IT-314 Software Engineering

Lab Session: Modeling Class Diagram and Activity Diagram (Point of Sale System)

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

1) Process Sale:

- **Actors**: Cashier, Customer, System
- **Trigger**: A customer wants to purchase items.
- **Main Flow**:
    - The cashier starts a new sale transaction.
    - The cashier scans the items' barcodes.
    - The system retrieves item details (name, price) from the backend catalog and updates the stock in the inventory system.
    - The cashier enters the payment method (cash, card, etc.).
    - The system processes the payment.
    - A receipt is printed.
- **Extensions**:
    - If a coupon is used, the system applies the discount.
    - If payment fails, an error message is displayed.

2) Handle Return:

- **Actors**: Cashier, Customer, System
- **Trigger**: A customer returns an item.
- **Main Flow**:
    1. The cashier starts a return transaction.
    2. The cashier scans the returned item's barcode.
    3. The system verifies the original sale.
    4. The system updates the stock and processes the refund.
    5. A return receipt is printed.

2) Identify Entity/Boundary Control Objects

Entity Objects:

- `Item`: Represents goods in the store.
- `Transaction`: Stores details about each sale or return.
- `Inventory`: Tracks stock levels of items.
- `Receipt`: Contains details of the transaction (sale/return).

Boundary Objects:

- `POS Screen`: Interface for the cashier to interact with the system.
- `Barcode Scanner`: Device to input item codes.

Control Objects:

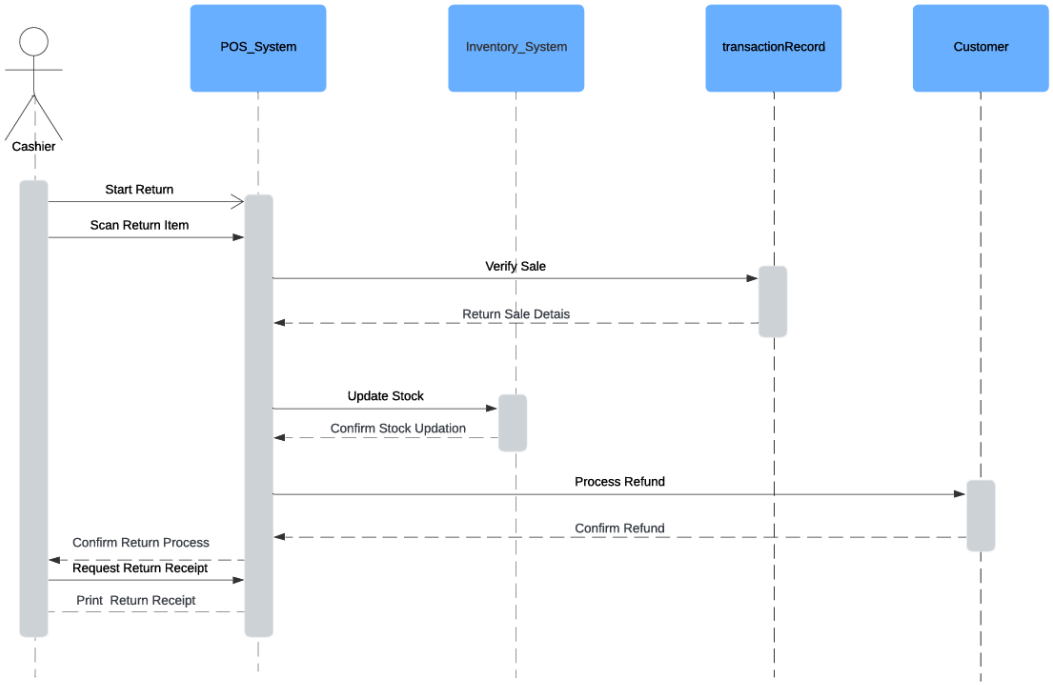
- `Sale Processor`: Manages the sale process, including item scanning and payment.
- `Return Processor`: Manages the return process.

3) Develop Analysis Domain Models

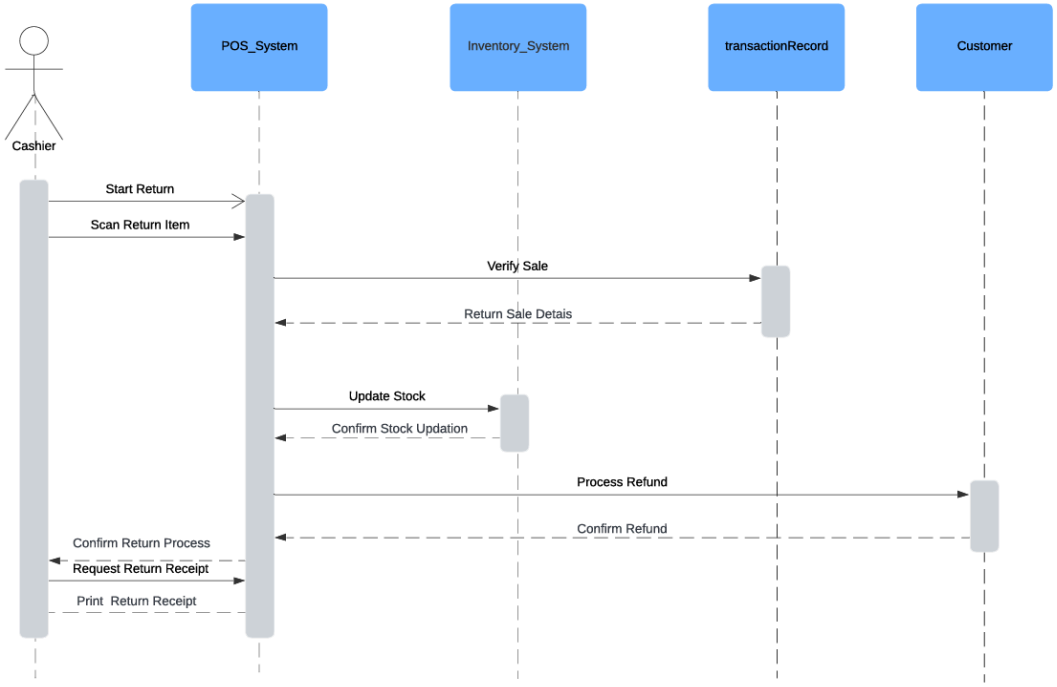
- **Entities**:
    - **Sale Transaction**: Contains details such as item, price, quantity, and total amount.
    - **Customer**: Information about the buyer (optional in POS).
    - **Payment**: Details of the payment (method, amount, status).
    - **Return Transaction**: Similar to a sale but for returned goods.
    - **Inventory**: Details about stock levels and items.
- **Relationships**:
    - Each **Sale Transaction** is linked to one or more **Items**.
    - **Payment** is associated with each **Sale Transaction**.
    - **Return Transaction** modifies stock in **Inventory**.

- Sequence Diagram

1) Process Sale

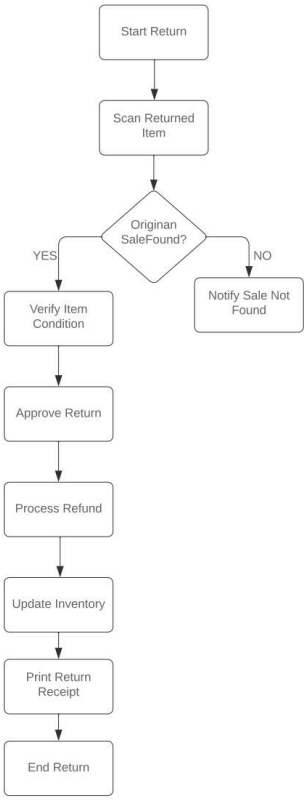


2) Handle Return

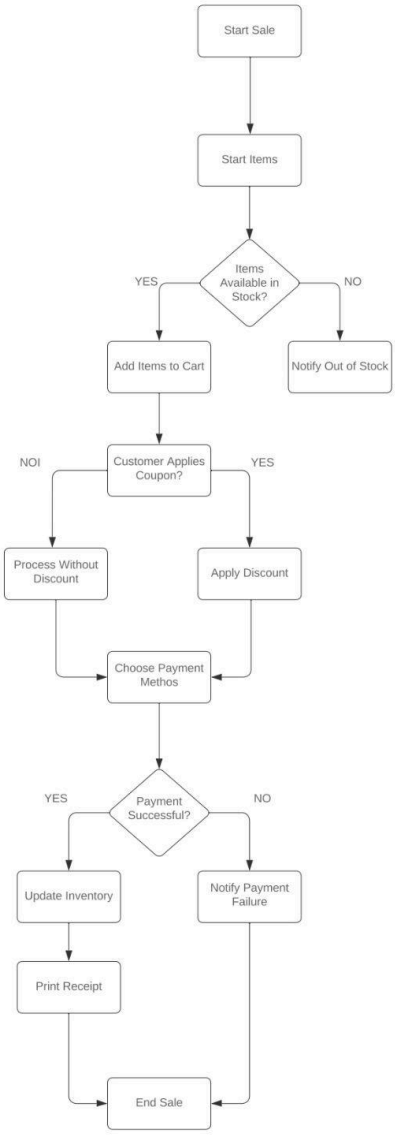
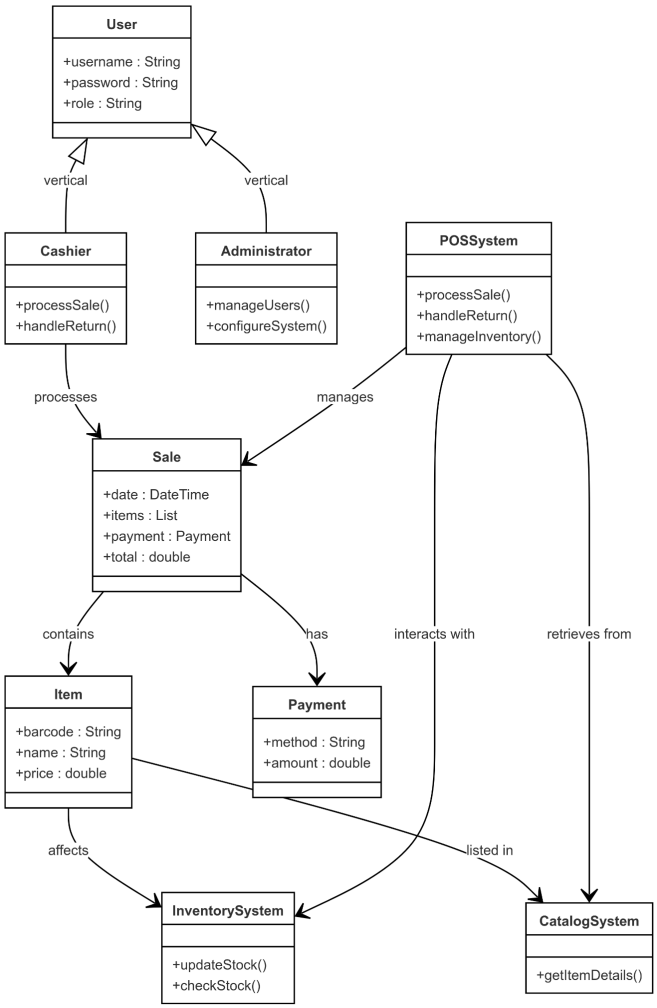


- Activity Diagram

1) Process Sale



2) Handle Return



- Class Diagram for POS System