

IT304 - Software Engineering

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A Problem Description

A POS (Point-Of-Sale) system is a computer system typically used to manage the sales in retail stores. It includes hardware components such as a computer, a bar code scanner, a printer and also software to manage the operation of the store.

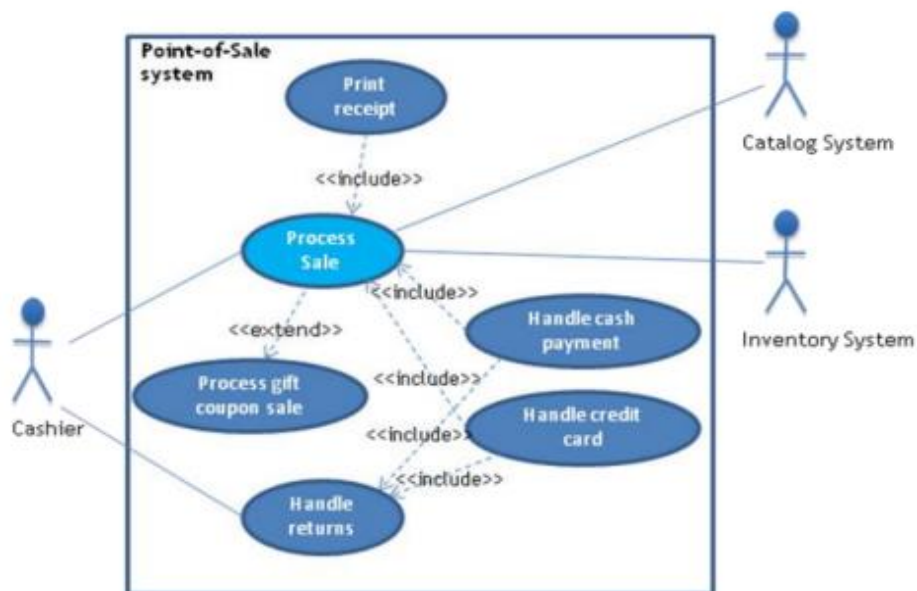
The most basic function of a POS system is to handle sales. When a customer arrives at a POS counter with goods to purchase, the cashier will start a new sale transaction. When the barcode of a good is read by the POS system, it will retrieve the name and price of this good from the backend catalog system and interact with the inventory system to deduce the stock amount of this good. When the sale transaction is over, the customer can pay in cash, credit card or even check. After the payment is successful, a receipt will be printed. Note that for promotion, the store frequently issues gift coupons. The customer can use the coupons for a better price when purchasing goods. Another function of a POS system is to handle returns.... [The details of which are not given here]

A user must log in to use the POS. The users of a POS system are the employees of the store including cashiers and the administrator. The administrator can access the system management functions of the POS system including user management and security configuration that cashiers can't do.

Question 1 : Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases

Process Sale

- Primary Actor: Cashier
- Preconditions:
 - Cashier is logged in.
 - Items are scanned and present in the inventory.
- Main Success Scenario:
 - The cashier initiates a new sale.
 - The system retrieves the item information (name, price) from the catalog system when the barcode is scanned.
 - The system interacts with the inventory system to reduce stock.
 - The cashier enters payment details (cash, card, or check).
 - The system processes the payment.
 - A receipt is printed.
 - If applicable, the system applies gift coupons.
 - Sale is completed, and the customer exits.
- Postconditions: The inventory is updated, and the payment is recorded.
- Extensions:



- If an item is not in stock, alert the cashier.
- If the payment fails, prompt the cashier to retry or select a different payment method.

Handle Return

- Primary Actor: Cashier
- Preconditions:
 - Cashier is logged in.
 - Customer has a valid receipt.
- Main Success Scenario:
 - The cashier initiates a return.
 - The system retrieves the sale details using the receipt.
 - The returned item is scanned and checked against the receipt.
 - The system updates the inventory to reflect the return.
 - The system processes the refund based on the original payment method.
 - A return receipt is printed.
- Postconditions: The inventory is updated, and the refund is recorded.
- Extensions:
 - If the receipt is invalid, alert the cashier.
 - If the item is damaged or non-returnable, notify the cashier.

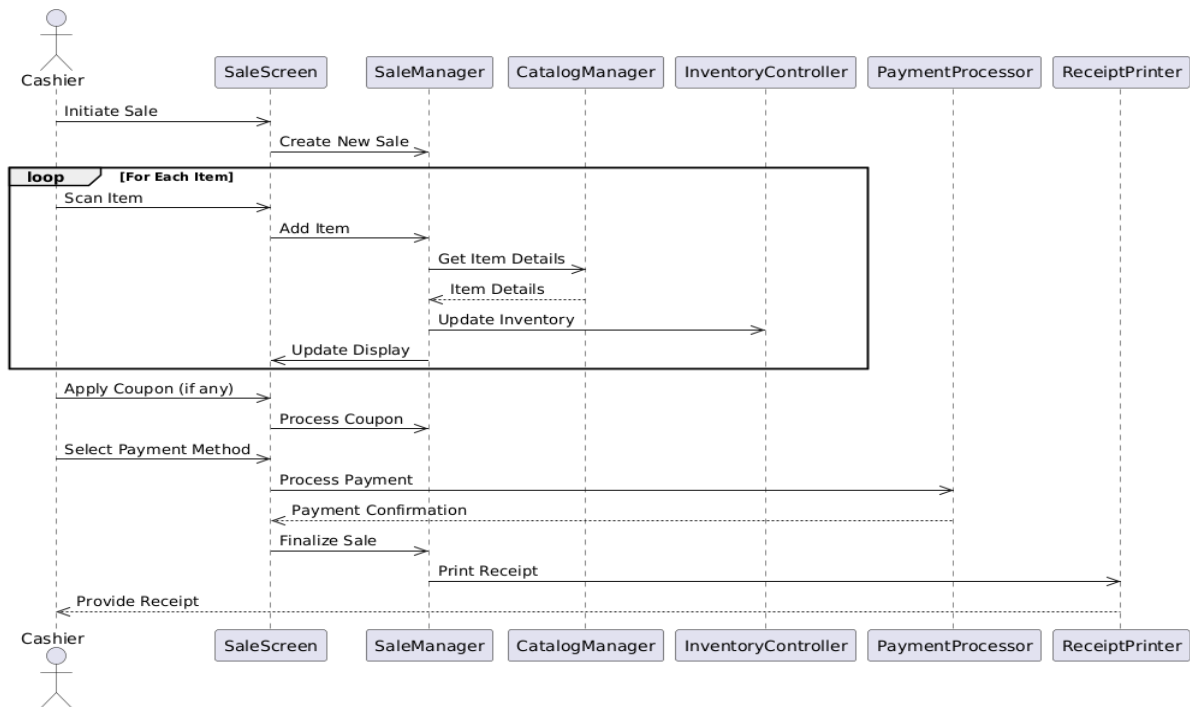
Question 2 : Entity/Boundary/Control Objects

- Entity Objects:
 - Sale,
 - Item,
 - Payment,
 - Receipt,
 - Inventory,
 - Catalog,
 - Return
- Boundary Objects:
 - POS Interface (for the cashier),
 - Barcode Scanner,
 - Receipt Printer,
 - Payment Gateway
- Control Objects:

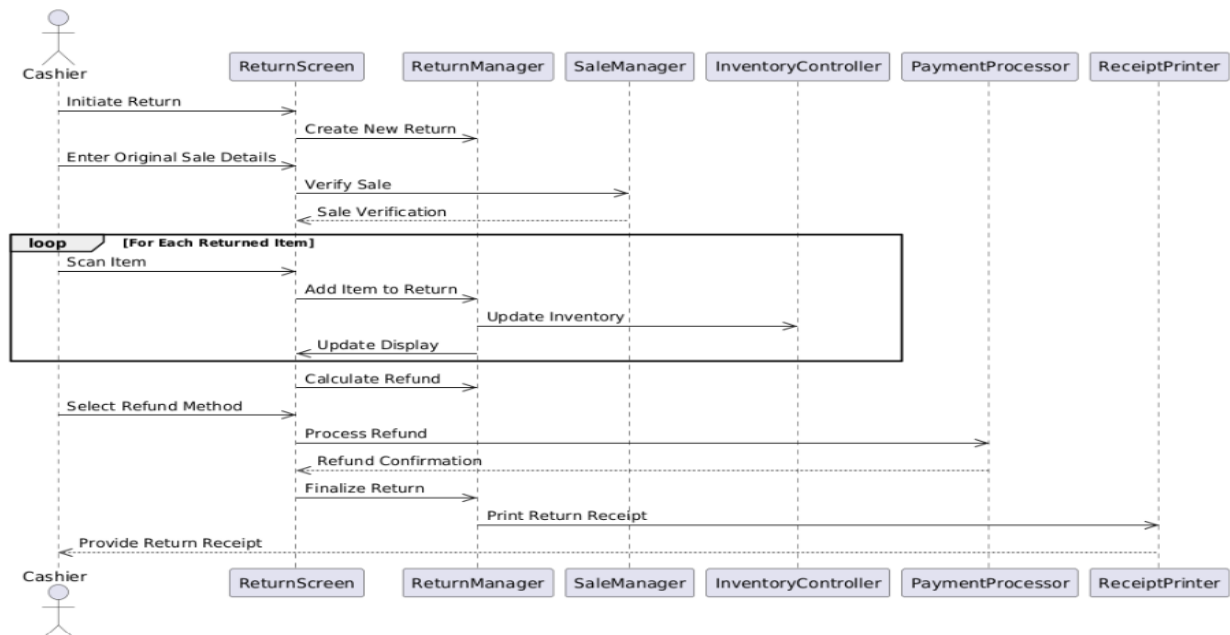
- SaleController,
- PaymentController,
- InventoryController,
- ReturnController

Question 3: Develop Sequence Diagrams

Use case for process sale

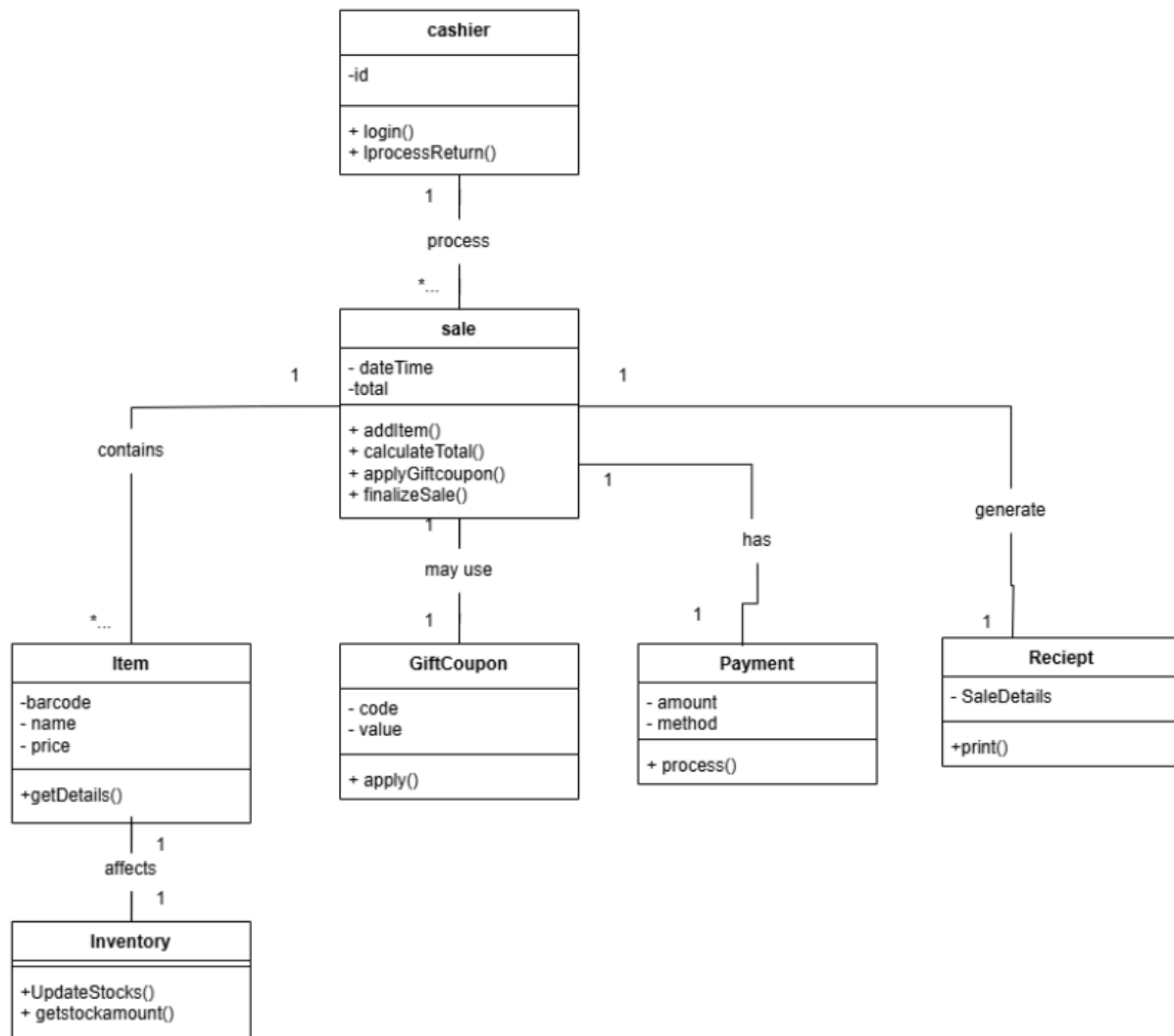


Use case for handle return

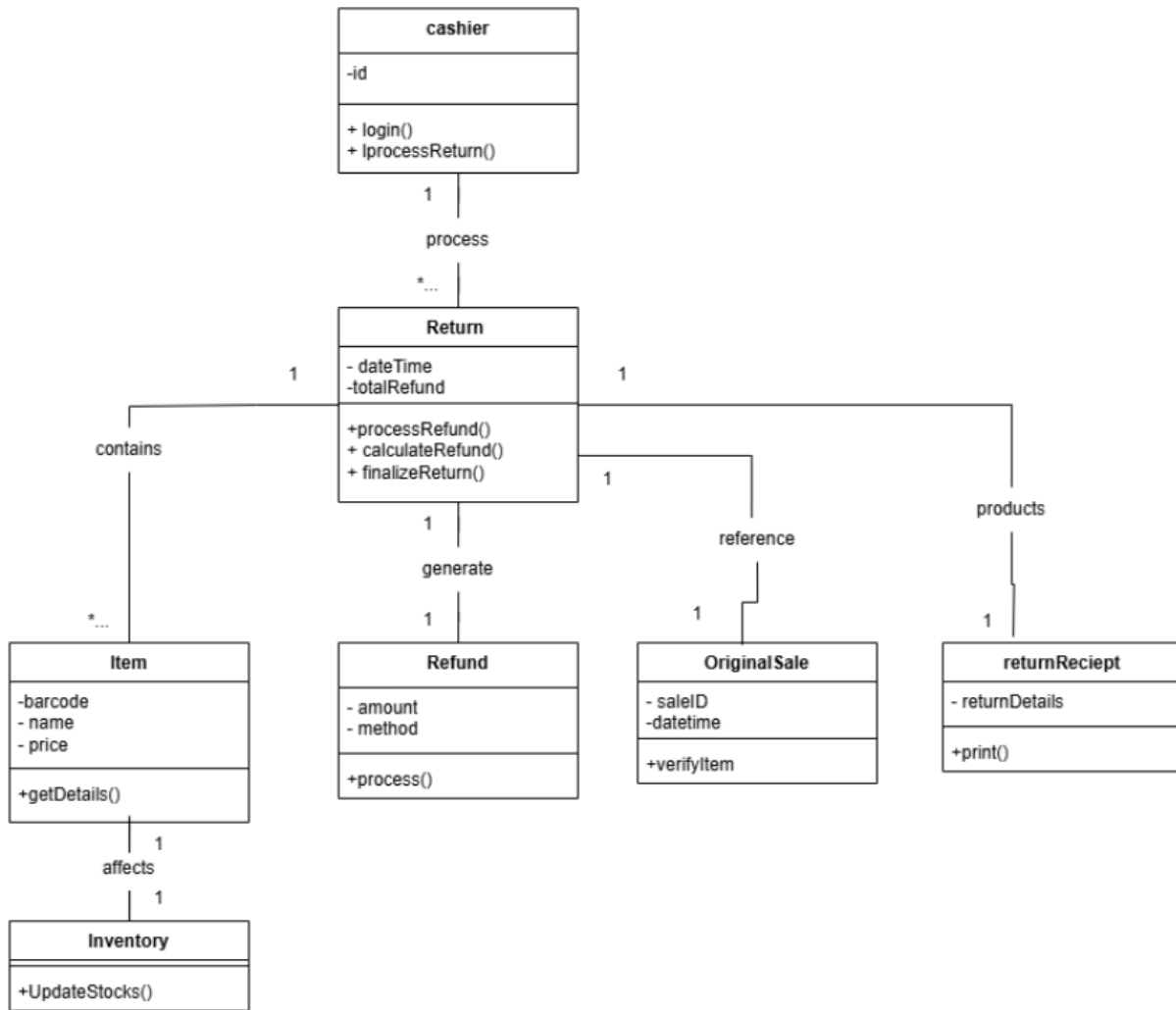


Question 4: Develop Analysis Domain Models

For process sale

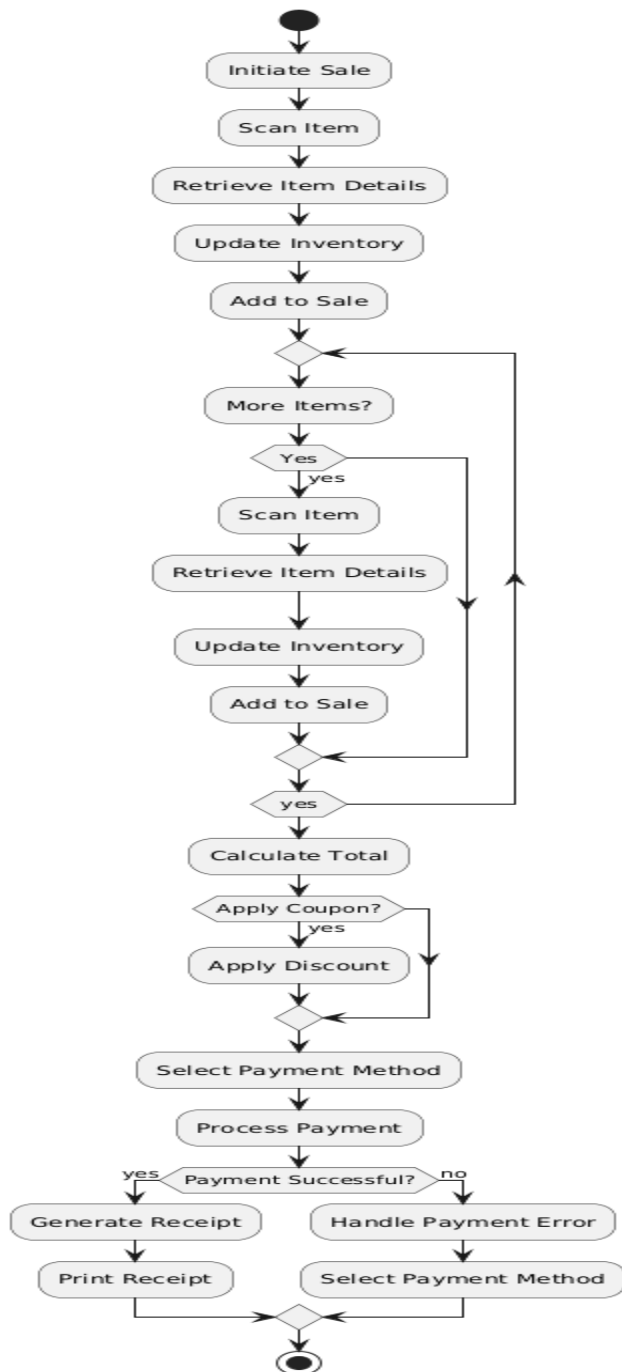


For handle return



Question 5 : Develop activity diagram for "Process Sale" and "Handle Return" use cases.

For process sale



For handle return

