IT-314
Software Engineering

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

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Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

1. Use Case: Process Sale

Primary Actor: Cashier
Stakeholders & Interests:

- Cashier: Wants to process the sale quickly and accurately.
- Customer: Wants to purchase goods with a valid price, using various payment methods.
- Inventory System: Needs to update the stock when items are sold.
- Catalog System: Provides the price and name of goods.

Preconditions:

- The cashier must be logged into the POS system.
- The Catalog and Inventory systems must be available.

Postconditions:

- The sale is recorded.
- The inventory is updated.
- A receipt is printed.
- Payment is confirmed (cash, credit card, or check).

Main Success Scenario:
1. The cashier initiates a new sale.
2. The cashier scans the barcode of the goods.
3. The POS system retrieves the item details (price, name) from the Catalog System.
4. The POS system interacts with the Inventory System to ensure enough stock is available and to update the stock quantity.

5. The customer chooses a payment method (cash, credit card, check).
6. The POS system processes the payment.
7. The system prints a receipt.
8. The sale is completed and recorded in the system.

Extensions (Alternative Flows):
3a. Item not found: If the Catalog System doesn't return the item details, the cashier can manually enter the item code and price or reject the item from the sale.
4a. Insufficient stock: The system informs the cashier that the item is out of stock. The cashier can inform the customer and either proceed without that item or cancel the sale.
5a. Payment fails: If the credit card or check payment is declined, the cashier asks the customer for an alternate payment method or cancels the transaction.

Special Requirements:
- The system should handle promotions and discounts (e.g., gift coupons).

2. Use Case: Handle Return

Primary Actor: Cashier
Stakeholders & Interests:
- Cashier: Wants to return goods and refund the customer efficiently.
- Customer: Expects a quick refund for returned goods.
- Inventory System: Needs to restore the returned item to stock.
- Store Administrator: Ensures fraud prevention and accurate accounting for returns.

Preconditions:
- The cashier must be logged into the POS system.
- The item being returned must have been sold by the store.
- The customer has a valid receipt or proof of purchase.

Postconditions:
- The return is recorded.
- Inventory is updated to reflect the return.
- A refund is processed.

Main Success Scenario:
1. The cashier initiates a return process.
2. The cashier scans the item to be returned or enters the receipt details.
3. The POS system checks if the item was sold previously and is eligible for a return.
4. The POS system interacts with the Inventory System to update the stock.
5. The customer is refunded either in cash, credit card refund, or store credit.
6. A return receipt is printed.
7. The return is recorded in the system.

Extensions (Alternative Flows):
3a. Invalid receipt or no proof of purchase: The system notifies the cashier, who may either reject the return or proceed with store credit (based on store policy).
5a. Refund fails: If a refund cannot be processed (e.g., card declined), the cashier offers an alternative refund method (cash or store credit).

Special Requirements:
- The system should detect fraudulent or repeated returns and alert the cashier.

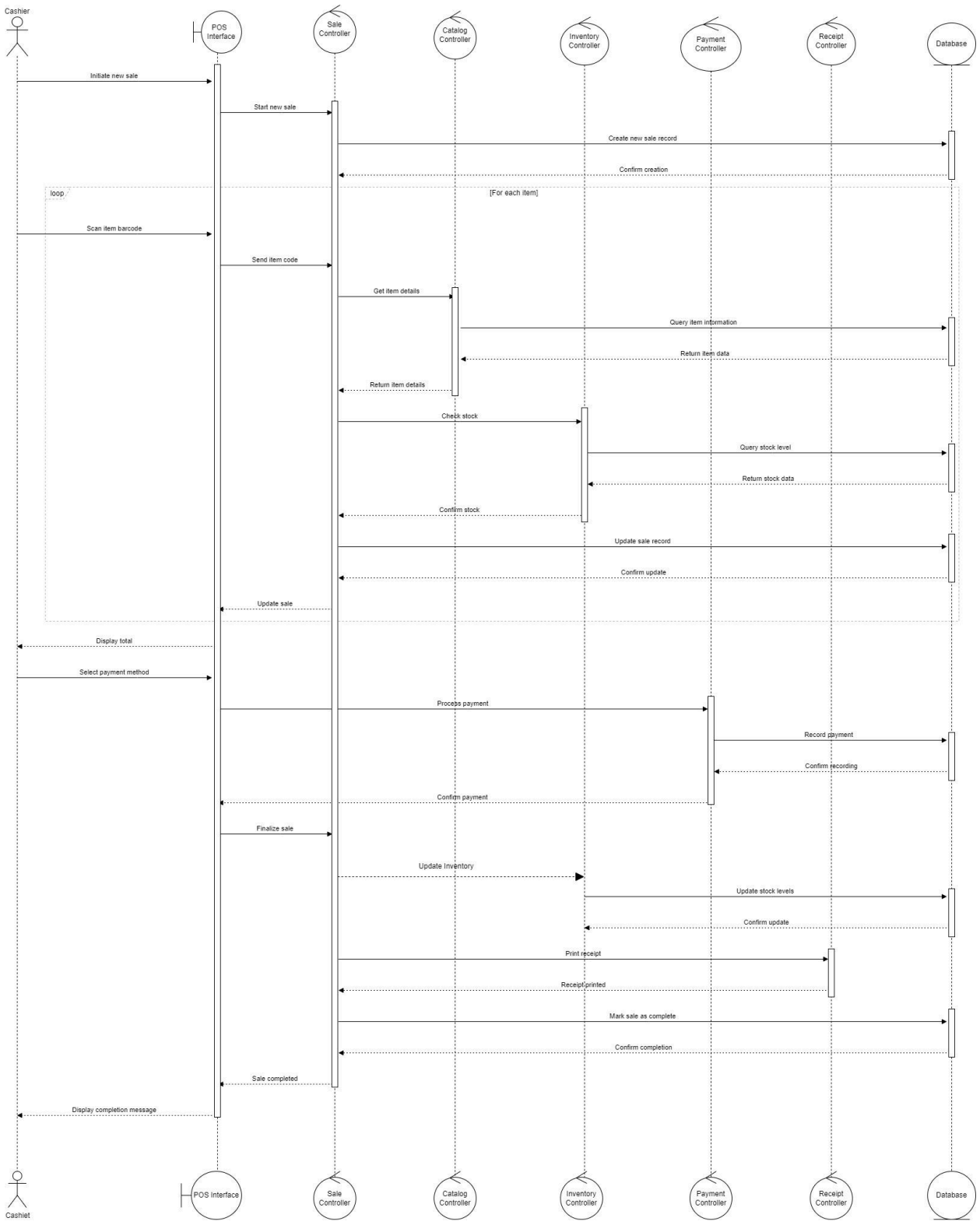
Identify Entity/Boundary/Control Objects

Entity Objects:
- Sale: Represents a completed transaction.
- Item: Product being sold or returned, including details like price, stock, and description.
- Payment: Records details of the transaction, including method and amount paid.
- Receipt: Digital or printed proof of purchase/return.
- User: Represents the cashier or store administrator.

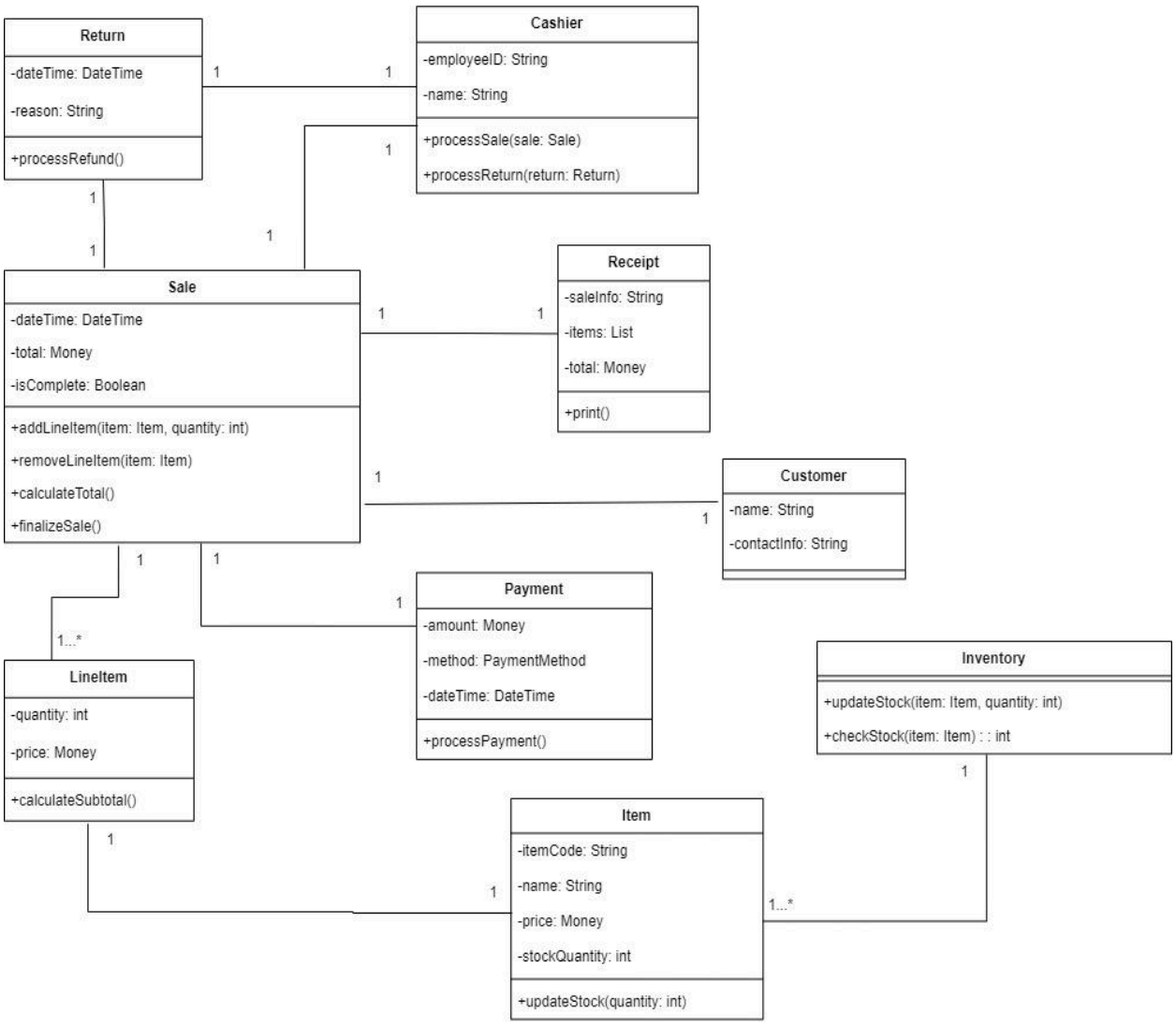
Boundary Objects:
- POS Interface: The cashier's interface for entering sales and returns.
- Barcode Scanner: A tool for inputting the product details into the POS system.
- Payment Terminal: Device used for credit card transactions.
- Receipt Printer: Hardware used to print receipts for sales or returns.
- Login Screen: Interface used by employees to access the system.

Control Objects:
- Sale Controller: Handles the process of scanning items, calculating totals, and managing the sale.
- Payment Controller: Manages the payment process, including cash, credit card, or check.
- Return Controller: Manages the return process, verifies eligibility for returns, and updates inventory.
- Inventory Controller: Coordinates with the Inventory System to update stock levels after a sale or return.
- Catalog Controller: Interacts with the Catalog System to retrieve product details like price and name.
- Security Controller: Handles user authentication, permissions, and logging in.

Develop Sequence Diagrams

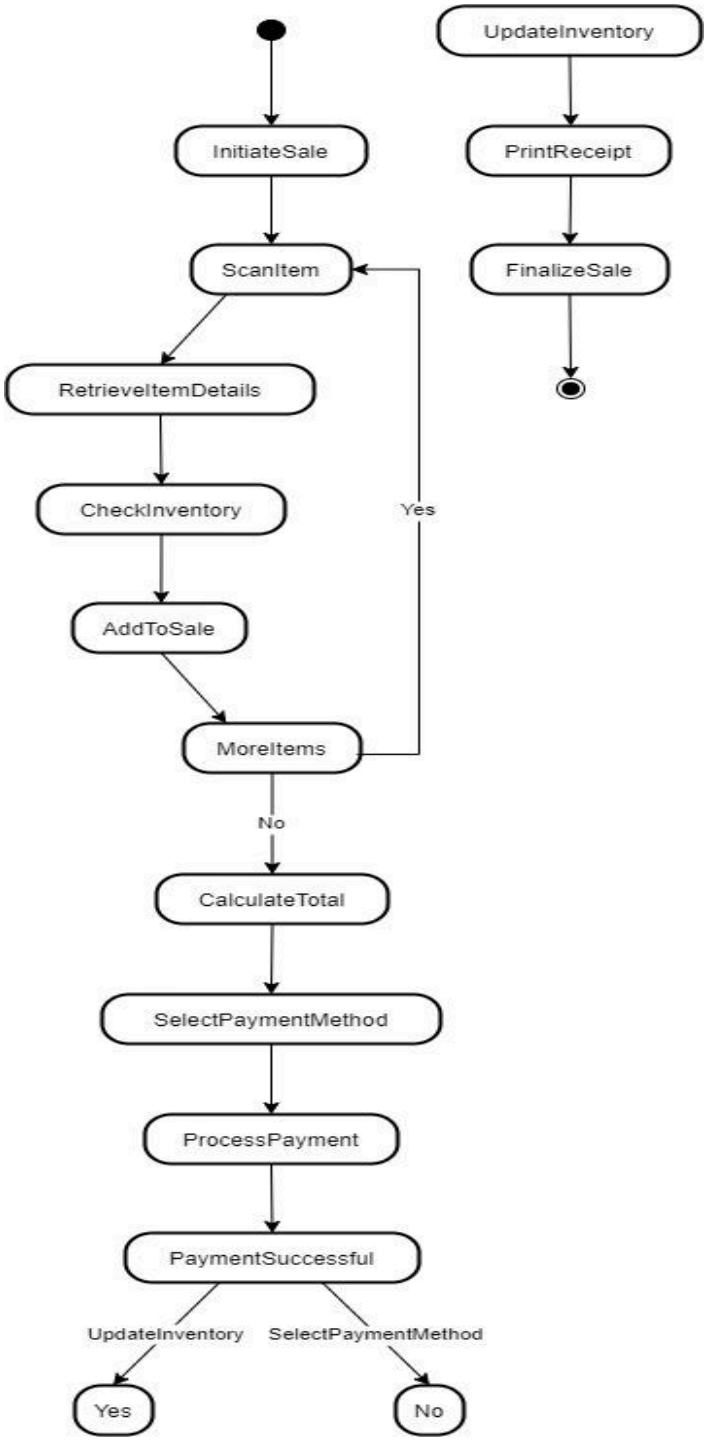
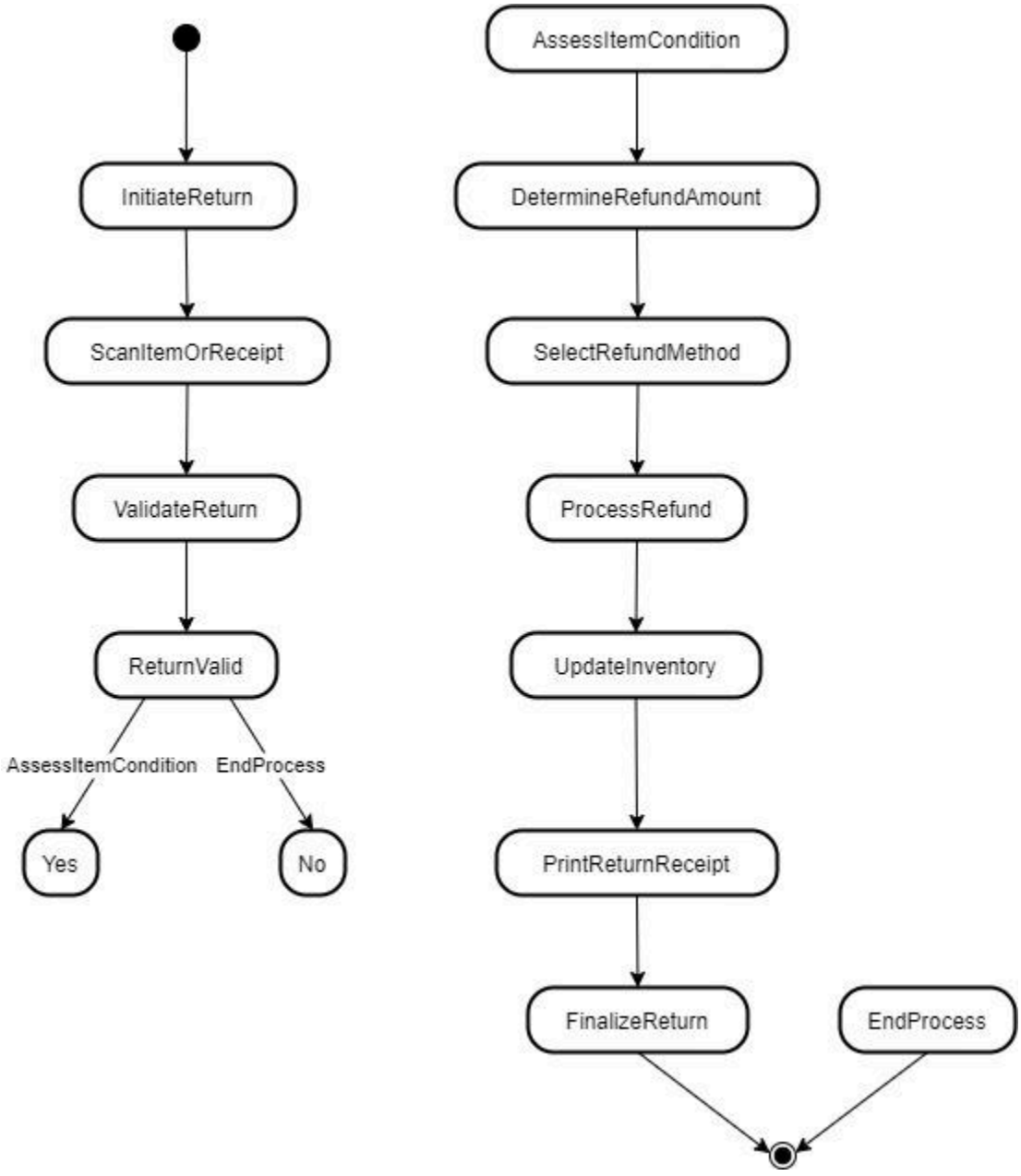


Develop Analysis Domain Models



Develop activity diagram for "Process Sale" and "Handle Return" use cases.

“Process Sale”



“Handle Returns”