IT 314 Software Engineering
Lab 6
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1)

Use Case: Process Sale

Actor: Cashier
Description: This use case describes the process of completing a sale transaction for a customer, including payment processing and receipt generation.

Preconditions:

- The cashier is logged into the POS system.
- The customer has selected items to purchase.

Postconditions:

- A sale transaction is completed.
- Inventory is updated to reflect the sale.
- A receipt is printed for the customer.

Main Flow:

1. The cashier scans the barcode of the first item.
2. The POS system retrieves the item's name and price from the Catalog System.
3. The system checks the Inventory System to confirm the item is in stock.
4. The item is added to the transaction list.
5. Steps 1-4 are repeated for each additional item the customer wishes to purchase.

6. Once all items are scanned, the cashier confirms the total amount due.
7. The cashier asks the customer for the payment method (cash, credit card, or gift coupon).
8. If the customer presents a gift coupon:
    - The system applies the discount associated with the coupon (Extend: Process Gift Coupon Sale).
9. The cashier processes the payment based on the selected method:
    - For Cash Payment: The cashier enters the amount received, and the system calculates change due.
    - For Credit Card Payment: The cashier swipes the card, and the system processes the payment.
10. Once payment is confirmed, the system generates a receipt.
11. The receipt is printed for the customer.
12. The cashier thanks the customer and completes the transaction.

Use Case: Handle Return

Actor: Cashier
Description: This use case describes the process of handling a return of items purchased by a customer.

Preconditions:

- The cashier is logged into the POS system.
- The customer has items to return and a receipt for the original purchase.

Postconditions:

- The returned items are processed.
- Inventory is updated to reflect the return.
- A return receipt is printed for the customer.

Main Flow:

1. The cashier greets the customer and requests the items to be returned.
2. The cashier asks for the original purchase receipt.
3. The cashier verifies the receipt and checks the return policy (e.g., time limit, condition of items).
4. The cashier scans each item being returned.
5. The system retrieves the original purchase details from the Catalog System.
6. The system updates the Inventory System to add the returned items back into stock.
7. The system calculates any refund amount due to the customer.
8. The cashier processes the refund using the original payment method (cash or credit card).

    - For Cash Payment: The cashier prepares the cash refund.
    - For Credit Card Refund: The system processes the refund back to the card.
9. The system generates a return receipt.
10. The return receipt is printed for the customer.
11. The cashier thanks the customer and completes the return transaction.

2)

Entity Objects

1. Product
    - Represents items for sale, including attributes like product ID, name, price, and stock quantity.
2. Transaction
    - Represents a sale or return transaction, containing details such as transaction ID, date, items sold/returned, payment method, and total amount.
3. Receipt
    - Represents the printed receipt for transactions, including details of the transaction, items, prices, and payment information.
4. Customer
    - Represents the customer making a purchase or return, including attributes like customer ID, name, and contact information.
5. Coupon
    - Represents gift or promotional coupons that can be applied to transactions, including attributes like coupon code, discount value, and expiration date.
6. Inventory
    - Represents the inventory database that tracks stock levels for each product.

Boundary Objects

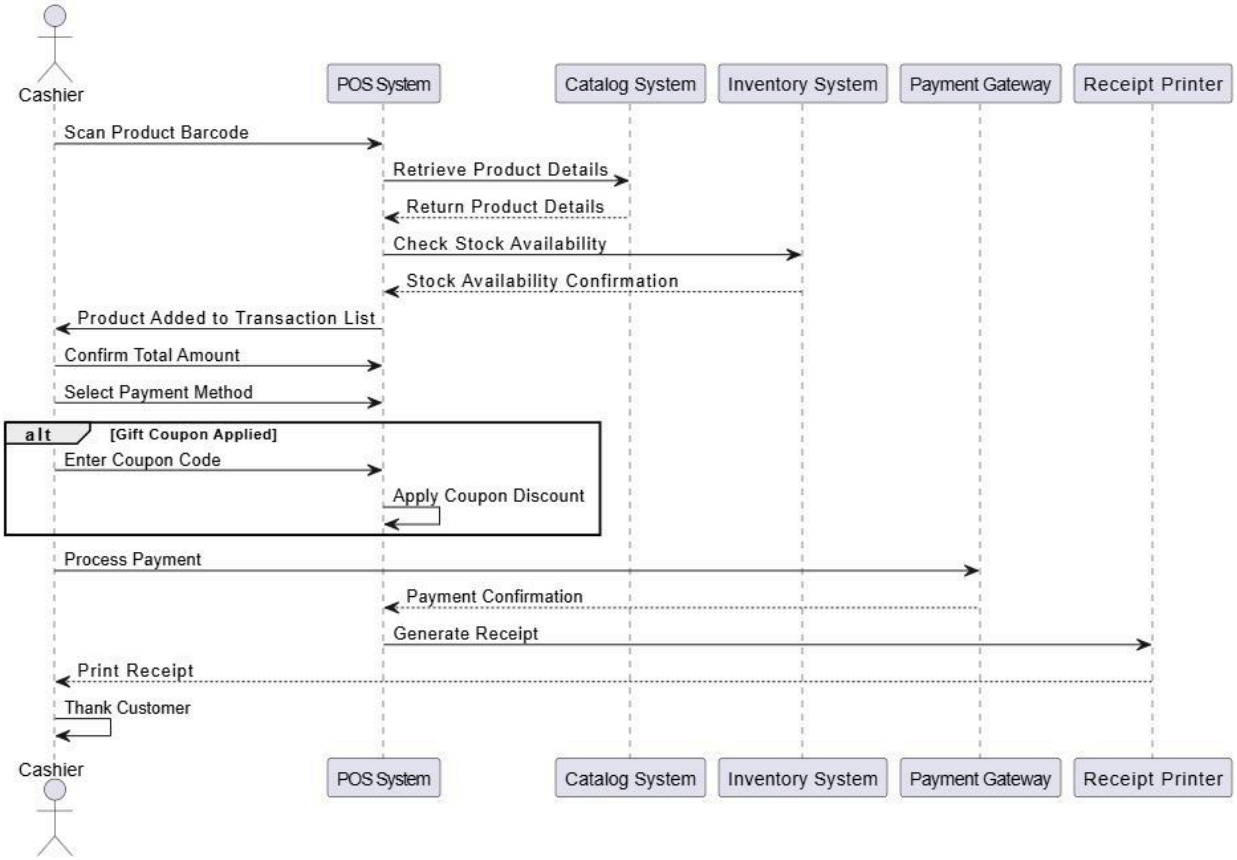
1. POS Terminal Interface
    - User interface through which the cashier interacts with the POS system (e.g., touch screen, buttons).
2. Barcode Scanner

    - Device used to scan product barcodes, interacting with the POS system to retrieve product information.
3. Payment Gateway Interface
    - Interface for processing credit card payments, connecting to external payment systems.
4. Receipt Printer
    - Boundary object responsible for printing transaction receipts for customers.
5. Coupon Input Interface
    - Interface for cashiers to input or scan gift coupons during transactions.

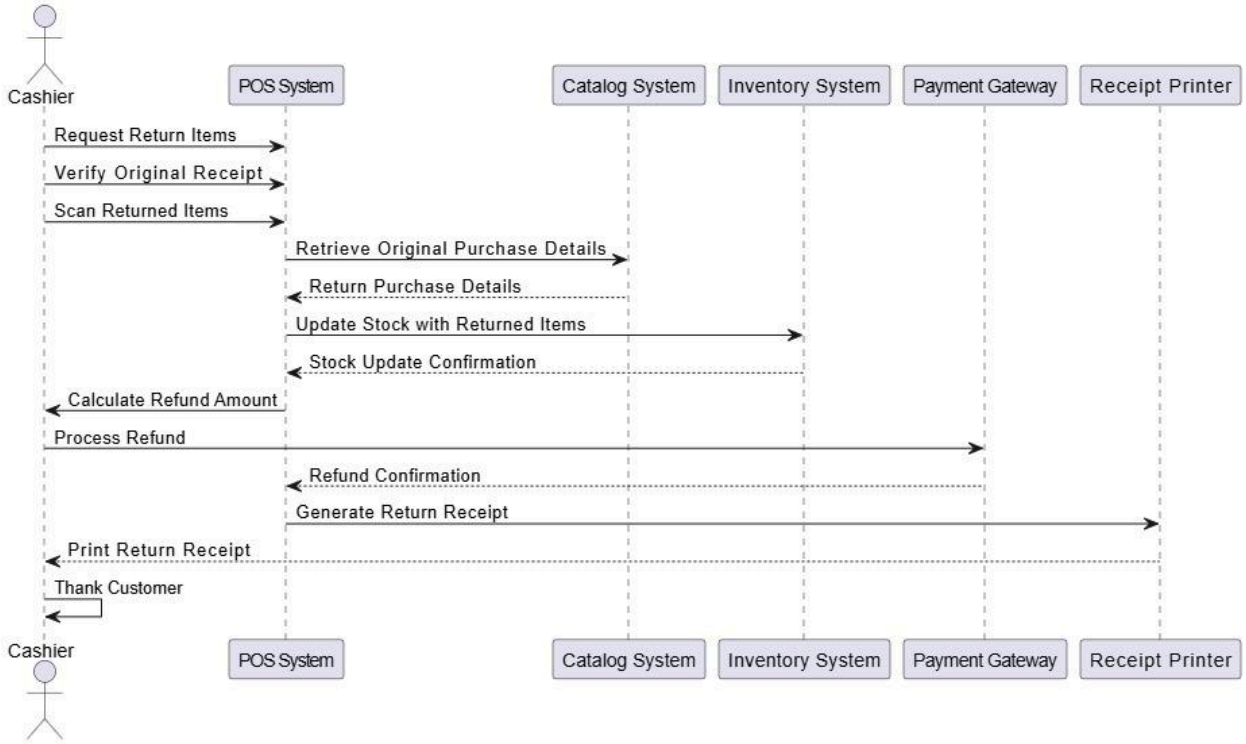
Control Objects

1. ProcessSaleControl
    - Created when the cashier initiates a sale transaction. It coordinates the scanning of items, handles payment processing, and generates the receipt. It manages the flow of data between the boundary objects (e.g., Barcode Scanner, Payment Gateway) and the entity objects (e.g., Transaction, Product).
2. HandleReturnControl
    - Created when the cashier begins processing a return. It manages the scanning of returned items, checks the return policy, processes refunds, and generates return receipts. It interacts with the relevant boundary and entity objects throughout the return process.

3) Sequence Diagrams

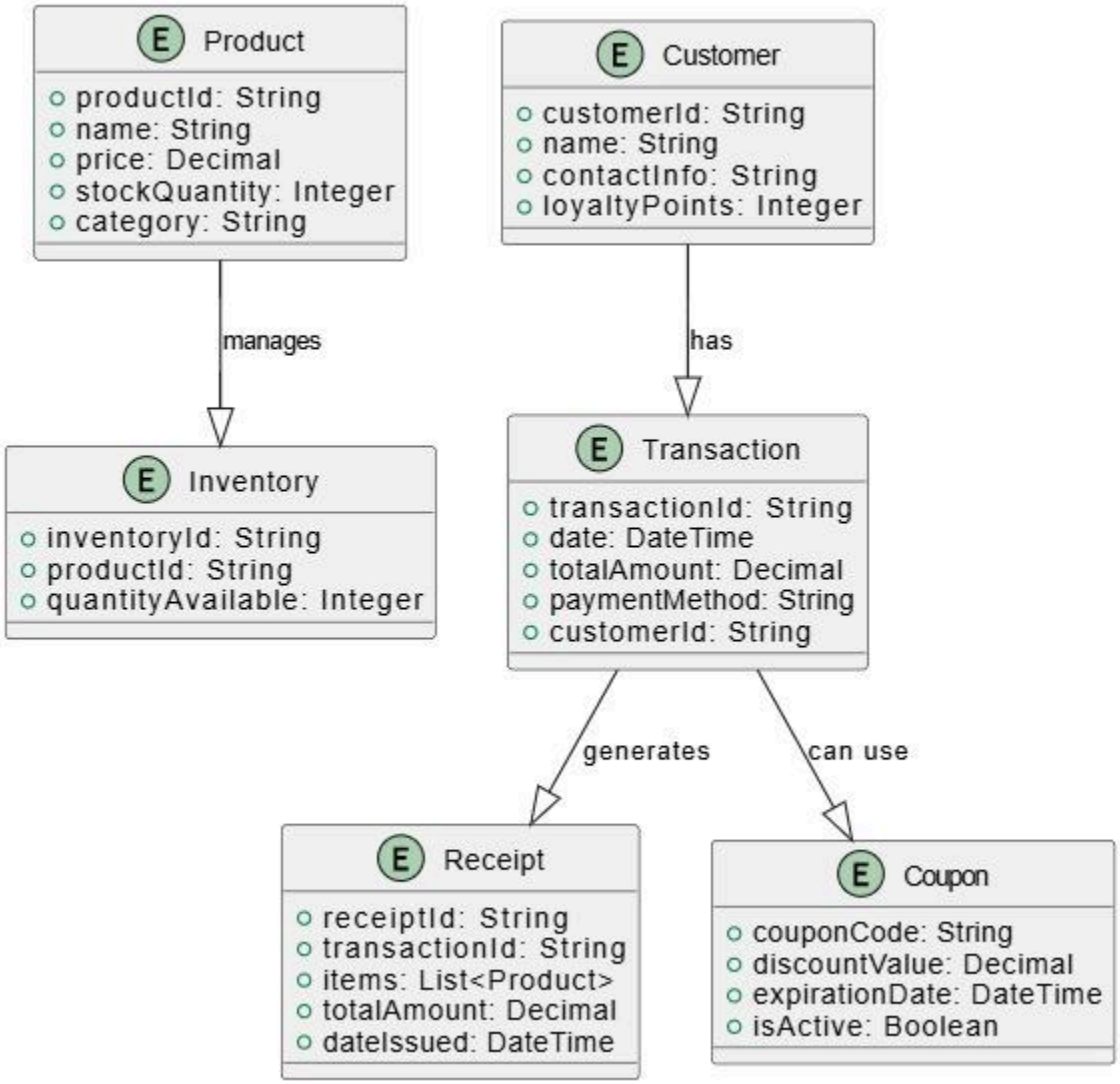


Process Sales

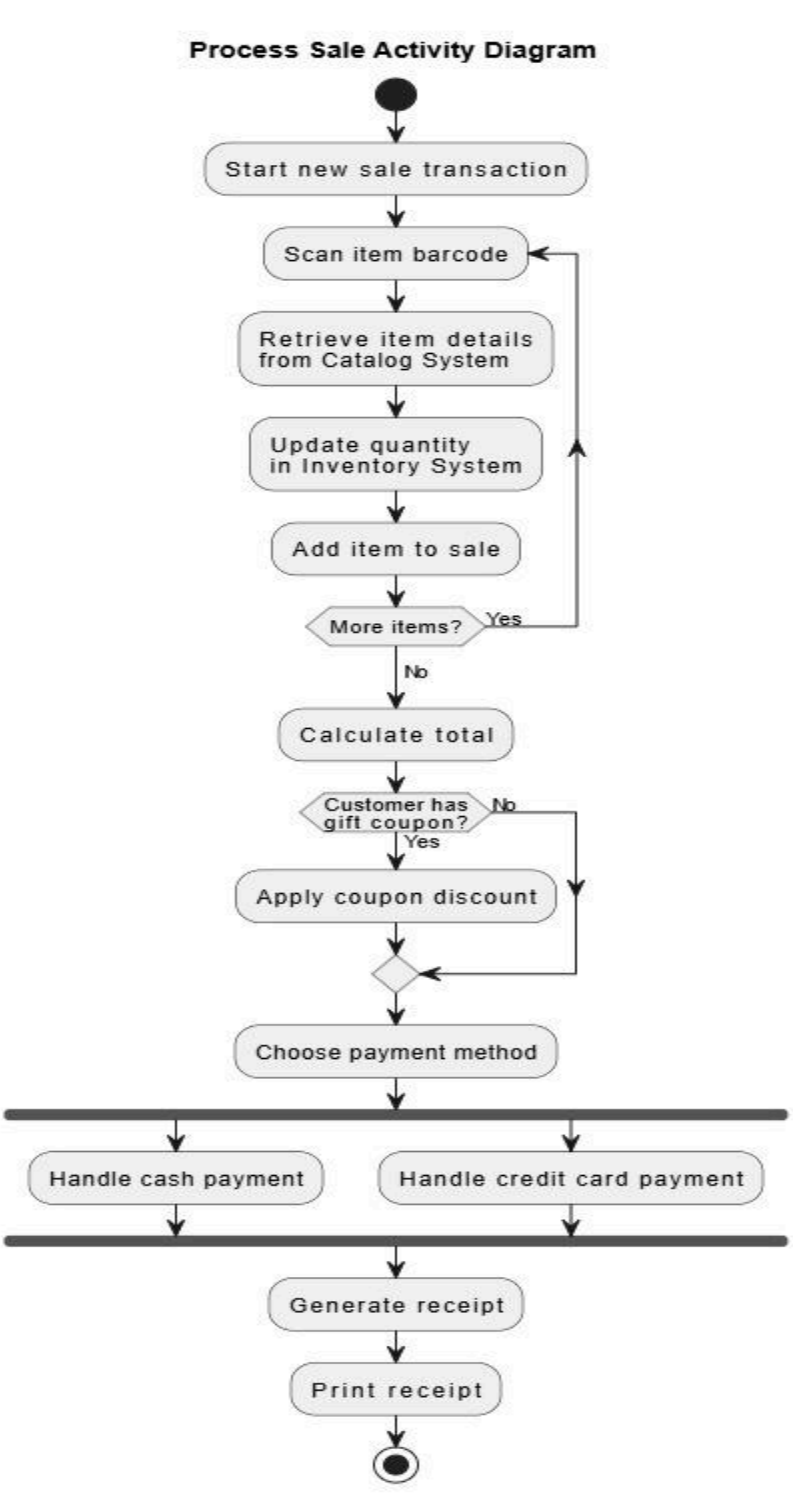


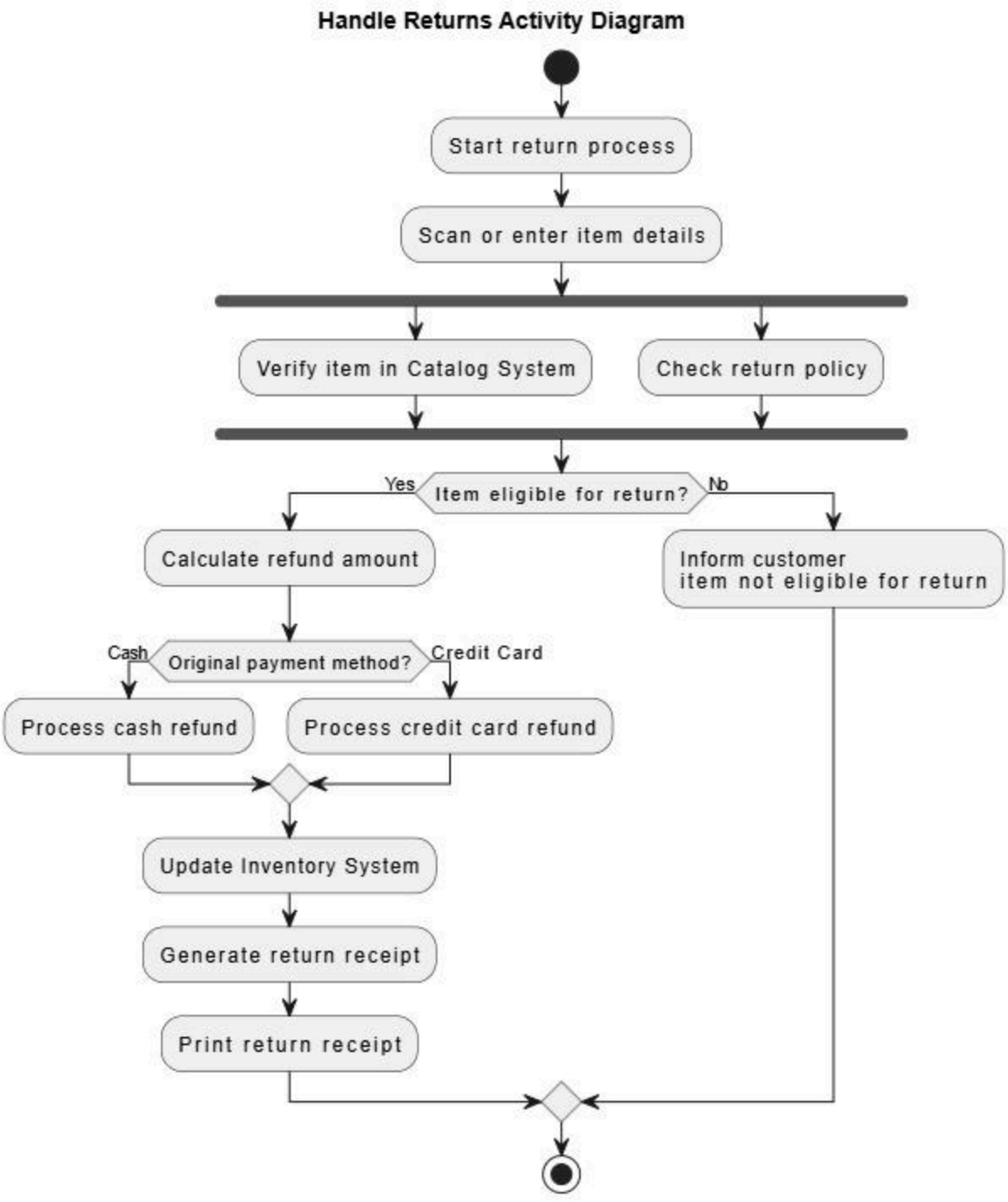
Handle Returns

4)


Product
productId: String
name: String
price: Decimal
stockQuantity: Integer
category: String
Customer
customerId: String
name: String
contactInfo: String
loyaltyPoints: Integer
manages
has
Inventory
inventoryId: String
productId: String
quantityAvailable: Integer
Transaction
transactionId: String
date: DateTime
totalAmount: Decimal
paymentMethod: String
customerId: String
generates
can use
Receipt
receiptId: String
transactionId: String
items: List<Product>
totalAmount: Decimal
dateIssued: DateTime
Coupon
couponCode: String
discountValue: Decimal
expirationDate: DateTime
isActive: Boolean

5)


Process Sale Activity Diagram
Start new sale transaction
Scan item barcode
Retrieve item details from Catalog System
Update quantity in Inventory System
Add item to sale
More items?
Yes
No
Calculate total
Customer has gift coupon?
No
Yes
Apply coupon discount
Choose payment method
Handle cash payment
Handle credit card payment
Generate receipt
Print receipt


Handle Returns Activity Diagram
Start return process
Scan or enter item details
Verify item in Catalog System
Check return policy
Item eligible for return?
Yes
No
Calculate refund amount
Inform customer
item not eligible for return
Original payment method?
Cash
Credit Card
Process cash refund
Process credit card refund
Update Inventory System
Generate return receipt
Print return receipt