POS System

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23rd september 2024

Introduction & Background

QUESTION 01:

Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

Use Case 1: Process Sale

- **Primary Actor**: Cashier
- **Goal**: Sale is recorded, payment is processed, stock levels are updated, and the receipt is printed.
- **Preconditions**:
    - Cashier is logged into the POS system.
    - The system is connected to the inventory and catalogue system.
- **Main Flow**:
    - The customer arrives at the POS counter with goods to purchase.
    - The cashier initiates a new sale transaction.
    - The cashier scans or manually enters the barcode of each item.
    - The system retrieves the item details (name, price) from the catalogue and updates the total.
    - The cashier continues scanning until all items are processed.
    - The system calculates the total amount and presents it.
    - The customer chooses a payment method (cash, credit card, check).
    - The system processes the payment.
    - Upon successful payment, the system updates the stock in the inventory system.
    - The receipt is printed, and the customer leaves with their items.
- **Extensions**:
    - If the system fails, it must support recovery by reconstructing the prior state.
    - If an invalid barcode is entered, the system shows an error.

- If the customer wants to remove an item, the cashier can do so, and the total is updated.
- If the customer cancels the sale, the cashier can cancel it in the system.
- If a coupon is used, the cashier records the coupon, and the system reduces the price accordingly.

System Failure (Steps 1-10):

1. *At any point*: If the POS system crashes or loses connection:
    a. The cashier restarts the system and logs back in.
    b. The system attempts to recover the previous transaction.
        i. If recovery is successful, the transaction continues from the last valid state.
        ii. If recovery is unsuccessful, the system signals an error, and the cashier must restart the sale transaction from scratch.

Invalid Barcode (Step 3):

2. *If a barcode cannot be read*:
    a. The system signals an error and prompts the cashier to enter the barcode manually.
    b. The cashier enters the barcode manually.
    c. The system re-attempts to retrieve the product details.
        i. If the manual entry fails or the barcode is invalid, the system rejects the entry and the cashier informs the customer.

Multiple Quantities of the Same Item (Steps 3-4):

3. *When the customer is purchasing multiple units of the same item*:
    a. The cashier can scan the item once and enter the quantity manually.
    b. The system adjusts the total price and updates the inventory accordingly.

Customer Request to Remove an Item (Steps 3-6):

4. *If the customer decides to remove an item after scanning*:
    a. The cashier selects the item to be removed from the current transaction.
    b. The system recalculates the total price and updates the display.

c. **Customer Request to Cancel Sale** (Steps 3-6):

5. *If the customer cancels the sale before payment*:
    a. The cashier cancels the sale on the POS system.
    b. The system discards all current items and clears the transaction.
    c. If the system is connected to inventory, no stock deductions occur for the cancelled sale.

Use Case 2: Handle Return

- **Primary Actor**: Cashier
- **Goal**: The return is processed, the stock is updated, and the customer's refund is completed.
- **Preconditions**:
    - Cashier is logged into the POS system.
    - The customer has a valid receipt for the return.
- **Main Flow**:
    - The customer presents the item they want to return along with the receipt.
    - The cashier scans the receipt or enters the transaction details.
    - The system retrieves the sale information and checks if the item is eligible for return.
    - The cashier confirms the return details with the customer.
    - The system processes the return, adjusting the stock in the inventory system.
    - The customer receives a refund through their original payment method.
    - The system prints a return receipt for the customer.
- **Extensions**:

Invalid Receipt (Step 2):

- *If the customer's receipt cannot be found or matched*:
    - The system signals an error.
    - The cashier asks the customer for additional details such as the transaction date or the card used.
    - If the transaction is not found, the return is rejected, and the customer is informed.

    - The cashier may offer store credit as an alternative if allowed by store policy.

Return Period Expired (Step 3):

- *If the system detects that the item is beyond the allowable return period*:
    - The system signals an error, indicating that the return period has expired.
    - The cashier informs the customer that the return cannot be processed.
    - If the store allows exceptions, the cashier may override this (if authorized), and the system will log the override action for auditing.

Damaged Goods (Step 3):

- *If the returned item is damaged*:
    1. The cashier inspects the item and enters the condition in the system.
    2. The system checks the store's policy on damaged returns.
        - If allowed, the system processes the return and marks it as a damaged return (possibly with a reduced refund amount).
        - If not allowed, the system signals an error, and the cashier informs the customer.

Exchange Instead of Return (Step 3):

- *If the customer requests an exchange rather than a return*:
    1. The cashier processes the return of the original item first.
    2. The system initiates a new sale transaction for the exchanged item.
    3. If the exchanged item costs more, the customer is required to pay the balance. If it costs less, the system issues a partial refund.

QUESTION 02:

Identify Entity/Boundary Control Objects

Entity Objects

- Product:
- Sale:
- Receipt:
- Payment:
- Coupon:
- Inventory:
- Customer

Boundary Objects

- POS Terminal
- Barcode Scanner
- Receipt Printer
- Payment Processor
- Catalogue System
- Inventory System

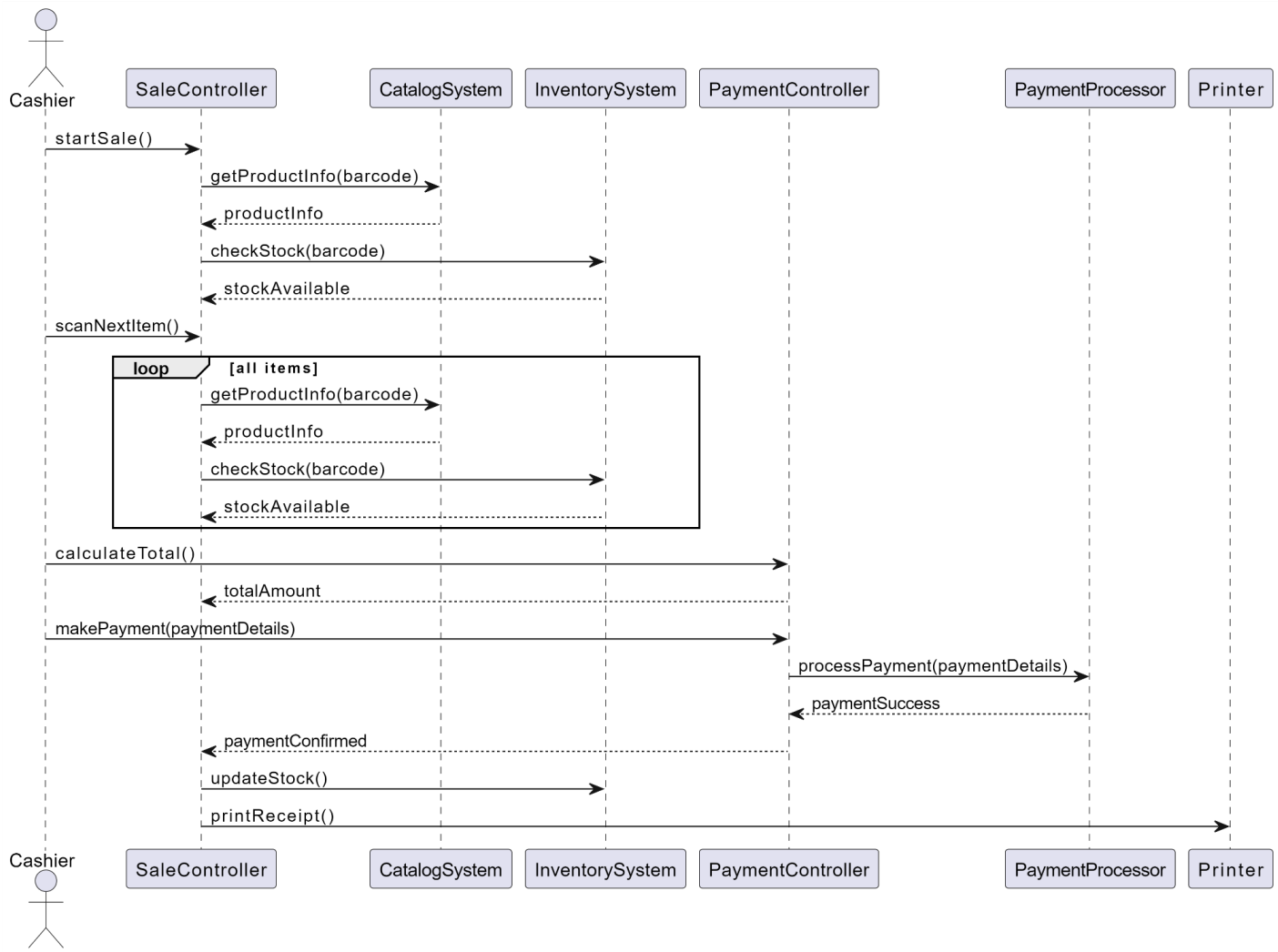
Control Objects

- SaleController
- PaymentController
- ReturnController
- CouponController

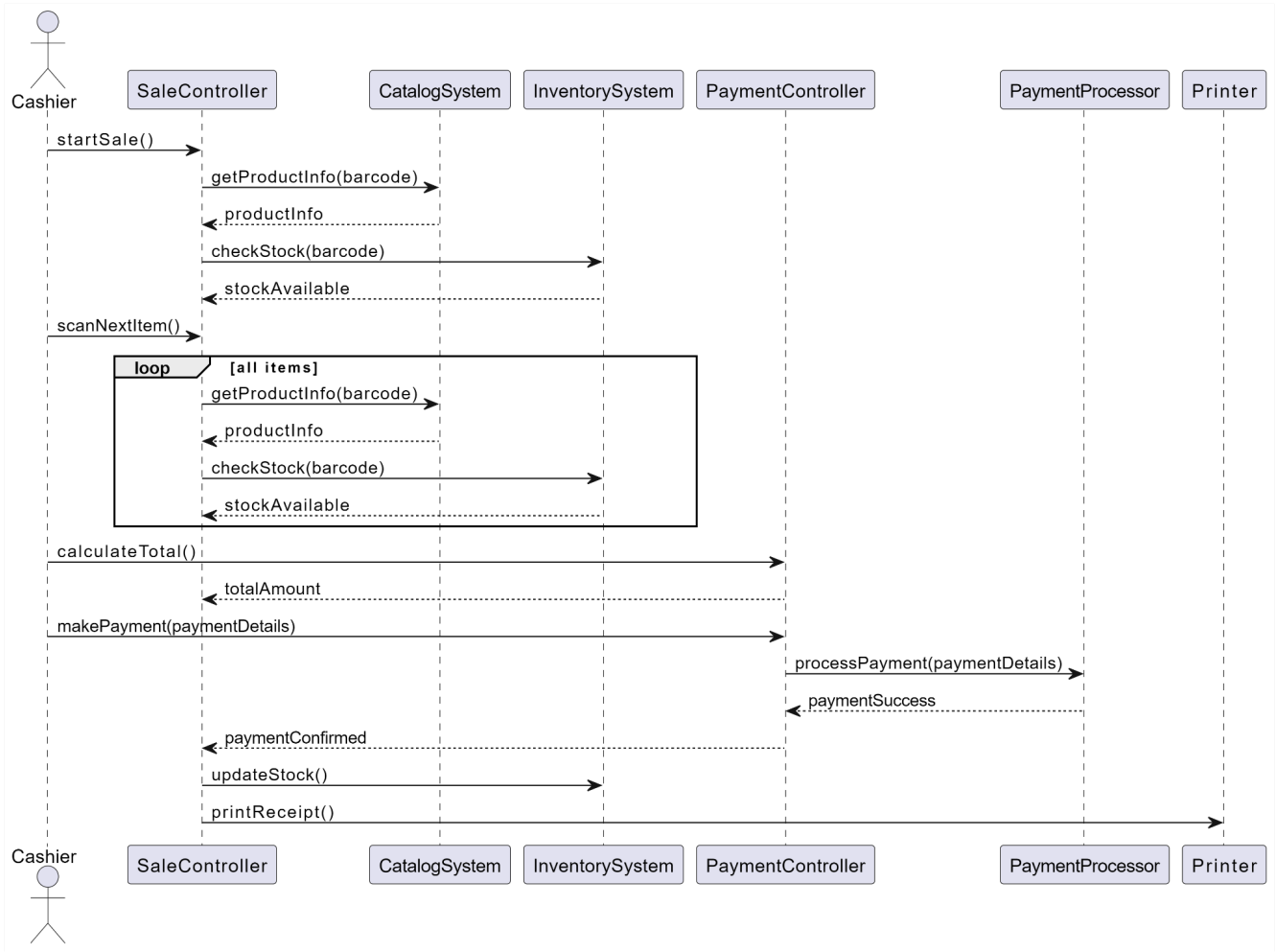
QUESTION 03:

Develop Sequence Diagrams for Process sales and Handle return

a) *PROCESS SALES*



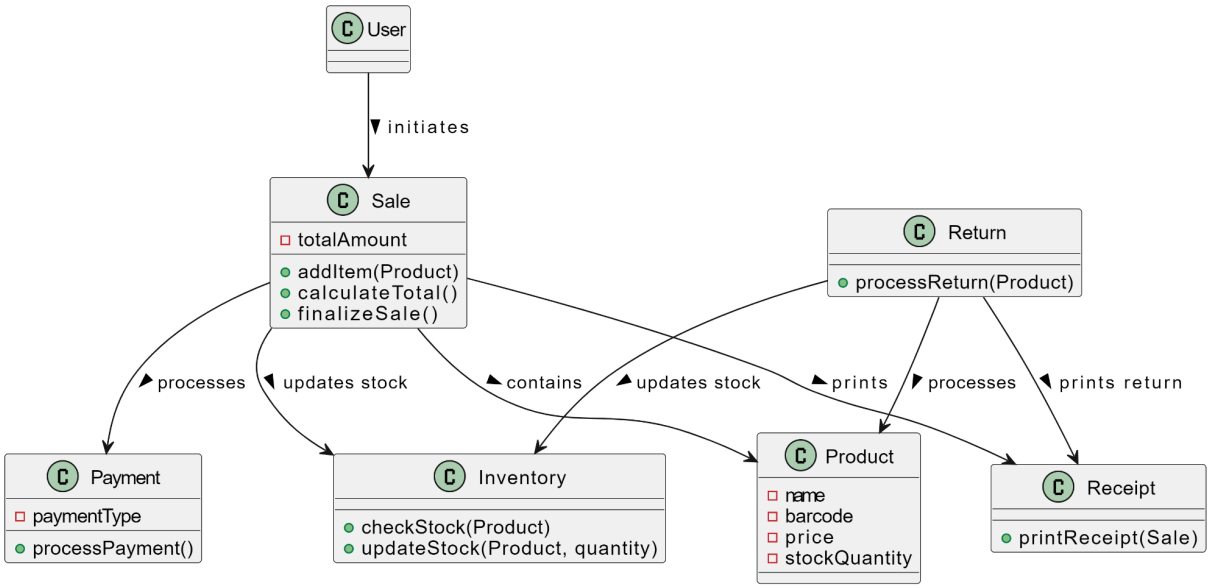
b) *HANDLE SALES*



QUESTION 04:

Develop Analysis Domain Models

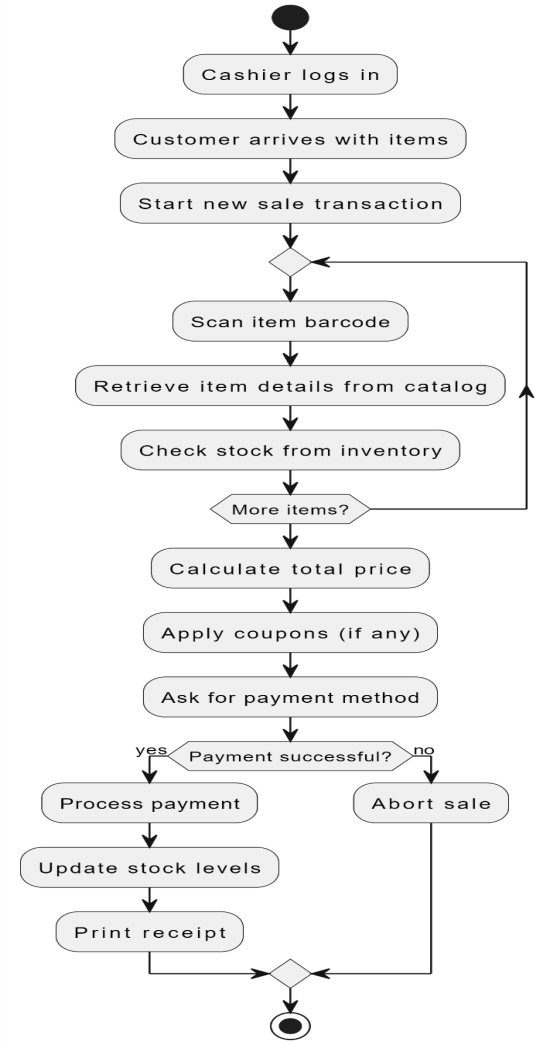
ANALYSIS DOMAIN DIAGRAM FOR BOTH THE USE CASES:



QUESTION 05:

Develop activity diagrams for "Process Sale" and "Handle Return" use cases.

a) Process sales



b) Handle Return