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

Use case textual description:

1) Process sale

Actor(s): Cashier, Customer
Preconditions:

- The cashier is logged into the POS system.
- The store inventory is updated and accessible.

Postconditions:

- The sale transaction is completed, and the inventory is updated.
- A receipt is printed for the customer.

Main Flow:

1. The cashier greets the customer and asks for items to purchase.
2. The customer places items on the counter.
3. The cashier scans the barcode of each item using the barcode scanner.
    - The system retrieves the item name and price from the backend catalog.
    - The system checks the inventory to confirm availability.
4. The system updates the inventory by deducting the quantity of each item sold.
5. Once all items are scanned, the cashier informs the customer of the total amount due.
6. The customer chooses a payment method (cash, credit card, check).
7. The cashier processes the payment:
    - For cash: the cashier accepts cash and provides change if necessary.
    - For credit card: the cashier swipes the card and verifies the transaction.

   ○ For check: the cashier verifies the check before accepting it.
8. After successful payment, the system generates a receipt.
9. The cashier hands the receipt and purchased items to the customer.
10. The cashier thanks the customer and invites them to return.

2) Handle return

Actor(s): Cashier, Customer
Preconditions:

- The cashier is logged into the POS system.
- The customer presents items for return with proof of purchase (receipt).

Postconditions:

- The return transaction is completed, and inventory is updated.
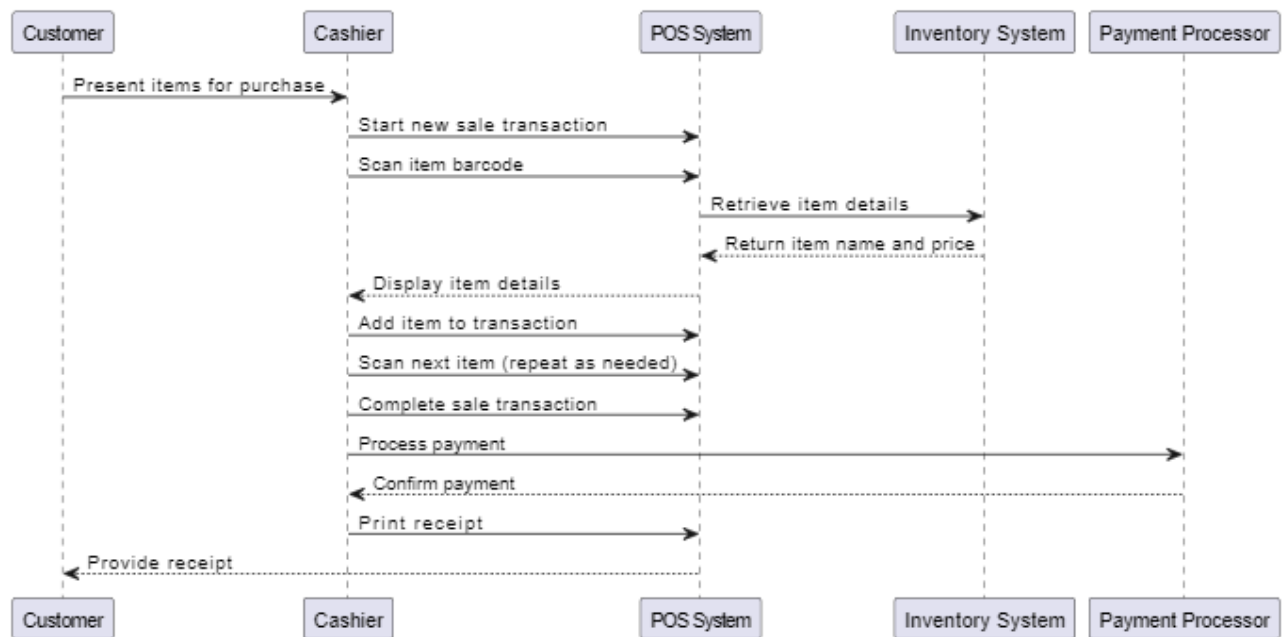- A return receipt is printed for the customer.

Main Flow:

1. The cashier greets the customer and asks about the return.
2. The customer presents items for return along with the original purchase receipt.
3. The cashier verifies the receipt against the POS system to confirm the original sale.
4. The system checks the return policy (e.g., within return period, condition of items).
5. If the return is valid:
  ○ The system processes the return transaction.
  ○ The system updates the inventory by increasing the stock quantity of the returned items.
  ○ The system calculates any refund amount if applicable.
6. The cashier informs the customer of the return approval and refund amount.
7. The customer receives the refund via the original payment method:
  ○ For cash: the cashier gives cash back.
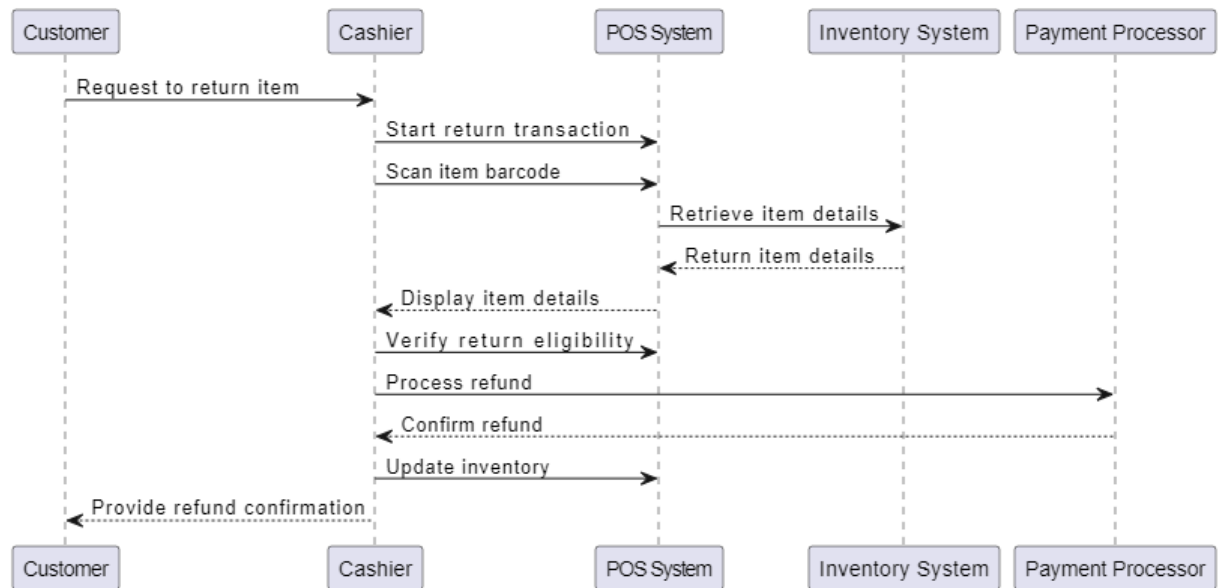 ○ For credit card: the cashier processes the refund to the card.

- For check: the cashier issues a store credit or another method as per store policy.

8. The system generates a return receipt.
9. The cashier hands the return receipt and any refunded amount to the customer.
10. The cashier thanks the customer for their visit.

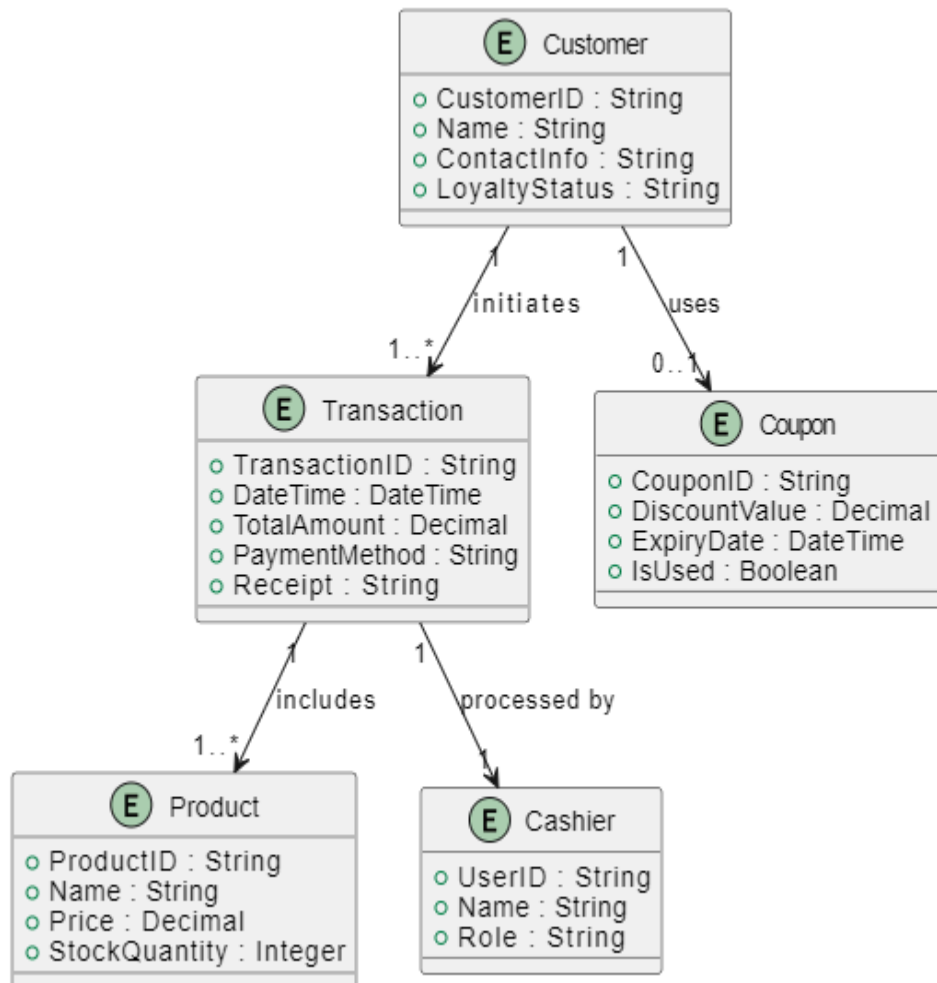# Sequence diagram:

1) Process sales:

2) Handel return

Analysis domain model:

1) Process sale

2) Handle Return

E Cashier

- UserID : String
- Name : String
- Role : String

1

processes

0..*

E Return

- ReturnID : String
- DateTime : DateTime
- Reason : String
- Restocked : Boolean

1   1..*

linked to   involves

1   1..*

E Transaction

- TransactionID : String
- DateTime : DateTime
- TotalAmount : Decimal
- PaymentMethod : String
- Receipt : String

E Product

- ProductID : String
- Name : String
- Price : Decimal
- StockQuantity : Integer
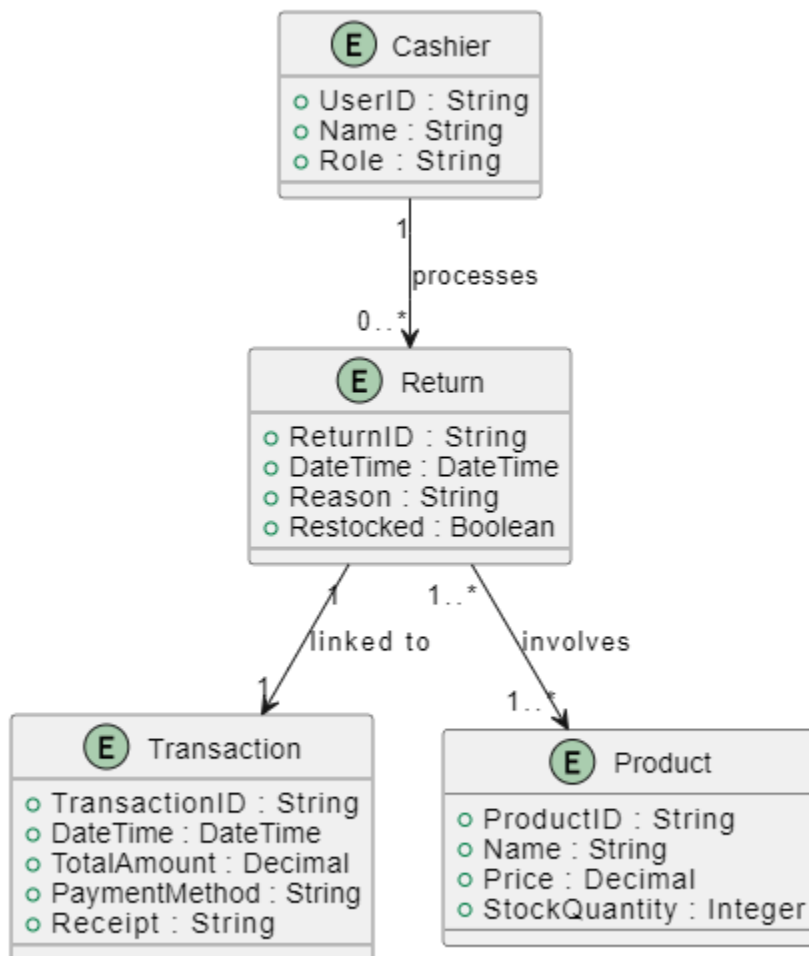
Activity Diagram:

1) Process sales


```
Log in to POS
Start new sale transaction
Scan item barcode
Retrieve item details from catalog
Update inventory stock
Display item price to customer
Receive payment (Cash/Credit Card/Check)
Is payment successful?
  yes → Print receipt → Update sales records
  no → Display payment error
End sale transaction
```

2) Handle return

Log in to POS

Start return transaction

Scan item barcode

Retrieve item details from catalog

yes — Is return valid? — no

Process return

Update inventory stock

Issue refund (Cash/Credit Card)

Print return receipt

Display return error

End return transaction