**Vraj Patel - 202201401**
**Lab6 IT314**

## Q.1 Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.

### Use Case: Completing a Sale

Actors
- Main Actor: Cashier
- Supporting Actor: Customer

Prerequisites
1. Cashier is logged into the point of sale (POS) system.
2. The POS system is linked to the product catalog and inventory systems.

Primary Flow
1. The customer approaches the checkout with items for purchase.
2. The cashier begins a new sales transaction.
3. For each item:
   3.1. The cashier scans the barcode.
   3.2. The system fetches the item's details (name, price) from the catalog.
   3.3. The system updates the stock quantity.
   3.4. The system adds the item to the ongoing transaction.
4. The system calculates the total cost.
5. The cashier informs the customer of the final amount.
6. The customer selects a payment option (cash, card, or check).
7. The cashier completes the payment process.
8. The system logs the transaction.
9. A receipt is printed.
10. The cashier hands the receipt and purchased items to the customer.

Alternative Flows
- 4a. If the customer presents a gift coupon:
  1. The cashier applies the coupon to the transaction.
  2. The system recalculates the total with the discount.
  3. Return to step 5.

- 6a. If the customer decides not to proceed with the purchase:
  1. The cashier cancels the transaction.
  2. The system reverses any inventory changes.

3. The process ends.

- 7a. If the payment is declined:
  1. The system shows an error message.
  2. The cashier informs the customer.
  3. Return to step 6 or 6a.

Outcomes
1. The sale is saved in the system.
2. Inventory levels are updated.
3. Payment is completed (if the sale was finalized).

## Use Case: Processing a Return

Actors
- Main Actor: Cashier
- Supporting Actor: Customer

Prerequisites
1. The cashier is logged into the POS system.
2. The customer has items to return along with the original receipt.

Primary Flow
1. The customer approaches the counter with the items and receipt.
2. The cashier initiates a return transaction.
3. The cashier scans or enters the receipt number.
4. The system pulls up the original transaction.
5. For each returned item:
   5.1. The cashier scans the barcode.
   5.2. The system verifies that the item was included in the original sale.
   5.3. The system calculates the refund amount for the item.
   5.4. The item is added to the return transaction.
6. The system calculates the total refund.
7. The cashier checks the condition of the returned items.
8. The cashier processes the refund using the original payment method.
9. The system updates the stock.
10. The system records the return.
11. A return receipt is printed.
12. The cashier gives the return receipt and refund to the customer.

Alternative Flows
- 5a. If the item was not part of the original transaction:
  1. The system displays an error.

2. The cashier informs the customer the item cannot be returned.
3. Proceed to the next item or continue to step 6.

- 7a. If the item is not in a returnable condition:
1. The cashier informs the customer that the item is ineligible for return.
2. The system removes the item from the return transaction.
3. Proceed to the next item or continue to step 6.

- 8a. If the original payment method is unavailable:
1. The cashier chooses an alternate refund method (store credit or cash).
2. Continue to step 9.

Outcomes
1. The return is logged in the system.
2. Inventory is adjusted.
3. The refund is processed.

## Q.2 Identify Entity/Boundary Control Objects

Entity Objects:

- Sale
- Item
- Payment
- Customer
- Employee (Cashier, Administrator)
- Inventory
- Coupon
- Return

Boundary Objects:

- POS Terminal Interface
- Barcode Scanner
- Payment Terminal
- Receipt Printer

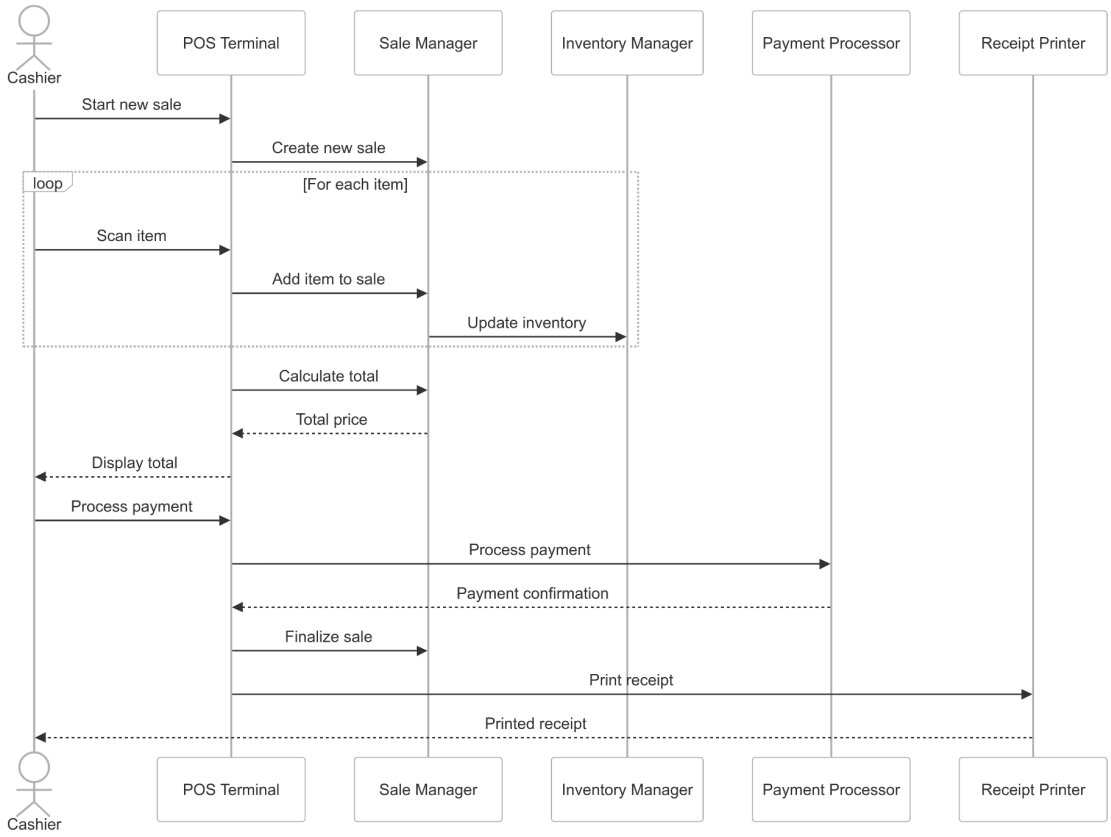
Control Objects:

- Sale Manager
- Inventory Manager
- Payment Processor

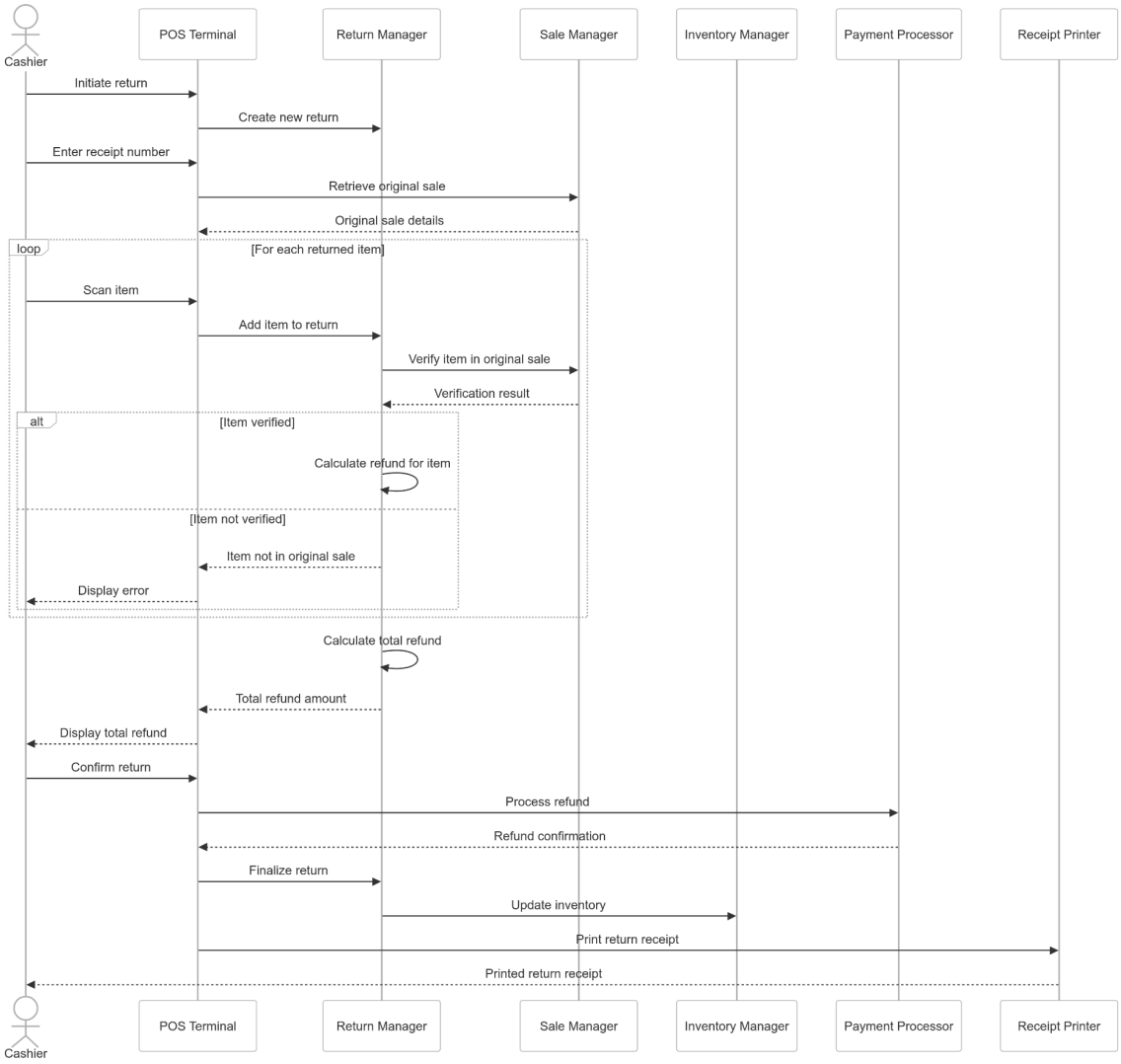
- User Authentication Controller
- Return Manager

## Q.3 Develop Sequence Diagrams

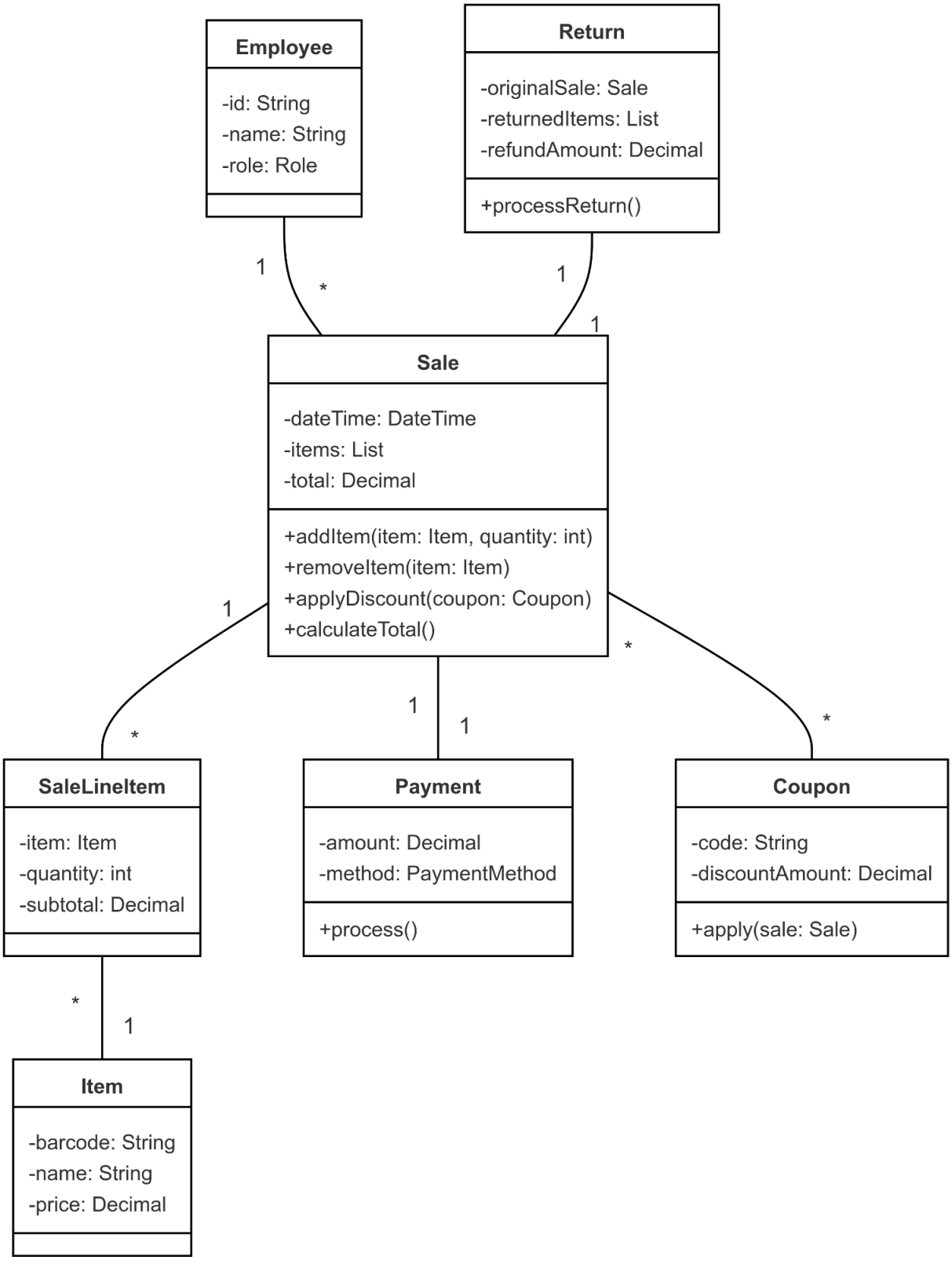
Sequence diagram for process sale:



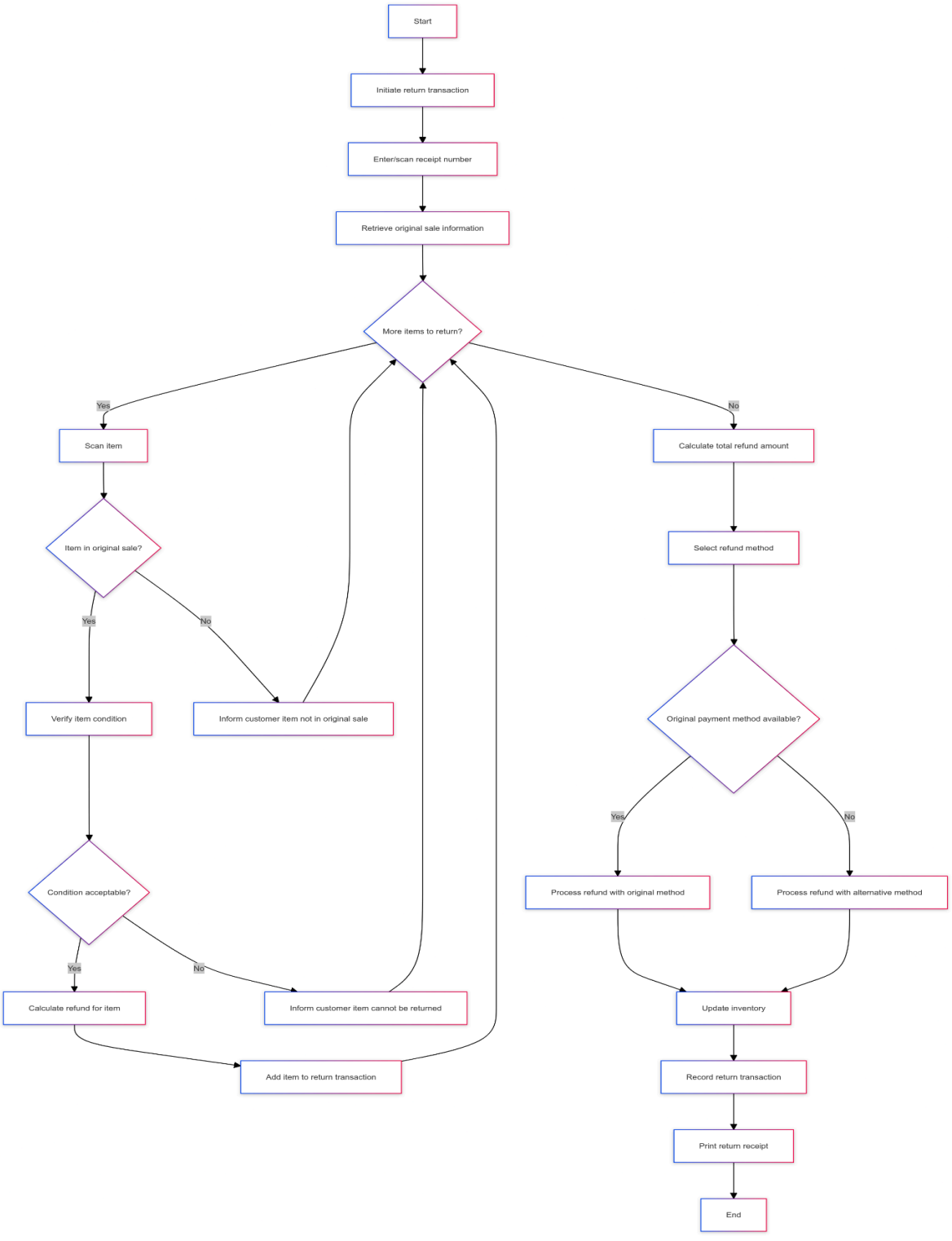
Sequence diagram for Handle return:

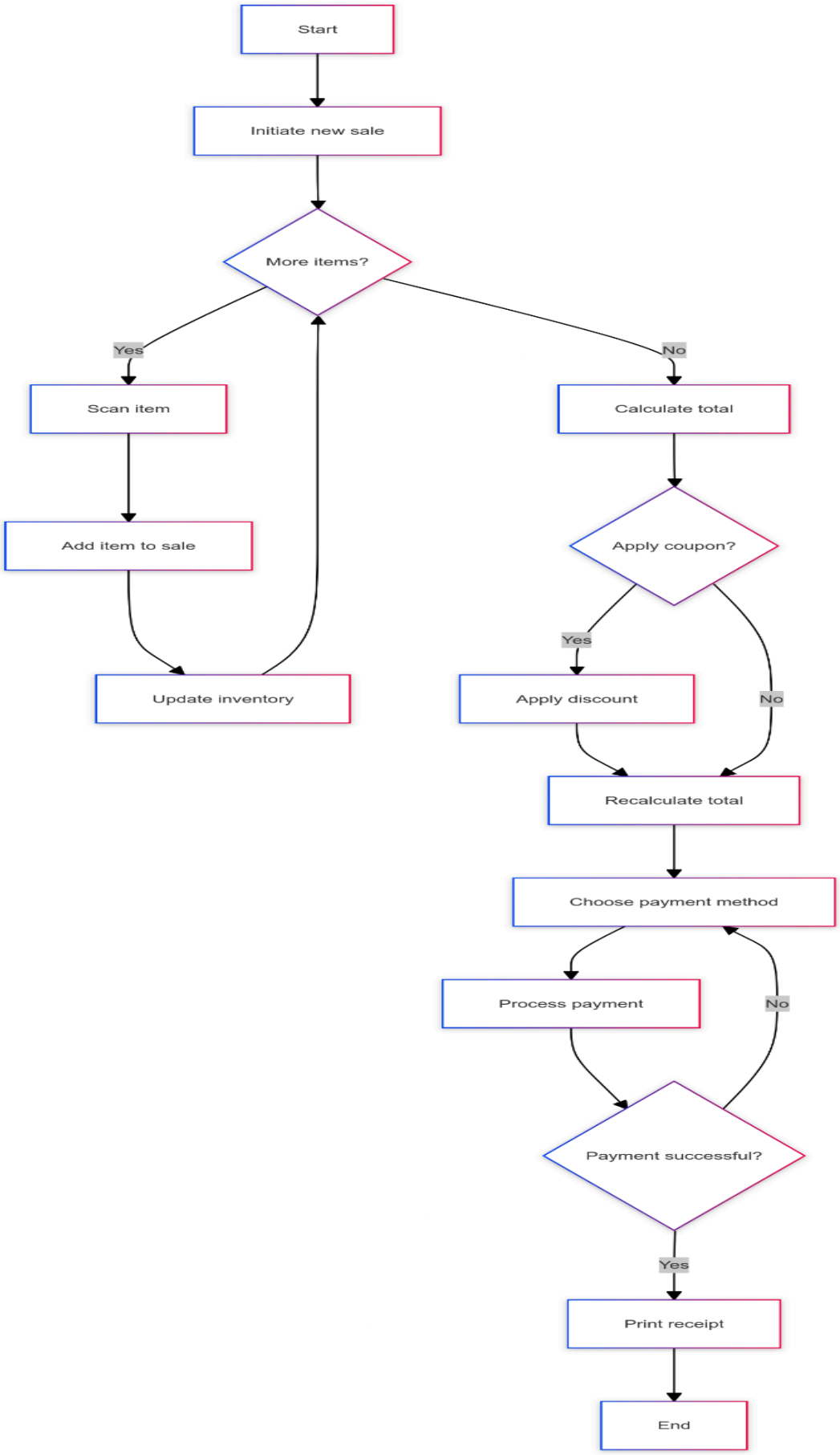



# Q.4 Develop Analysis Domain Models


Employee
-id: String
-name: String
-role: Role
Return
-originalSale: Sale
-returnedItems: List
-refundAmount: Decimal
+processReturn()
1
*
1
1
Sale
-dateTime: DateTime
-items: List
-total: Decimal
+addItem(item: Item, quantity: int)
+removeItem(item: Item)
+applyDiscount(coupon: Coupon)
+calculateTotal()
1
*
1
1
*
*
SaleLineItem
-item: Item
-quantity: int
-subtotal: Decimal
Payment
-amount: Decimal
-method: PaymentMethod
+process()
Coupon
-code: String
-discountAmount: Decimal
+apply(sale: Sale)
*
1
Item
-barcode: String
-name: String
-price: Decimal

# Q.5 Develop activity diagram for "Process Sale" and "Handle Return" use cases




Start
Initiate new sale
More items?
Yes
No
Scan item
Add item to sale
Update inventory
Calculate total
Apply coupon?
Yes
No
Apply discount
Recalculate total
Choose payment method
Process payment
No
Payment successful?
Yes
Print receipt
End