Lab 6:
Modeling Class Diagram and Activity Diagram (Point of Sale System)

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❖ Process Sale

Q1. Develop Use Case Textual Description for "Process Sale".

Ans: Actors: Cashier

Preconditions:

- The cashier is logged into the Point of Sale (POS) system.
- The system has updated inventory and pricing information.
- Payment systems (e.g., card readers) are connected or ready for offline cash transactions.

Basic Flow:

1. The customer arrives at the checkout with their items.
2. The cashier scans or manually enters the product details.
3. The POS system retrieves the price, description, and stock status from the database.
4. The cashier reviews and confirms the total price, including any taxes or discounts.
5. The system calculates the final amount based on stored tax and discount information.
6. The cashier communicates the final amount to the customer.
7. The customer selects a payment method, and the cashier processes the payment.
8. Upon successful payment, the system deducts the items from inventory.
9. The system generates and prints a receipt for the customer.
10. The sale is recorded in the system's database.

Postconditions:

- The sale is logged in the POS system.
- The inventory reflects the sold items.

Alternate Flows:

- 2.1 Barcode Scan Error: If an item scan fails, the cashier manually enters the product code.
- 2.2 Remove an Item: The cashier removes an item from the list, and the total updates accordingly.

- 4.1 Amount Discrepancy: If the total amount doesn't match expectations, the customer or cashier reviews the items.
- 7.1 Promotional Coupons: The customer presents a coupon, which the cashier enters or scans to adjust the total.
- 7.2 Payment Declined: If a card payment is declined, the cashier requests an alternative payment method.

Q2. Identify Entity/Boundary Control Objects

Ans: Entity Objects:

- Item
- Stock Management System
- Cashier
- Shopper
- Sales Receipt
- Transaction

Boundary Objects:

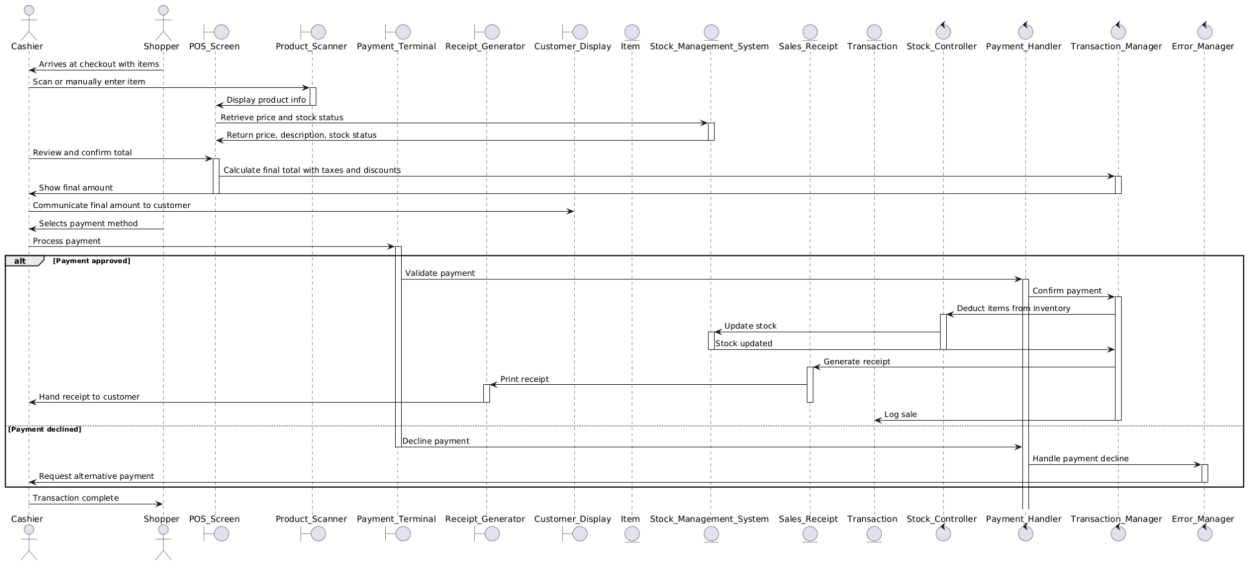
- POS Screen
- Product Scanner
- Payment Terminal
- Receipt Generator
- Customer Display

Control Objects:

- Stock Controller
- Payment Handler
- Transaction Manager
- Error Manager

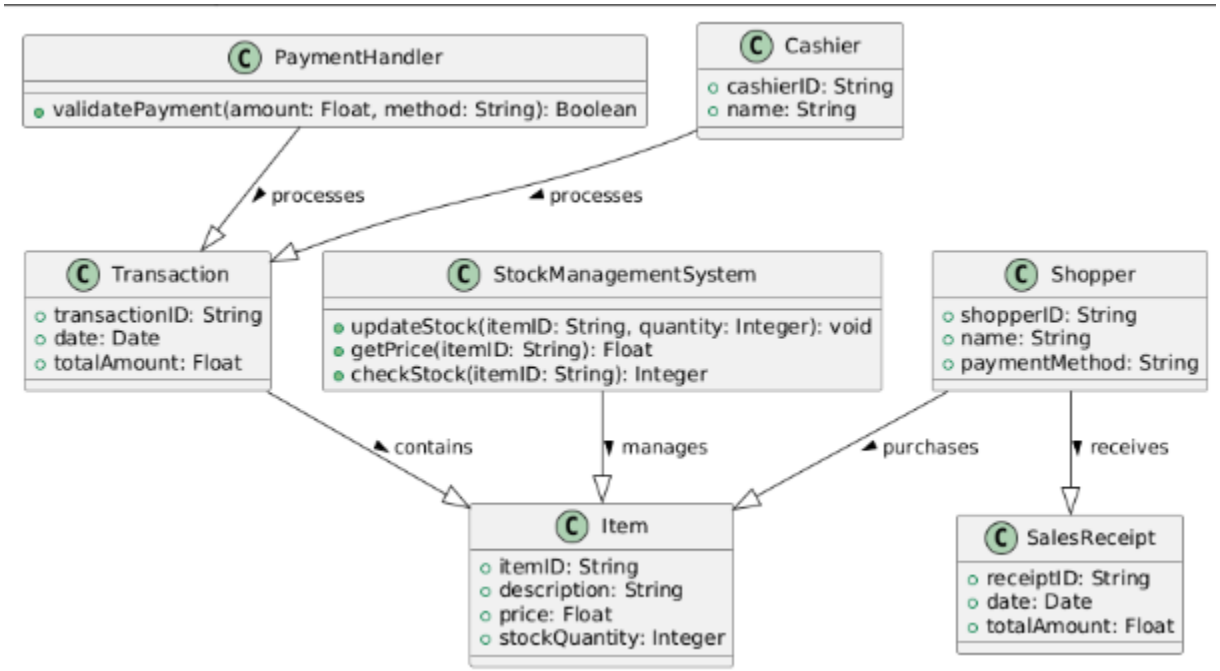
Q3. Develop Sequence Diagram.

Ans:



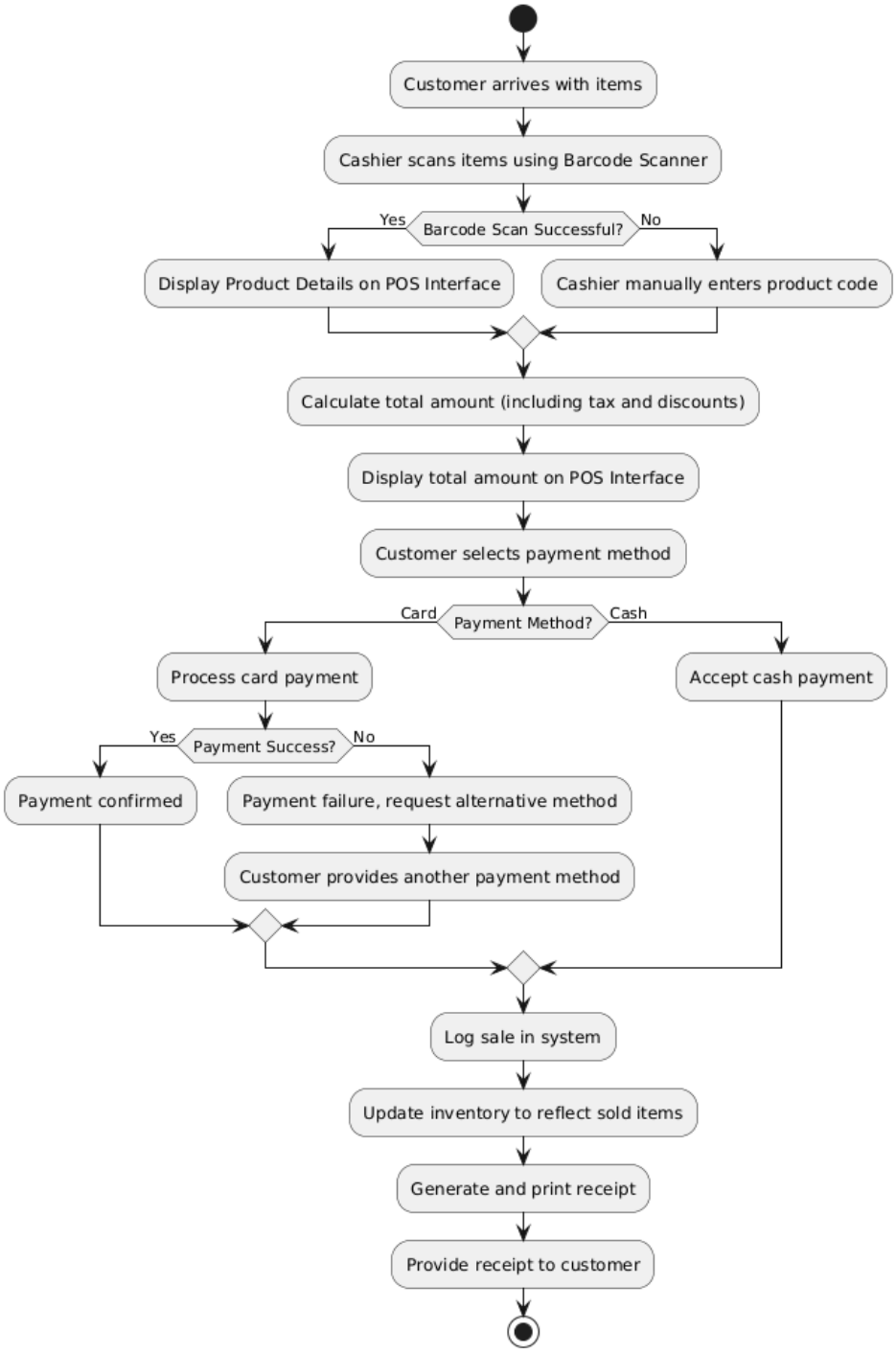
Q4. Develop Analysis Model.

Ans:



Q5. Develop an activity diagram.

Ans:



❖ Handle Returns:

1. Develop Use Case for "Handle Return" use case.

Ans:

Actor: Cashier

Preconditions:

- The POS (Point of Sale) system is working.
- The customer has a valid receipt or proof of purchase.
- Sales data can be accessed.

Flow:

1. The customer asks to return an item.
2. The cashier searches for the sale in the local database using the receipt or transaction ID.
3. The system checks if the items can be returned according to store policy.
4. The cashier confirms the return and processes it.
5. The system calculates the refund based on the original transaction (the refund will likely be in cash since online payment methods may not be accessible).
6. The system updates the local inventory and records the return transaction locally.
7. A return receipt is printed for the customer.

Postconditions:

- The return is recorded in the local database.
- Local inventory is updated to show the returned items.
- The system will wait to sync with the central server once connectivity is restored.

Alternate Flow:

2.1 Product Not Found in the System:
The system shows an error that the product cannot be found in the database, so the cashier checks the purchase receipt manually.

3.1 No Receipt Available:
If the customer doesn't have a receipt, the cashier asks for another proof of purchase (like a loyalty account or card transaction).

4.1 Item Condition Not Acceptable:
If the item is damaged or not in acceptable condition, the cashier informs the customer about the return policy.

5.1 Partial Refund or Exchange:
Instead of a full refund, the customer can choose to exchange the item or receive a partial refund based on the store's return policy.

6.1 Payment Method Mismatch:
If the customer wants the refund in a different way (like cash for a card transaction), the system will only allow the refund to go back to the original payment method.

7.1 System Error During Refund:
If a system error happens during the refund, the cashier may process the refund manually or give store credit to the customer.

2. Identify Entity/Boundary Control Objects.

Ans: Entity Objects:

1. Product
2. Receipt
3. Return
4. Refund
5. Inventory System
6. Customer
7. Cashier

Boundary Objects:

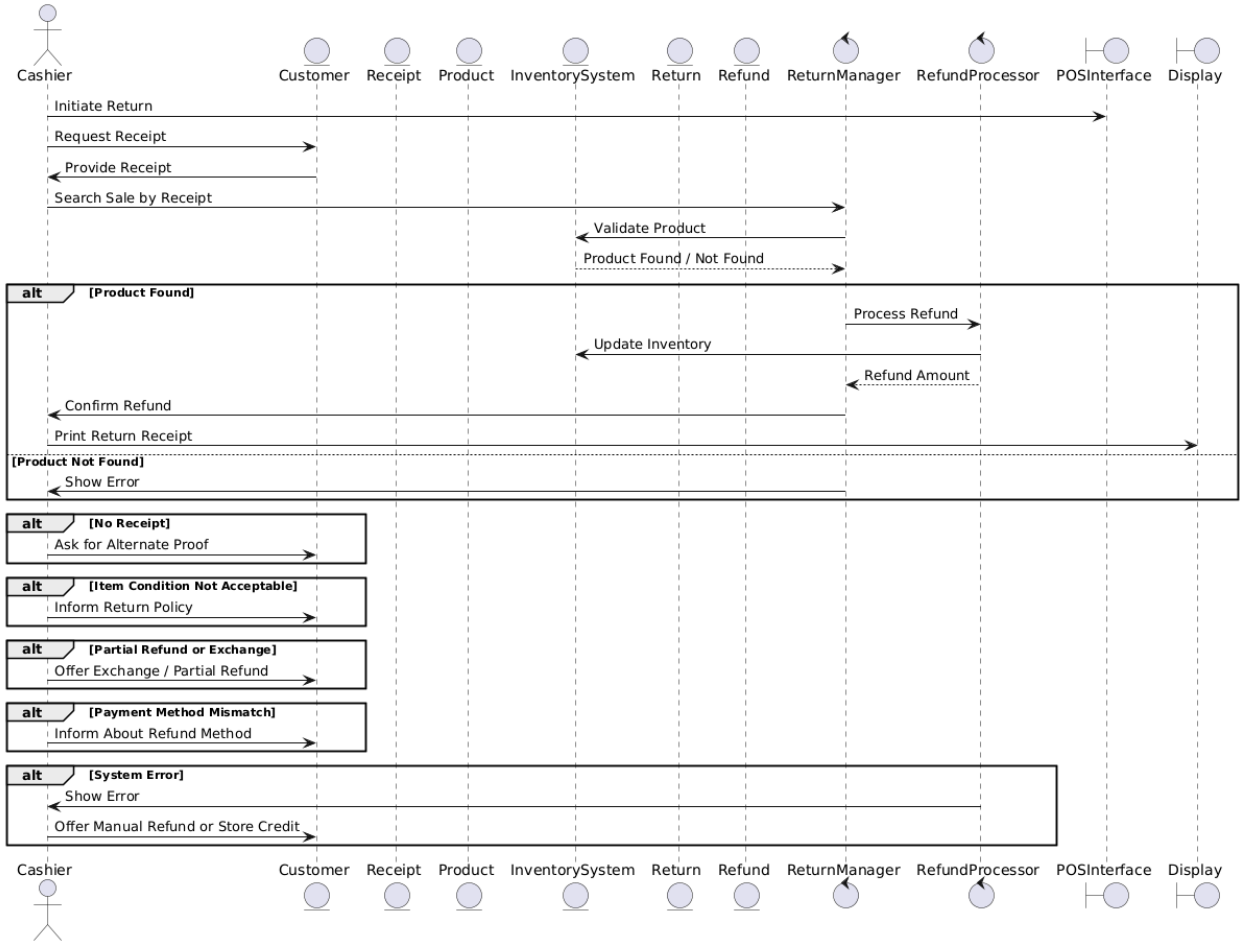
1. POS Interface
2. Barcode Scanner
3. Display

Control Objects:

1. Return Manager
2. Refund Processor
3. Inventory Manager
4. Error Handler

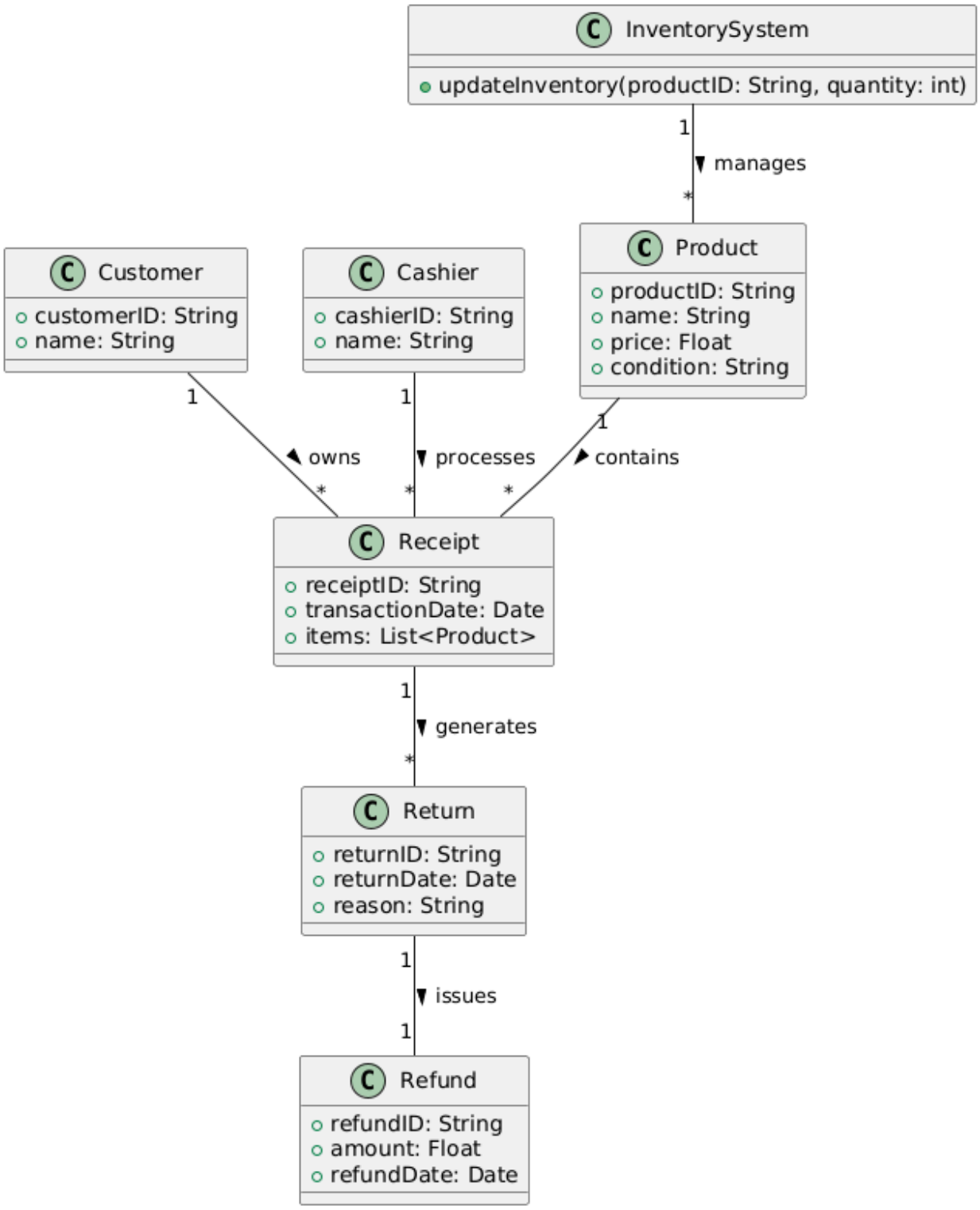
3. Develop a sequence diagram.

Ans:



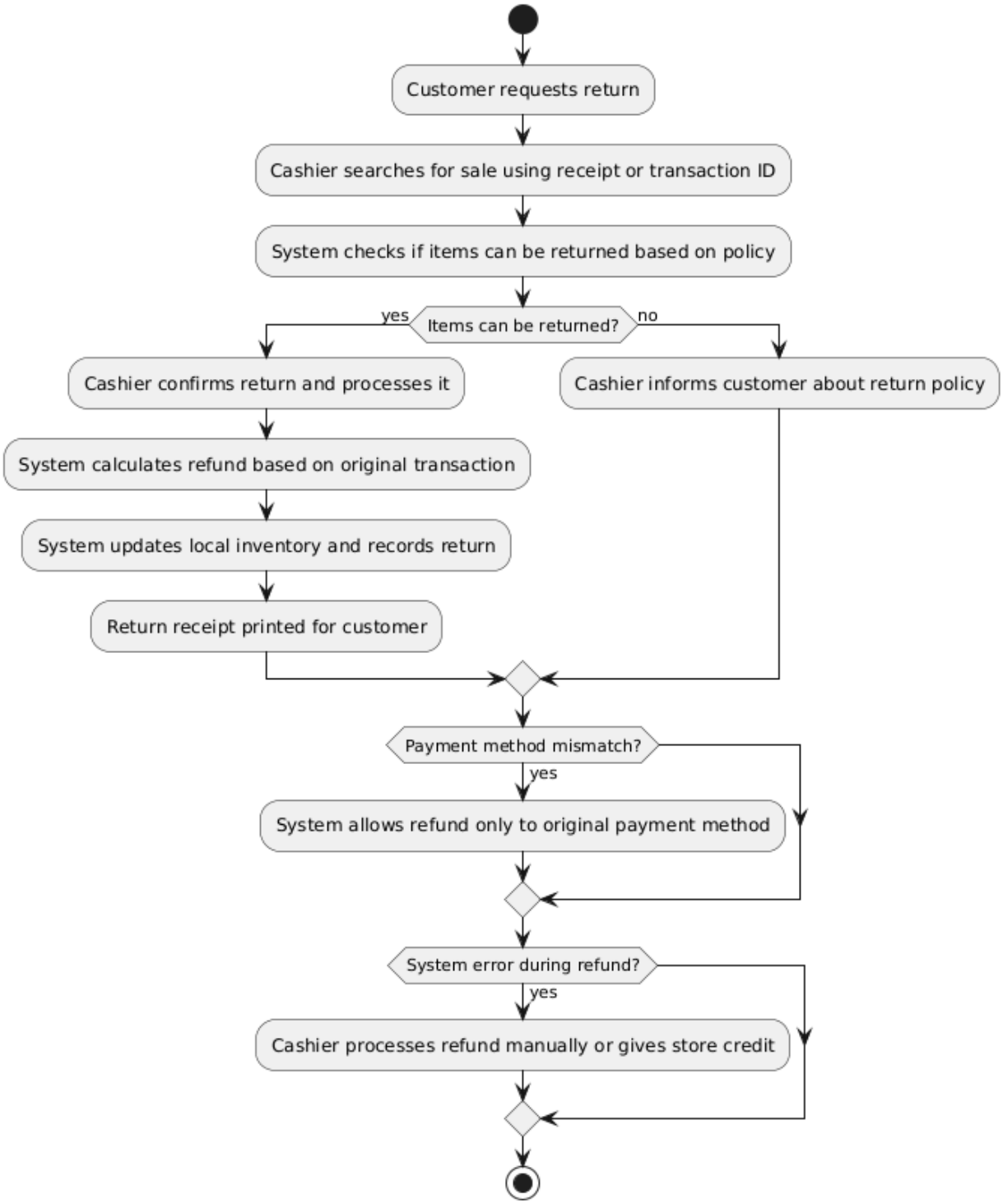
Q4. Develop Analysis Domain Model.

Ans:



Q5: Develop activity diagram.

Ans:


Customer requests return
Cashier searches for sale using receipt or transaction ID
System checks if items can be returned based on policy
Items can be returned?
yes
no
Cashier confirms return and processes it
Cashier informs customer about return policy
System calculates refund based on original transaction
System updates local inventory and records return
Return receipt printed for customer
Payment method mismatch?
yes
System allows refund only to original payment method
System error during refund?
yes
Cashier processes refund manually or gives store credit