IT-314 Software Engineering

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

Name: Nishtha Patel
StudentID: 202201209

Use Case: Process Sale

Use Case ID: UC-001
Use Case Name: Process Sale
Actors: Cashier, Customer
Preconditions:

- The cashier is logged into the POS system.
- The customer has selected items for purchase.

Postconditions:

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

Main Flow:

1. The cashier starts a new sale transaction in the POS system.
2. The cashier scans the barcode of each item selected by the customer.
    - For each scanned item, the system retrieves the item name and price from the catalog.
    - The system checks the inventory for stock availability.
3. The system calculates the total amount for the transaction, including any applicable taxes.
4. If the customer has gift coupons, the cashier processes the coupons to apply discounts to the total.
5. The cashier informs the customer of the total amount due.
6. The customer selects a payment method (cash, credit card, or check).
7. The cashier processes the payment through the POS system:
    - For cash: The cashier accepts cash and provides change.
    - For credit card: The cashier processes the card through the card reader.
    - For check: The cashier verifies and accepts the check.

8. The system confirms that the payment is successful.
9. The system generates and prints a receipt for the customer.
10. The sale transaction is completed, and the inventory is updated accordingly.

Alternative Flows:

- **Invalid Barcode:** If an invalid barcode is scanned, the system alerts the cashier and prompts them to rescan.
- **Payment Failure:** If a payment fails, the system alerts the cashier and allows the customer to retry payment or choose a different method.
- **Insufficient Stock:** If an item is out of stock, the system informs the cashier, who can remove the item from the sale or suggest alternatives to the customer.

Use Case: Handle Return

Use Case ID: UC-002
Use Case Name: Handle Return
Actors: Cashier, Customer
Preconditions:

- The cashier is logged into the POS system.
- The customer has items to return, along with the original receipt (if applicable).

Postconditions:

- The return transaction is completed.
- The inventory is updated to reflect the returned items.
- A refund receipt is printed for the customer.

Main Flow:

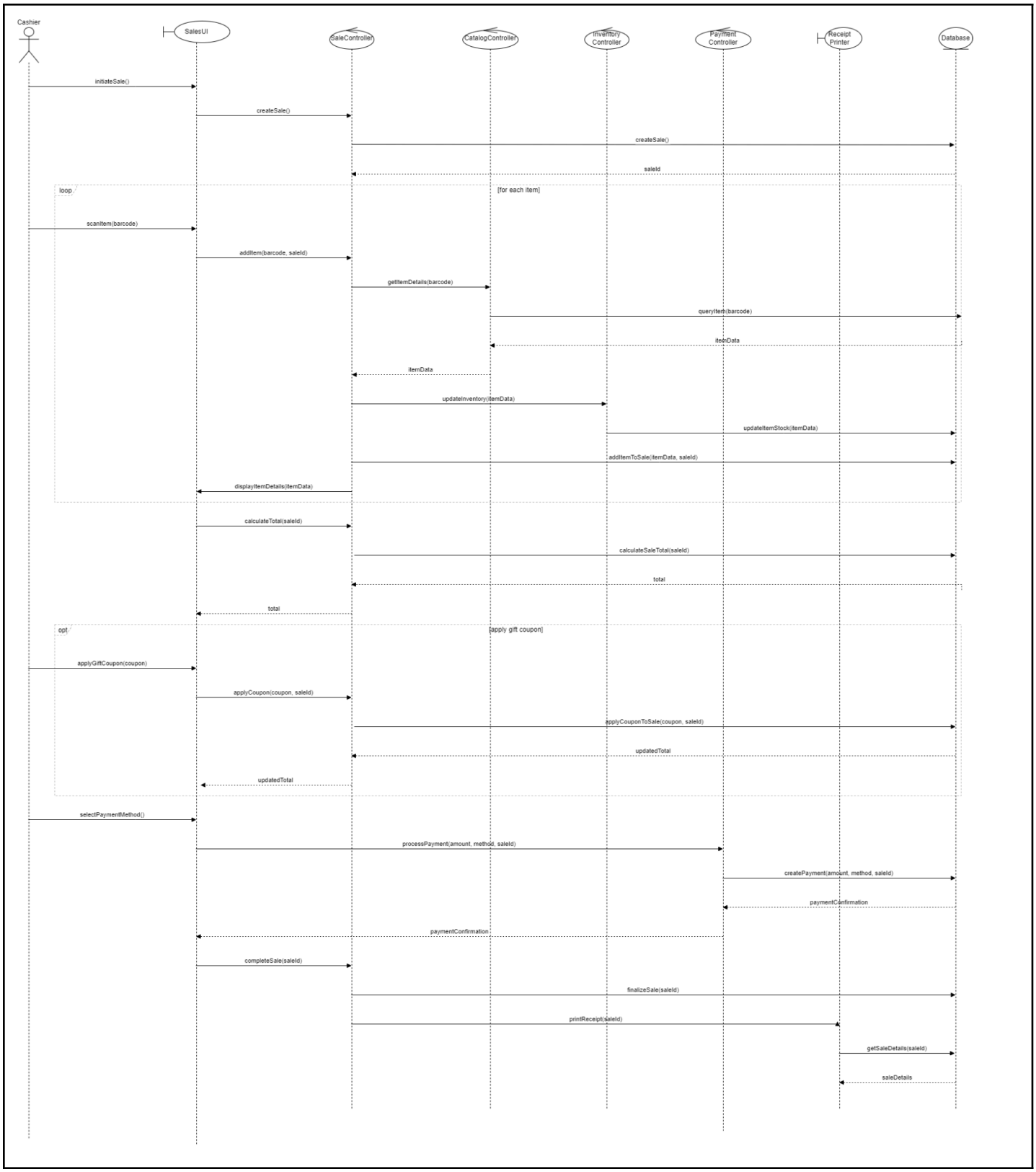
1. The cashier starts a new return transaction in the POS system.
2. The cashier asks the customer for the original receipt or proof of purchase.
3. The cashier scans the receipt or enters the transaction ID into the system.
4. The system retrieves the items associated with the transaction.
5. The cashier verifies the items being returned against the original purchase:
    - Confirm the condition of the items (e.g., unopened, undamaged).
6. The system calculates the refund amount, including any applicable deductions (e.g., restocking fees).
7. The cashier informs the customer of the refund amount and processes the return:

    - If the original payment was made by cash, the cashier gives cash back.
    - If the original payment was made by credit card, the cashier processes the refund to the card.
    - If the original payment was made by check, the cashier may issue a store credit instead.
8. The system confirms the return transaction is successful.
9. The system updates the inventory to reflect the returned items.
10. The system generates and prints a refund receipt for the customer.

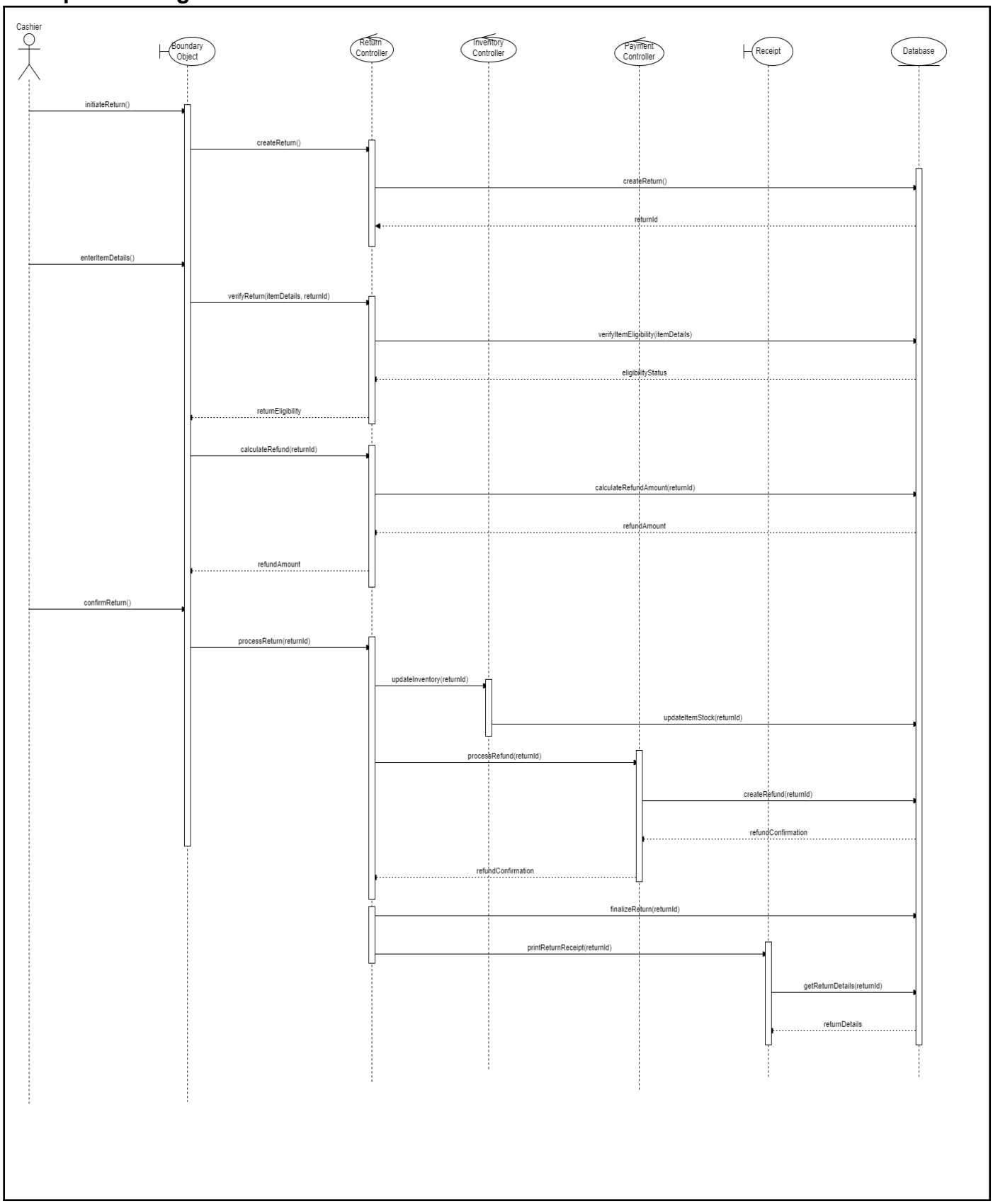
Alternative Flows:

- **Receipt Not Found:** If the receipt cannot be found in the system, the cashier informs the customer and may need to deny the return or follow store policy for non-receipt returns.
- **Item Not Eligible for Return:** If an item is outside the return window or ineligible per store policy, the system alerts the cashier.
- **Refund Processing Error:** If an error occurs while processing the refund, the system alerts the cashier and allows for a retry or alternative resolution.

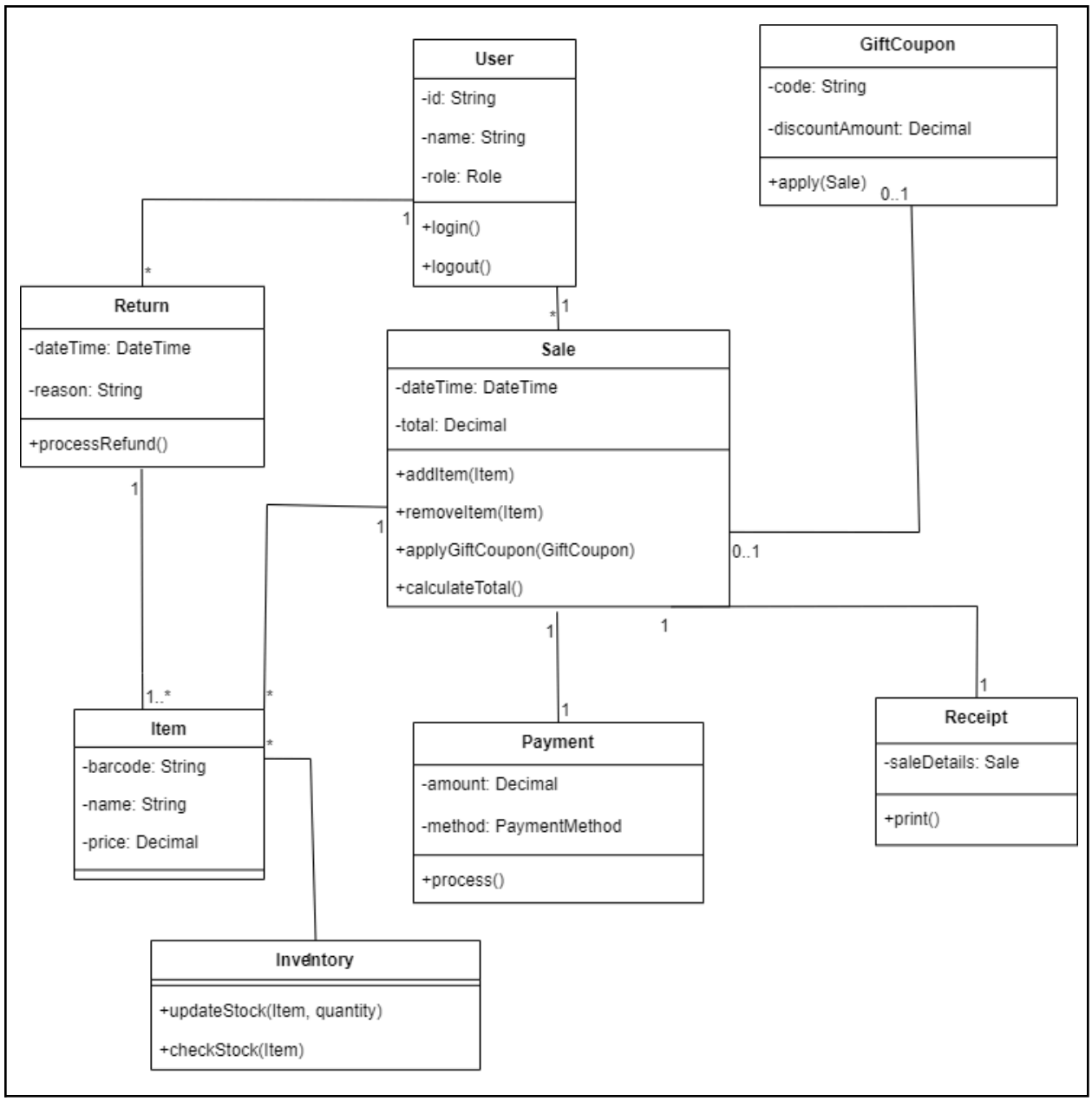
Sequence Diagram for Sale Process


Cashier
SalesUI
SaleController
CatalogController
Inventory Controller
Payment Controller
Receipt Printer
Database
initiateSale()
createSale()
createSale()
saleId
loop
[for each item]
scanItem(barcode)
addItem(barcode, saleId)
getItemDetails(barcode)
queryItem(barcode)
itemData
itemData
updateInventory(itemData)
updateItemStock(itemData)
addItemToSale(itemData, saleId)
displayItemDetails(itemData)
calculateTotal(saleId)
calculateSaleTotal(saleId)
total
total
opt
[apply gift coupon]
applyGiftCoupon(coupon)
applyCoupon(coupon, saleId)
applyCouponToSale(coupon, saleId)
updatedTotal
updatedTotal
selectPaymentMethod()
processPayment(amount, method, saleId)
createPayment(amount, method, saleId)
paymentConfirmation
paymentConfirmation
completeSale(saleId)
finalizeSale(saleId)
printReceipt(saleId)
getSaleDetails(saleId)
saleDetails

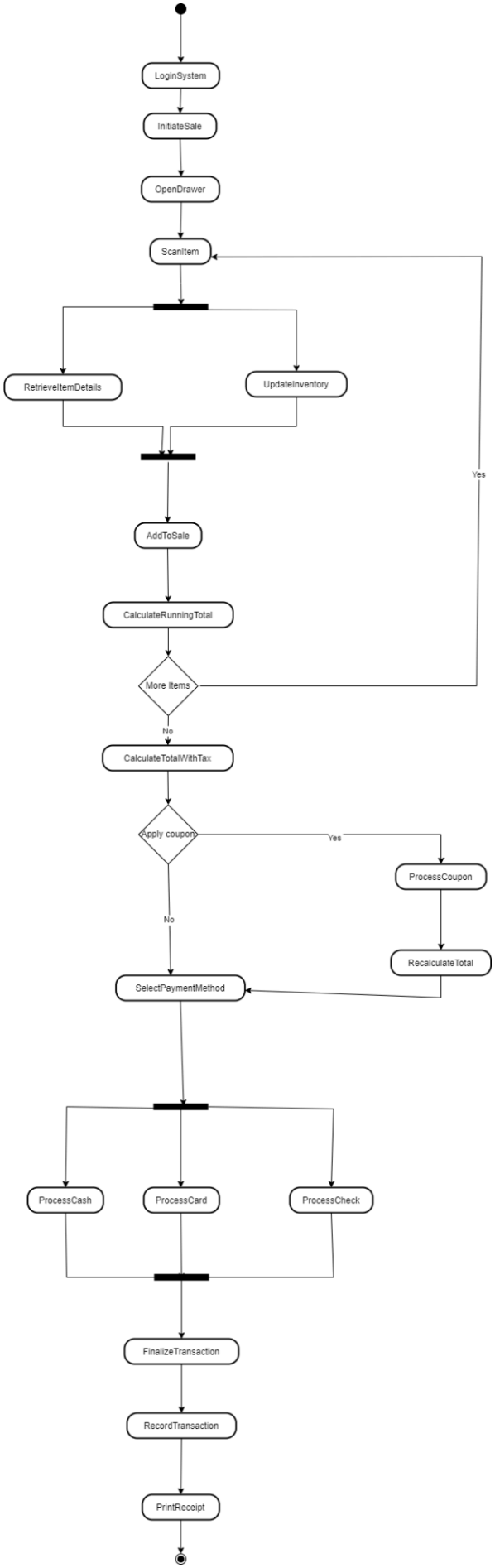
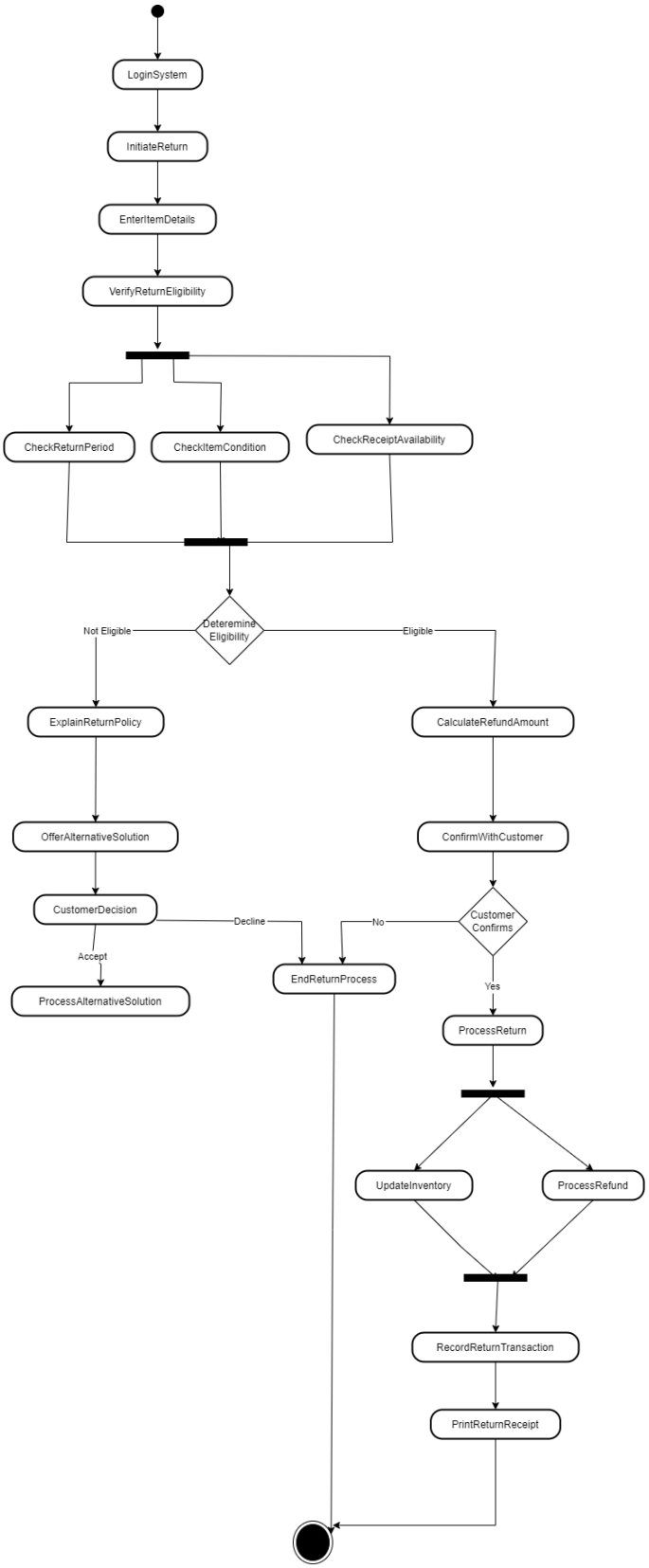
Sequence Diagram for Return Process:



Class Diagram:



Activity Diagram for sale process:


LoginSystem
InitiateSale
OpenDrawer
ScanItem
RetrieveItemDetails
UpdateInventory
AddToSale
CalculateRunningTotal
More Items
Yes
No
CalculateTotalWithTax
Apply coupon
Yes
ProcessCoupon
No
RecalculateTotal
SelectPaymentMethod
ProcessCash
ProcessCard
ProcessCheck
FinalizeTransaction
RecordTransaction
PrintReceipt

Activity Diagram for Return