

Lab 6 - Point of Sales System

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Use Case: Process Sale

Process Sale Use Case

Primary Actors: Cashier, Customer

Preconditions:

- The cashier is logged into the POS system.
- The customer is at the checkout with items to purchase.

Postconditions:

- The sale is completed successfully.
- The customer receives a printed receipt.
- The POS updates the sale details, stock levels, and payment information.

Basic Flow:

1. The cashier begins a new sale transaction.
2. The cashier scans the barcode of an item.
3. The system fetches the item details from the backend, adds the item to the current bill, and updates the total amount. Steps 2 and 3 are repeated until all items are scanned.
4. The system calculates and shows the total price to the customer.

5. The cashier processes any coupons provided by the customer, entering the discount information into the system, and informs the customer of the new total.
6. The customer selects a payment method and completes the transaction.
7. The system finalizes the sale, updates stock data in the backend, saves the transaction details, and sends a request to the printer to issue a receipt.
8. The printer produces a receipt.
9. The customer leaves with the purchased items and receipt.

Extensions:

1. System Failure:

- If the system fails at any point, it must recover the transaction state to maintain integrity.
- The cashier restarts the system, logs in, and attempts to restore the previous transaction.
- The system reconstructs the previous state.
- If any issues are detected during recovery, the cashier initiates a new sale.

2. Scanning Issues:

- Invalid Scan:
 - The system displays an error message and rejects the entry.
 - The cashier can manually enter the barcode number or ask the customer to present another unit.
- Multiple Units: The cashier can input the quantity for the same item.

3. Item Removal:

- If the customer wants to remove items from the bill, the cashier can remove them from the interface and place them in a separate basket for restocking.

4. Expired Coupons:

- If the customer presents expired coupons, they will be invalidated and discarded.

5. **Payment Issues:** If the transaction fails, the customer is prompted to retry payment using the same or a different method.

Handle Return Use Case

Primary Actors: Cashier, Customer

Preconditions:

- The cashier is logged into the POS system.
- The customer has the original receipt and the items they wish to return.

Postconditions:

- The customer successfully returns the items and receives a new receipt along with a refund via the original payment method.

Basic Flow:

1. The cashier starts a return transaction in the system.
2. The cashier scans the items being returned.
3. The system retrieves details from the original sale and checks the return eligibility according to store policy.
4. The system updates the inventory to reflect the returned items.
5. The system calculates the refund amount, factoring in the original price and any applicable return fees.
6. The cashier processes the refund using the original payment method (cash, credit, check).

7. The system logs the return transaction and prints a return receipt.
8. The customer departs with the refund receipt.

Extensions:

1. System Failure:

- In case of system failure during the return process, the same recovery method from the "Process Sale" use case applies.

2. Invalid Receipt:

- If the receipt is invalid or not found, the system displays an error.
- A manager's approval may be needed for manual processing of the return.

3. Partial Returns:

- If only some items are being returned, the cashier scans only those items.
- The system adjusts the refund amount and updates the inventory accordingly.

4. Exchanging Items:

- If the customer wishes to exchange returned items for different products:
 - The cashier processes the return.
 - The cashier then initiates a new sale for the new items, applying the refund to the total.

Entity/Boundary/Control Objects

Entity Objects:

- Sale
- Return
- Inventory (Backend)

- **Cashier**
- **Customer**
- **Receipt**
- **Goods**

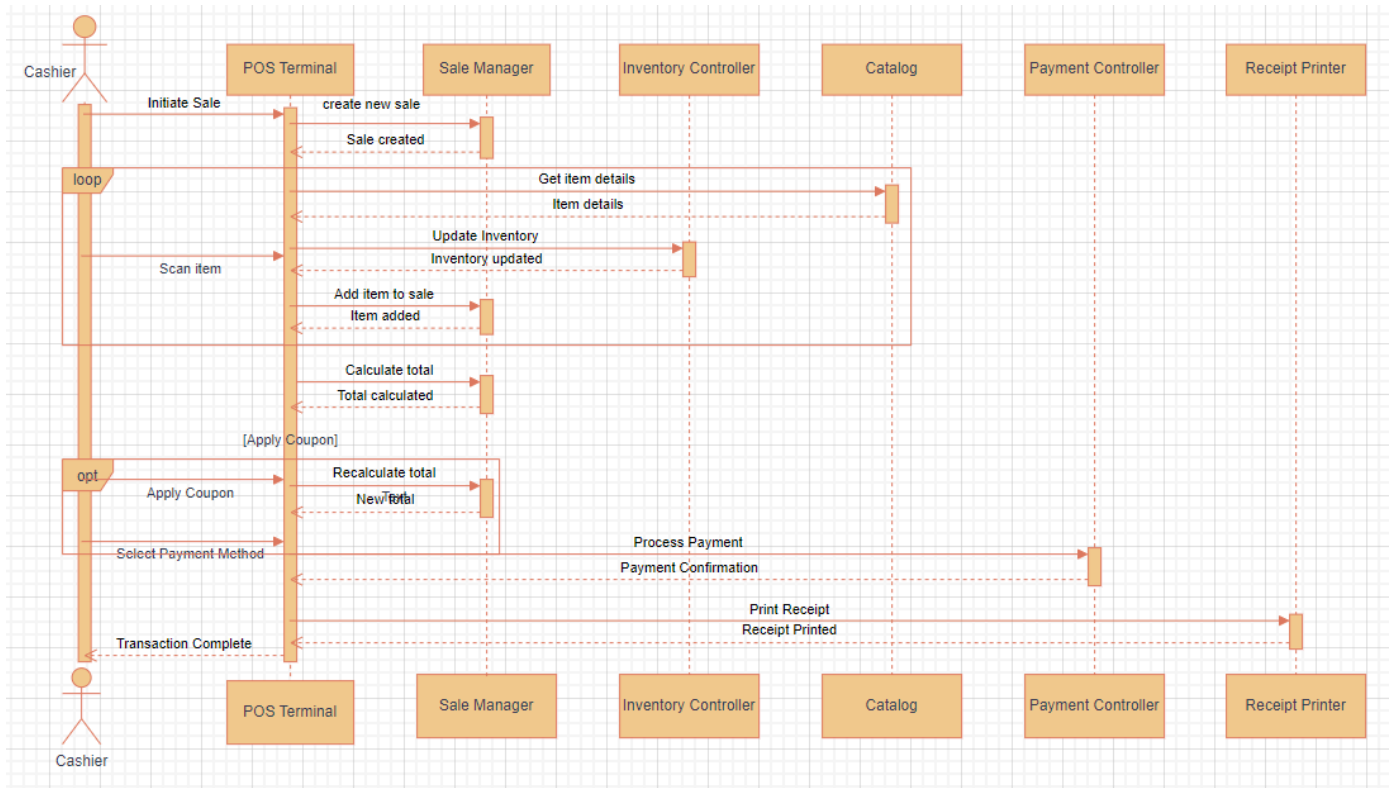
Boundary Objects:

- **POS Interface (for cashier interactions)**
- **Barcode Scanner**
- **Receipt Printer**

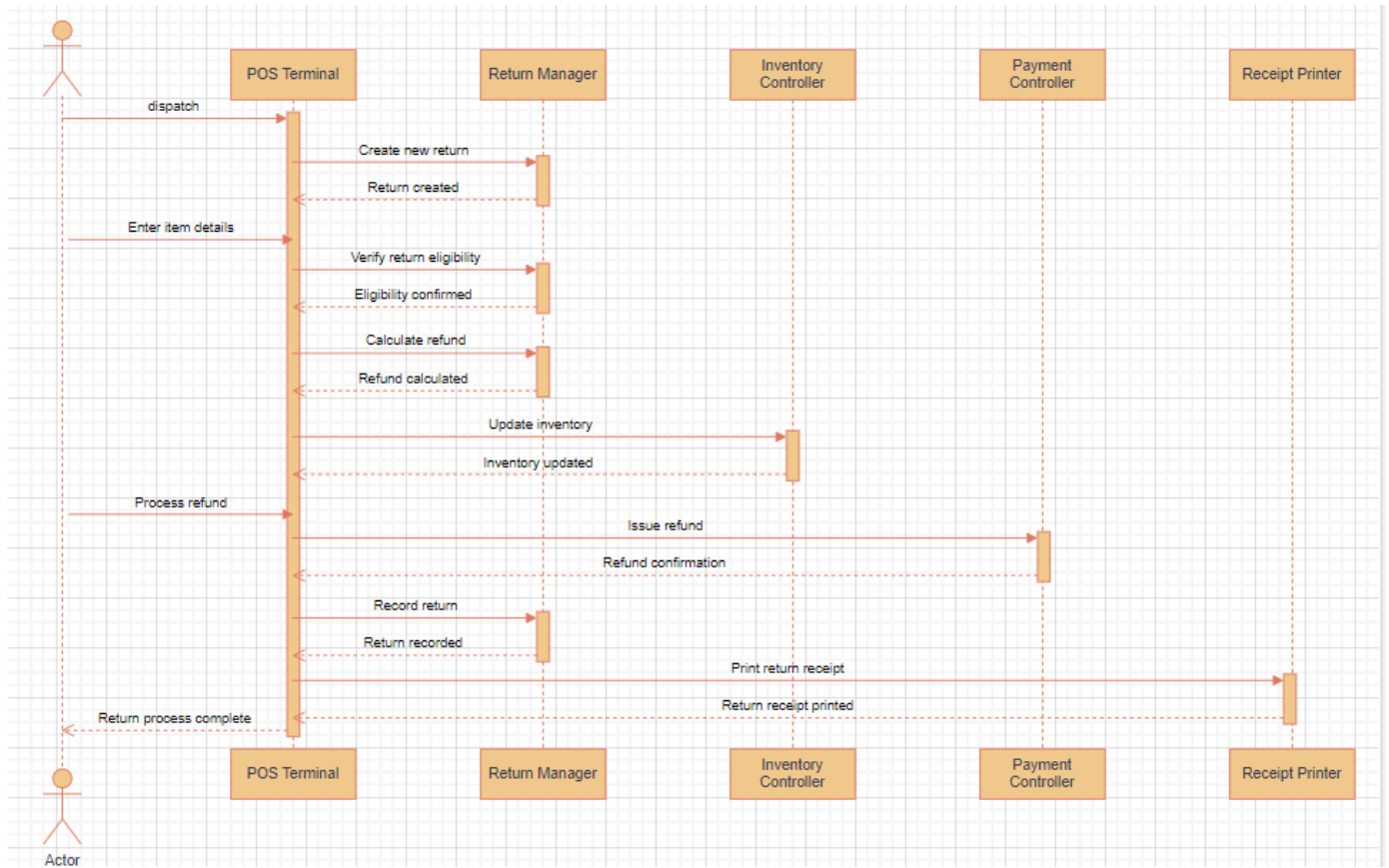
Control Objects:

- **SaleController (manages the sale process)**
- **PaymentProcessor (handles payment transactions)**
- **ReturnController (manages product returns)**
- **InventoryController (oversees stock management)**

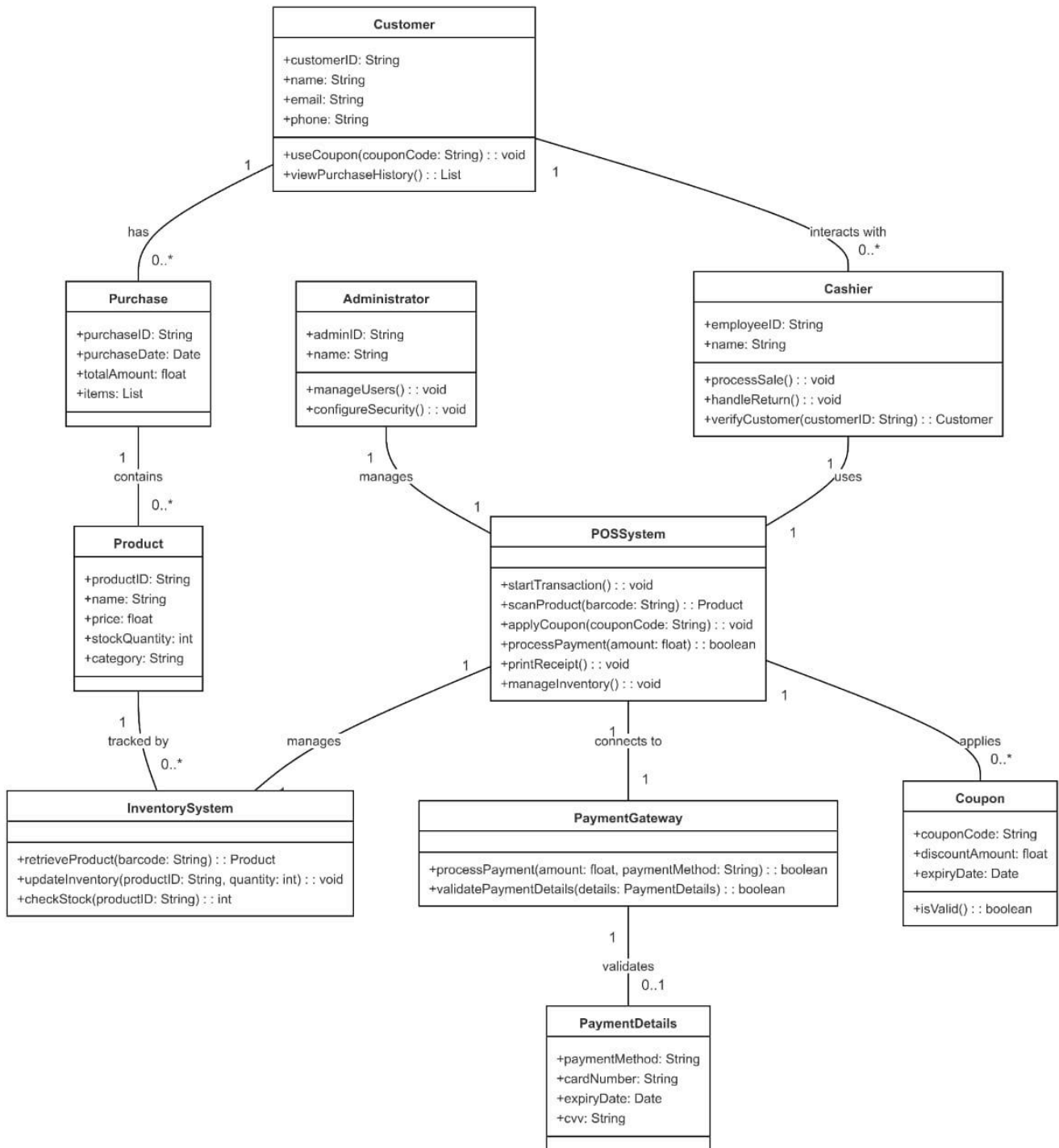
Sequence Diagram: Process Sale Sequence Diagram



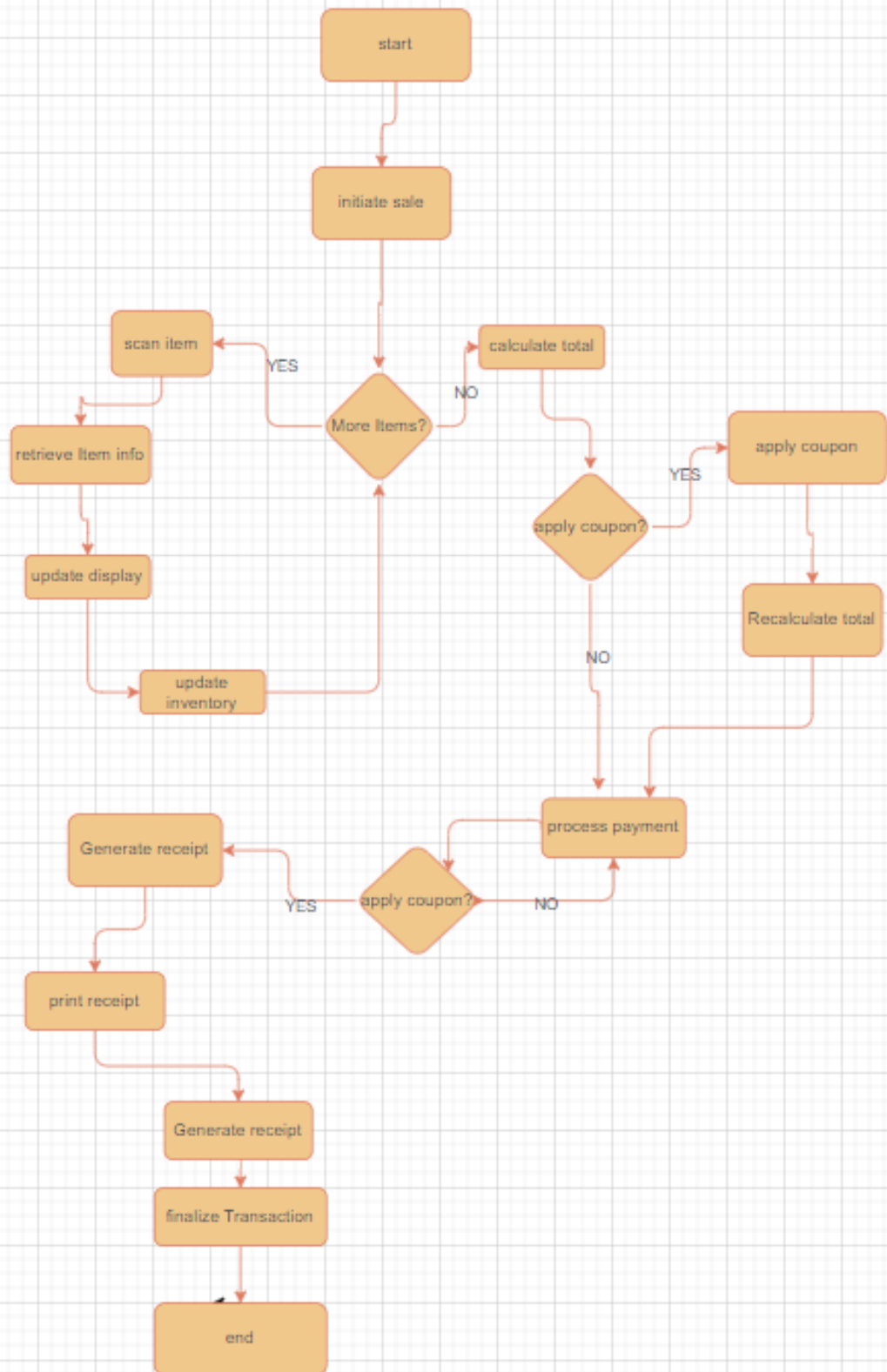
Sequence Diagram: Handle Return Sequence Diagram



Analysis Domain Model



Process Sale Activity Diagram



Handle Return Activity Diagram

