Lab-6: Class Modeling

Software Engineering

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24th September, 2024

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

Process Sale:

Actors: Inventory System, Payment Gateway, Cashier, Catalog System.

Preconditions: The cashier must be logged into the system. The inventory and catalog system are connected to the POS.

Main Flow:

1. The cashier initiates a new transaction.
2. The cashier scans the barcode of the item.
3. The system fetches the product name and price from the database.
4. The inventory count for the item is updated.
5. The cashier completes the transaction and chooses the payment method.
6. The payment is processed using cash, card, or check.
7. A receipt is printed for the customer.
8. If the customer has a coupon, the system applies the discount before processing the payment.

Alternatives:

- If the payment is unsuccessful, prompt the cashier to either retry the transaction or cancel it.
- If an invalid barcode is scanned, prompt the cashier to scan the item again.

Postconditions: The transaction is finalized, payment has been successfully processed, inventory is updated, and a receipt has been printed.

Handle Return:

Actors: Cashier, Inventory System

Preconditions: The cashier is logged into the system. The item being returned must have a valid receipt or sale record.

Main Flow:

1. The cashier begins the return process.
2. The cashier scans or inputs the product details from the receipt.
3. The system verifies the product and its price against the sale record.
4. The inventory stock is updated to reflect the returned item.
5. The system processes the refund according to the original payment method.
6. A return receipt is printed for the customer.

Alternatives:

- If the product cannot be found in the sale record, prompt the cashier to verify the receipt.
- If the refund amount exceeds a specified limit, escalate the situation to an administrator for approval.

Postconditions: The return is processed, inventory is updated, and a refund is issued.

2. Identify Entity/Boundary Control Objects.

Process Sale

Entity Objects:

1. **Product**: Represents each individual product in the inventory, containing its name, price, and unique identifier.
2. **Transaction**: Maintains details of the sale, such as items purchased, their quantities, the total amount, and the transaction date.
3. **Customer Receipt**: Contains information provided to the customer, including a list of purchased items and the total payment.
4. **Inventory**: Monitors the available quantity of each product.

Boundary Objects:

1. **Point of Sale (POS) Interface**: The platform through which the Cashier inputs item information and processes the sale.
2. **Product Database**: Displays product information such as prices and total amounts on the POS interface.
3. **Receipt Printer**: Prints out the customer receipt once the transaction is completed.

Control Objects:

1. **Transaction Manager**: Oversees the entire transaction process, including item input, payment processing, and finalizing the sale.
2. **Payment Gateway**: Manages payment authorizations and ensures successful transaction completion.
3. **Stock Manager**: Adjusts inventory levels following the completion of the sale.

Handle Return

Entity Objects:

1. **Product**: Represents the item being returned, including its price and product identifier.
2. **Return Transaction**: Captures details of the return, such as the item returned, refund amount, and date of return.
3. **Original Receipt**: Acts as proof of the initial purchase, required for processing the return.
4. **Inventory**: Reflects the updated stock level once the returned item is added back.

Boundary Objects:

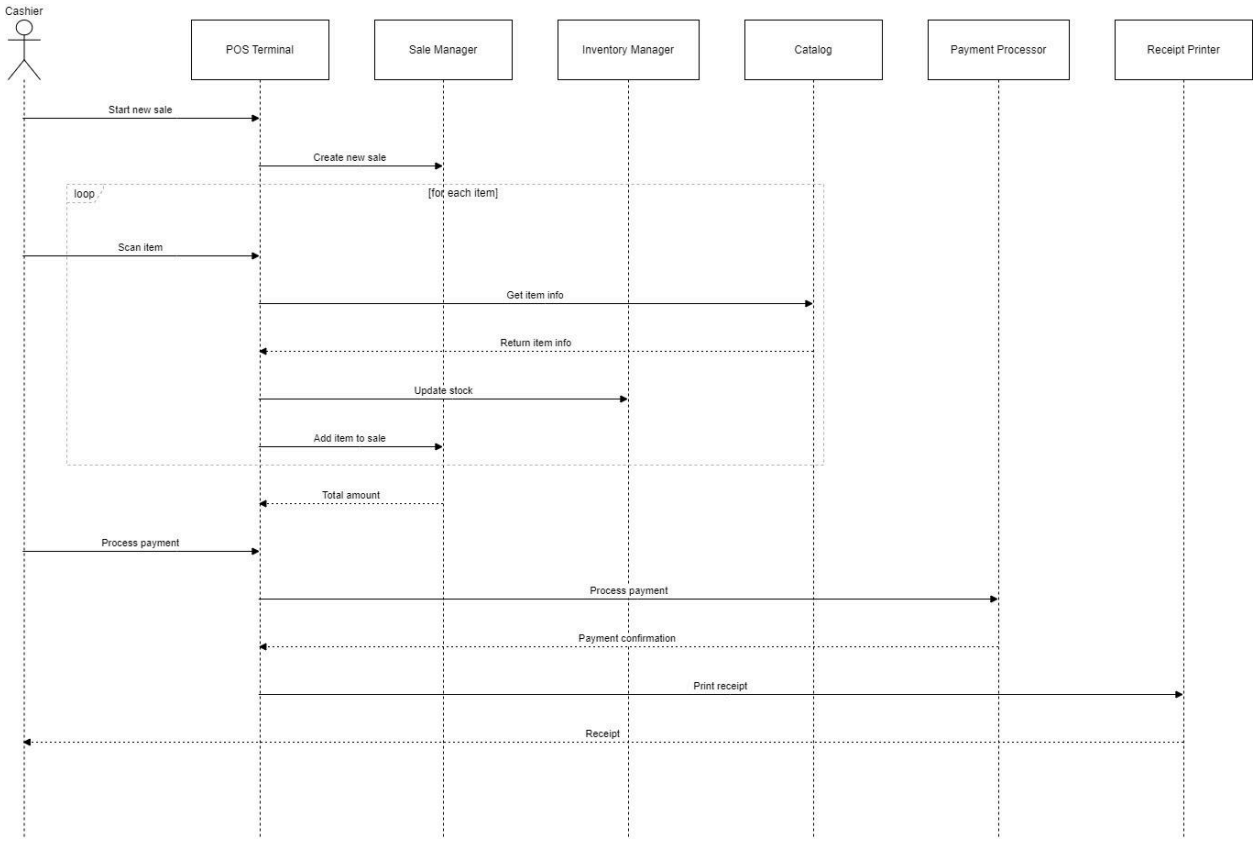
1. **POS Interface**: The system through which the cashier processes returns and interacts with the relevant data.
2. **Product Database**: Displays item information and checks the return policy on the POS system.
3. **Receipt Printer**: Prints the return receipt for the customer once the return is processed.

Control Objects:

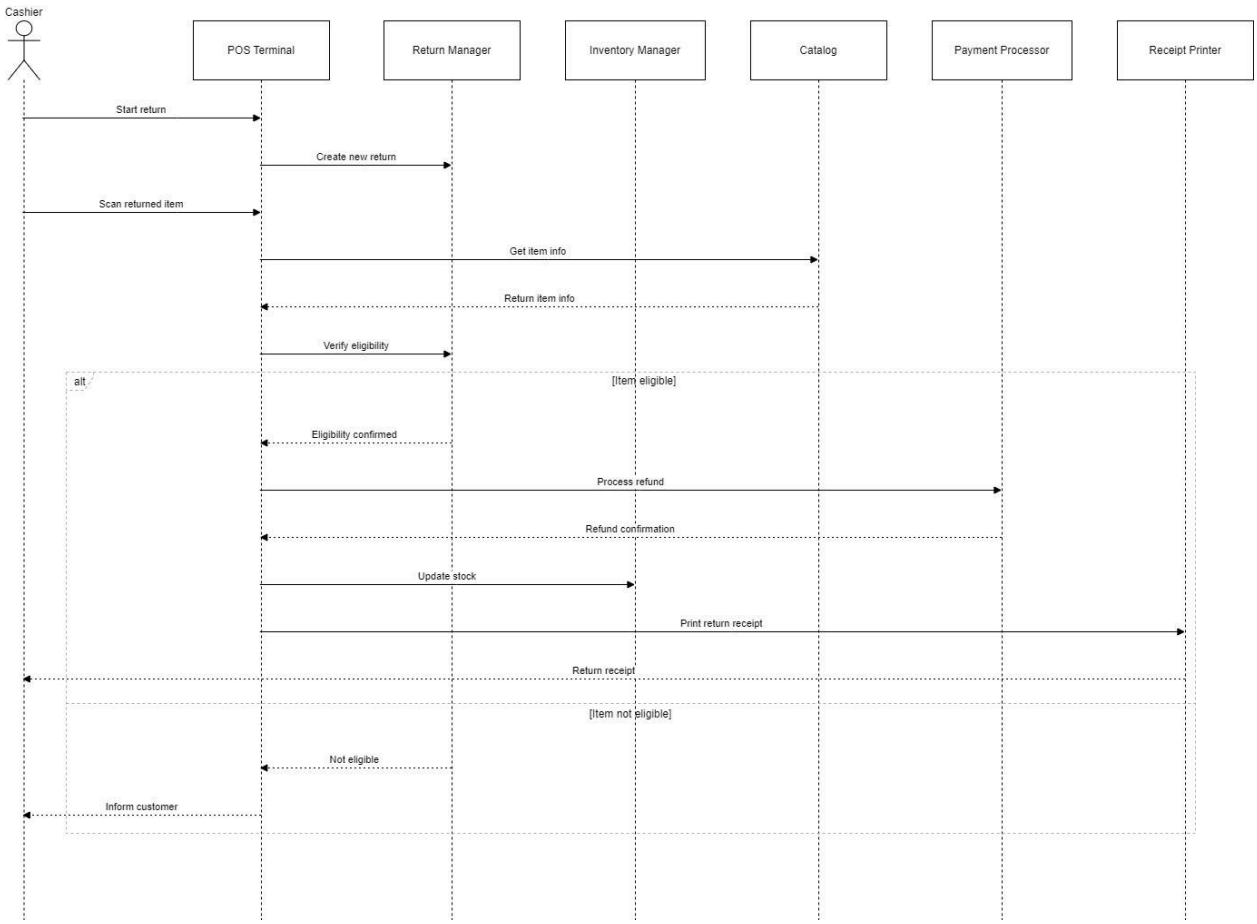
1. **Return Manager**: Oversees the return process, ensuring item verification, refund calculations, and inventory updates are handled correctly.
2. **Refund Processor**: Manages refund transactions and payment reversals.
3. **Stock Manager**: Adjusts inventory levels when the returned item is restocked.

3. Develop Sequence Diagrams

Process Sale:

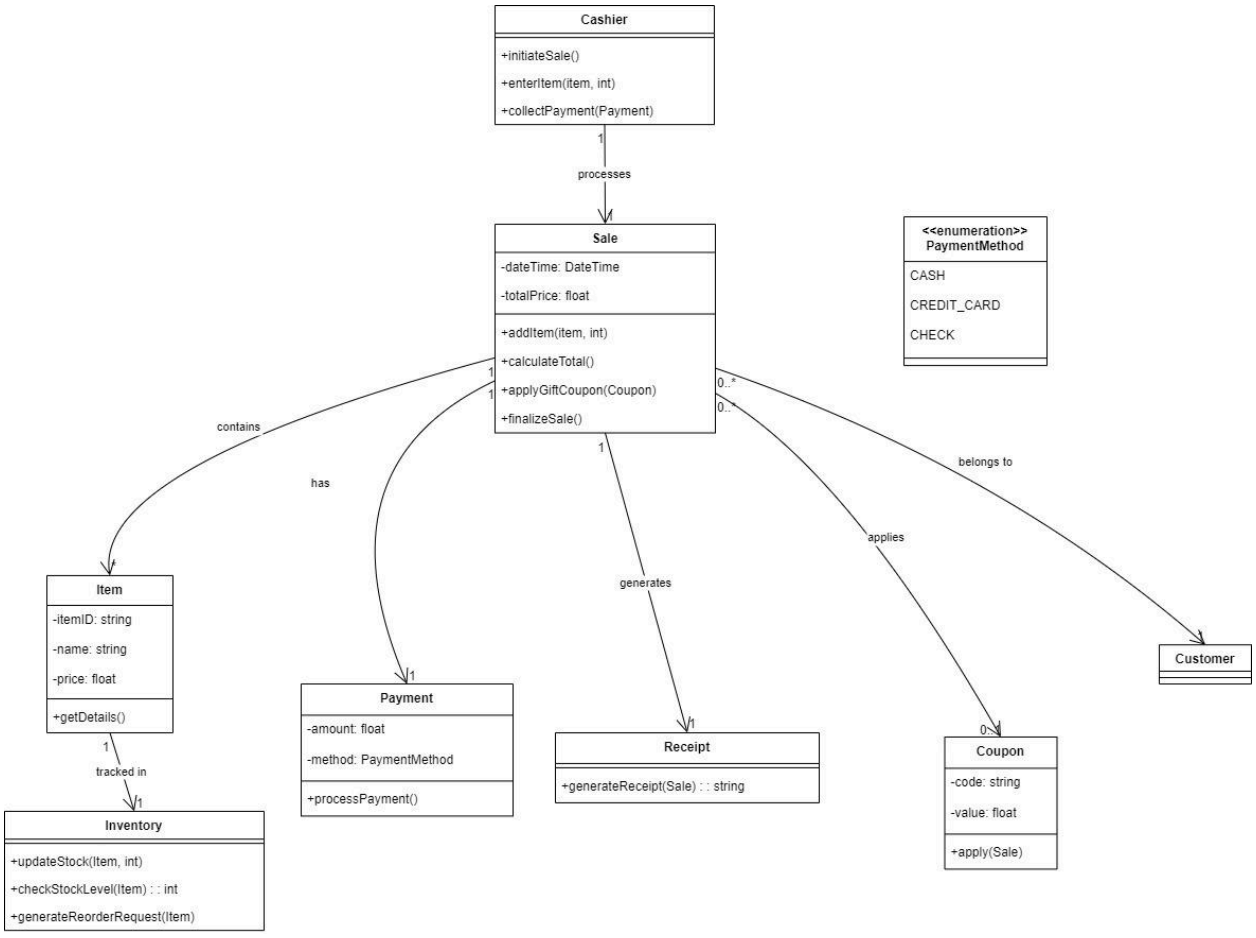


Handle Return:

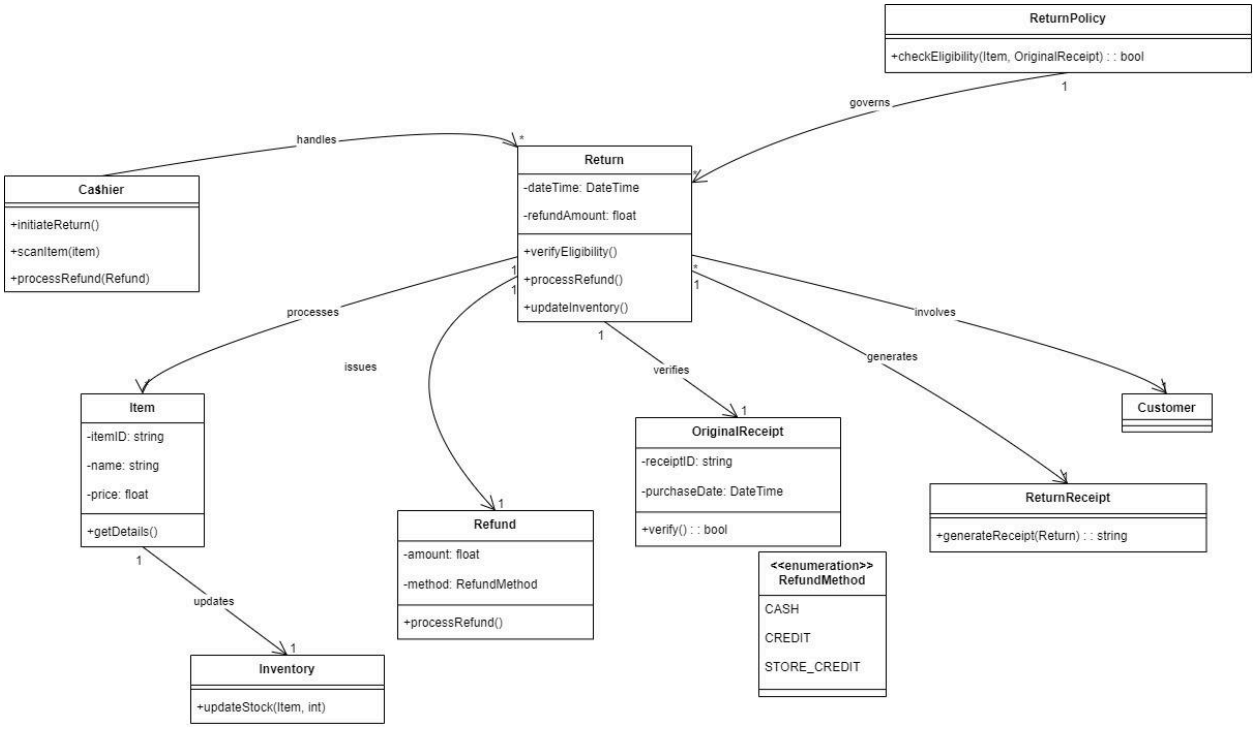


4. Develop Analysis Domain Models

Process Sale:

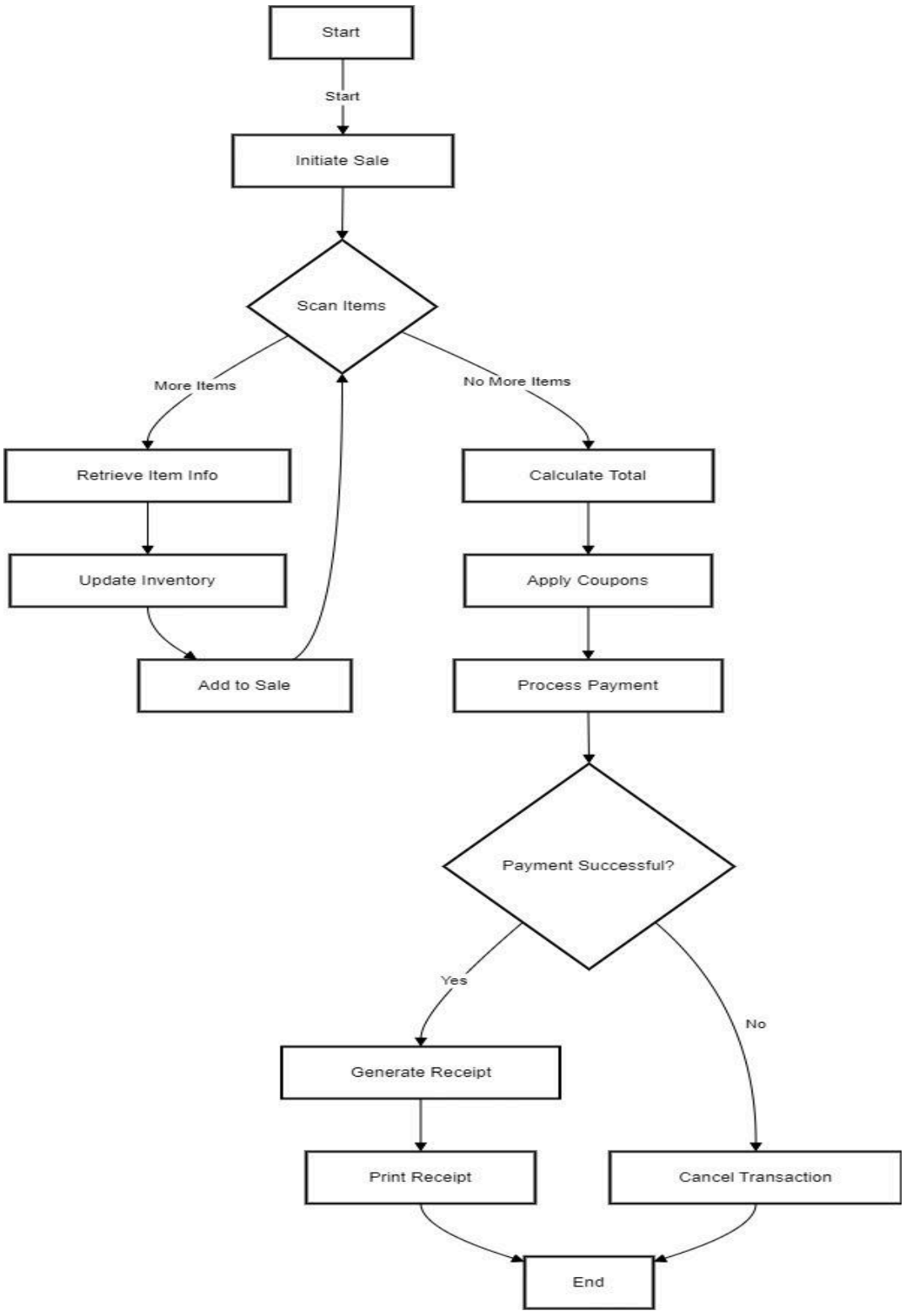


Handle Return:



5. Develop Activity Diagram for “Process Sale” and “Handle Return” use cases.

Process Sale:


Start
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: