IT - 314 Software Engineering

Lab 6 : Modeling Class Diagram and Activity Diagram (Point of Sale System)

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Lab Group : 3

Point of Sale (POS) System Analysis

Introduction:

A Point of Sale (POS) system is a vital tool in retail and service sectors, facilitating transactions between businesses and customers. This document examines the essential functions of a modern POS system, with a focus on two main use cases: "Processing a Sale" and "Handling Returns."

Use Case 1: “Process Sale”

Actor :

- Cashier

Preconditions :

- The POS system is up and running.
- Cashier is logged into the system with valid credentials.

Postconditions :

- The sale is successfully recorded in the system.
- Inventory is automatically adjusted to reflect the items sold.
- The customer is provided with a receipt for the transaction.

Basic Flow :

1. Customer brings items to the checkout counter.
2. Cashier starts a new sale on the POS system.
3. For each item:
    - Cashier scans the item's barcode.
    - The system pulls item details (such as name and price) from the database.

    - The system adds the item to the transaction.
4. The system calculates the total amount due and displays it.
5. Cashier informs the customer of the total cost.
6. Customer selects a payment option (cash, card, or mobile payment).
7. Cashier processes the payment through the system.
8. The system finalizes the sale and adjusts the inventory.
9. The system generates a receipt.
10. Cashier hands the receipt and purchased items to the customer.

Alternative Flows :

- **3b**: If the barcode cannot be scanned, the cashier can manually enter the item's SKU or look it up in the system.
- **5a**:
    - Customer provides a discount code or coupon.
    - The cashier applies the discount, and the system recalculates the total.
- **6a**:
    - If the payment is declined, the cashier informs the customer.
    - The customer either chooses another payment method or decides to remove some items.
- **7a**:
    - Before completing the transaction, the customer may choose to cancel it.
    - The cashier cancels the transaction, and the system reverses any inventory changes made.

Use Case 2: Process Return

Actor :

- Cashier

Preconditions :

- POS system is operational and ready for transactions.
- Cashier is authenticated and logged into the system.
- Customer possesses items to return along with the original purchase receipt.

Postconditions :

- Return is completed and recorded in the system.
- Inventory is adjusted to account for the returned items.
- Customer receives a refund and a return receipt.

Basic Flow :

1. A customer approaches the counter with items for return and the original receipt.
2. The cashier initiates a new return transaction in the POS system.
3. The cashier scans the items being returned.
4. The system checks return eligibility (e.g., within the return period, item condition).
5. The system calculates the refund amount.
6. The cashier confirms the reason for the return with the customer.
7. The system updates the inventory to reflect the returned items.
8. The cashier processes the refund using the original payment method.
9. The system logs the return transaction.
10. The system generates a return receipt.
11. The cashier hands the return receipt to the customer.

Alternative Flows :

- **3a**. If the scanner is unavailable, the cashier manually enters the item details into the system.

- **4a**. Item Not Eligible for Return:
    - The system alerts the cashier that an item cannot be returned.
    - The cashier informs the customer of this issue.
    - The customer decides whether to continue with eligible items or cancel the return.
- **7a**. Damaged or Used Item:
    - The cashier inspects the item for damage or signs of use.
    - The system applies a restocking fee or adjusts the refund amount.
    - The cashier informs the customer of the adjusted refund.
    - The customer decides whether to proceed with the return.
- **8a**. Original Payment Method Unavailable:
    - If the original payment method is not accessible for refund,
    - The cashier selects an alternative refund method (e.g., store credit).
    - The system processes the refund via the alternative method.

Identify Entity/Boundary Control Objects

Entity Objects

1. Customer
2. Cashier
3. Item
4. Payment
5. Inventory
6. Sale
7. Coupon
8. Return

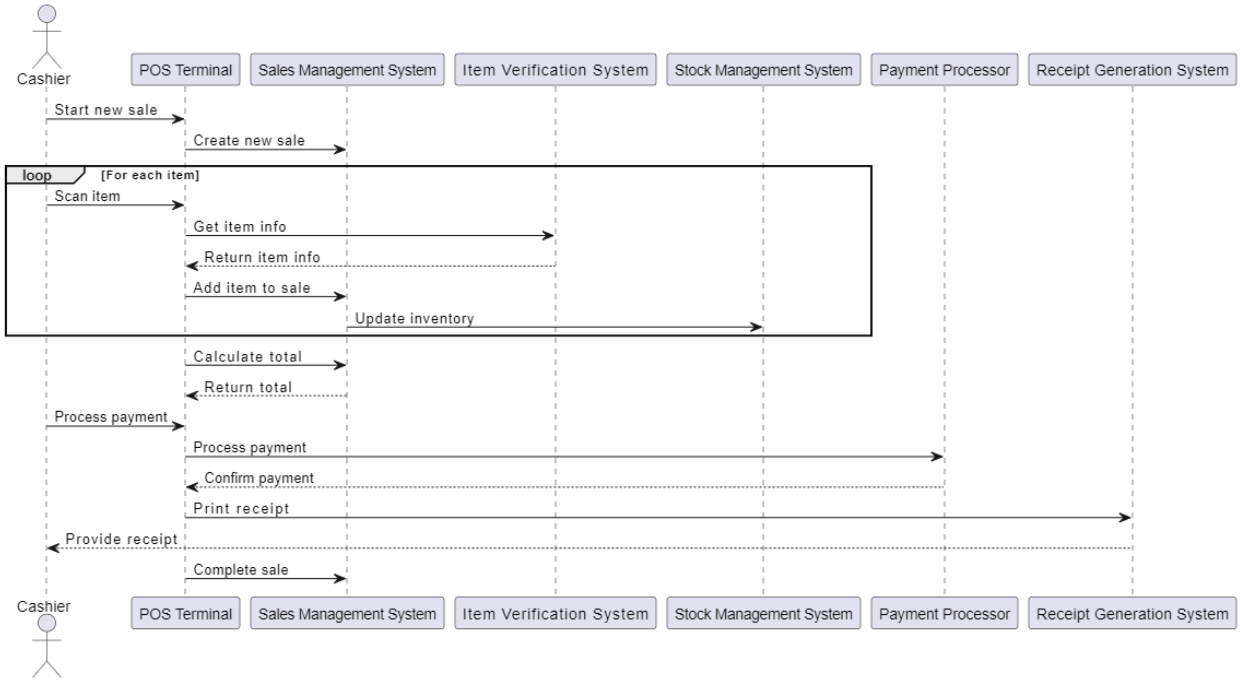
Boundary Objects

1. Payment Terminal
2. Receipt Printer
3. Barcode Scanner
4. POS Terminal Interface

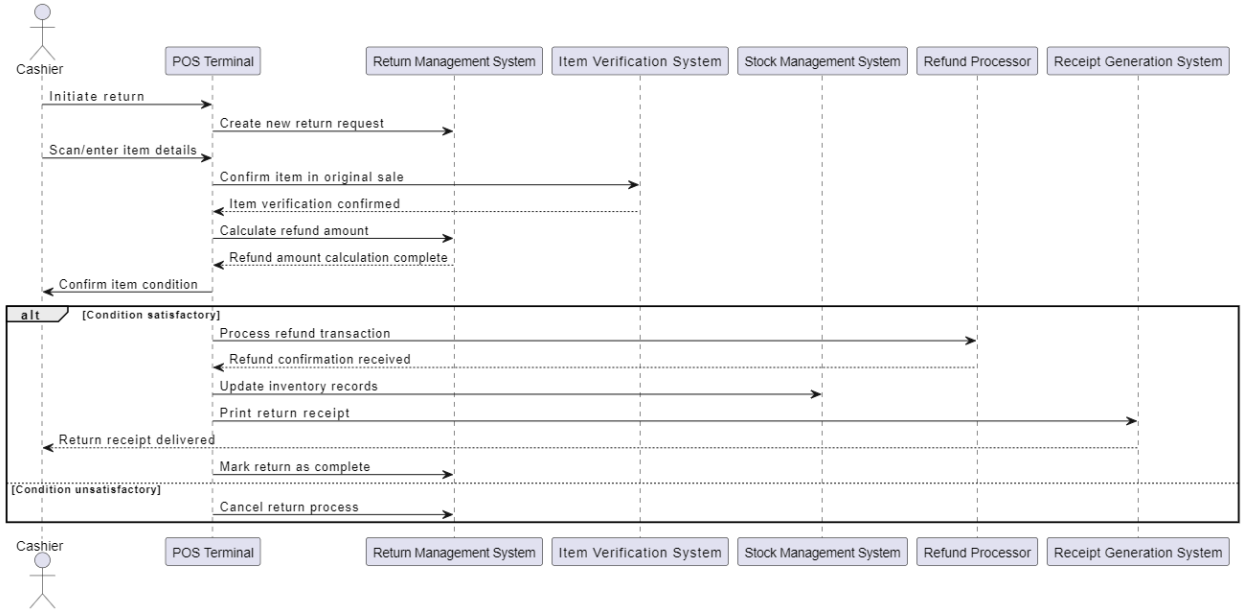
Control Objects

1. Return Manager
2. Payment Processor
3. Catalog Manager
4. Inventory Controller
5. Sale Manager

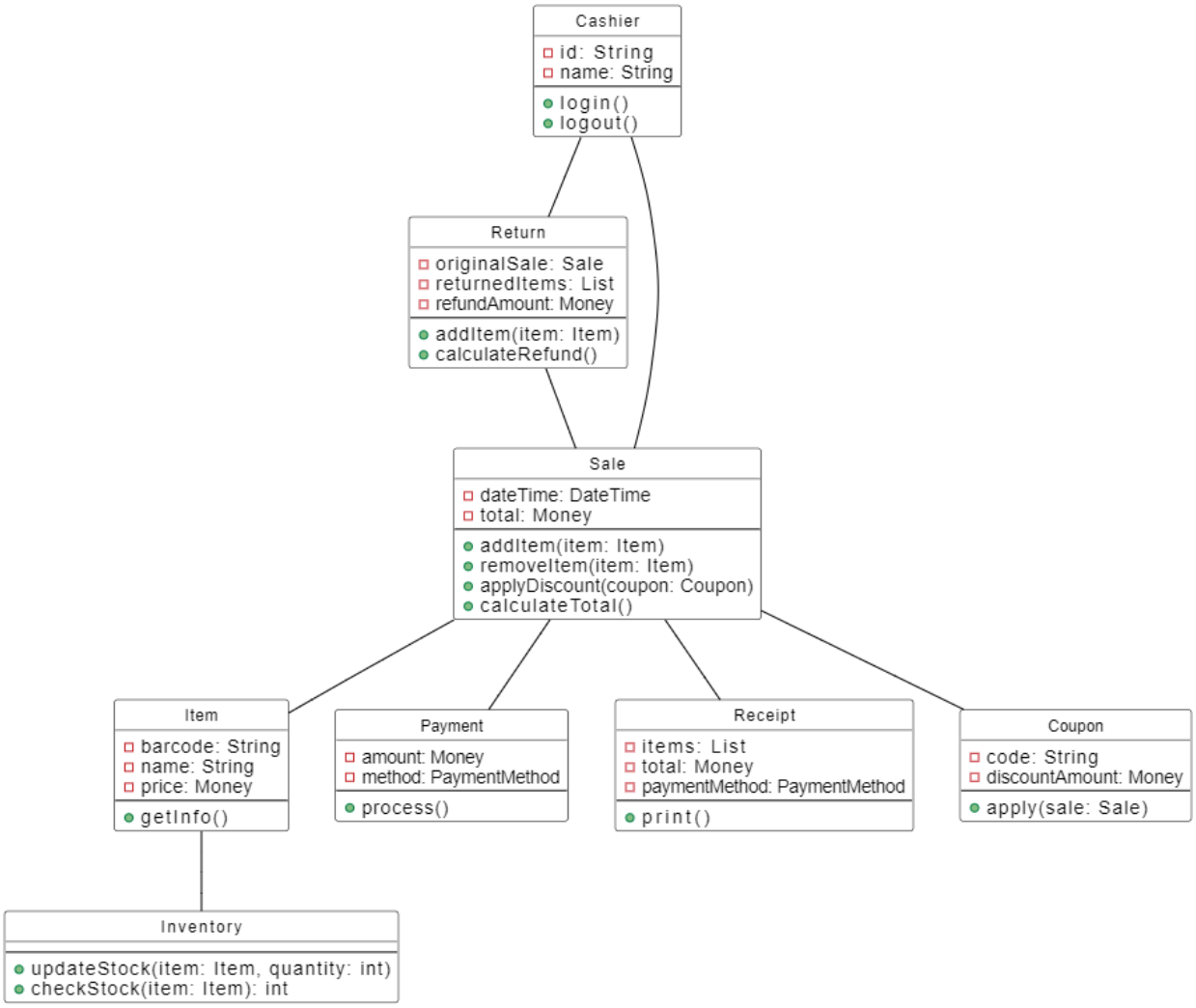
Develop Sequence Diagram : (For “Process Sale”)



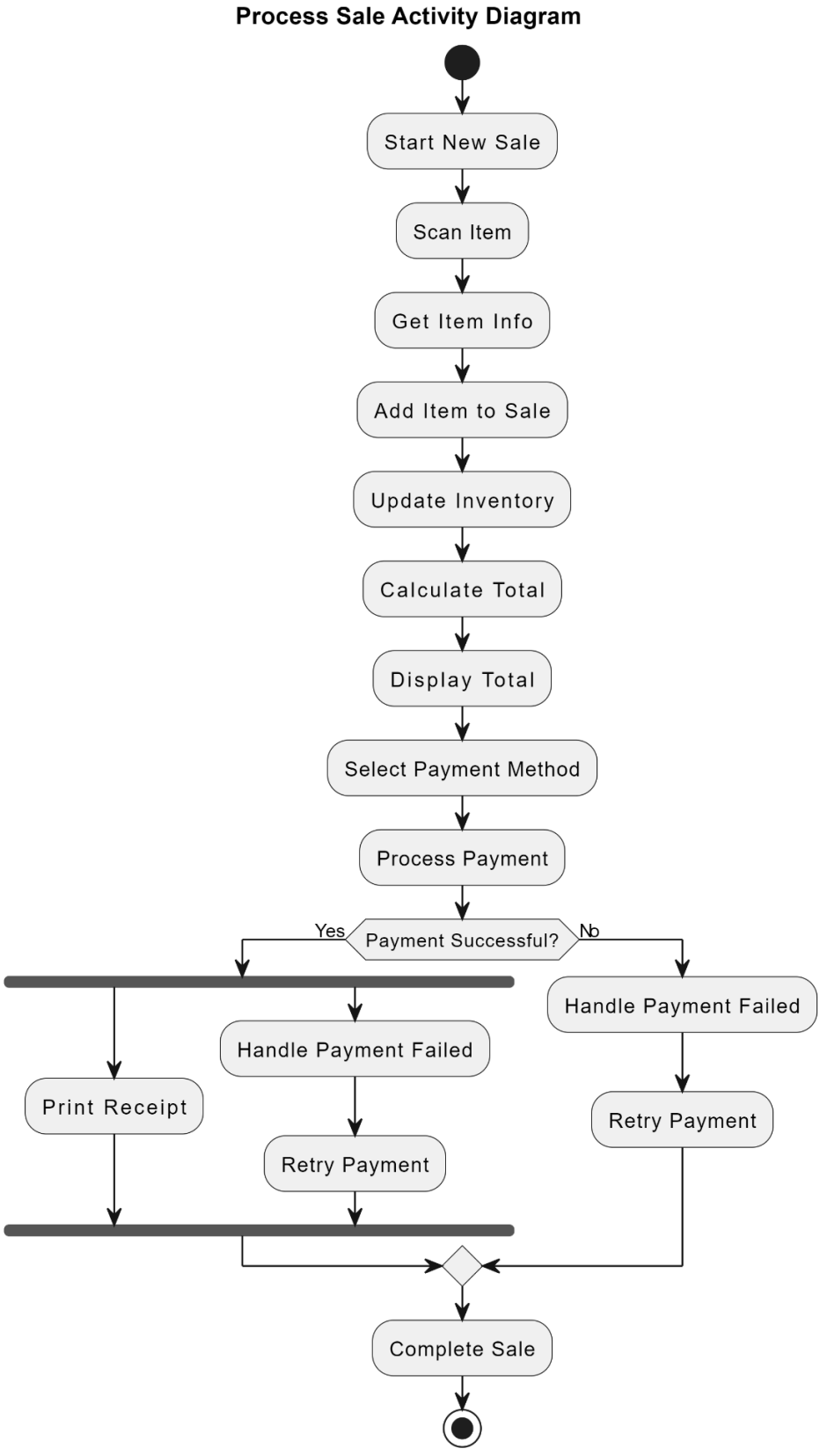
Develop Sequence Diagram : (For "Handle Return")



Develop Analysis Domain Models



Develop activity diagram : (for "Process Sale")



Develop activity diagram : (for "Handle Return")