Dhirubhai Ambani
Institute of Information and Communication Technology

IT 314

SOFTWARE ENGINEERING

# Modeling Class Diagram and Activity Diagram

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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 catalogue 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.

**Tasks:**

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

## Process Sale:

**Primary Actor:** Cashier Goal: To efficiently process a customer's purchase and complete the sale while ensuring accuracy and customer satisfaction.

**Precondition:**

- The customer has selected items for purchase
- The cashier is logged into the POS system
- The POS system is connected to the inventory and payment processing systems

**Main Flow:**

1. The cashier greets the customer and initiates a new sale in the POS system.

2. For each item: a. The cashier scans the item's barcode or manually enters the product code. b. The POS system retrieves item details (price, description, etc.) from the catalogue system. c. The POS system adds the item to the current sale and displays it on the screen. d. The cashier verifies the scanned item matches the physical item.
3. Once all items are scanned, the cashier asks if the customer has any coupons or discount codes.
4. If applicable, the cashier applies any valid discounts or promotions.
5. The cashier informs the customer of the total amount due.
6. The cashier asks for the customer's preferred payment method.
7. Based on the chosen method, the cashier processes the payment: a. For cash: Enter the amount received and provide change if necessary. b. For card: Process the card payment through the integrated payment system. c. For mobile payment: Initiate the mobile payment process.
8. The POS system updates the inventory in real-time.
9. The cashier asks if the customer wants a receipt (digital or paper).
10. The receipt is generated and provided to the customer as requested.
11. The cashier thanks the customer and concludes the transaction.

**Postcondition:**

- The sale is completed and recorded in the system
- The inventory is updated
- The payment is processed and recorded
- The customer receives their purchased items and receipt

**Alternative Flows:**

1. Item not found in system: a. Cashier manually enters the item details or requests a price check. b. Supervisor approval may be required for manual price entries.
2. Payment failure: a. The system displays an error message. b. The cashier informs the customer and offers alternative payment methods. c. If no alternative is available, the transaction is voided.

## Handle return:

**Primary Actor:** Cashier Goal: To efficiently and accurately process the return of purchased items while ensuring customer satisfaction and maintaining inventory integrity.

**Precondition:**

- The customer has a valid receipt or proof of purchase
- The cashier is logged into the POS system
- The POS system is connected to the inventory and payment processing systems
- The items being returned are in a condition eligible for return as per store policy

**Main Flow:**

1. The cashier greets the customer and inquires about the reason for the return.
2. The cashier selects the "Process Return" option in the POS system.
3. The cashier asks for the receipt or proof of purchase: a. If a physical receipt is provided, the cashier scans the receipt's barcode. b. If a digital receipt, the cashier enters the transaction number or customer information. c. If no receipt, the cashier follows the store's no-receipt return policy.
4. The POS system retrieves the original transaction details.
5. For each item to be returned: a. The cashier scans the item or manually enters the product code. b. The cashier inspects the item to ensure it meets return criteria (e.g., unused, undamaged). c. The POS system verifies the item against the original purchase and store's return policy. d. The cashier selects the reason for return (e.g., defective, unwanted gift, wrong size).
6. The POS system calculates the refund amount, considering: a. Original purchase price b. Any applicable restocking fees c. Current promotions or price changes
7. The cashier confirms the total refund amount with the customer.
8. The cashier processes the refund: a. For original cash purchases: Provide cash refund b. For card purchases: Process refund to the original payment card c. For other payment methods: Follow store policy (e.g., store credit)
9. The POS system communicates with the inventory system to: a. Update stock levels b. Flag returned items for resale, repair, or disposal as appropriate
10. The cashier generates and provides a return receipt to the customer.
11. The cashier thanks the customer and concludes the transaction.

**Postcondition:**

- The return is completed and recorded in the system
- The inventory is updated
- The refund is processed and recorded
- The customer receives the refund and a return receipt

**Alternative Flows:**

1. Item ineligible for return: a. The system alerts the cashier of the ineligibility. b. The cashier explains the reason to the customer (e.g., past return window, final sale item). c. If appropriate, offer store credit or an exchange instead.

**2)**

## Entity Objects:

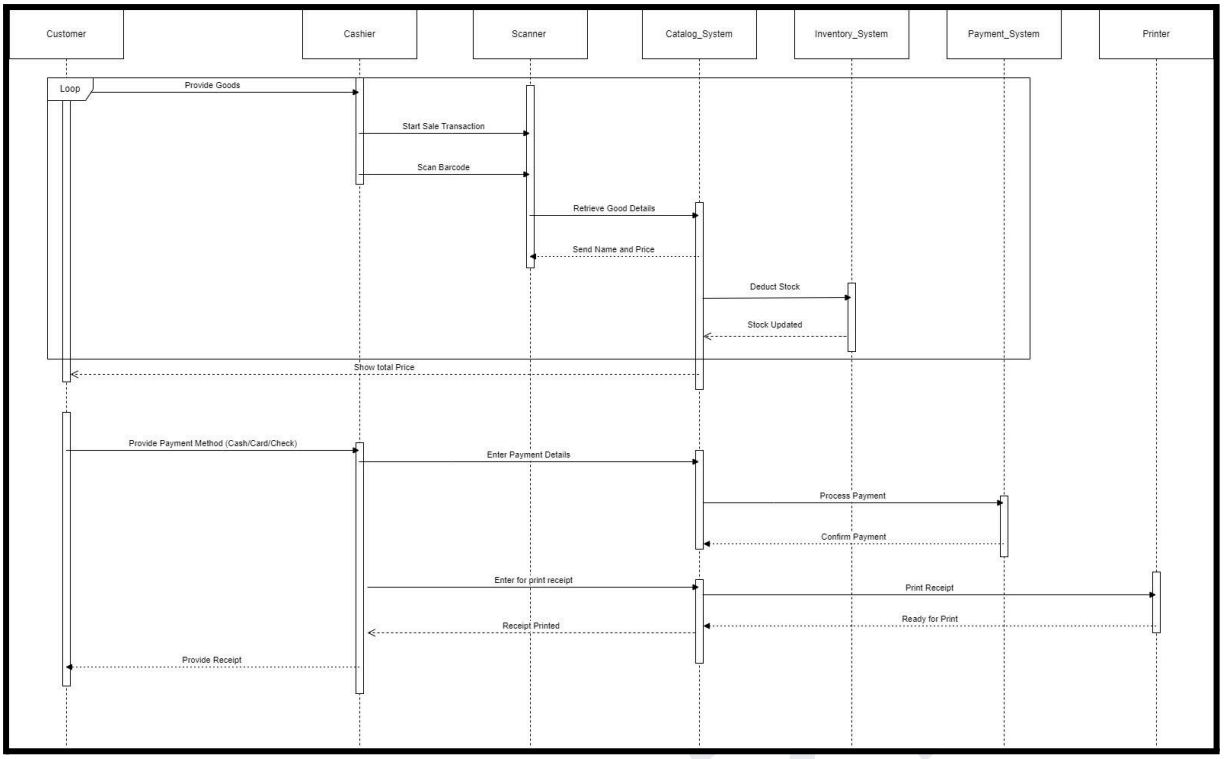
1. Sale
2. Item
3. Customer
4. Payment
5. Receipt
6. Return Transaction

## Boundary Objects:

1. Cashier Interface
2. UI for scanning and entering details
3. Catalogue System
4. Provides item details
5. Inventory System
6. Updates item stock
7. Payment System
8. Handles cash/card payments

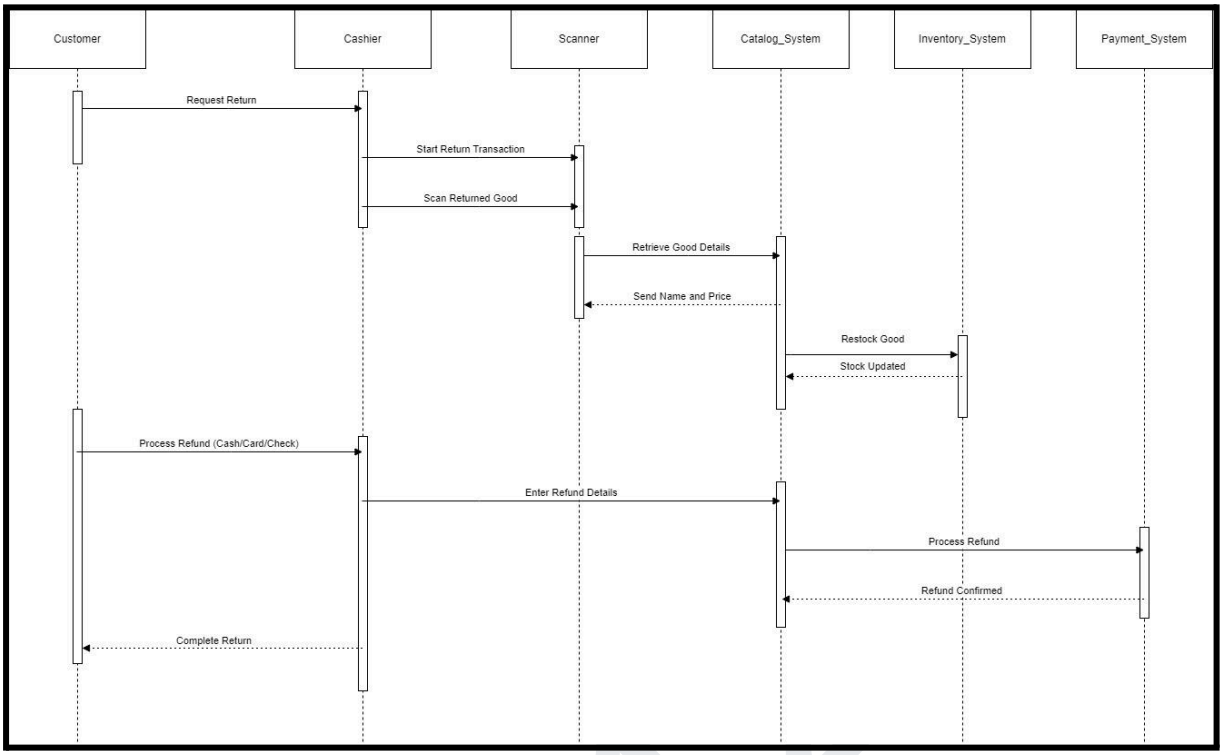
**3)**

**Sequence Diagram of process Sale:**



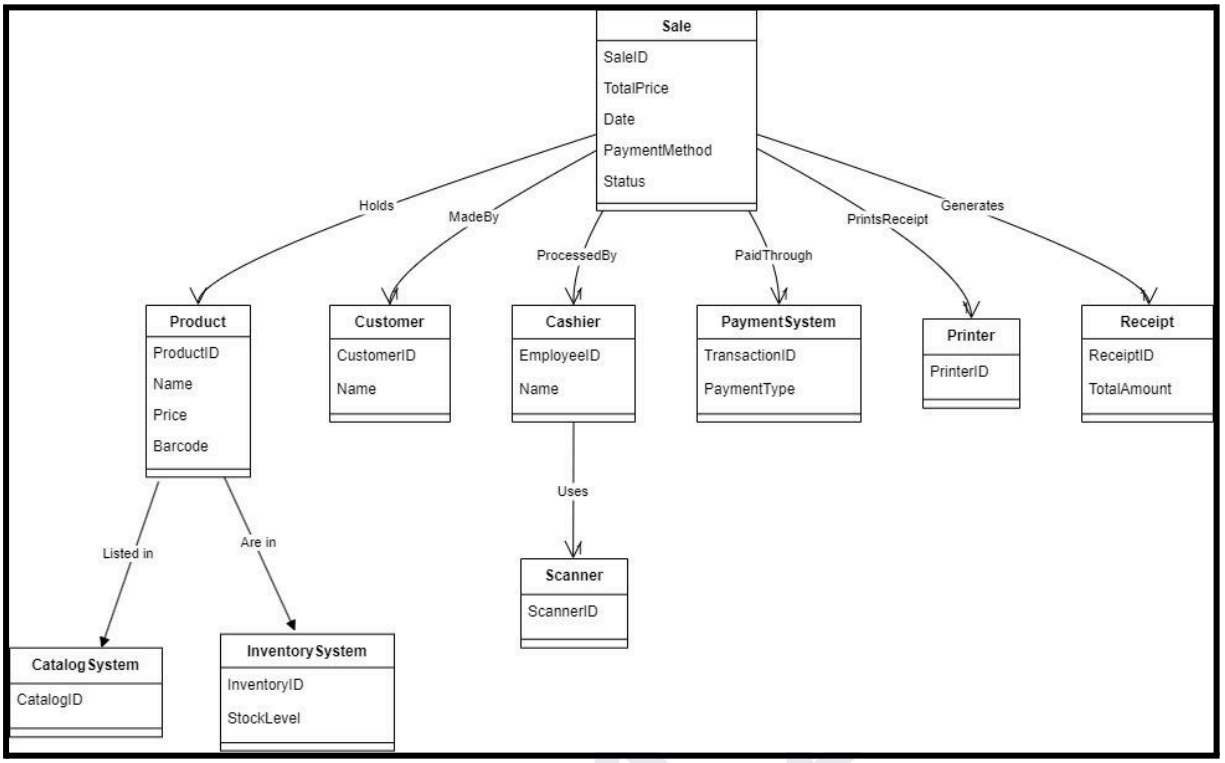

- Process sale contains loop because at a time customer will buy more than one items.

## Sequence Diagram of Handle Return:

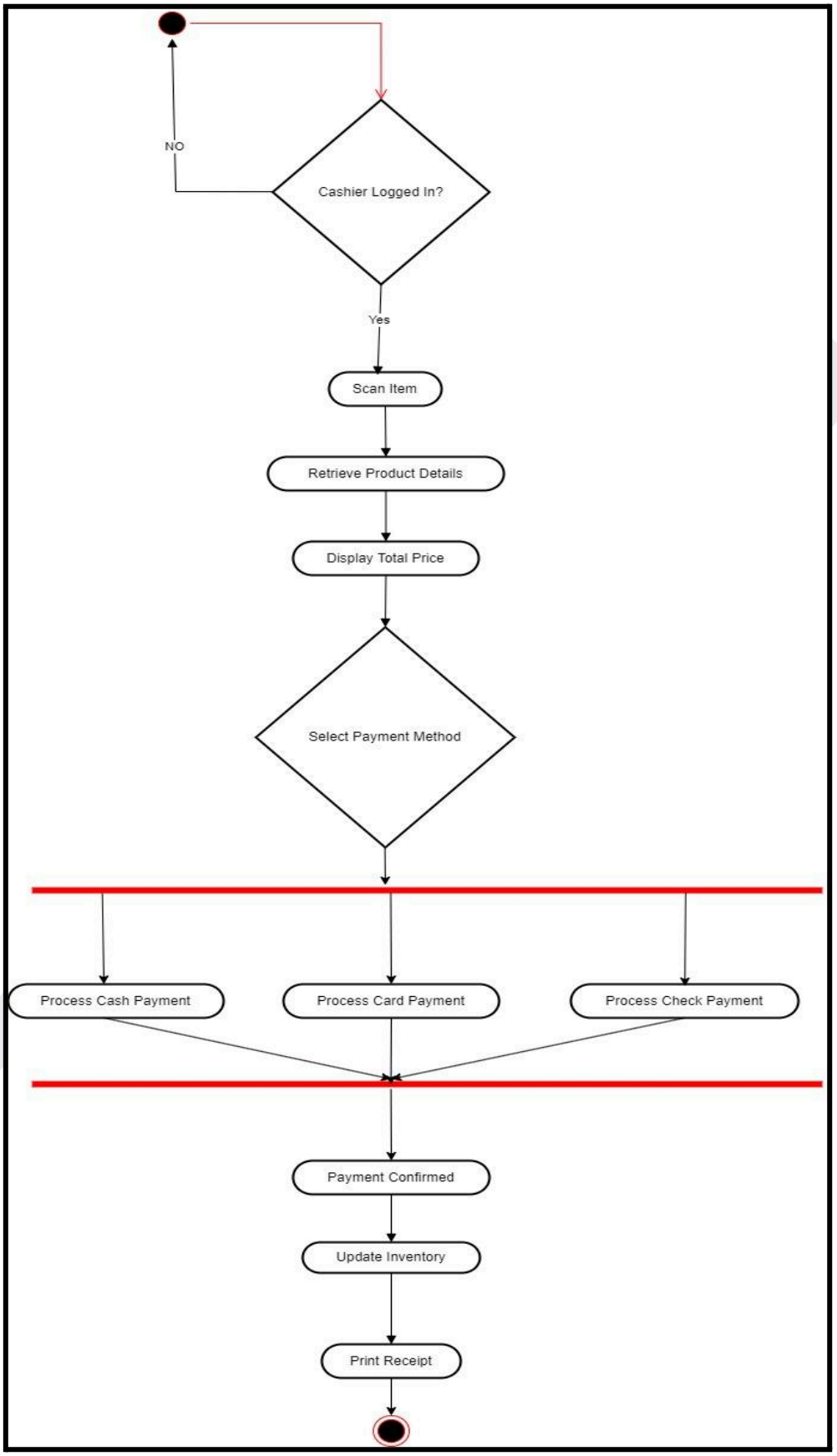



- I didn't include a loop here because at a time there is less probability of returning more than one item so it may be feasible to not include a loop.

## 4) Develop Anaysis Domain:



## 5) Activity Diagram for Process sell:



## Activity Diagram for Handle return: