

Lab 06: Modeling Class Diagram and Activity Diagram (Point of Sale System)

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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 the 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: Process Sale

Actors: Cashier

Preconditions:

- Cashier must be authenticated and logged into the system.
- The item must exist in the inventory.

Description:

1. Customer arrives at the POS checkout with goods to purchase.
2. The cashier initiates a new sale transaction.
3. The cashier scans the barcode of items presented by the customer.
4. System retrieves item information from the catalog system and records the sale line item and presents item description, price, and running total. Cashier repeats steps 3-4 until all the products are added.
5. System calculates and presents the total price.
6. The cashier may apply any applicable gift coupons for discounts.
7. The system calculates and displays the total amount due.
8. The customer makes a payment using cash, credit card or check.
9. The system processes the payment and confirms the transaction.
10. The system updates the inventory, deducting the stock amount.
11. A receipt is printed for the customer.
12. Customer leaves with a receipt and goods.

Postconditions:

- Transaction is completed, and inventory is updated.
- Receipt is printed for the customer.

Alternate Flow:

- 3a. The barcode could not be detected, so cashier enters the item manually.
- 8a. Payment Failure occurs and money if deducted should be refunded back and the system waits for another attempt.
- 10a. The stock goes below 5 quantities then reorder option shows up in POS.

Entity/Boundary Control Objects:**Entities:**

- Item catalog
- Inventory database
- Transaction Database
- Cashier
- Coupon
- Sale Receipt

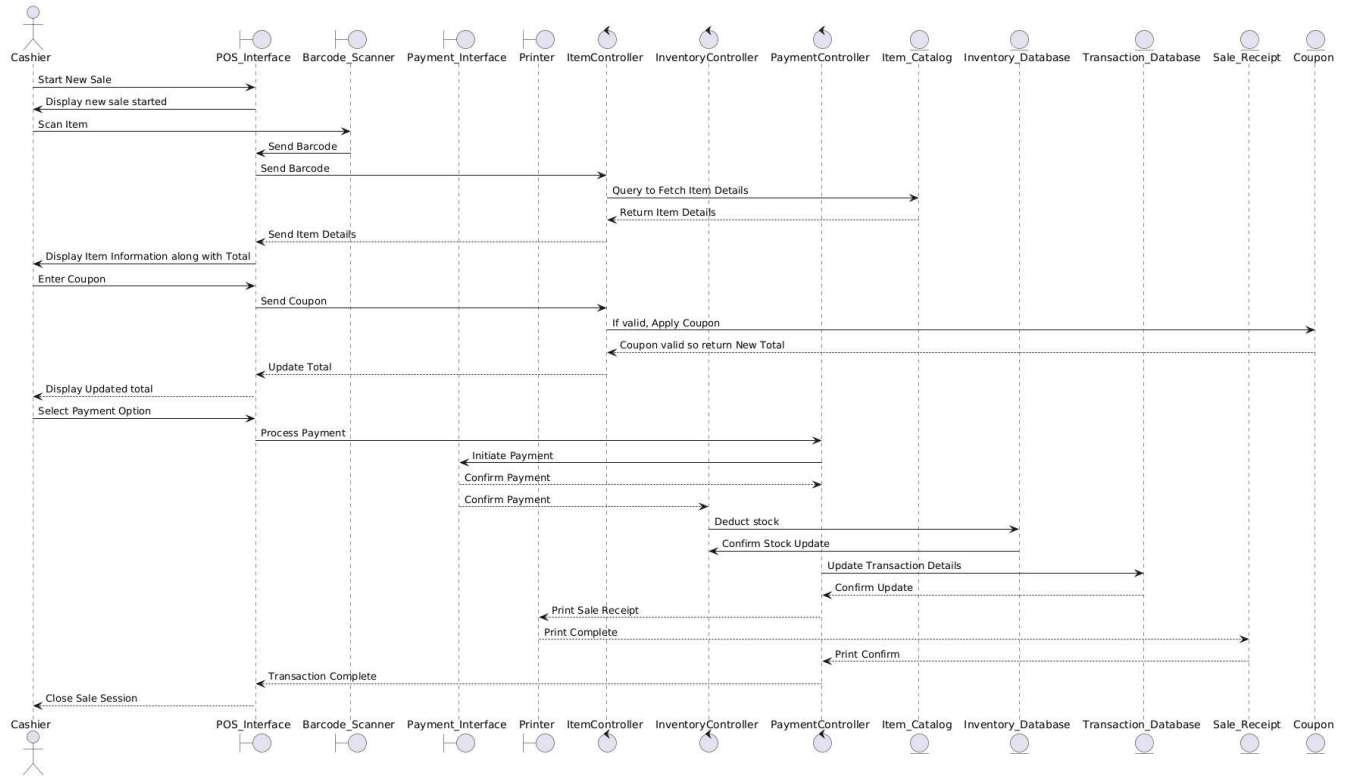
Boundary Objects:

- POS Interface
- Payment interface (Card reader etc)
- Barcode scanner
- Printer

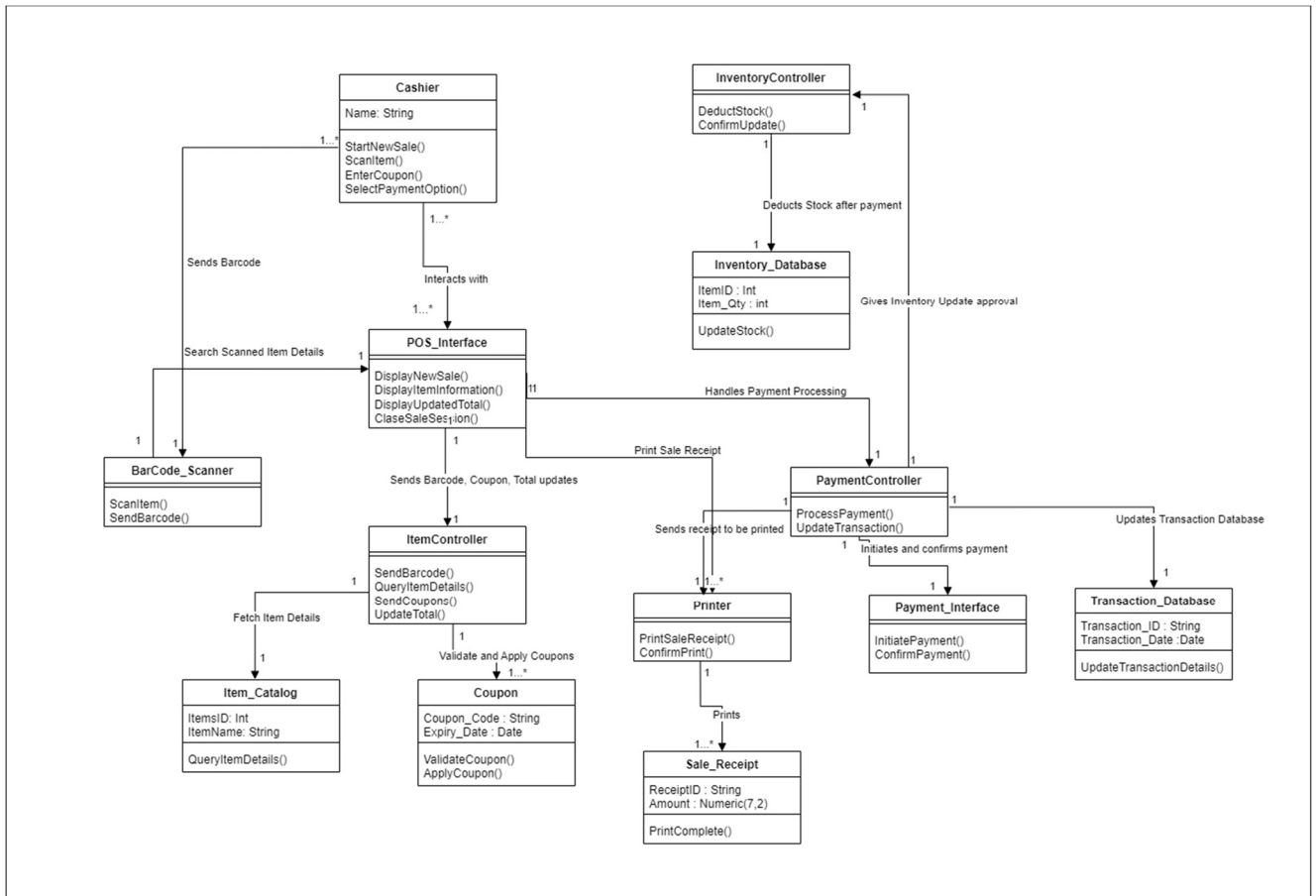
Control Objects:

- ItemController
- InventoryController
- PaymentController

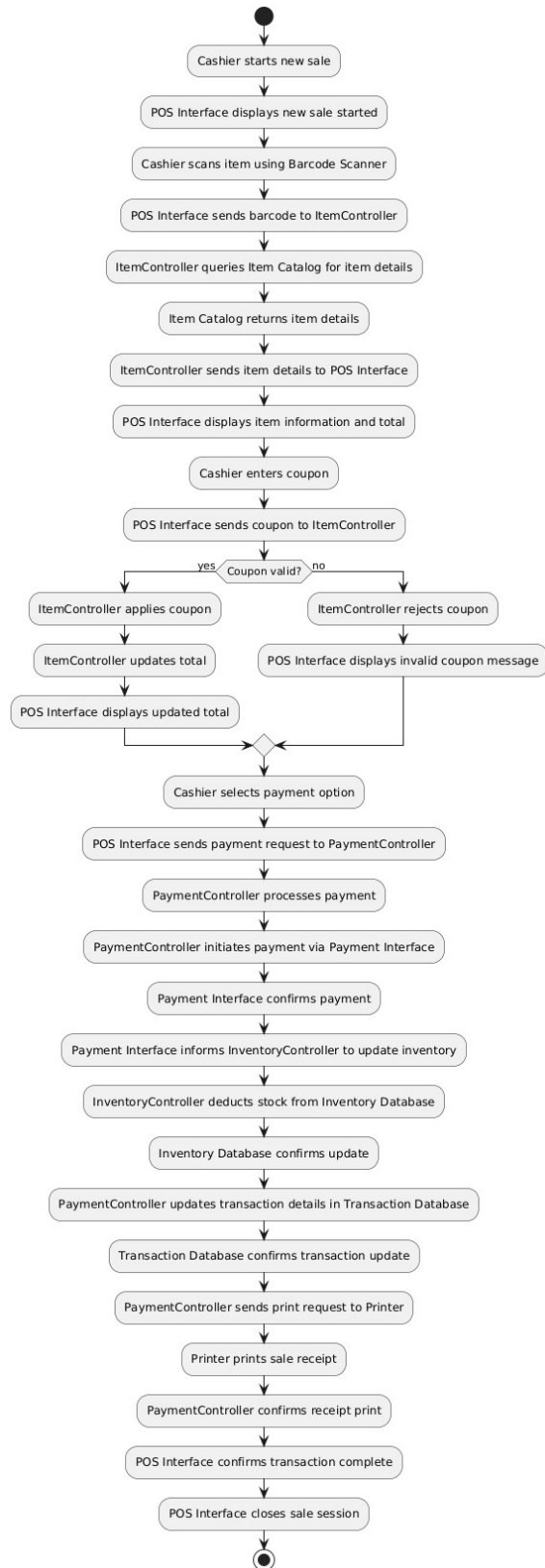
Sequence Diagram:



Analysis Domain Models (Class Diagram):



Activity Diagram:



Use Case: Handle Return

Actors: Cashier, Customer

Preconditions:

- Cashier must be authenticated and logged into the system.

Description:

1. Customer arrives at the POS checkout with goods to return.
2. The cashier initiates a return transaction.
3. The cashier scans the barcode of the original receipt of the item being returned.
4. The system verifies the purchase details (original transaction).
5. The system checks if the items in the receipt are eligible for return.
6. The system calculates any refunds or store credit or vouchers.
7. The cashier processes the return and the system updates the inventory, adding the stock amount.
8. A return receipt is printed for the customer.

Postconditions:

- Transaction is completed, and inventory is updated.
- Receipt for the return is printed.

Alternate Flow:

- 3a. The barcode could not be scanned properly hence the cashier checks the original receipt number by manually entering it.
- 4a. The receipt is not found in records due to which the session will be terminated.
- 5a. The items in the receipt are not eligible for return due to which the session will get terminated.

Entity/Boundary Control Objects:

Entities:

- Item catalog
- Transaction Database
- Inventory database
- Cashier
- Customer
- Store Credit/Coupons
- Return Receipt

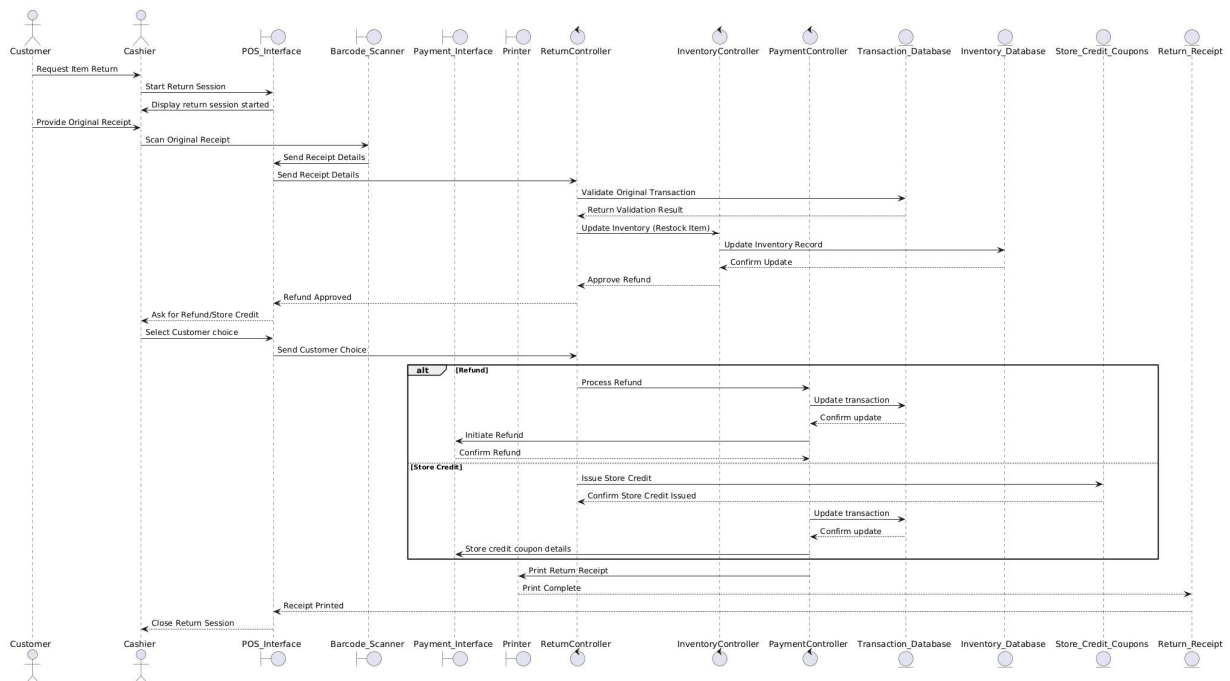
Boundary Objects:

- POS Interface
- Payment interface (Card reader etc)
- Barcode scanner
- Printer

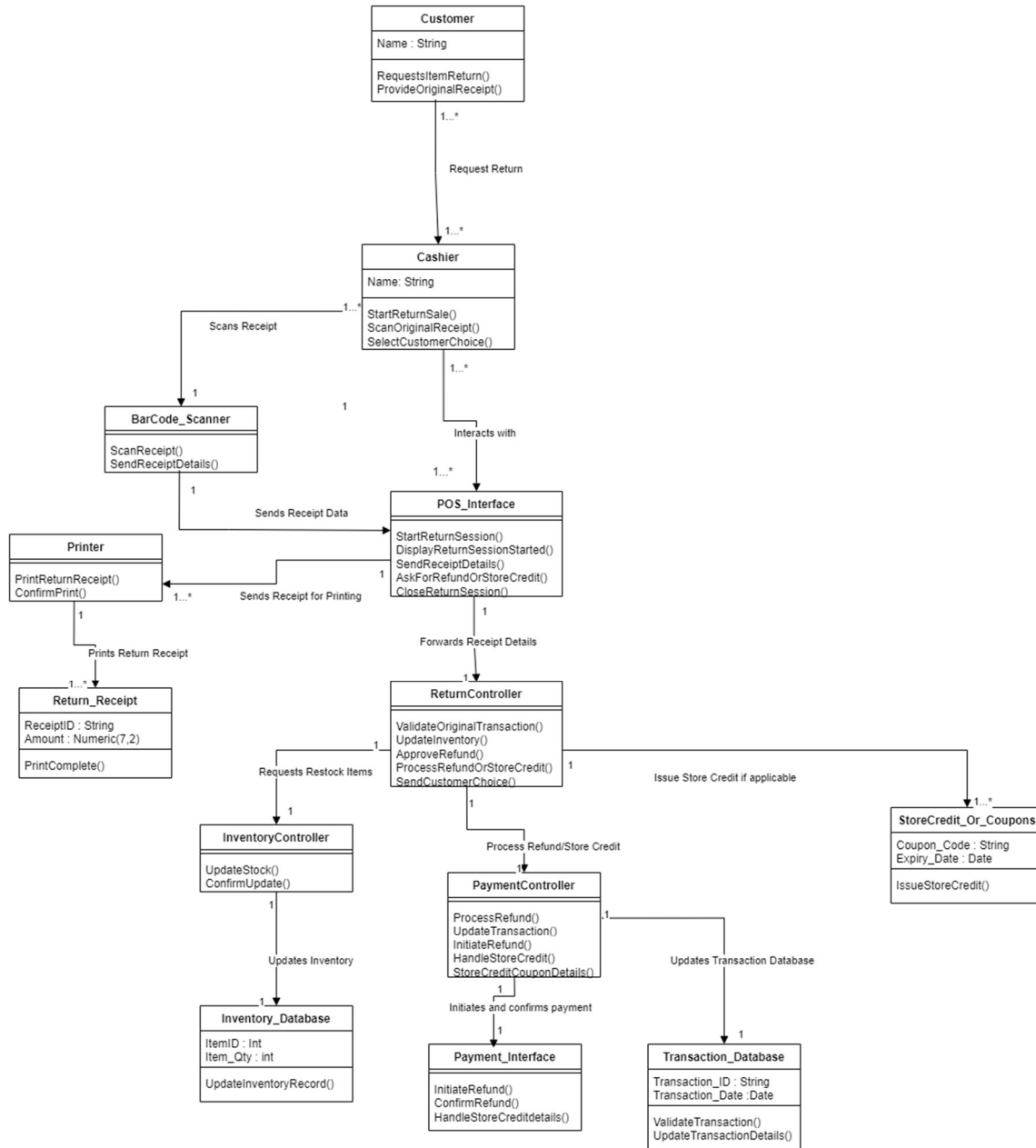
Control Objects:

- ReturnController
- InventoryController
- PaymentController

Sequence Diagram:



Analysis Domain Models (Class Diagram):



Activity Diagram:

