



ENGINEERS WITH  
SOCIAL RESPONSIBILITY

# **IT 314 SOFTWARE ENGINEERING**

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## **LAB 6**

### **MODELING CLASS DIAGRAM AND ACTIVITY DIAGRAM**

# POINT OF SALE SYSTEM

## Q1. Develop Use Case Textual Description for "Process

- Sale" and "Handle Return" use cases.

- **Use Case:** Process Sale

- **Actor:** Cashier

- **Stakeholders:**

- Customer: Has a want to buy something easily and quickly.

- Store: Needs sales records to be accurate, inventory up-to-date, and payment safe.

- **Preconditions:**

- The cashier is already logged into the POS system.

- The system is connected to the catalog and inventory.

- **Main Flow:**

- The cashier initiates a new sale transaction.

- Items are scanned and the system retrieves name, price, and any applicable discount.

- The inventory is updated as items are scanned.
- Cashier gives the customer the total amount.
- The customer chooses a method of making the payment (cash, card, check, coupon etc).
- The transaction is collected either in
  - **Cash:** The amount received is noted and change is automatically calculated.
  - **Card or check:** The system automatically completes the transaction. Once the transaction is successful, a receipt is produced and the sale is now closed.
- Postconditions.
- Sale recorded.
- Inventory accounted for.
- Transaction accounted for.

○ **Alternate Flows:**

- **Item not found:** The cashier can manually key in the code of the item or have an assistant.

- **Low Stock:** The system sends a message to the cashier when there is low stock for a particular product.
  - **Failure at Payment:** It gives the cashier the option to reattempt or try another payment method.
  - **Redeeming Coupons:** Coupons must be processed on the final amount.
- **Use Case:** Process Return
  - **Actor:** Cashier
  - **Stakeholders:**
    - **Customer:** Return or replace products with ease.
    - **Shop:** The return process with the right processing of returns should automatically update the inventory and proper refund.
  - **Preconditions:**
    - The cashier has logged into the POS.
    - The product being returned is within its return period, if any.

- **Body:**

- **Step 1:** The cashier initiates a return transaction.
- **Step 2:** The customer presents a receipt or proof of purchase.
- **Step 3:** The cashier scans the item being returned.
- **Step 4:** The system accesses original sale information.
- **Step 5:** The cashier accepts the return.
- **Step 6:** The system adjusts the inventory to replenish the item.
- **Step 7:** The cashier processes the refund;  
Cash: The system indicates how much to refund.

- **Card:** The refund is made directly via the card provider.

- **Store credit:** The system issues the credit coupon.

- **End Conditions:**

- The return is posted.
- Inventory is updated.
- The credit or store credit is posted.

- **Other End Flows:**

- **No Receipt:** the cashier can search for the original sale another way.
- **Item Not Eligible:** The system notifies the cashier, and then the cashier notifies the customer.
- **Partial Return:** the cashier can perform a partial return if part of the sale needs to be returned.
- **Damaged Goods:** if the item has been damaged, the merchant may make an adjustment.

## **Q2. Identify Entity/Boundary Control Objects.**

- **Entity Objects:**

- **Sale Transaction:** This object is for holding information on sales related activities; it may track which items were transacted,

what is the total, payment method, and status including being open or closed, etc.

- **Item:** one article in the shop; this includes such details as name and price; a stock quantity and whether or not it carries a discount
- **Payment:** payment type, such as cash, credit card, or check; it also holds the amount paid, and whether the transaction was successful or failed.
- **Customer:** This contains customer-specific information, such as his name, number of the loyalty account, or coupon information (if any).
- **Receipt:** This is issued in paper or digital form after completing a transaction. This includes the transaction summary and confirmation of payment.
- **Return Transaction:** It captures information about returned items. In this, it reports the refund amount, original sale reference, and status.
- **Inventory:** It keeps track of the number of stocks in the store.

- **Coupon:** These include discount offers or promotional codes. In this way, the coupon gets represented by offering the promotion code to apply against the transaction.

- **Boundary Objects:**

- **POS Interface:** Graphical interface through which the cashier sells and returns, scans items, accepts payments, and prints receipts on the receipt printer.
- **Barcode Scanner:** It is used by the cashier while scanning the items and, therefore identifying the products within the system
- **Payment Processor Interface:** Connects to external payment gateways for credit card or check processing.
- **Receipt Printer:** Hardware for printing customer receipts.
- **Customer Display:** small screen that displays the total of the current sale and items scanned to the customer.

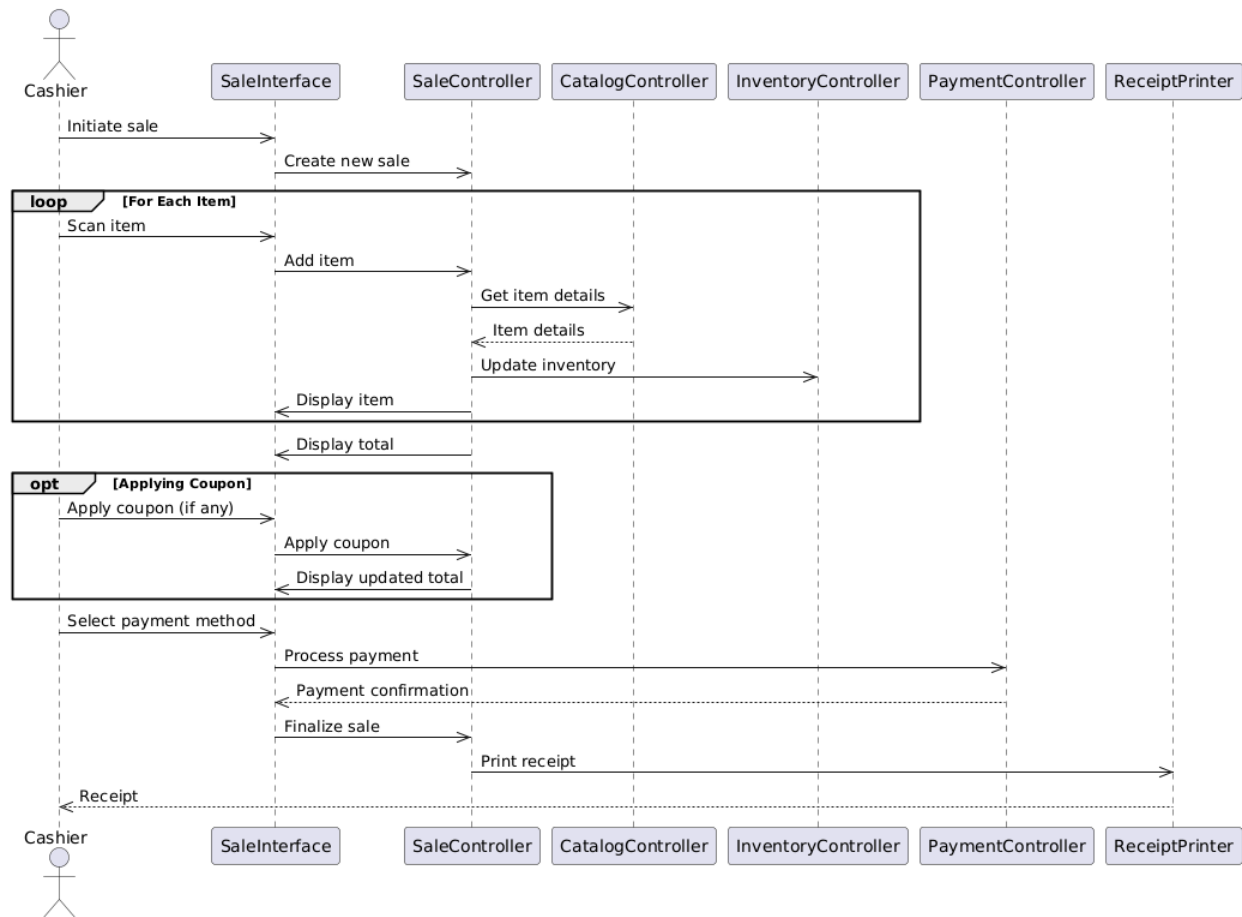
- **Control Objects:**



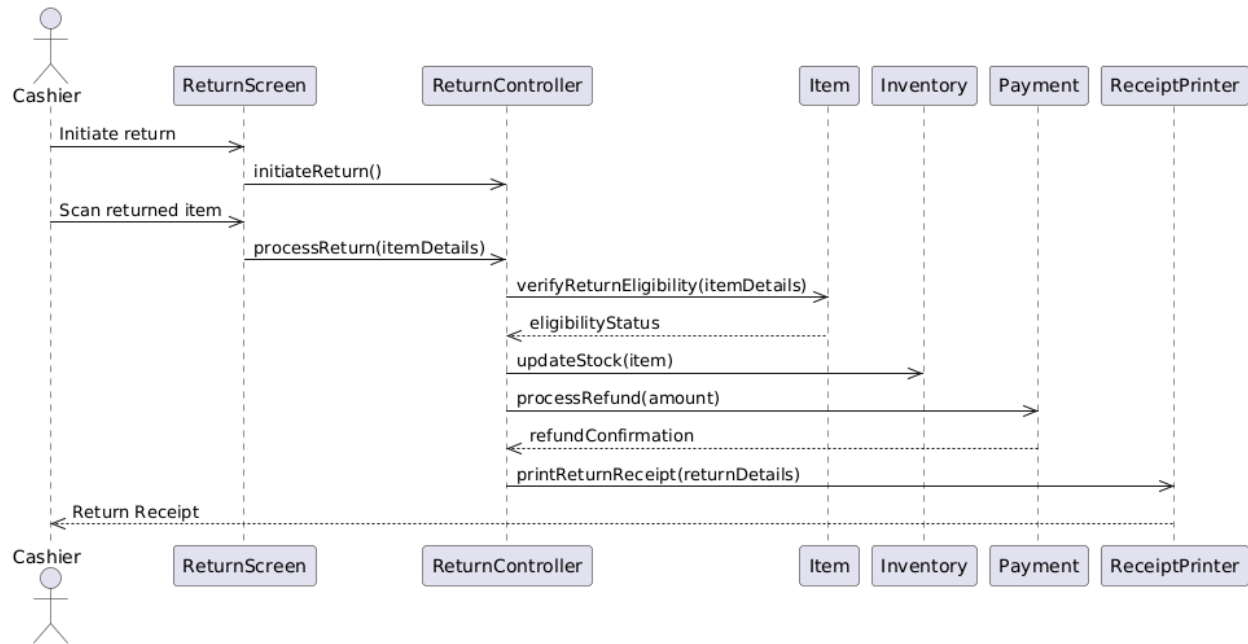
- **Sale Controller:** It controls the entire lifecycle of a sale transaction as it concerns adding items, applying discounts and performing payments, also finalizing the sale.
- **Payment Controller:** It controls cash, credit card, check, coupon, etc, it also manages interaction with payment processors.
- **Return Controller:** Follows the process of return, to get the right thing is being returned, updated the inventory, and proceeds with refund
- **Inventory Controller:** The stock of the item in hand in any purchase or return process is updated. It checks whether the items are in hand or have run out of stock
- **Promotion Controller:** It will apply the discount or promotional offers like a coupon on the sales transaction
- **Login Controller:** There is access control, only authorized users are the cashier and admins who can log in and operate POS.

### Q3. Develop Sequence Diagrams.

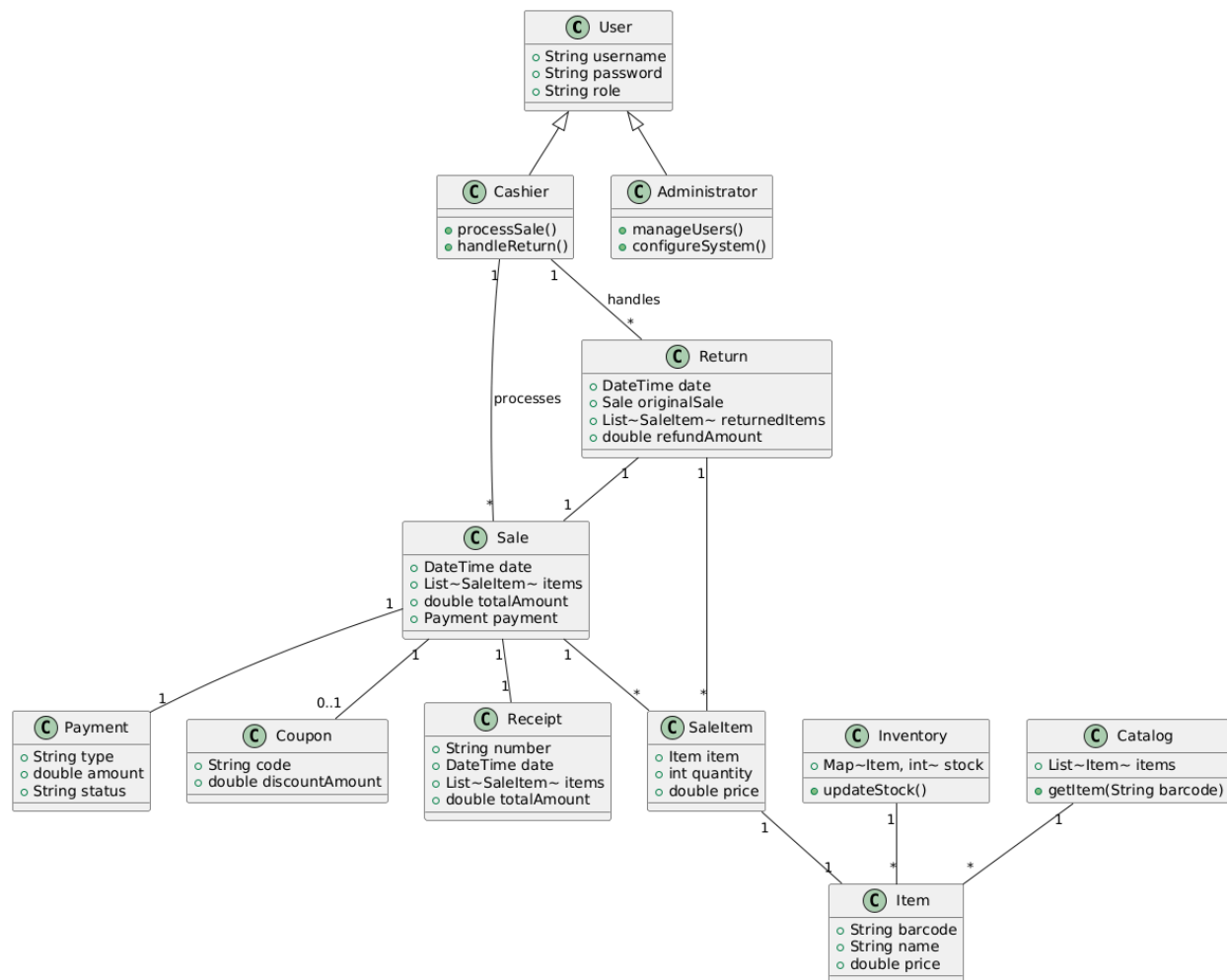
#### ● Process Sale:



## • Handle Return:

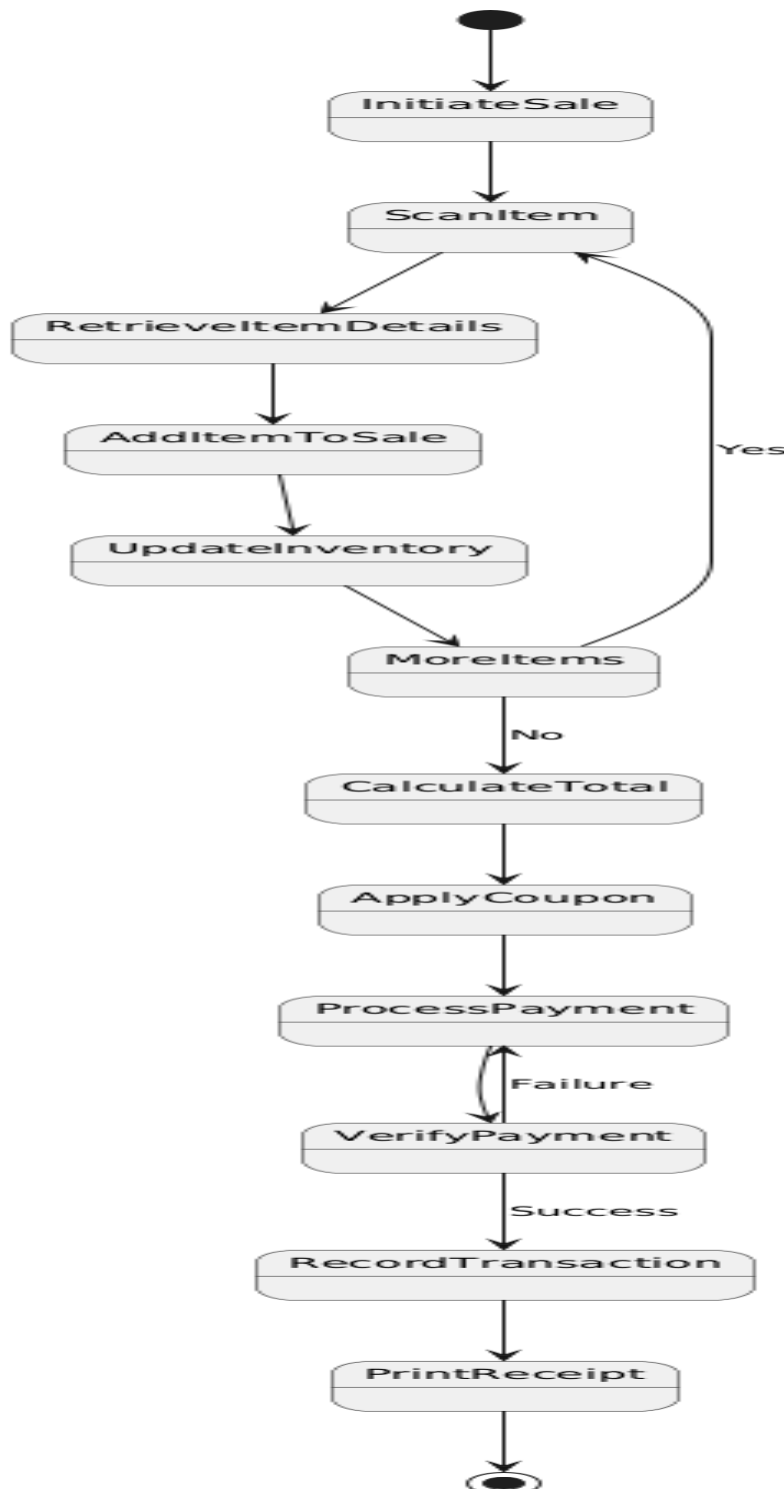


## Q4. Develop Analysis Domain Models.



**Q5. Develop activity diagrams for "Process Sale" and "Handle Return" use cases.**

- **Process Sale:**



- **Handle Return:**

