

IT314 – Software Engineering



Lab 6: Modeling Class Diagram and Activity Diagram (Point of Sale System)

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❖ Use Case Textual Description

a. Process Sale Use Case:

- **Use Case Name:** Process Sale
- **Primary Actor:** Cashier
- **Secondary Actors:** Customer, Payment System, Inventory System, Catalog System, Receipt Printer
- **Preconditions:**
 - The cashier is logged into the POS system.
 - The POS system is operational and connected to the catalog and inventory systems.
 - Items to be purchased are available in the inventory.
- **Postconditions:**
 - The sale transaction is successfully completed.
 - The stock in the inventory is updated.
 - Payment is processed.
 - A receipt is printed.
- **Main Success Scenario:**
 - Start: The cashier begins the sale by scanning the barcodes of the items that the customer wants to purchase.
 - The POS system retrieves the details (name, price, etc.) for each item from the catalog system.
 - The system updates the current sale and deducts the stock of the items from the inventory system.
 - The customer chooses a payment method (cash, card, check, or other).
 - The POS system interacts with the payment system to process the customer's payment.
 - Upon successful payment, the system registers the sale, and the receipt printer generates a receipt.
 - End: The customer receives the receipt and leaves with the purchased goods.
- **Alternative Scenarios:**
 - Invalid Barcode: If the barcode is unrecognized, the cashier manually enters the item code.

- Insufficient Stock: If an item is out of stock, the system notifies the cashier, and the item cannot be added to the sale.
- Payment Declined: If the payment is declined, the cashier asks the customer for another form of payment.

b. Handle Return Use Case:

- **Use Case Name:** Handle Return
- **Primary Actor:** Cashier
- **Secondary Actors:** Customer, Payment System, Inventory System, Receipt Printer
- **Preconditions:**
 - The cashier is logged into the POS system.
 - The customer presents an item for return, along with a receipt.
 - The item was purchased within the allowed return period (as per store policy).
- **Postconditions:**
 - The return transaction is successfully completed.
 - The stock in the inventory is updated to reflect the returned item.
 - A refund is processed or store credit is issued.
- **Main Success Scenario:**
 - Start: The customer presents the item and the original receipt for the return.
 - The cashier scans the receipt, and the POS system retrieves the details of the original sale.
 - The POS system verifies if the item is eligible for return based on store policy.
 - The system updates the inventory to add the returned item back into stock.
 - The cashier processes a refund to the original payment method (cash, card, etc.) or issues store credit.
 - The system registers the return, and the receipt printer generates a return receipt for the customer.
 - End: The customer receives the refund/store credit and the return receipt.

- **Alternative Scenarios:**

- No Receipt: If the customer has no receipt, the return may be denied, or store policy may allow a return with store credit only.
- Item Not Returnable: If the item is outside the return period or does not meet return conditions, the system notifies the cashier, and the return is denied.

❖ Entity/Boundary Control Objects

a). Entity Objects:

- **Item:** Represents a product that is being sold or returned.
- **Sale:** Represents the transaction of purchasing items.
- **Return:** Represents the transaction of returning purchased items.
- **Payment:** Represents the customer's payment for a sale.
- **Receipt:** Represents the document provided to the customer upon completing a sale or return.
- **Inventory:** Represents the stock of items available in the store.

b). Boundary Objects:

- **POS User Interface:** The interface used by the cashier to interact with the POS system.
- **Barcode Scanner:** Hardware that scans item barcodes to retrieve product information.
- **Receipt Printer:** Hardware that prints receipts for sales and returns.
- **Payment Terminal:** External device used to process card payments.
- **Customer:** The person purchasing or returning items.

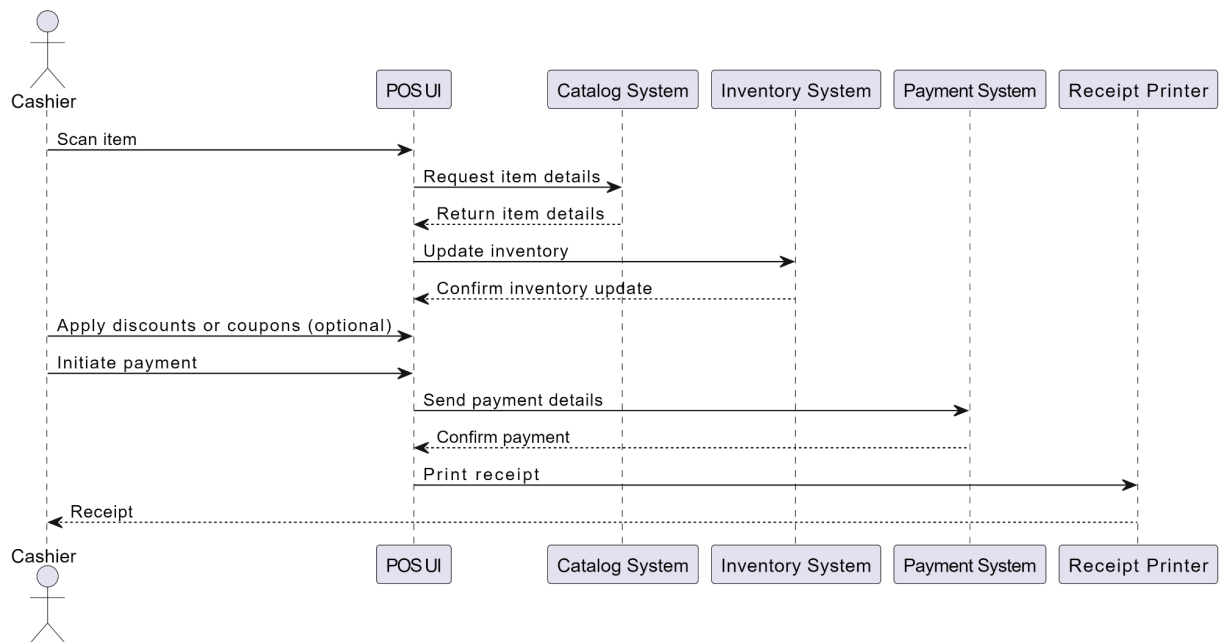
c). Control Objects:

- **SaleProcessor:** Handles the steps involved in processing a sale (e.g., adding items, applying discounts, completing payment).
- **ReturnProcessor:** Manages the process of verifying and completing returns (e.g., verifying the item, refunding the payment).

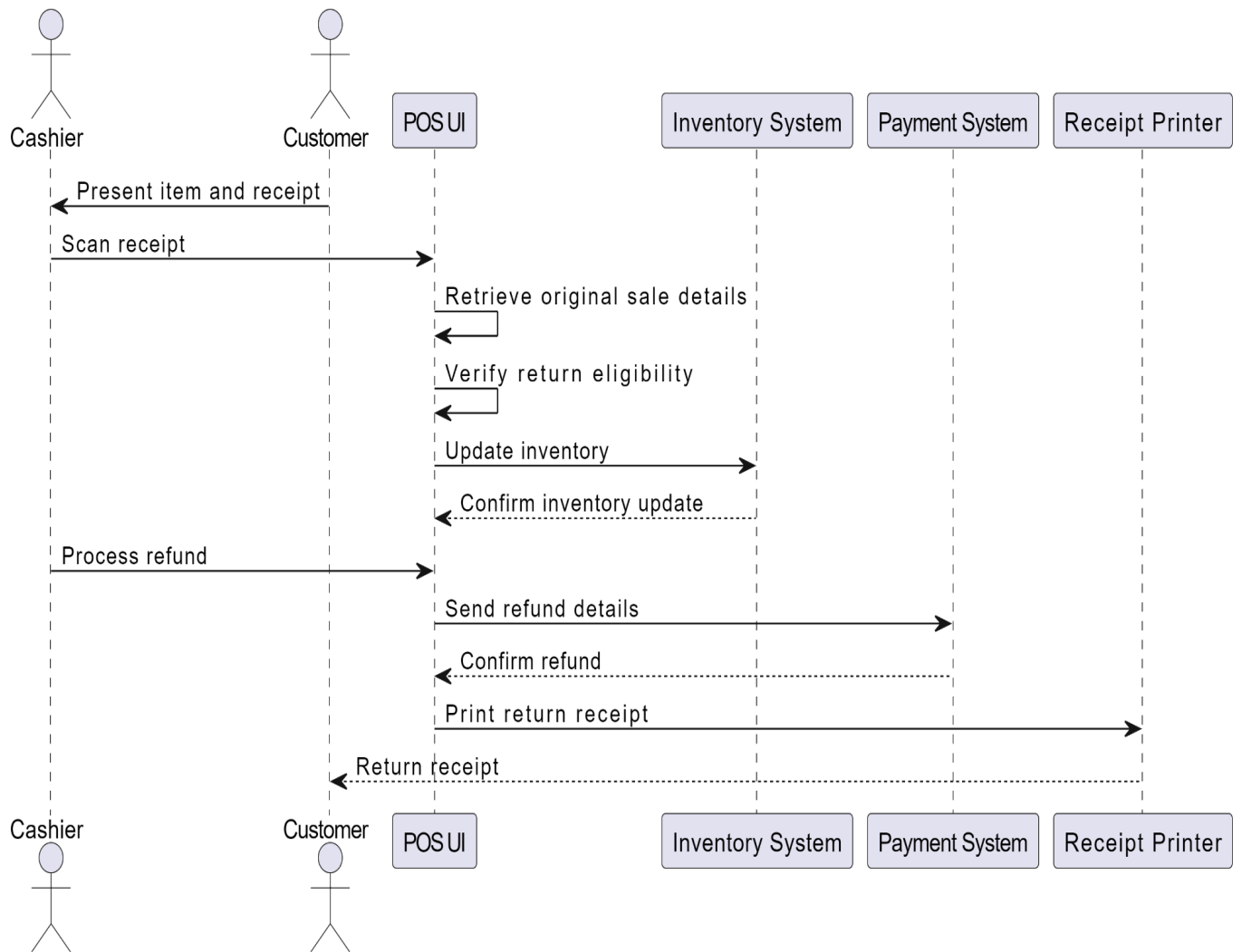
- **PaymentProcessor**: Manages payment operations (e.g., verifying and completing payments with the payment system).
- **InventoryManager**: Updates the inventory during both sales and returns.
- **CatalogManager**: Retrieves item information (e.g., name, price) from the catalog system.
- **ReceiptGenerator**: Manages the creation of sale and return receipts.

❖ Sequence Diagram

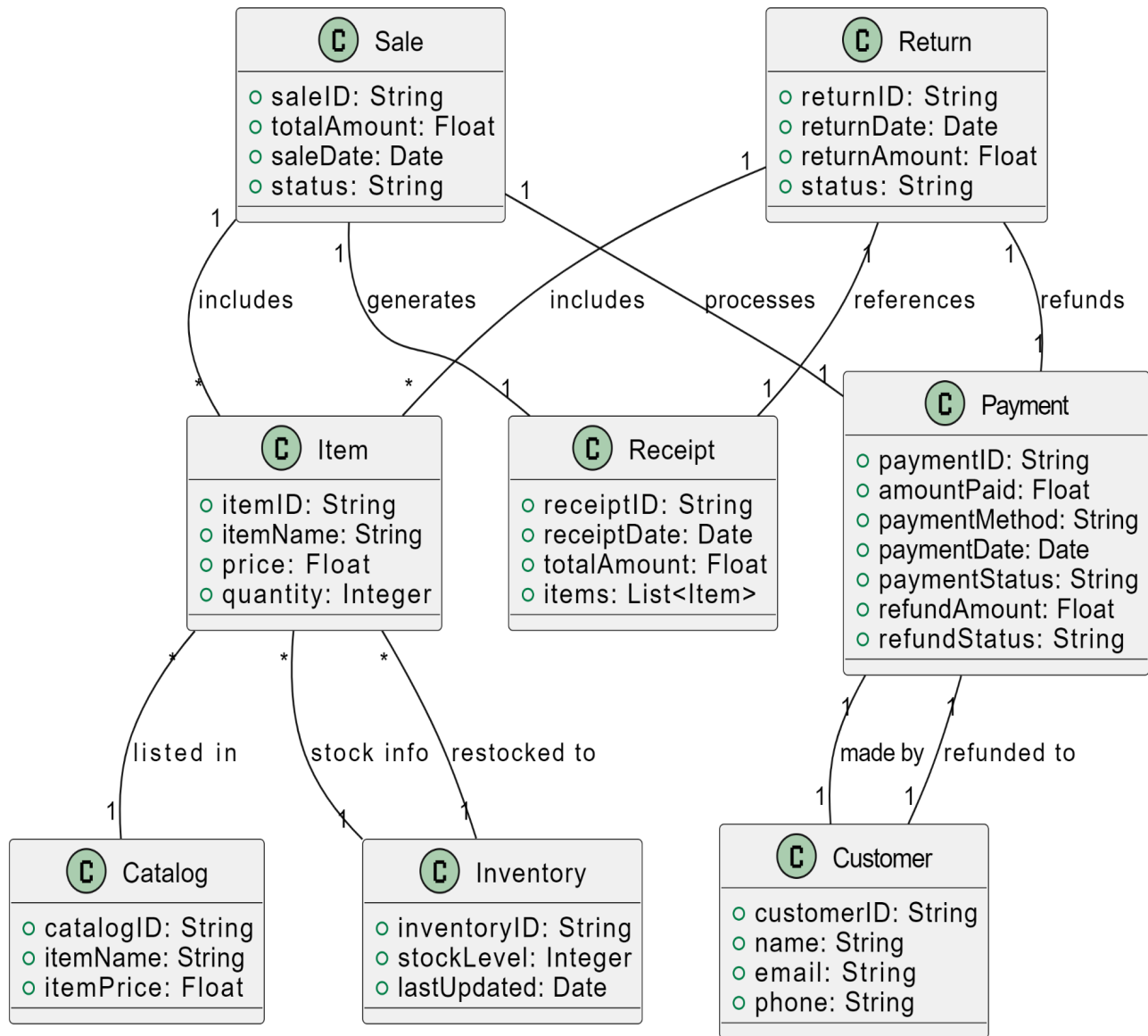
a). Process Sale



b). Handle Return

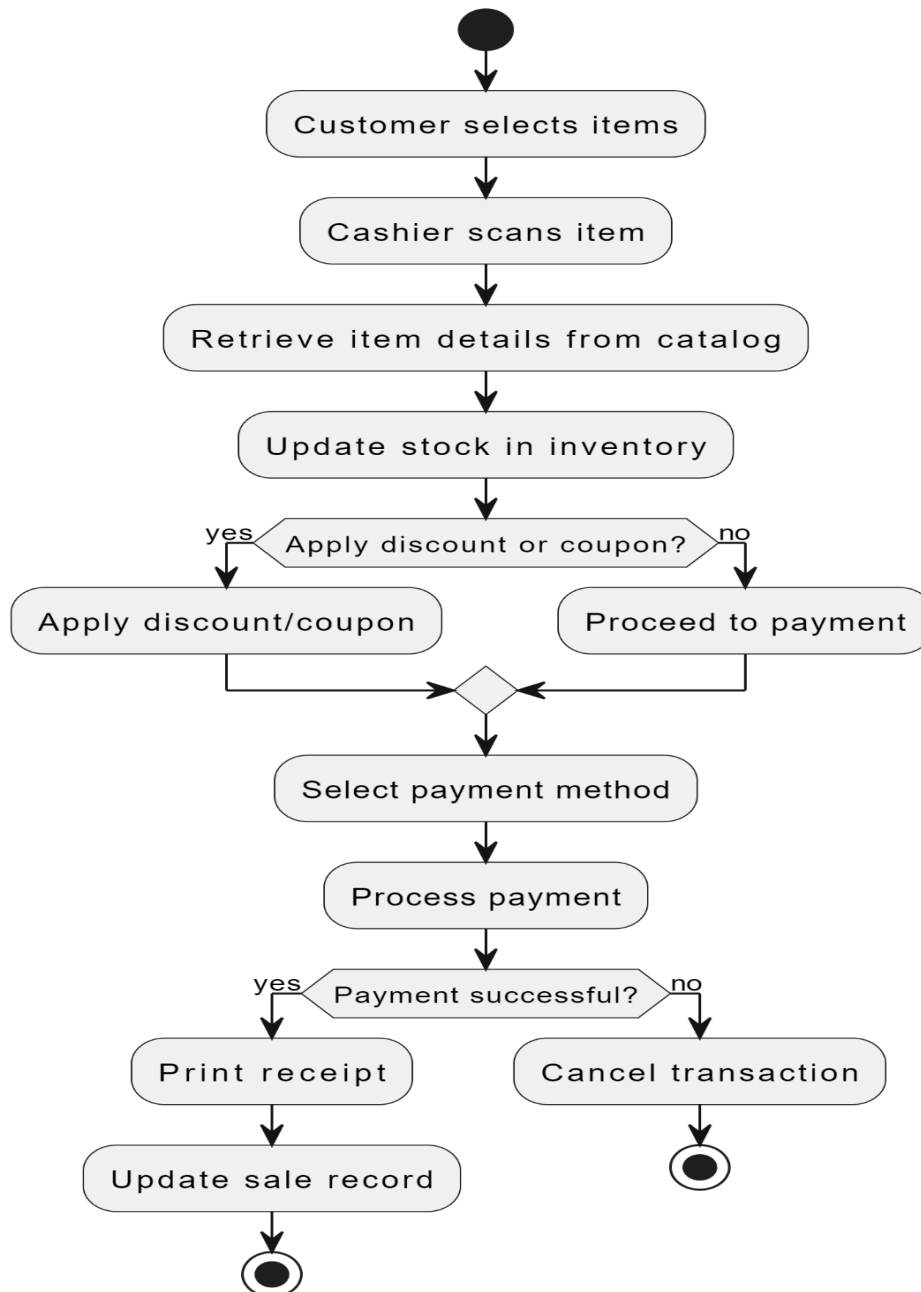


❖ Analysis Domain Model (Class Diagram)



❖ Activity Diagram

a). Process Sale



b). Handle Return

