SOFTWARE ENGINEERING

Lab06 - Modeling Class Diagram and Activity Diagram (Point of Sale System)

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Task 1: Use Case Textual Descriptions for "Process Sale" and "Handle Return" Use Cases

★Use Case: Process Sale

➢Summary

- This use case describes the process of completing a sale transaction in the Point of Sale (POS) system.

➢Actors

- Primary Actor: Cashier
- Secondary Actor: Customer

➢Preconditions

- Cashier is authenticated in the POS system
- POS system is operational
- Customer has items to purchase

➢Main Success Scenario

- Cashier initiates a new sale transaction
- Cashier scans the item's barcode
- System retrieves item details from the catalog
- System updates inventory

- System adds item to the current transaction
- System calculates the total amount
- Cashier applies any applicable coupons
- System recalculates the total if coupons are applied
- Customer selects payment method (cash, credit card, or check)
- Cashier processes the payment
- System validates the payment
- System records the transaction
- System prints the receipt

➢ Alternative Flows

- A1. Item not found in catalog
  - System displays an error message
  - Cashier manually enters item details

- A2. Payment validation fails
  - System displays an error message

➢ Postconditions

- Sale is recorded in the system
- Inventory is updated
- Receipt is printed
- Payment is processed

➢ Special Requirements
    - Barcode scanner must be functional
    - Receipt printer must be operational
    - Payment processing system must be available

★ Use Case: Handle Return

➢ Summary
    - This use case describes the process of handling a customer return in the Point of Sale (POS) system.

➢ Actors
    - Primary Actor: Cashier
    - Secondary Actor: Customer

➢ Preconditions
    - Cashier is authenticated in the POS system
    - POS system is operational

- Customer has items to return and original receipt

➢ Main Success Scenario
- Cashier initiates the return process
- Cashier scans or enters receipt details
- System retrieves the original transaction
- For each item to be returned: 4.1. Cashier scans item barcode 4.2. System verifies item was in the original transaction 4.3. Cashier verifies item condition 4.4. System updates inventory 4.5. System adds item to return transaction
- System calculates refund amount
- Cashier processes refund (cash, credit to card, or store credit)
- System records return transaction
- System prints return receipt

➢ Alternative Flows
- A1. Item not found in original transaction
  - System displays an error message
  - Cashier informs customer return cannot be processed without receipt
  - Use case ends

- A2. Item not found in original transaction
  - System displays an error message
  - Cashier informs customer item cannot be returned
  - Continue with next item or end return process

➢ Postconditions
- Return is recorded in the system
- Inventory is updated
- Refund is processed
- Return receipt is printed

➢ Special Requirements
- Barcode scanner must be functional
- Receipt printer must be operational
- Refund processing system must be available

Task 2: Identification of Entity, Boundary, and Control Objects

➢ Entity Objects:

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

➢ Boundary Objects:

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

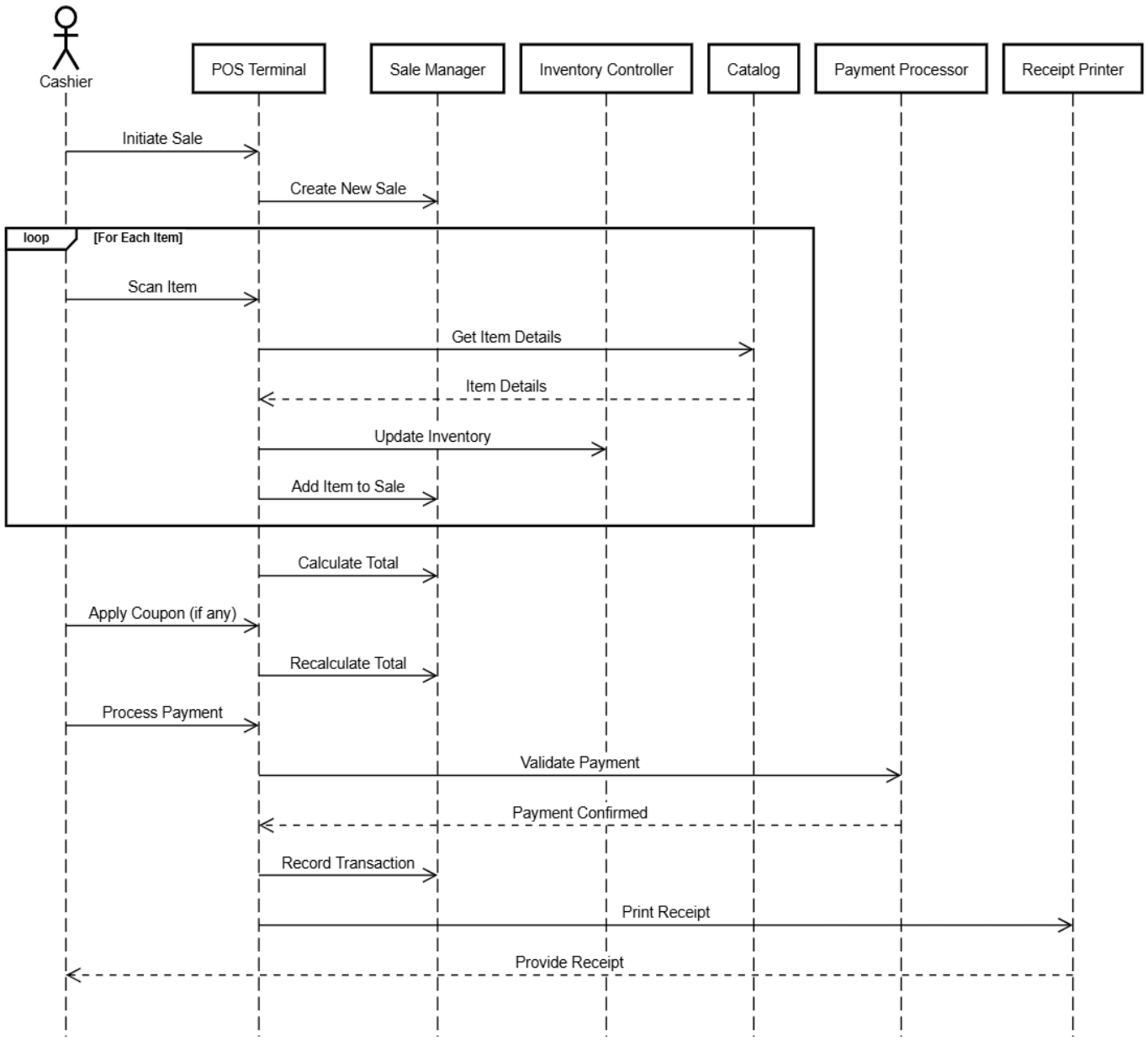
➢ Control Objects:

- Sale Manager
- Inventory Controller

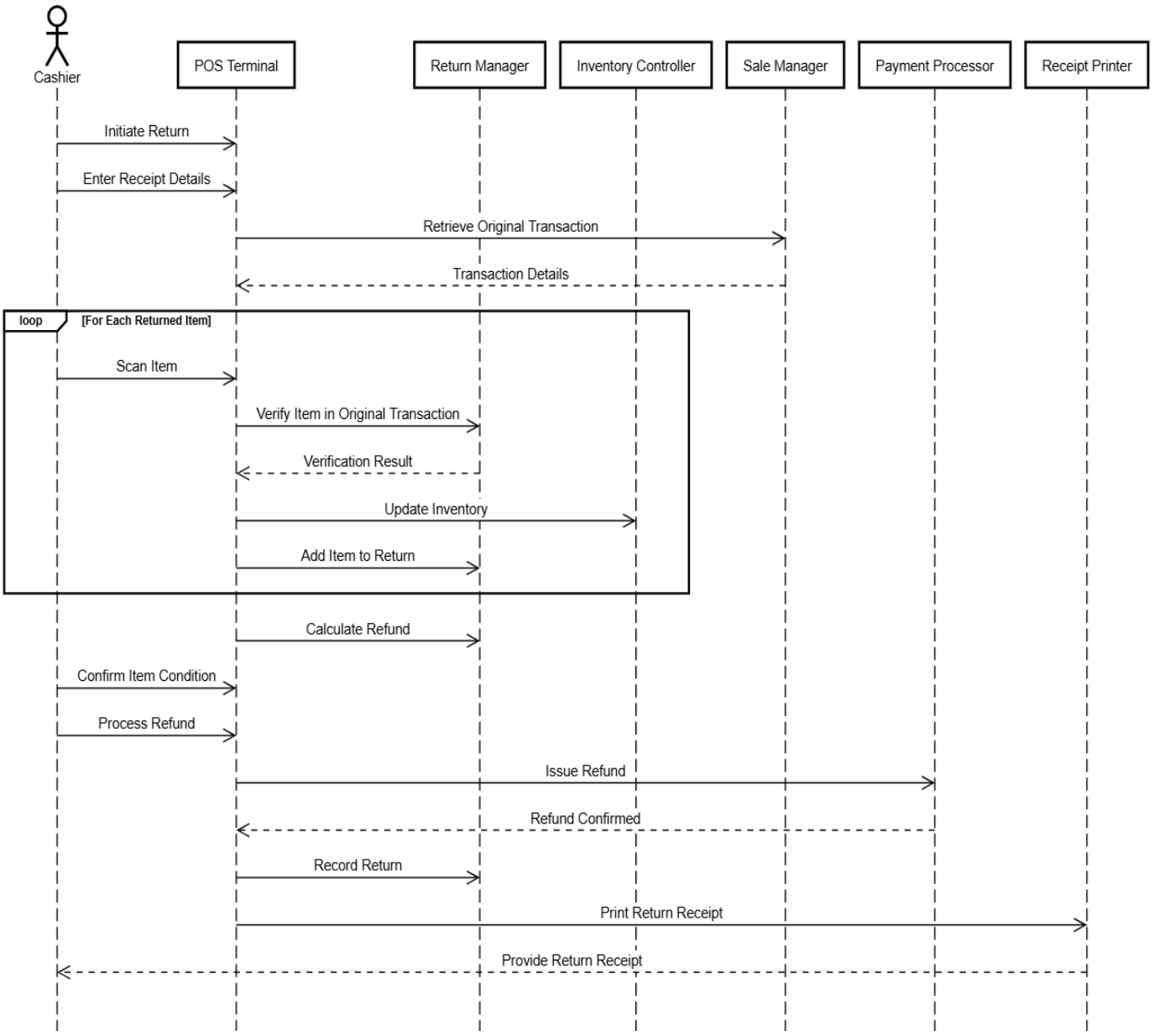
- Payment Processor
- User Authentication Controller
- Return Manager

Task 3: Develop Sequence Diagrams

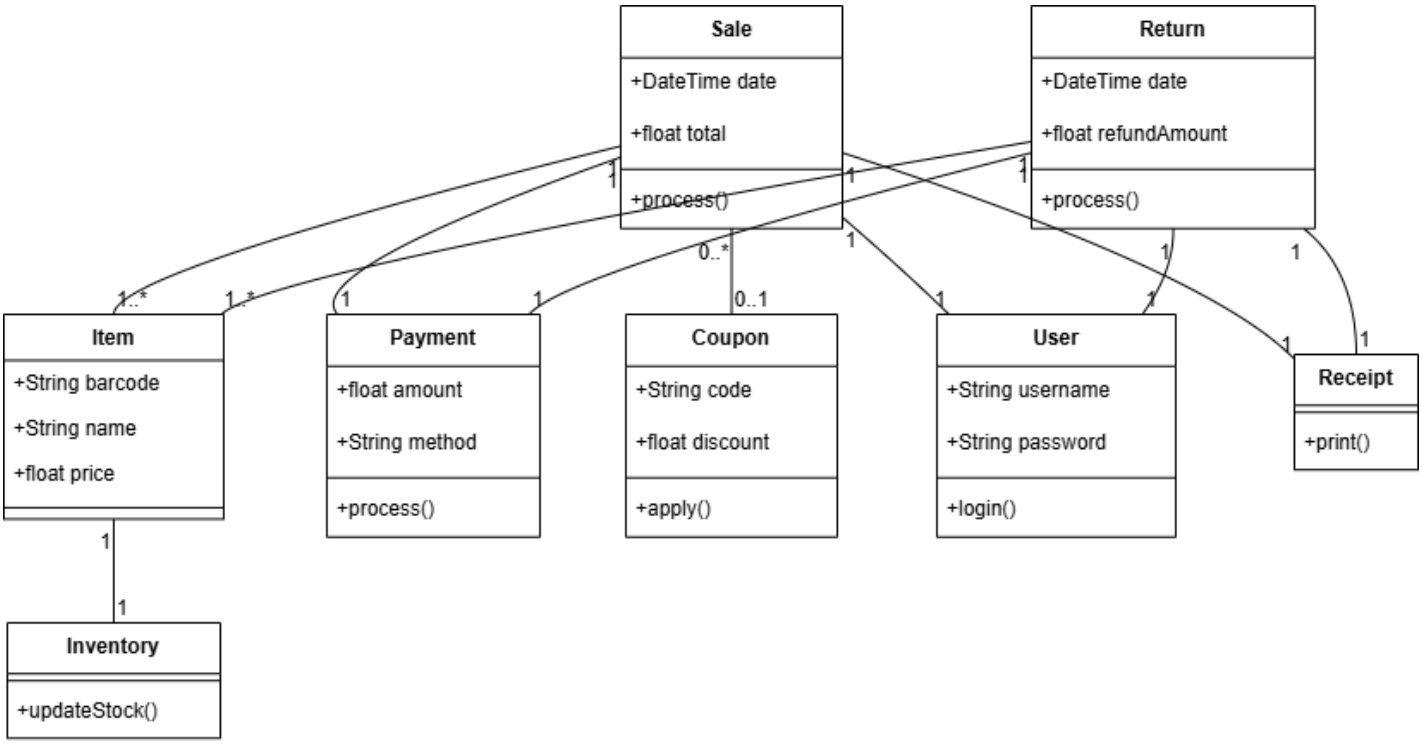
- **Process Sale**



- **Handle Return**

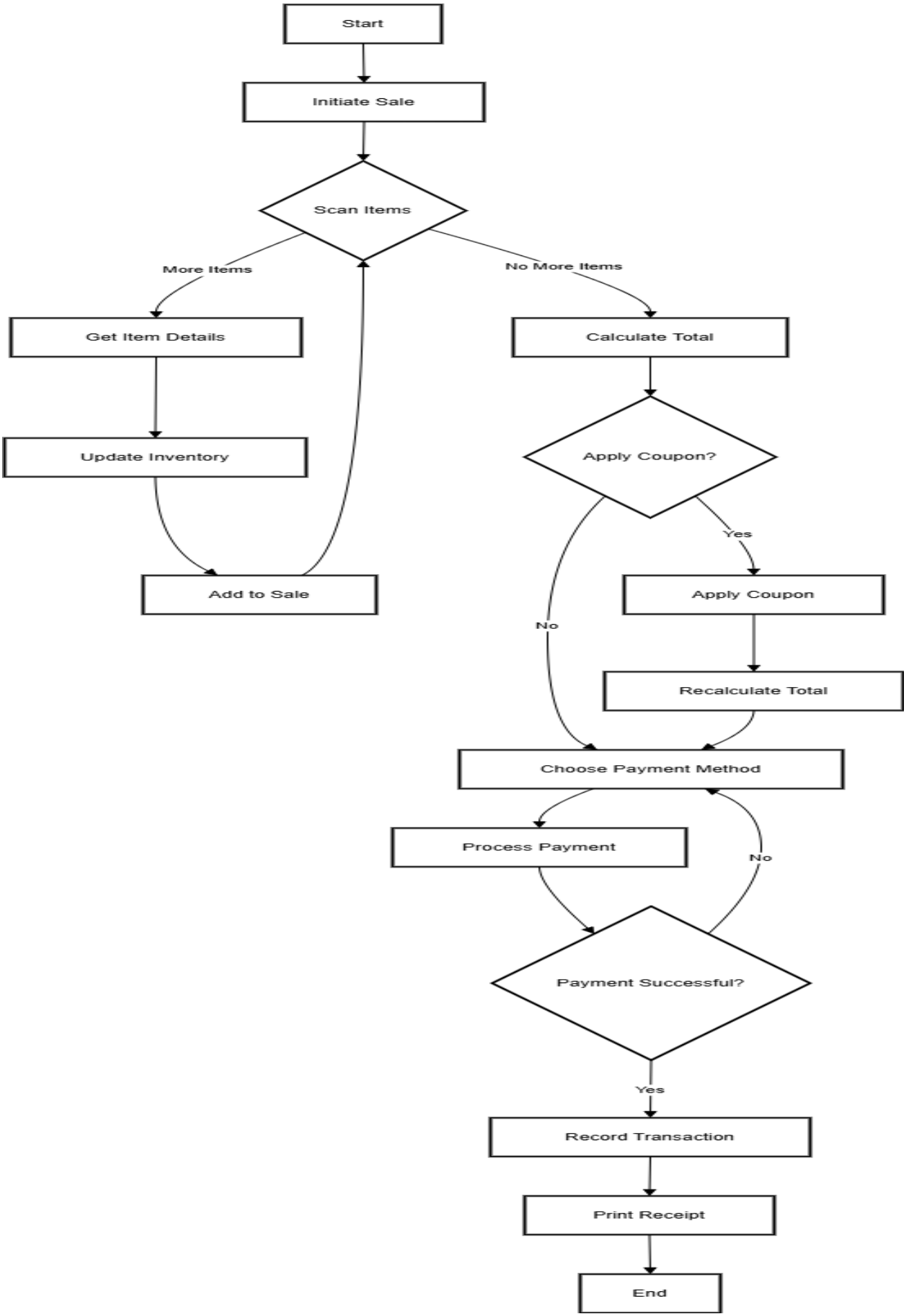

Cashier
POS Terminal
Return Manager
Inventory Controller
Sale Manager
Payment Processor
Receipt Printer
Initiate Return
Enter Receipt Details
Retrieve Original Transaction
Transaction Details
loop
[For Each Returned Item]
Scan Item
Verify Item in Original Transaction
Verification Result
Update Inventory
Add Item to Return
Calculate Refund
Confirm Item Condition
Process Refund
Issue Refund
Refund Confirmed
Record Return
Print Return Receipt
Provide Return Receipt

Task 4: Develop Analysis Domain Models



Task 5: Develop activity diagram for "Process Sale" and "Handle Return" use cases.

- **Process Sale**


Start
Initiate Sale
Scan Items
More Items
No More Items
Get Item Details
Update Inventory
Add to Sale
Calculate Total
Apply Coupon?
Yes
No
Apply Coupon
Recalculate Total
Choose Payment Method
Process Payment
No
Payment Successful?
Yes
Record Transaction
Print Receipt
End

• Handle Return