales. Below is an overview of the system components and their interactions:

Key Entities

1. Customer:

- Interacts with both the physical and online stores.
- Adds items (physical books or e-books) to a shopping cart and proceeds to checkout.

2. Author:

- Creates and submits books to the store, connecting through publishers.

3. Publisher:

- Makes the submission and publication of books (both physical and electronic) to the store.

Book Store

The system serves as the core hub, managing:

1. Physical Store:

- Handles in-person customer interactions and purchases.
- Provides access to physical book inventory.

2. Online Store:

- Allows customers to browse, shop, and purchase items online.

3. Shopping Cart:

- A temporary storage area for selected items before purchase.
- Used by customers in both physical and online store contexts.

4. Store Databases:

- Tracks inventory, sales records, and customer data.
- Maintains book details (physical and electronic) along with metadata about authors and publishers.

Payment Integration

1. Checkout:

- A interface for processing customer purchases.
- Connects the shopping cart to the payment systems.

2. Payment Options:

- Offers many payment methods, such as credit cards, digital wallets, and cryptocurrencies.
- Integrates with external API's (Bank).

3. Bank API:

- Allows for communication with the bank for payment validation and authorization.

4. Bank Database:

Maintains customer account details and handles transactional records.