IT314 : Software Engineering

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Q1. Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

1. Process Sale Use Case

- **Use Case Name:** Process Sale
- **Description:** The cashier registers the purchased items and handles the payment process. The Catalog system displays the name and price of each item entered by the cashier. The Catalog system then communicates with the Inventory system to update the stock levels of the item.
- **Actors:** Cashier, Customer, Inventory System, Payment System
- **Preconditions:**
    - The customer arrives at the POS checkout with items to purchase.
    - The cashier initiates a new sale session.
- **Postconditions:**
    - The sale is recorded, and a receipt is printed.
    - Stock data is updated.
    - Payment authorization and approvals are logged.
- **Basic Flow:**
    - The customer arrives at a POS checkout with items to purchase. The cashier uses the POS system to start a new sale and enters the item identifier.
    - The Catalog system fetches the item information, logs the sale line item, and shows the item description, price, and running total. The cashier repeats the item entry steps until all items are entered.
    - The Inventory system calculates and displays the total price. The cashier informs the customer of the total amount due and requests payment. The customer makes the payment, and the Catalog system processes it.
    - The Catalog system records the completed sale and sends the sale details to the Inventory system to update stock levels.

    - The Inventory system generates the receipt, and the customer leaves with the receipt and their purchased items.
- **Extensions:**
    - If multiple quantities of the same item are purchased, the cashier can enter the quantity, and the subtotal is shown.
    - If an invalid item identifier is entered, an error is indicated.
    - The Catalog system applies any applicable gift coupons.
    - If the customer does not have enough funds, the transaction is canceled.
    - If the stock for an item falls below a predefined minimum level, a restocking order is placed.

2. Handle Return Use Case

- **Use Case Name:** Handle Return
- **Actors:** Cashier, Customer, Inventory System, Payment System
- **Preconditions:**
    - The customer must present the original purchase receipt or other proof of purchase.
    - The POS system must be operational, and the cashier must be logged in.
- **Postconditions:**
    - The item is returned to inventory.
    - The customer receives a refund or store credit.
    - The system logs the return transaction.
- **Basic Flow:**
    - The customer approaches the cashier to return an item with a valid purchase receipt.
    - The cashier begins the return transaction by logging into the POS system and selecting the "Return" option.
    - The cashier scans the item’s barcode or manually enters the product details. The POS system retrieves item information from the Catalog system.
    - The system verifies the return eligibility by checking the return policy, including factors like the return window and item condition.
    - If the item is eligible, the system updates the inventory by adding the returned item back into stock.
    - The system calculates the refund amount based on the original purchase price.
    - The cashier selects the refund method (cash, credit, or store credit).
    - The system interacts with the Payment System to process the refund.
    - A new receipt with return details is generated. The cashier prints and hands the receipt to the customer.
    - The return transaction is recorded in the system, marking it as complete.

Q2 . Identify Entity/Boundary/Control Objects

⇒ **Entity Objects:**

- Product
- Customer
- Cashier
- Transaction
- Coupon
- Inventory

⇒ **Boundary Objects:**

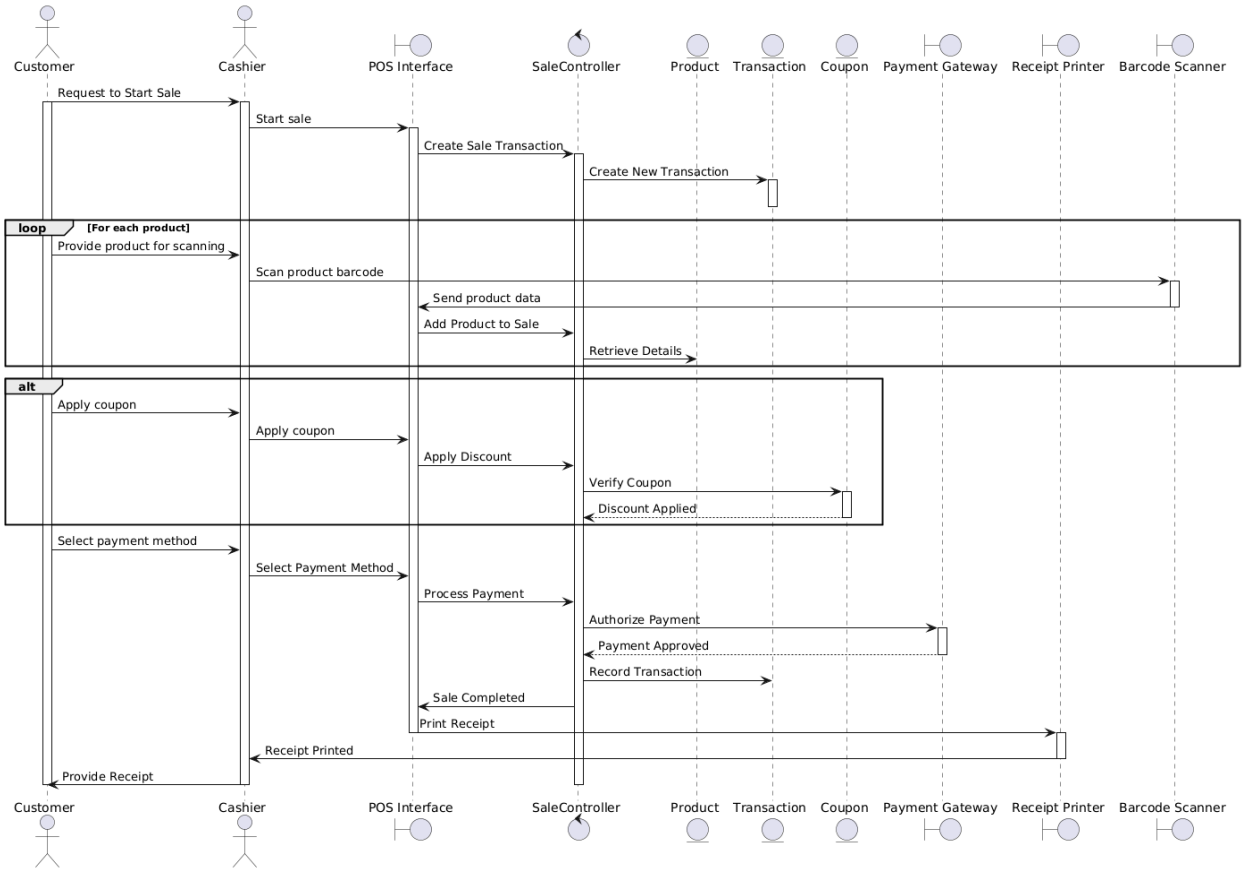
- POS Interface
- Payment Gateway
- Receipt Printer
- Barcode Scanner
- Inventory System Interface

⇒ **Control Objects:**

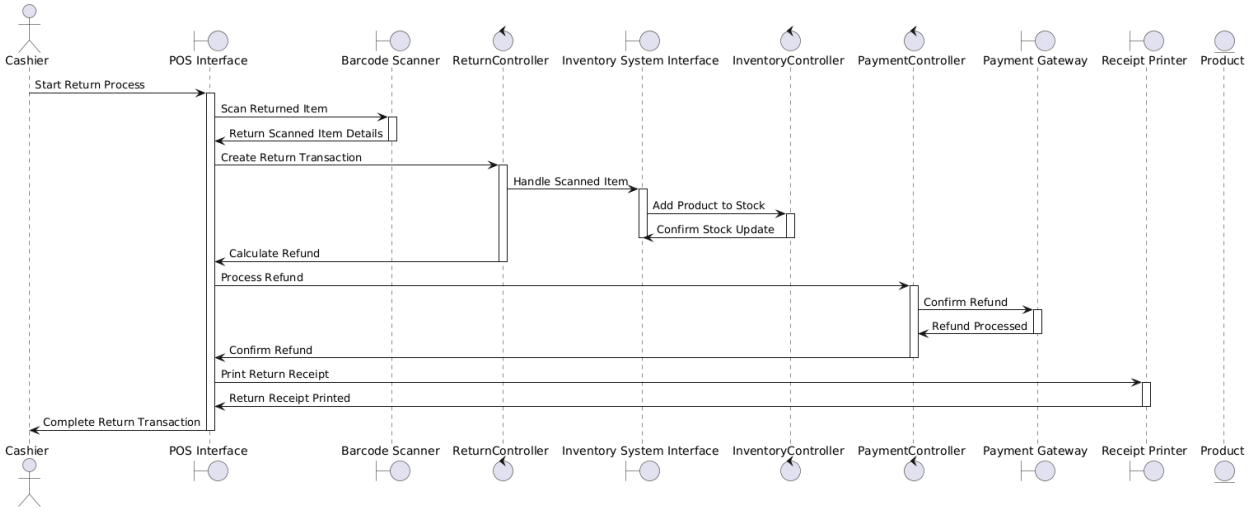
- SaleController
- PaymentController
- ReturnController
- InventoryController
- UserController

Q-3. Develop Sequence Diagrams

Use Case: Process Sale

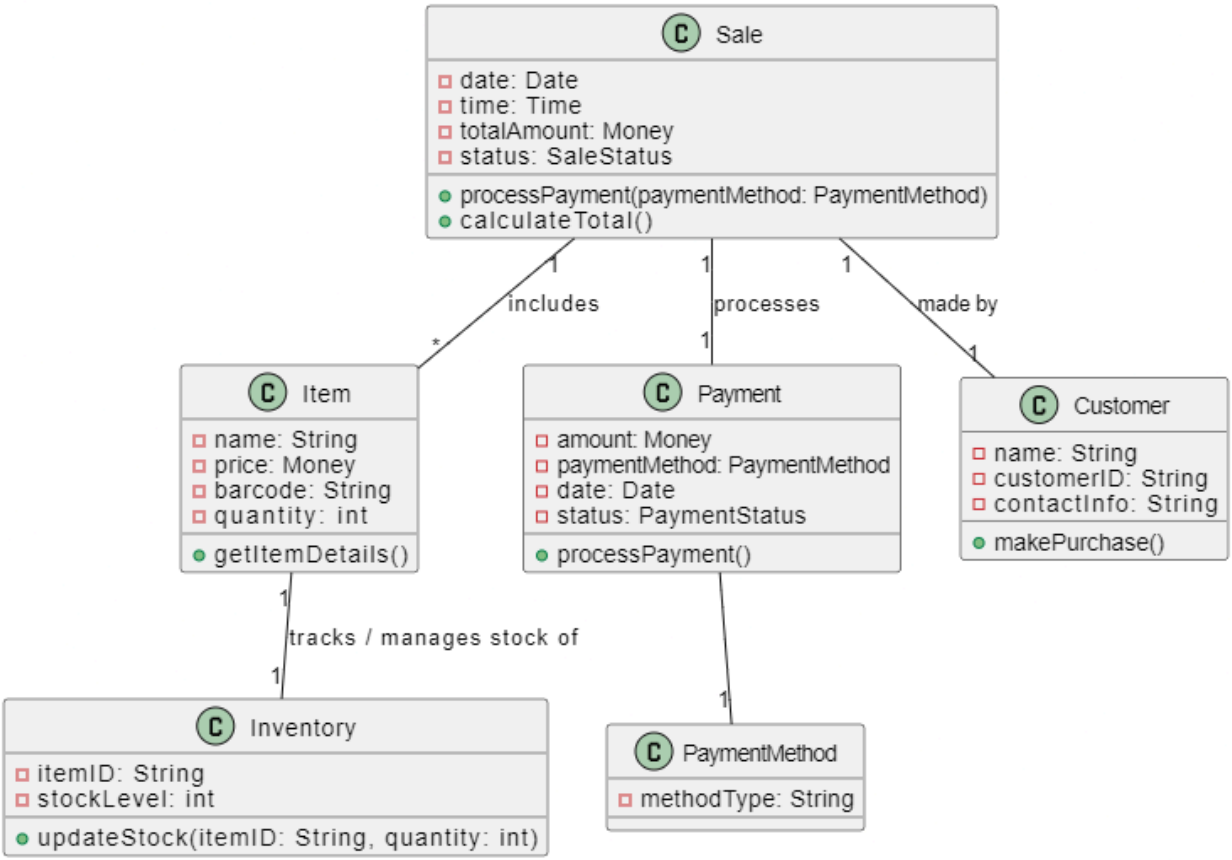


Use Case: Handle Return

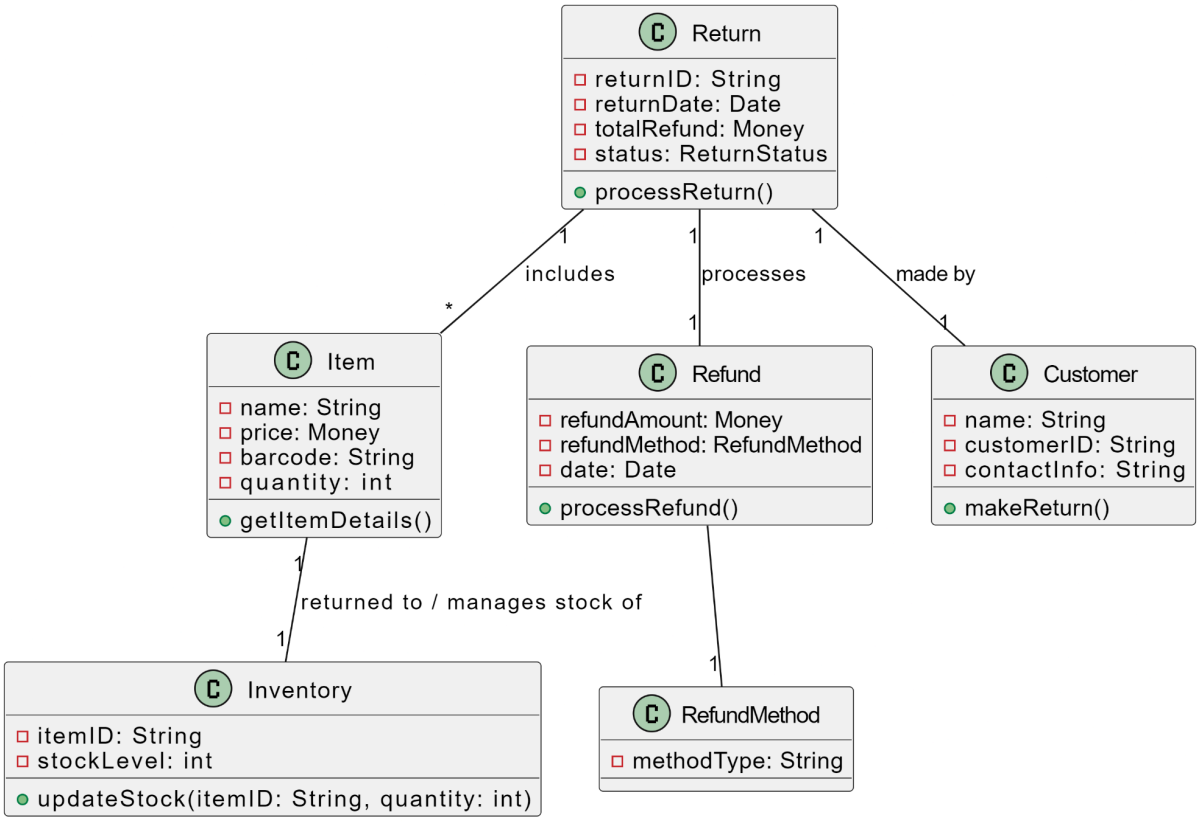


Q-4. Develop Analysis Domain Models

Use Case: Process Sale

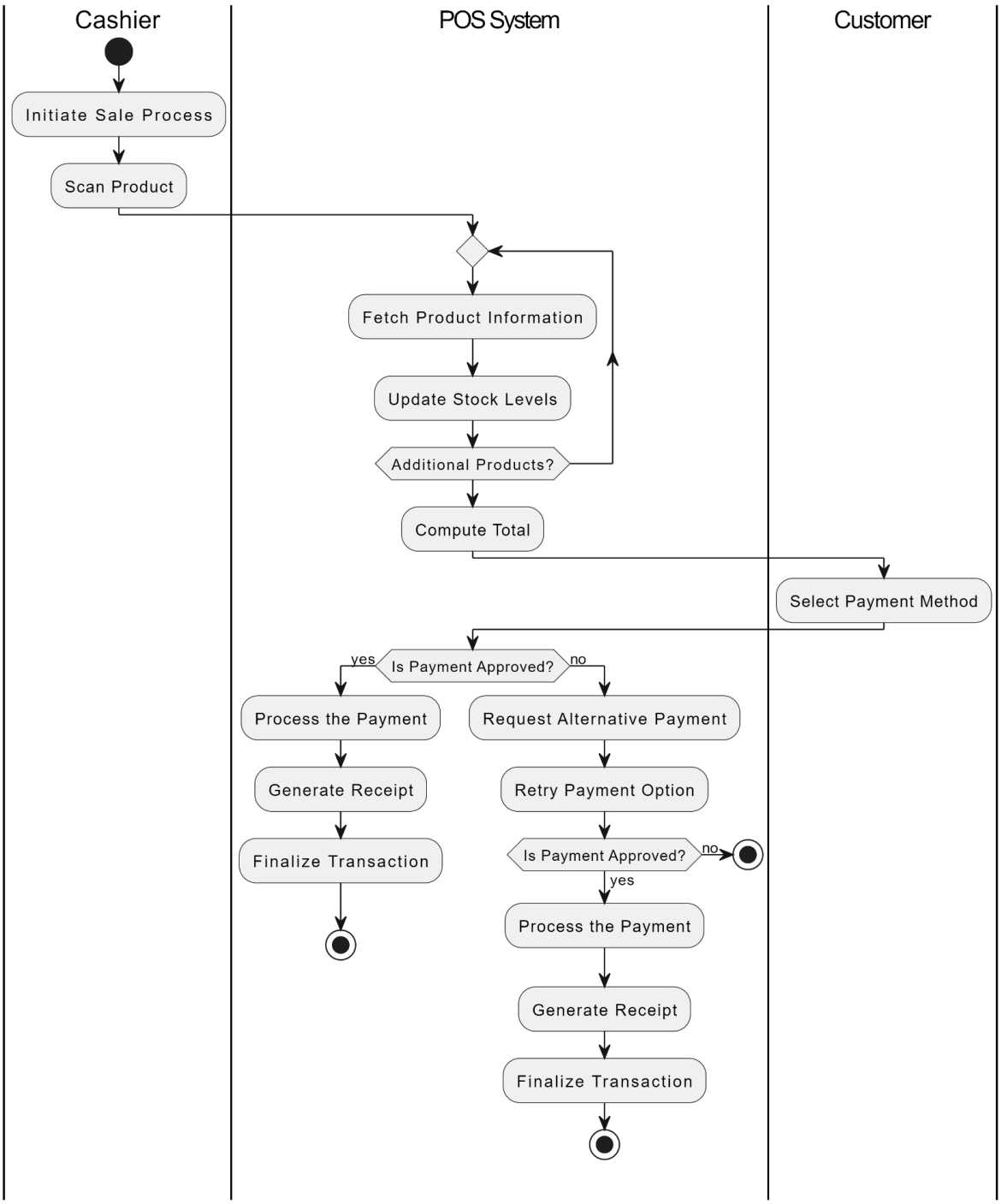


Use Case: Handle Return

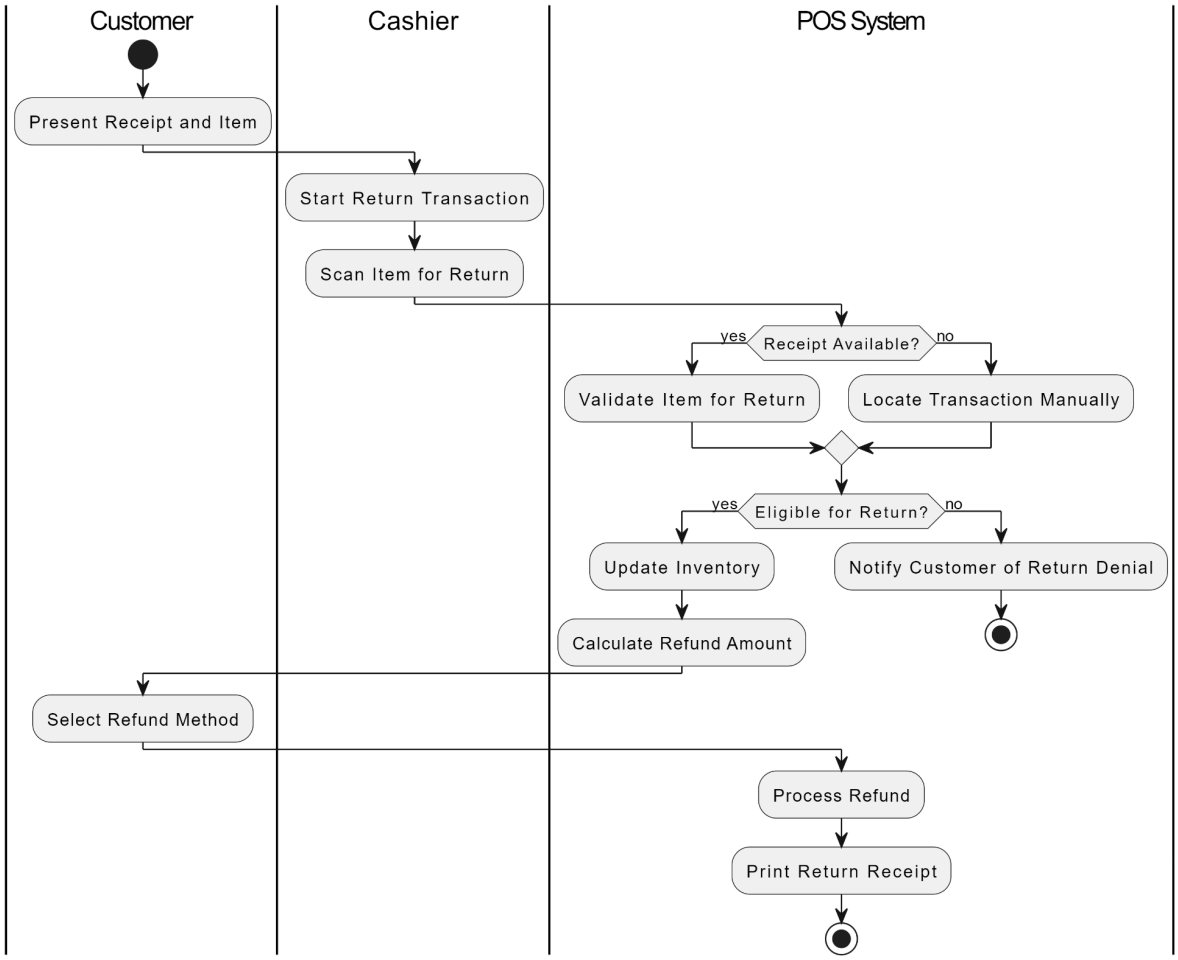


Q-5. Develop activity diagrams for "Process Sale" and "Handle Return" use cases.

Use Case: Process Sale



Use Case: Handle Return


Customer
Cashier
POS System
Present Receipt and Item
Start Return Transaction
Scan Item for Return
yes
Receipt Available?
no
Validate Item for Return
Locate Transaction Manually
yes
Eligible for Return?
no
Update Inventory
Notify Customer of Return Denial
Calculate Refund Amount
Select Refund Method
Process Refund
Print Return Receipt