IT314 - Software Engineering

Lab Report - 6

202201269 - Varnika Chhawcharia

1.USER CASE TEXTUAL DESCRIPTION

Use Case: Process Sale

Description:
This use case outlines how a cashier efficiently processes a customer's purchase transaction using a Point-of-Sale (POS) system. It encompasses item scanning, discount application, total cost calculation, payment acceptance, and receipt issuance.

Actors:

- **Primary Actor:** Cashier
- **Secondary Actors:** Customer, Inventory System, Payment Gateway

Preconditions:

- The cashier is logged into the POS system.
- All items are confirmed to be in stock.
- The system is successfully connected to the payment gateway.

Postconditions:

- The transaction details are recorded in the system.
- Inventory levels are updated to reflect the sale.
- A receipt is generated and provided to the customer.

Basic Flow:

1. **Initiate Sale:**
   The cashier begins the sale by scanning each item presented by the customer.
2. **Retrieve Item Details:**
   The system automatically retrieves the price and description for each scanned item from the inventory database.
3. **Apply Discounts:**
   If applicable, the cashier applies any relevant discounts or promotions to the transaction.
4. **Calculate Total:**
   The system calculates the total cost, including taxes and discounts, and displays it for the cashier.

5. **Select Payment Method:**
   The cashier prompts the customer to choose a payment method (cash, card, or mobile payment).
6. **Process Payment:**
   The customer provides the selected payment, which the system processes through the payment gateway.
7. **Confirm Sale:**
   Upon successful payment, the system confirms the transaction and generates a receipt, which the cashier prints for the customer.
8. **Update Inventory:**
   The system automatically updates the inventory to reflect the items sold during the transaction.

Alternative Flows:

- **Item Out of Stock:**
  If an item is not available, the system notifies the cashier, who then informs the customer and may suggest alternatives.
- **Payment Declined:**
  If the payment is declined, the system alerts the cashier, allowing them to retry the payment or select an alternative payment method.

Use Case: Handle Return

Description:

This use case details how a cashier processes a customer's request to return previously purchased items. The procedure includes verifying the original purchase, issuing a refund, and updating inventory.

Actors:

- **Primary Actor:** Cashier
- **Secondary Actors:** Customer, Inventory System, Payment Gateway

Preconditions:

- The cashier is logged into the POS system.
- The customer presents a valid receipt for the item being returned.
- The item meets the store's return eligibility criteria.

Postconditions:

- The item is successfully returned to inventory.
- The refund is processed and completed.
- A return receipt is issued to the customer.

Basic Flow:

1. **Initiate Return:**
   The customer presents the item and receipt to the cashier for processing the return.
2. **Scan Receipt:**
   The cashier scans the receipt to retrieve details of the original sale, including the purchase date and item information.
3. **Verify Eligibility:**
   The system checks if the item is eligible for return based on store policies (e.g., return window, condition).
4. **Inspect Item:**
   The cashier inspects the item to confirm it meets the return criteria (e.g., no damage, unused).
5. **Approve Return:**
   If the return is approved, the system calculates the refund amount based on the original sale price.
6. **Process Refund:**
   The cashier processes the refund using the original payment method (cash, card, etc.).
7. **Update Inventory:**
   The system updates inventory to reflect the returned item, making it available for future sales.
8. **Issue Return Receipt:**
   A return receipt is printed and given to the customer as confirmation of the return.

Alternative Flows:

- **Return Not Eligible:**
  If the item does not meet return eligibility (e.g., outside the return window or damaged), the system alerts the cashier, who informs the customer of the policy.

- **Original Payment Method Unavailable:**
  If the original payment method cannot be processed (e.g., expired card), the cashier can offer store credit as an alternative solution.

2.ENTITY / BOUNDARY CONTROL OBJECT

Entity Objects

1. Item
   Represents individual products that are scanned, sold, or returned.
   Attributes:
   - Item ID
   - Description
   - Price
   - Stock Level
2. Sale
   Represents a complete sale transaction.
   Attributes:
   - Sale ID
   - List of Items Sold
   - Total Price
   - Payment Method
3. Return
   Represents the return transaction details.
   Attributes:
   - Return ID
   - List of Returned Items
   - Original Sale Reference
   - Refund Amount
4. Receipt
   Represents the transaction record given to the customer.
   Attributes:
   - Receipt ID
   - Transaction Type (Sale/Return)
   - Date and Time
   - Item List
   - Total Amount

5. Payment
   Represents the method of payment used in a transaction.
   Attributes:
   - Payment ID
   - Payment Amount
   - Payment Method (Cash, Card, Mobile)
   - Payment Status (Completed, Declined)
6. Inventory
   Represents the stock levels of items.
   Attributes:
   - Item ID
   - Current Stock Level
   - Stock Threshold
7. Customer
   Represents the customer involved in transactions.
   Attributes:
   - Customer ID
   - Name
   - Contact Information
   - Loyalty Status (if applicable)

Boundary Objects

1. POS Interface
   The main interface for the cashier to process transactions.
   Functions:
   - Scan items
   - Process sales and returns
   - Handle payments
2. Scanner
   A device used to input item information into the system.
   Functions:
   - Scan barcodes or QR codes
3. Receipt Printer
   Device for printing receipts for customers.
   Functions:
   - Print sales and return receipts

4. Payment Gateway Interface
   Interface responsible for processing payment transactions.
   Functions:
   - Verify payment information
   - Confirm transaction success or failure
5. Customer Display
   A display that shows transaction details to the customer in real-time.
   Functions:
   - Display items scanned
   - Show total amount due

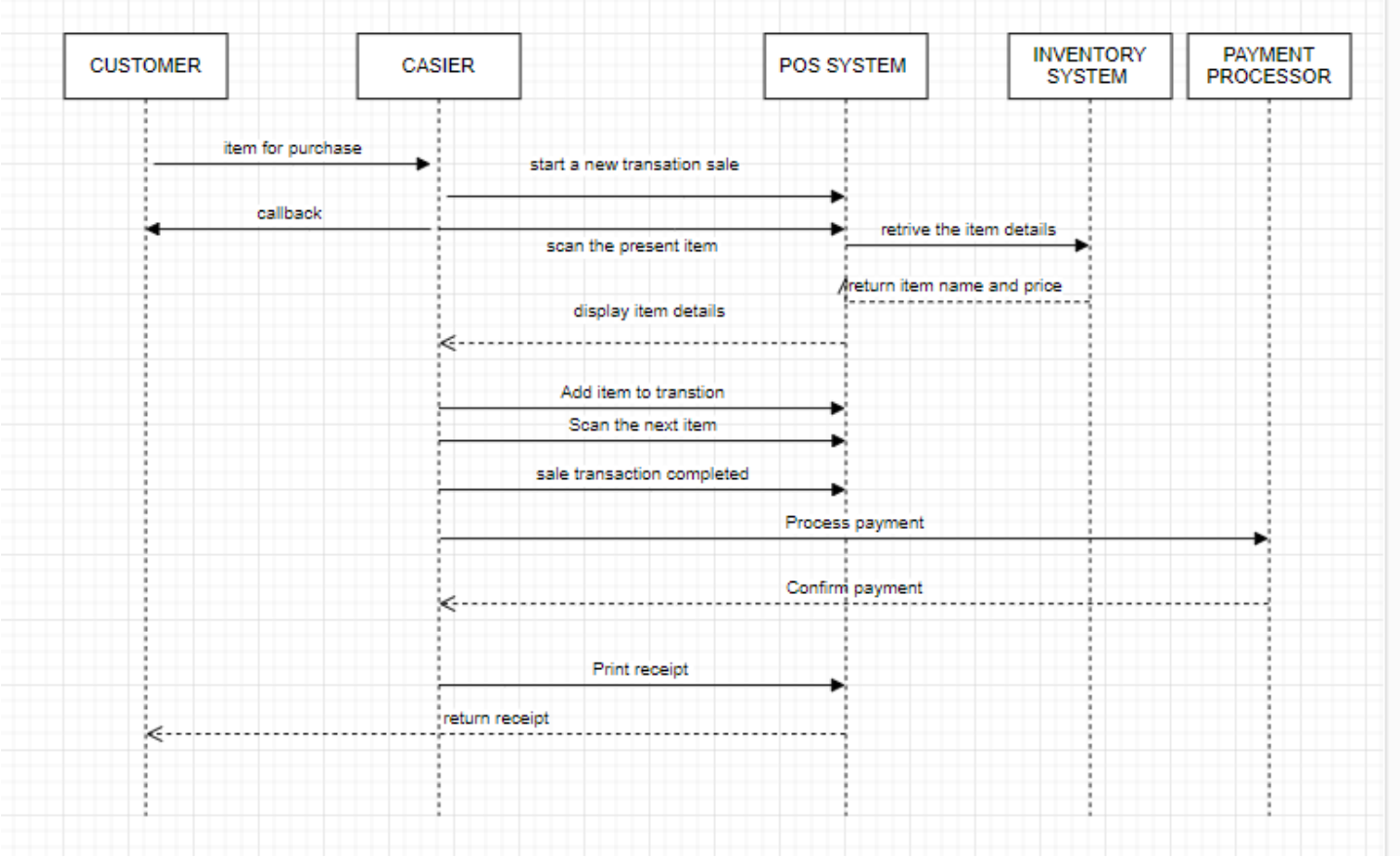
Control Objects

1. Sale Controller
   Manages the workflow for processing a sale.
   Responsibilities:
   - Scanning items
   - Applying discounts
   - Calculating totals
   - Handling payments
2. Return Controller
   Manages the workflow for processing a return.
   Responsibilities:
   - Verifying the original sale
   - Inspecting returned items
   - Processing refunds
3. Inventory Manager
   Ensures inventory levels are updated after sales or returns.
   Responsibilities:
   - Update stock levels
   - Alert for low inventory
4. Discount Controller
   Handles the application of promotions and loyalty points.
   Responsibilities:
   - Verify eligibility for discounts
   - Apply discounts to the transaction

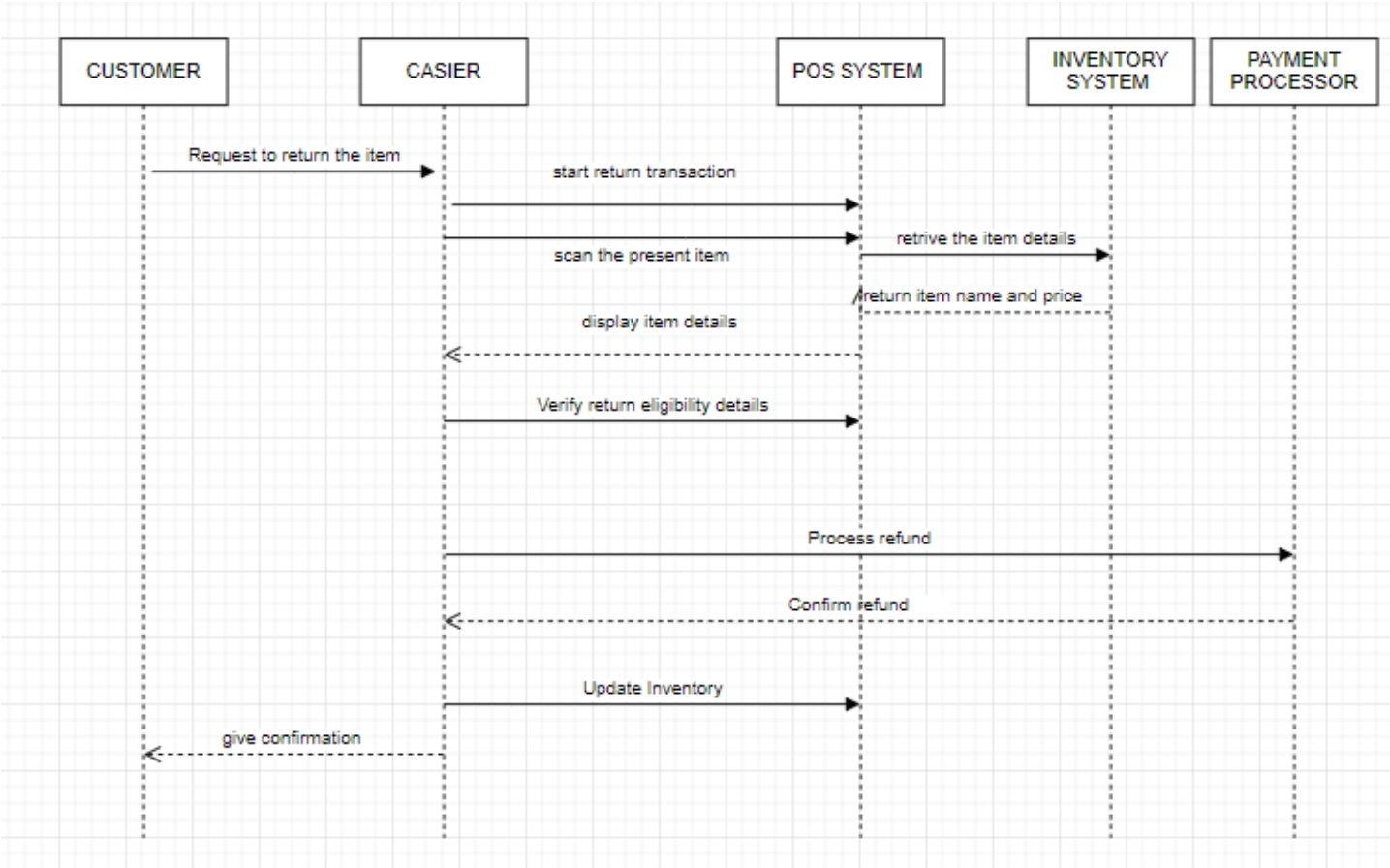
5. Payment Processor
   Manages interactions with the payment gateway.
   Responsibilities:
   - Validate payment information
   - Confirm payment status

3.SEQUENCE DIAGRAM

PROCESS SALES:

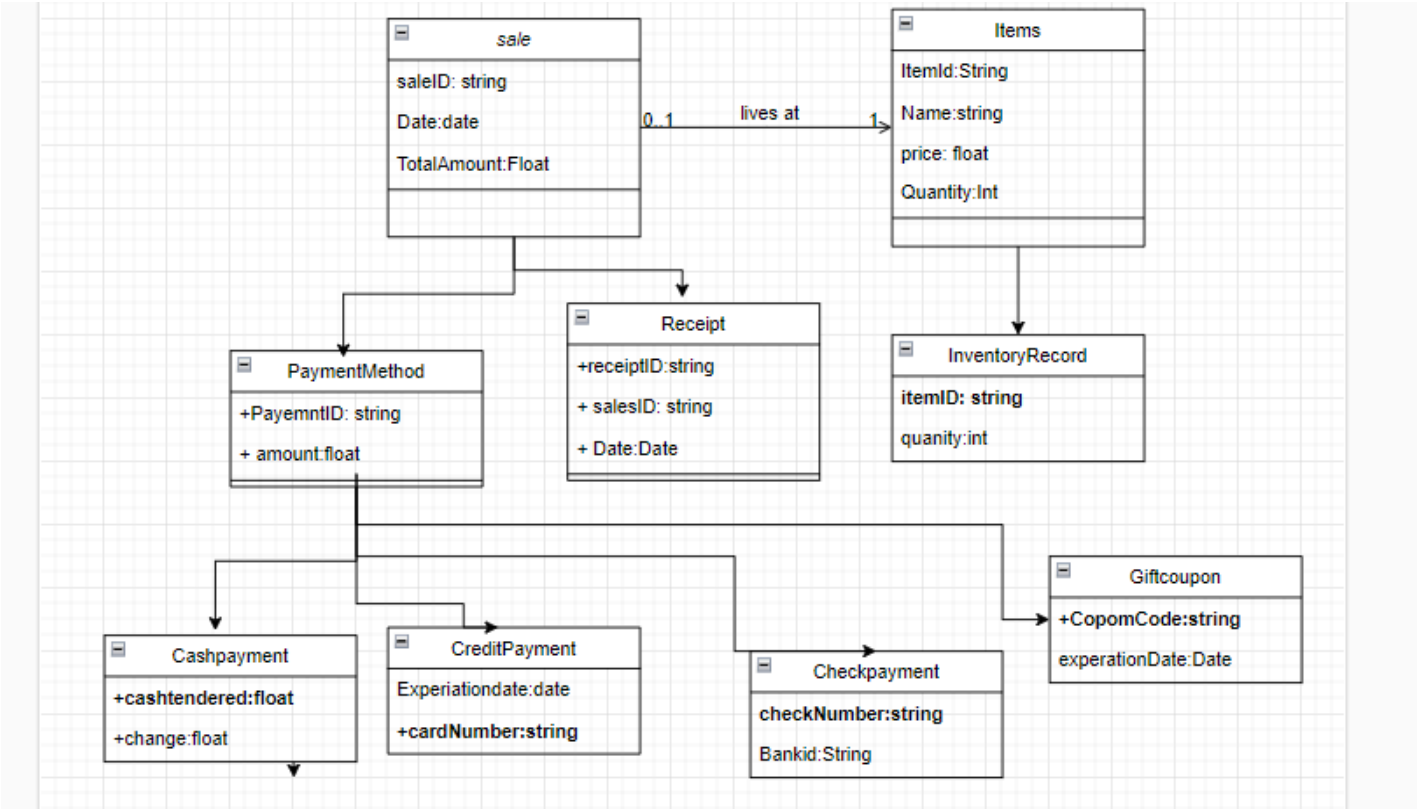


Handle Returns:



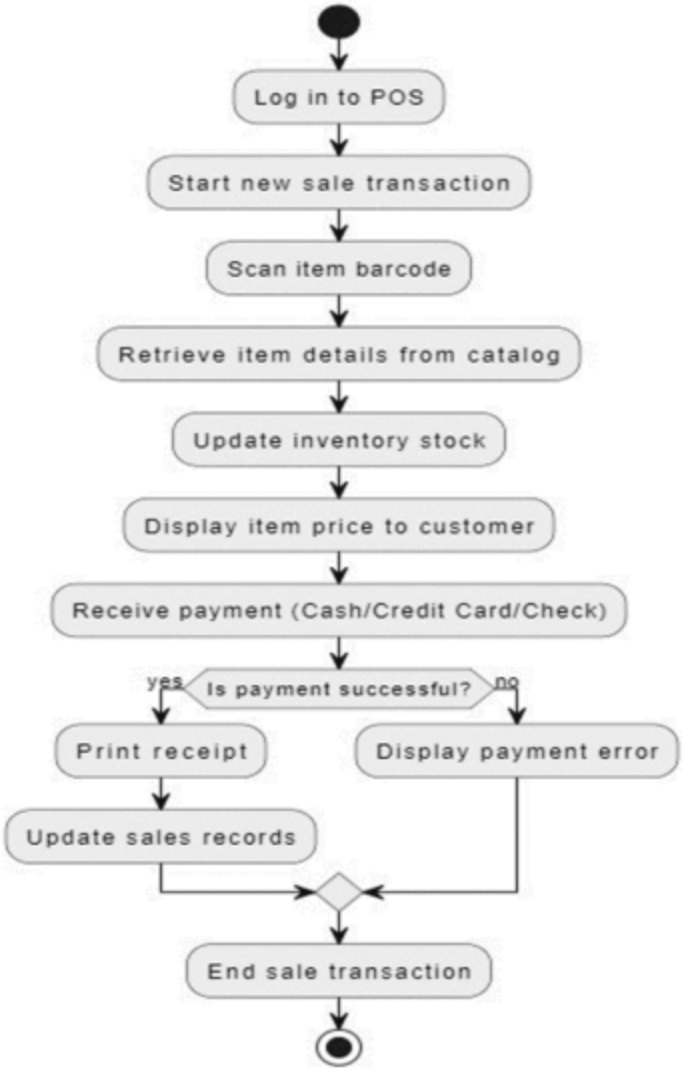
Analysis Domain Model

Process Sales:

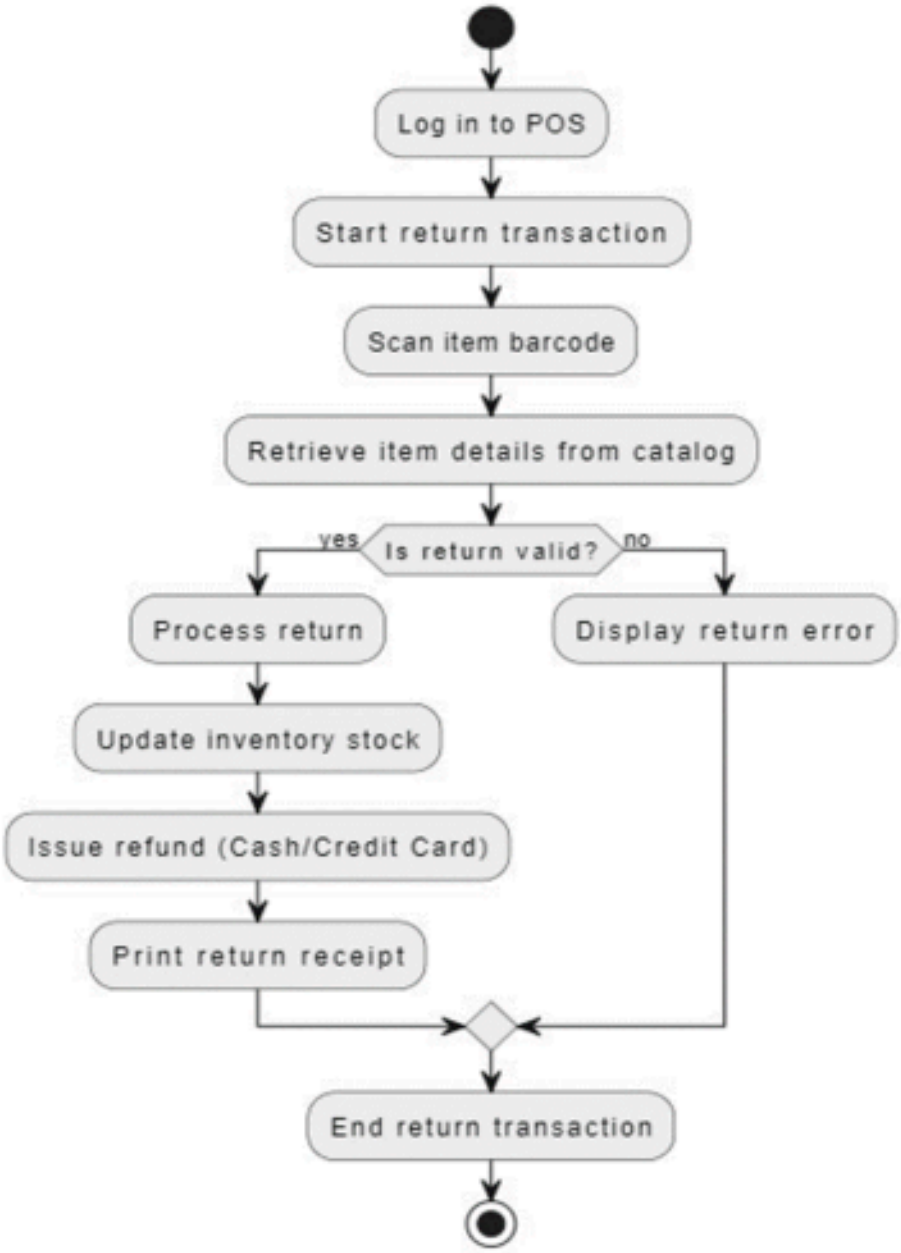


5 Activity Diagram

Process Sales:



Handle Returns:


Log in to POS
Start return transaction
Scan item barcode
Retrieve item details from catalog
Is return valid?
yes
no
Process return
Display return error
Update inventory stock
Issue refund (Cash/Credit Card)
Print return receipt
End return transaction