IT - 314 Software Engineering

Assignment 6: Point of Sale(POS) System

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Question-1: Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

Use Case Description: "Process Sale"

Name: Process Sale

Actors: Cashier, Customer

Preconditions:

1. The cashier is logged into the POS system.
2. The POS system is connected to the catalog and inventory systems.

Trigger:

- A customer arrives at the POS counter with goods to purchase.

Main Flow:

1. The cashier starts a new sale transaction on the POS system.
2. The cashier scans the barcode of each item.
3. The POS system retrieves the item name and price from the backend catalog system.
4. The POS system updates the inventory by deducting the stock of the purchased items.
5. The cashier can apply any valid coupons or promotions if provided by the customer.
6. The POS system calculates the total amount payable.
7. The customer chooses a payment method (cash, credit card, or check).
8. The cashier enters the payment information.
9. The POS system processes the payment.
10. Upon successful payment, the POS system prints a receipt.
11. The sale transaction is completed.

Postconditions:

1. The payment is processed and the inventory is updated.
2. A receipt is printed and provided to the customer.

Alternative Flows:

- If a barcode is not recognized, the cashier can manually enter the product details.
- If the customer cannot provide sufficient payment, the cashier cancels the transaction.
- If the payment method fails, the cashier asks the customer to try another method.

Use Case Description: "Handle Return"

Name: Handle Return

Actors: Cashier, Customer

Preconditions:

1. The cashier is logged into the POS system.
2. The customer has a receipt for the items to be returned.

Trigger:

- A customer requests to return an item purchased earlier.

Main Flow:

1. The cashier starts a return transaction in the POS system.
2. The customer provides the receipt, and the cashier scans the items or enters the return details.
3. The POS system validates the items against the receipt.
4. The POS system updates the inventory by adding the returned items back to stock.
5. The cashier asks the customer for a preferred refund method (cash, credit card, or store credit).
6. The cashier processes the refund in the POS system.
7. Upon successful refund, the POS system prints a return receipt.
8. The return transaction is completed.

Postconditions:

1. The refund is processed, and the inventory is updated.
2. A return receipt is printed and provided to the customer.

Alternative Flows:

- If the return period has expired or the item is not eligible for return, the cashier informs the customer and cancels the return transaction.
- If the customer does not have the receipt, the cashier may follow store policies to handle the situation manually.

Question-2: Identify Entity/Boundary/Control Objects

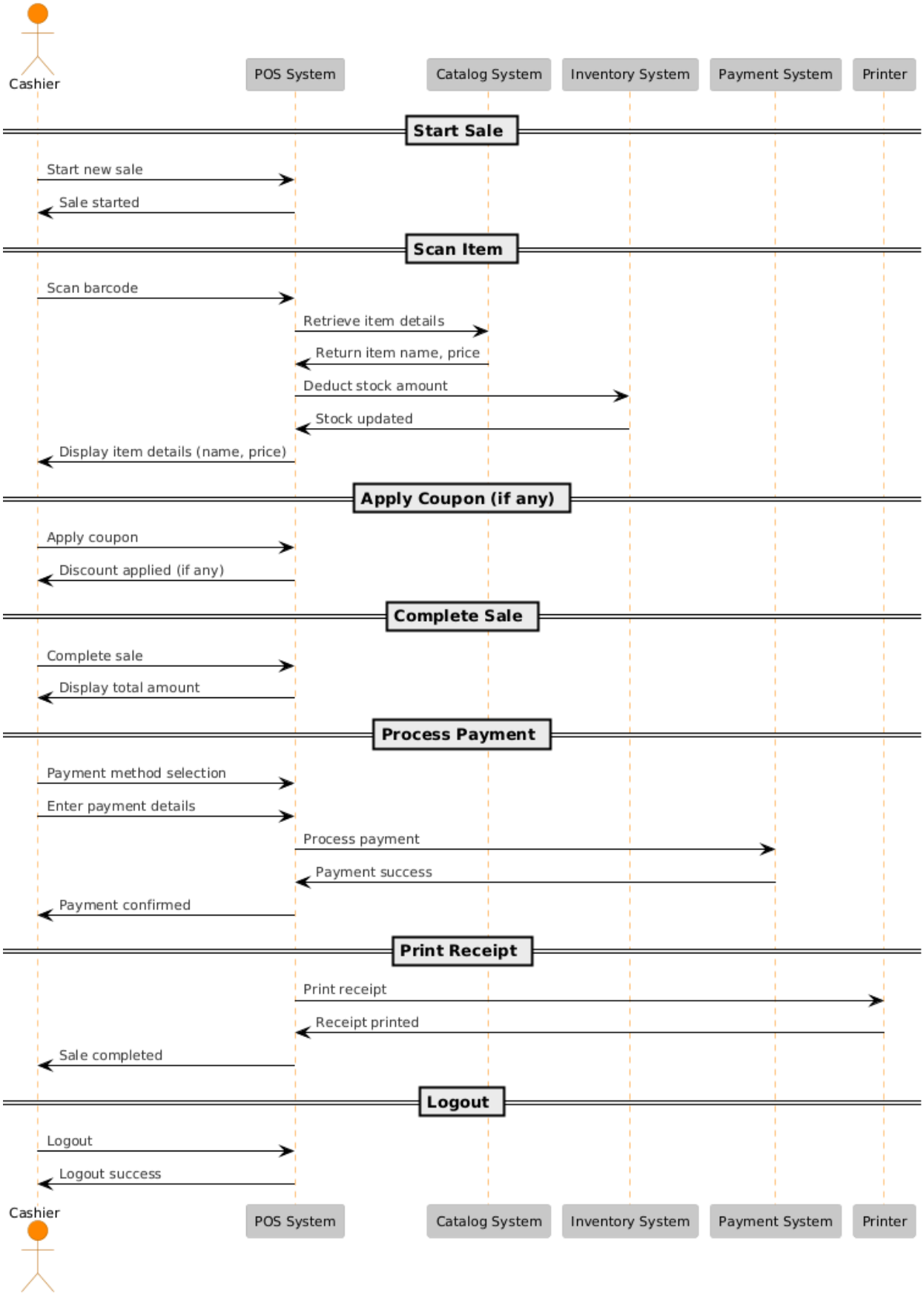
1. **Entity Objects:**
    - **Item**: Represents the goods being sold or returned, containing attributes such as name, barcode, price, and stock.
    - **Sale Transaction**: Tracks the details of the sale, including items sold, total amount, and payment method.
    - **Return Transaction**: Tracks the details of returned items, associated sale, and refund.
    - **Receipt**: Represents the printed confirmation for sale or return.
    - **Coupon**: Represents the promotional coupon used to reduce the price during a sale.

2. **Boundary Objects:**
    - **POS Interface**: The user interface used by the cashier to interact with the POS system.
    - **Barcode Scanner**: Used to scan item barcodes.
    - **Payment Terminal**: The hardware used to process payment, whether by cash, card, or check.
    - **Printer**: Used to print receipts for both sales and returns.

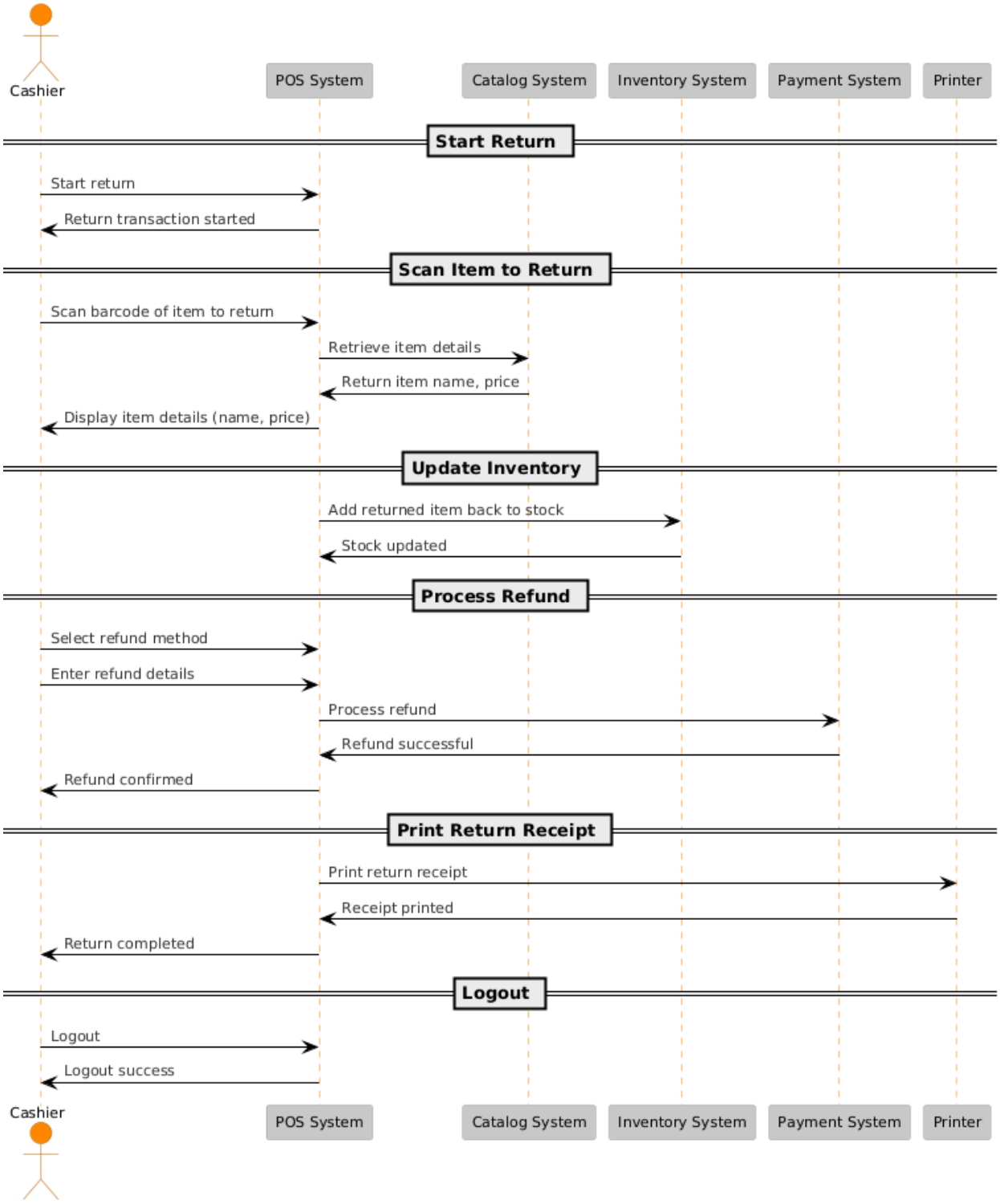
3. **Control Objects:**
    - **SaleController**: Manages the sale process, ensuring that item details are retrieved, stock is deducted, and payment is processed.
    - **ReturnController**: Manages the return process, ensuring validation of returned items and processing of the refund.
    - **InventoryController**: Interacts with the inventory system to update stock levels during sales and returns.
    - **PaymentController**: Handles the processing of payment transactions (cash, credit card, check).
    - **CouponController**: Manages coupon validation and application during a sale.

Question-3: Develop Sequence Diagrams

1. **Process Sales Sequence Diagram:**

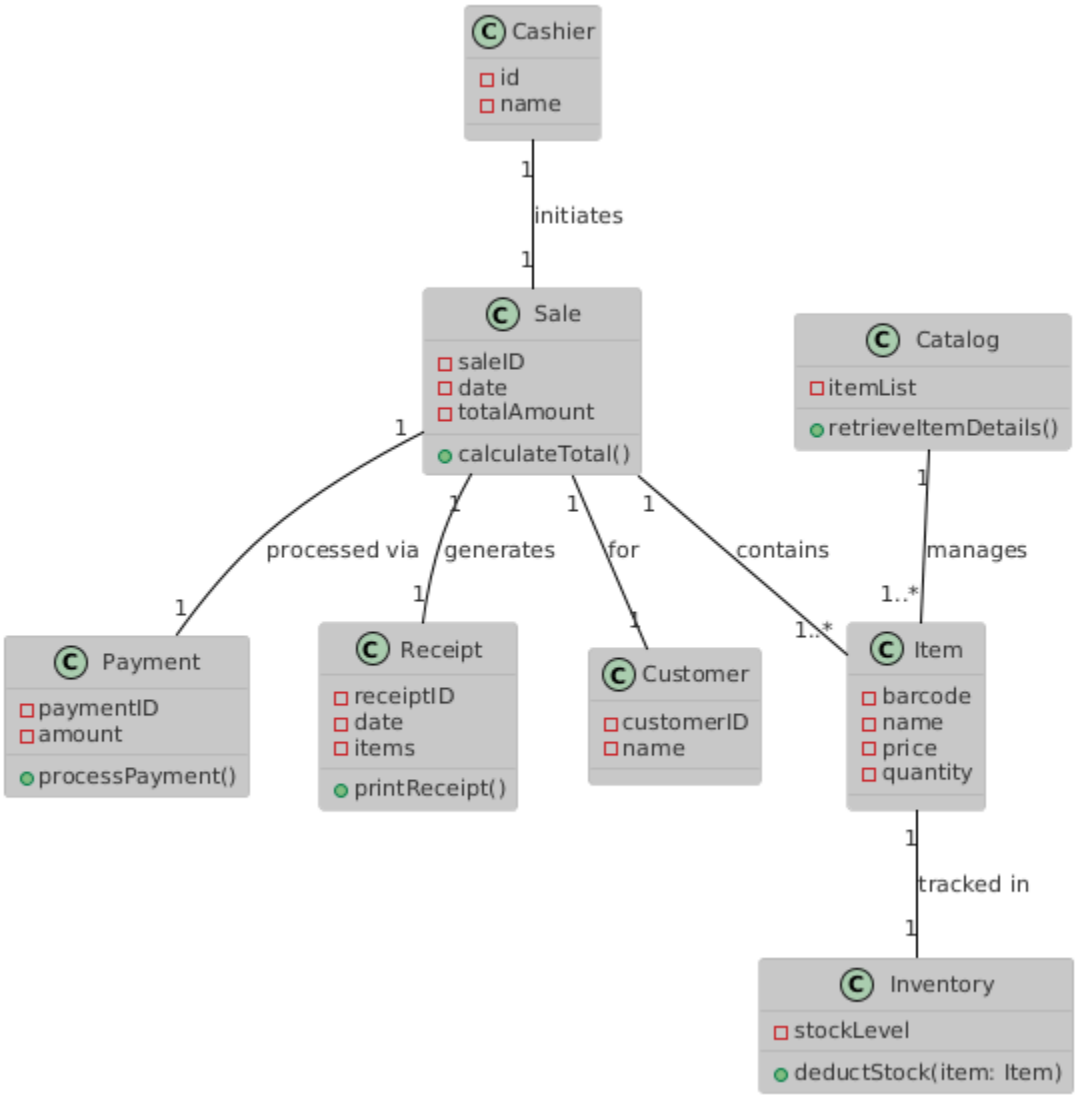

Cashier
POS System
Catalog System
Inventory System
Payment System
Printer
Start Sale
Start new sale
Sale started
Scan Item
Scan barcode
Retrieve item details
Return item name, price
Deduct stock amount
Stock updated
Display item details (name, price)
Apply Coupon (if any)
Apply coupon
Discount applied (if any)
Complete Sale
Complete sale
Display total amount
Process Payment
Payment method selection
Enter payment details
Process payment
Payment success
Payment confirmed
Print Receipt
Print receipt
Receipt printed
Sale completed
Logout
Logout
Logout success
Cashier
POS System
Catalog System
Inventory System
Payment System
Printer

2. Handle Return Sequence Diagram:

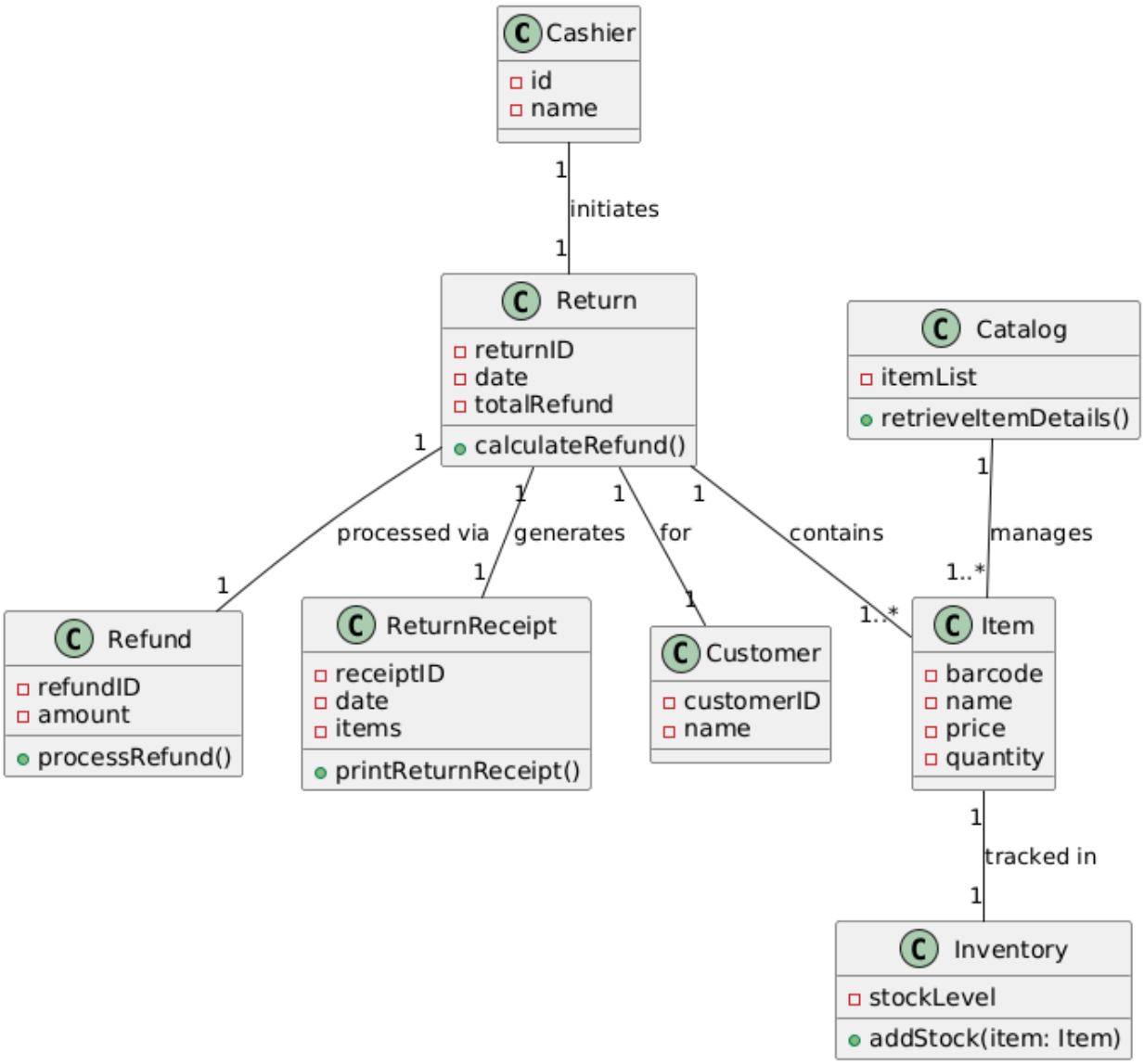


Question-4: Develop Analysis Domain Models

1. Process Sales Diagram:

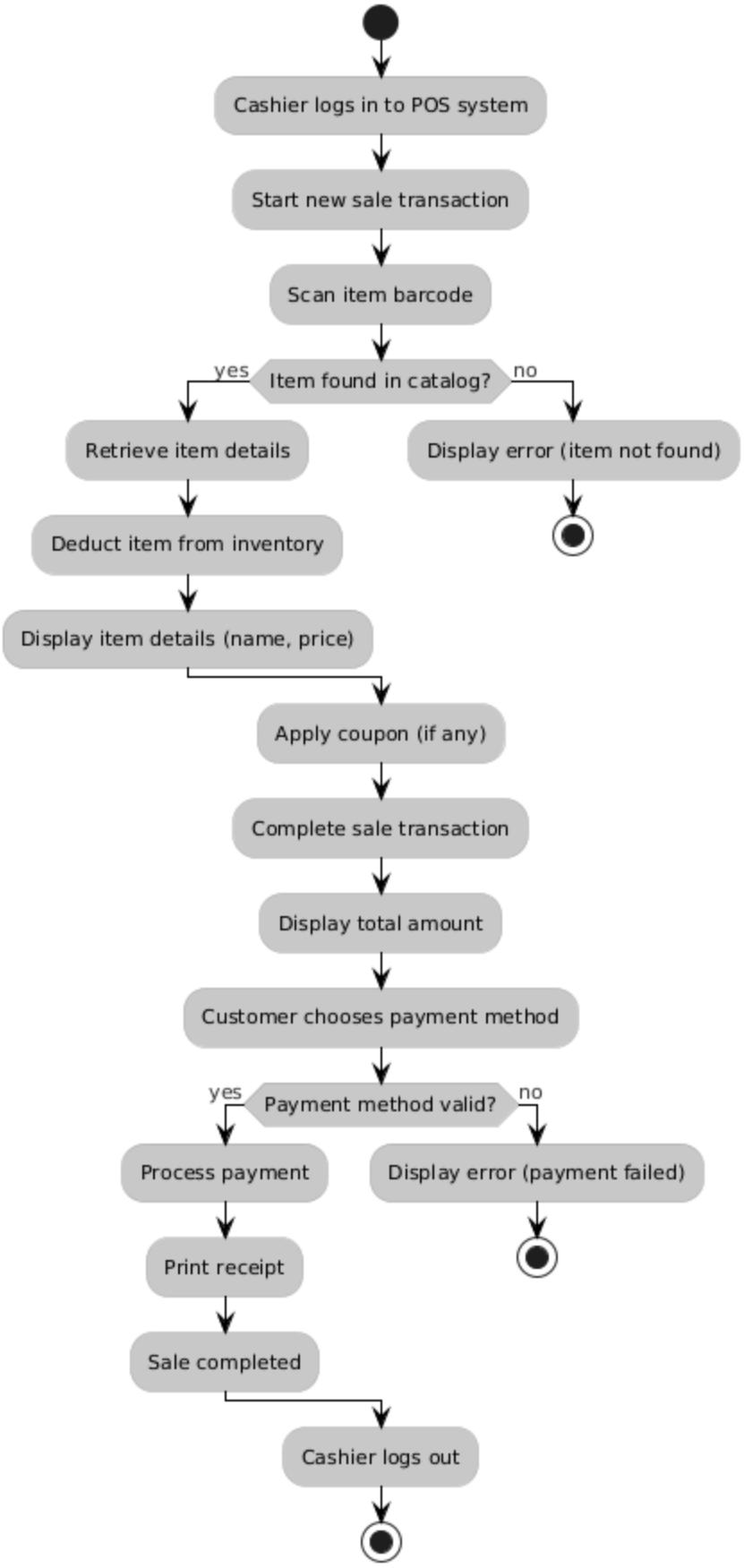


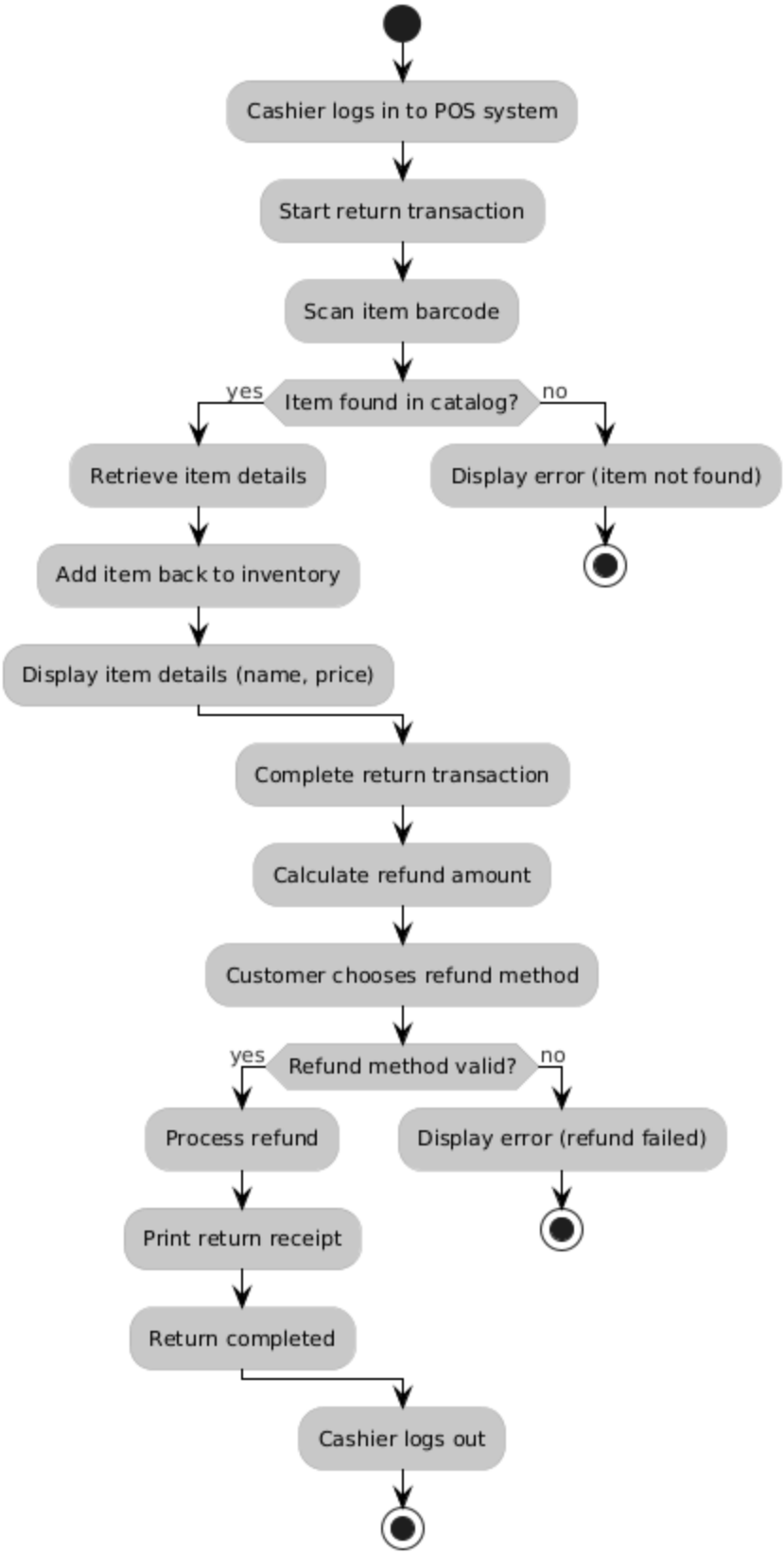
2. **Handle Return Diagram:**



Question-5: Develop Activity Diagram for Process Sales and Handle Return Use Case:

1. **Process Sales Diagram:**
2. **Handle Return Diagram:**


Cashier logs in to POS system
Start new sale transaction
Scan item barcode
Item found in catalog?
yes
no
Retrieve item details
Display error (item not found)
Deduct item from inventory
Display item details (name, price)
Apply coupon (if any)
Complete sale transaction
Display total amount
Customer chooses payment method
Payment method valid?
yes
no
Process payment
Display error (payment failed)
Print receipt
Sale completed
Cashier logs out


Cashier logs in to POS system
Start return transaction
Scan item barcode
Item found in catalog?
yes
no
Retrieve item details
Display error (item not found)
Add item back to inventory
Display item details (name, price)
Complete return transaction
Calculate refund amount
Customer chooses refund method
Refund method valid?
yes
no
Process refund
Display error (refund failed)
Print return receipt
Return completed
Cashier logs out