Software Engineering (IT-314)

Lab 6 : Modeling Class Diagram and Activity Diagram

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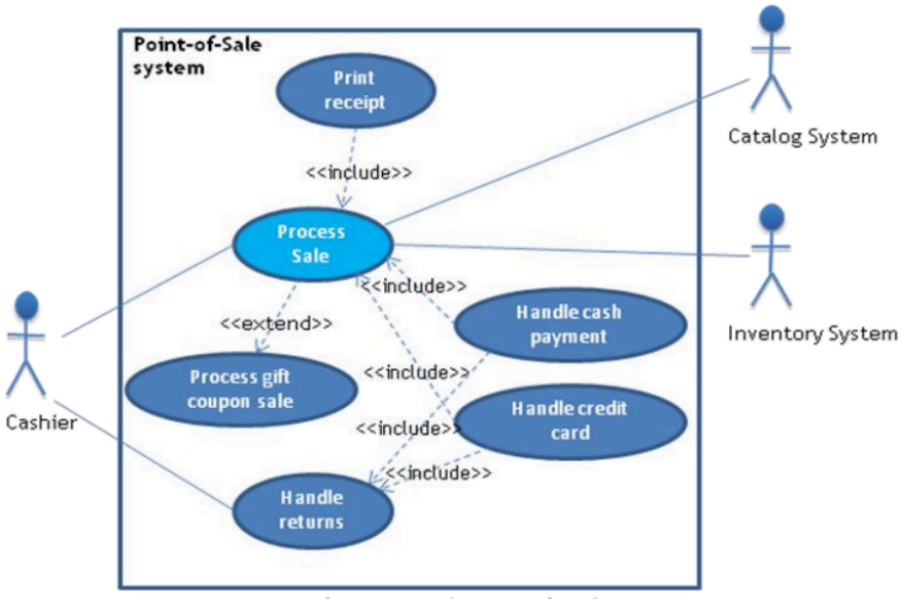
Lab group - 14

(Q1)

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.



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

- **Process Sale**

Primary Actor: Cashier

Goal : To complete the customer's transaction and finalize the sale.
Precondition: The customer has chosen items for purchase, and the cashier is logged into the system.

Main Flow:

1. The cashier initiates a new transaction by scanning the item's barcode.
2. The POS system retrieves item details (such as price and description) from the catalog system.
3. The item is added to the transaction in the POS system.
4. Steps 1-3 are repeated for each item the customer intends to buy.
5. The cashier selects the payment option (cash, credit card, etc.).
6. The POS system calculates the total amount and updates the inventory records.
7. The payment is processed successfully.
8. A receipt is generated and provided to the customer.

Postcondition: The transaction is completed, and inventory records are updated accordingly.

Alternative Flow: If the payment is unsuccessful, the system will prompt for a different payment method or allow the transaction to be canceled.

- **Handle Return**

Primary Actor: Cashier

Goal: To handle the return of purchased items.
Precondition: The customer possesses a valid receipt, and the cashier is logged into the system.

Main Flow:

1. The cashier selects the return option in the POS system.
2. The system prompts for the receipt details or the original transaction number.
3. The cashier scans the items that the customer wishes to return.
4. The POS system coordinates with the inventory system to restock the returned items.
5. The system calculates the refund amount.
6. The cashier processes the return by issuing a cash refund or a card refund.
7. The inventory is updated, and a return receipt is generated.

Postcondition: The return is finalized, and inventory records are updated.

Alternative Flow: If the receipt is invalid or the item cannot be returned, the system displays an error message and cancels the return process.

2). Identify Entity/Boundary Control Objects

- **Entity Objects**

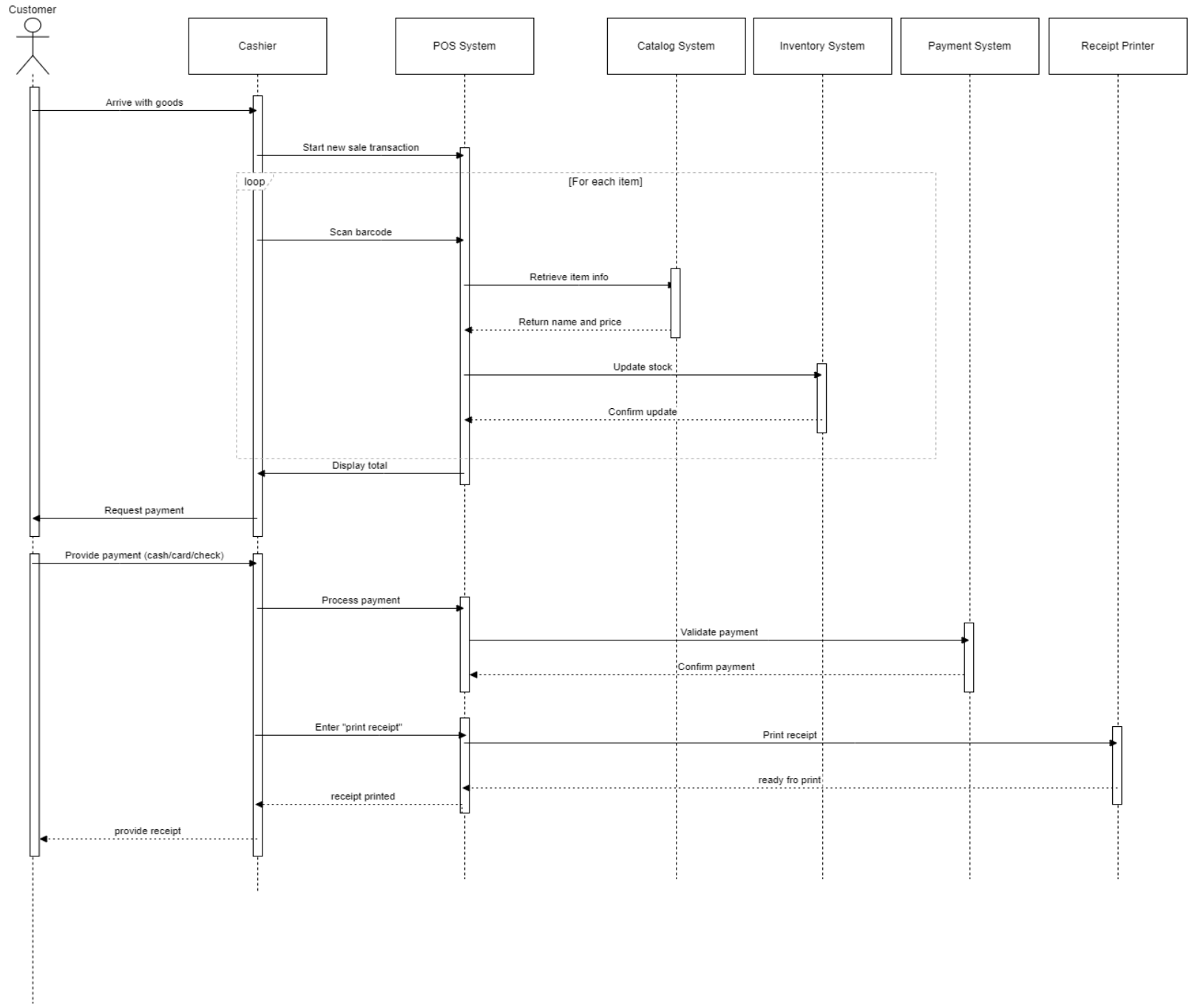
Sale	**Item**	**Customer**
Payment	**Receipt**	**Return Transaction**

- **Boundary Objects**

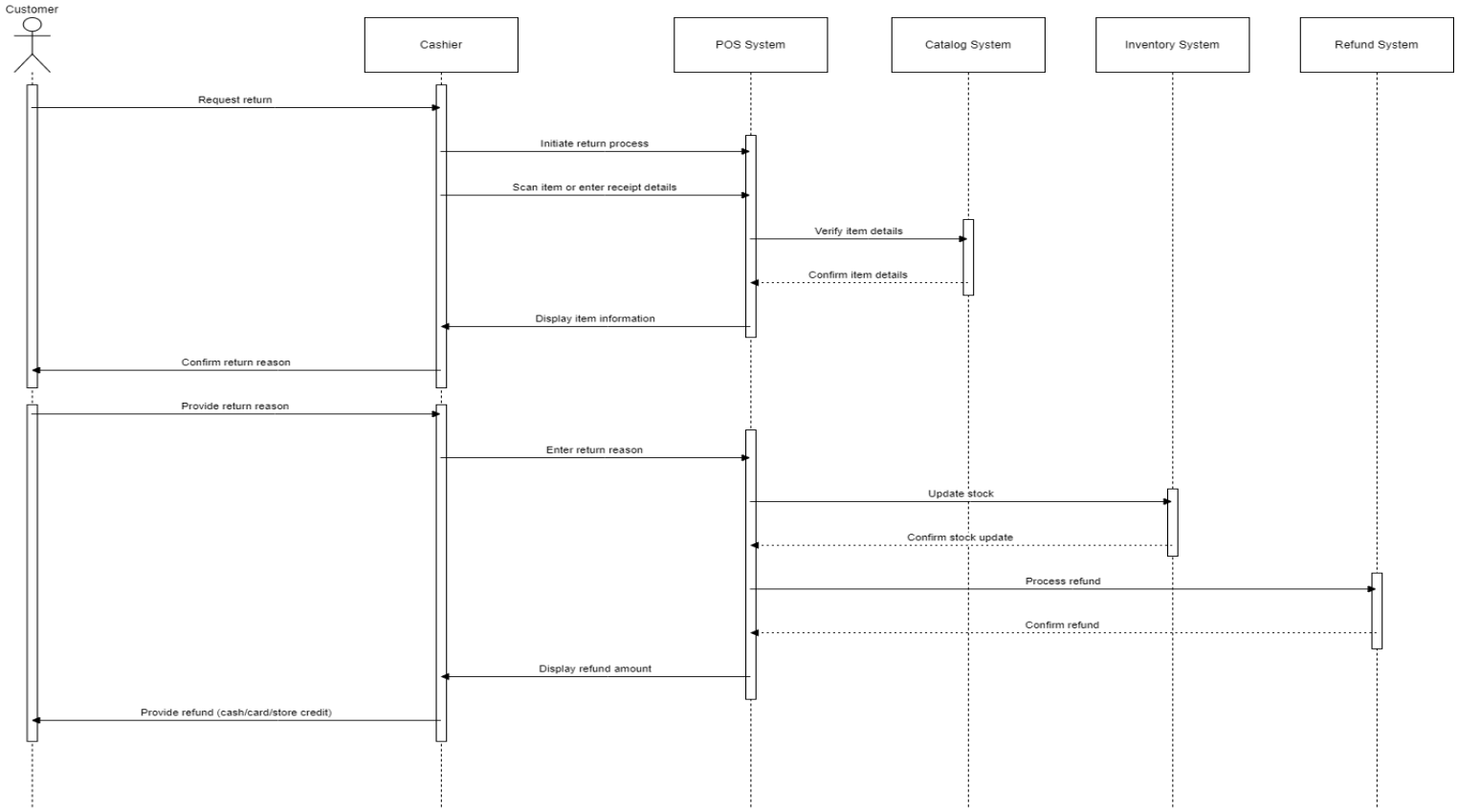
Cashier Interface	**UI for scanning and entering details**
Catalog System	**Provides item details**
Inventory System	**Updates item stock**
Payment System	**Handles cash/card payments**

3). Develop Sequence Diagrams

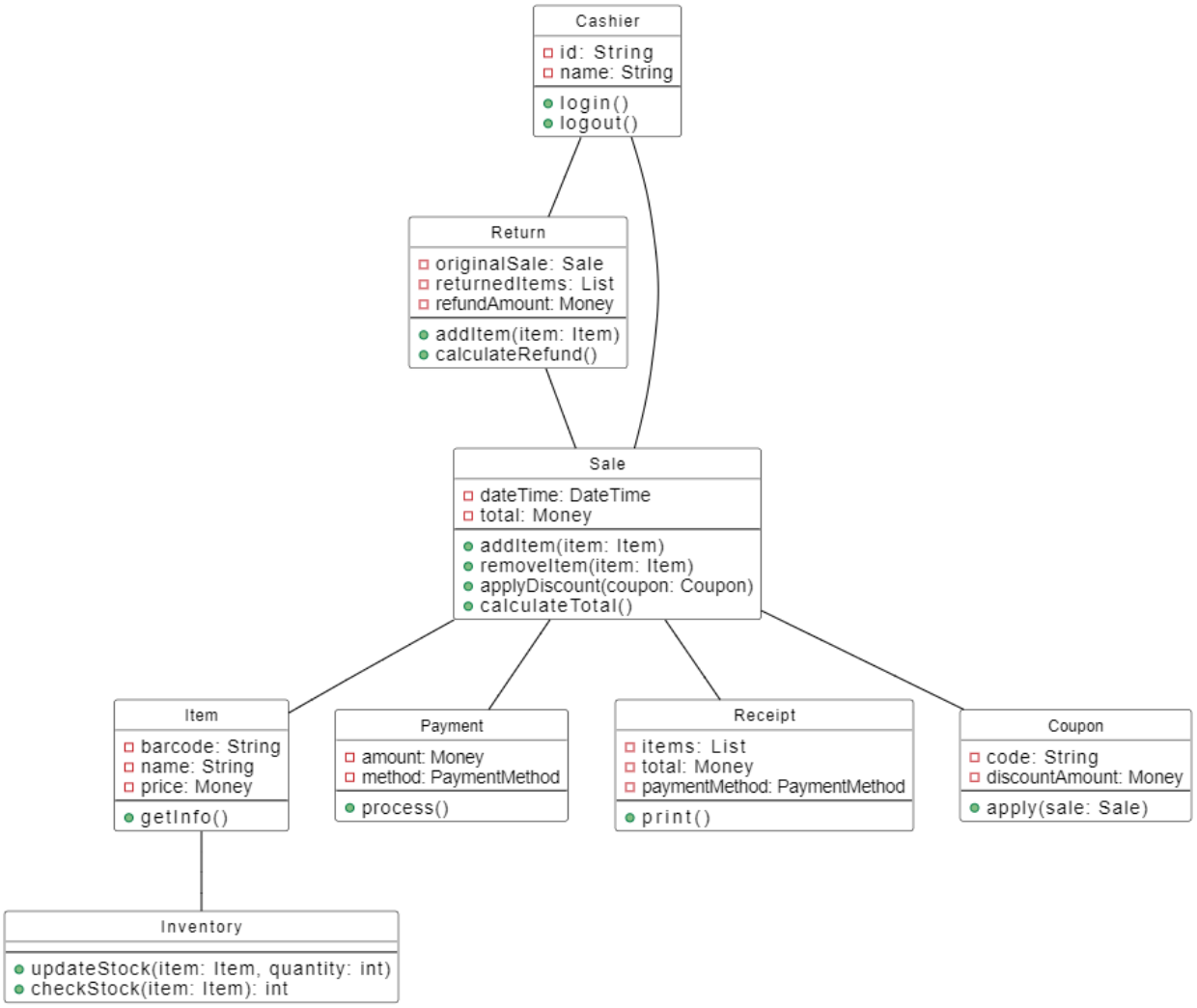
- **Process Sale**



- **Handle Return**

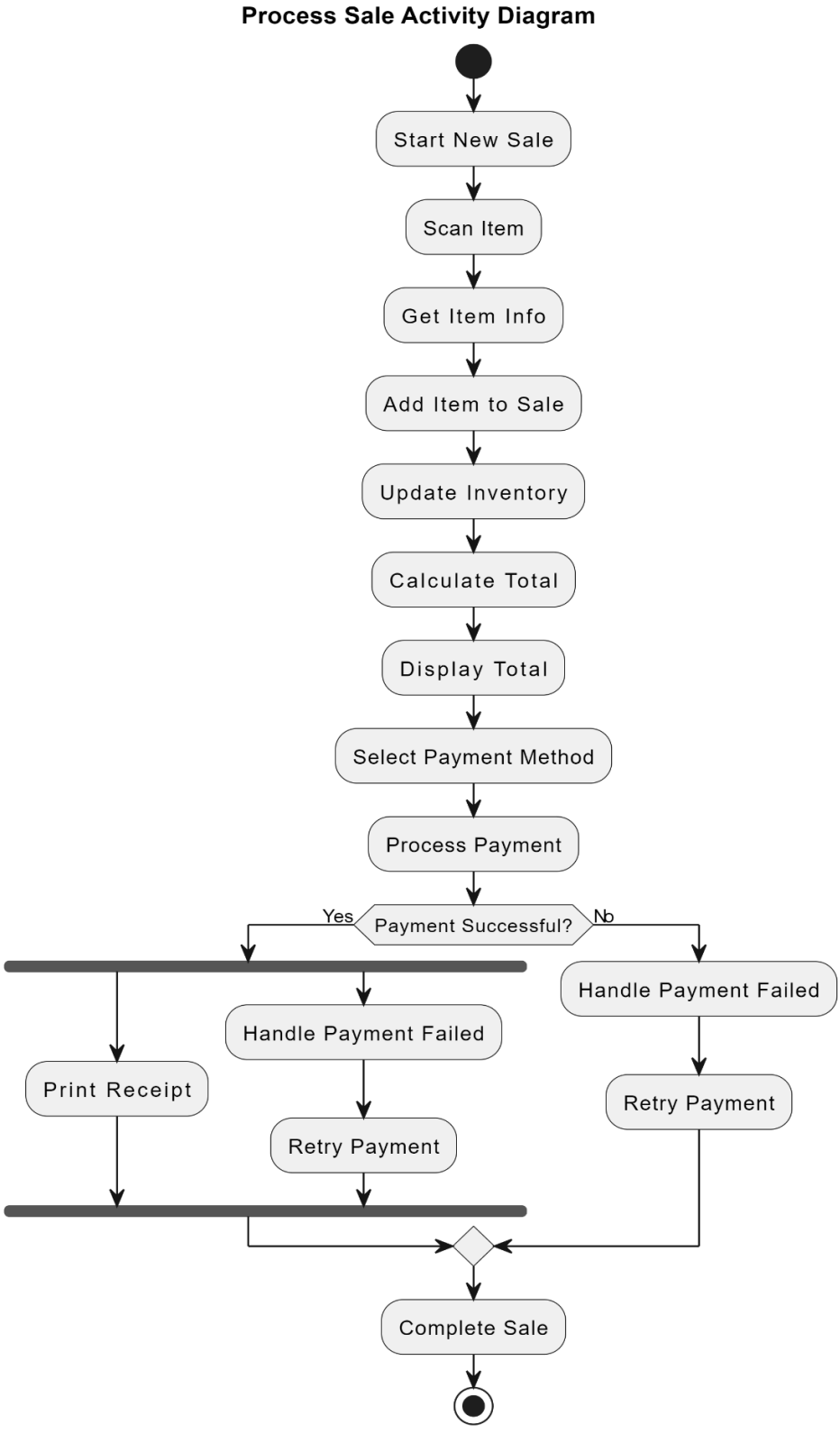


4). Develop Analysis Domain Model



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

- **Process Sale**



- **Handle Return**