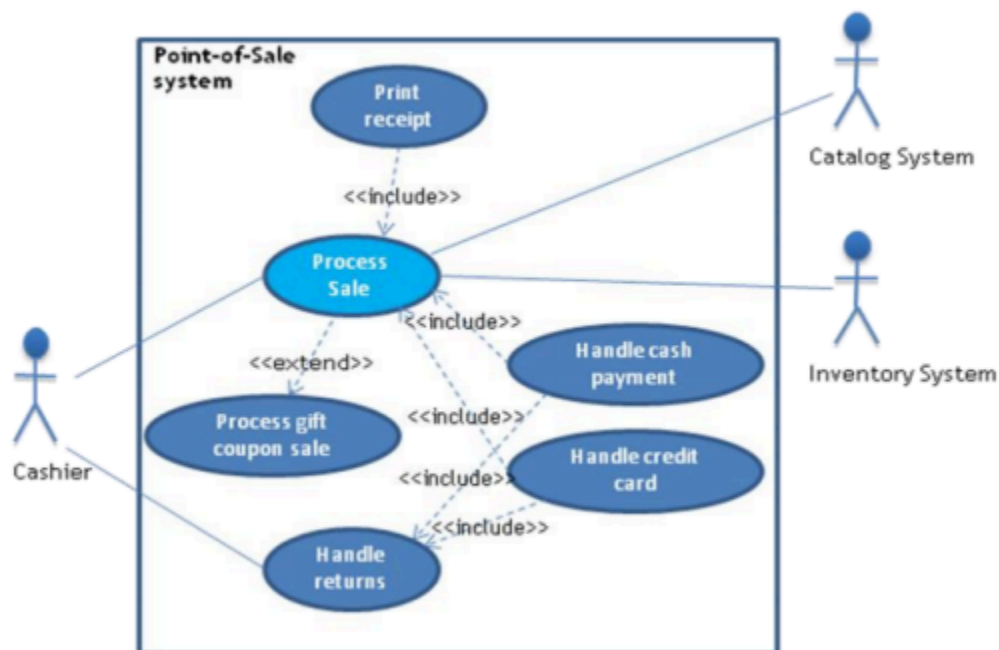


A Problem Description

A POS (Point-Of-Sale) system is a computer system typically used to manage the sales in retail stores. It includes hardware components such as a computer, a bar code scanner, a printer and also software to manage the operation of the store. The most basic function of a POS system is to handle sales. When a customer arrives at a POS counter with goods to purchase, the cashier will start a new sale transaction. When the barcode of a good is read by the POS system, it will retrieve the name and price of this good from the backend catalog system and interact with the inventory system to deduce the stock amount of this good. When the sale transaction is over, the customer can pay in cash, credit card or even check. After the payment is successful, a receipt will be printed. Note that for promotion, the store frequently issues gift coupons. The customer can use the coupons for a better price when purchasing goods. Another function of a POS system is to handle returns.... [The details of which are not given here] A user must log in to use the POS. The users of a POS system are the employees of the store including cashiers and the administrator. The administrator can access the system management functions of the POS system including user management and security configuration that cashiers can't do.



Use Case Description

1) Process Sale

Title: Process Sale

Actors: Cashier, Catalog System, Inventory System

Precondition: The cashier must be logged into the POS system.

Basic Flow:

1. The cashier initiates a new sale transaction.
2. The customer presents goods at the POS counter.
3. The cashier scans the barcode of the goods.
4. The system retrieves the name and price of the goods from the Catalog System.
5. The system interacts with the Inventory System to deduct the stock for the goods.
6. The customer selects a payment method (cash, credit card, gift coupon).
7. The payment is processed.
8. Upon successful payment, the system prints a receipt for the customer.

Extensions:

4a) If there is a system issue retrieving product information, the cashier enters product details manually.

8a) If payment fails, the system prompts the cashier to retry or select a different payment method.

Postcondition: The sale transaction is completed, and the stock for the purchased items is updated.

2) Handle Returns

Title: Handle Returns

Actors: Cashier, Inventory System

Precondition: The customer must present a valid receipt or order ID.

Basic Flow:

1. The cashier initiates a return transaction in the POS system.
2. The system verifies the original purchase details using the receipt or order ID.
3. The customer presents the items for return.
4. The system interacts with the Inventory System to update the stock, adding the returned items back.
5. The system processes the refund via the customer's original payment method (cash, credit card, etc.).
6. The cashier prints a return receipt for the customer.

Extensions:

1a) If the item is damaged or unreturnable, the cashier rejects the return and explains the policy to the customer.

5a) If the original payment method is unavailable, an alternate refund method is chosen.

Postcondition: The returned items are restocked, and the customer is refunded.

Entity/Boundary Control Objects

Entity Objects:

- *Product*: Represents items in the catalog.
- *Transaction*: Represents sales and return transactions.
- *Payment*: Represents payment processing (cash, credit card, gift coupon).

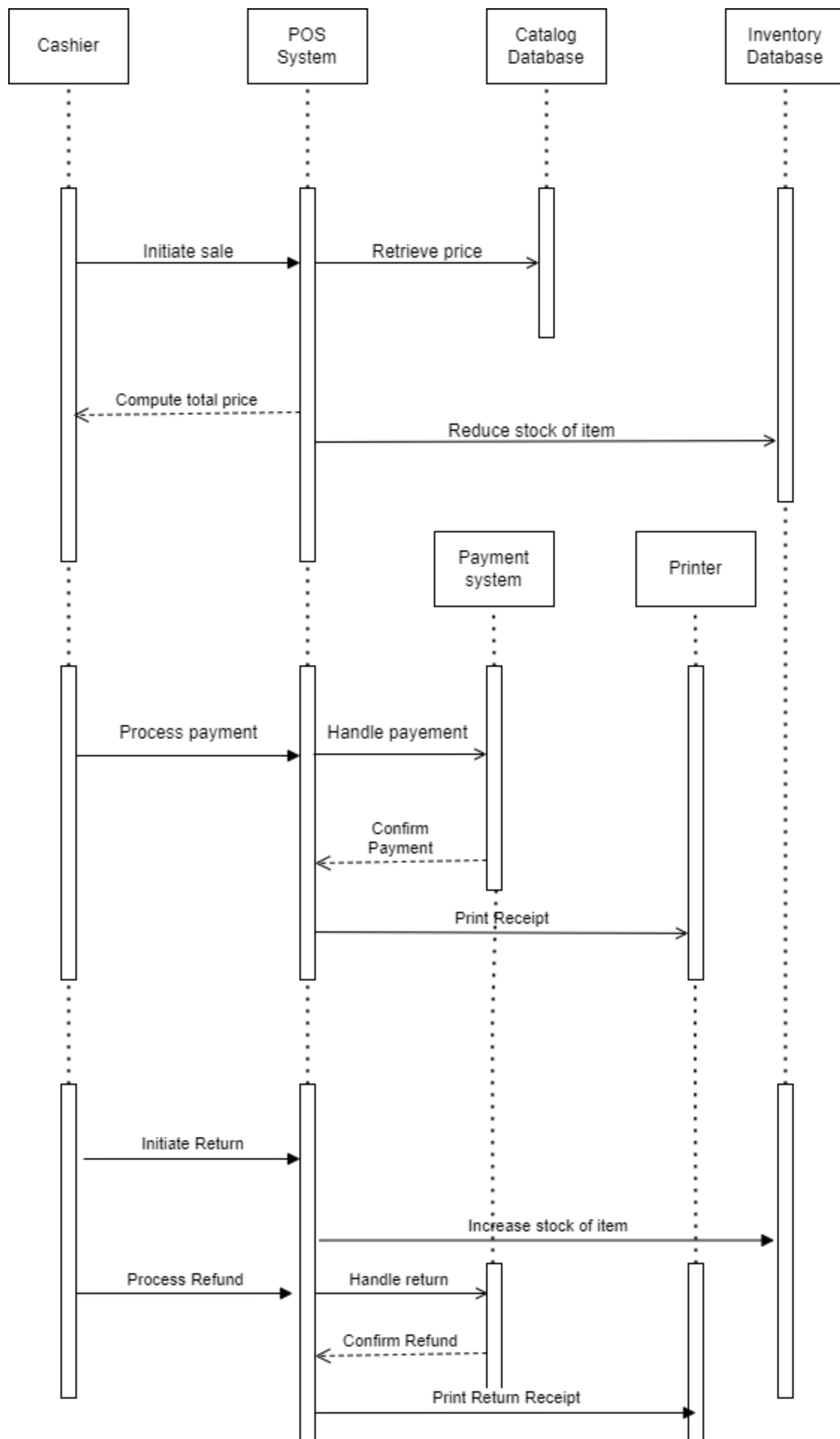
Boundary Objects:

- *POS Interface*: Used by the cashier to interact with the system (e.g., starting transactions, scanning items).
- *Receipt Printer*: Prints receipts for completed sales or returns.

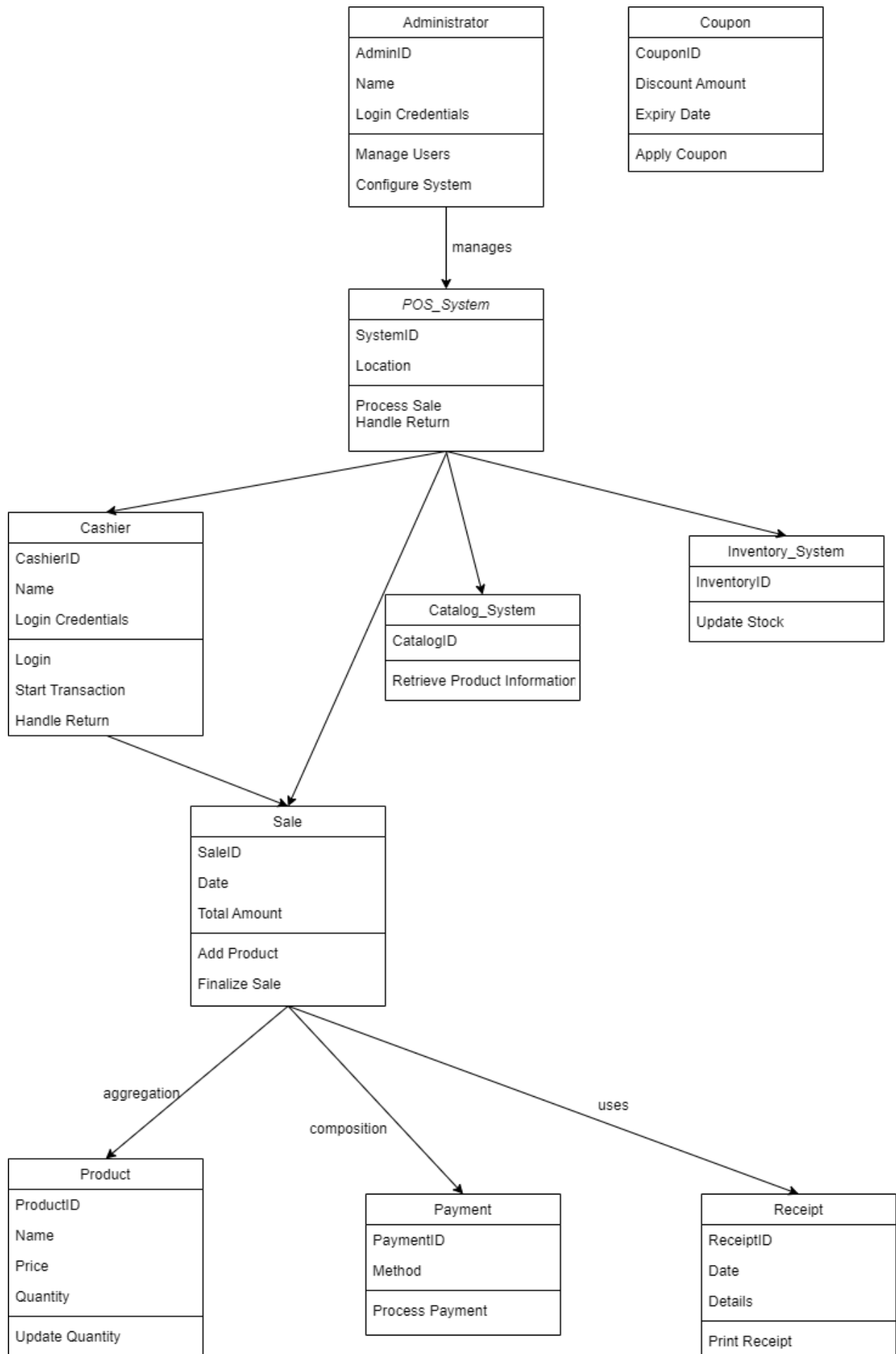
Control Objects:

- *SaleController*: Manages the process of handling sales.
- *ReturnController*: Manages the process of handling returns.
- *PaymentController*: Manages payment processing.
- *InventoryController*: Handles interactions with the Inventory System.

Sequence Diagram

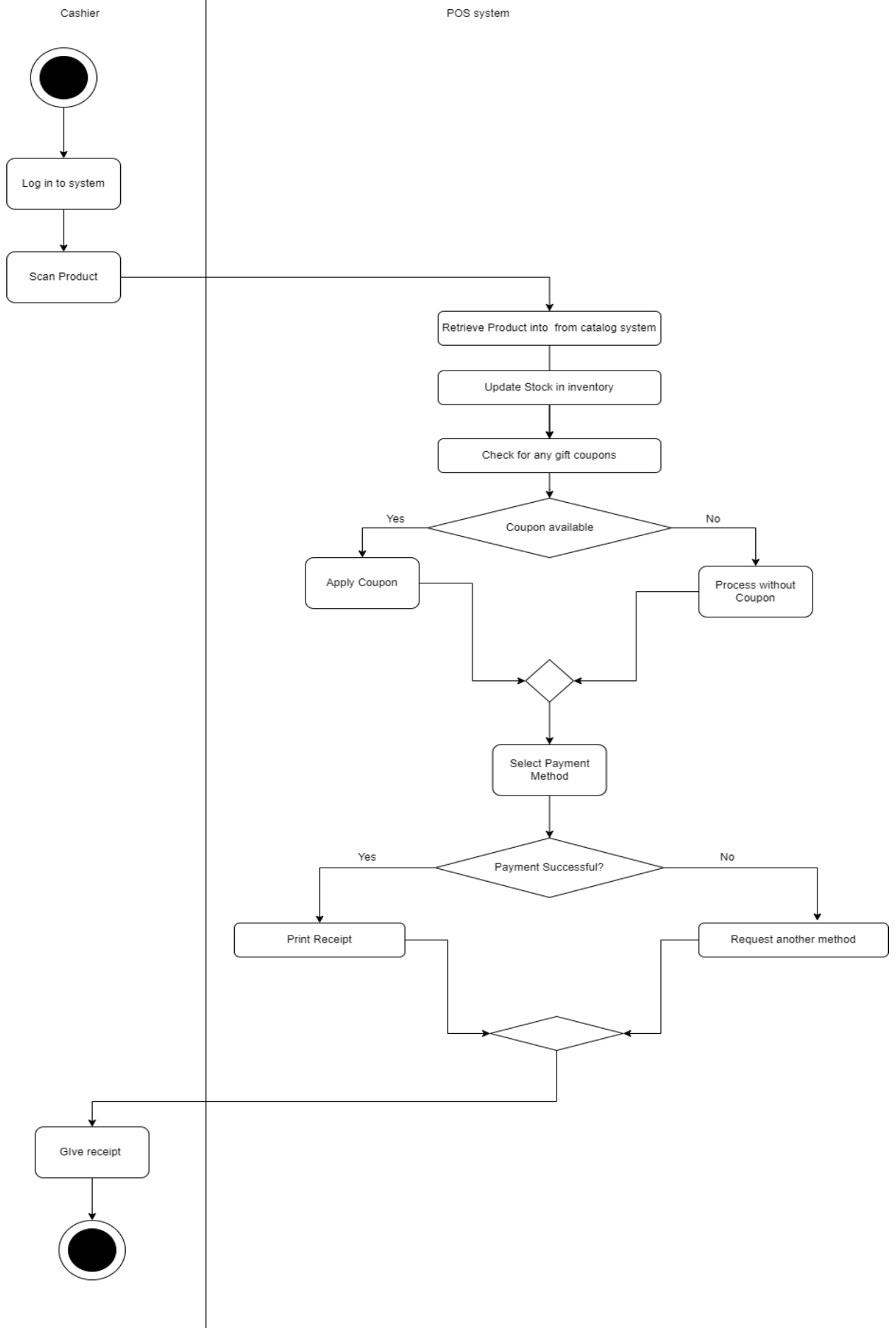


Class Diagram



Activity Diagram

1) Process Sale



2) Handle Return

