IT-314: Software Engineering
Lab Assignment 6 : Point of Sale System

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Point of Sale (POS) System Analysis

Introduction

A Point of Sale (POS) system is essential in retail and service sectors, enabling smooth transactions between businesses and customers. This document analyzes the critical functionalities of a contemporary POS system, concentrating on two primary use cases: Processing a Sale and Handling Returns.

Task-1:Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases

Use Case 1: Process Sale

Actor:

- Cashier

Preconditions:

- The POS system is operational and ready for transactions.
- The cashier is authenticated and logged into the system.

Postconditions:

- The sale is successfully recorded in the system.
- Inventory is updated to reflect the sale.
- The customer receives a receipt for the transaction.

Basic Flow:

1. The customer places items on the checkout counter.
2. The cashier starts a new sale in the POS system.
3. For each item:
   a. The cashier scans the item's barcode.
   b. The system retrieves item details (name, price) from the database.
   c. The system adds the item to the ongoing transaction.
4. The system calculates and displays the total amount due.
5. The cashier informs the customer of the total.

6. The customer selects a payment method (cash, credit card, or mobile payment).
7. The cashier processes the payment through the system.
8. The system records the sale and updates the inventory.
9. The system generates a receipt.
10. The cashier hands the receipt and items to the customer.

Alternative Flows:

- 3b. Manual Entry: If an item's barcode cannot be scanned, the cashier manually inputs the item's SKU or searches for it in the system.
- 5a. Apply Discount: If the customer presents a coupon or discount code, the cashier applies it, and the system recalculates the total due.
- 6a. Payment Declined: If the payment method is declined, the cashier informs the customer, who can either choose another payment method or cancel some items.
- 7a. Transaction Cancellation: At any point before finalizing, the customer may cancel the transaction. The cashier initiates the cancellation, and the system voids the transaction, reverting any inventory changes.

Use Case 2: Handle Return

Actor:

- Cashier

Preconditions:

- The POS system is operational and ready for use.
- The cashier is authenticated and logged in.
- The customer has items to return along with the original purchase receipt.

Postconditions:

- The return is processed and recorded in the system.
- Inventory is updated to account for the returned items.
- The customer receives a refund and a return receipt.

Basic Flow:

1. The customer approaches the counter with items for return and the original receipt.
2. The cashier starts a new return transaction in the POS system.
3. The cashier scans the items being returned.
4. The system verifies the return eligibility (e.g., within the return period, item condition).
5. The system calculates the refund amount.
6. The cashier confirms the reason for the return with the customer.
7. The system updates the inventory to reflect the returned items.
8. The cashier processes the refund using the original payment method.
9. The system records the return transaction.
10. The system generates a return receipt.
11. The cashier hands the return receipt to the customer.

Alternative Flows:

- 3a. Manual Entry: If the scanner is unavailable, the cashier manually enters the details of the items into the system.
- 4a. Item Ineligible for Return: If an item is ineligible, the system notifies the cashier, who informs the customer. The customer then decides whether to proceed with eligible items or cancel the return.
- 7a. Damaged or Used Item: The cashier inspects the item for damage or signs of use. The system may apply a restocking fee or adjust the refund amount, which the cashier communicates to the customer. The customer then decides whether to proceed.
- 8a. Original Payment Method Unavailable: If the original payment method cannot be refunded, the cashier selects an alternative refund method (e.g., store credit), and the system processes the refund accordingly.

Task-2:Entity/Boundary/Control Objects

Entity Objects:

- **Transaction:** Represents the sale being processed.
- **Product:** Represents individual items for sale.
- **TransactionDetails:** Contains information about the payment made.
- **Client:** Represents the customer making a purchase.
- **Cashier:** Represents the employee handling the transaction.
- **Stock:** Represents the inventory available for sale.
- **Discount:** Represents promotional offers or coupons.
- **ReturnTransaction:** Represents the details of a return process.

Boundary Objects:

- **POS Interface:** The primary user interface for cashiers.
- **Scanner Device:** The equipment used to read barcodes.
- **Printer:** The device that produces receipts for transactions.
- **Payment Processing Device:** The hardware used to handle payment methods.

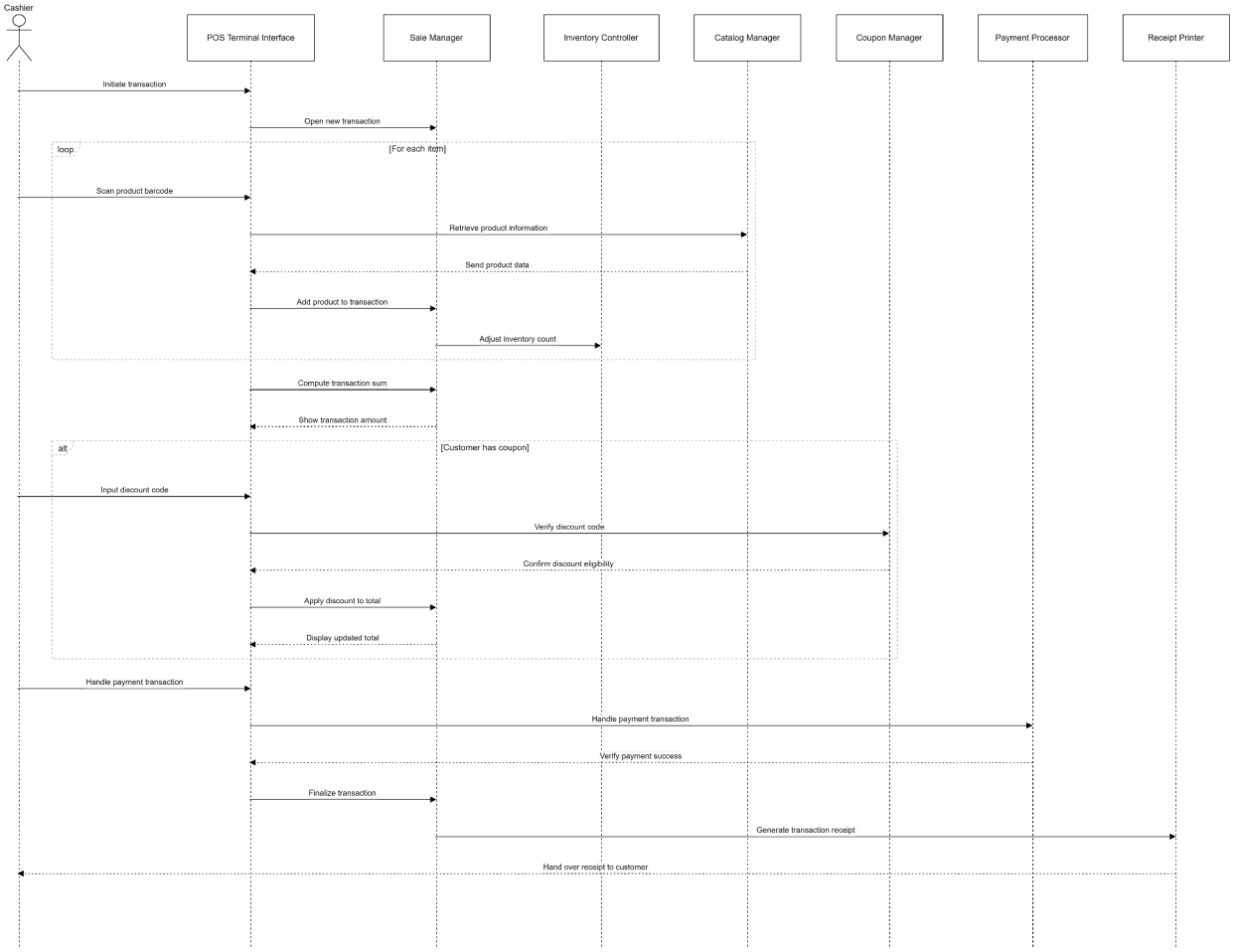
Control Objects:

- **Sales Coordinator:** Manages the sales transaction workflow.
- **Inventory Manager:** Oversees stock levels and updates.
- **Payment Handler:** Facilitates payment processing.
- **Product Catalog Manager:** Maintains the database of items for sale.
- **Return Coordinator:** Manages the return process and policies.

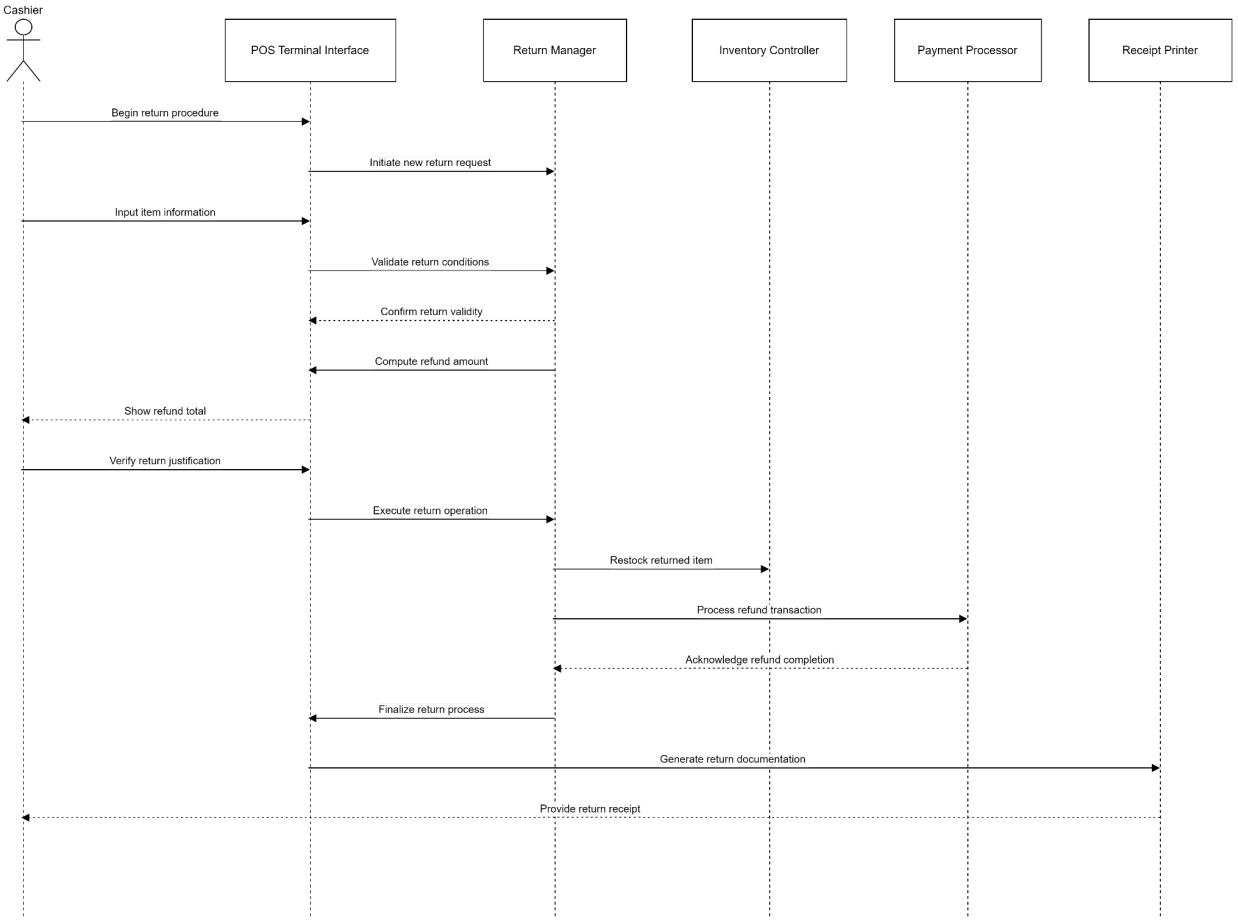
This analysis aims to clarify the operations of a POS system and its significance in enhancing customer service and operational efficiency.

Task-3:

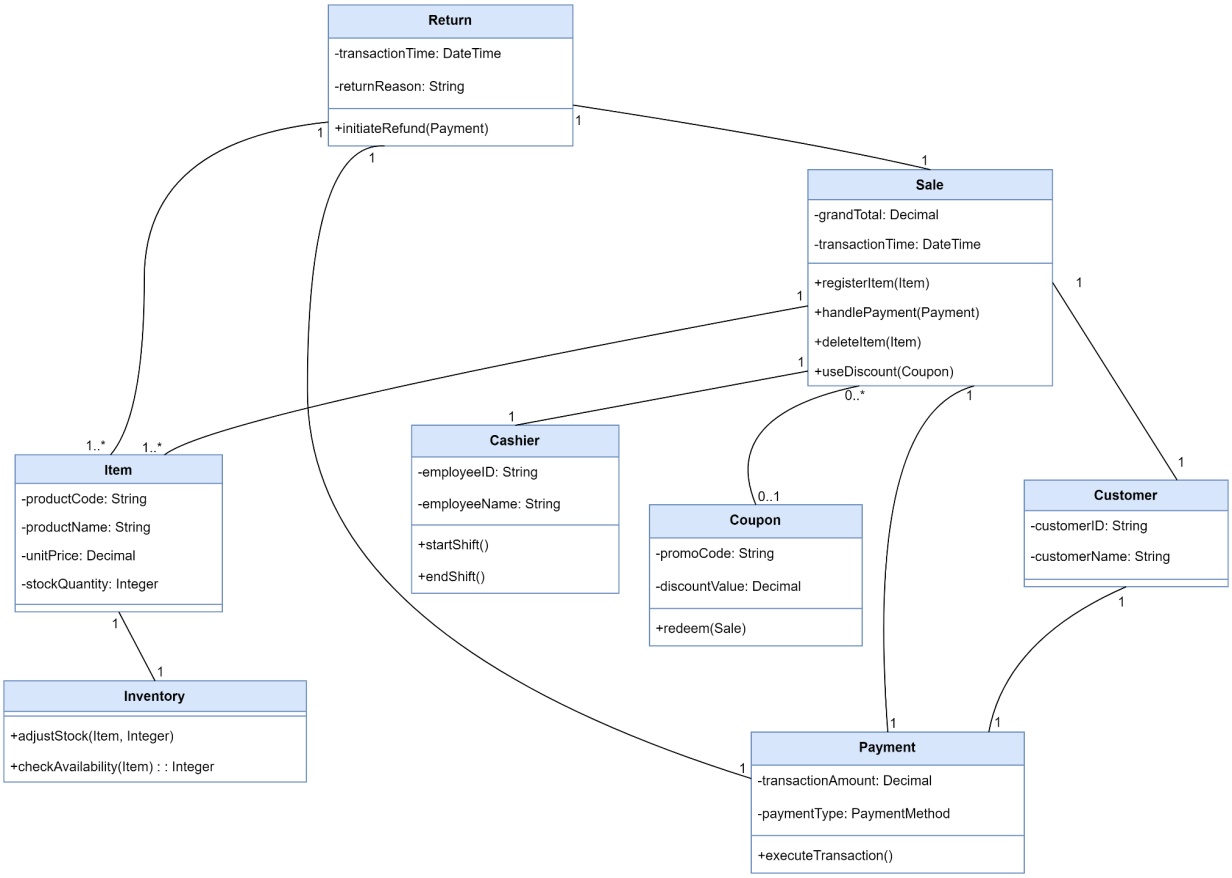
- **Sequence Diagram : (Process Sale)**



- **Sequence Diagram : (Handle Returns)**

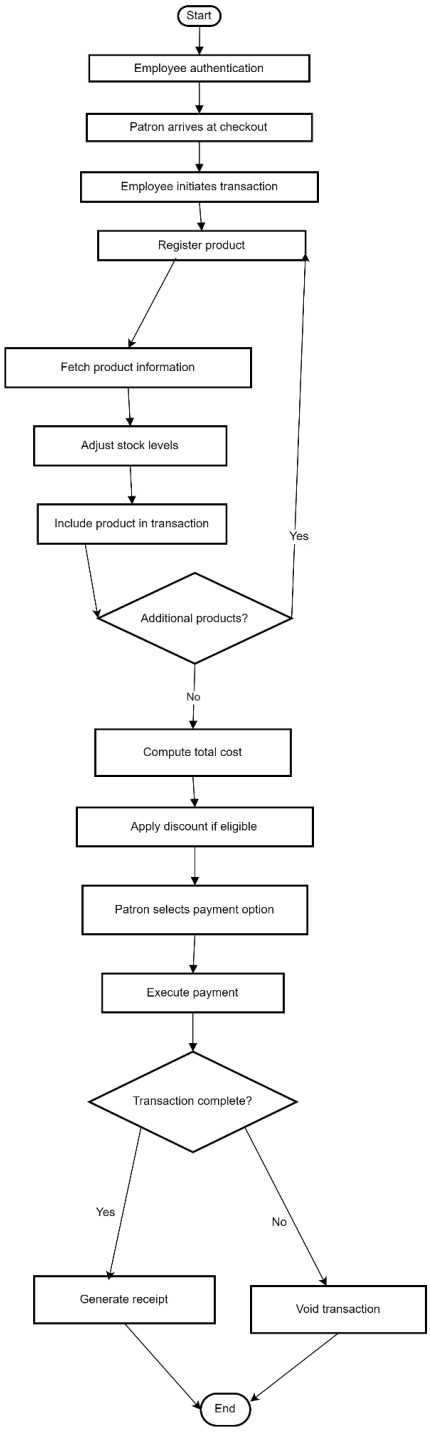


Task-4: Develop Analysis Domain Models



Task-5:

- **Activity diagram : (Process Sale)**



- **Activity diagram : (Handle Return)**