IT-314 | LAB - 6

Name: Chirag Chaudhari
StudentID: 202201219

Lab Session: Modeling Class Diagram and Activity Diagram

(Point of Sale System)

Use Case: Process Sale

Actor: Cashier

Preconditions:

1. The cashier is logged into the point-of-sale (POS) system.
2. The POS system is connected to both the catalog and inventory systems.

Main Flow:

1. The cashier initiates a new sales transaction.
2. For each item in the transaction: a. The cashier scans the item's barcode. b. The system retrieves the item's name and price from the product catalog. c. The inventory count is updated accordingly. d. The item is added to the current transaction.
3. The system calculates the total amount for the transaction.
4. If the customer has a gift coupon: a. The cashier applies the coupon to the transaction. b. The system updates the total amount after applying the coupon.
5. The cashier informs the customer of the total amount due.
6. The customer chooses a payment method (cash, credit card, or check).

7. The cashier processes the selected payment method.
8. The system verifies the payment details.
9. A receipt is generated and printed by the system.
10. The system finalizes and closes the transaction.

Alternative Flows:

- **Invalid Coupon Scenario:**
    1. The system alerts the cashier that the coupon is invalid.
    2. The cashier informs the customer about the invalid coupon and continues with the transaction from step 5.
- **Payment Validation Failure:**
    1. The system notifies the cashier of a payment validation failure.
    2. The cashier asks the customer for a different payment method.
    3. If the customer provides an alternative method, return to step 7; if not, cancel the transaction.

Postconditions:

1. The transaction is recorded in the system.
2. Inventory is updated to reflect the sale.
3. The payment is processed successfully.
4. A receipt has been printed

Use Case: Processing a Return

Actor: Cashier

Preconditions:

1. The cashier is logged into the POS system.
2. The customer has a valid receipt for the items they wish to return.

Main Flow:

1. The cashier initiates a new return transaction.
2. The cashier either scans the receipt or manually enters the receipt details.
3. The system retrieves the original transaction information.
4. For each item being returned: a. The cashier scans the item's barcode. b. The system verifies that the item matches the original transaction. c. Inventory levels are updated to reflect the return. d. The system adds the item to the ongoing return transaction.
5. The system calculates the total refund amount.
6. The cashier confirms the return details with the customer.
7. The system processes the refund using the same payment method as the original purchase.
8. A return receipt is generated and printed by the system.
9. The system finalizes and completes the return transaction.

Alternative Flows:

- Receipt Not Found:
    1. The system notifies the cashier that the receipt is invalid or cannot be located.
    2. The cashier informs the customer that the return cannot proceed and terminates the process.
- **Item Verification Fails:**
    1. The system flags the item as not matching the original transaction.
    2. The cashier informs the customer and either proceeds to the next item or stops the return process.
- **Original Payment Method Unavailable:**
    1. The cashier selects an alternative refund option (e.g., store credit or cash).
    2. The system processes the refund using the newly selected method.

Postconditions:

1. The return is recorded in the system.
2. Inventory is updated to reflect the returned item(s).
3. The refund has been processed successfully.
4. A return receipt is printed and provided to the customer.

Identify Entity/Boundary/Control Objects

Entity Objects :

- Item
- Inventory
- Catalog
- Payment
- Receipt
- Coupon
- User (Cashier/Administrator)
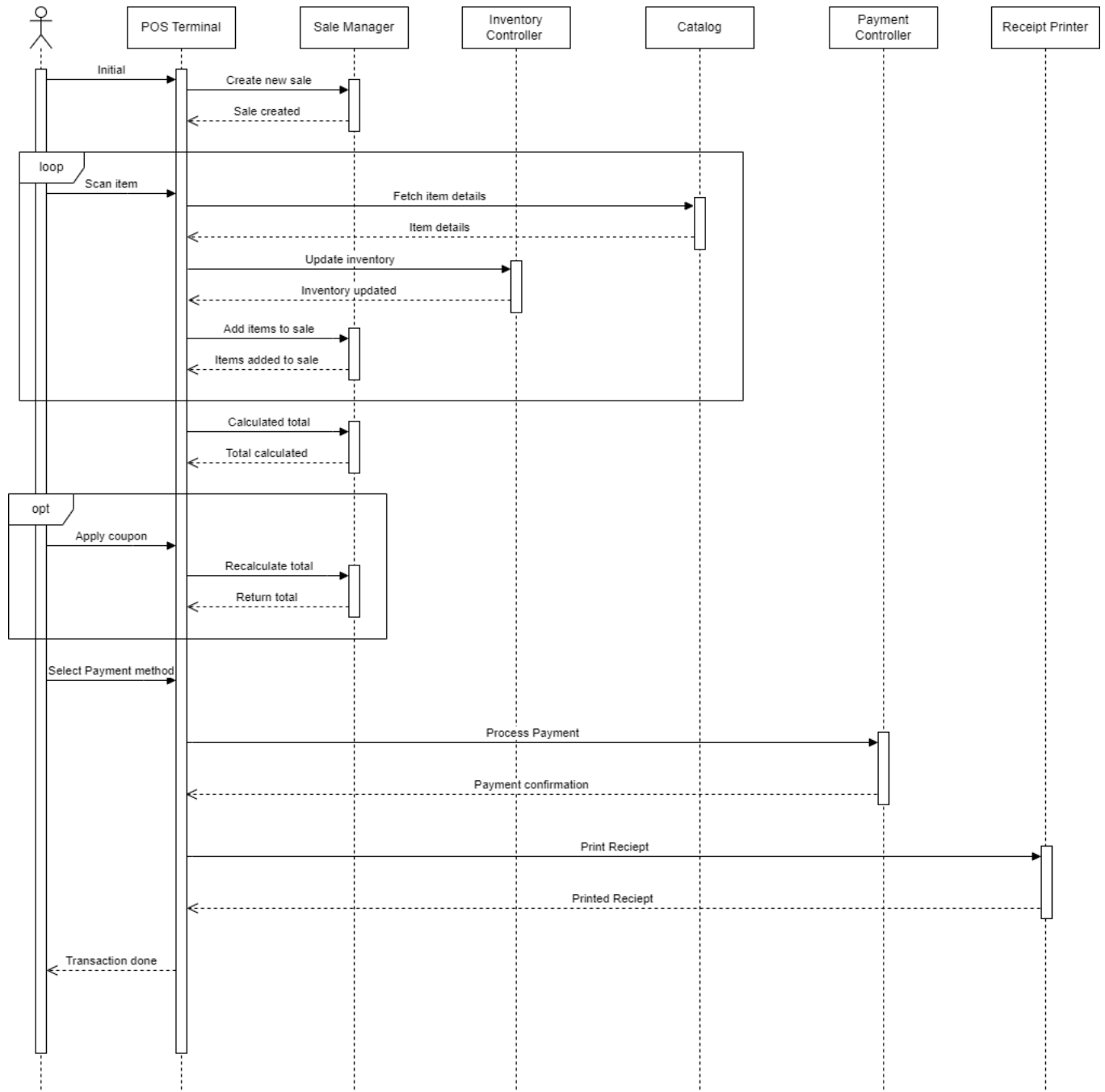- Return

Boundary Objects :

- POSTerminal Interface
- Scanner Interface
- Payment Processing Interface
- Receipt Printer Interface

Control Objects :

- Sale Manager
- Inventory Manager
- Catalog Manager
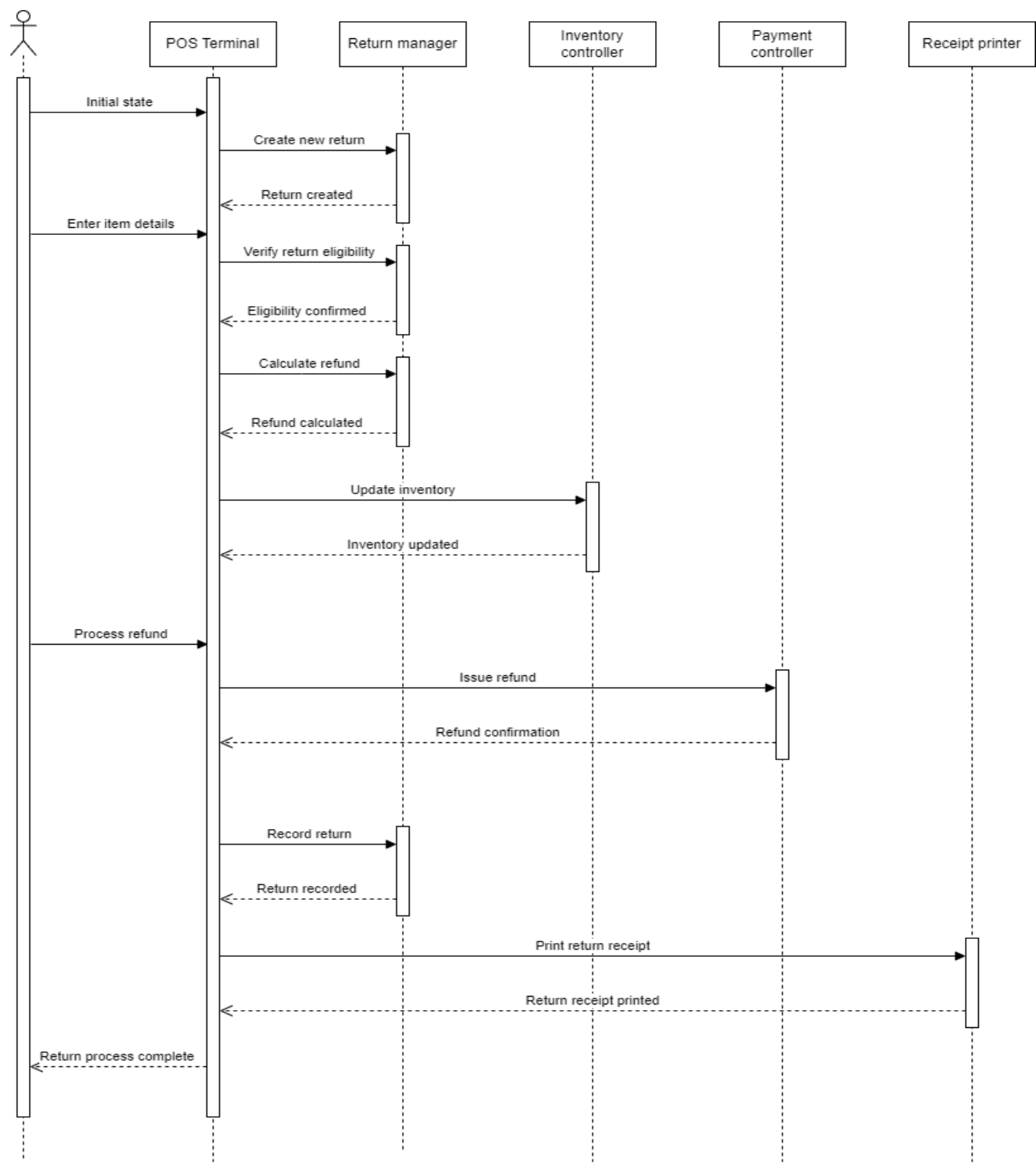- Payment Manager
- User Authentication Manager
- Return Manager
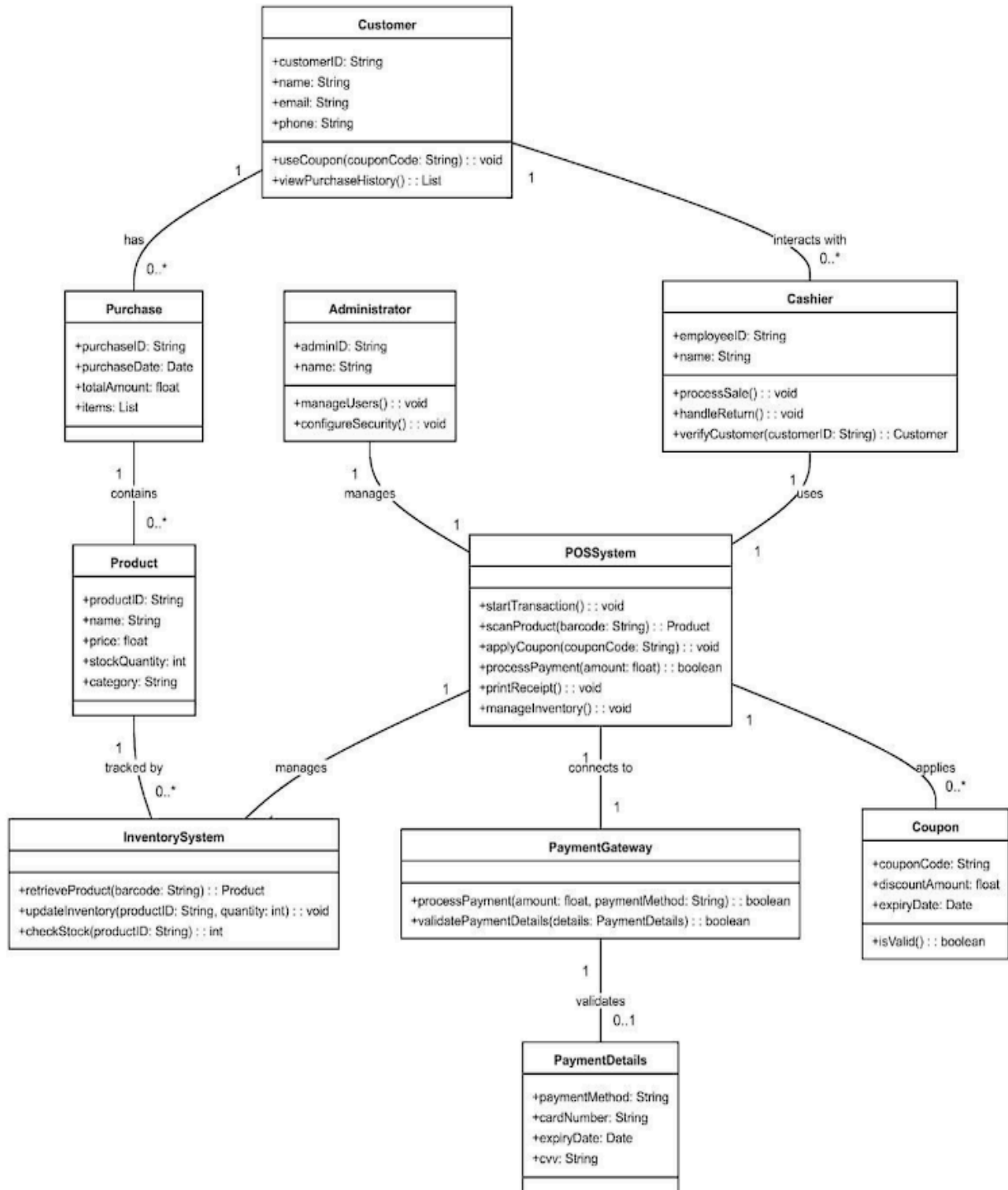
Sequence Diagram:

Process Sale Sequence Diagram
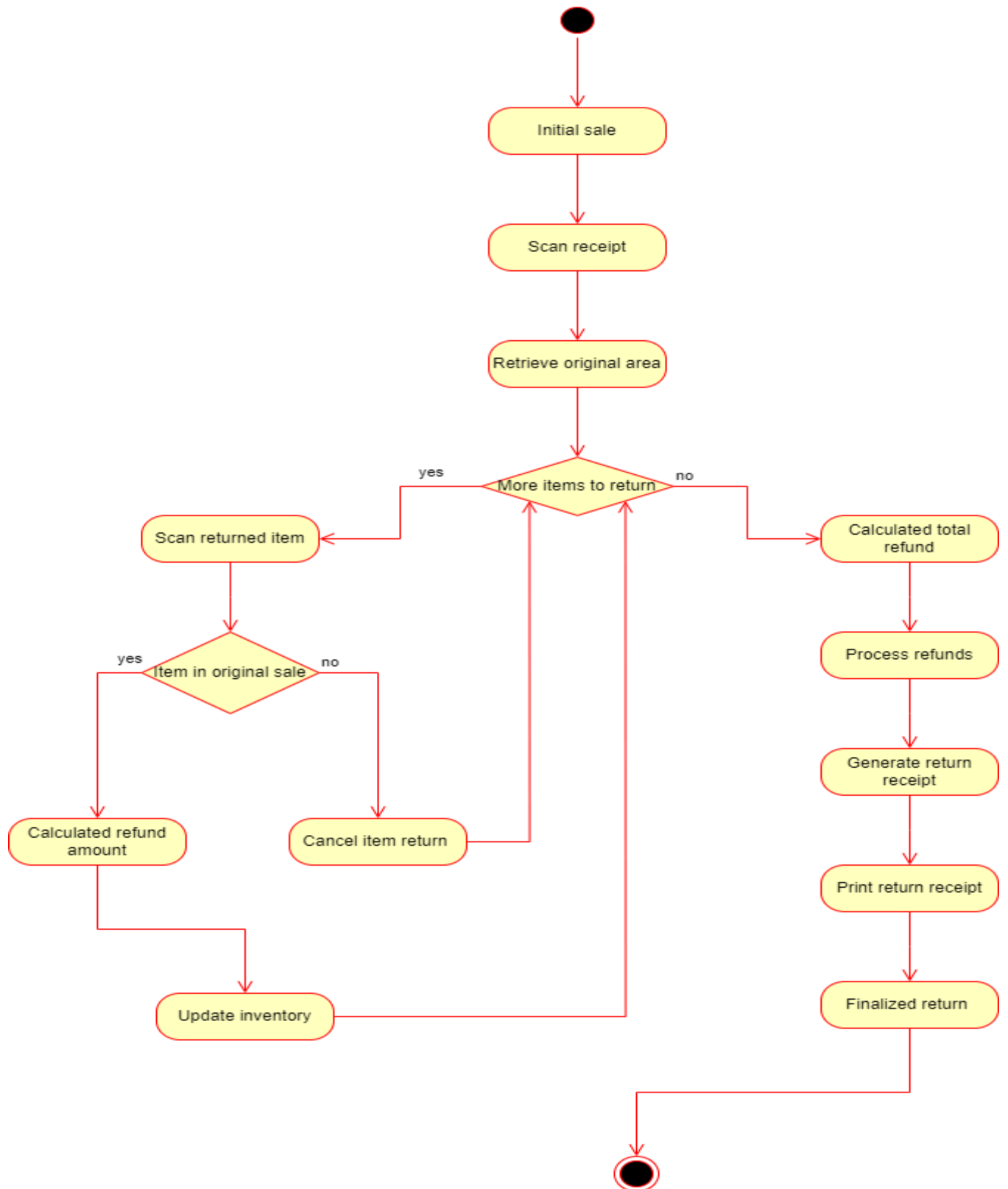
Sequence Diagram:

Handle Return Sequence Diagram

Analysis Domain Model

Customer

+customerID: String
+name: String
+email: String
+phone: String

+useCoupon(couponCode: String) : : void
+viewPurchaseHistory() : : List

Purchase

+purchaseID: String
+purchaseDate: Date
+totalAmount: float
+items: List

Administrator

+adminID: String
+name: String

+manageUsers() : : void
+configureSecurity() : : void

Cashier

+employeeID: String
+name: String

+processSale() : : void
+handleReturn() : : void
+verifyCustomer(customerID: String) : : Customer

Product

+productID: String
+name: String
+price: float
+stockQuantity: int
+category: String

POSSystem

+startTransaction() : : void
+scanProduct(barcode: String) : : Product
+applyCoupon(couponCode: String) : : void
+processPayment(amount: float) : : boolean
+printReceipt() : : void
+manageInventory() : : void

InventorySystem

+retrieveProduct(barcode: String) : : Product
+updateInventory(productID: String, quantity: int) : : void
+checkStock(productID: String) : : int

PaymentGateway

+processPayment(amount: float, paymentMethod: String) : : boolean
+validatePaymentDetails(details: PaymentDetails) : : boolean

Coupon

+couponCode: String
+discountAmount: float
+expiryDate: Date

+isValid() : : boolean

PaymentDetails

+paymentMethod: String
+cardNumber: String
+expiryDate: Date
+cvv: String

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Process Sale Activity Diagram

Handle Return Activity Diagram