IT-314: Software Engineering

Lab-06: Modeling Class Diagram and Activity Diagram

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BTech, ICT + CS

Section - B

Point of Sale System

Develop Use Case Textual Description

❖ Process Sale:

Name : Process Sale
Identifier : UC-001
Actors : Cashier
Goals : To facilitate the sale of goods to customers, process payments, and generate a receipt.

Preconditions:

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

Main Flow:

1. The cashier starts a new sale transaction in the POS system.
2. The cashier scans the barcode of the item using the barcode scanner.
3. The POS system retrieves the item's name and price from the backend catalog system.
4. The system checks the inventory and deducts the stock amount of the scanned item.
5. The system adds the item's price into the total price of the transaction.
6. The cashier continues scanning additional items until the cart of the customer is empty.
7. The cashier informs the customer of the total amount due.
8. The customer selects a payment method (cash, credit card or check).
9. The cashier processes the payment through the POS system:
   9.1 If cash, the cashier enters the amount received and the system calculates change.
   9.2 If credit card, the system prompts for card details and processes the transaction.
   9.3 If check, the cashier verifies the check and processes accordingly.
10. Upon successful payment, the system generates a receipt.
11. The cashier hands the receipt along with the baggage of goods to the customer and ends the transaction.

Trigger: A customer approaches the cashier to bill out and purchase items.

Postconditions:

- The sale transaction is recorded in the system.
- Inventory levels for sold items are updated.
- A receipt is printed and a copy of receipt is given to the customer.
- The system is ready for the next transaction.

Extension:

9. Customer Uses Gift Coupon
    - Description: If the customer presents a gift coupon:
        1. The cashier scans the coupon barcode or enters the coupon code.
        2. The system validates the coupon and applies the discount to the total.
        3. The cashier informs the customer of the new total amount due.

Alternatives:

3. Item Not Found
    - Description: If the scanned item is not found in the catalog:
        1. The POS system displays an error message indicating the item is not found.
        2. The cashier can either skip the item or search for it manually.
        3. If skipped, the system continues to process the next item.
4. Insufficient Stock
    - Description: If there is insufficient stock for a scanned item:
        1. The POS system alerts the cashier of insufficient stock.
        2. The cashier can either proceed with the transaction for the available quantity or remove the item from the transaction.
9. Payment Failure
    - Description: If the payment is not successful:
        1. The system displays an error message regarding payment failure.
        2. The cashier informs the customer and offers to retry the payment or select a different payment method.
        3. If the customer opts to retry, the cashier re-enters payment details; if not, the transaction is canceled.

❖ Handle Return:

Name : Handle Return
Identifier : UC-002
Actors : Cashier
Goals : To process the return of items purchased by the customer and issue a refund.

Preconditions:

- The cashier is logged into the POS system.
- The customer has items to return that were previously purchased.
- The return is within the store's return policy deadline.

Description:

1. The cashier starts a new return transaction in the POS system.
2. The cashier requests the customer to provide the items for return and the original receipt.
3. The cashier scans the barcode of each item being returned.
4. The POS system verifies that each item is eligible for return based on the store's policy.
5. If an item is not eligible for return, the system displays an error message, and the cashier informs the customer.
6. For eligible items, the system calculates the total refund amount.
7. The cashier informs the customer of the total refund amount.
8. The customer chooses the refund method (cash, credit card).
9. The cashier processes the refund through the POS system:
   9.1 If cash, the cashier gives the cash refund to the customer.
   9.2 If credit card, the system processes the refund to the original card.
10. Upon successful processing, the system generates a return receipt.
11. The cashier hands the copy of the return receipt to the customer and ends the transaction.

Trigger: A customer approaches the cashier to return items.

Postconditions:

- The return transaction is recorded in the system.
- Inventory levels for returned items are updated.
- A return receipt is printed and a copy is given to the customer.
- The system is ready for the next transaction.

Extensions:

8. Customer Requests Exchange
    - Description: If the customer prefers to exchange the item instead of returning it:
        1. The cashier initiates an exchange transaction.
        2. The cashier processes the return of the original item and adds the new item to the sale transaction.
        3. The system adjusts inventory accordingly and processes any additional payment if required.

Alternatives:

2. Missing Receipt
    - Description: If the customer does not have the original receipt:
        1. The cashier can search for the transaction using other details.
        2. If found, the return process continues; if not, the cashier informs the customer that the return cannot be processed without a receipt.

3. Item Condition Issues
    - Description: If the returned item is damaged or not in original condition:
        1. The POS system alerts the cashier that the item does not meet return standards.
        2. The cashier informs the customer, and the return is either canceled or re-evaluated based on store policy.

9.2. Refund Failure
    - Description: If the refund process fails for credit card issue:
        1. The system displays an error message indicating the failure.
        2. The cashier informs the customer and offers to retry the refund process or select a different refund method.

Identifying Entity / Boundary / Controller Objects

❖ Process Sale:

Entity Object:

- Cashier
- Catalog system
- Inventory system
- Invoice
- Discount Coupons

Boundary Object:

- Barcode scanner
- Credit Card scanner
- Cashier's Terminal (monitor screen and Keyboard)
- Customer Display screen
- Payment Interface
- Discount Coupon Card Interface
- Invoice Printer

Controller Object:

- Sales Controller
- Inventory Controller
- Payment Controller
- Receipt Controller
- Manage Discount Coupon Card Controller

❖ Handle Return:

Entity Object:

- Cashier
- Catalog system
- Inventory system
- Invoice
- Return Transaction
- Return Policy

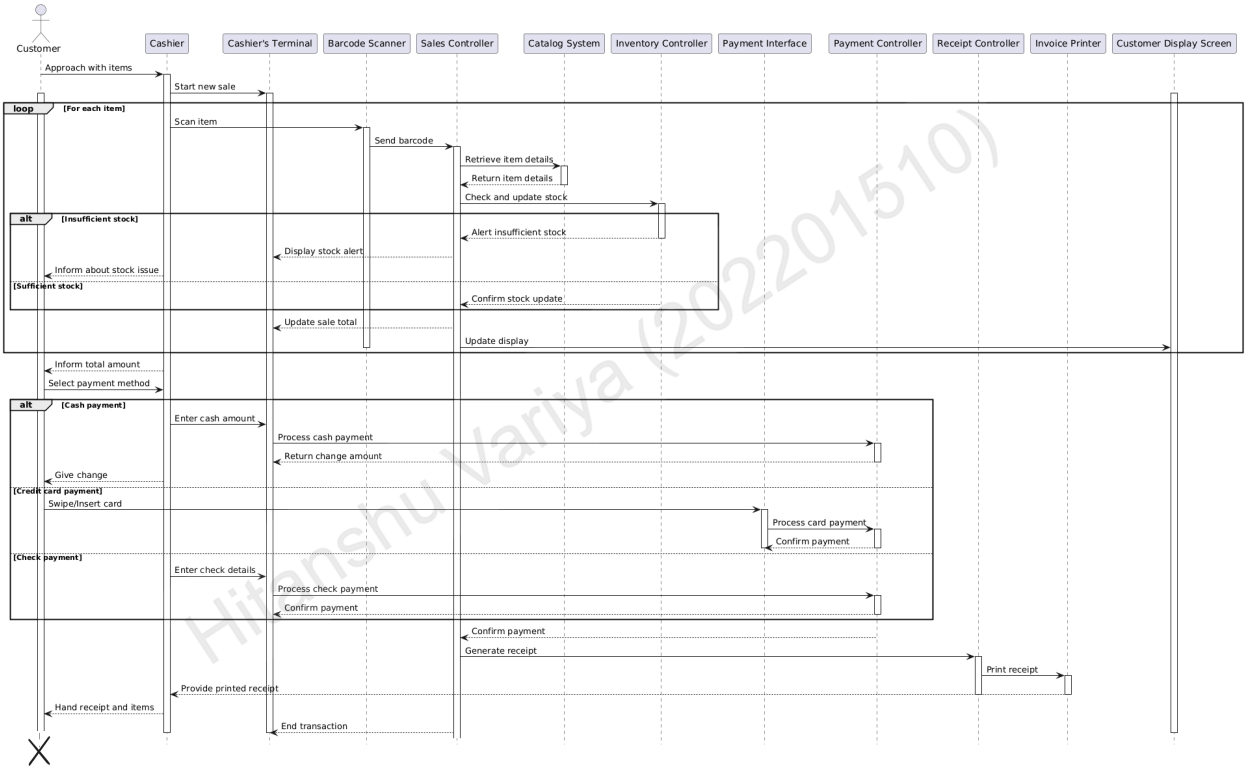
Boundary Object:

- Barcode scanner
- Original Receipt Scanner
- Credit Card scanner
- Cashier's Terminal (monitor screen and Keyboard)
- Customer Display screen
- Payment Interface
- Return Receipt Printer

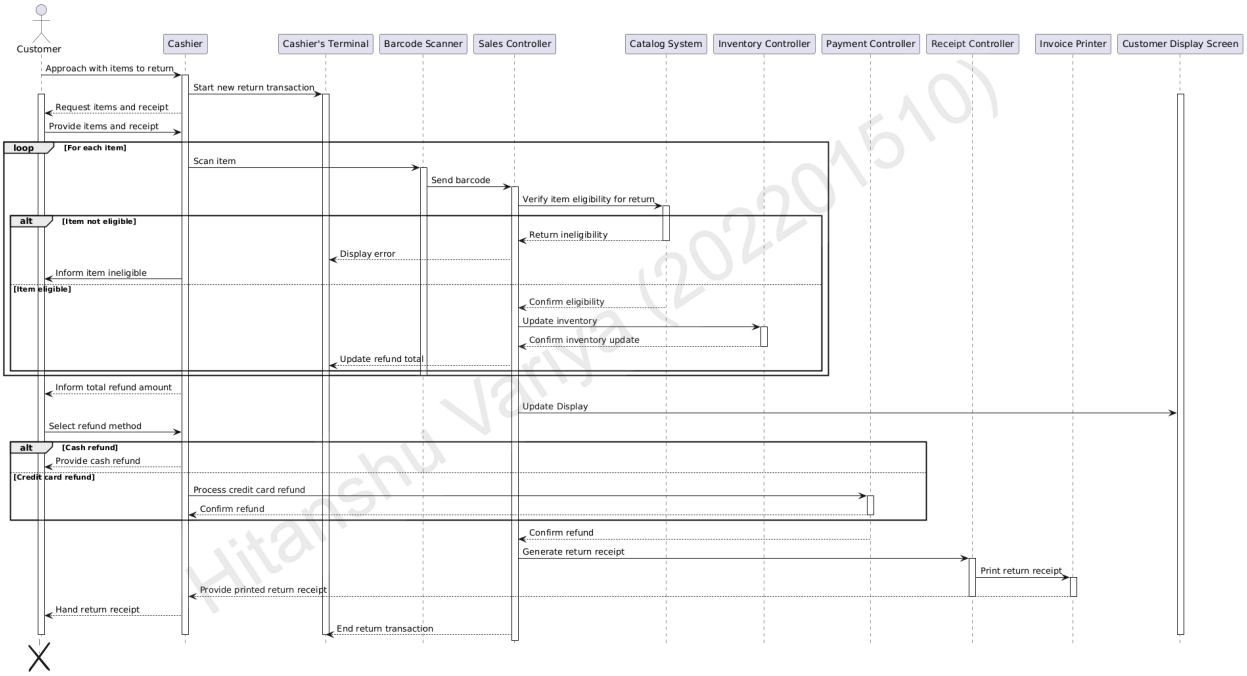
Controller Object:

- Return Controller
- Inventory Controller
- Payment Controller
- Receipt Controller
- Refund Controller

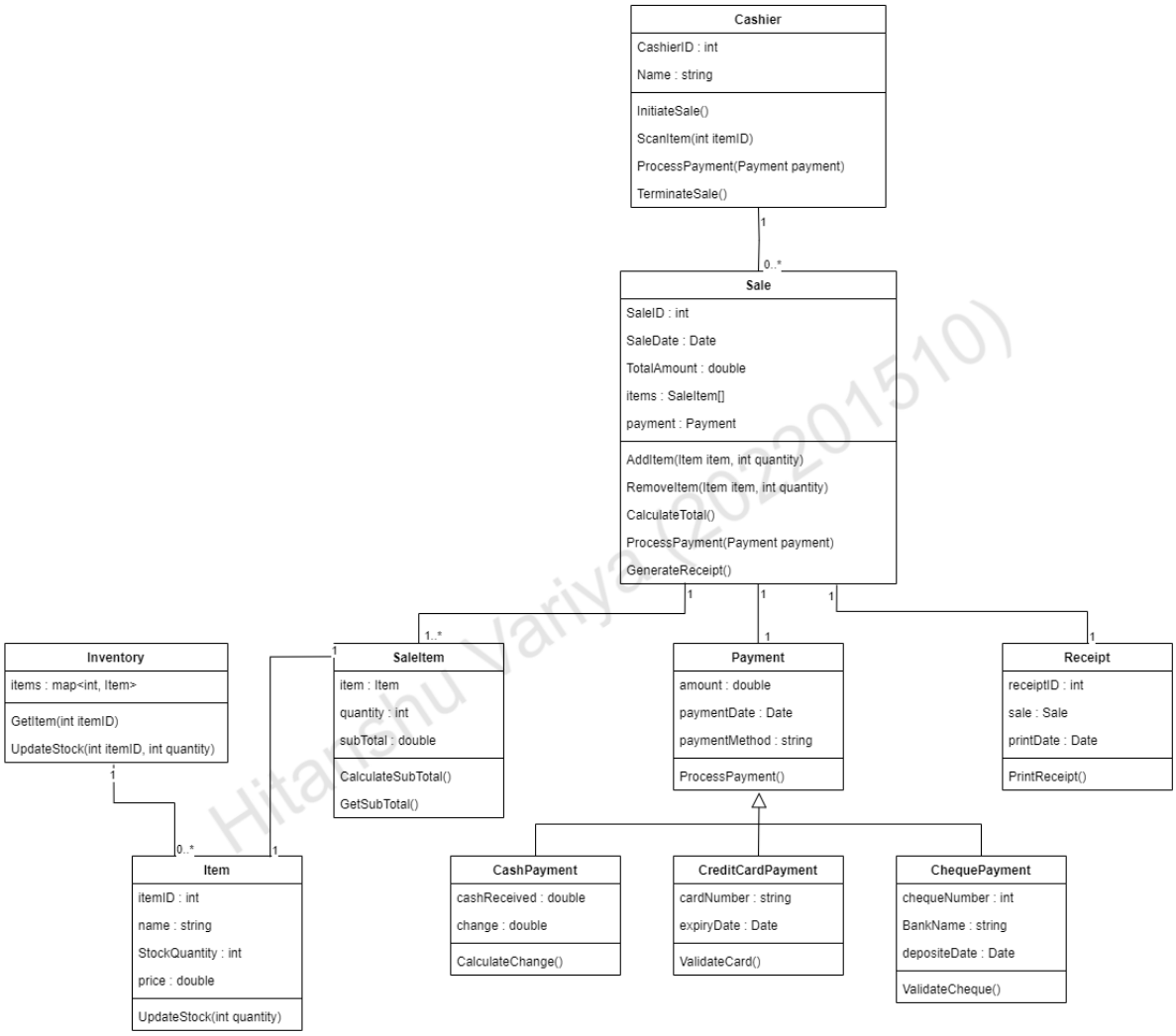
Developing Sequence Diagrams for “Process Sales”



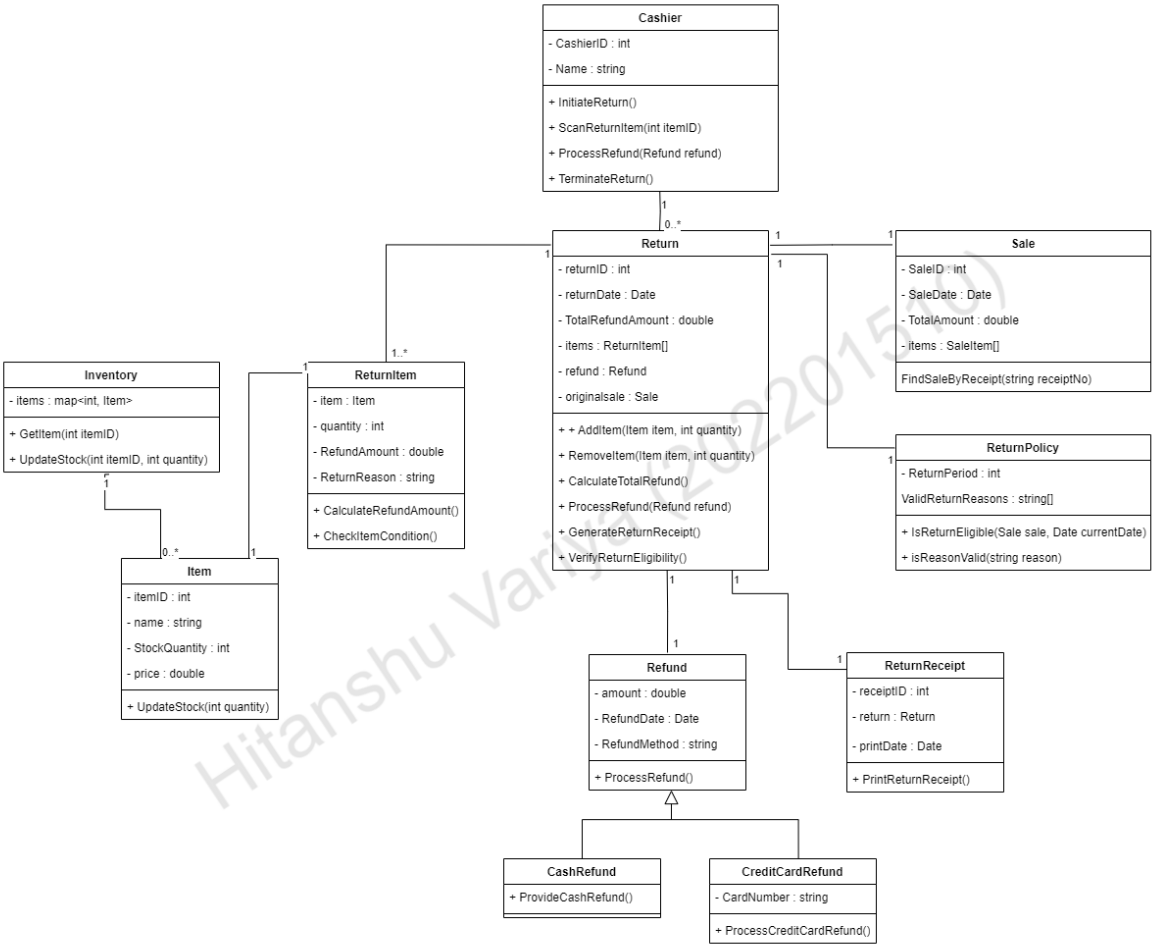
Developing Sequence Diagrams for “Handle Returns”



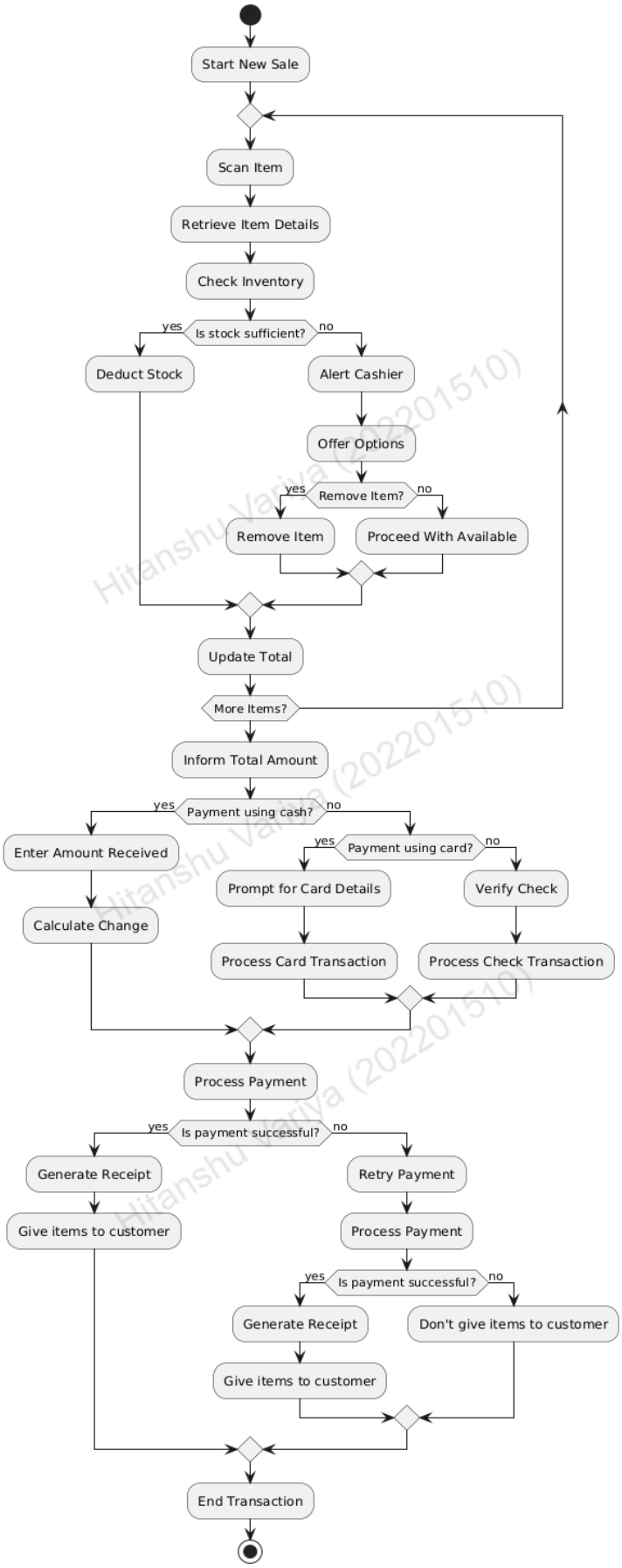
Developing Analysis Domain Model for “Process Sales”



Developing Analysis Domain Model for “Handle Returns”



Developing Activity Diagram for “Process Sales”



Developing Activity Diagram for “Handle Returns”