IT 314 : Software Engineering

Modeling Class Diagram and Activity Diagram

(Point of Sale System)

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Use Case Descriptions:

1) Process Sales

Actors:

- Cashier

- Customer

Preconditions:

- The customer is at the POS counter with the goods they intend to purchase.

- The POS system is online and connected to the backend systems (catalogue, inventory, and payment gateway).

Basic Flow:

1. The cashier starts a new sales transaction in the POS system.

2. The cashier scans each good using the barcode scanner.

3. The POS system retrieves the product details from the catalogue system.

4. The POS system interacts with the inventory system and deducts the stock amount for each scanned good.

5. If the customer presents a coupon, the cashier enters the coupon code, and if the code is valid, the system applies the discount and updates the price.

6. The cashier presents the grand total of all items.

7. The customer selects a payment method (cash or credit card).

8. The POS system processes the payment and confirms the transaction.

9. The POS system prints the receipt.

10. The transaction is completed, and the cashier hands over the goods and receipt to the customer.

Extensions (Alternative Flows):

- 2a. The barcode is invalid, the cashier informs the customer about the invalid item and tries to fetch new product if available.

- 4a. If the coupon is invalid, the system notifies the cashier, and the customer have to pay the full price.

- 7a. If the payment is declined, the customer can retry with another payment method or cancel the transaction.

Postconditions:

- The sale is completed, and the inventory is updated.

2) Handle Returns

Actors:
- Cashier
- Customer

Preconditions:

- The customer is at the POS counter with the goods they wish to return.

- The POS system is connected to the backend (catalogue, inventory and payment gateway).

Basic Flow:

1. The customer provides the goods they wish to return.
2. The cashier scans the product using barcode scanner.
3. The POS system retrieves the original purchase details from the backend when customer hand overs the invoice.
4. The cashier verifies the item's return eligibility based on store policies.
5. If the item is eligible for return, the cashier processes the return by registering the return into the system.
6. The system processes the refund either by cash, card or by giving a gift card.
7. The system updates the inventory by adding the returned item back to stock.
8. A return receipt is printed and it is handed to the customer.

Extensions (Alternative Flows):

- 3a. If the item is not eligible for return, the cashier informs the customer that the return cannot be processed.

Postconditions:

- The return is completed, the inventory is updated, and the customer is refunded.

Entity Objects

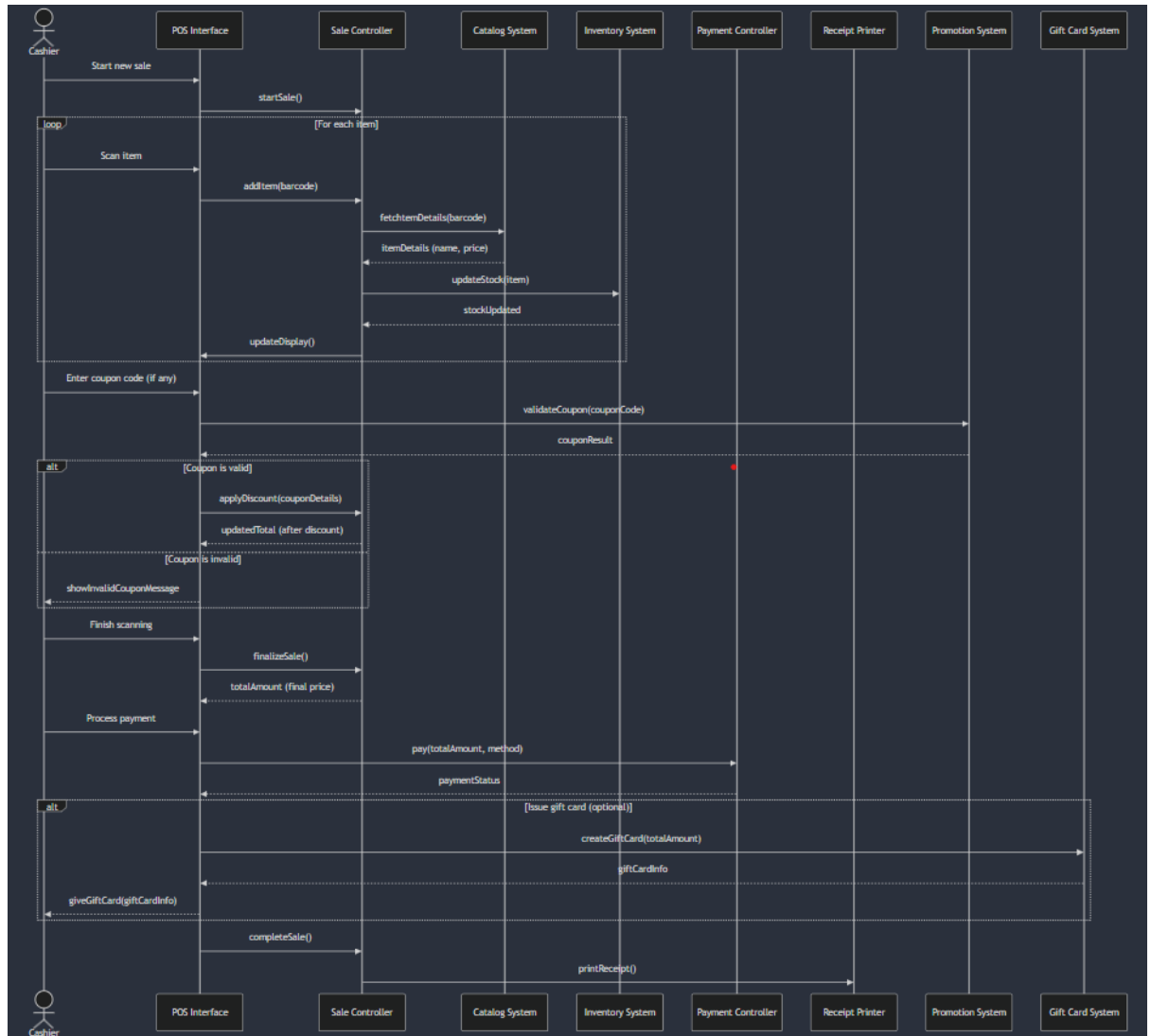- Sale Transaction
- Product
- User

Boundary Objects

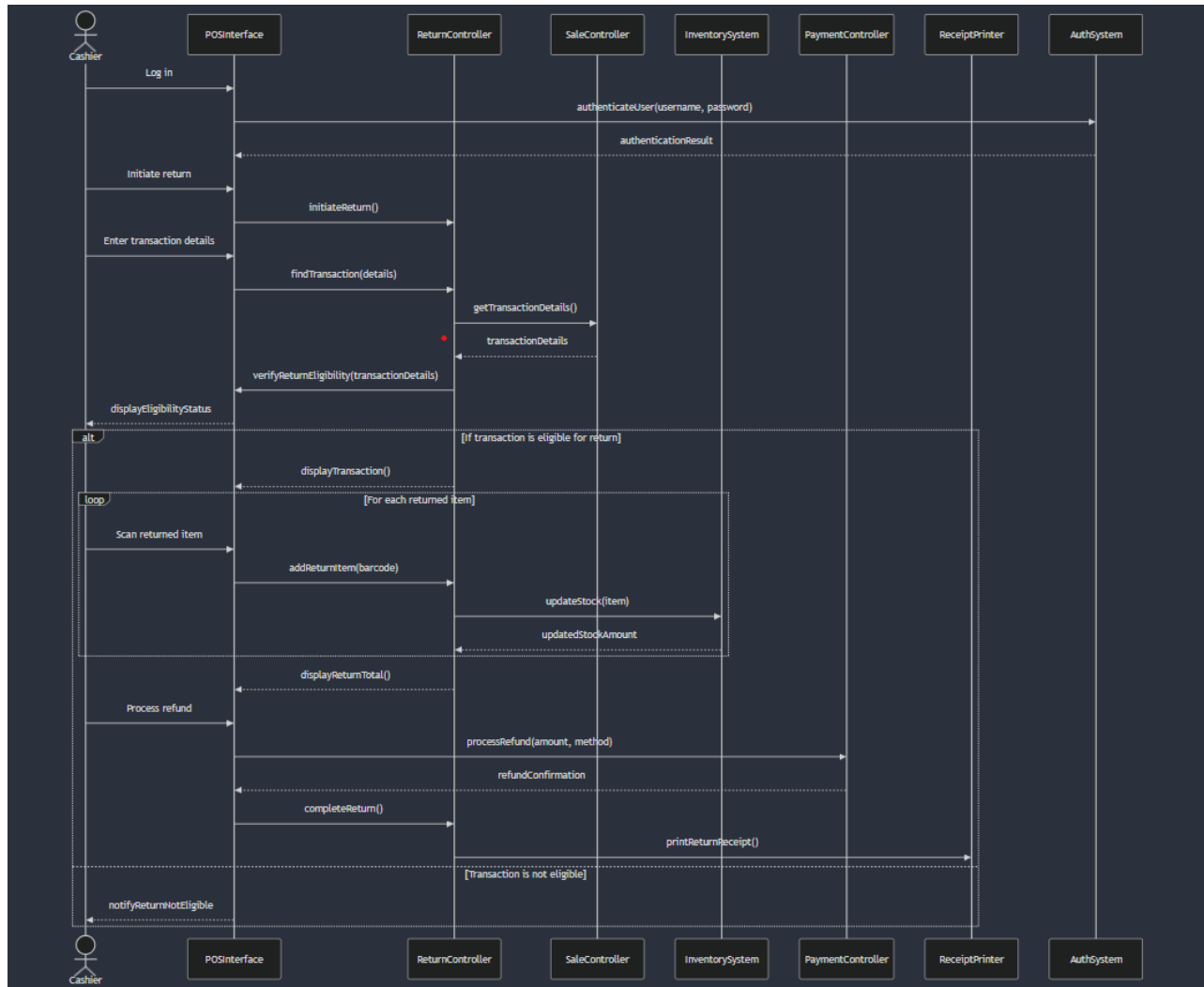- Sale Screen

- Payment Screen

Control Objects

- SaleController
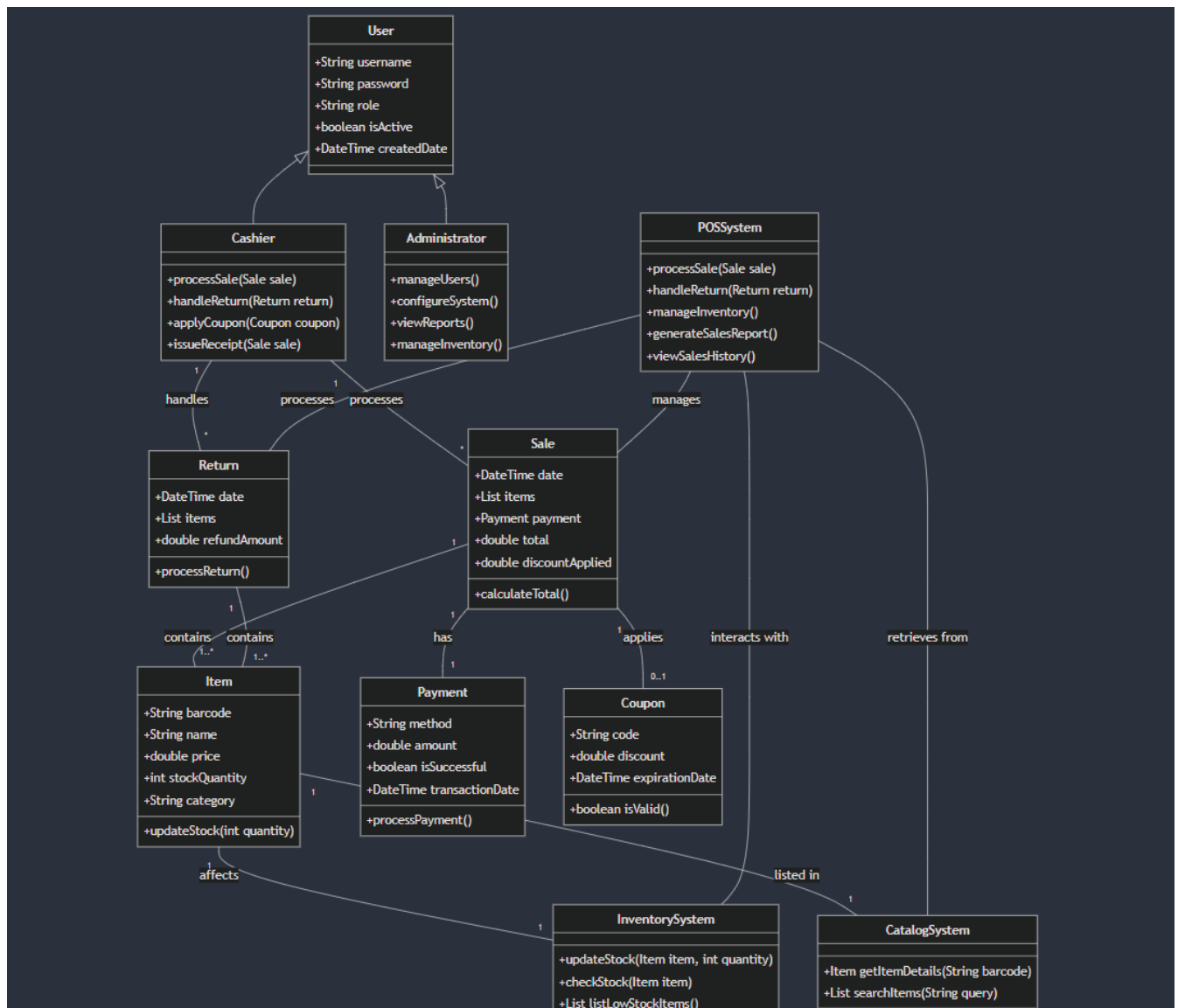
- PaymentController

- ReturnController

Sequence Diagrams:

1) Process Sales

Sequence diagram — Process Sales

Participants: Cashier, POS Interface, Sale Controller, Catalog System, Inventory System, Payment Controller, Receipt Printer, Promotion System, Gift Card System

- Cashier → POS Interface: Start new sale
- POS Interface → Sale Controller: startSale()

loop [For each item]
- Cashier → POS Interface: Scan item
- POS Interface → Sale Controller: addItem(barcode)
- Sale Controller → Catalog System: fetchItemDetails(barcode)
- Catalog System → Sale Controller: itemDetails (name, price)
- Sale Controller → Inventory System: updateStock(item)
- Inventory System → Sale Controller: stockUpdated
- Sale Controller → POS Interface: updateDisplay()

- Cashier → POS Interface: Enter coupon code (if any)
- POS Interface → Promotion System: validateCoupon(couponCode)
- Promotion System → POS Interface: couponResult

alt [Coupon is valid]
- POS Interface → Sale Controller: applyDiscount(couponDetails)
- Sale Controller → POS Interface: updatedTotal (after discount)

[Coupon is invalid]
- POS Interface: showInvalidCouponMessage

- Cashier → POS Interface: Finish scanning
- POS Interface → Sale Controller: finalizeSale()
- Sale Controller → POS Interface: totalAmount (final price)

- Cashier → POS Interface: Process payment
- POS Interface → Payment Controller: pay(totalAmount, method)
- Payment Controller → POS Interface: paymentStatus

alt [Issue gift card (optional)]
- Payment Controller → Gift Card System: createGiftCard(totalAmount)
- Gift Card System → Payment Controller: giftCardInfo
- POS Interface: giveGiftCard(giftCardInfo)

- POS Interface → Sale Controller: completeSale()
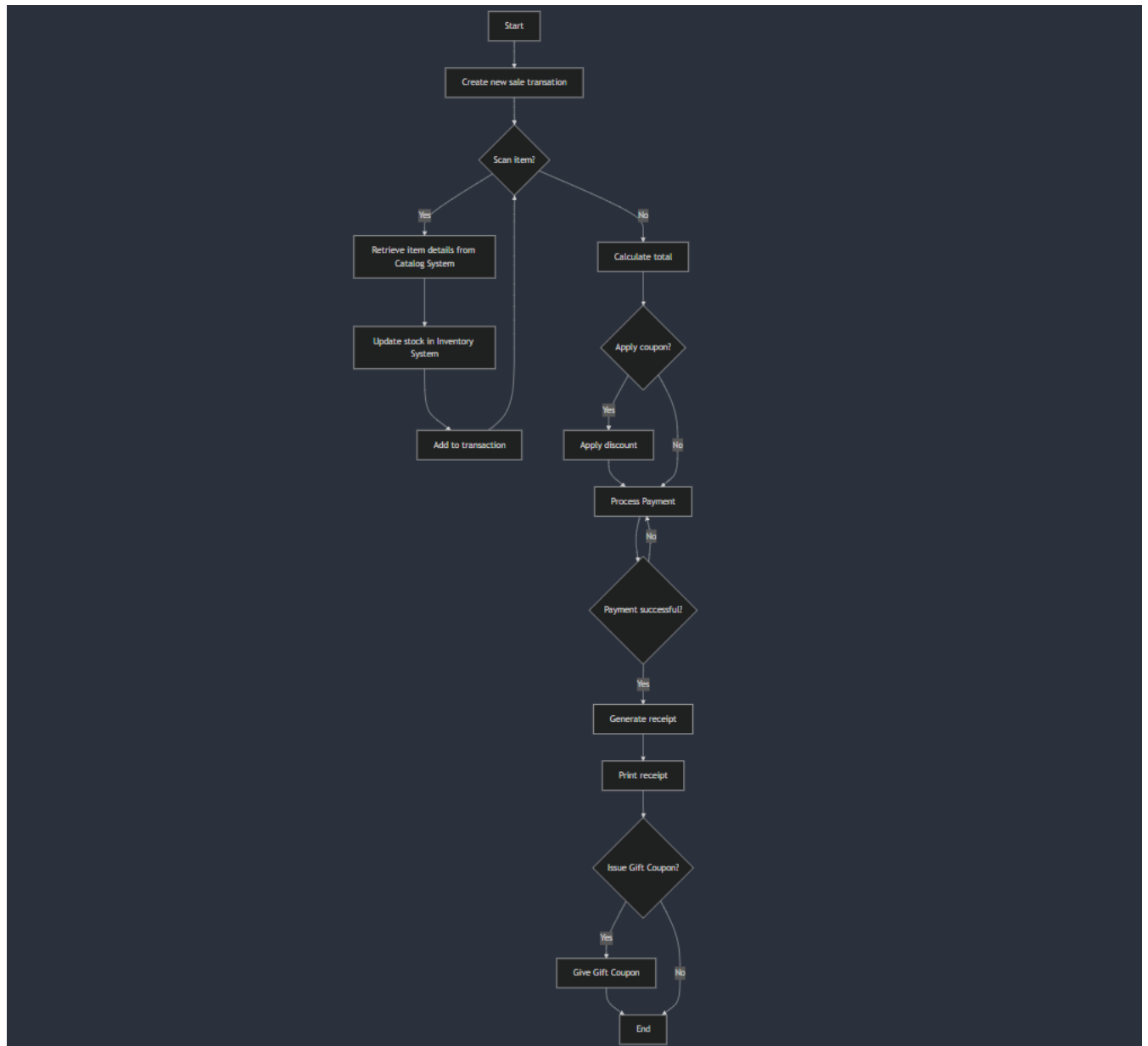- Sale Controller → Receipt Printer: printReceipt()

2) Handle Returns

Analysis Domain Model

Activity Diagram for Process Sales

Activity Diagram for Handle Returns