IT314 - Software Engineering

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

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Q1. Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

Use Case Name: Process Sale

Description: The Cashier scans purchased items, handles payment, and the system interacts with the inventory. The Catalog system displays item details like name and price on the Cashier's terminal. It communicates with the Inventory system to update stock levels accordingly.

Actors: Cashier, Customer, Inventory System, Payment System

Preconditions:

1. The Customer is ready to make a purchase at the checkout counter.
2. The Cashier initiates a new sale session.

Postconditions:

1. The sale is recorded and saved. A receipt is issued to the Customer.
2. The stock quantities are updated.
3. Payment authorization and transaction records are logged.

Basic Flow:

1. The Customer brings items to the checkout counter. The Cashier initiates a new transaction.
2. The Cashier inputs the item ID into the POS system.
3. The Catalog system fetches item details and updates the sales information, showing the description, price, and running total. This continues until all items are entered.
4. The Inventory system calculates and displays the total price.
5. The Cashier informs the Customer of the total and collects payment. The Catalog system processes the payment.
6. Upon payment, the sale is recorded, and the Inventory system updates stock levels.
7. A receipt is printed, and the Customer leaves with the receipt and purchased items.

Extensions:

1. If multiple quantities of an item are purchased, the cashier enters the quantity, and a subtotal is displayed.
2. If an invalid item identifier is entered, the system shows an error.
3. If applicable, the Catalog system processes gift coupons.
4. If the Customer lacks sufficient funds, the transaction is voided.
5. If stock falls below a certain threshold, a reorder request is generated automatically.

Use Case Name: Handle Return

Description: The "Handle Return" process manages product returns by verifying the purchase, updating inventory, and issuing a refund or store credit. The system ensures the return meets policy requirements, logs the transaction, and generates a return receipt.

Actors: Cashier, Customer, Inventory System, Payment System

Preconditions:

1. The Customer must provide a receipt or proof of purchase.
2. The POS system must be functional, and the Cashier must be logged in.

Postconditions:

1. The returned item is restocked in the inventory.
2. The Customer receives a refund or store credit.
3. The return transaction is logged in the system.

Basic Flow:

1. The Customer presents the item and proof of purchase to the Cashier for return.
2. The Cashier logs into the POS system and selects the "Return" option.
3. The Cashier scans the item or manually enters its details, retrieving information from the Catalog system.
4. The system checks the return policy to confirm eligibility (e.g., time frame, item condition).
5. Once verified, the Inventory system updates stock levels by adding the returned item back into inventory.

6. The system calculates the refund based on the original purchase price.
7. The Cashier selects the refund method (cash, credit, or store credit), and the system processes the refund through the Payment system.
8. A return receipt is generated and provided to the Customer.
9. The return transaction is recorded, completing the process.

Extensions:

1. **Invalid Receipt**: If the receipt is missing or invalid, the return is denied.
2. **Return Policy Violation**: If the item doesn't meet the return policy, the return is canceled.
3. **Payment System Failure**: If the payment system fails, the return is paused until resolved.

Q2 . Identify Entity/Boundary/Control Objects.

Process Sale

Entity Objects:

1. **Item**: Represents each product in the catalog, including its name, price, and identifier.
2. **Sale**: Stores the details of the transaction, including purchased items, quantities, total price, and date.
3. **Receipt**: Holds the information to be printed for the customer, including the list of purchased items and the total cost.
4. **Stock**: Tracks the inventory level of each item.

Boundary Objects:

1. **POS Terminal**: Interface where the Cashier enters item details and processes the sale.
2. **Catalog System**: Displays item details, price, and total cost on the POS system.
3. **Receipt Printer**: Prints the receipt after the sale is completed.

Control Objects:

1. **Sale Controller**: Manages the overall sale process, handling item entry, payment, and sale finalization.
2. **Payment Processor**: Handles payment authorization and processing.
3. **Inventory Controller**: Updates stock levels after the sale is completed.

Handle Return

Entity Objects:

1. **Item**: Represents the returned product, including its price and identifier.
2. **Return Transaction**: Stores details of the return, such as item, refund amount, and return date.
3. **Receipt**: Represents the original proof of purchase, which is used to process the return.
4. **Stock**: Tracks the inventory update after the return.

Boundary Objects:

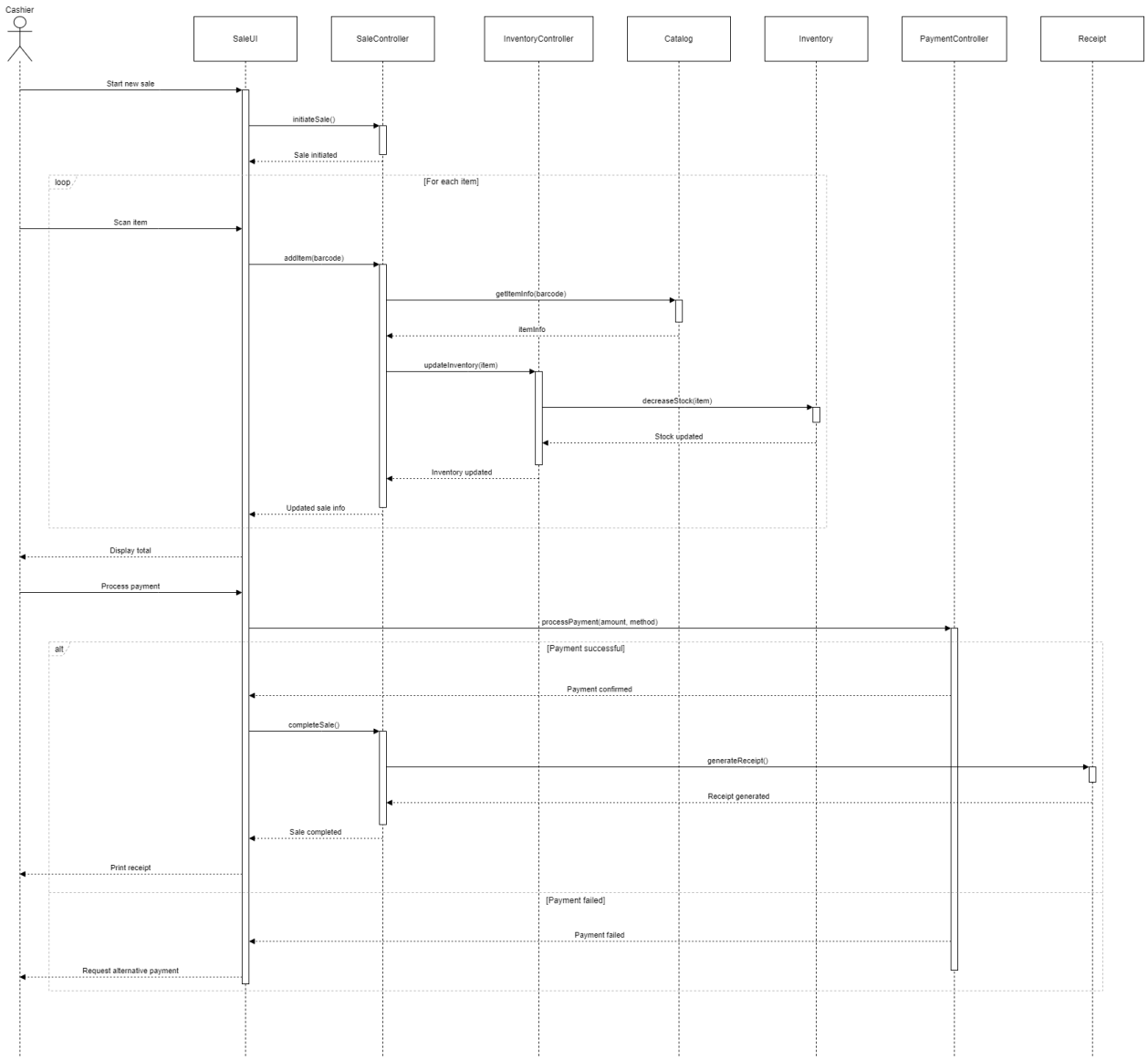
1. **POS Terminal**: Interface where the Cashier processes the return and interacts with the system.
2. **Catalog System**: Displays the returned item's details and verifies return policy.
3. **Receipt Printer**: Prints a receipt for the completed return.

Control Objects:

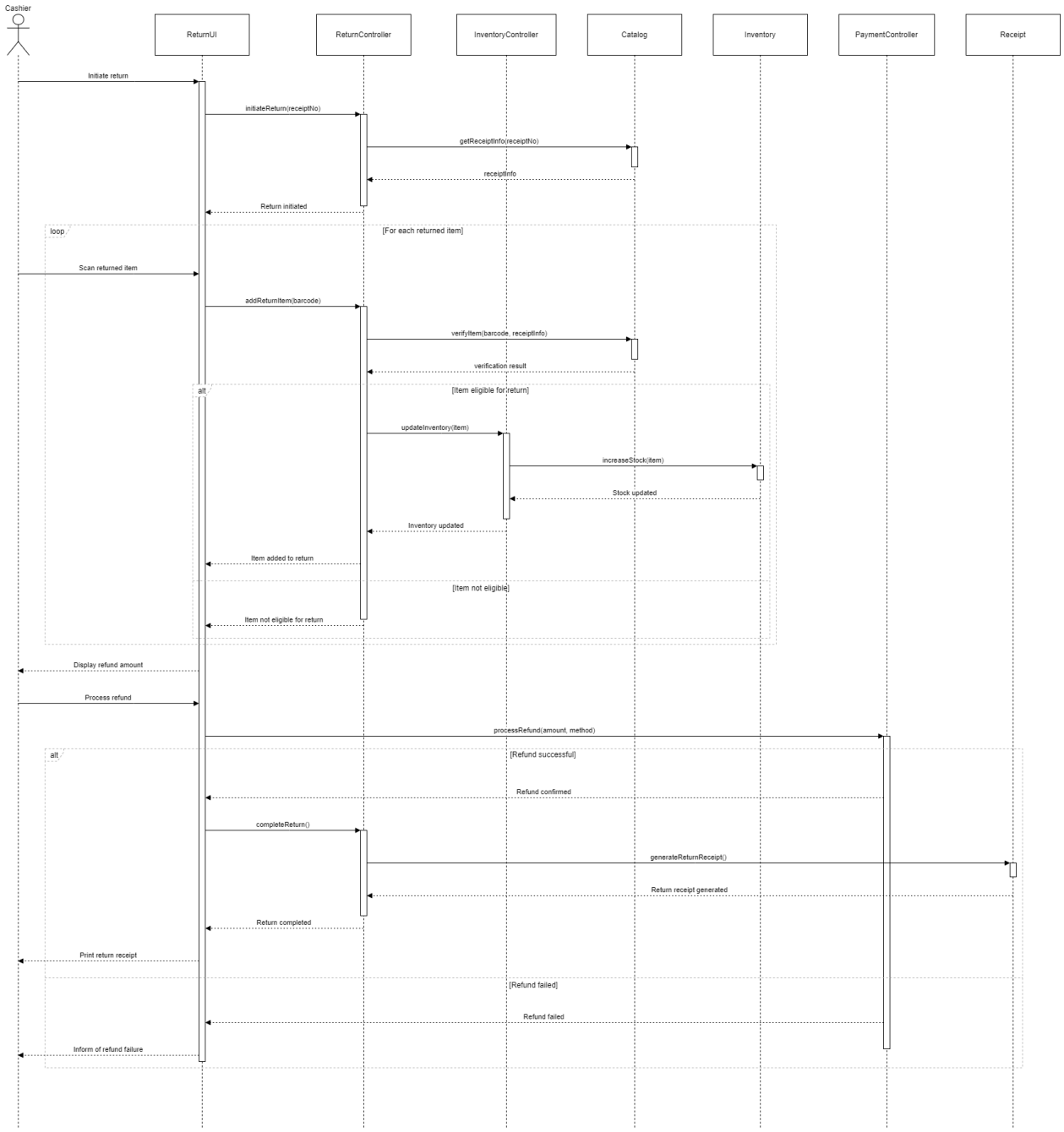
1. **Return Controller**: Oversees the entire return process, including verifying the item, refund calculation, and stock update.
2. **Payment Processor**: Handles the refund transaction.
3. **Inventory Controller**: Updates stock levels when the item is returned.

Q3. Develop Sequence Diagrams.

Process Sale :

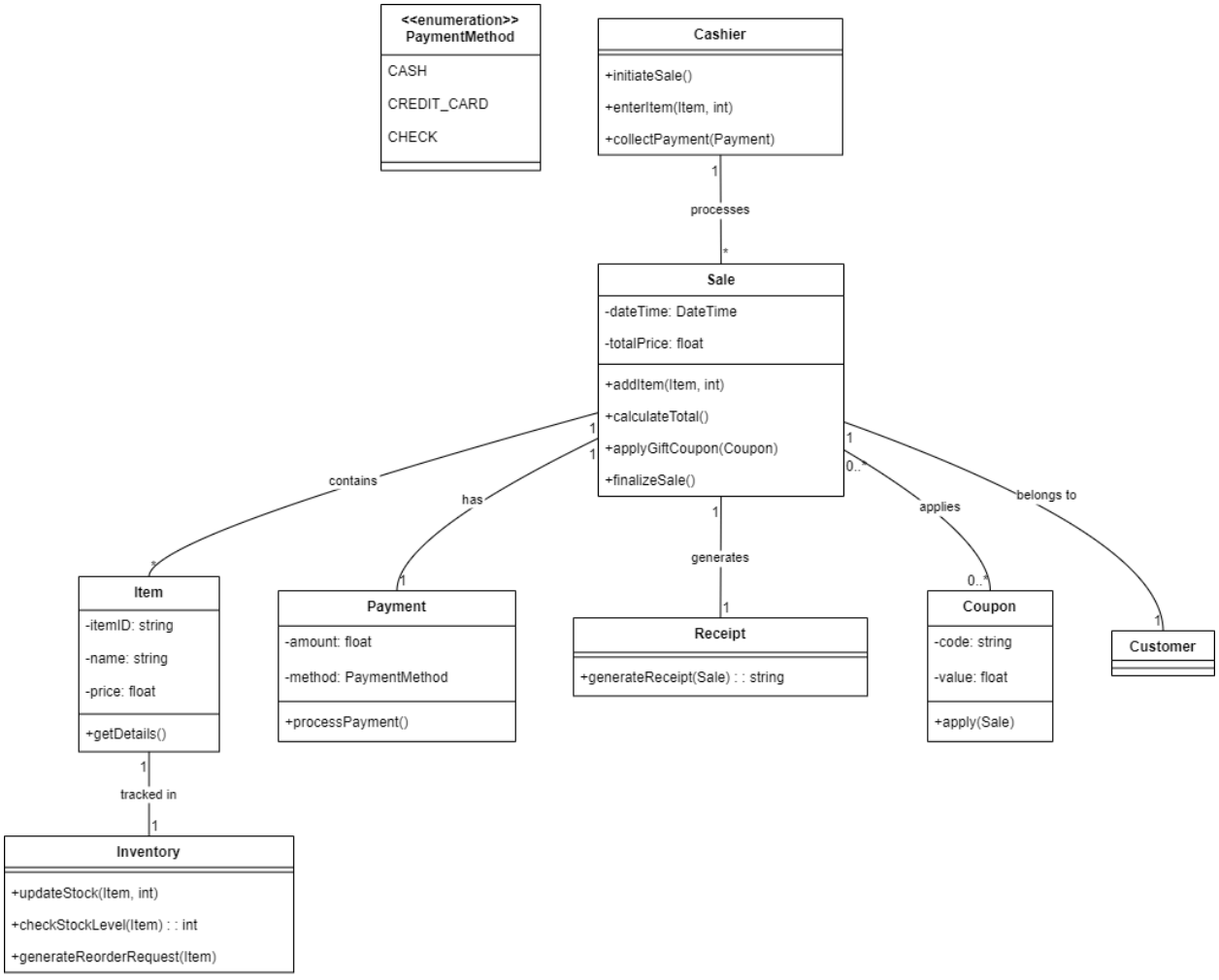


Handle Return:

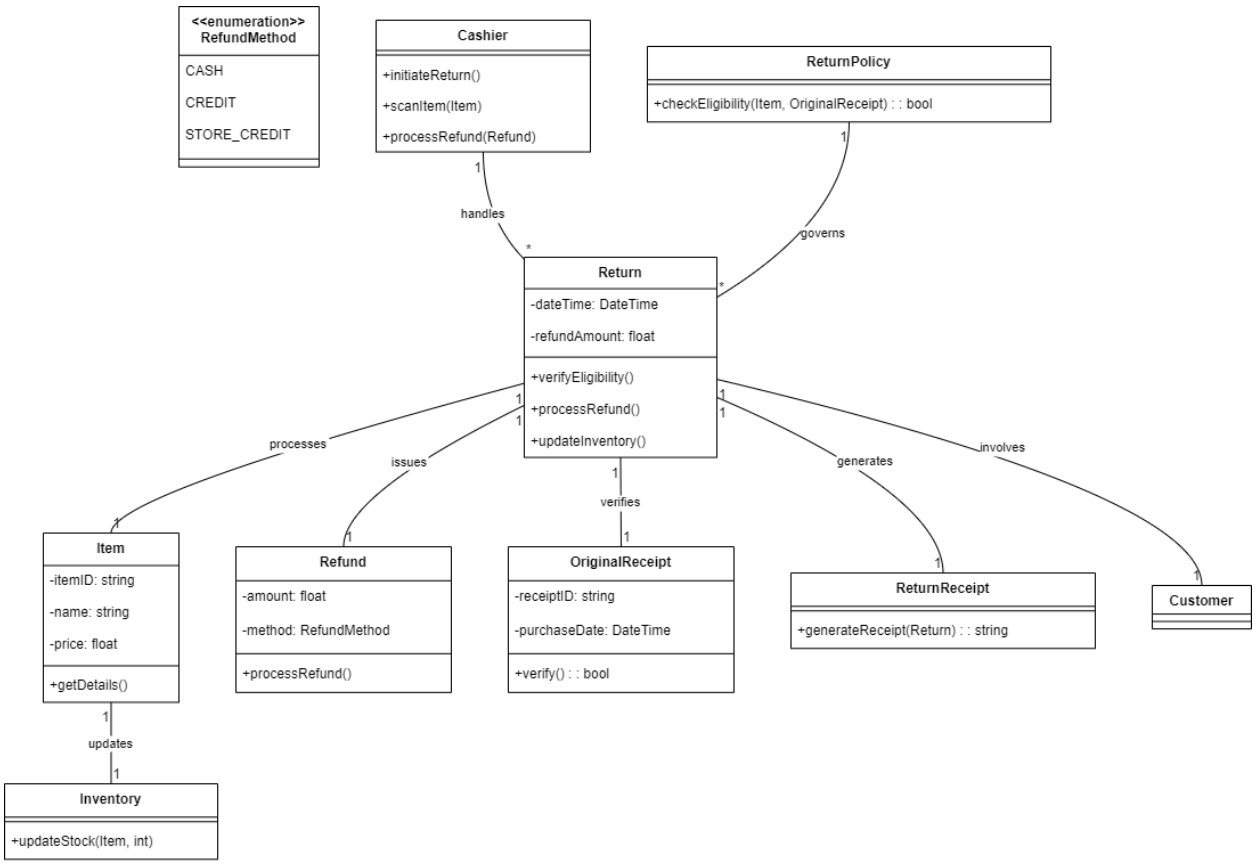


Q4. Develop Analysis Domain Models.

Process Sale:

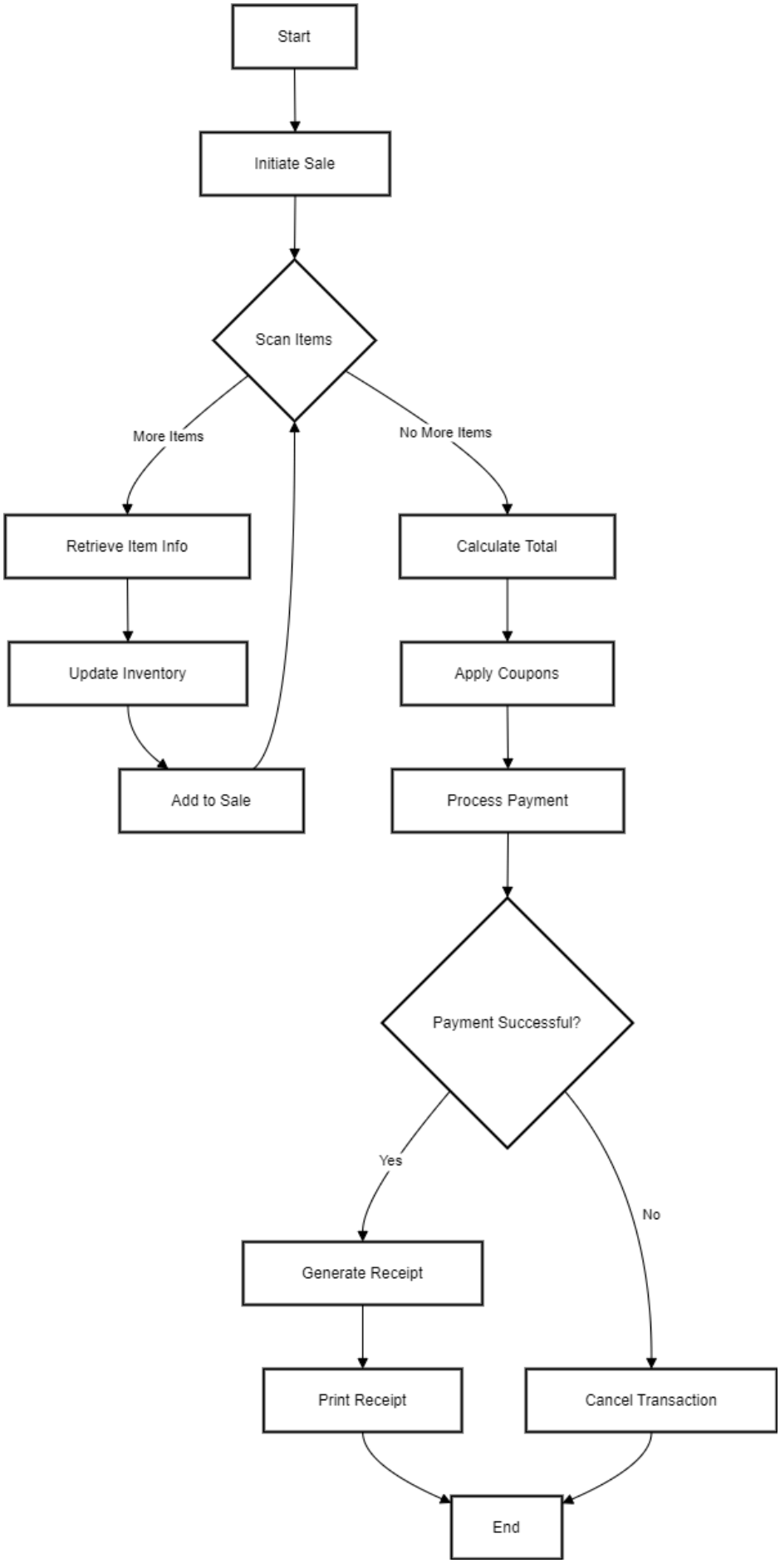


Handle Return:



Q5. Develop activity diagram for "Process Sale" and "Handle Return" use cases.

Process Sale:


Start
Initiate Sale
Scan Items
More Items
No More Items
Retrieve Item Info
Update Inventory
Add to Sale
Calculate Total
Apply Coupons
Process Payment
Payment Successful?
Yes
No
Generate Receipt
Print Receipt
Cancel Transaction
End

Handle Return: