SOFTWARE ENGINEERING

IT-314

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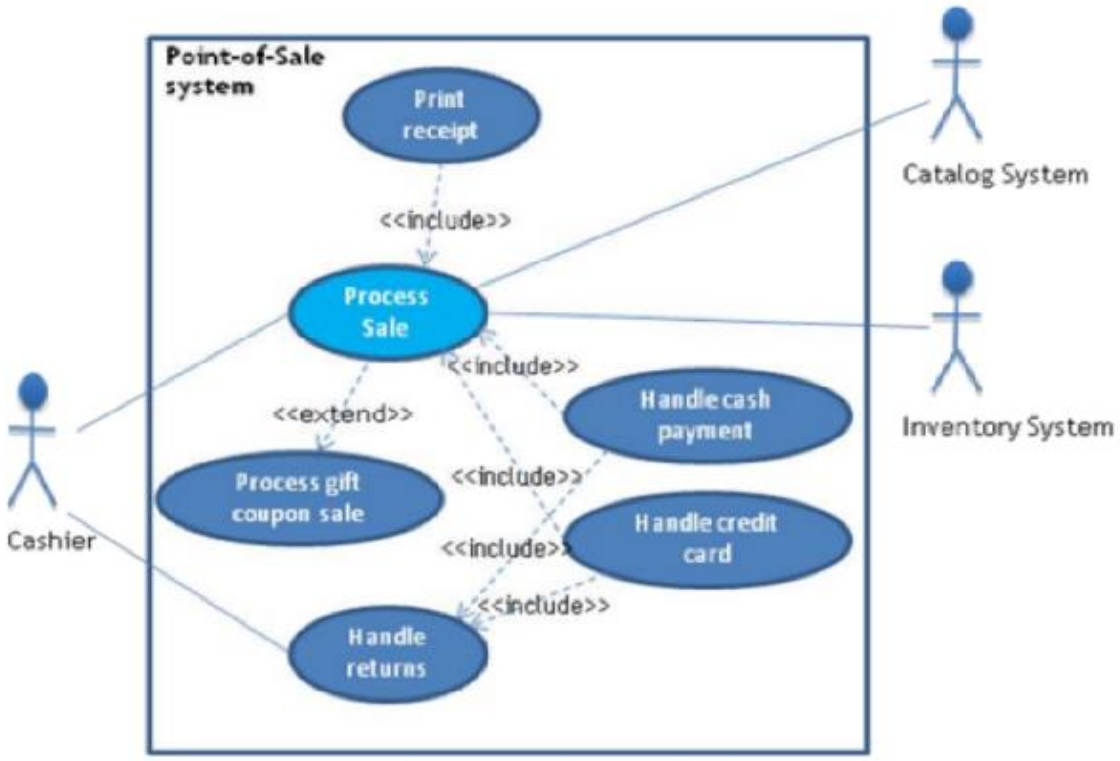
A Problem Description

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 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 issue 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.



Q1) Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

Answer :

Primary Actor: Cashier
Objective: To finalize a customer's purchase and complete the transaction.
Precondition: The customer has chosen items for purchase, and the cashier is logged into the system.

Main Steps:

1. The cashier initiates a new sale by scanning the barcode of the item.
2. The point-of-sale (POS) system retrieves item details (such as price and description) from the catalog system.
3. The item is added to the ongoing sale in the POS system.
4. Steps 1-3 are repeated for each item the customer intends to purchase.
5. The cashier chooses the method of payment (e.g., cash, credit card).
6. The POS system computes the total amount and updates the inventory accordingly.
7. The payment transaction is executed.
8. A receipt is generated and given to the customer.

Postcondition: The transaction is completed, and the inventory records are updated.
Alternative Flow: If the payment is unsuccessful, the system will prompt the cashier to select a different payment method or to cancel the sale.

Handle Return

Primary Actor: Cashier
Objective: To facilitate the return of items that were previously purchased.
Precondition: The customer presents a valid receipt, and the cashier is logged into the system.

Main Steps:

1. The cashier selects the return option within the POS system.
2. The system prompts the cashier for receipt information or the original transaction number.
3. The cashier scans the items that the customer wishes to return.

4. The POS system interacts with the inventory system to restock the returned items.
5. The system calculates the refund amount due to the customer.
6. The cashier finalizes the return by processing either a cash refund or a credit card refund.
7. The inventory is updated, and a return receipt is printed for the customer.

Postcondition: The return process is completed, and inventory records are adjusted.
Alternative Flow: If the receipt is not valid or if the item cannot be returned, the system will show an error message and terminate the return process.

Q2) Identify Entity/Boundary Control Objects.

Answer :

Entity Objects:

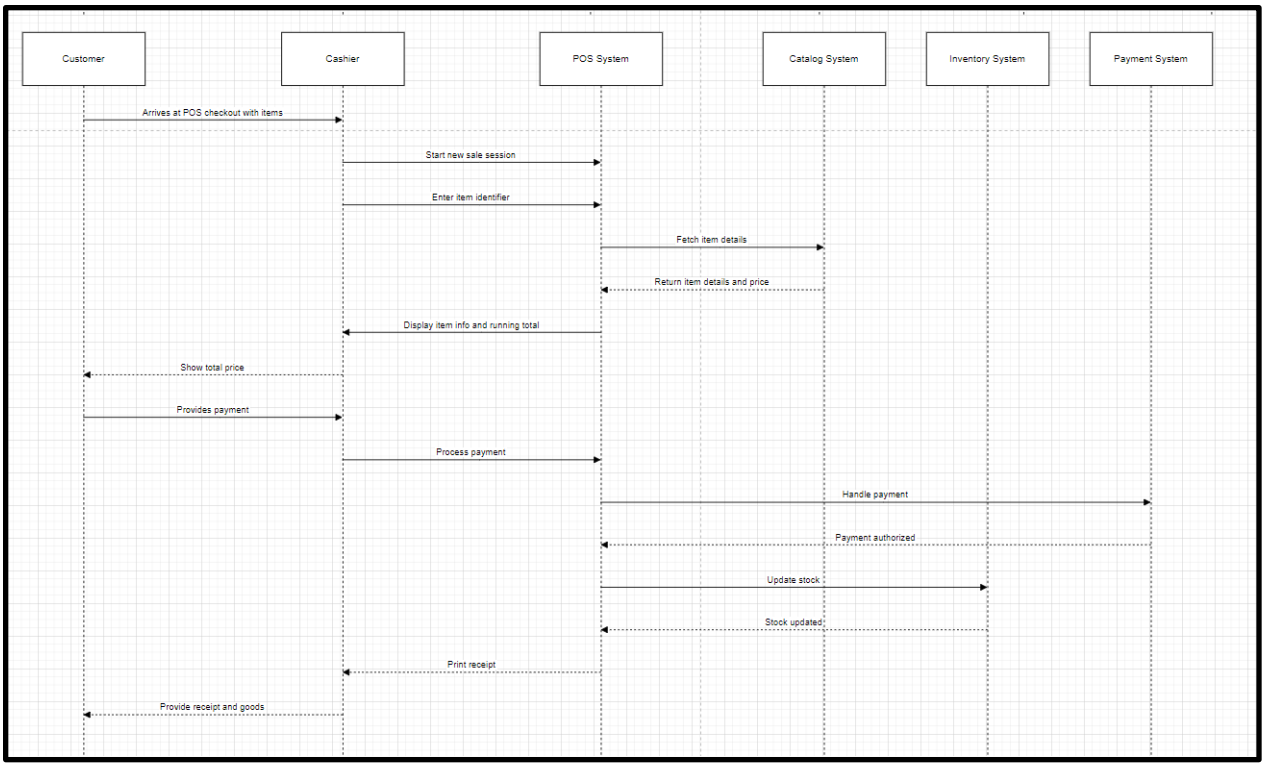
- Sale
- Item for sale
- Customer
- Payment
- Receipt
- Return Transaction

Boundary Objects:

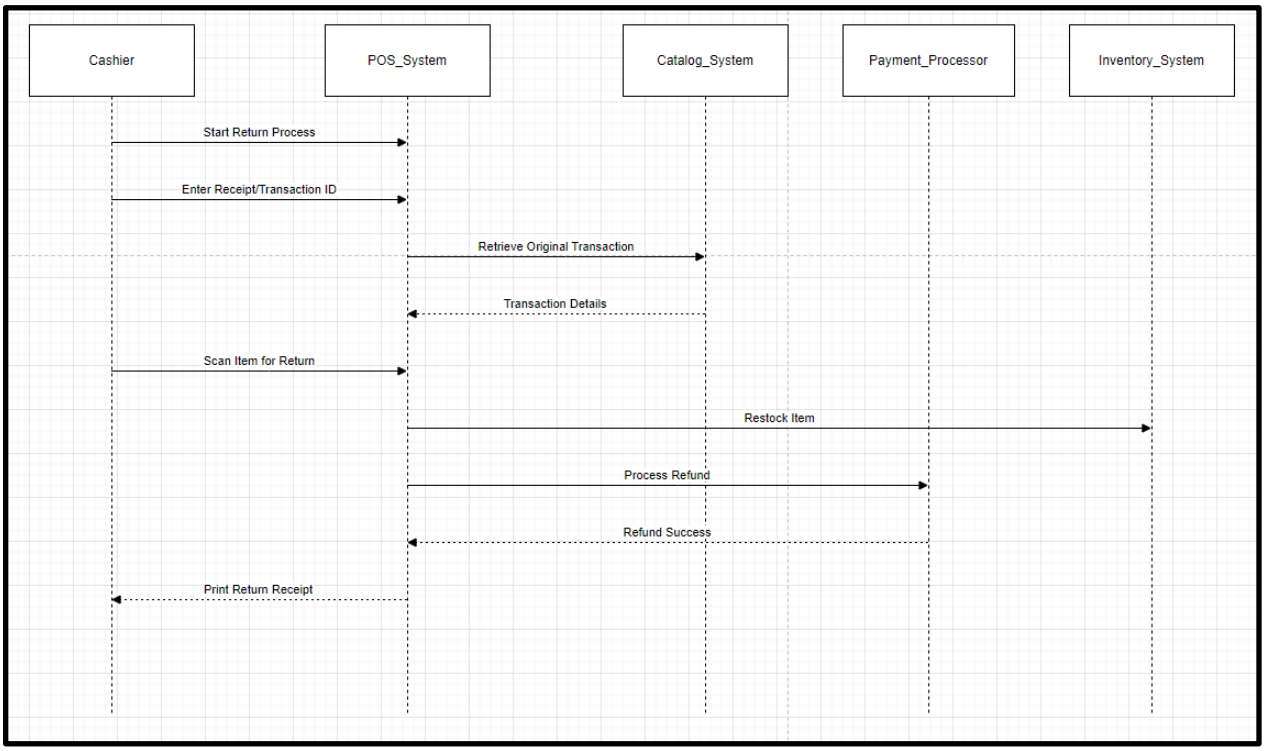
- Cashier Interface: The user interface used by the cashier for scanning items and entering transaction details.
- Catalog System: Provides essential item information, such as pricing and descriptions.
- Inventory System: Manages updates to item stock levels following sales and returns.
- Payment System: Facilitates the processing of cash and card payments.

Q3) Develop Sequence Diagrams.

Answer :

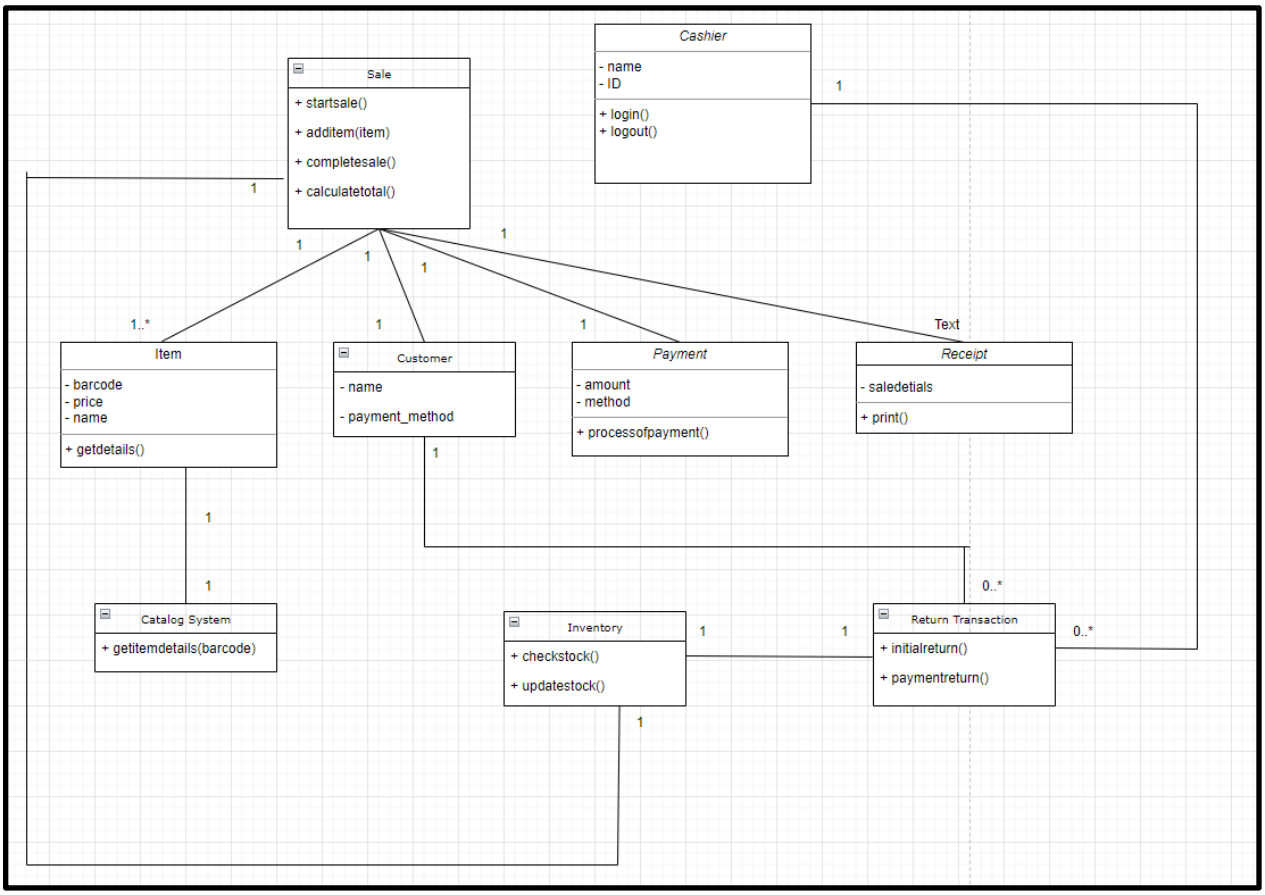


Handle return



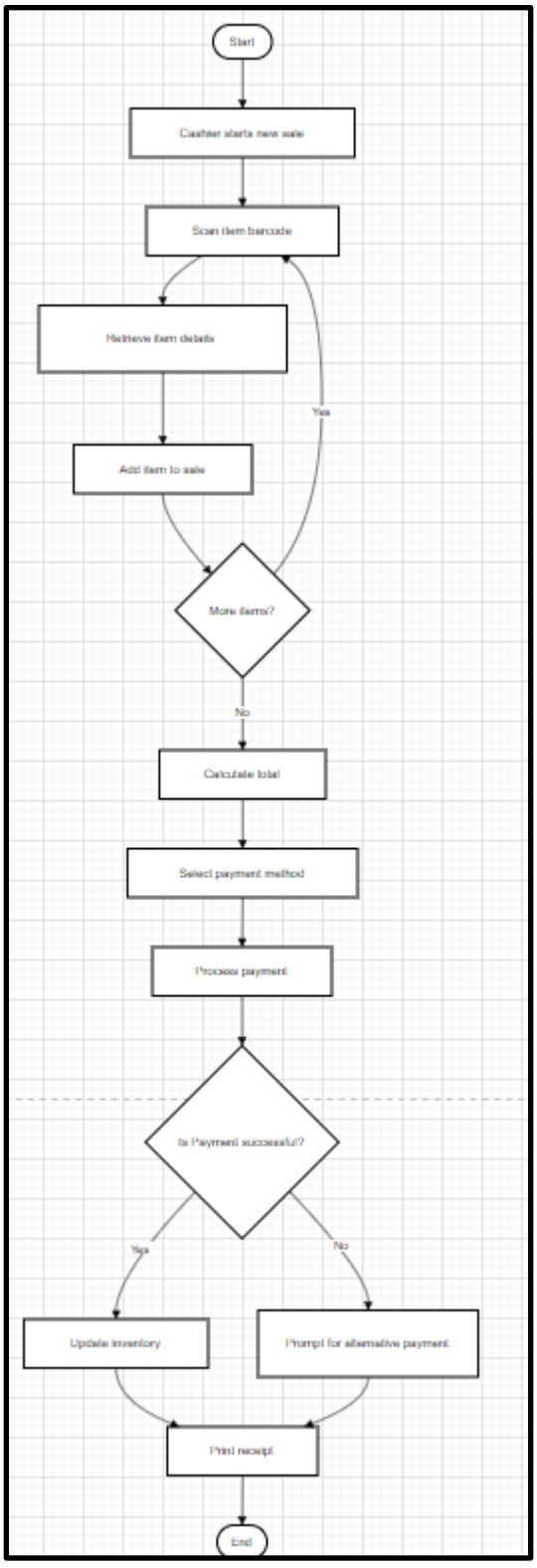
Q4) Develop Analysis Domain Model.

Answer :



Q5) Develop activity diagram for "Process Sale" and "Handle Return" use cases.

Answer :


Start
Cashier starts new sale
Scan item barcode
Retrieve item details
Add item to sale
Yes
More items?
No
Calculate total
Select payment method
Process payment
Is Payment successful?
Yes
No
Update inventory
Prompt for alternative payment
Print receipt
End

Handle return