

# Lab - 06

## **Modeling Class Diagram and Activity Diagram (Point of Sale System)**

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Ramya Shah

202201409



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

### **a) Process Sale:**

**Use case:** Process sale

**Primary Actor:** Cashier


**Goal:** To complete a sales transaction for a customer

#### **Preconditions:**

- The cashier is logged into the system.
- The customer has selected items to purchase and is ready to pay.

#### **Description:**

1. The cashier scans the barcode of each item the customer wishes to purchase.
2. The POS system retrieves the item's name and price from the backend catalog system and updates the sale transaction.
3. The POS system interacts with the inventory system to deduct the stock amount of each item.
4. The cashier applies any applicable gift coupons or promotions to the sale transaction.
5. The cashier calculates the total amount due and presents it to the customer.

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6. The customer pays for the sale transaction using cash, credit card, or check.
  7. The POS system processes the payment and updates the sale transaction status.
  8. Once the payment is successful, the POS system prints a receipt for the customer.

### **Postconditions:**

1. The sale transaction is complete and recorded in the POS system.
2. The customer has received a receipt for the purchase.
3. The inventory system has been updated to reflect the sale.

### **Extensions:**

#### **3a. Invalid Barcode:**

- The system cannot retrieve the item details.
- The cashier manually enters the item code or uses a different scanning method.
- The system retrieves the item's name and price.

#### **5a. Invalid Coupon:**

- The system rejects the coupon due to expiration or incorrect application.
- The cashier informs the customer and asks if they wish to continue without applying the coupon.



### **5b. Multiple Coupons:**

- The customer presents multiple gift coupons or promotions.
- The cashier applies all valid coupons, and the system calculates the discounted total.

### **5c. Price Override:**

- The cashier notices a price discrepancy or a special offer is available.
- The cashier overrides the item's price after manager approval.
- The system logs the override and updates the total.

### **6a. Insufficient Funds:**

- The customer attempts to pay with cash but does not have enough.
- The customer switches to another payment method (credit card or check).

### **6b. Declined Credit Card:**

- The system detects a card payment failure (insufficient balance, technical error).
- The cashier asks the customer to provide an alternative payment method or retry with the same card.



### **6c. Check Payment Error:**

- The system cannot validate the check or detects an issue.
- The cashier requests another form of payment or manually processes the check based on store policy.

### **7a. Payment Failure:**

- The system experiences a technical error when processing the payment.
- The cashier retries the payment process.
- If the failure persists, the cashier informs the customer and logs the issue for follow-up.

### **8a. Receipt Reprint:**

- The customer requests a reprint of the receipt.
- The cashier accesses the sale transaction history and prints a duplicate receipt.



## **b) Handle Return:**

**Use Case:** Handle Return

**Primary Actor:** Cashier

**Goal:** To process the return of previously purchased items for a customer.

### **Preconditions:**

- The cashier is logged into the POS system.
- The customer has the item to be returned and, if necessary, the original purchase receipt.

### **Description:**

- The cashier starts a return transaction in the POS system.
- The cashier scans the barcode of the item the customer wishes to return.
- The POS system retrieves the original sale transaction details from the system and verifies the item against the sale record.
- The POS system interacts with the inventory system to update the stock for the returned item.
- The cashier reviews the return details and determines if any restocking fees or conditions apply.
- The cashier processes the return based on the original payment method (cash, credit card, or check).
- The POS system updates the return transaction status.

- Once the return is successfully processed, the POS system prints a receipt for the customer.

### **Postconditions:**

- The return transaction is recorded in the POS system.
- The inventory system is updated to reflect the returned item.
- The customer receives a receipt for the return.

### **Extensions (Alternative Flows):**

#### **2a. No Barcode / Missing Receipt:**

- The customer does not have the barcode or receipt.
- The cashier manually searches for the original transaction using the customer's purchase details (e.g., date, payment method).
- The system retrieves the sale record for the cashier to continue the return.

#### **3a. Return Period Exceeded:**

- The system flags that the item is outside the allowable return period.
- The cashier informs the customer that the return cannot be processed due to store policy.

#### **3b. Item Not Found in Original Transaction:**

- The system cannot find the item in the original sale record.
- The cashier informs the customer and checks if the item was purchased through another store or transaction.



#### **4a. Damaged Item:**

- The system detects that the item being returned is damaged.
- The cashier follows store policy, either rejecting the return or issuing a partial refund/store credit based on the condition.

#### **6a. Refund Process Error (Cash):**

- The customer is owed a refund in cash, but the cashier does not have enough change.
- The cashier informs the customer and offers an alternative solution, such as issuing a store credit or asking the customer to wait.

#### **6b. Refund Process Error (Credit Card):**

- The system encounters an issue refunding to the customer's credit card.
- The cashier retries the process. If the issue persists, the cashier offers a manual override or another refund option.

#### **6c. Refund Process Error (Check):**

- The customer paid with a check, but the system cannot validate the check for refund.
- The cashier manually processes the return according to store policy, possibly issuing store credit instead.





### **7a. Return Refusal:**

- The system rejects the return based on store policies (e.g., non-returnable item, too much time passed).
- The cashier informs the customer that the return cannot be processed and offers possible alternatives (e.g., warranty process).

### **8a. Refund Receipt Reprint:**

- The customer requests a reprint of the refund receipt.
- The cashier accesses the return transaction history and prints a duplicate receipt.



## **2) Identify Entity/Boundary Control Objects**

### **1. Entity Objects**

- **Item**
- **Sale Transaction**
- **Return Transaction**
- **Inventory**
- **Payment**
- **Coupon**
- **Customer**

### **2. Boundary Objects**

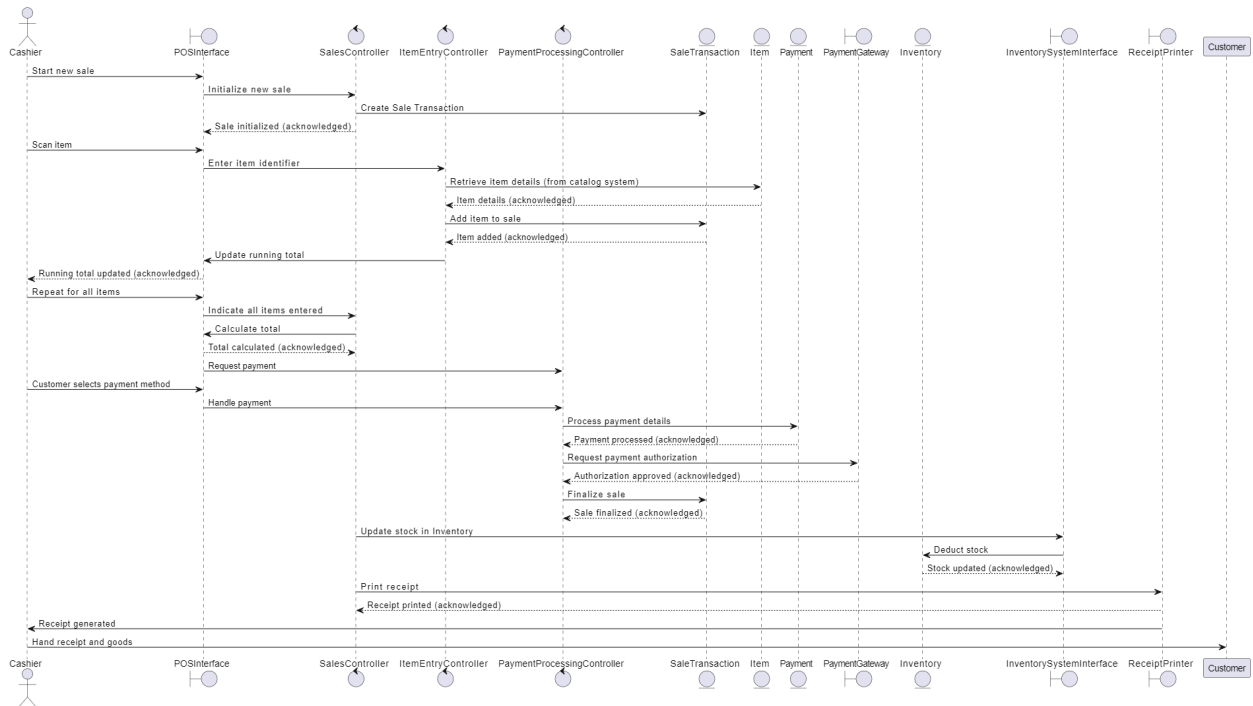
- **POS Interface**
- **Barcode Scanner**
- **Receipt Printer**
- **Payment Terminal**
- **Customer Display**

### **3. Control Objects**

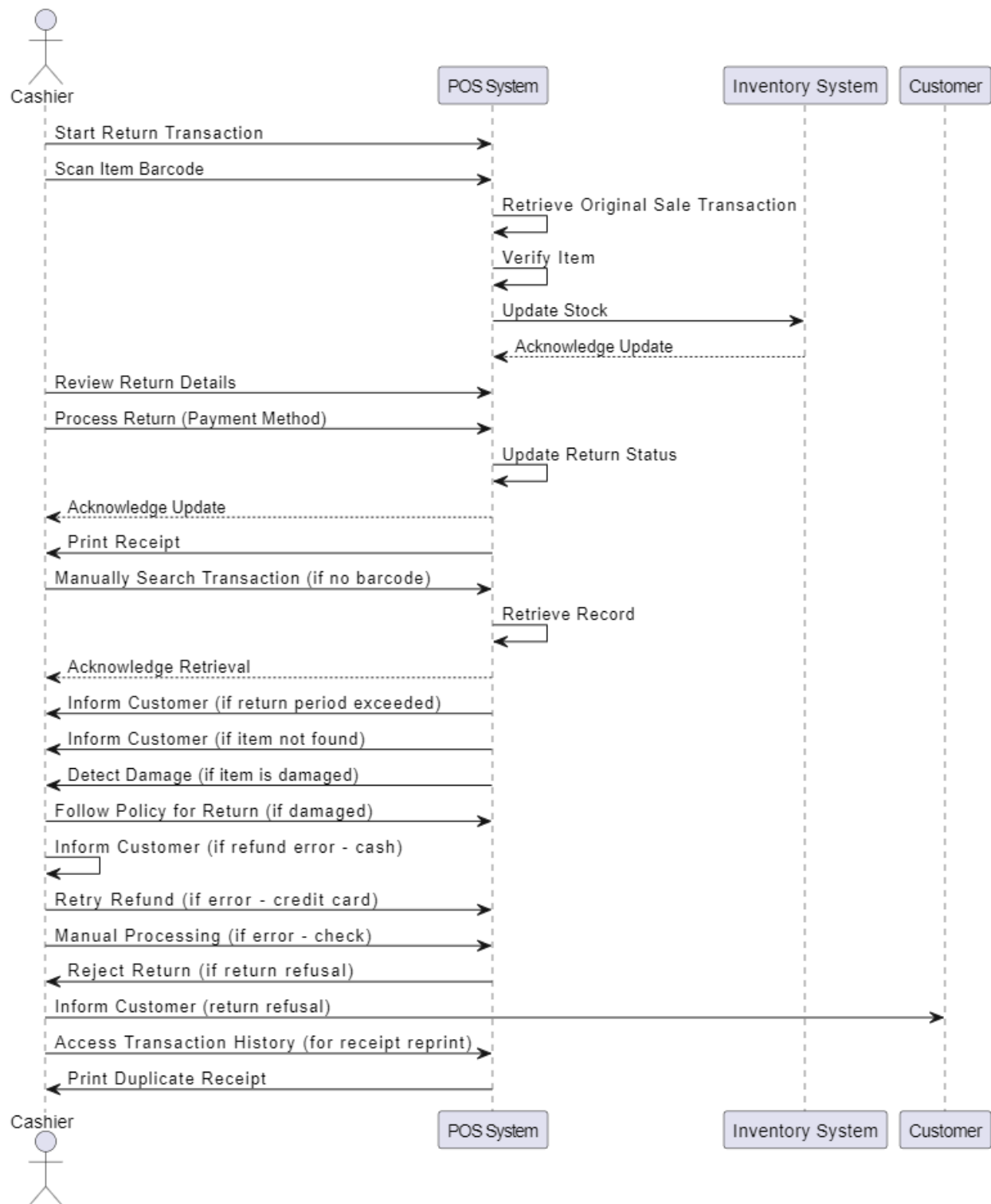
- **SaleController**
- **ReturnController**
- **PaymentController**
- **InventoryController**
- **CouponController**

### 3) Develop Sequence Diagrams

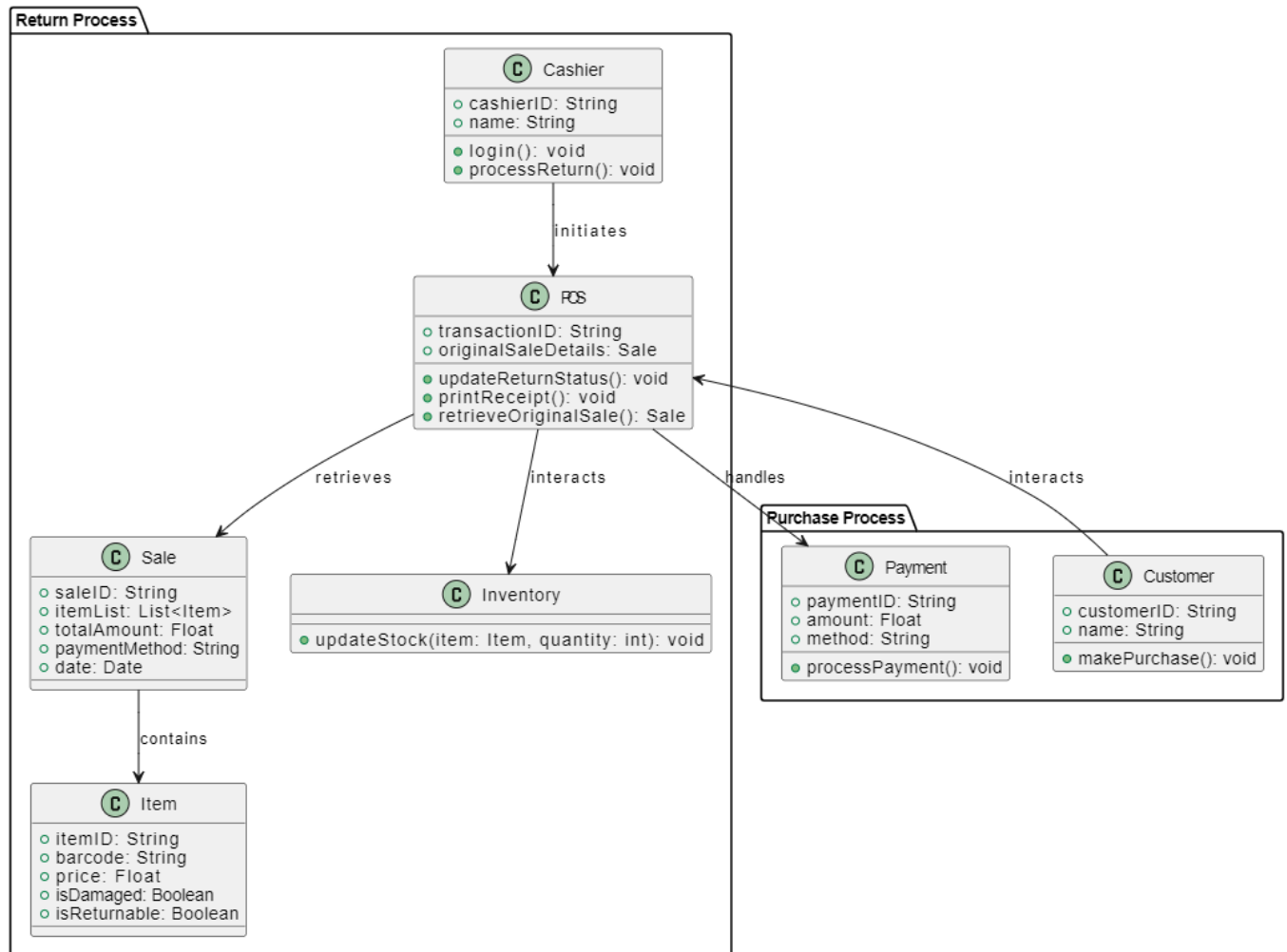
#### a) Process Sale



## b) Handle Return

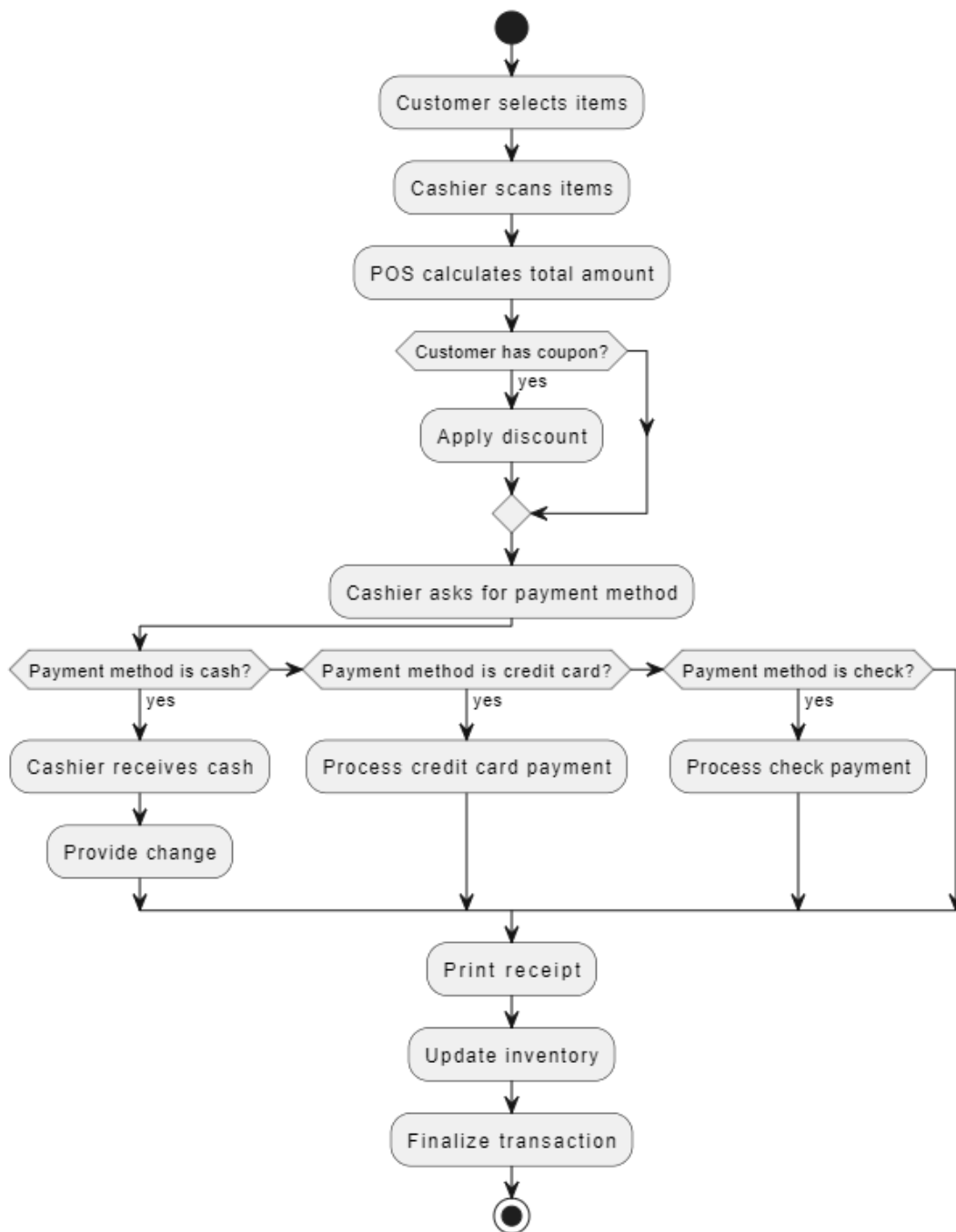


## 4) Develop Analysis Domain Models



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

### a) Process Sale



## b) Handle Return

