
**Course : CSE 326 — Information System
Design Sessional**

Project Name : ReMan

Soumya Swagata Biswas : 1905093

Abrar Mahmud : 1905097

MD Sadik Hossain Shanto : 1905101

Shahriar Raj : 1905105

Tahsin Wahid : 1905115

Sabah Ahmed : 1905118

September 2023

**Department of Computer Science and Engineering
Bangladesh University of Engineering and Technology**

Contents

1. Motivation	6
2. Introduction	7
3. Proposed Modules	7
3.1. MarketPlace	7
3.2. Inventory Management	7
3.3. Data Analytics	7
3.4. Delivery System	7
4. Requirement Analysis using BPMN diagram	8
4.1. Full BPMN diagram	8
4.2. Pool 1: Retailer	9
4.3. Pool 2: Manufacturer	11
4.4. Pool 3: Server	13
4.5. Pool 4: Delivery	15
4.6. Pool 5: Data Analytics	16
5. Mock UI	18
5.1. Feedback Acknowledged	18
5.2. Retailer UI	18
5.2.1 Register	19
5.2.2 Login	20
5.2.3 Homepage & Sidebar	21
5.2.4 Show Profile & Update	22
5.2.5 Order History	23
5.2.6 Category, Products & Ordering	24
5.2.7 Finalizing Order & Payment	25
5.2.8 Notifications & Data Analytics	26
5.3. Manufacturer UI	27
5.3.1 Home, History & Product	28
5.3.2 Inventory Management	29
5.3.3 Production House Management	30
5.3.4 Shifting Products	31
5.3.5 Give Lease	32
5.3.6 Take Lease	33
5.3.7 Product Screening	34
5.3.8 Data Analytics	35
6. Entity Relationship Diagram	36
6.1. Complete ER Diagram	36
6.2. Retailer	37
6.3. Shop	37
6.4. Product	38
6.5. Single Product Quantity	38
6.6. Order Fragment	39
6.7. Order	39
6.8. Cart	40
6.9. Vouchers	40
6.10. Pay Later	41
6.11. Favourites	41
6.12. Category	41
6.13. Admin	42

6.14. Owner	42
6.15. Manufacturer	43
6.16. Batch	43
6.17. Inventory	44
6.18. Production House	44
6.19. Rental	45
6.20. Address	45
6.21. Shipment	46
6.22. Notification	46
6.23. Request	47
 7. Class Diagram	48
7.1. Feedback Acknowledged	48
7.2. Retailer Classes	52
7.2.1 Retailer Log In	52
7.2.2 Retailer Home	53
7.2.3 Retailer Profile	54
7.2.4 Retailer Select Category	55
7.2.5 Retailer Search Category	56
7.2.6 Retailer Select Quantity	57
7.2.7 Retailer Cart	58
7.2.8 Retailer Confirm Order	59
7.2.9 Retailer Pay Later	60
7.2.10 Retailer Make Product Request	61
7.2.11 Retailer Order History	62
7.2.12 Retailer Market Analysis	63
7.2.13 Retailer Notifications	64
7.3. Manufacturer Classes	65
7.3.1 Log In	65
7.3.2 Manufacturer Home	66
7.3.3 Manufacturer Profile	67
7.3.4 Manufacturer Product List	68
7.3.5 Manufacturer Inventory List	69
7.3.6 Manufacturer Inventory Product List	70
7.3.7 Manufacturer Select Restock Inventory	71
7.3.8 Manufacturer Select Restock Products	72
7.3.9 Manufacturer Select Shift Inventory	73
7.3.10 Manufacturer Select Shift Products	74
7.3.11 Manufacturer Add Inventory	75
7.3.12 Manufacturer Give Lease Inventory	76
7.3.13 Manufacturer Take Lease Inventory	77
7.3.14 Manufacturer Production House List	78
7.3.15 Manufacturer Add Production House	79
7.3.16 Manufacturer Production House Product List	80
7.3.17 Manufacturer Select Inventory To Shift From Production House	81
7.3.18 Manufacturer Select Production House Shift Products	82
7.3.19 Manufacturer Inventory List For Screening	83
7.3.20 Manufacturer Product List For Screening	84
7.3.21 Manufacturer Order History	85
7.3.22 Manufacturer Data Analysis	86
7.3.23 Manufacturer Notifications	87
 8. Collaboration diagram	88
8.1. Retailer	88

8.1.1 Home	88
8.1.2 Show Categories	89
8.1.3 Search & Filter	90
8.1.4 Add To Cart	91
8.1.5 Cart	92
8.1.6 Confirm Order	93
8.1.7 Pay Later	94
8.1.8 Order History & Rating	95
8.2. Manufacturer	96
8.2.1 View Inventory List	96
8.2.2 Adding Inventory	97
8.2.3 Give Lease	98
8.2.4 Take Lease	99
8.2.5 Lease Management	100
8.2.6 Shift Product	101
8.2.7 Restock	102
8.2.8 Product Screening	103
8.2.9 Batch Screening	104
8.2.10 View Production House	105
8.2.11 Adding Production House	106
8.2.12 Add New Product	107
8.2.13 Add New Batch	108
8.2.14 Order History	109
8.2.15 Data Analytics	110
9. Sequence Diagram	111
9.1. Retailer	111
9.1.1 HomePage	111
9.1.2 Show Categories	112
9.1.3 Search & Filter	113
9.1.4 Add To Cart	114
9.1.5 Cart	115
9.1.6 Confirm Order	116
9.1.7 Pay Later	117
9.1.8 Order History & Rating	118
9.2. Manufacturer	119
9.2.1 View Inventory List	119
9.2.2 Adding Inventory	120
9.2.3 Give Lease	121
9.2.4 Take Lease	122
9.2.5 Lease Management	123
9.2.6 Shift Product	124
9.2.7 Restock	125
9.2.8 Product Screening	126
9.2.9 Batch Screening	127
9.2.10 View Production House	128
9.2.11 Adding Production House	129
9.2.12 Add New Product	130
9.2.13 Add New Batch	131
9.2.14 Order History	132
9.2.15 Data Analytics	133
10. State Diagram	134
10.1. Feedback Acknowledged	134

10.2. Order State	134
10.3. Inventory State	135
10.4. Product Whereabouts	136
11. Module Implementation	137
11.1. Login & HomePage	138
11.2. Show Inventories & Add Inventory	139
11.3. Search & Filter Products In an Inventory	140
11.4. Sorting Batches & Shifting	141

Motivation

- As there are many middlemen in the supply chain from the manufacturer to the retailer, the process gets slow, inefficient, and costly.
- The retailer has to order more items than needed or it will affect the revenue system. And sometimes cannot stock more products for inventory capacity shortage.
- On the other hand manufacturer cannot get a real time demand of the market. So cannot predict and control the production .
- New manufacturers have to establish a distribution network and sometimes even the big manufacturers struggle to maintain the distribution network because of analog systems

Introduction

We connect the Retailers and Manufacturers through a completely digital platform. Efficient supply chain is one of our goals. Inventory Management and Renting are also key features of our system design. We took inspiration from [Mokam](#)

Proposed Modules

MarketPlace

- List of products categorized by companies
- Filtering products (based on price, popularity, location, discounts, and availability) and Search
- Online reviews taken from the retailers about the products
- Payment gateway system integration

Inventory Management

- Real-time visibility of inventory location and levels
- Manufacturers can identify available stock, allocate inventory to orders
- Also we will have a feature of shared inventory where one manufacturer can rent out their unused inventory for a limited time

Data Analytics

- Manufacturer end data analytics will include sales data, product performance metrics
- Retailer end data analytics will include order history
- Real-time market analysis
- Location-based product demand and market history visualization
- In the future with the help of machine learning, we have a plan of integrating demand forecasting

Delivery System

- Tracking products and giving notification to retailers and manufacturers about it
- Fast and efficient delivery system by analyzing shortest path for multiple orders

As the scope was getting vast, we dropped the delivery system module from our design.

Requirement Analysis using BPMN diagram

4.1. Full BPMN diagram

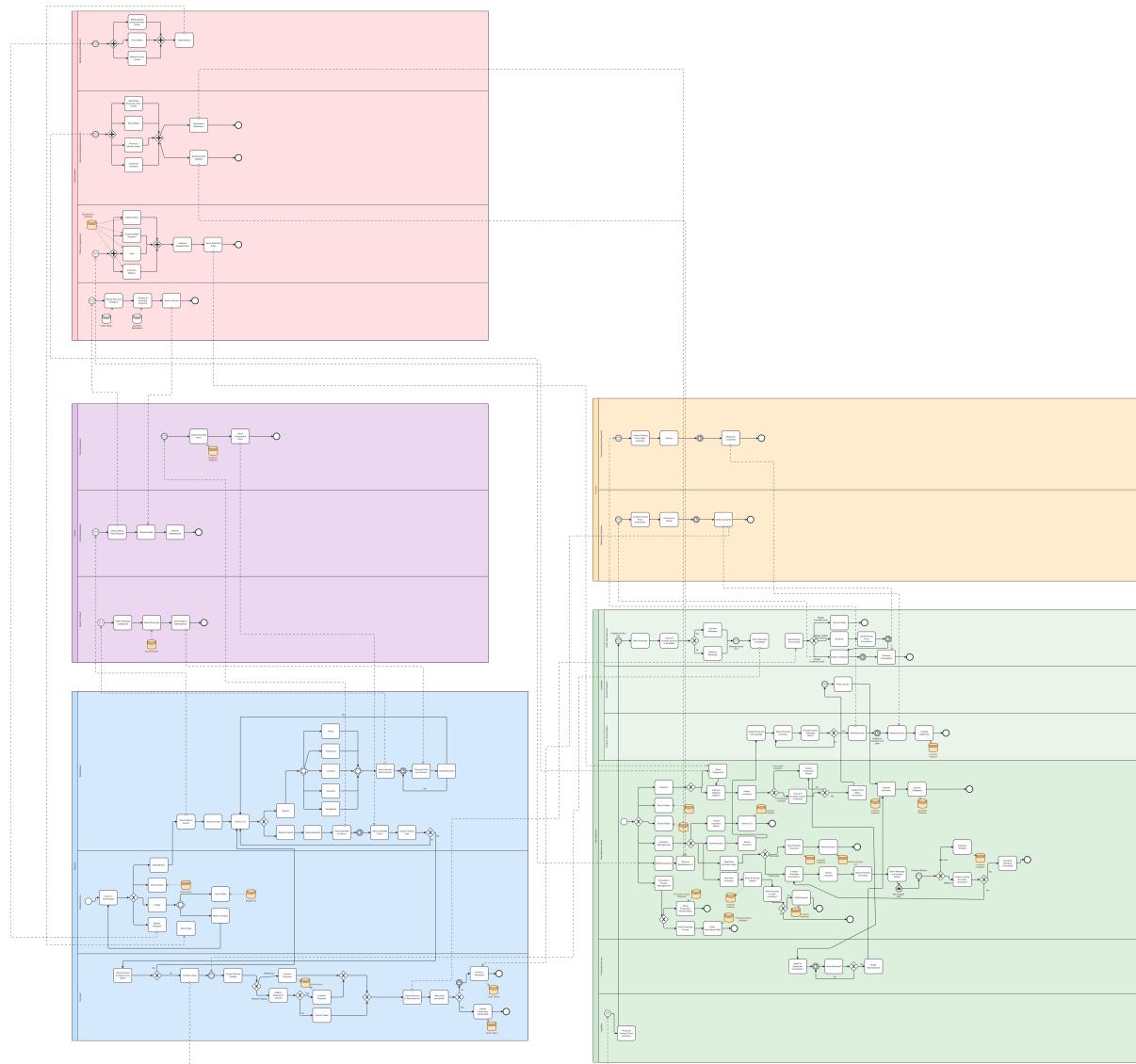


Figure 1: Complete BPMN Diagram

4.2. Pool 1: Retailer

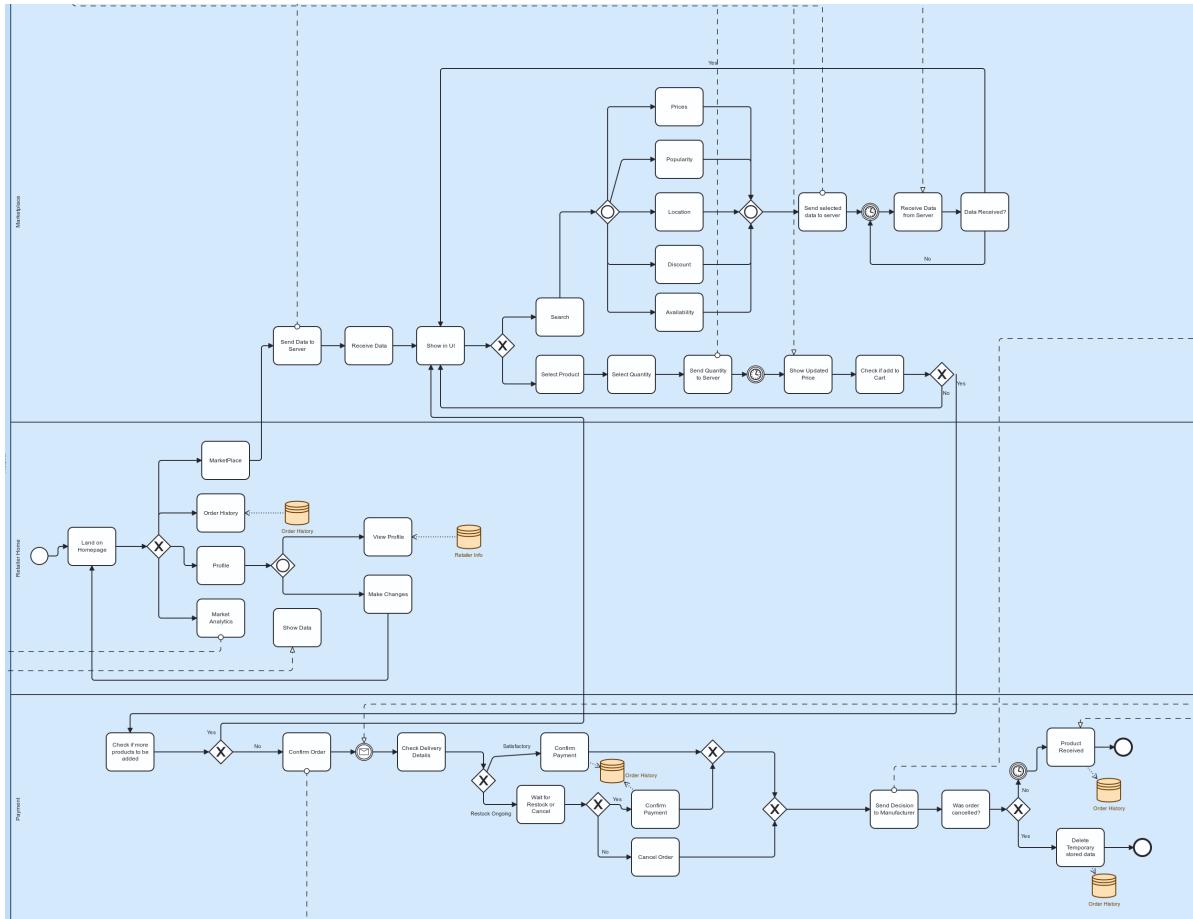


Figure 2: Pool 1: Retailer

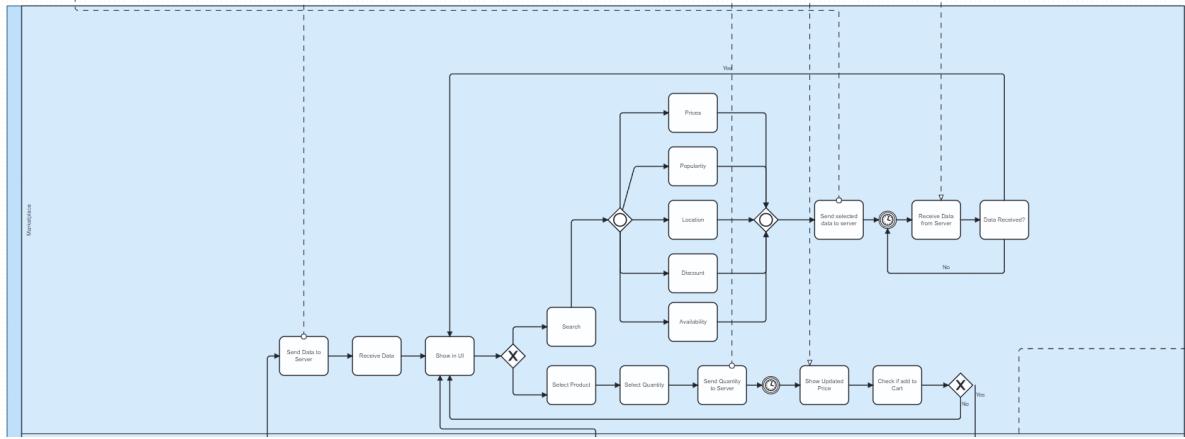


Figure 3: Lane : MarketPlace

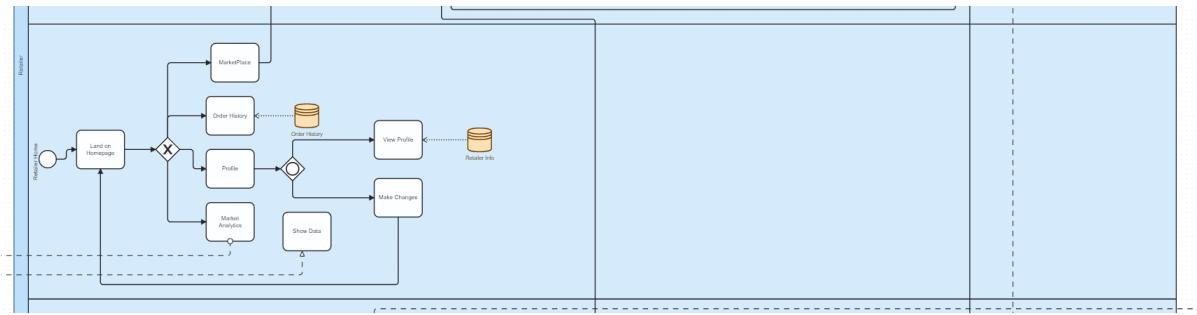


Figure 4: Lane : Retailer Home

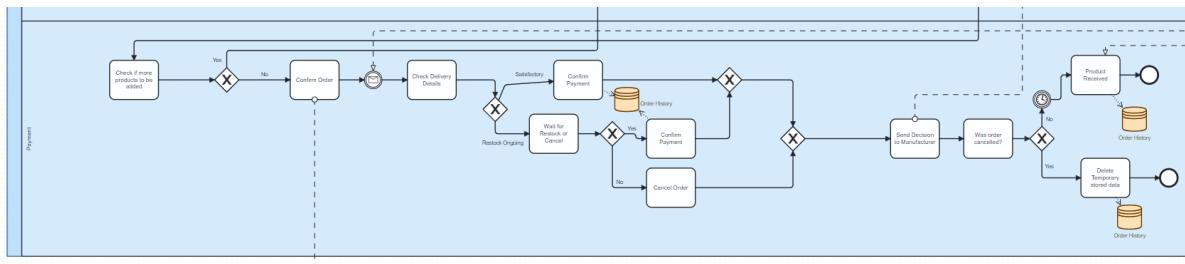


Figure 5: Lane : Payment

4.3. Pool 2: Manufacturer

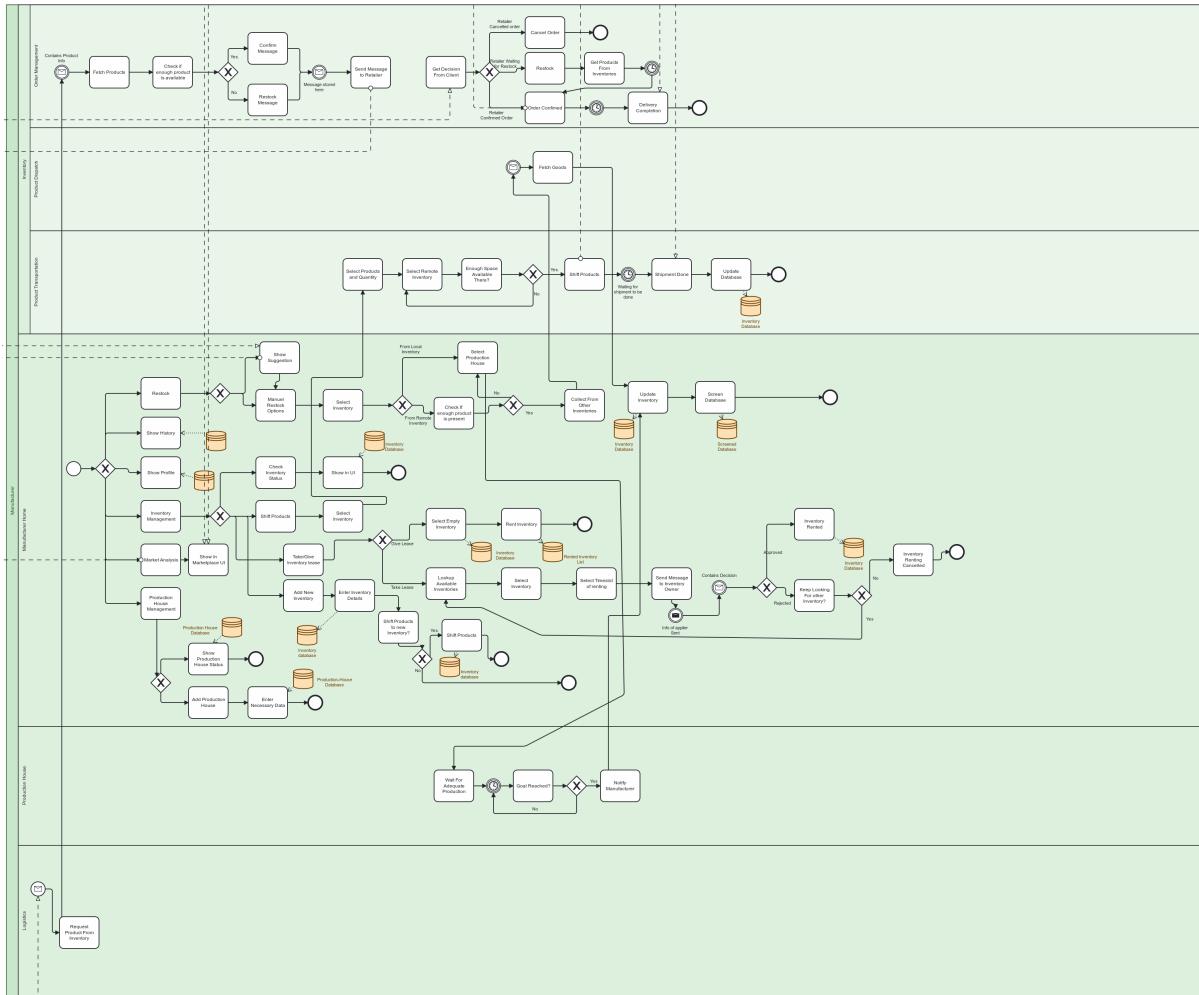


Figure 6: Pool 2: Manufacturer

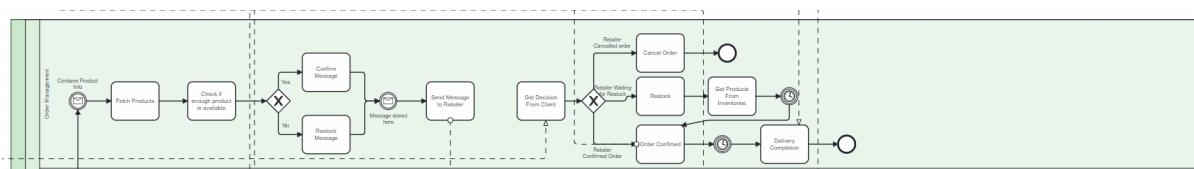


Figure 7: Lane : Order Management

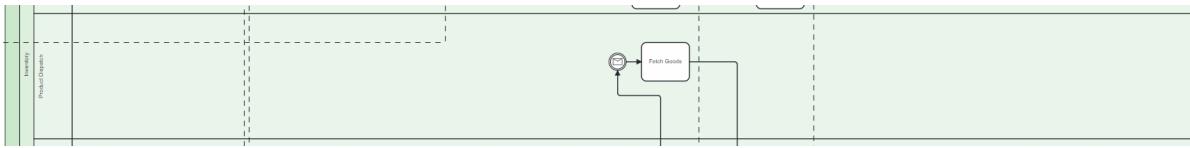


Figure 8: Lane : Product Dispatch

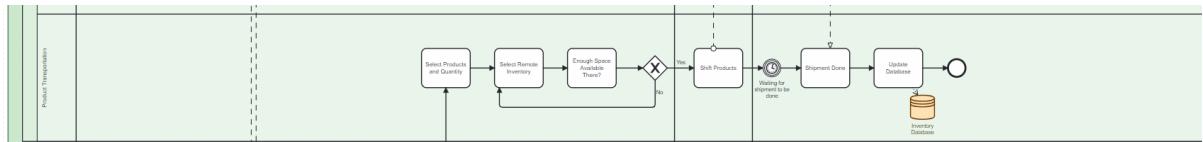


Figure 9: Lane : Product Transportation

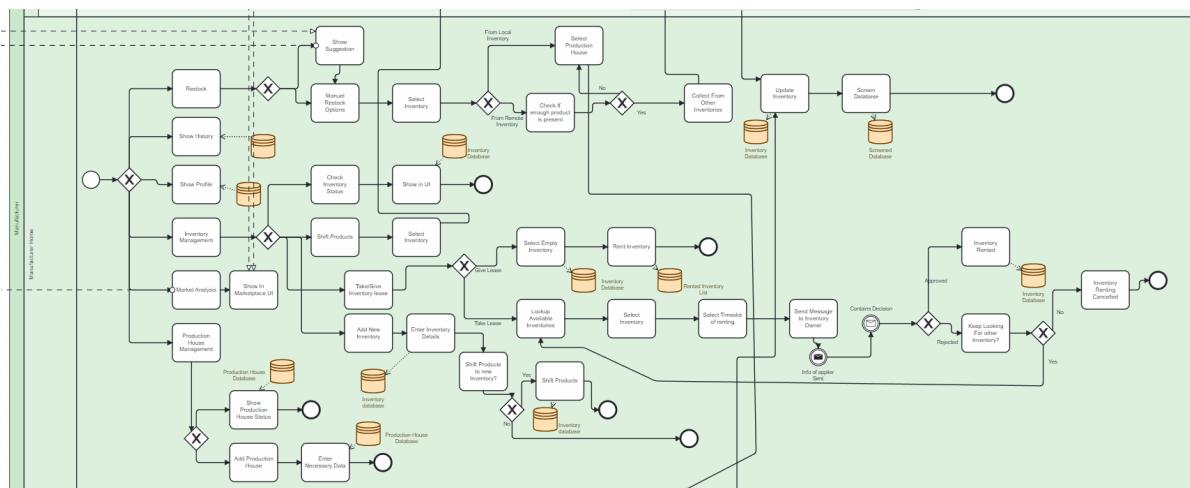


Figure 10: Lane : Manufacturer Home

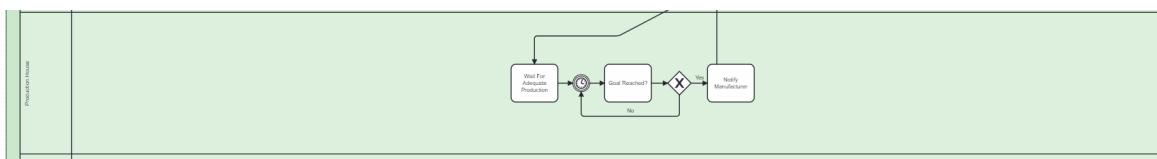


Figure 11: Lane : Production House



Figure 12: Lane : Logistics

4.4. Pool 3: Server

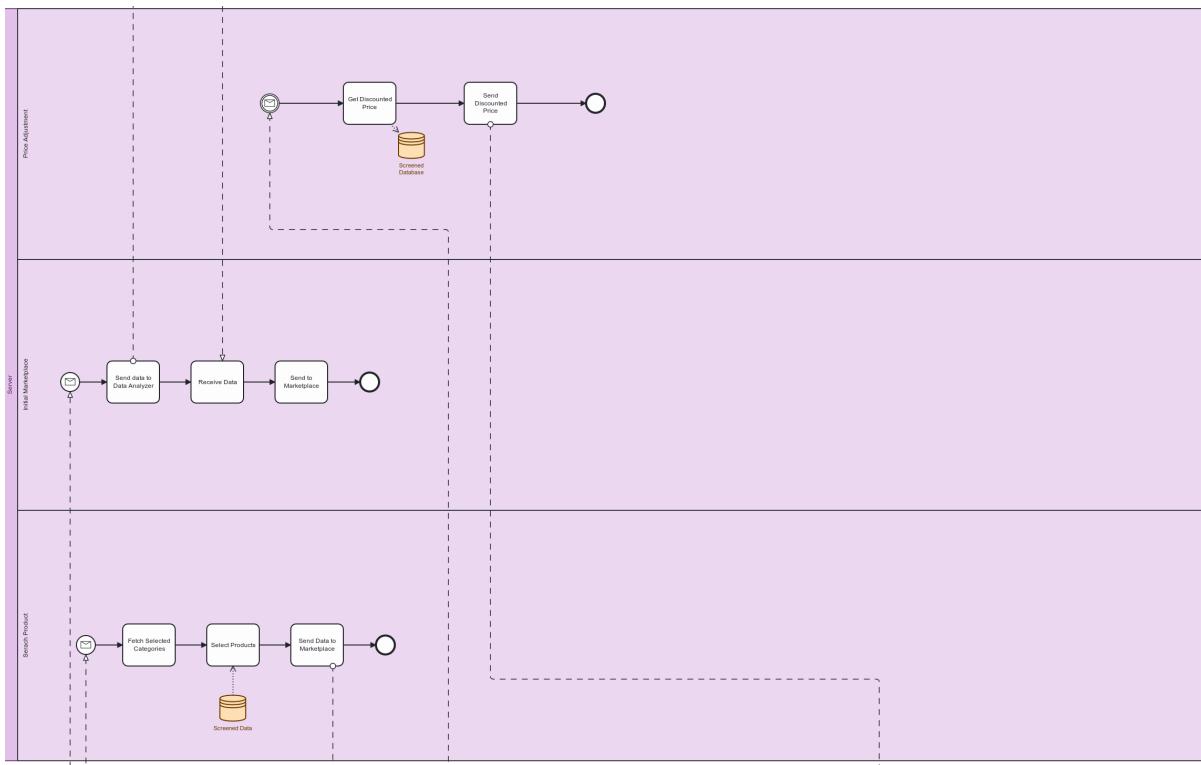


Figure 13: Pool 3: Server

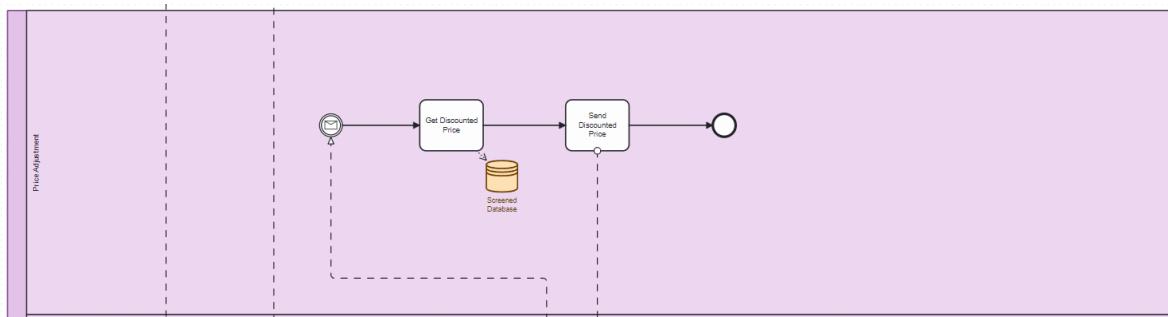


Figure 14: Lane : Price Adjustment

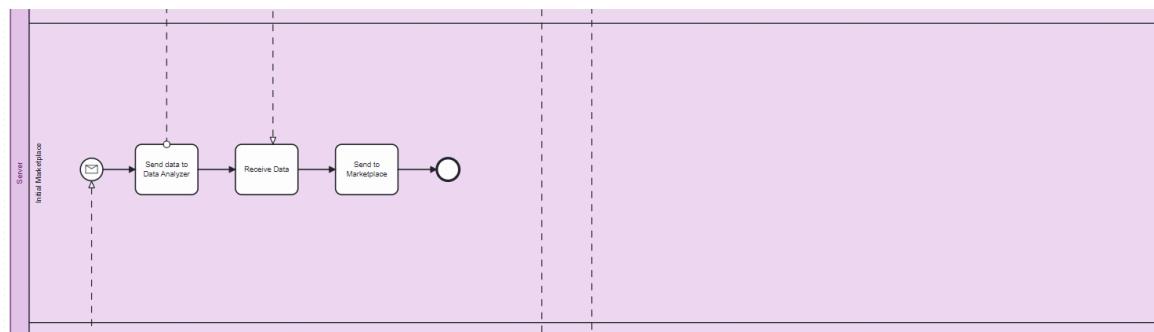


Figure 15: Lane : Initial Marketplace

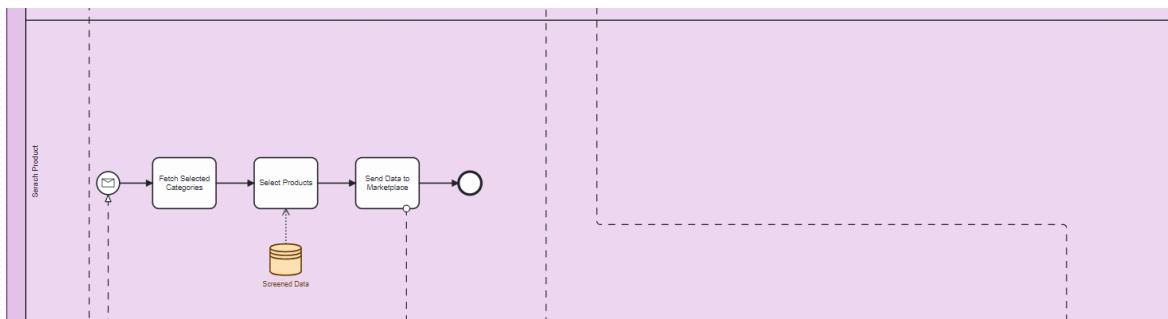


Figure 16: Lane : Search Product

4.5. Pool 4: Delivery

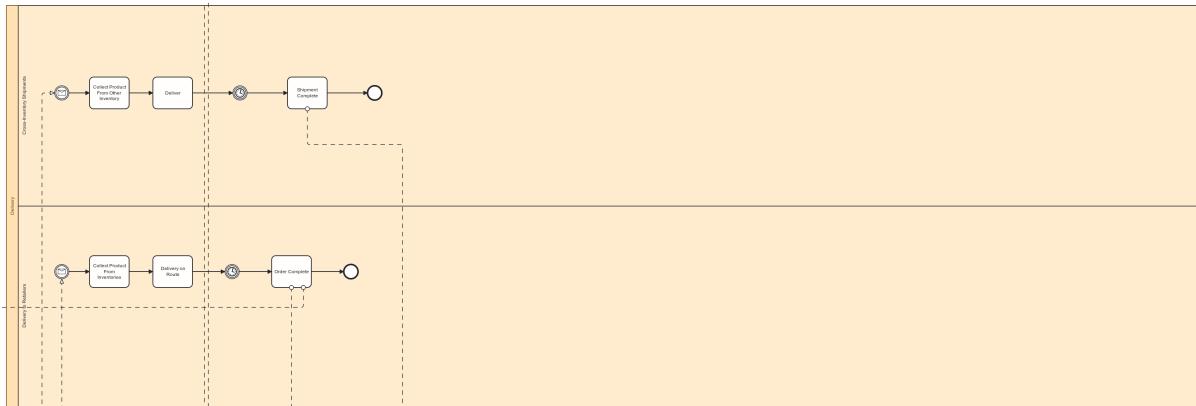


Figure 17: Pool 4: Delivery

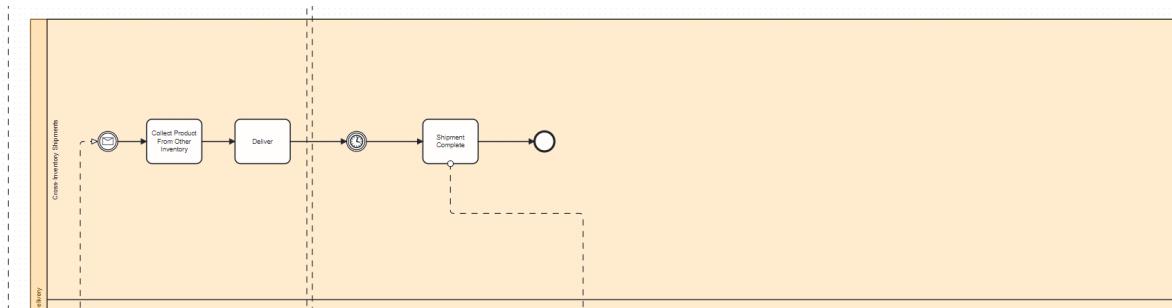


Figure 18: Lane : Cross Inventory Shipment

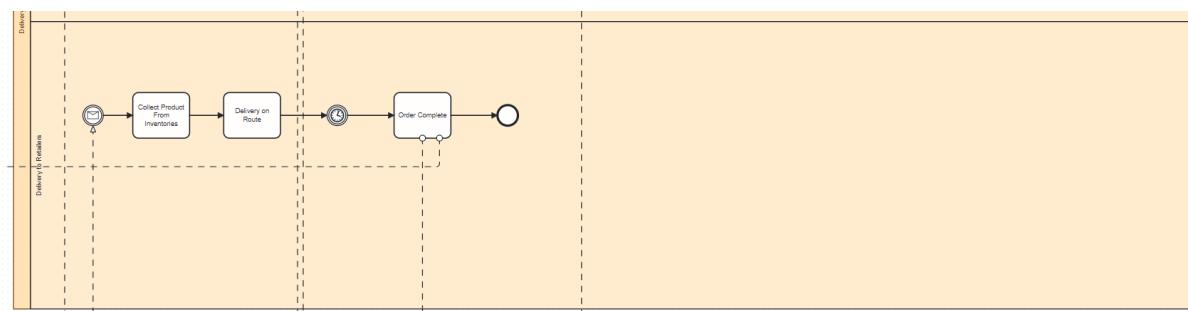


Figure 19: Lane : Delivery To Retailers

4.6. Pool 5: Data Analytics

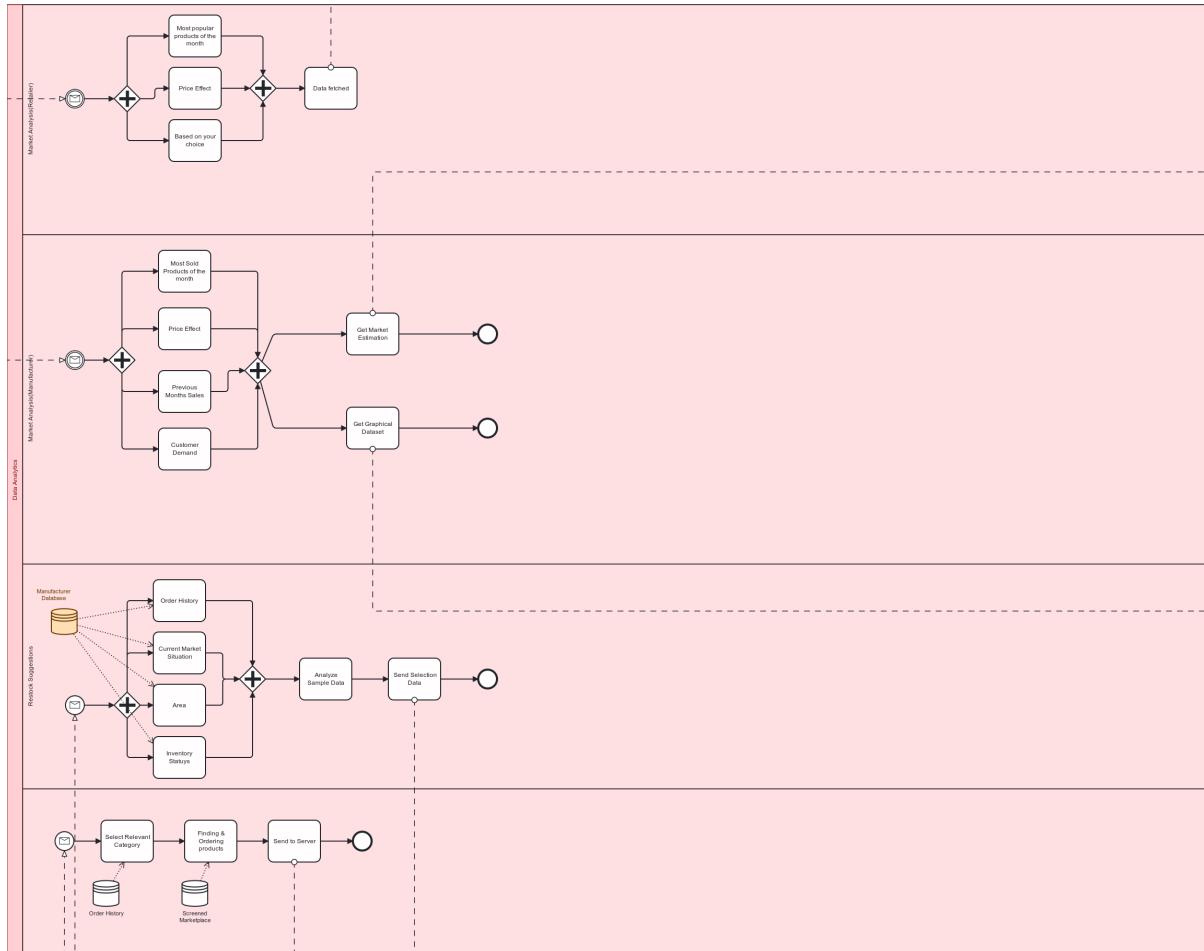


Figure 20: Pool 5: Data Analytics

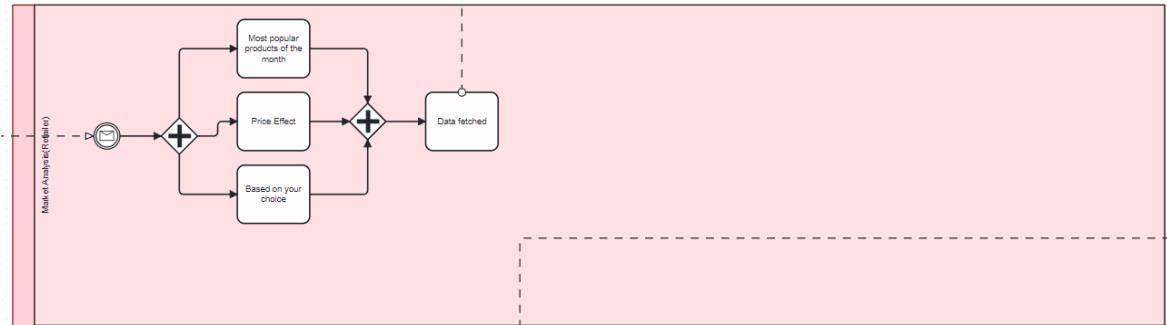


Figure 21: Lane : Market Analysis (Retailer)

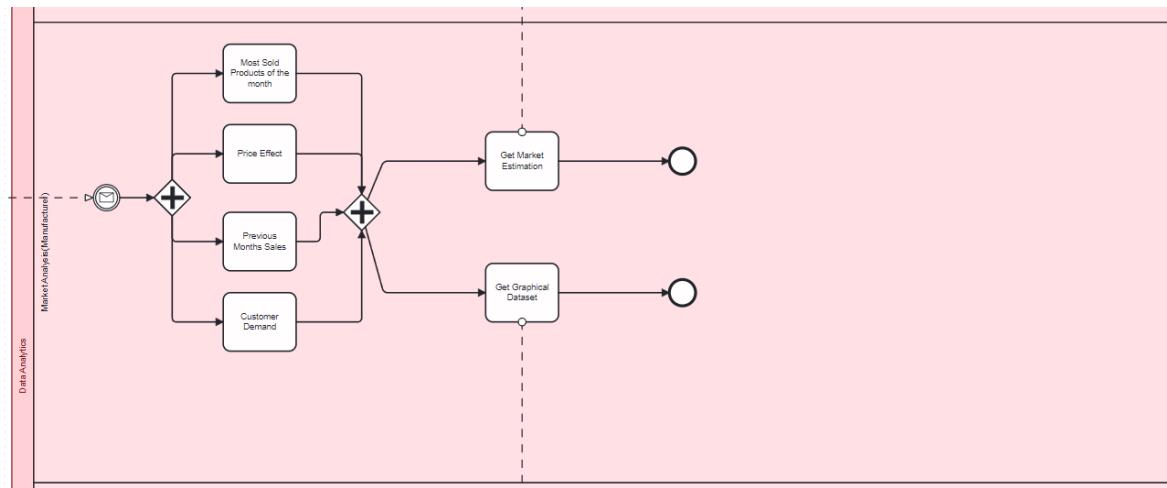


Figure 22: Lane : Market Analysis (Manufacturer)

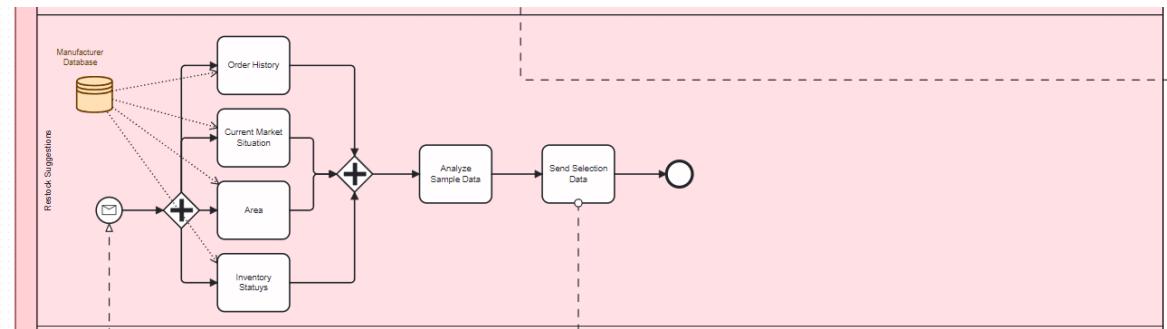


Figure 23: Lane : Restock Suggestions

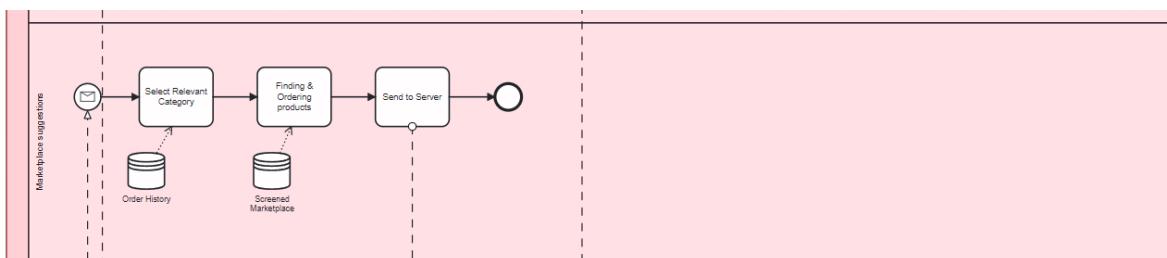


Figure 24: Lane : Marketplace Suggestions

Mock UI

5.1. Feedback Acknowledged

- Inventory size and type (such as cold storage, raw materials etc.) added

5.2. Retailer UI

The key components of Retailer part:

- Register
- Login
- Homepage & Sidebar
- Show Profile & Update
- Order History
- Category, Products & Ordering
- Finalizing Order & Payment
- Notifications & Data Analytics

5.2.1 Register

(a) First Page

Please provide your mobile number!

Mobile Number

I Agree To The [Terms & Conditions](#)

Continue >

(b) Enter Mobile Number

Please provide your mobile number!

Mobile Number **01234567660**

I Agree To The [Terms & Conditions](#)

Continue >

(c) Enter OTP

A 6 digit OTP has been sent to your mobile number.

OTP **123456**

Resend OTP in 24 seconds

Resend OTP

Continue >

(d) Register Pin

Create a 5 digit Pin Number

PIN *********

Re Submit the Pin Number

VERIFY PIN

Continue >

(e) Personal Information

Please enter your Personal Information

Full Name **ABC Khan**

MID **12345678903**

Shop Name **XYZ Store**

Email (Optional) **abcxyz123@gmail.com**

Create New Account >

(f) Welcome Page

Thank You

We have collected your information.
We are going to contact you and
verify you as soon as possible.
After successful verification,
you can log into the app.

Figure 25: Register

5.2.2 Login

The figure consists of three mobile application screens labeled (a), (b), and (c), showing the login process for the ReMan app.

(a) Enter Mobile Number: This screen is in English. It features a logo with a shopping cart icon inside a cloud, followed by the text "ReMan" and "Connecting Shops". A green button in the top right corner says "বাংলা" (Bengali). Below the logo, a message says "Please provide your mobile number!". A black input field is labeled "Mobile Number". Below the input field is a checkbox labeled "I Agree To The Terms & Conditions". At the bottom is a purple "Continue >" button.

(b) Bengali Page: This screen is in Bengali. It has the same logo and text as screen (a). A red button in the top right corner says "English". Below the logo, a message says "অনুগ্রহ করে আপনার মোবাইল নম্বরটি লিখুন". A black input field is labeled "মোবাইল নম্বর". Below the input field is a checkbox labeled "আমি [শর্তাবলীর](#) প্রতি সম্মতি প্রকাশ করছি". At the bottom is a purple "চালিয়ে ঘান >" button.

(c) Enter Pin: This screen is in English. It features the same logo and text as the other screens. A green button in the top right corner says "বাংলা". Below the logo, a message says "Provide your Pin Number". A black input field is labeled "PIN" with four placeholder dots. Below the input field is a checkbox labeled "Remember Me For Future Login". At the bottom is a green "Log In >" button.

Figure 26: Login

5.2.3 Homepage & Sidebar

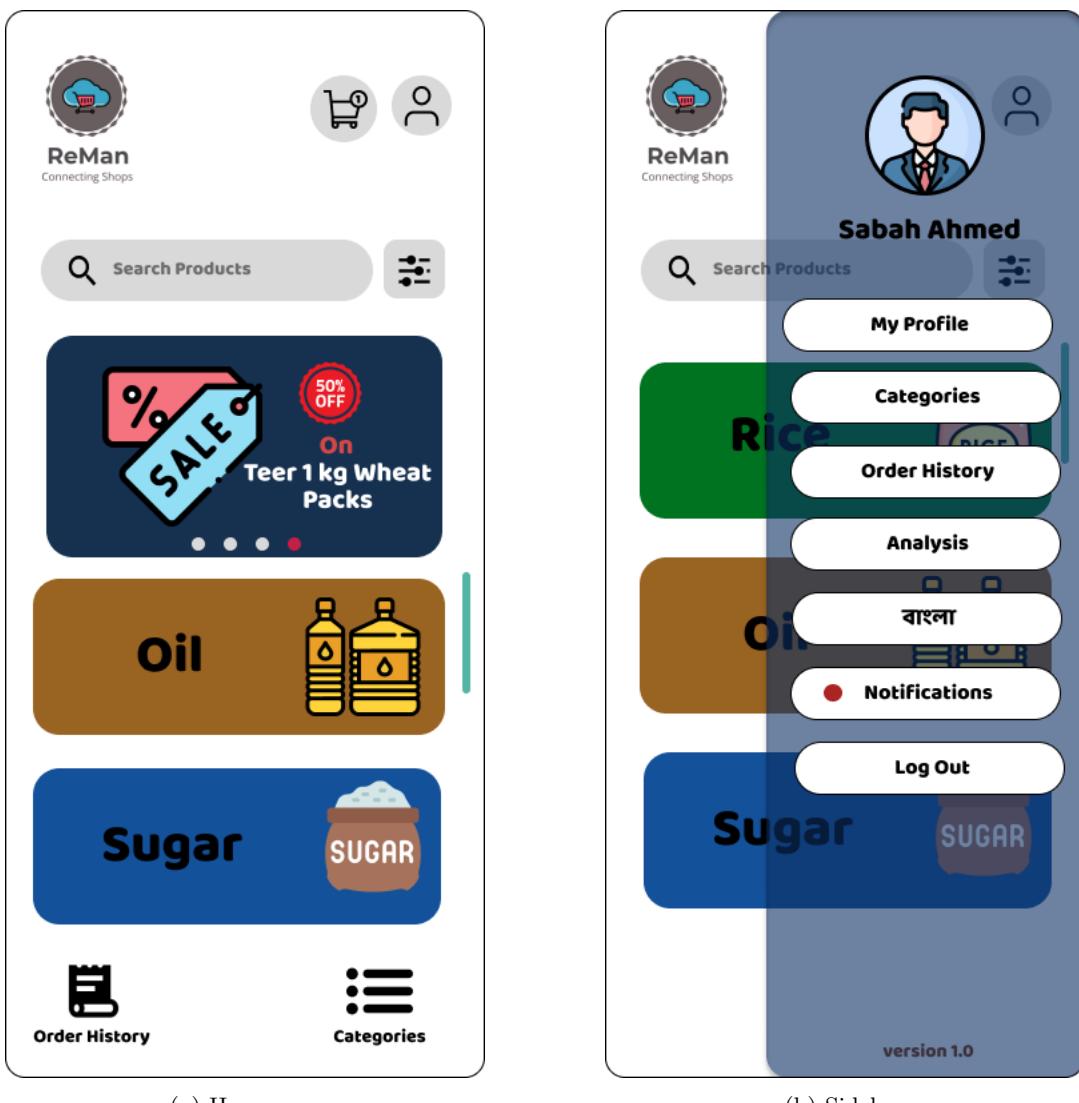


Figure 27: Homepage & Sidebar

5.2.4 Show Profile & Update

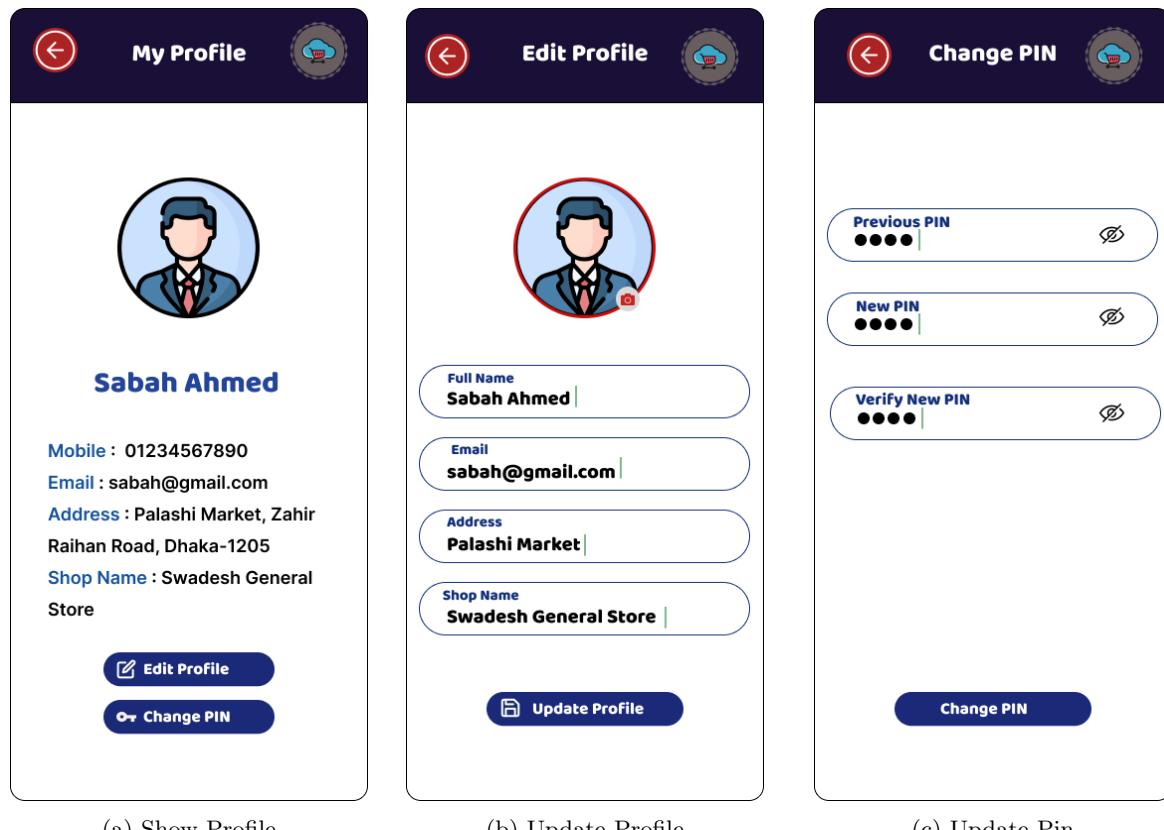
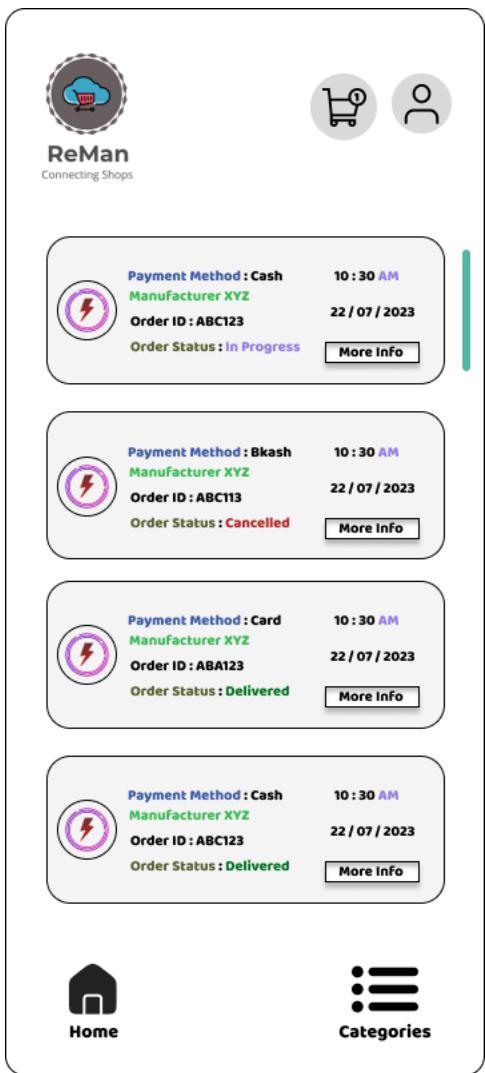
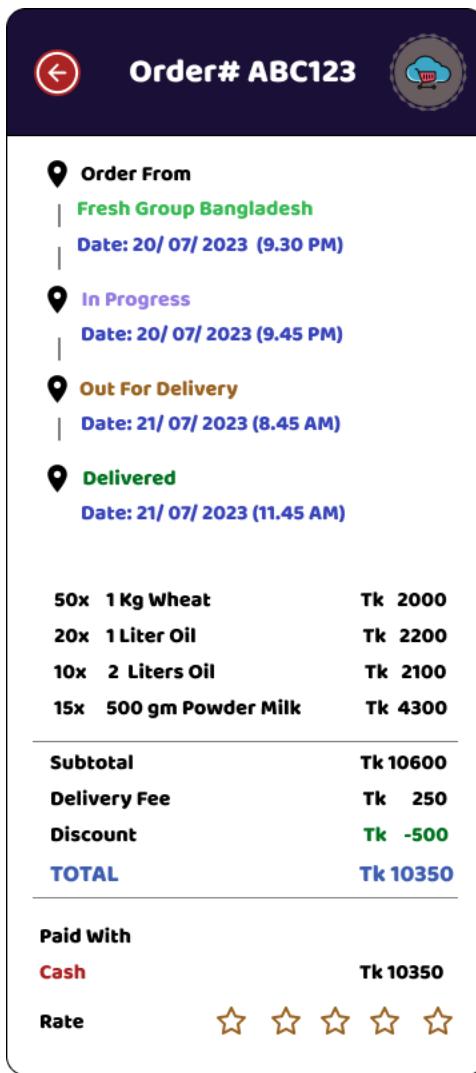


Figure 28: Show Profile & Update

5.2.5 Order History



(a) Complete History



(b) Specific Order

Order From	
Fresh Group Bangladesh	Date: 20 / 07 / 2023 (9.30 PM)
In Progress	Date: 20 / 07 / 2023 (9.45 PM)
Out For Delivery	Date: 21 / 07 / 2023 (8.45 AM)
Delivered	Date: 21 / 07 / 2023 (11.45 AM)

50x 1 Kg Wheat	Tk 2000
20x 1 Liter Oil	Tk 2200
10x 2 Liters Oil	Tk 2100
15x 500 gm Powder Milk	Tk 4300
Subtotal	Tk 10600
Delivery Fee	Tk 250
Discount	Tk -500
TOTAL	Tk 10350

Paid With	
Cash	Tk 10350
Rate	

Figure 29: Order History

5.2.6 Category, Products & Ordering

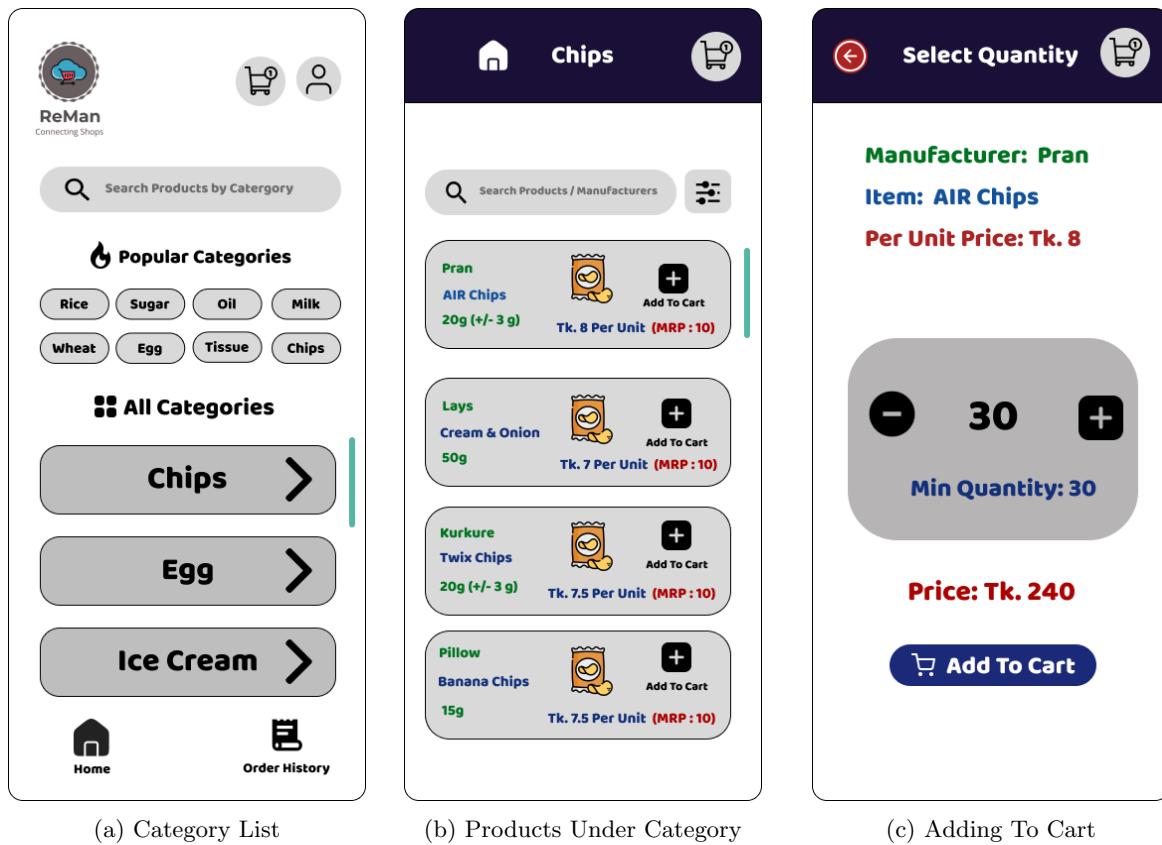


Figure 30: Category, Products & Ordering

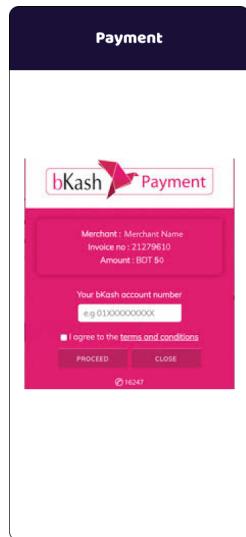
5.2.7 Finalizing Order & Payment



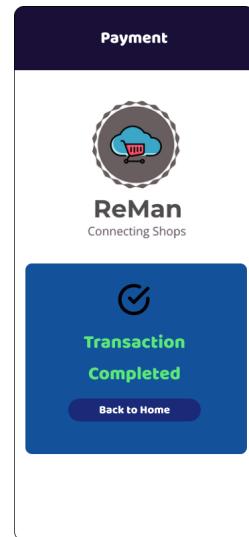
(a) Cart



(b) Select Payment Method



(c) Payment Gateway



(d) Completion Message

Figure 31: Finalizing Order & Payment

5.2.8 Notifications & Data Analytics

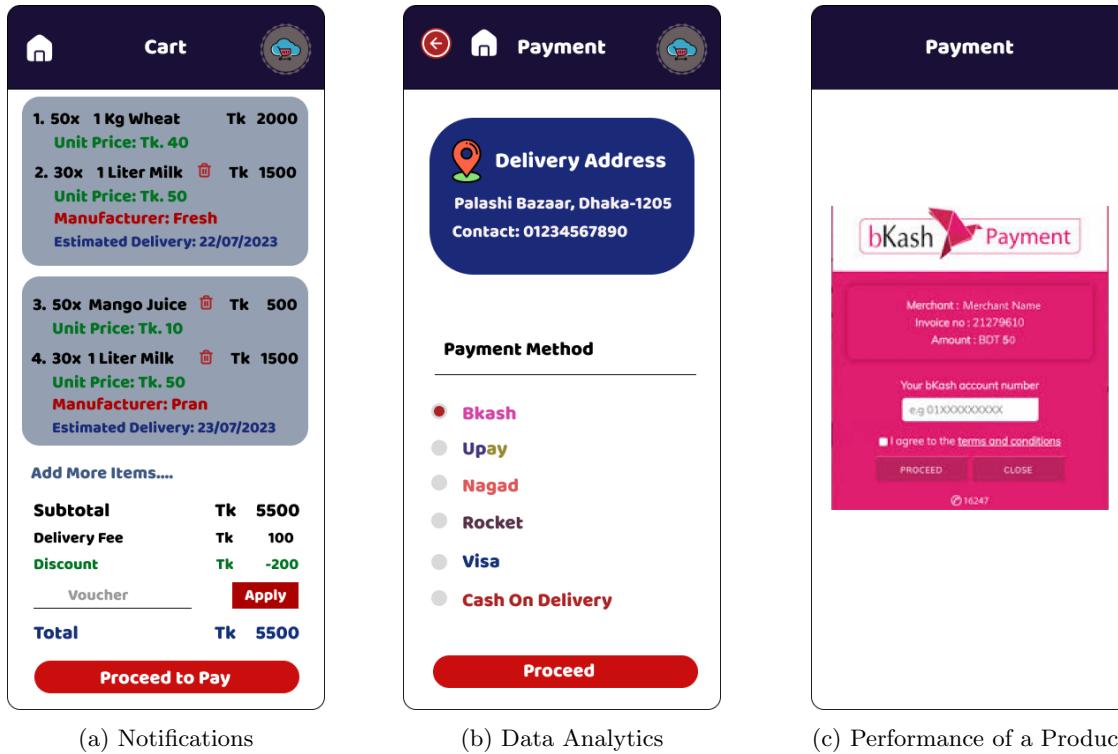


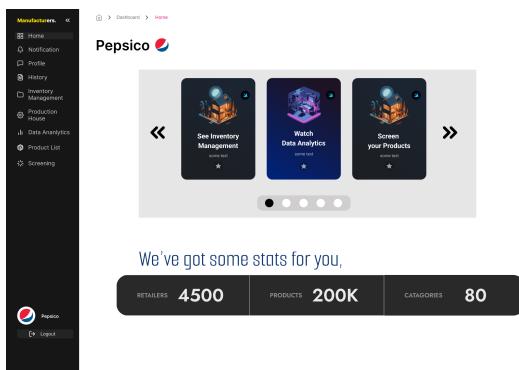
Figure 32: Notifications & Data Analytics

5.3. Manufacturer UI

The key components of Manufacturer part:

- Home, History & Product
- Inventory Management
- Production House Management
- Shifting Products
- Give Lease
- Take Lease
- Product Screening
- Data Analytics

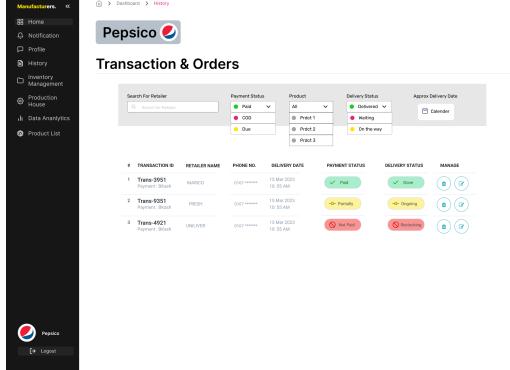
5.3.1 Home, History & Product



We've got some stats for you.

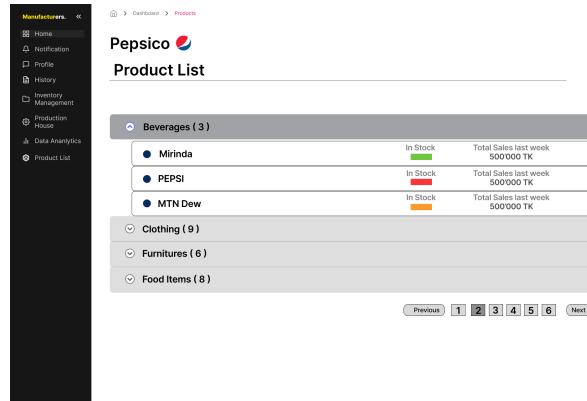
RETAILERS **4500** PRODUCTS **200K** CATEGORIES **80**

(a) Home



TRANSACTION ID	RETAILER NAME	PHONE NO.	DELIVERY DATE	PAYOUT STATUS	DELIVERY STATUS	MANAGE
Trans-3991	MARSH	09876543210	15-Mar-2023	Paid	Delivered	View
Trans-9391	FRESH	09876543210	15-Mar-2023	Partially	On the way	Edit
Trans-4021	LAWAER	09876543210	15-Mar-2023	Not Paid	Not Delivered	Delete

(b) History

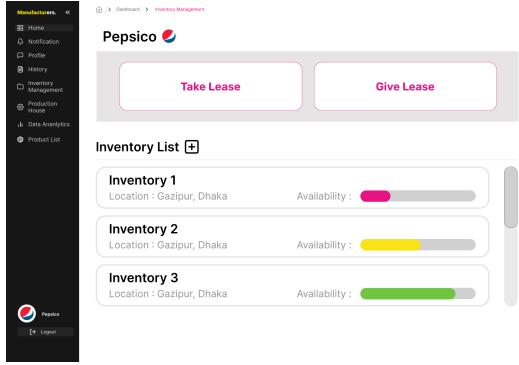


Category	Product Name	Stock Status	Total Sales last week
Beverages (3)	Mirinda	In Stock	500'000 TK
Beverages (3)	PEPSI	In Stock	500'000 TK
Beverages (3)	MTN Dew	In Stock	500'000 TK
Clothing (9)			
Furniture (6)			
Food Items (8)			

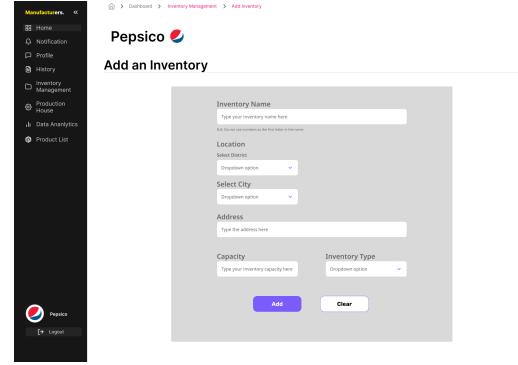
(c) Product

Figure 33: Home, History & Product

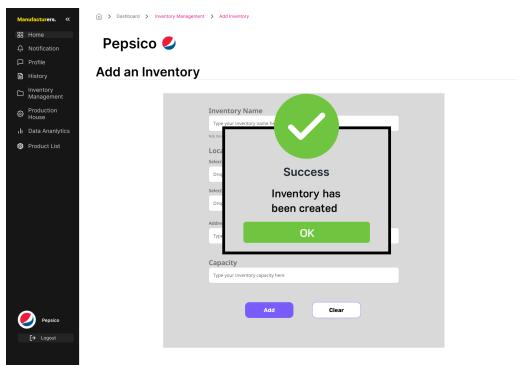
5.3.2 Inventory Management



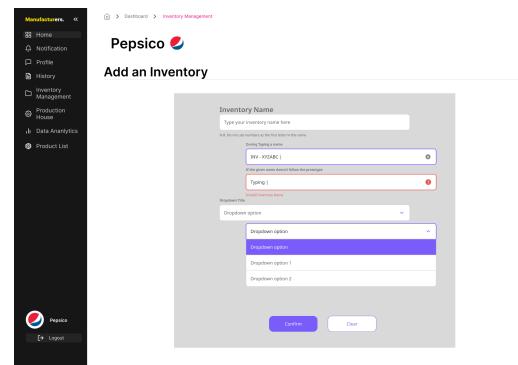
(a) Inventories



(b) Add Inventory



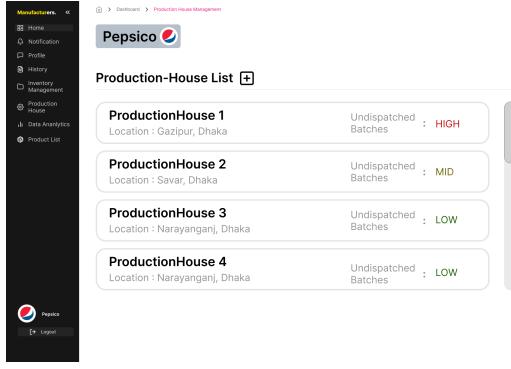
(c) Add Inventory



(d) Add Inventory

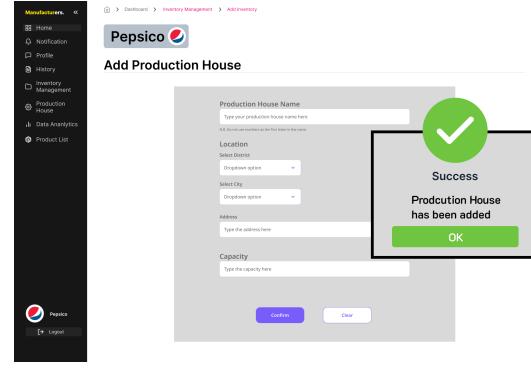
Figure 34: Inventory Management

5.3.3 Production House Management



Production-House List

ProductionHouse 1	Undispatched Batches : HIGH
Location : Gazipur, Dhaka	
ProductionHouse 2	Undispatched Batches : MID
Location : Savar, Dhaka	
ProductionHouse 3	Undispatched Batches : LOW
Location : Narayanganj, Dhaka	
ProductionHouse 4	Undispatched Batches : LOW
Location : Narayanganj, Dhaka	



Add Production House

Success
Production House has been added

(a) Production Houses
(b) Add Production House

Figure 35: Production House Management

5.3.4 Shifting Products

(a) Production House Homepage

(b) Select Product

(c) Choose Inventory For Shifting

(d) Success Message

Figure 36: Shifting Products

5.3.5 Give Lease

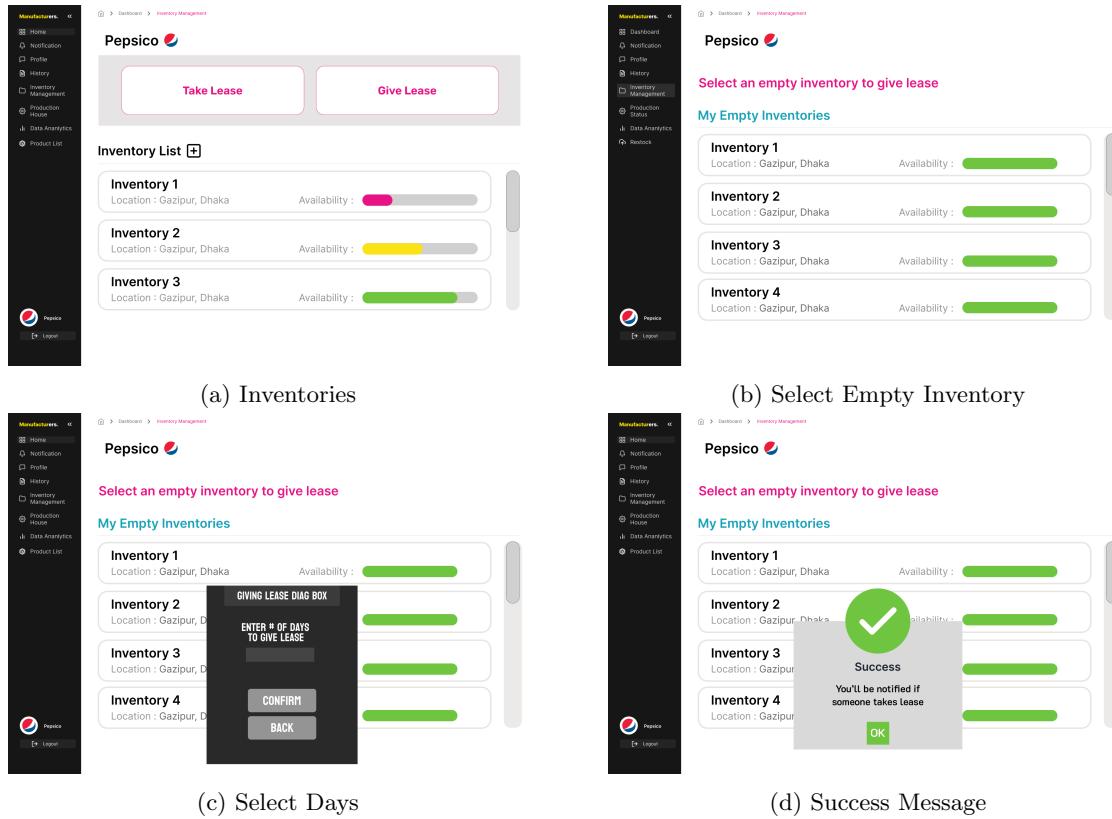


Figure 37: Give Lease

5.3.6 Take Lease

(a) Inventories

Pepsico Dashboard - Inventory Management

Inventory List

- Inventory 1: Location - Gazipur, Dhaka, Availability: 40 Days
- Inventory 2: Location - Gazipur, Dhaka, Availability: 52 Days
- Inventory 3: Location - Gazipur, Dhaka, Availability: 20 Days

(b) Select Inventory For Lease

Pepsico Dashboard - Inventory Management

Select an inventory to take lease

Empty Inventory Marketplace

- Inventory 1 - ABC Ltd: Location - Gazipur, Dhaka, Availability: 40 Days
- Inventory 2 - ABC Ltd: Location - Gazipur, Dhaka, Availability: 52 Days
- Inventory 1 - XYZ Ltd: Location - Gazipur, Dhaka, Availability: 20 Days
- Inventory 10 - FGH Ltd: Location - Gazipur, Dhaka, Availability: 30 Days

(c) Confirm

Pepsico Dashboard - Inventory Management

Select an inventory to take lease

Empty Inventory Marketplace

Are you sure? To confirm taking lease of the selected inventory, press Yes

Inventory 1 - ABC Ltd: Location - Gazipur, Dhaka, Availability: 40 Days

Inventory 2 - ABC Ltd: Location - Gazipur, Dhaka, Availability: 52 Days

Inventory 1 - X: Location - Gazipur, Dhaka, Availability: 0 Days

Inventory 10 - FGH Ltd: Location - Gazipur, Dhaka, Availability: 30 Days

No Yes

(d) Confirm

Pepsico Dashboard - Inventory Management

Select an inventory to take lease

Empty Inventory Marketplace

Success Your Request has been sent to the manufacturer

Inventory 1 - ABC Ltd: Location - Gazipur, Dhaka, Availability: 40 Days

Inventory 2 - ABC Ltd: Location - Gazipur, Dhaka, Availability: 52 Days

Inventory 1 - X: Location - Gazipur, Dhaka, Availability: 0 Days

Inventory 10 - FGH Ltd: Location - Gazipur, Dhaka, Availability: 30 Days

OK

Figure 38: Take Lease

5.3.7 Product Screening

(a) Screening Homepage

(b) Select Batch

(c) Select Quantity

(d) Select Discount Percentage

(e) Set Price

SET PRICE DIALOGUE BOX

ENTER BASE PRICE : [REDACTED]

ENTER DISCOUNT INFO :

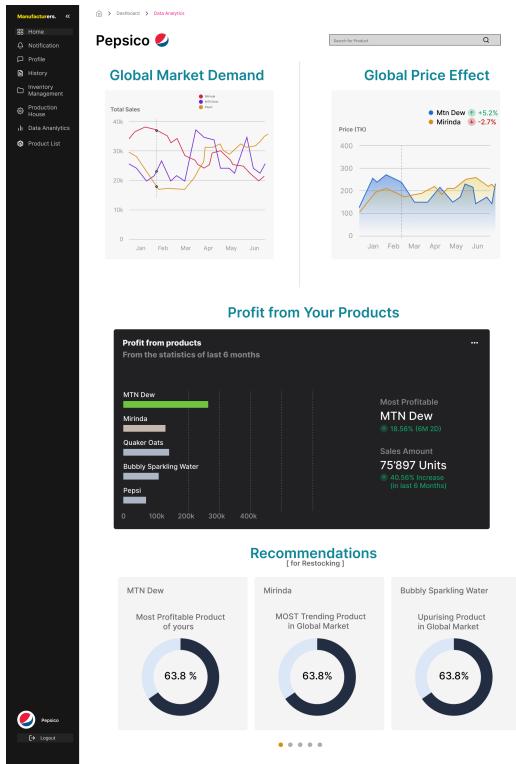
Per	[REDACTED]	Unit
Discount	[REDACTED]	%

HIGHEST DISCOUNT : [REDACTED]

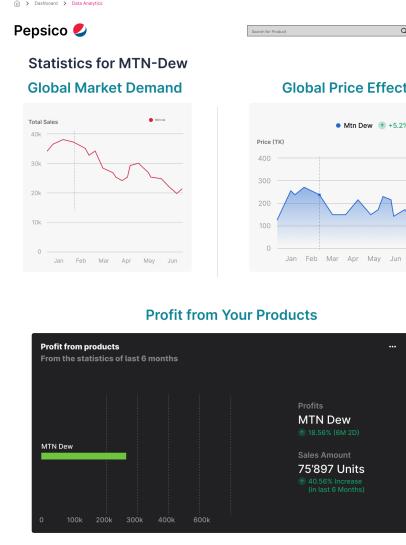
CONFIRM

Figure 39: Product Screening

5.3.8 Data Analytics



(a) Data Analytics General



(b) Data Analytics For Specific Product

Figure 40: Data Analytics

Entity Relationship Diagram

6.1. Complete ER Diagram

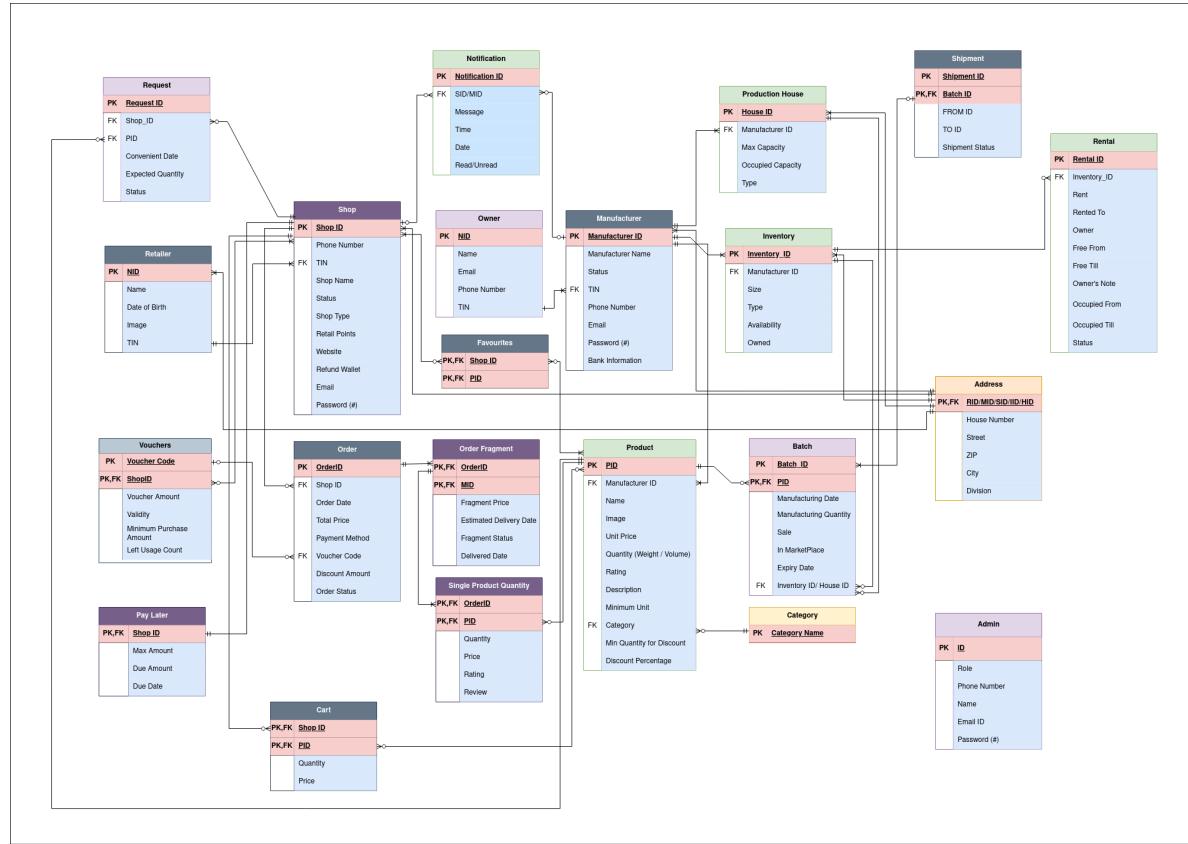


Figure 41: Complete ER Diagram

6.2. Retailer

Retailer table keeps the information about the retail shops' owners. One owner can have multiple shops. So it has a one to many relation with shops table.

Retailer	
PK	<u>NID</u>
	Name
	Date of Birth
	Image
	TIN

Figure 42: Retailer Table

6.3. Shop

Shop table acts as a single entity. It has relation with orders, vouchers, favourites. It keeps all the information about a retail shop.

Shop	
PK	<u>Shop ID</u>
	Phone Number
FK	TIN
	Shop Name
	Status
	Shop Type
	Retail Points
	Website
	Refund Wallet
	Email
	Password (#)

Figure 43: Shop Table

6.4. Product

Product table keeps the information about a specific product. It has relation with Manufacturer, Single Product Quantity, favourites table.

Product	
PK	<u>PID</u>
FK	Manufacturer ID
	Name
	Image
	Unit Price
	Quantity (Weight / Volume)
	Rating
	Description
	Minimum Unit
FK	Category
	Min Quantity for Discount
	Discount Percentage

Figure 44: Product Table

6.5. Single Product Quantity

Single Product Quantity table keeps the information about a specific product of a specific order. It has relation with Orders, Order Fragment, Product table. It stores the rating of that specific product in that order.

Single Product Quantity	
PK,FK	<u>OrderID</u>
PK,FK	<u>PID</u>
	Quantity
	Price
	Rating
	Review

Figure 45: Single Product Quantity Table

6.6. Order Fragment

Order Fragment table stores the manufacturer specific order information such as delivery date, manufacturer specific price. It has direct relations with order and single product quantity table.

Order Fragment	
PK,FK	<u>OrderID</u>
PK,FK	<u>MID</u>
	Fragment Price
	Estimated Delivery Date
	Fragment Status
	Delivered Date

Figure 46: Order Fragment Table

6.7. Order

Order table stores the order history. All the order specific information in this table.

Order	
PK	<u>OrderID</u>
FK	Shop ID
	Order Date
	Total Price
	Payment Method
FK	Voucher Code
	Discount Amount
	Order Status

Figure 47: Order Table

6.8. Cart

Cart table stores the order items temporarily before the confirmation

Cart	
PK,FK	<u>Shop ID</u>
PK,FK	<u>PID</u>
	Quantity
	Price

Figure 48: Cart Table

6.9. Vouchers

Vouchers table stores the voucher information specific to a shop. It has relation with Order and Shop tables.

Vouchers	
PK	<u>Voucher Code</u>
PK,FK	<u>ShopID</u>
	Voucher Amount
	Validity
	Minimum Purchase Amount
	Left Usage Count

Figure 49: Vouchers Table

6.10. Pay Later

Pay Later Table stores information about loan amounts and allowed max amount depending on retail points.

Pay Later	
PK,FK	<u>Shop ID</u>
	Max Amount
	Due Amount
	Due Date

Figure 50: Pay Later Table

6.11. Favourites

Favourites table stores the favourite products' id of a shop.

Favourites	
PK,FK	<u>Shop ID</u>
PK,FK	<u>PID</u>

Figure 51: Favourites Table

6.12. Category

Category table stores the product categories.

Category	
PK	<u>Category Name</u>

Figure 52: Category Table

6.13. Admin

Admin table holds the information about admins.

Admin	
PK	<u>ID</u>
	Role
	Phone Number
	Name
	Email ID
	Password (#)

Figure 53: Admin Table

6.14. Owner

Owner table has the information about the manufacturer company owners. There is a one to many relation between owner and manufacturer table

Owner	
PK	<u>NID</u>
	Name
	Email
	Phone Number
	TIN

Figure 54: Owner Table

6.15. Manufacturer

Manufacturer table holds the information about companies. It has relation with batches, inventories, production houses and many more.

Manufacturer	
PK	<u>Manufacturer ID</u>
FK	Manufacturer Name
	Status
	TIN
	Phone Number
	Email
	Password (#)
	Bank Information

Figure 55: Manufacturer Table

6.16. Batch

Batch table holds the information of product batches. It helps us to sort products.

Batch	
PK	<u>Batch_ID</u>
PK,FK	<u>PID</u>
FK	Manufacturing Date
	Manufacturing Quantity
	Sale
	In MarketPlace
	Expiry Date
	Inventory ID/ House ID

Figure 56: Batch Table

6.17. Inventory

Inventory table hold the information of inventories. Inventory management is one of the key modules of the design.

Inventory	
PK	<u>Inventory_ID</u>
FK	Manufacturer ID
	Size
	Type
	Availability
	Owned

Figure 57: Inventory Table

6.18. Production House

Production House table holds the information about production houses. It has relation with manufacturers.

Production House	
PK	<u>House ID</u>
FK	Manufacturer ID
	Max Capacity
	Occupied Capacity
	Type

Figure 58: Production House Table

6.19. Rental

Rental table has the information about inventory rental. This is the innovative idea we have added to the design.

Rental	
PK	Rental ID
FK	Inventory_ID
	Rent
	Rented To
	Owner
	Free From
	Free Till
	Owner's Note
	Occupied From
	Occupied Till
	Status

Figure 59: Rental Table

6.20. Address

Address table holds all the addresses of shops, manufacturers, inventories, production houses. For ease, we have separated this table.

Address	
PK,FK	RID/MID/SID/IID/HID
	House Number
	Street
	ZIP
	City
	Division

Figure 60: Address Table

6.21. Shipment

Shipment table holds the information of shipment between inventories and production houses to inventories

Shipment	
PK	<u>Shipment ID</u>
PK,FK	<u>Batch ID</u>
	FROM ID
	TO ID
	Shipment Status

Figure 61: Shipment Table

6.22. Notification

Notification table holds all the information about notifications sent to retailers and manufacturers.

Notification	
PK	<u>Notification ID</u>
FK	SID/MID
	Message
	Time
	Date
	Read/Unread

Figure 62: Notification Table

6.23. Request

Request table holds the information if some retailer requests a product that is stocked out.

Request	
PK	<u>Request ID</u>
FK	Shop_ID
FK	PID
	Convenient Date
	Expected Quantity
	Status

Figure 63: Request Table

Class Diagram

7.1. Feedback Acknowledged

- Function for updating retail points is added to shop class.

There are three types of classes in our system design. They are as follows:

- Entity Classes
- Retailer Boundary and Control Classes
- Manufacturer Boundary and Control Classes

Entity Classes

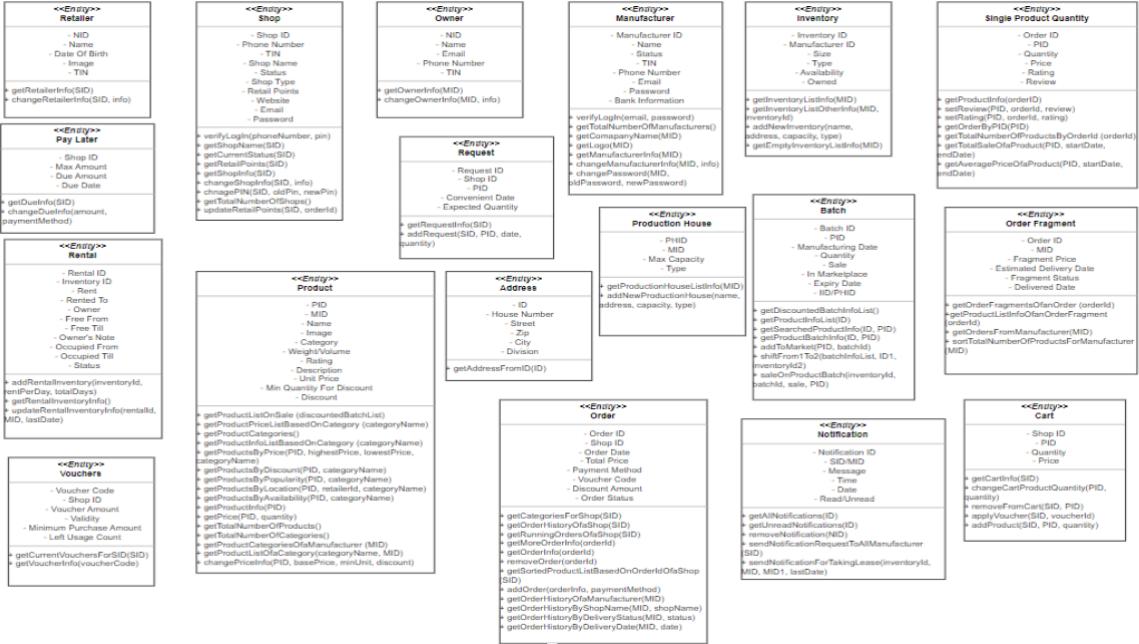


Figure 64: Entity Classes

Retailer Boundary and Control Classes

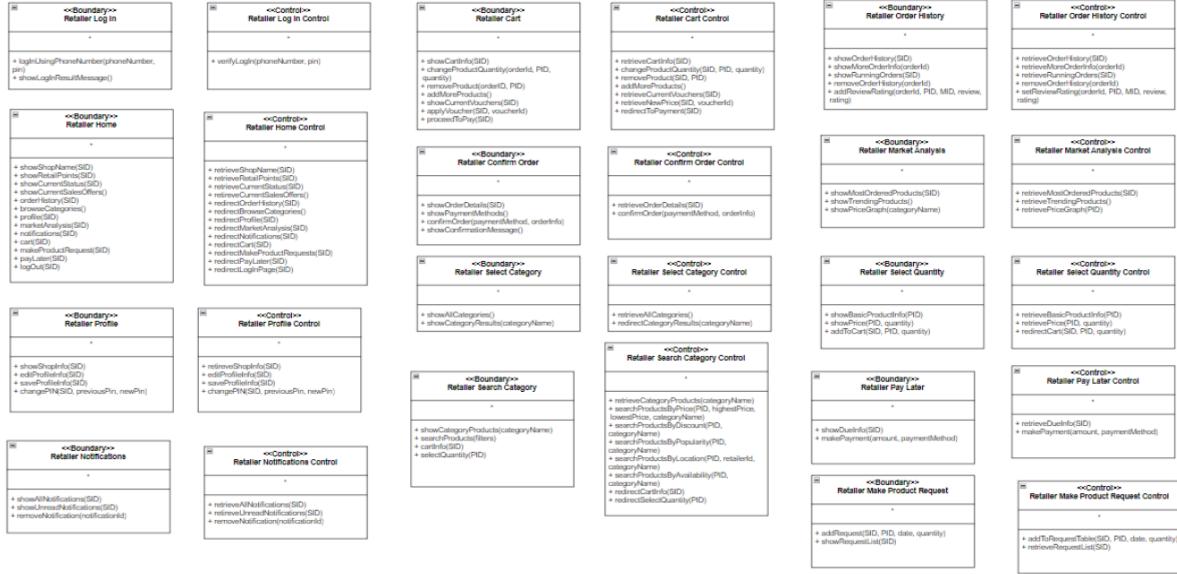


Figure 65: Retailer Boundary and Control Classes

Manufacturer Boundary and Control Classes

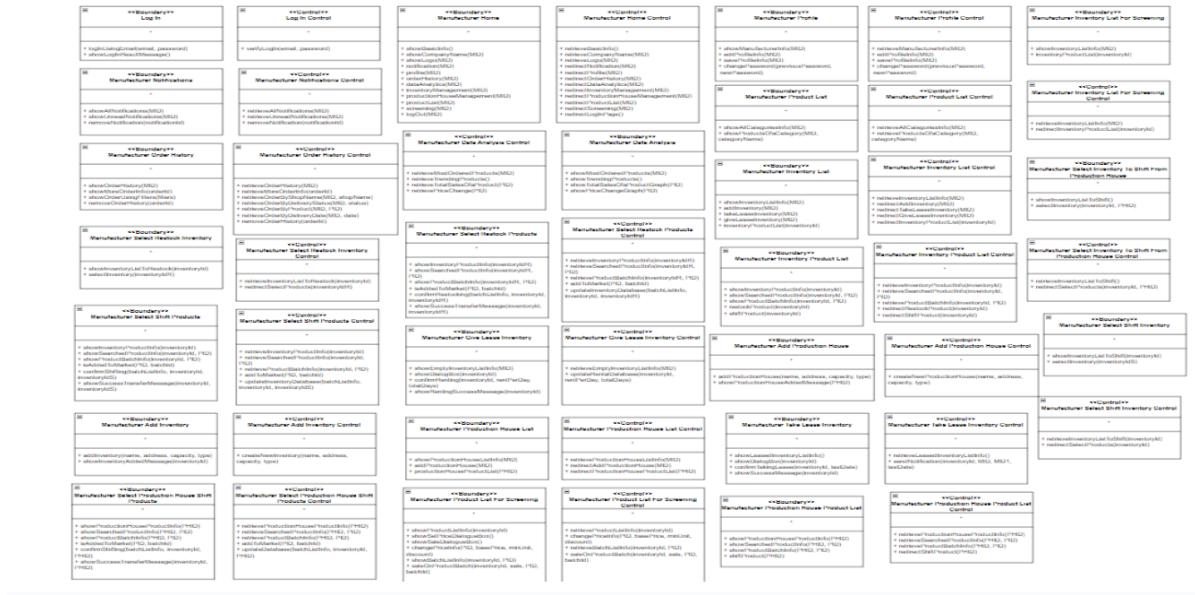


Figure 66: Manufacturer Boundary and Control Classes

7.2. Retailer Classes

7.2.1 Retailer Log In

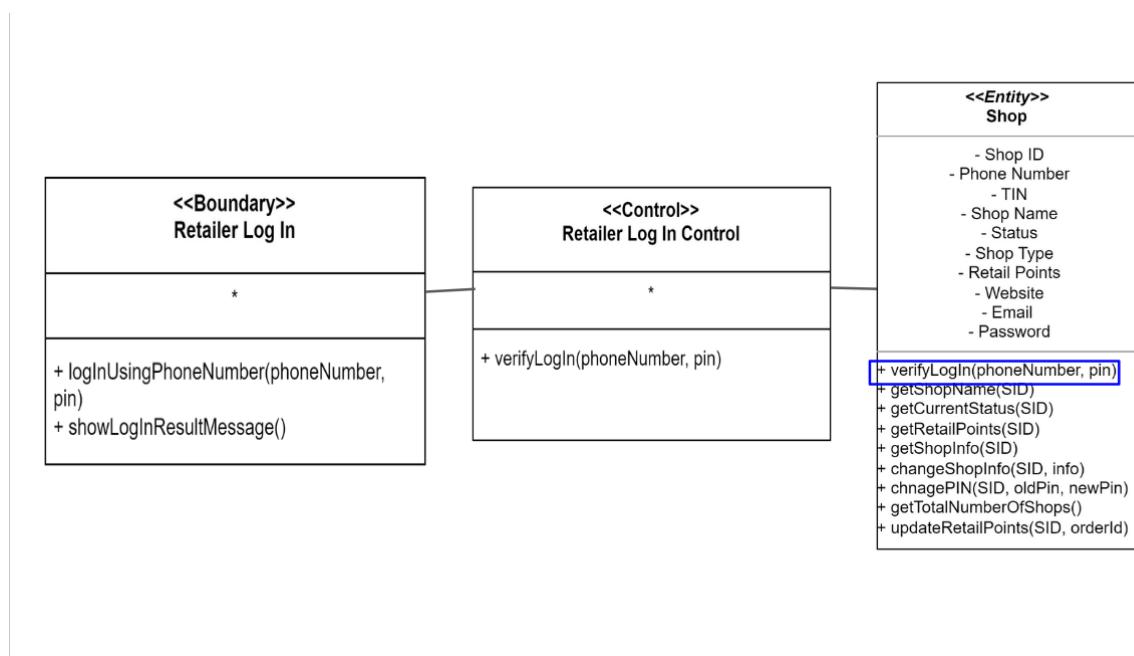


Figure 67: Retailer Log In

7.2.2 Retailer Home

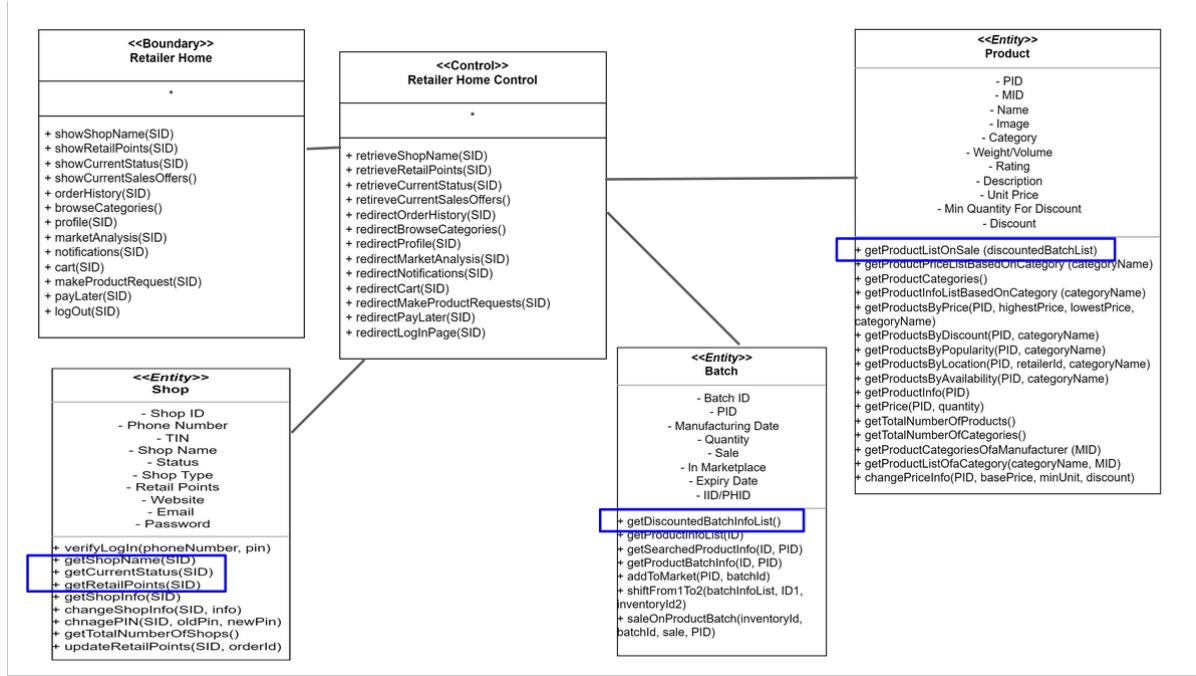


Figure 68: Retailer Home

7.2.3 Retailer Profile

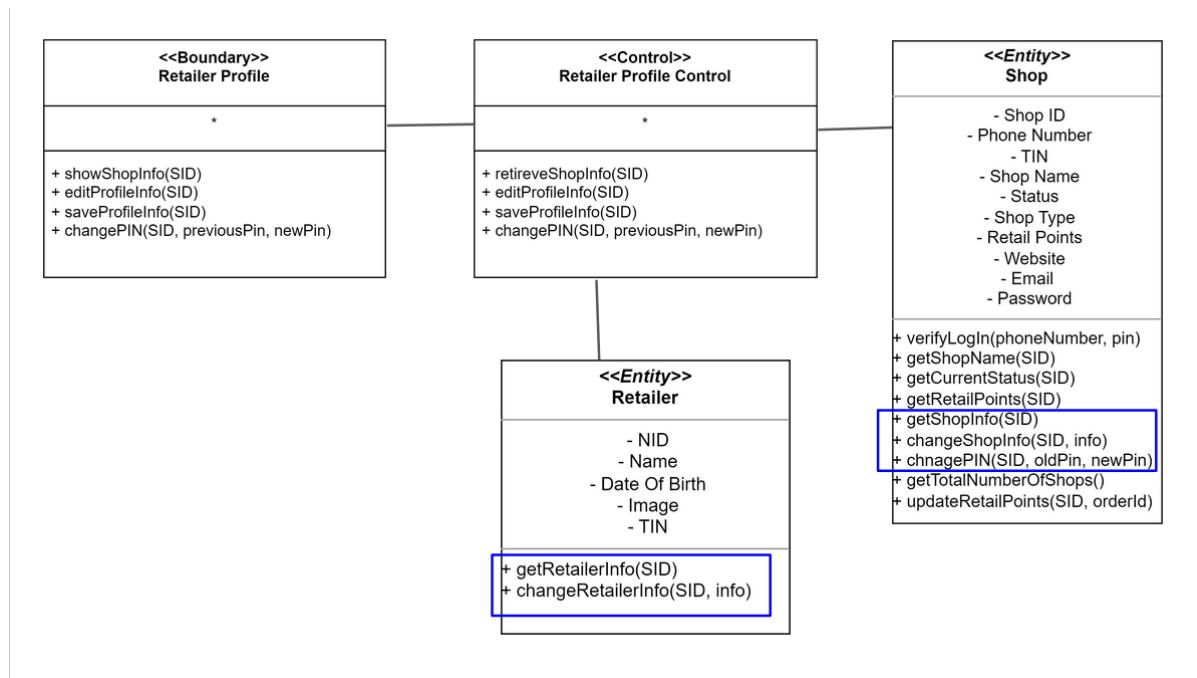


Figure 69: Retailer Profile

7.2.4 Retailer Select Category

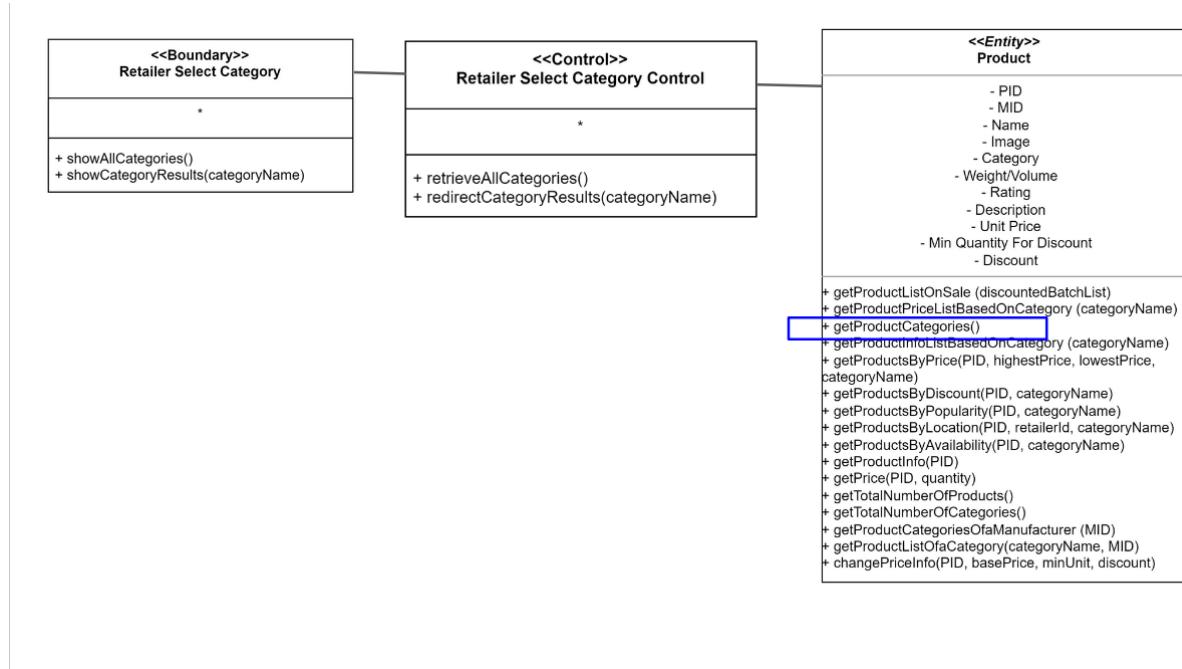


Figure 70: Retailer Select Category

7.2.5 Retailer Search Category

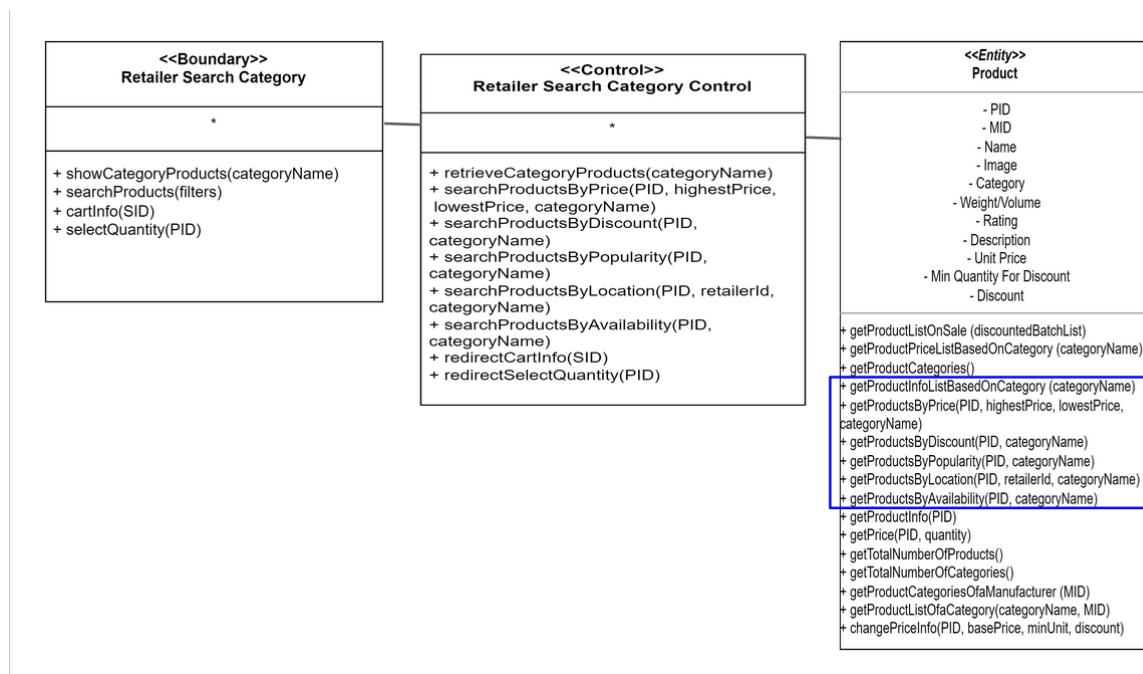


Figure 71: Retailer Search Category

7.2.6 Retailer Select Quantity

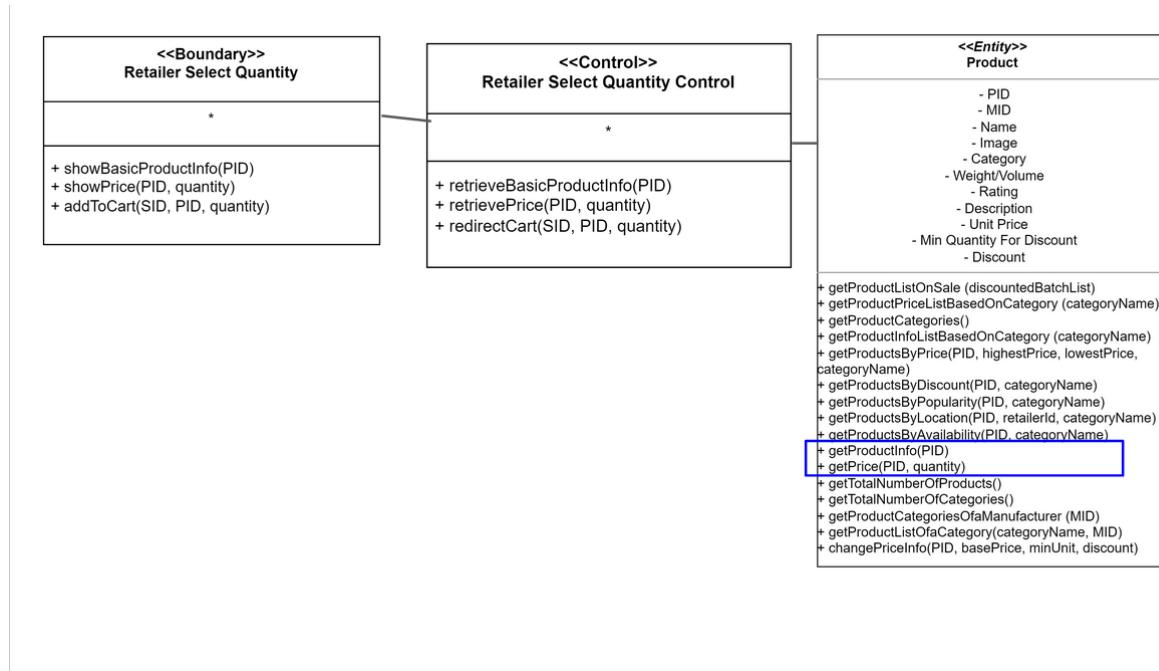


Figure 72: Retailer Select Quantity

7.2.7 Retailer Cart

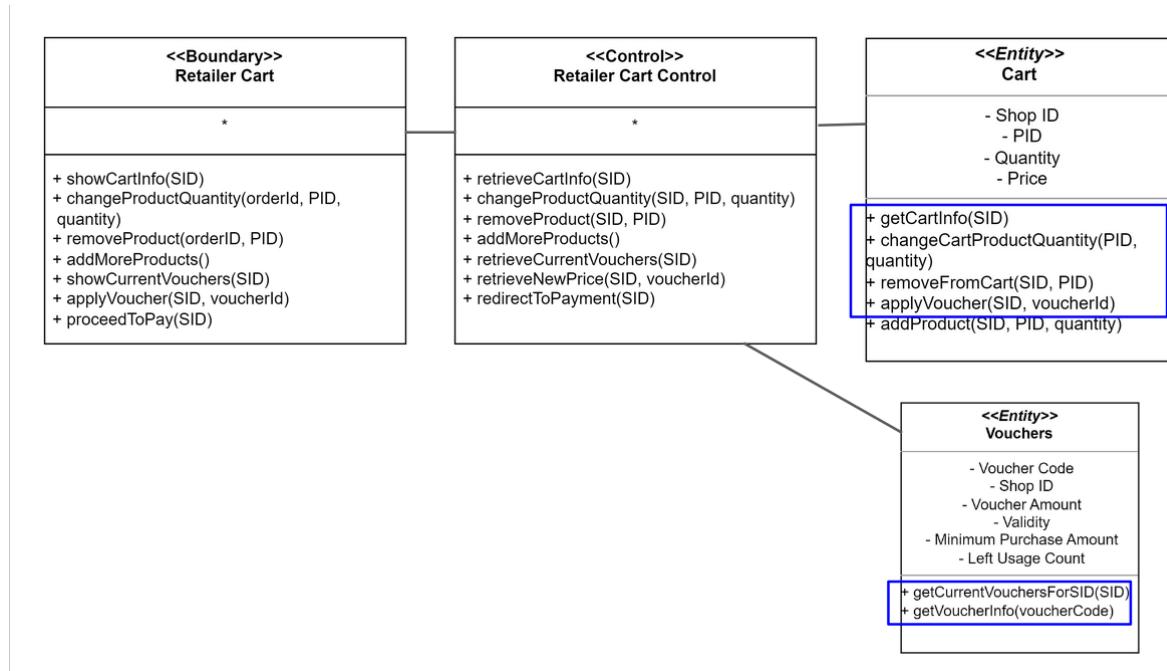


Figure 73: Retailer Cart

7.2.8 Retailer Confirm Order

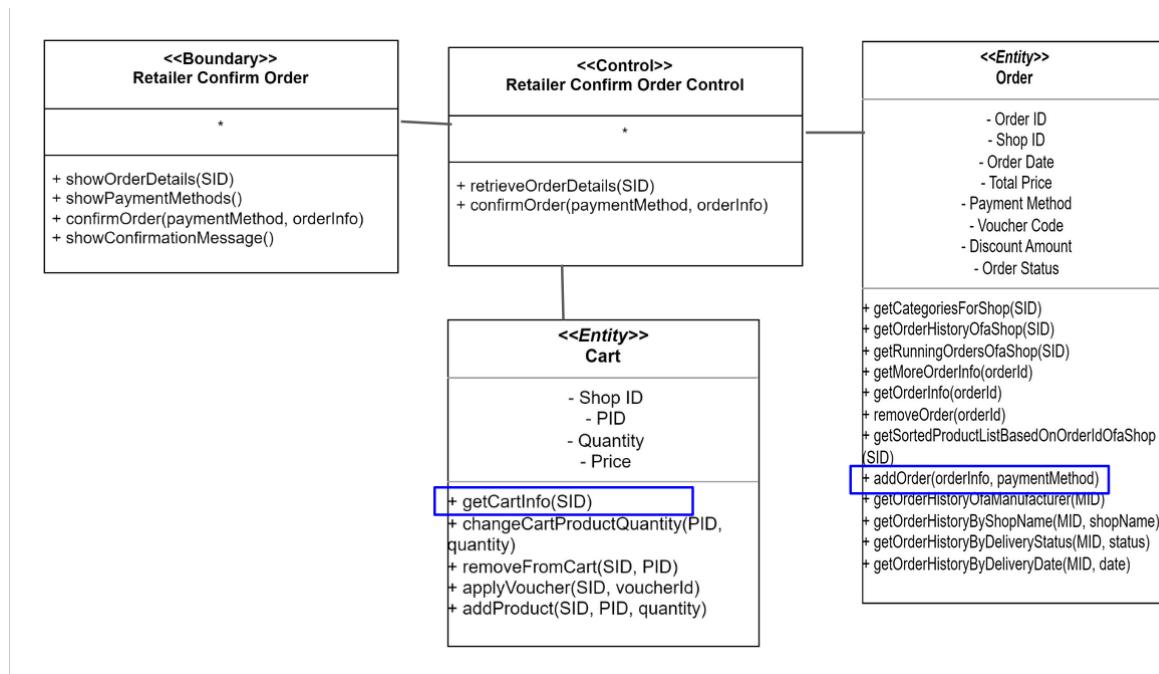


Figure 74: Retailer Confirm Order

7.2.9 Retailer Pay Later

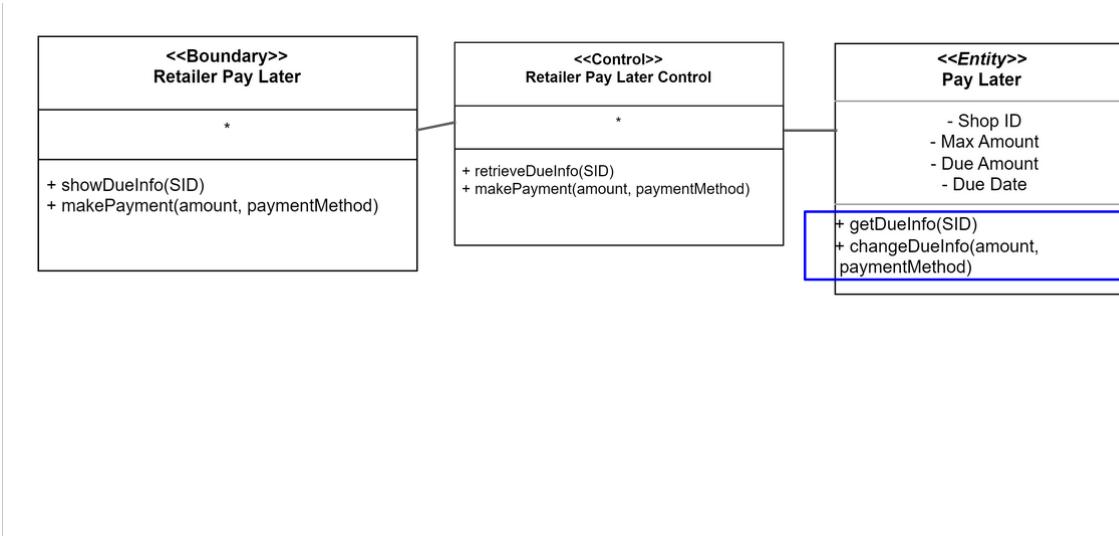


Figure 75: Retailer Pay Later

7.2.10 Retailer Make Product Request

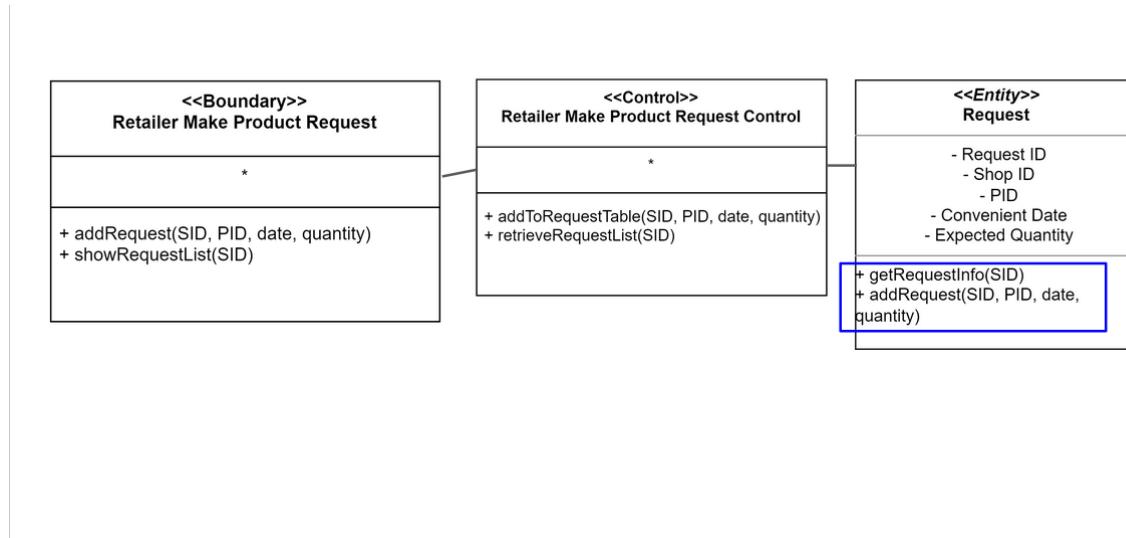


Figure 76: Retailer Make Product Request

7.2.11 Retailer Order History

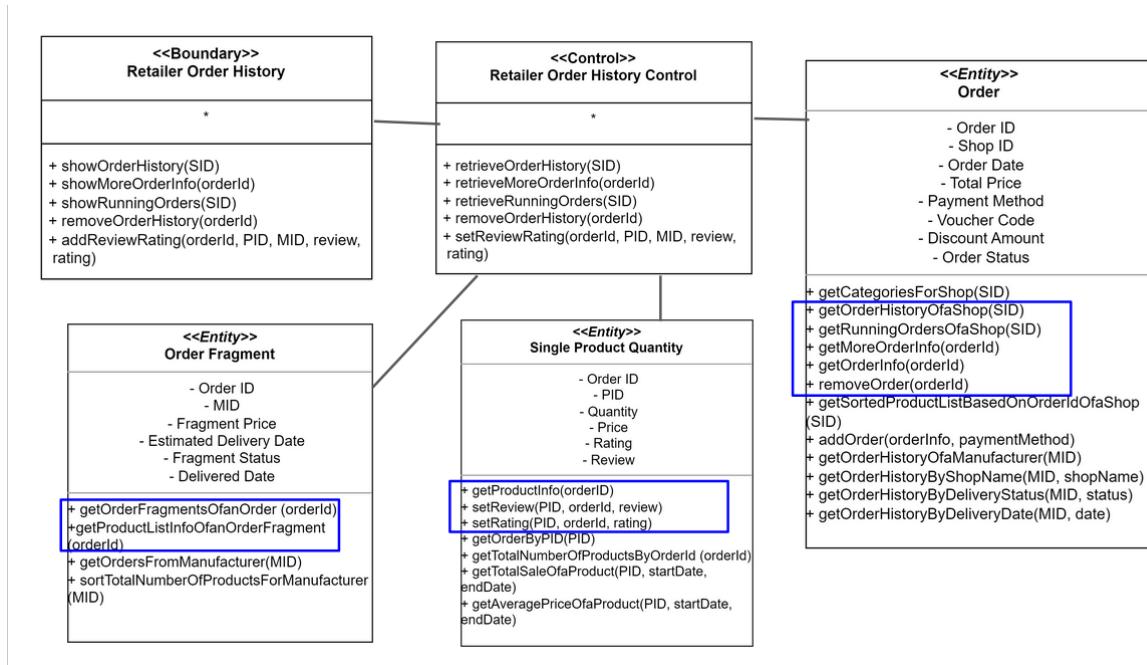


Figure 77: Retailer Order History

7.2.12 Retailer Market Analysis

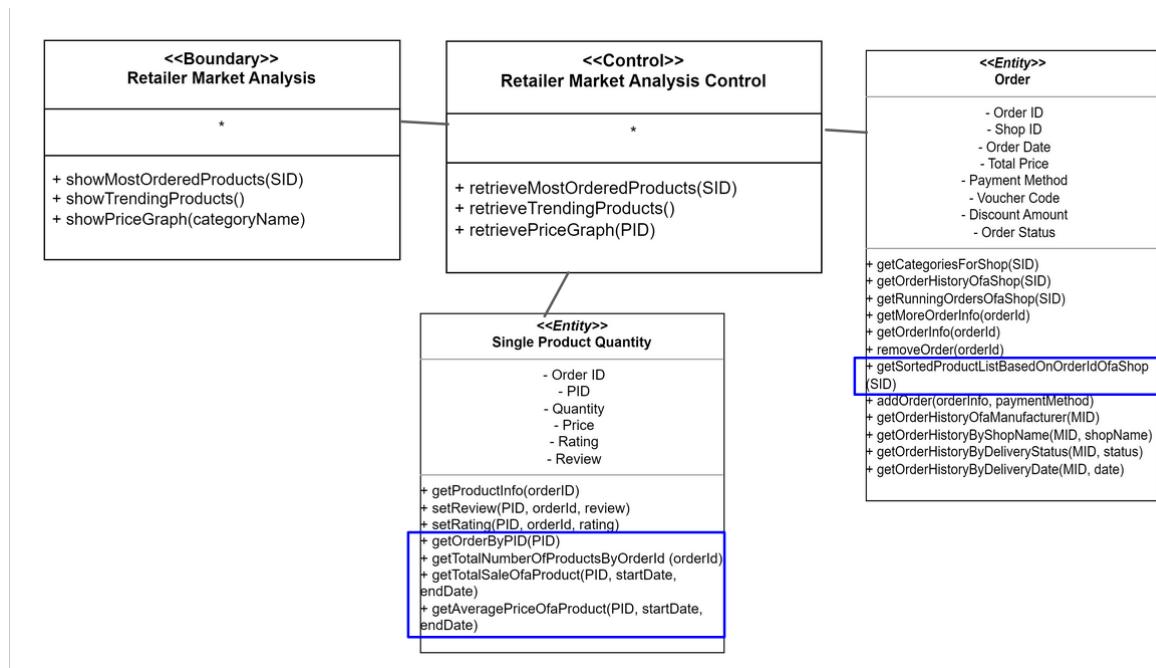


Figure 78: Retailer Market Analysis

7.2.12 Retailer Notifications

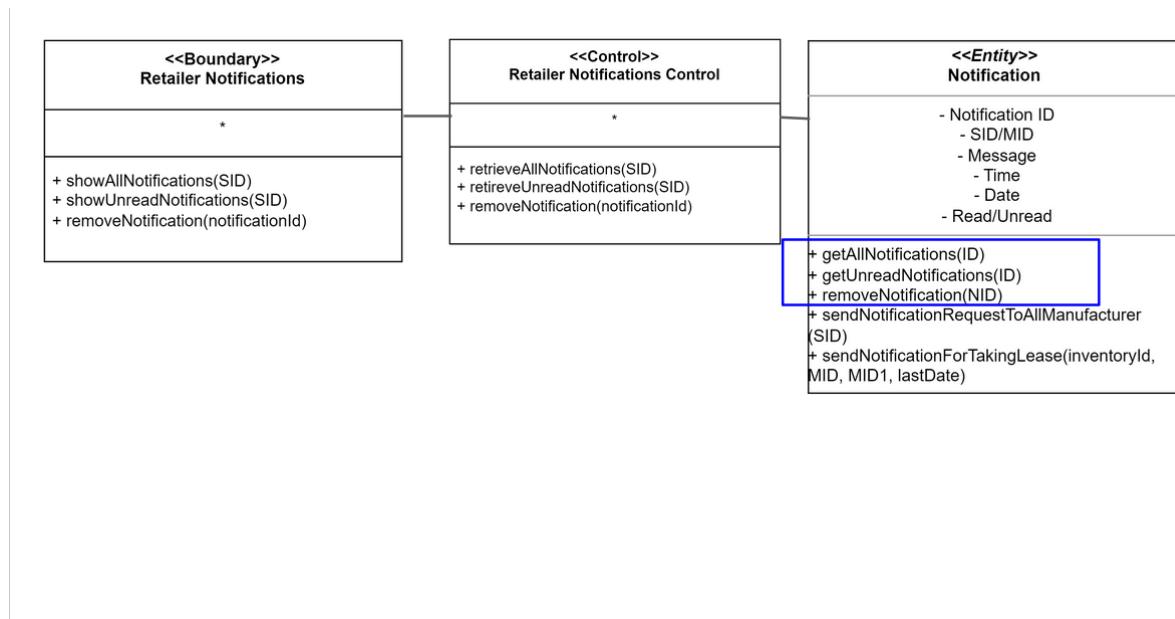


Figure 79: Retailer Notifications

7.3. Manufacturer Classes

7.3.1 Log In

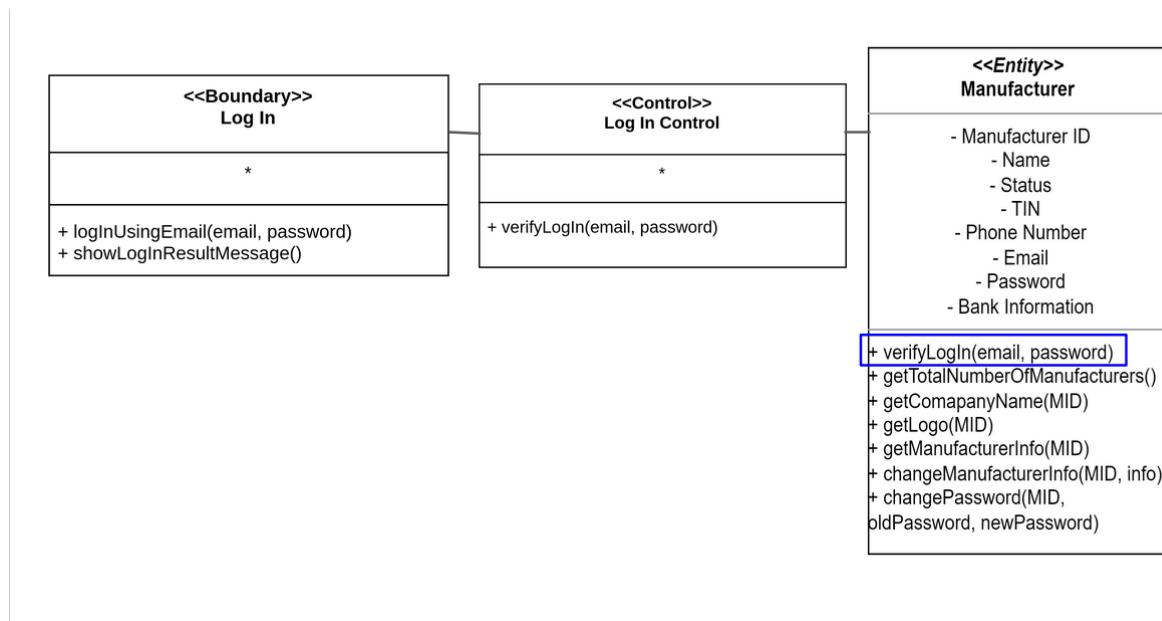


Figure 80: Log In

7.3.2 Manufacturer Home

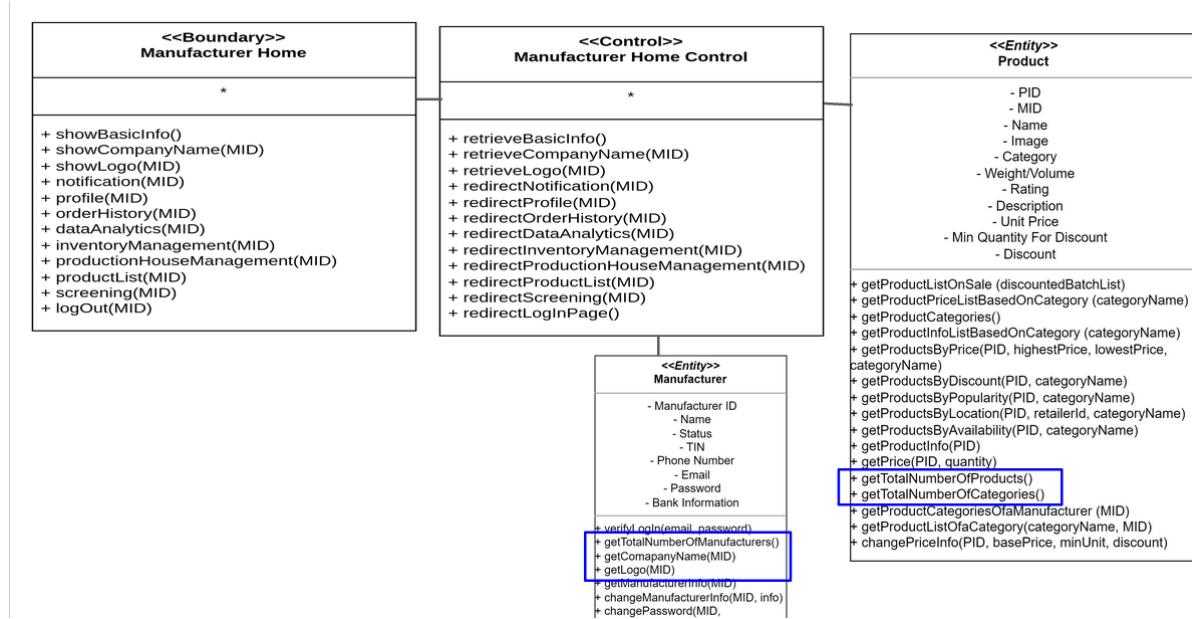


Figure 81: Manufacturer Home

7.3.3 Manufacturer Profile

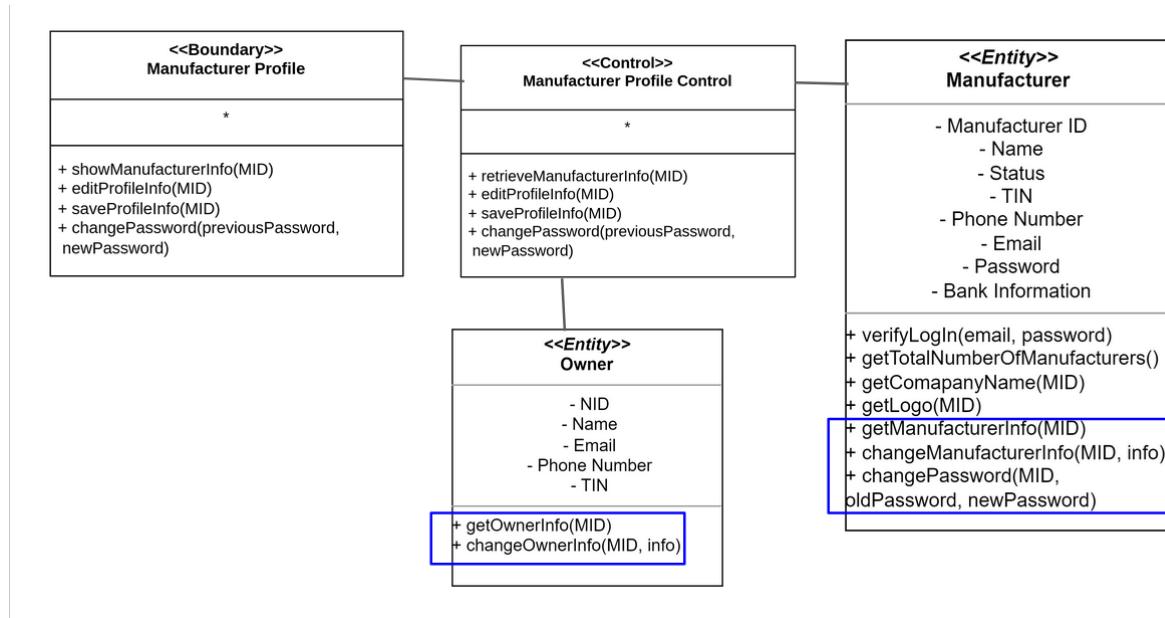


Figure 82: Manufacturer Profile

7.3.4 Manufacturer Product List

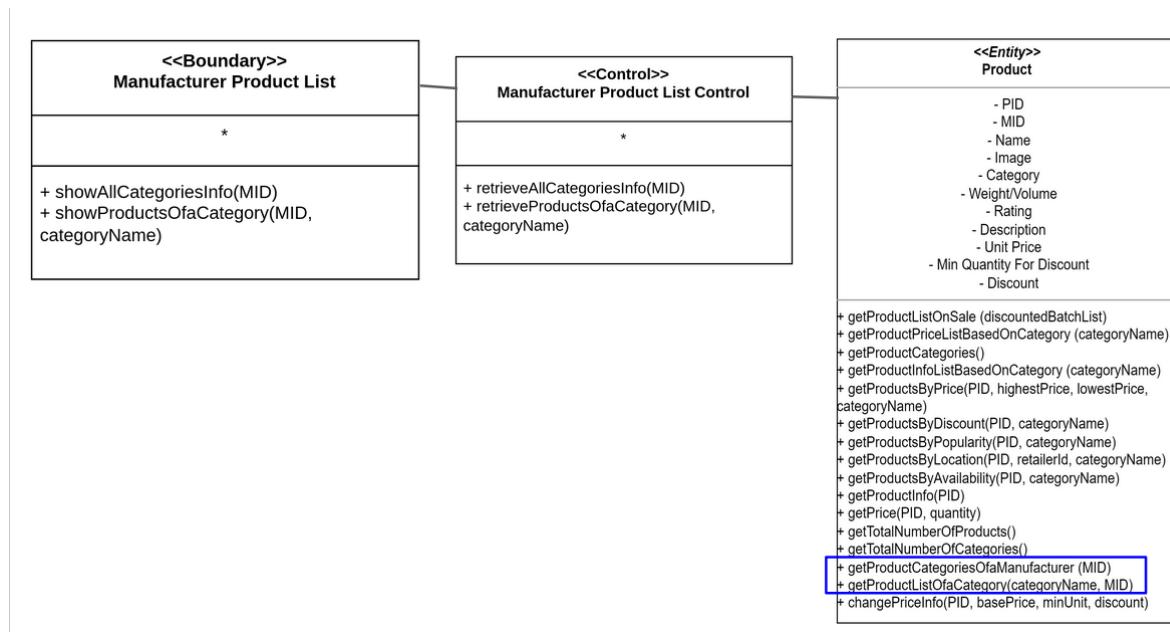


Figure 83: Manufacturer Product List

7.3.5 Manufacturer Inventory List

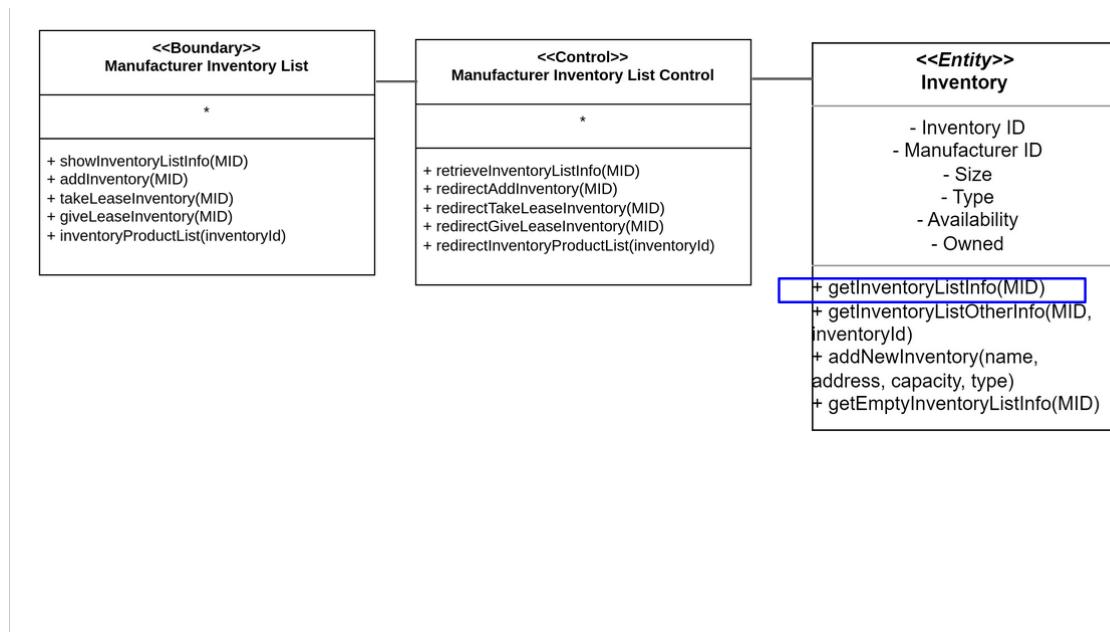


Figure 84: Manufacturer Inventory List

7.3.6 Manufacturer Inventory Product List

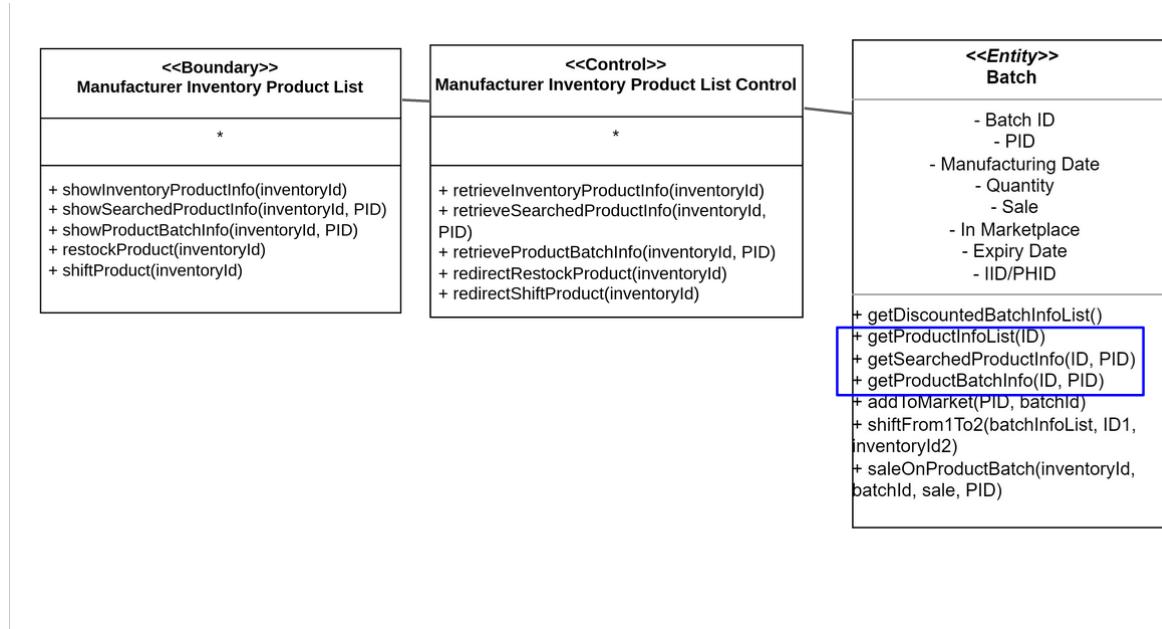


Figure 85: Manufacturer Inventory Product List

7.3.7 Manufacturer Select Restock Inventory

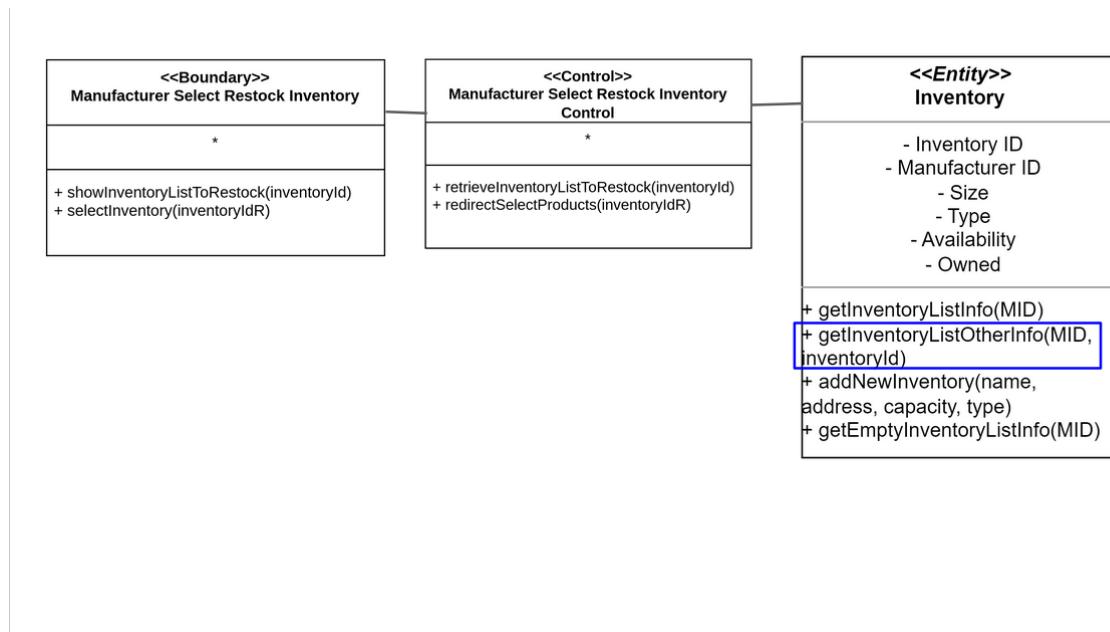


Figure 86: Manufacturer Select Restock Inventory

7.3.8 Manufacturer Select Restock Products

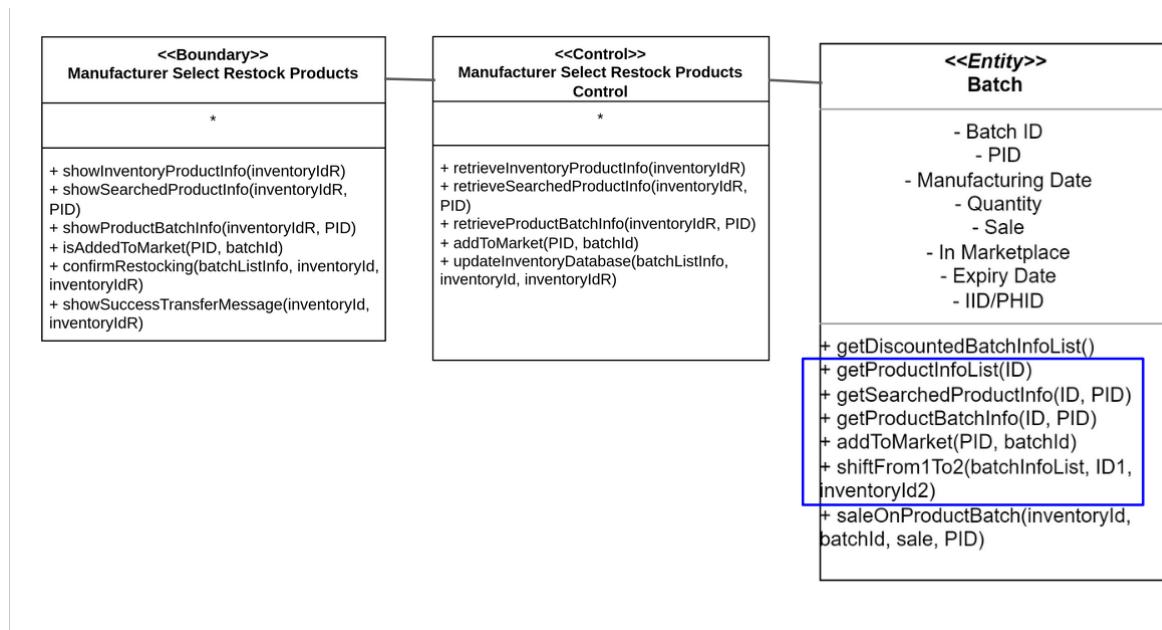


Figure 87: Manufacturer Select Restock Products

7.3.9 Manufacturer Select Shift Inventory

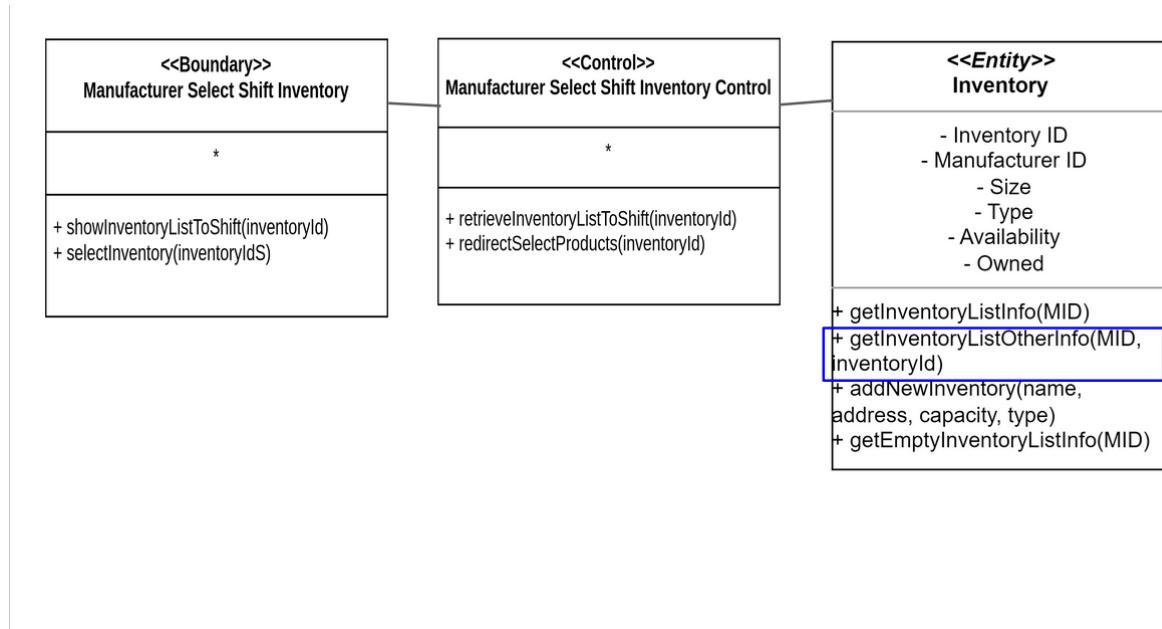


Figure 88: Manufacturer Select Shift Inventory

7.3.10 Manufacturer Select Shift Products

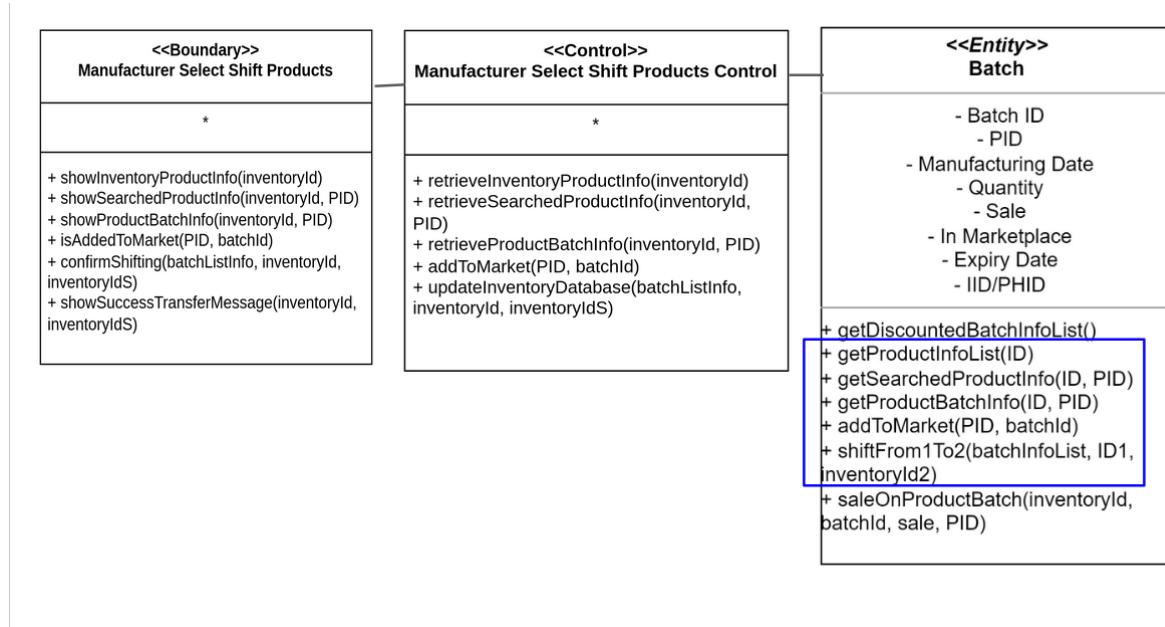


Figure 89: Manufacturer Select Shift Products

7.3.11 Manufacturer Add Inventory

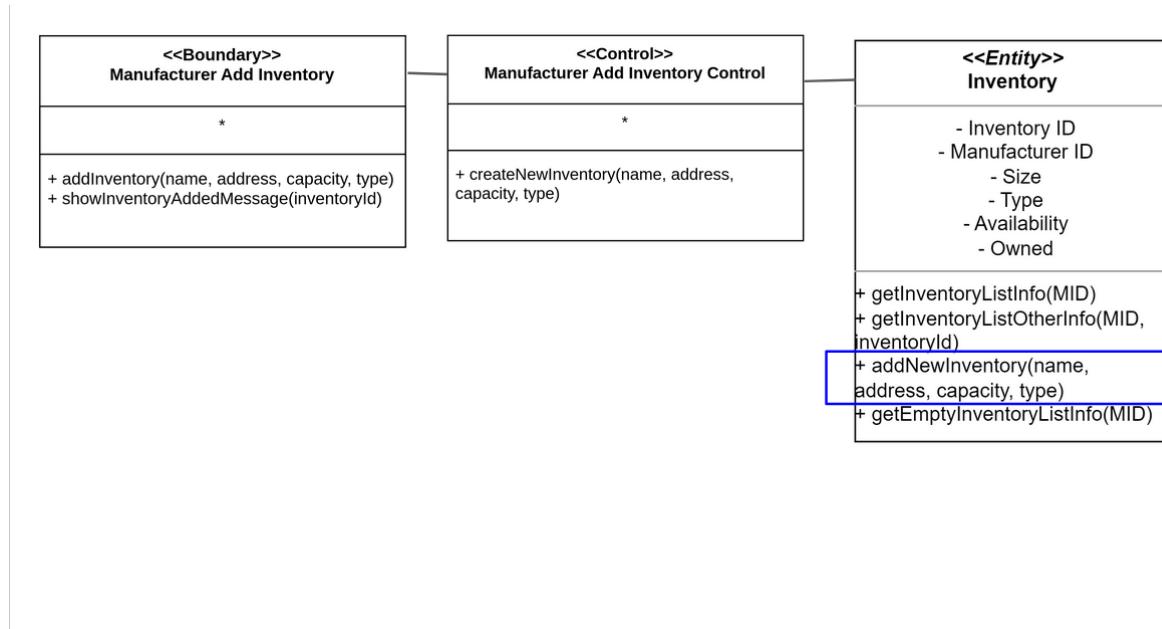


Figure 90: Manufacturer Add Inventory

7.3.12 Manufacturer Give Lease Inventory

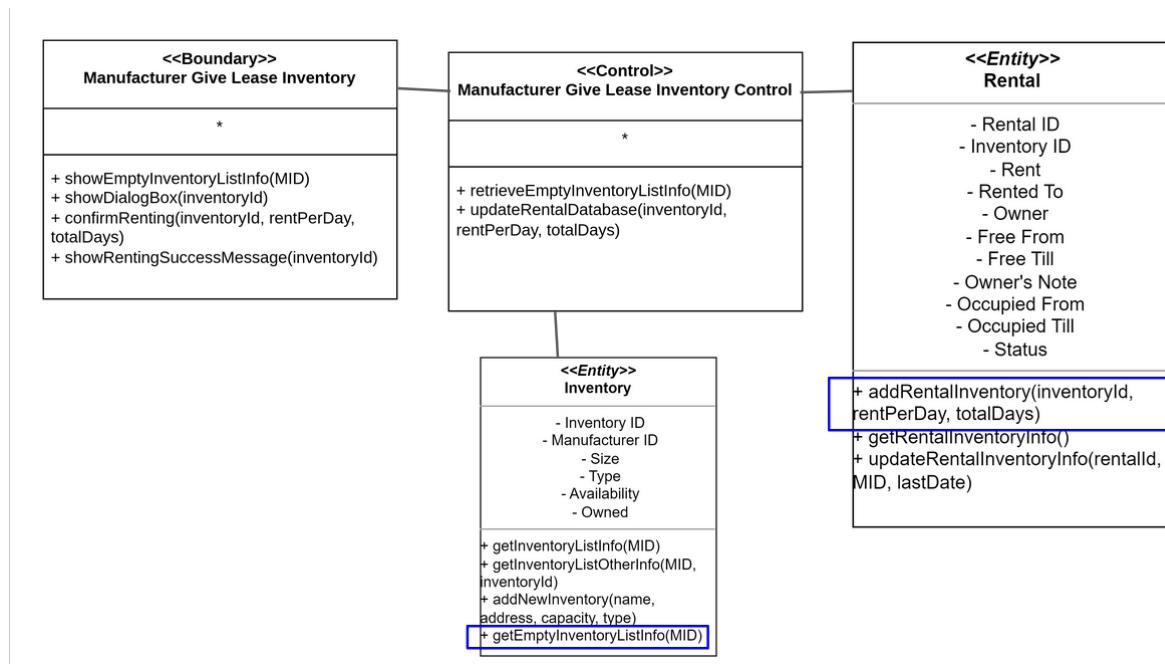


Figure 91: Manufacturer Give Lease Inventory

7.3.13 Manufacturer Take Lease Inventory

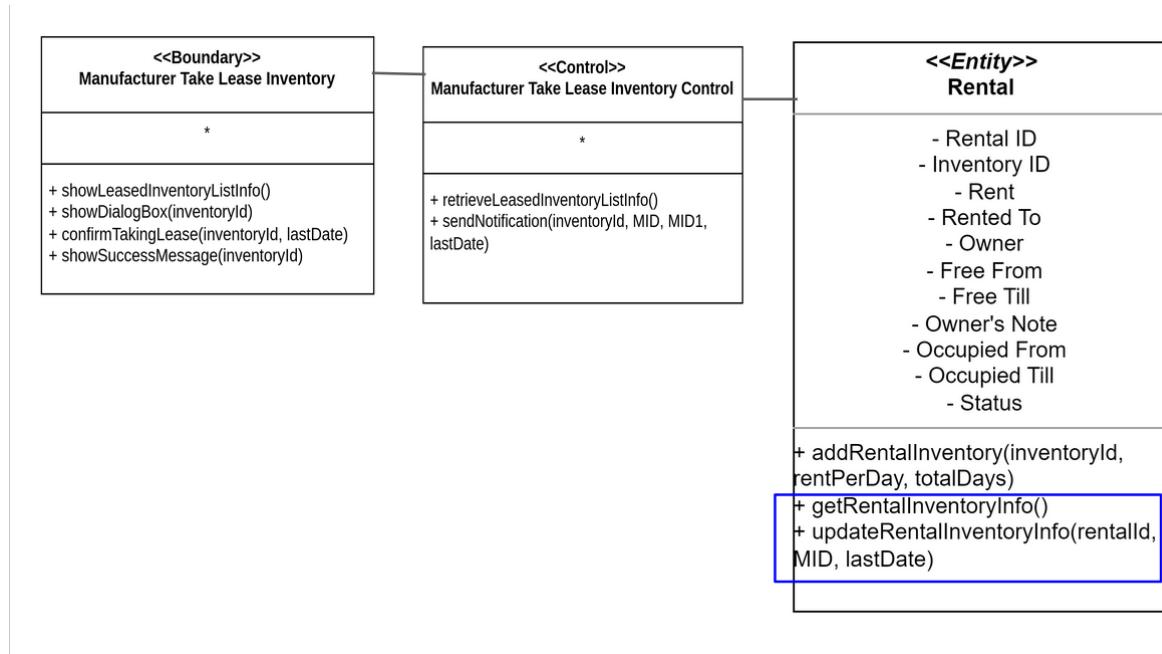


Figure 92: Manufacturer Take Lease Inventory

7.3.14 Manufacturer Production House List

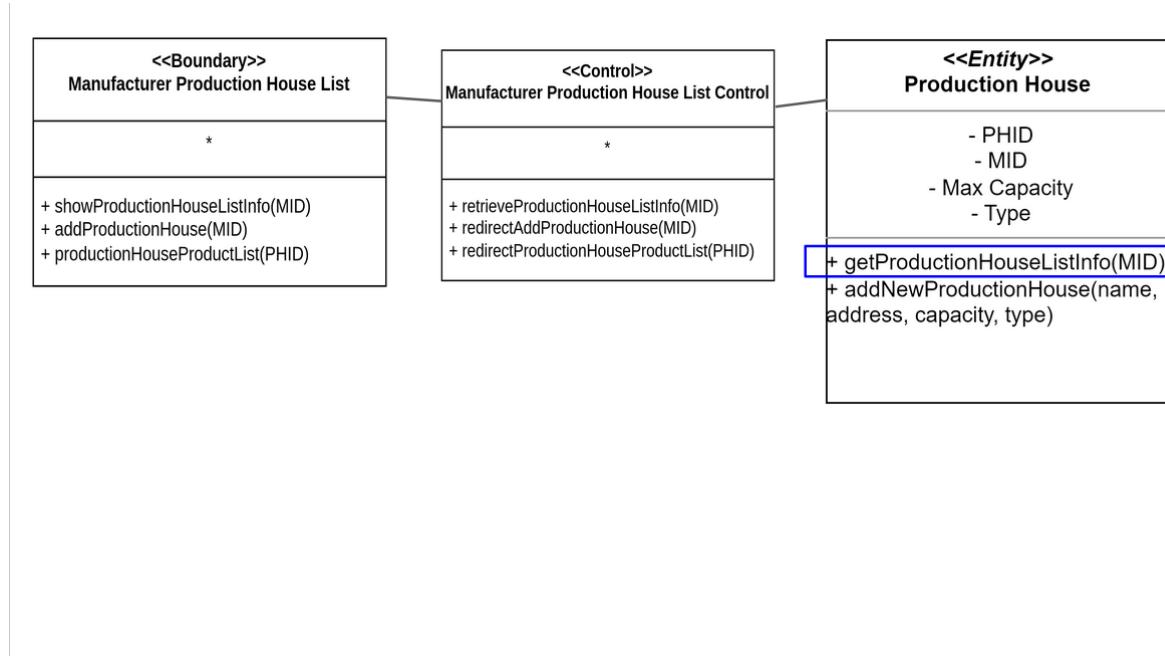


Figure 93: Manufacturer Production House List

7.3.15 Manufacturer Add Production House

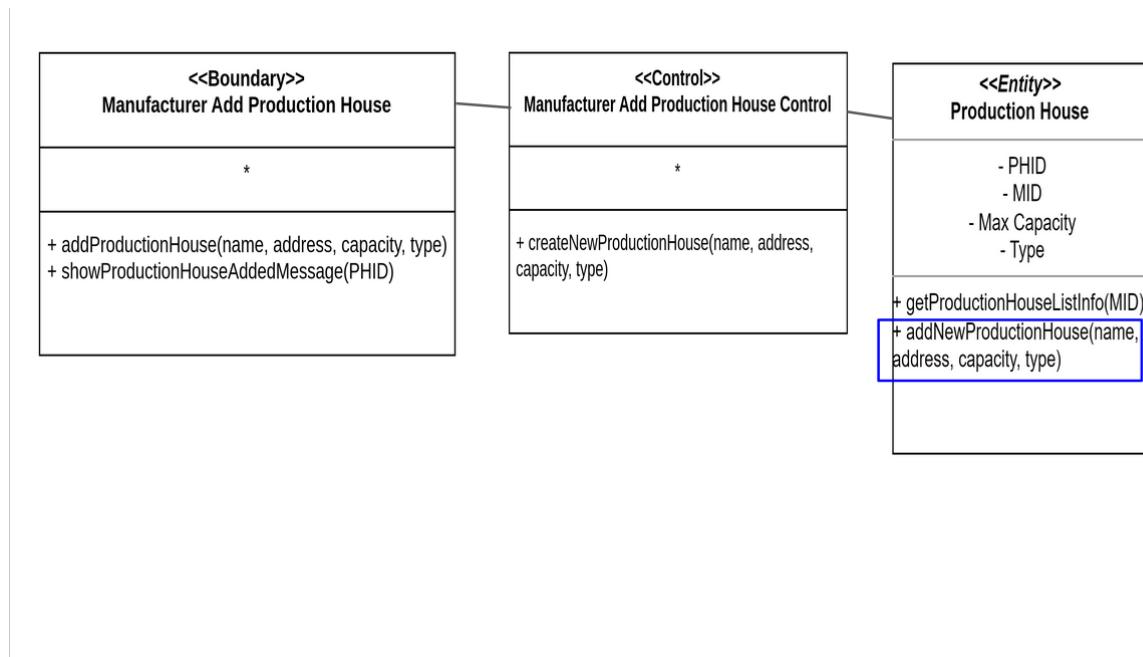


Figure 94: Manufacturer Add Production House

7.3.16 Manufacturer Production House Product List

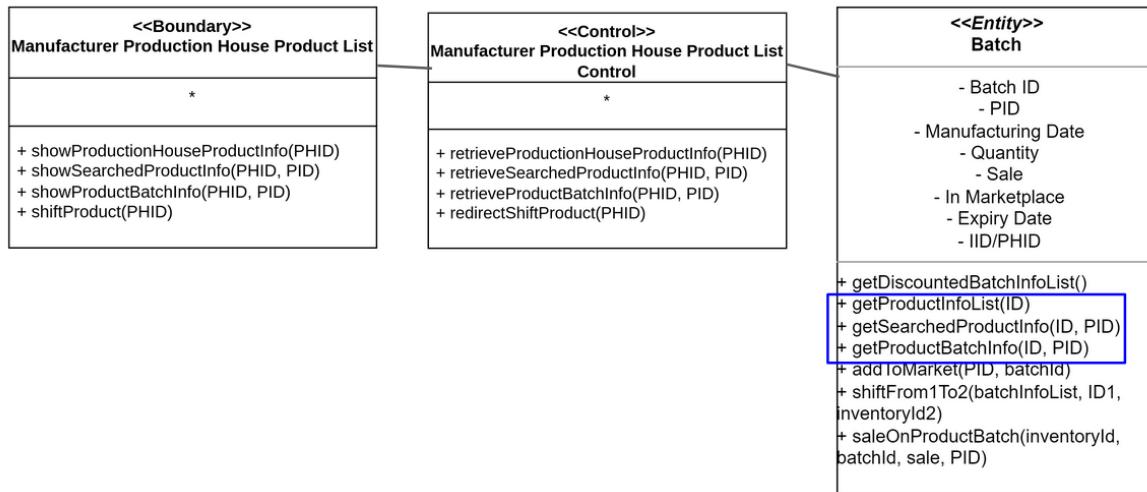


Figure 95: Manufacturer Production House Product List

7.3.17 Manufacturer Select Inventory To Shift From Production House

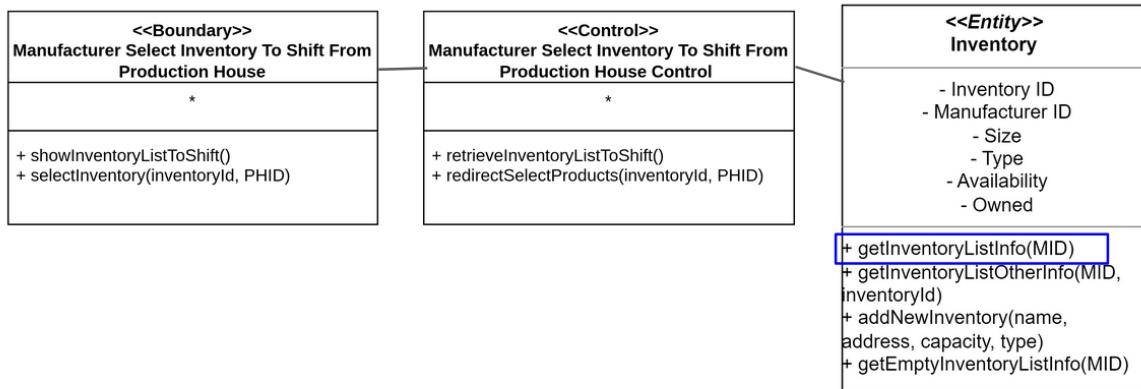


Figure 96: Manufacturer Select Inventory To Shift From Production House

7.3.18 Manufacturer Select Production House Shift Products

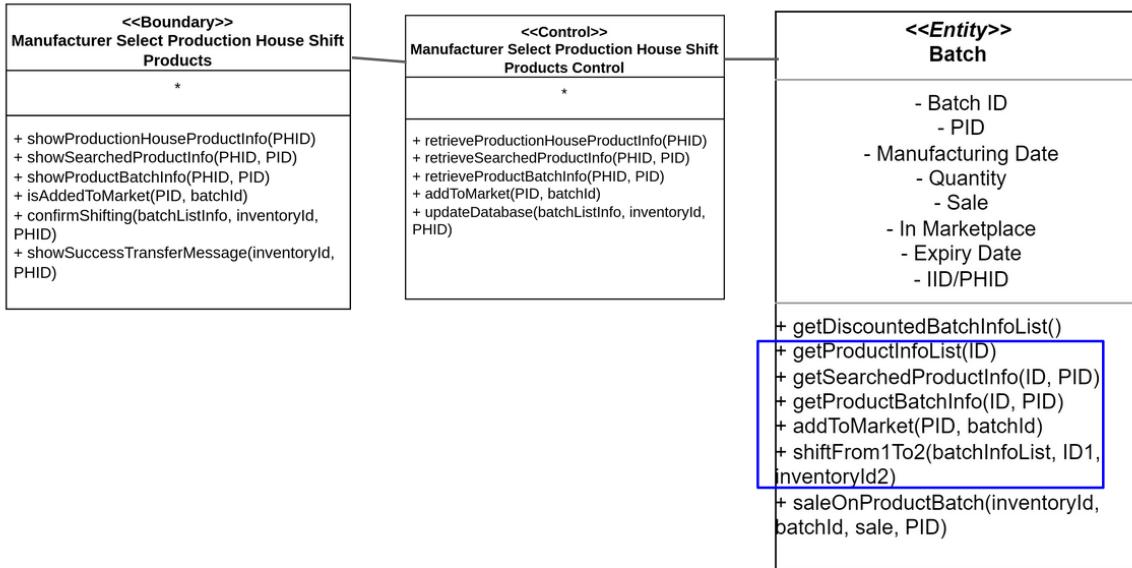


Figure 97: Manufacturer Select Production House Shift Products

7.3.19 Manufacturer Inventory List For Screening

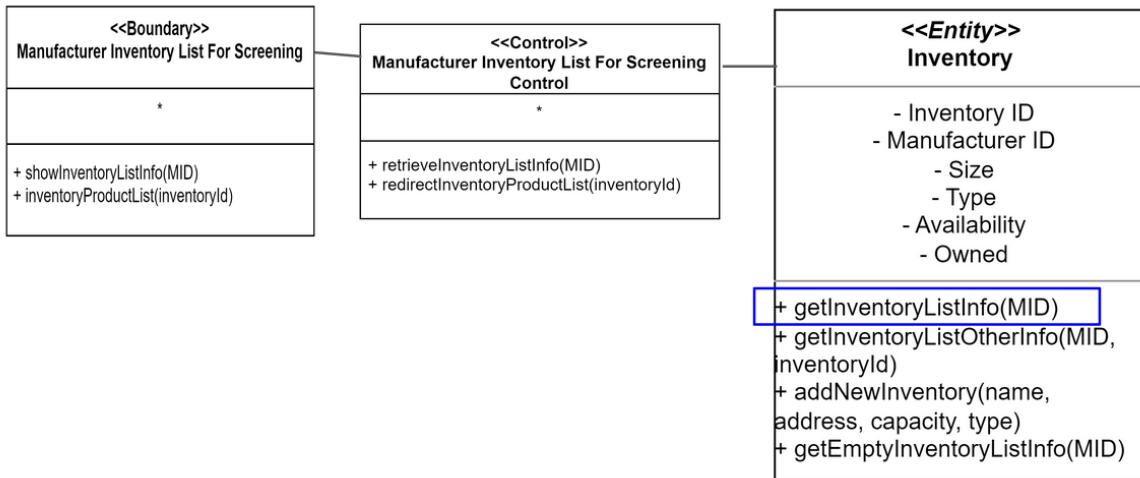


Figure 98: Manufacturer Inventory List For Screening

7.3.20 Manufacturer Product List For Screening

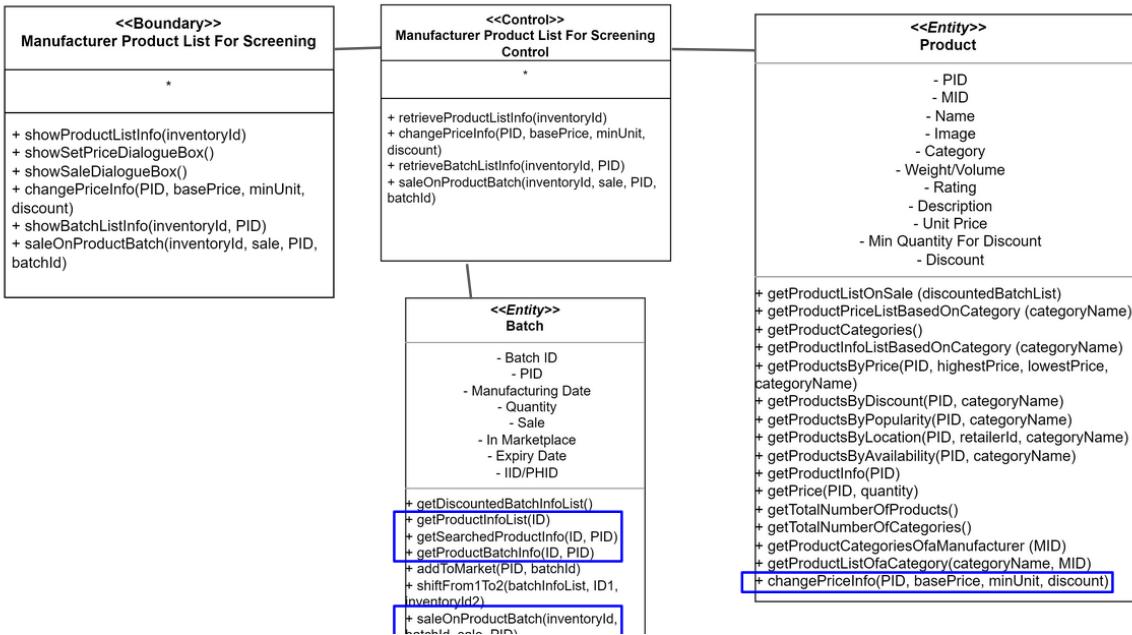


Figure 99: Manufacturer Product List For Screening

7.3.21 Manufacturer Order History

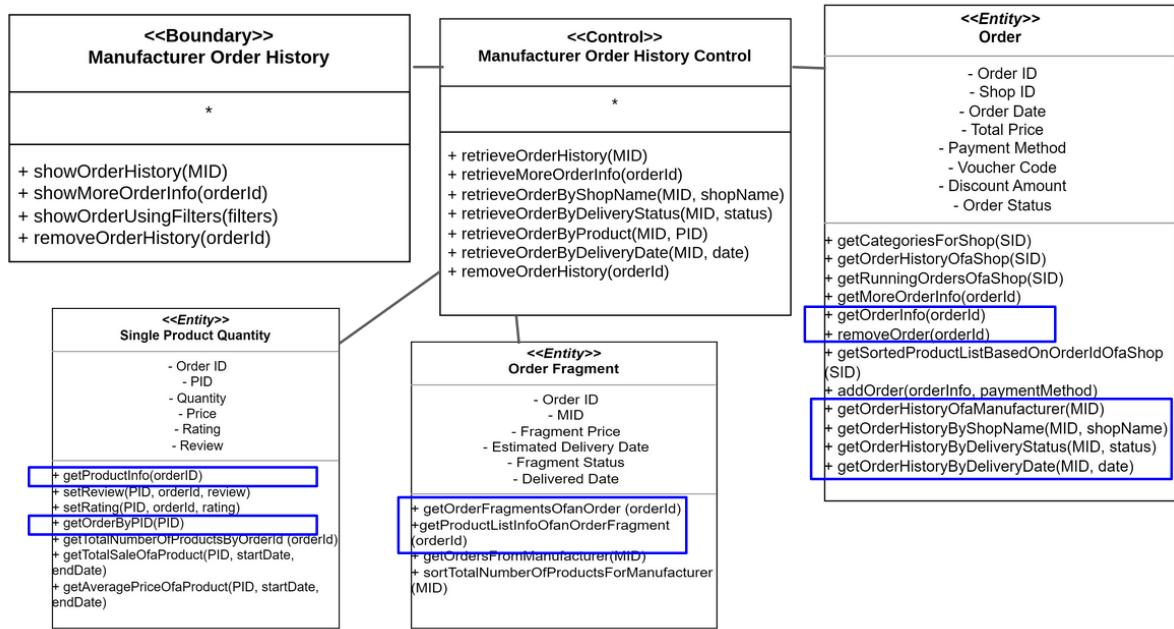


Figure 100: Manufacturer Order History

7.3.22 Manufacturer Data Analysis

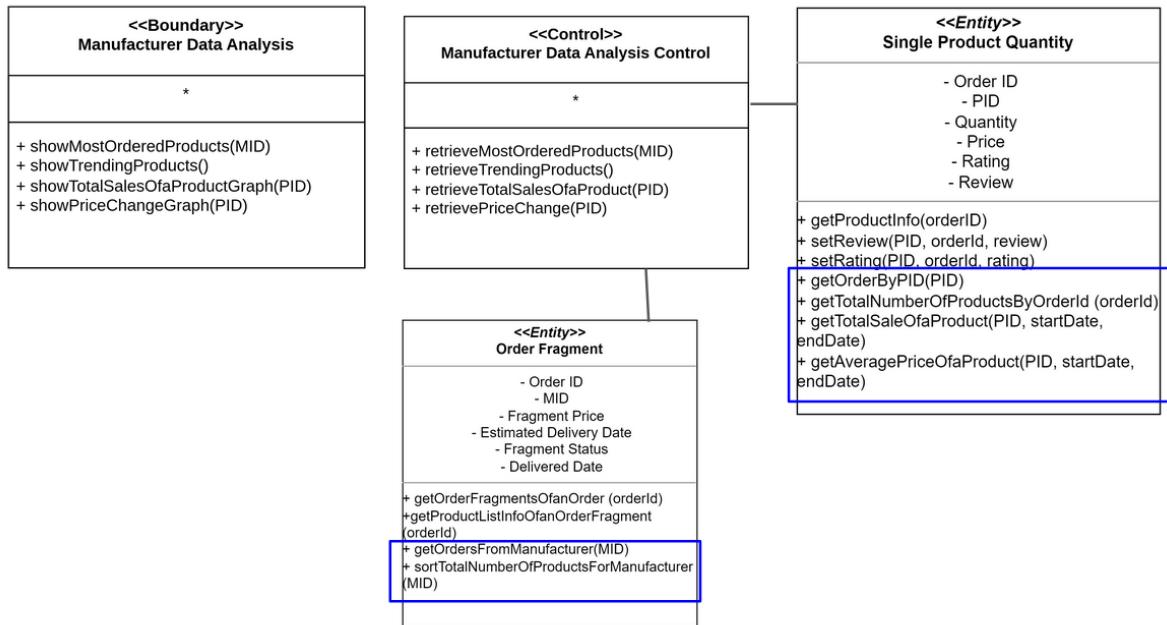


Figure 101: Manufacturer Data Analysis

7.3.23 Manufacturer Notifications

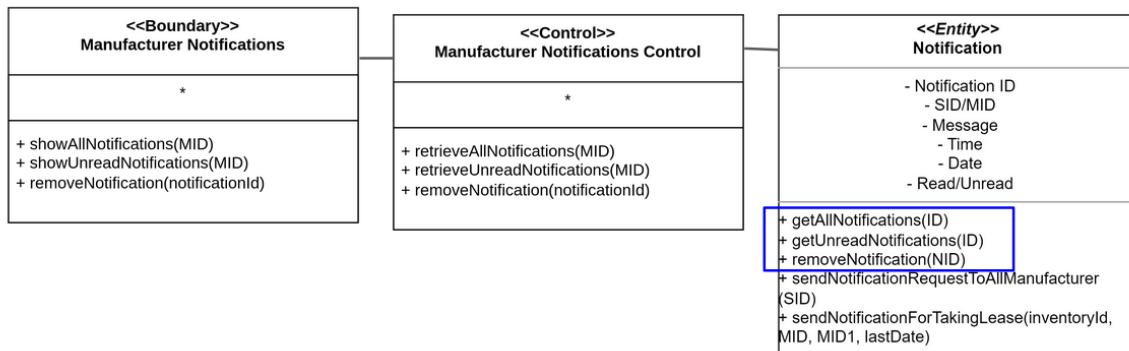


Figure 102: Manufacturer Notifications

Collaboration diagram

8.1. Retailer

8.1.1 Home

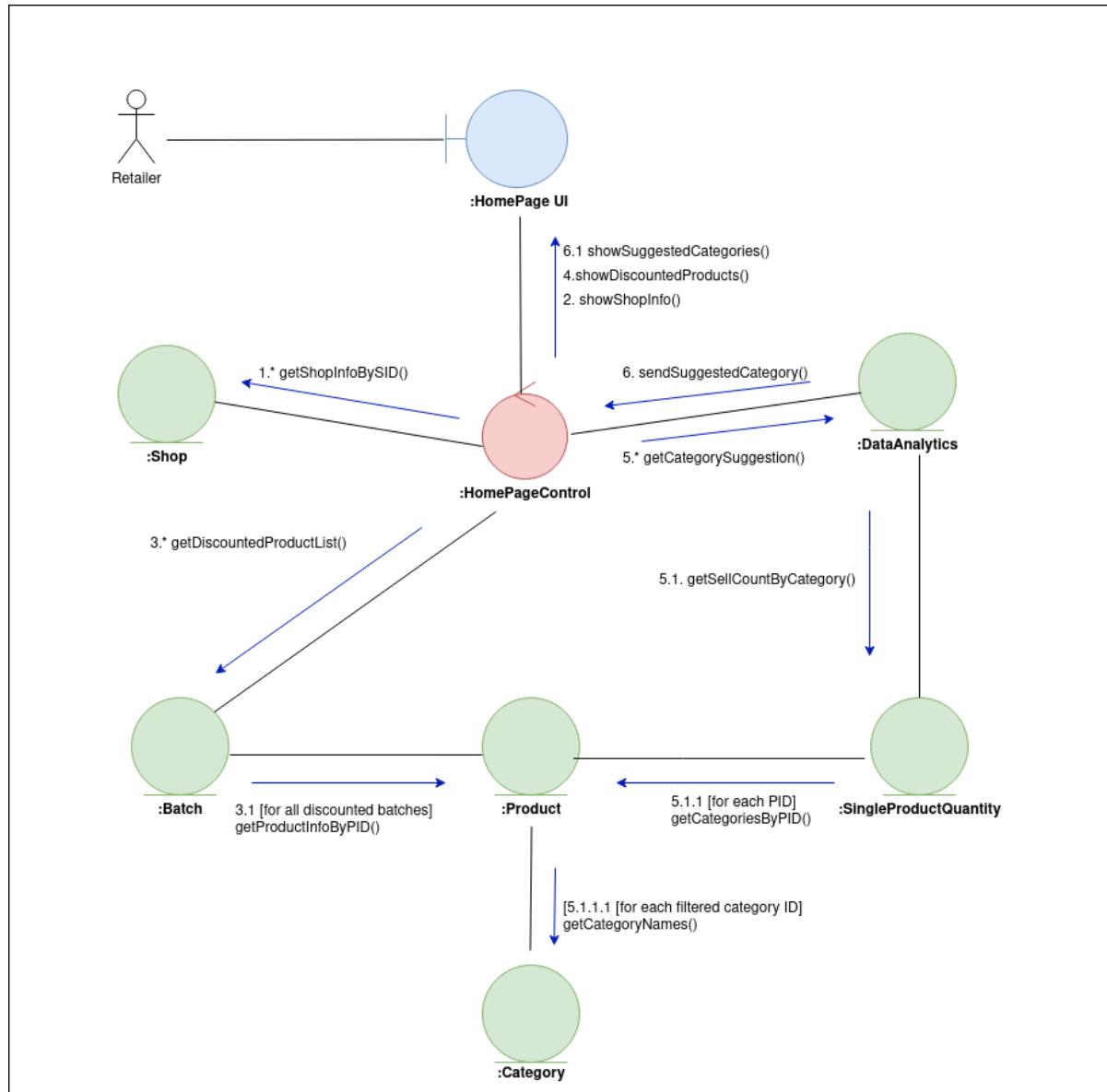


Figure 103: Home

8.1.2 Show Categories

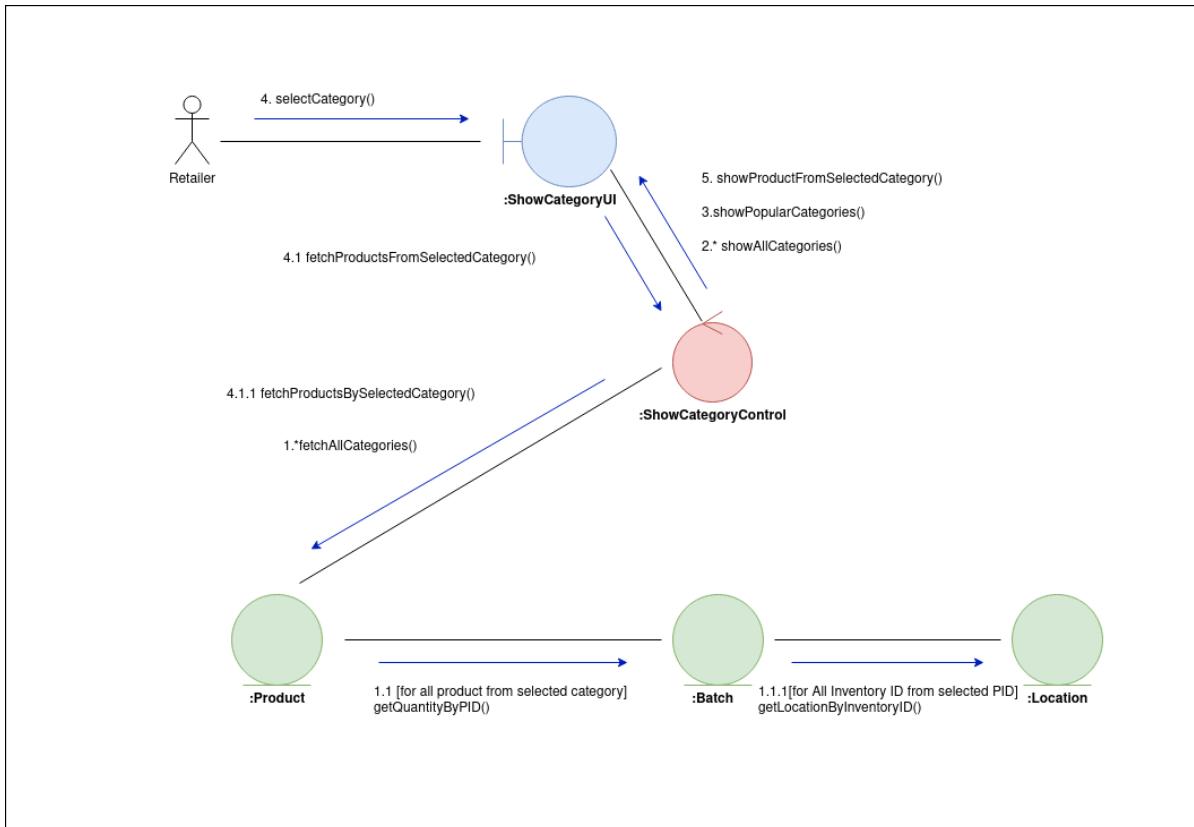


Figure 104: Show Categories

8.1.3 Search & Filter

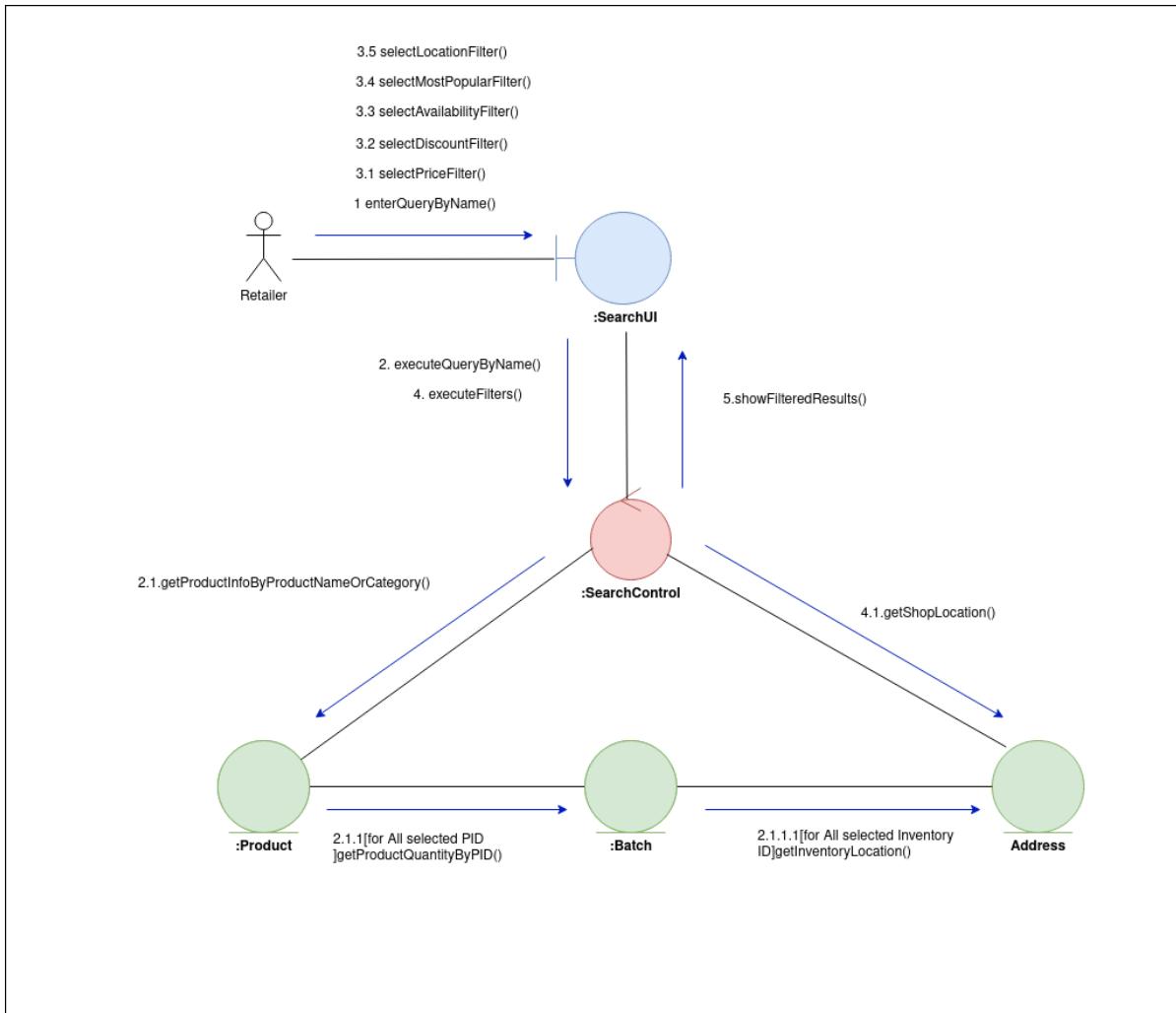


Figure 105: Search & Filter

8.1.4 Add To Cart

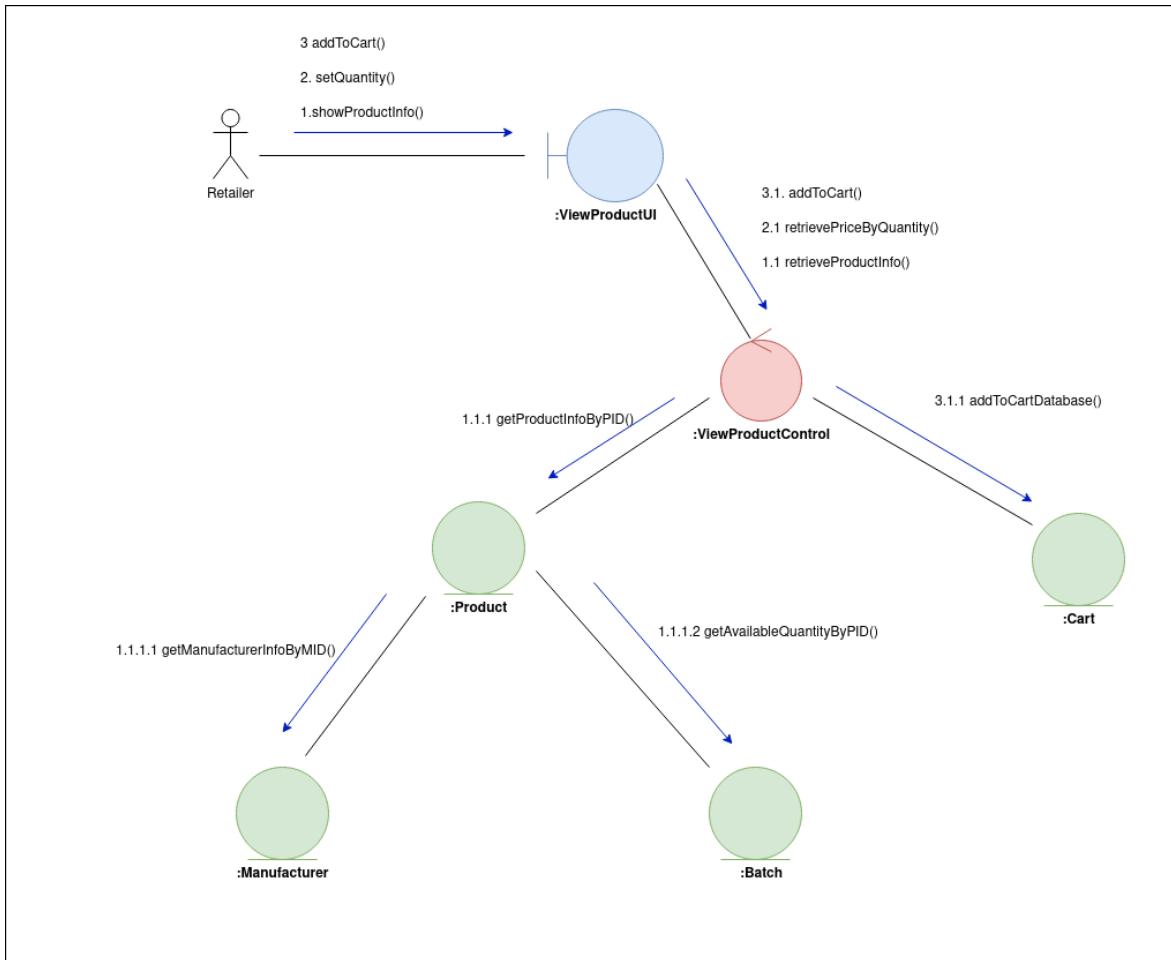


Figure 106: Add To Cart

8.1.5 Cart

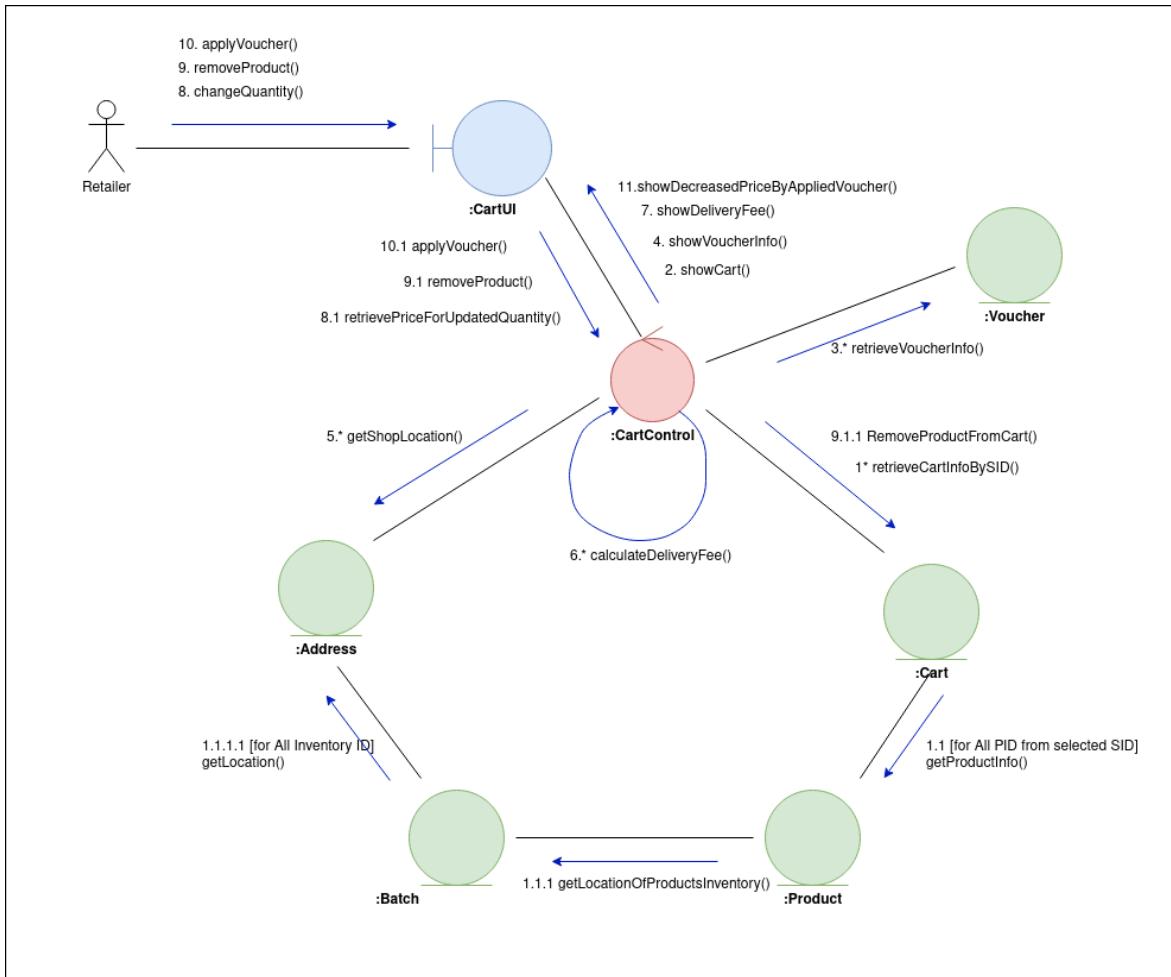


Figure 107: Cart

8.1.6 Confirm Order

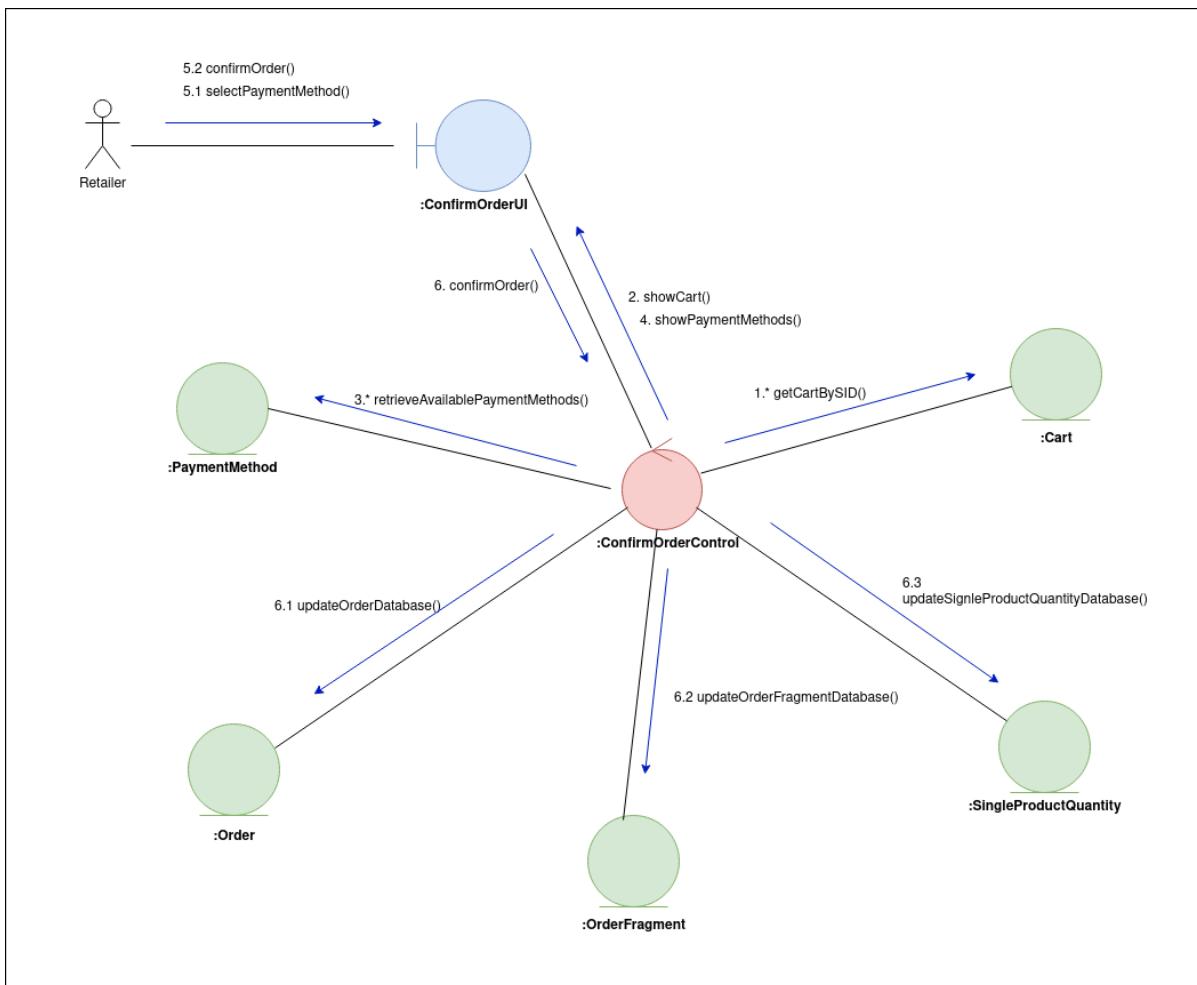


Figure 108: Confirm Order

8.1.7 Pay Later

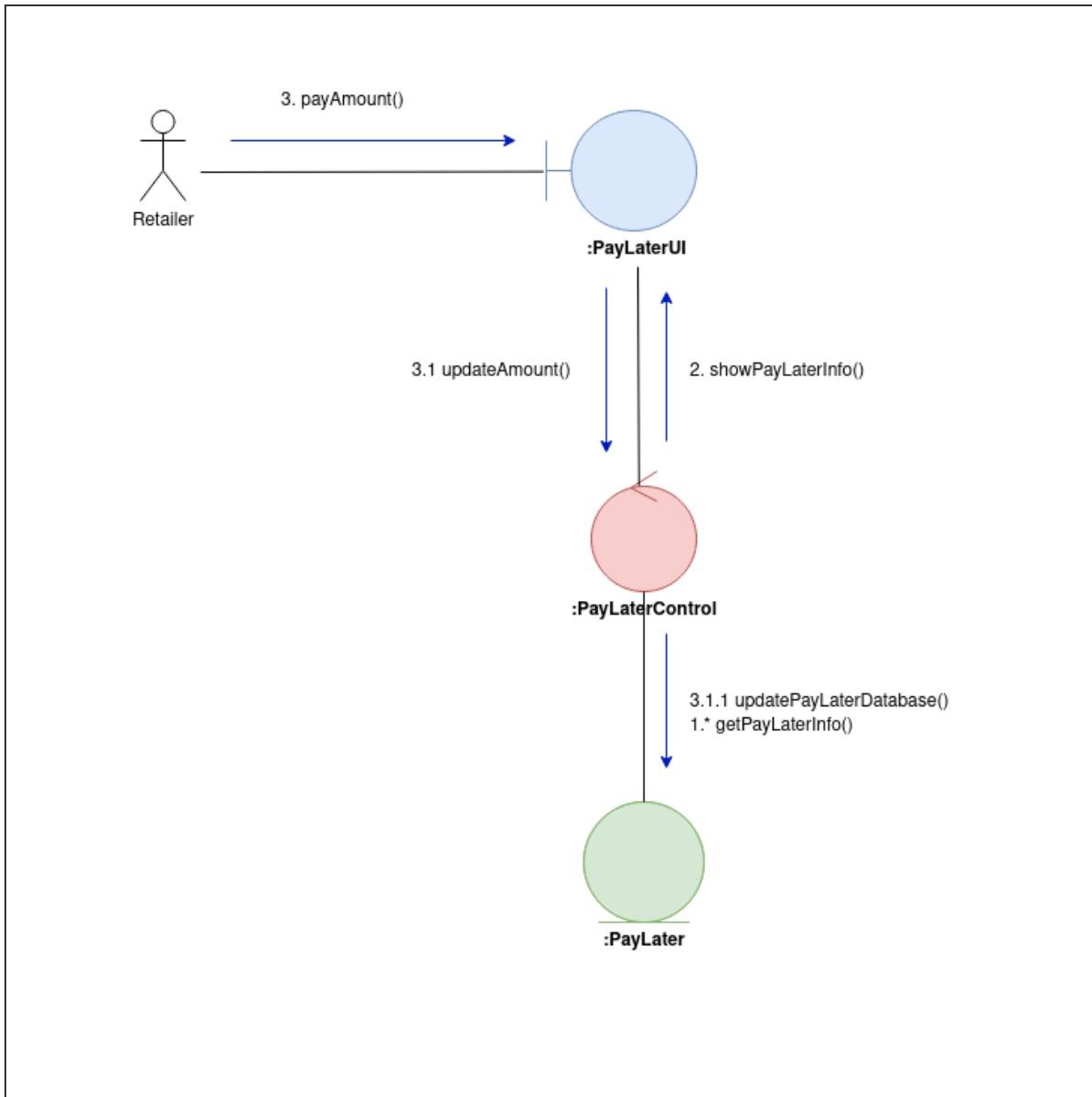


Figure 109: Pay Later

8.1.8 Order History & Rating

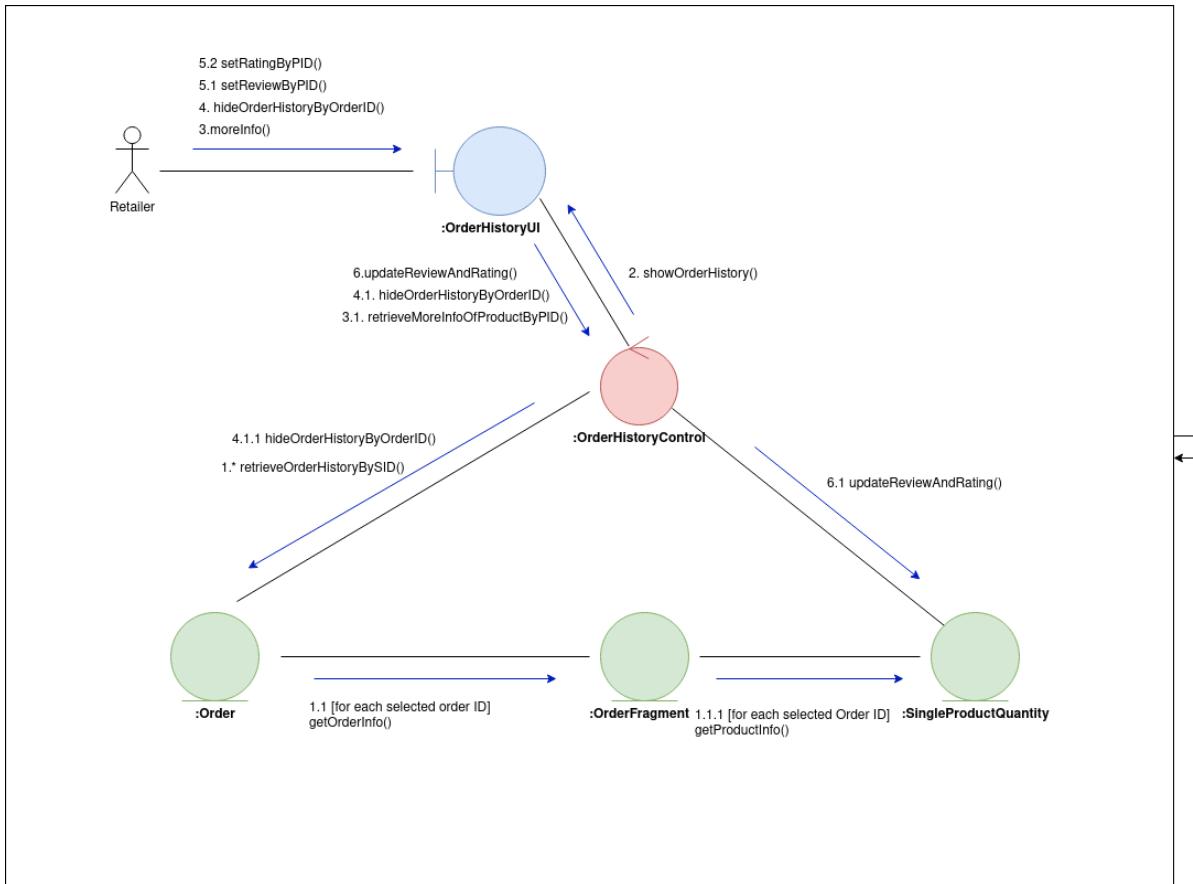


Figure 110: Order History & Rating

8.2. Manufacturer

8.2.1 View Inventory List

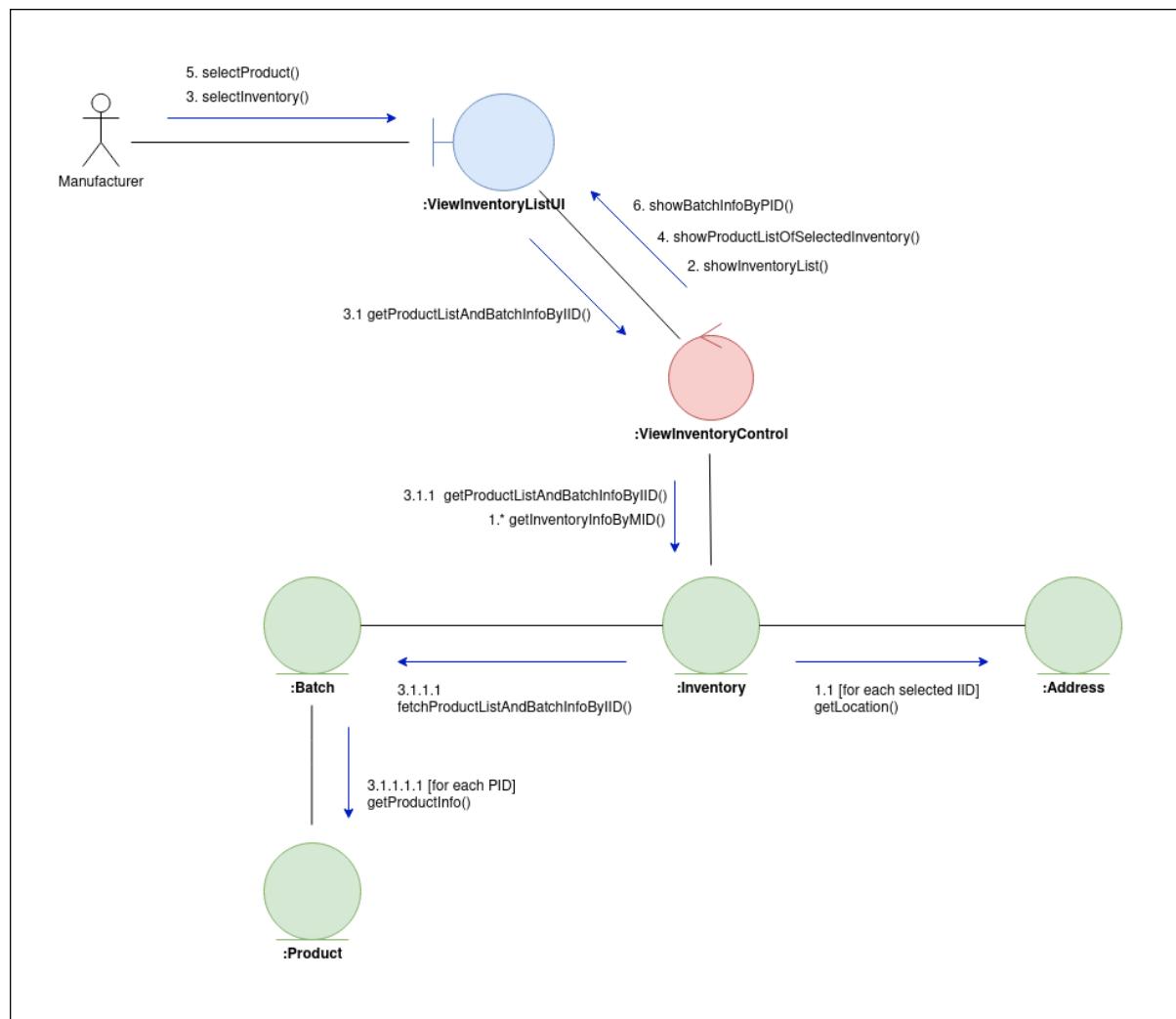


Figure 111: View Inventory List

8.2.2 Adding Inventory

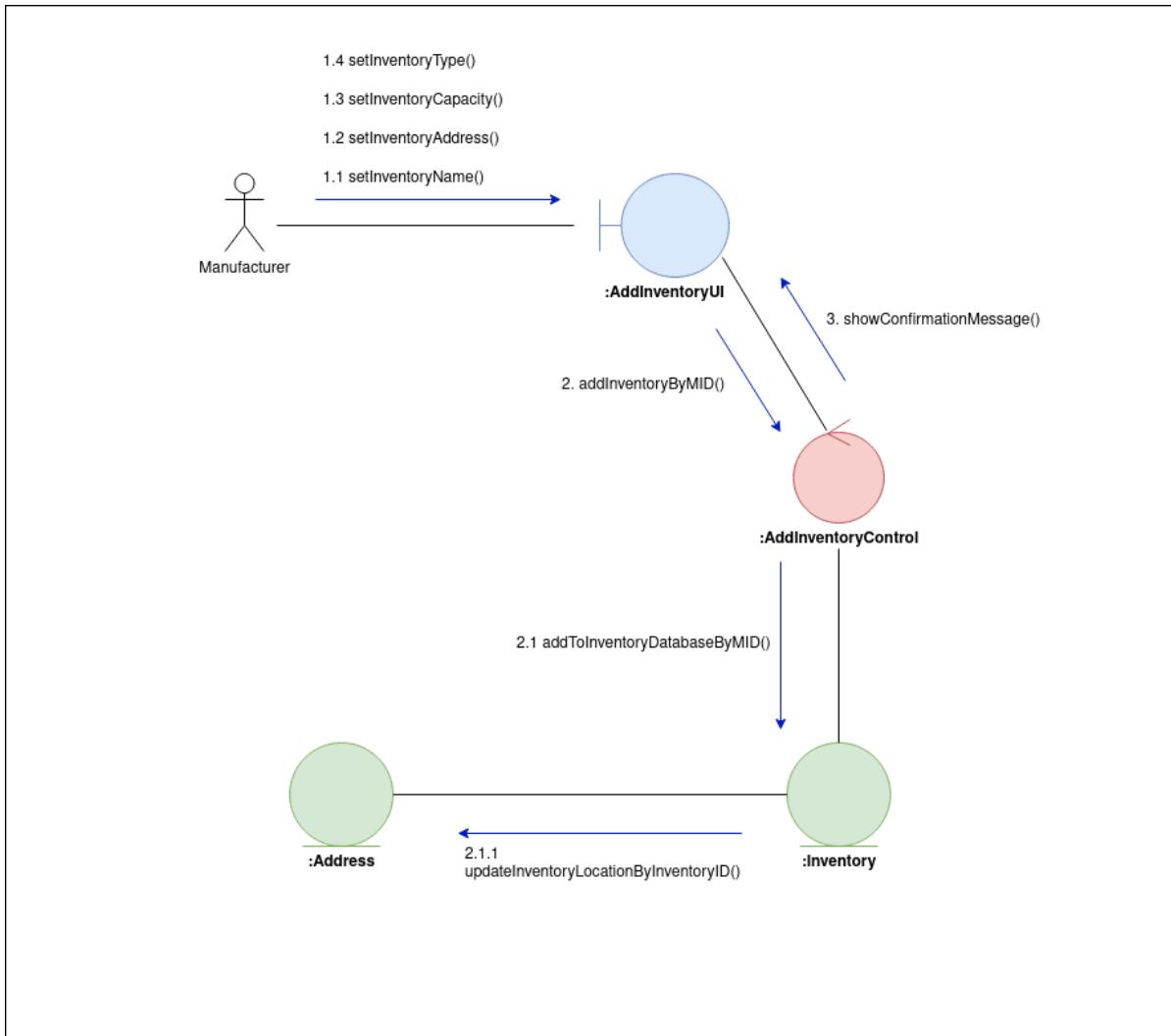


Figure 112: Adding Inventory

8.2.3 Give Lease

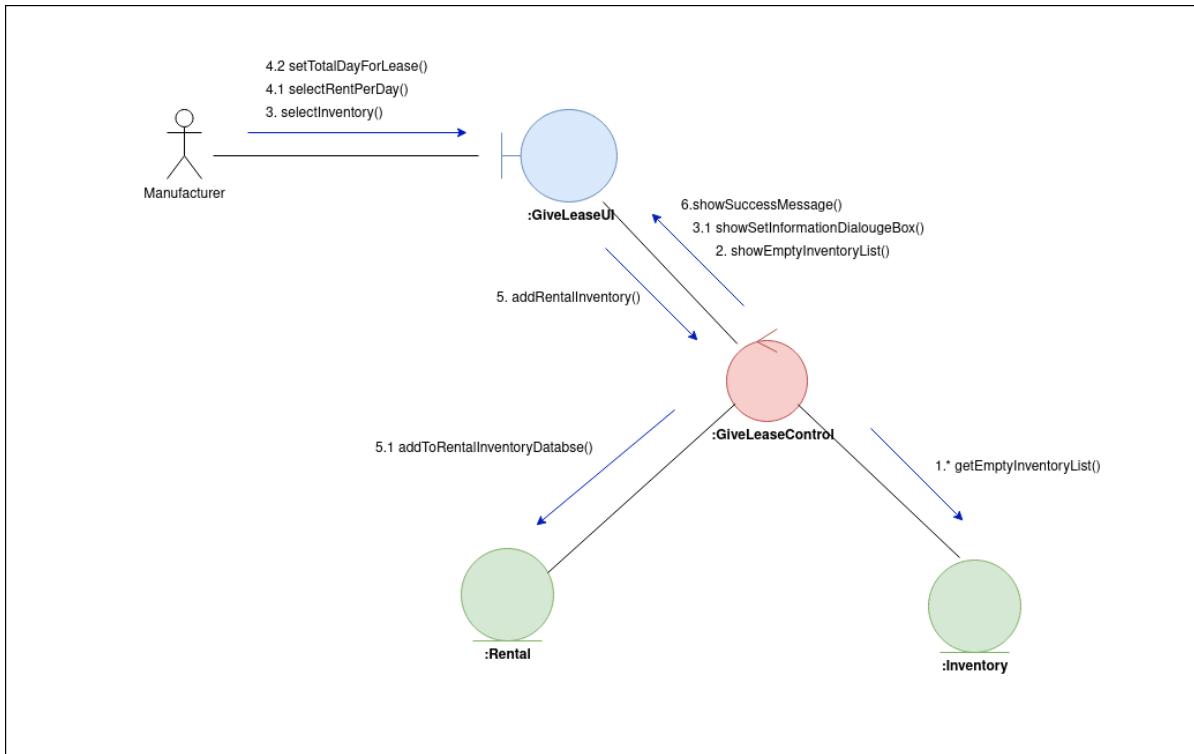


Figure 113: Give Lease

8.2.4 Take Lease

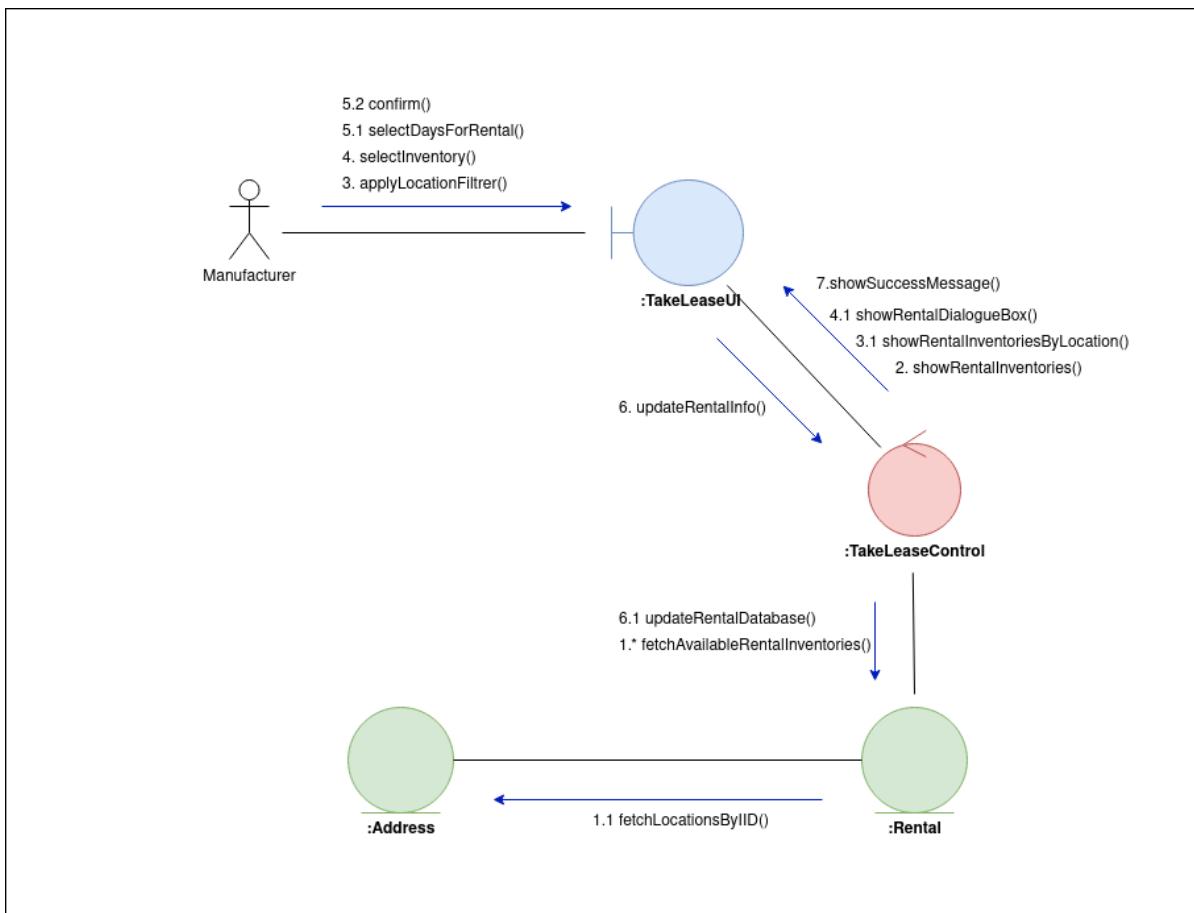


Figure 114: Take Lease

8.2.5 Lease Management

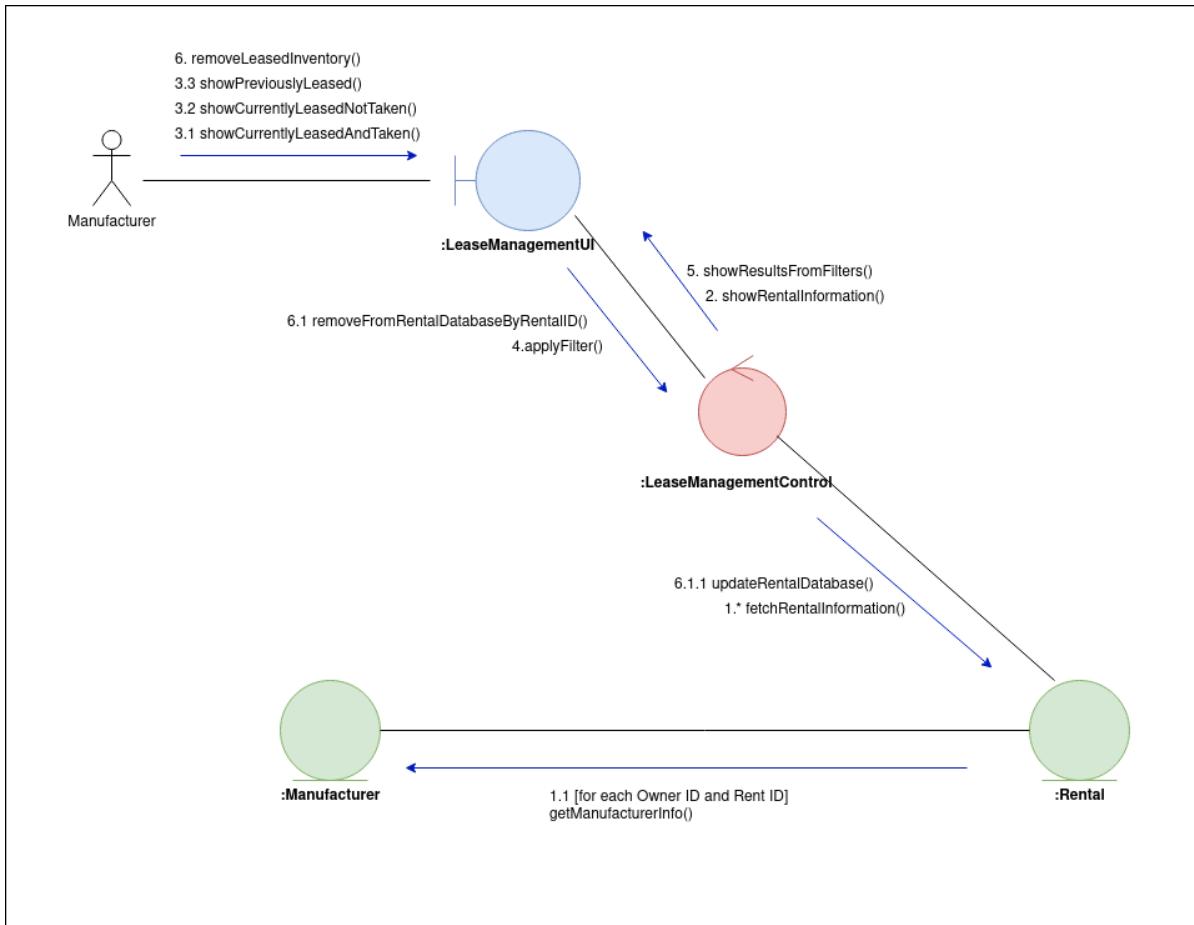


Figure 115: Lease Management

8.2.6 Shift Product

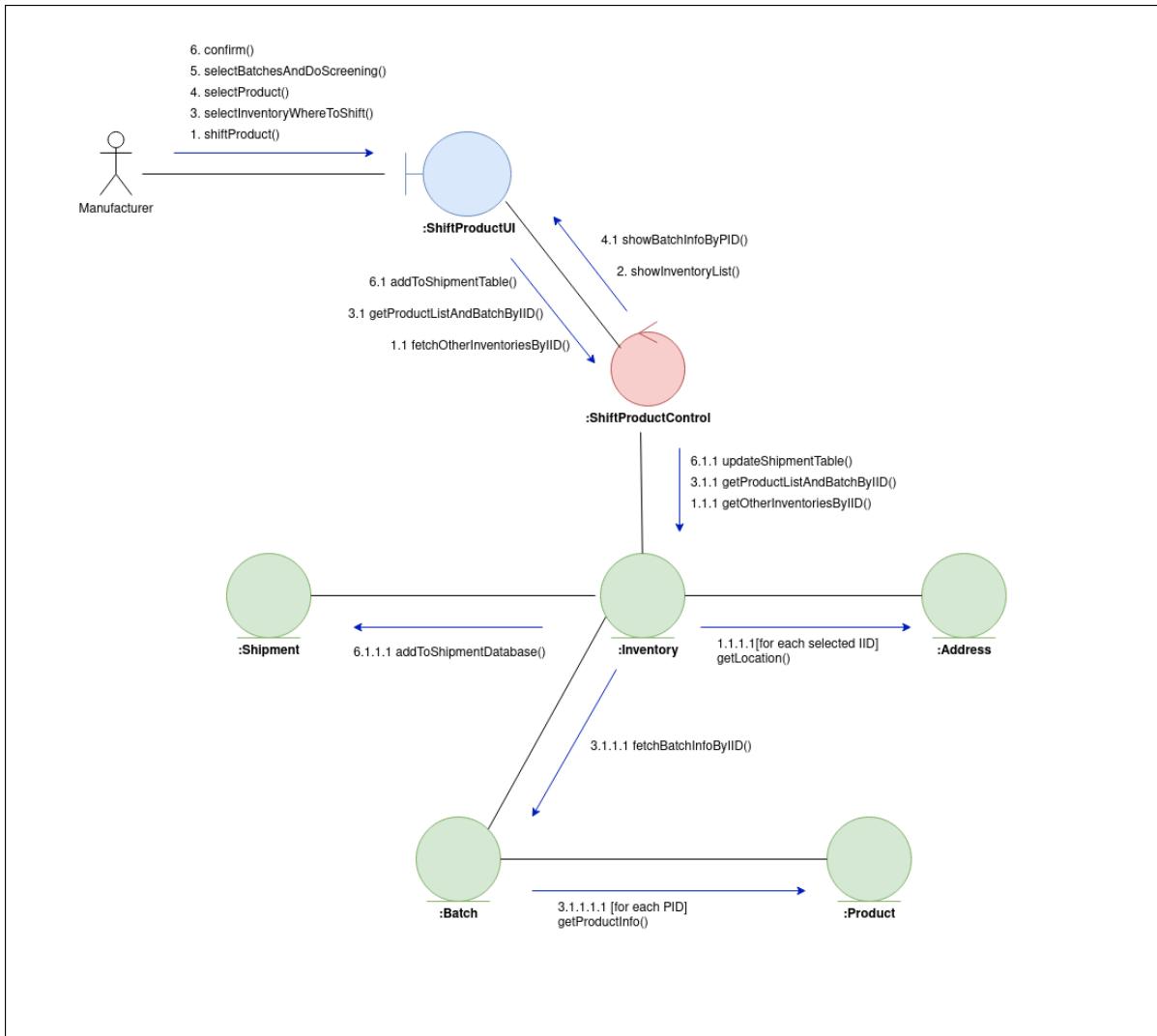


Figure 116: Shift Product

8.2.7 Restock



Figure 117: Restock

8.2.8 Product Screening

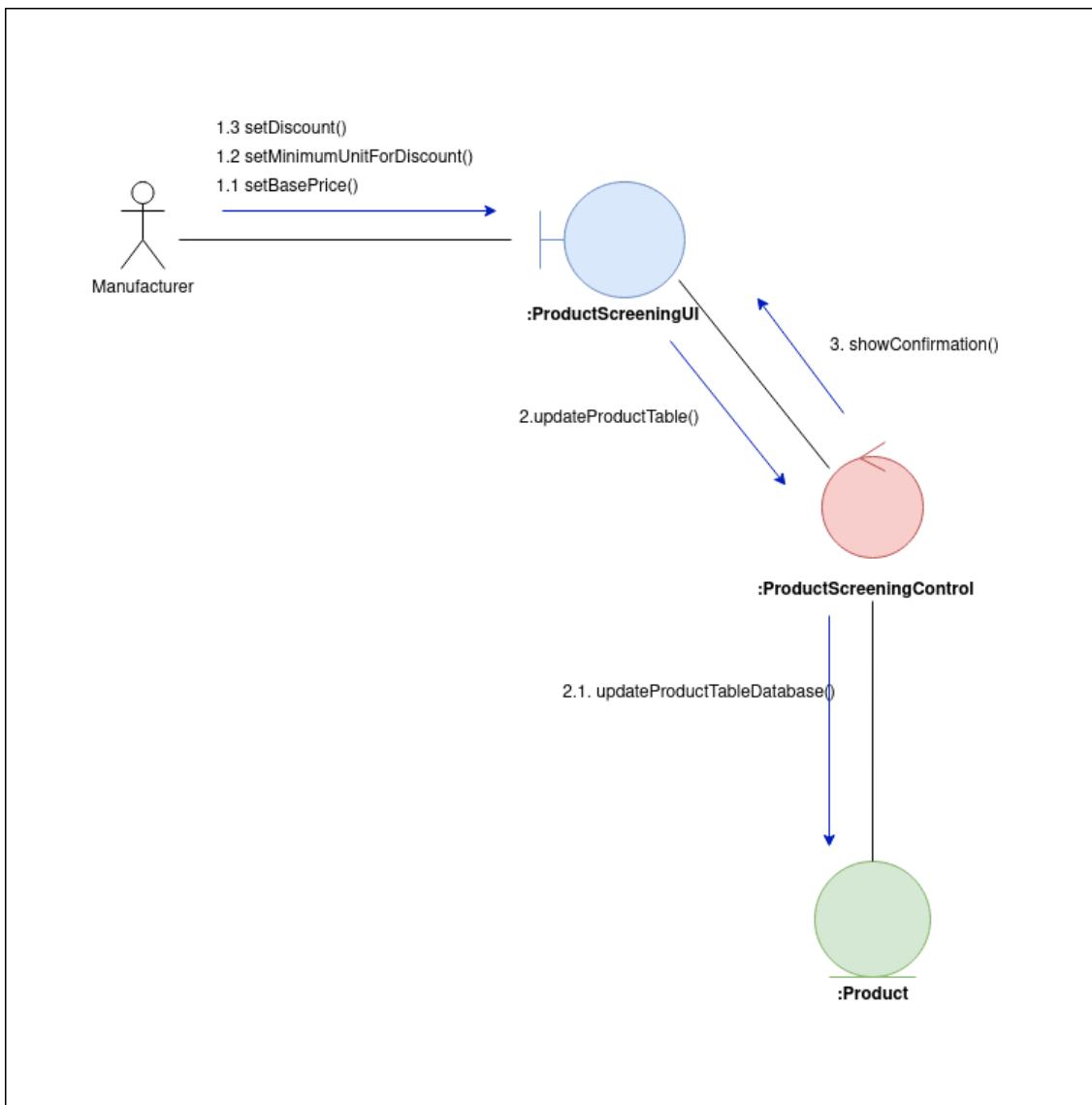


Figure 118: Product Screening

8.2.9 Batch Screening

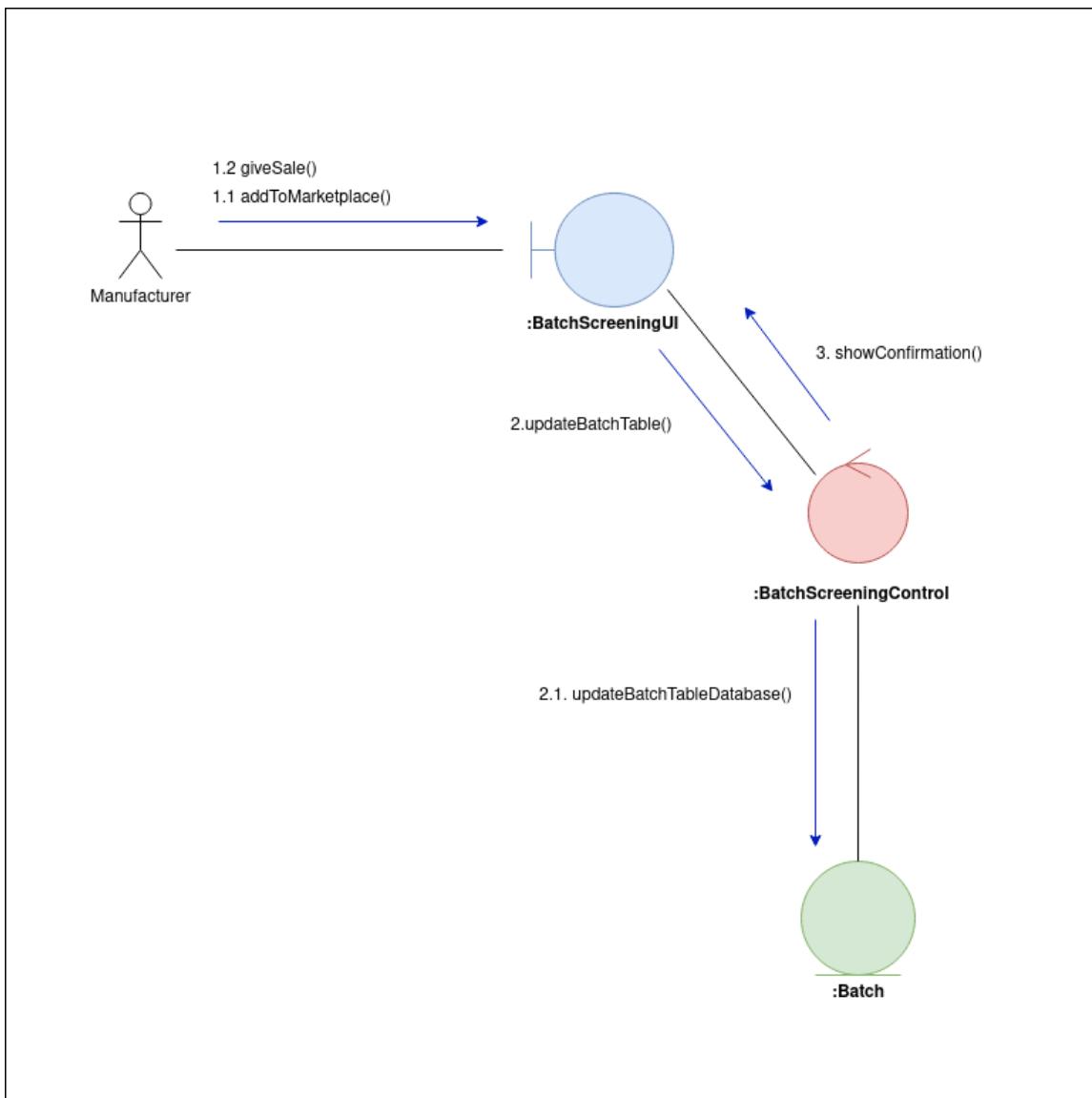


Figure 119: Batch Screening

8.2.10 View Production House

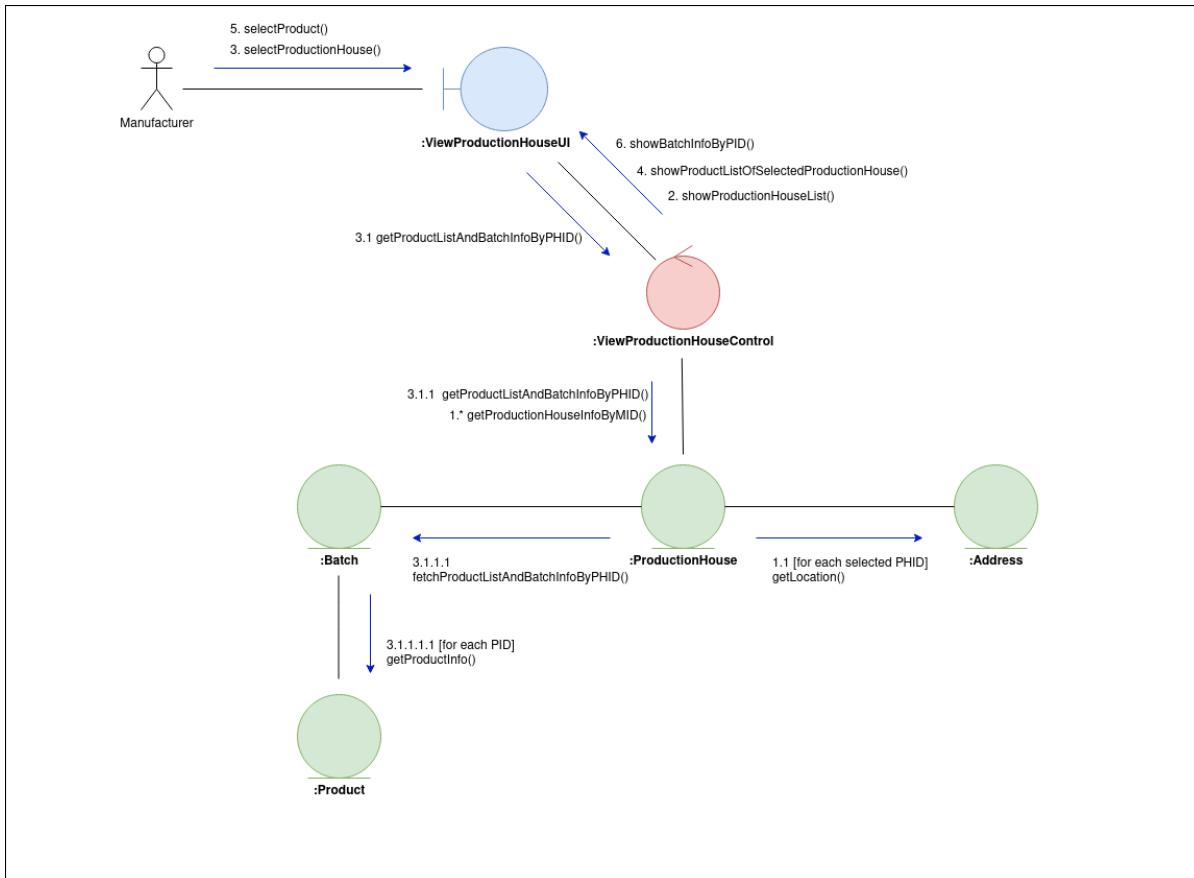


Figure 120: View Production House

8.2.11 Adding Production House

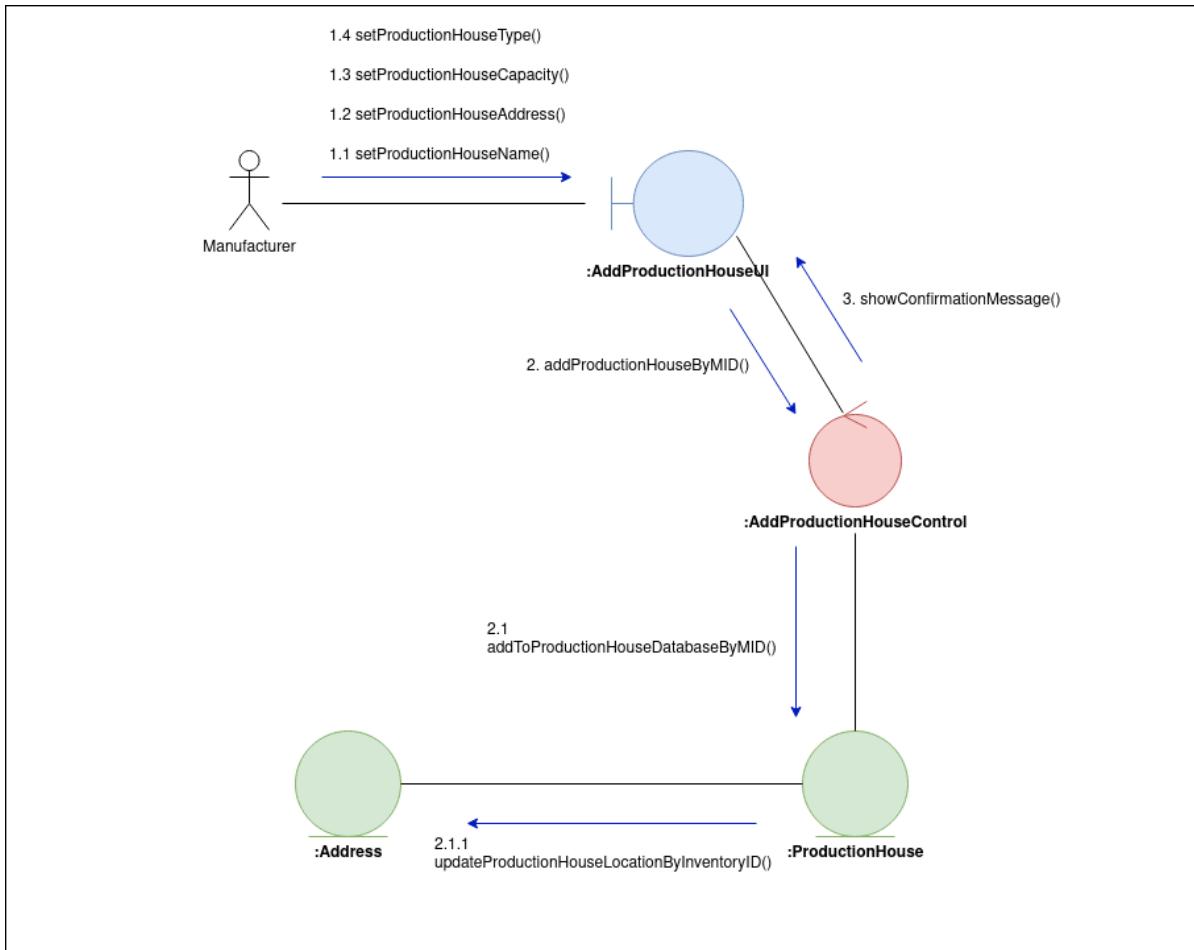


Figure 121: Adding Production House

8.2.12 Add New Product

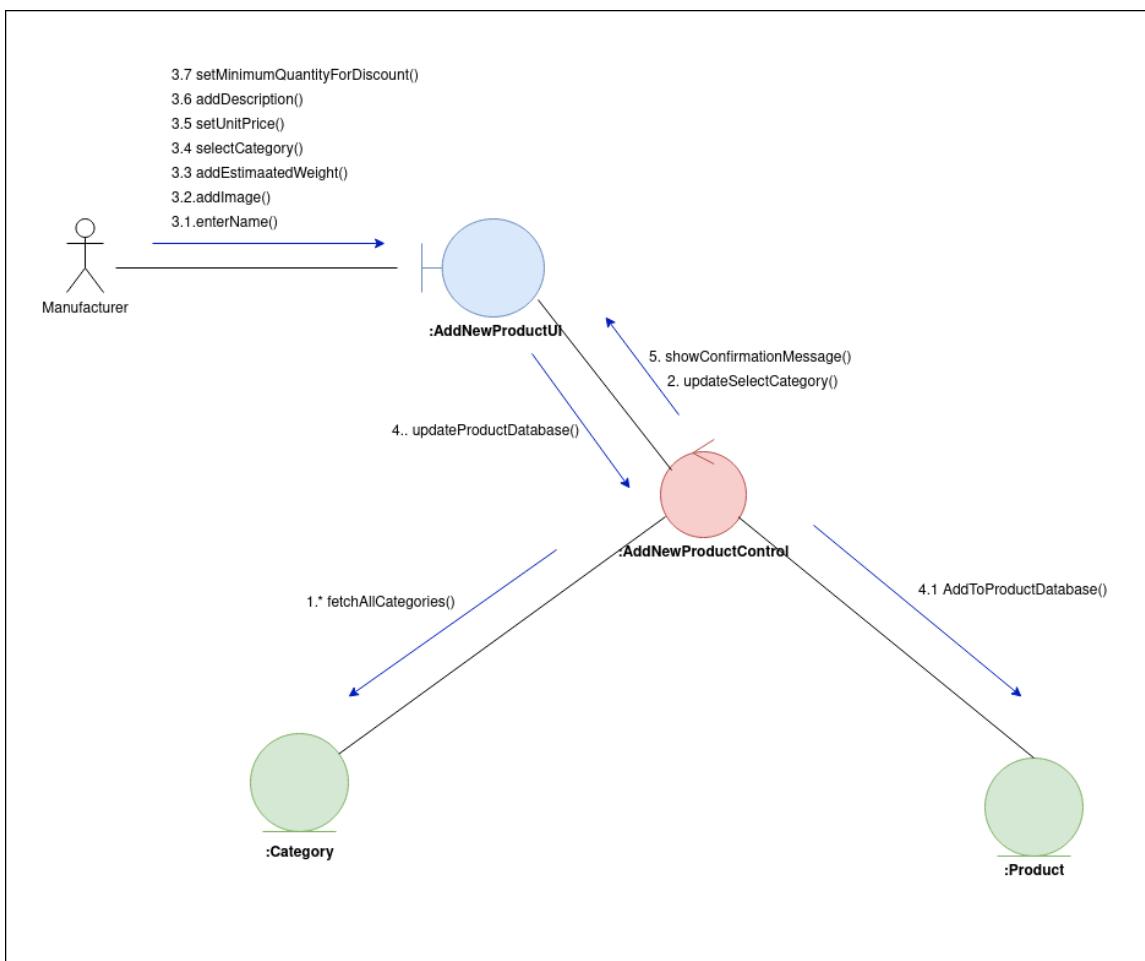


Figure 122: Add New Product

8.2.13 Add New Batch

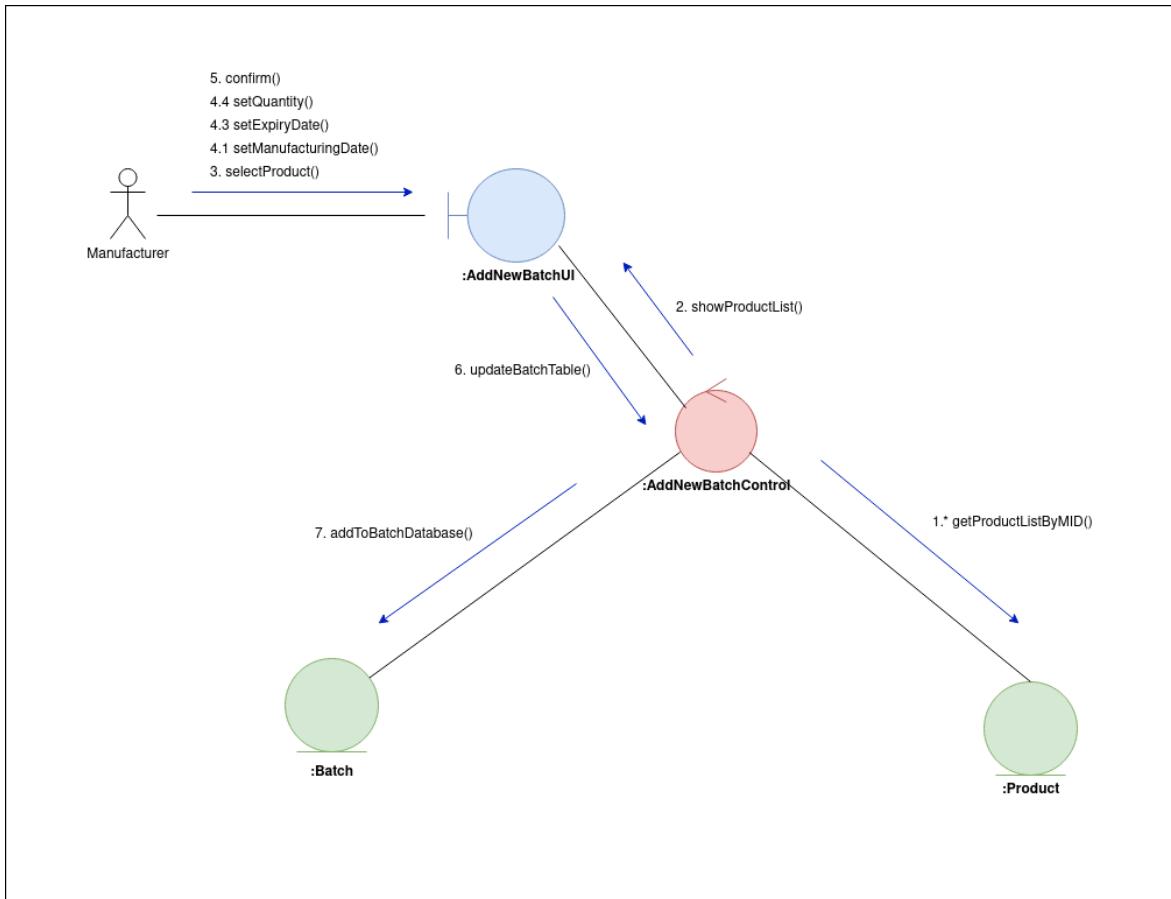


Figure 123: Add New Batch

8.2.14 Order History

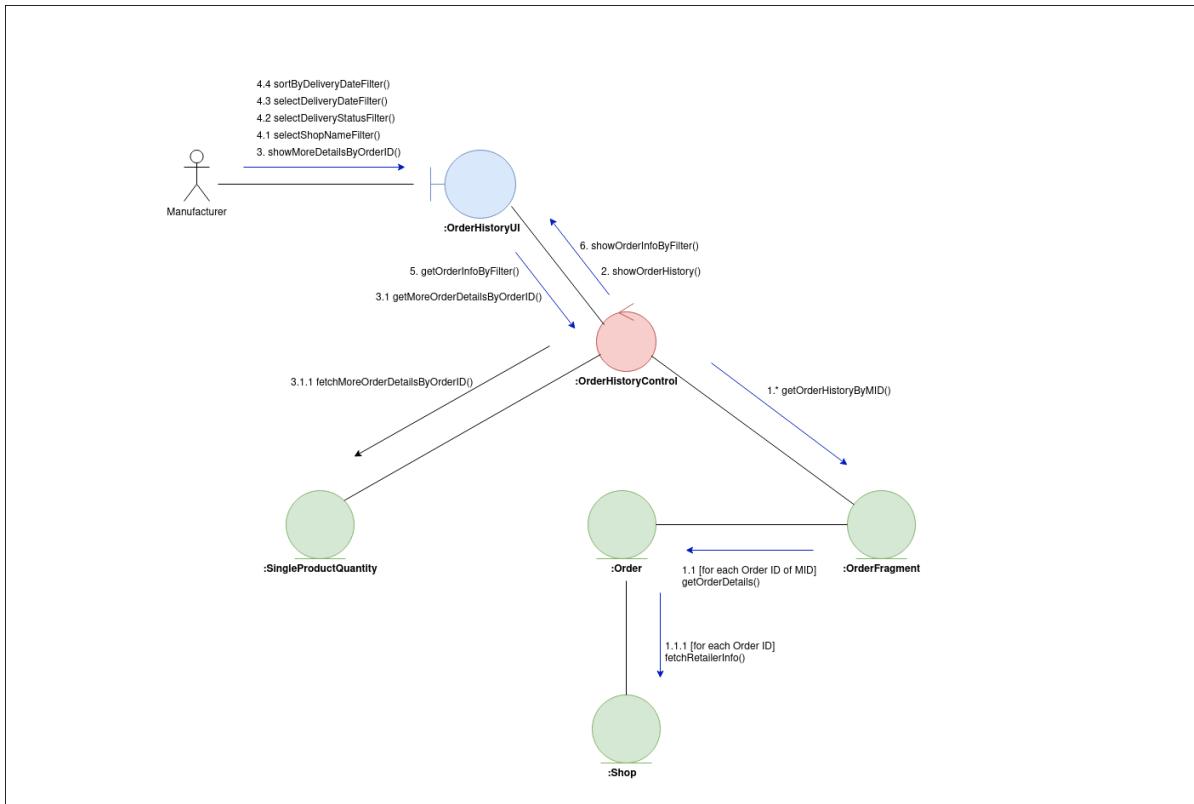


Figure 124: Order History

8.2.15 Data Analytics

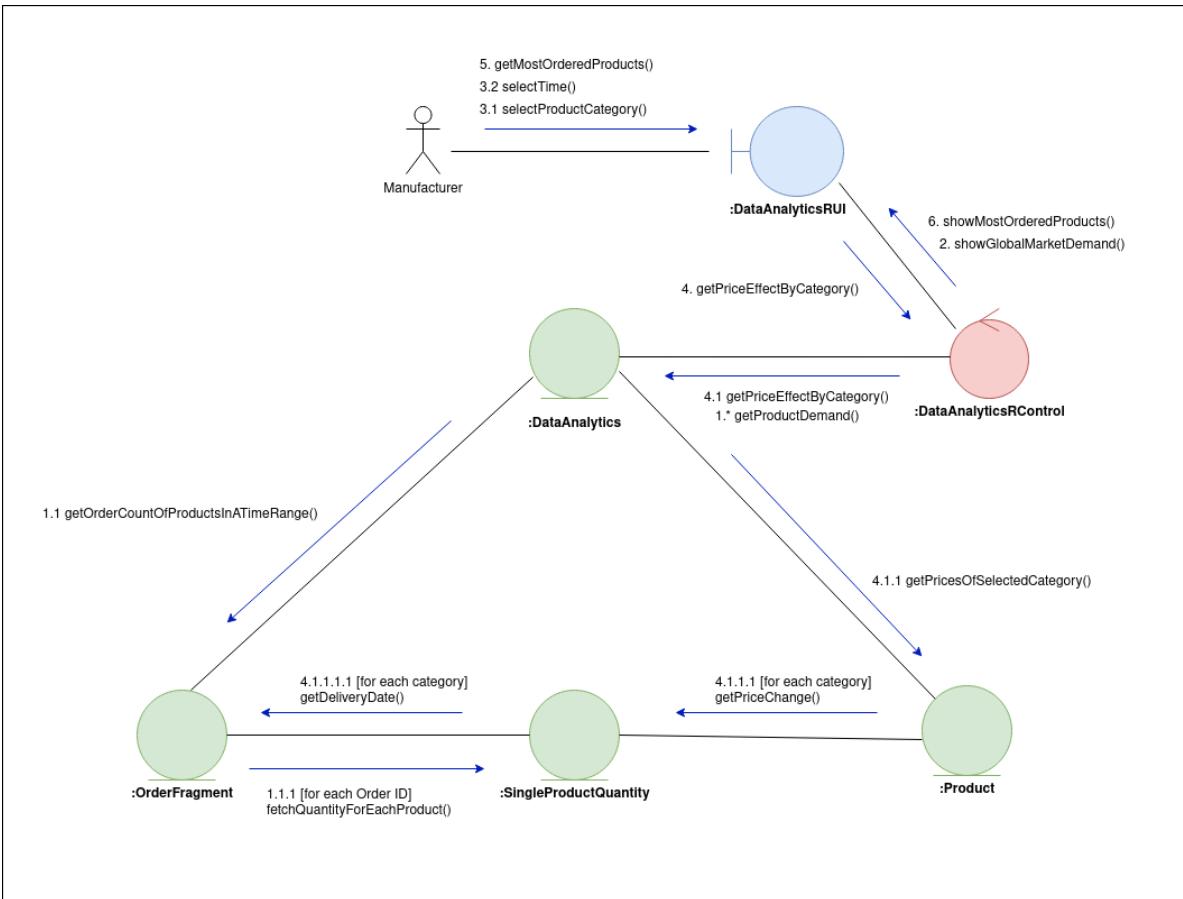


Figure 125: Data Analytics

Sequence Diagram

9.1. Retailer

9.1.1 HomePage

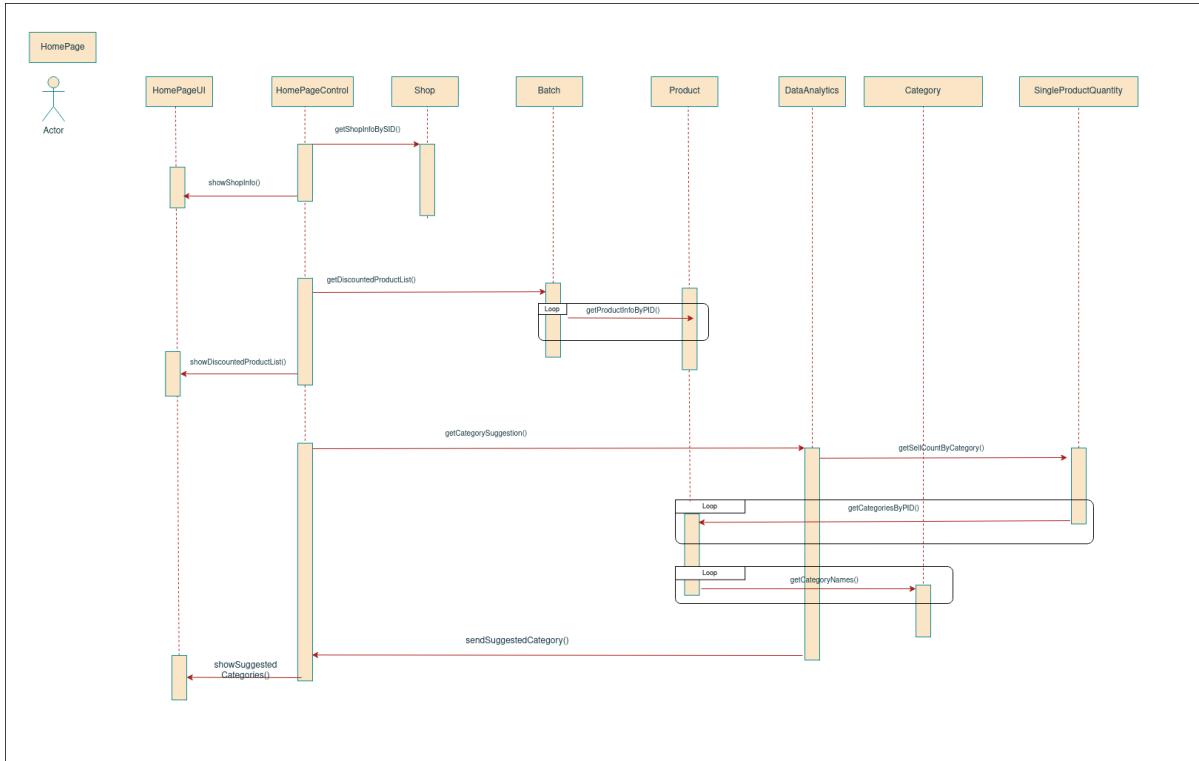


Figure 126: HomePage

9.1.2 Show Categories

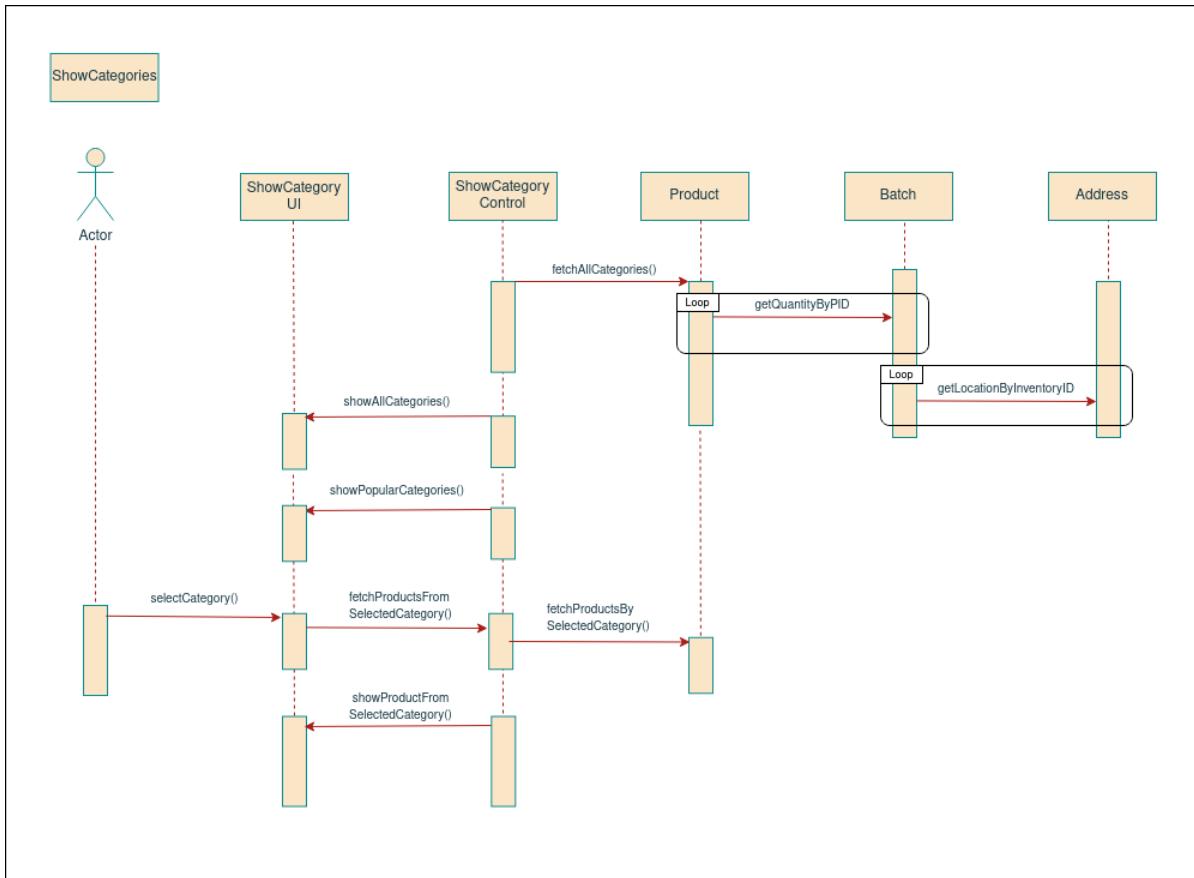


Figure 127: Show Categories

9.1.3 Search & Filter

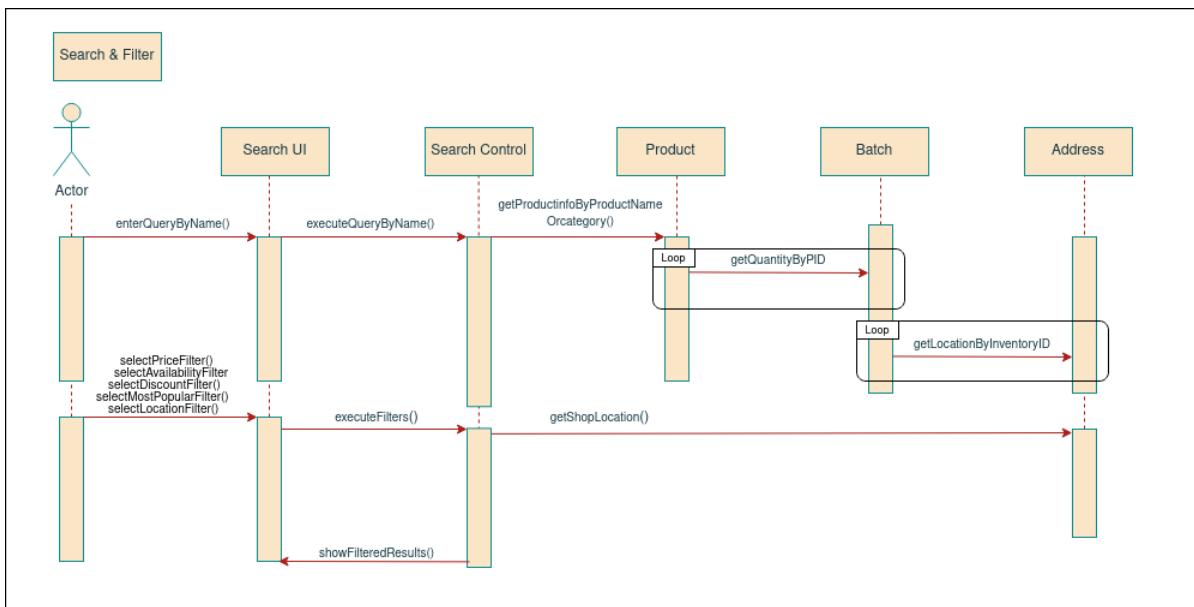


Figure 128: Search & Filter

9.1.4 Add To Cart

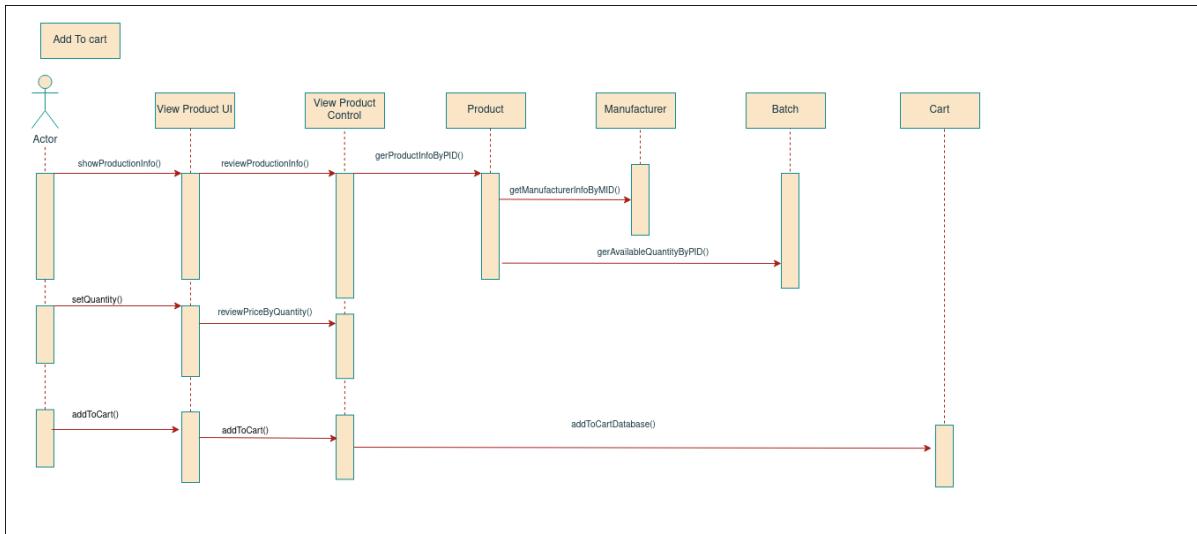


Figure 129: Add To Cart

9.1.5 Cart

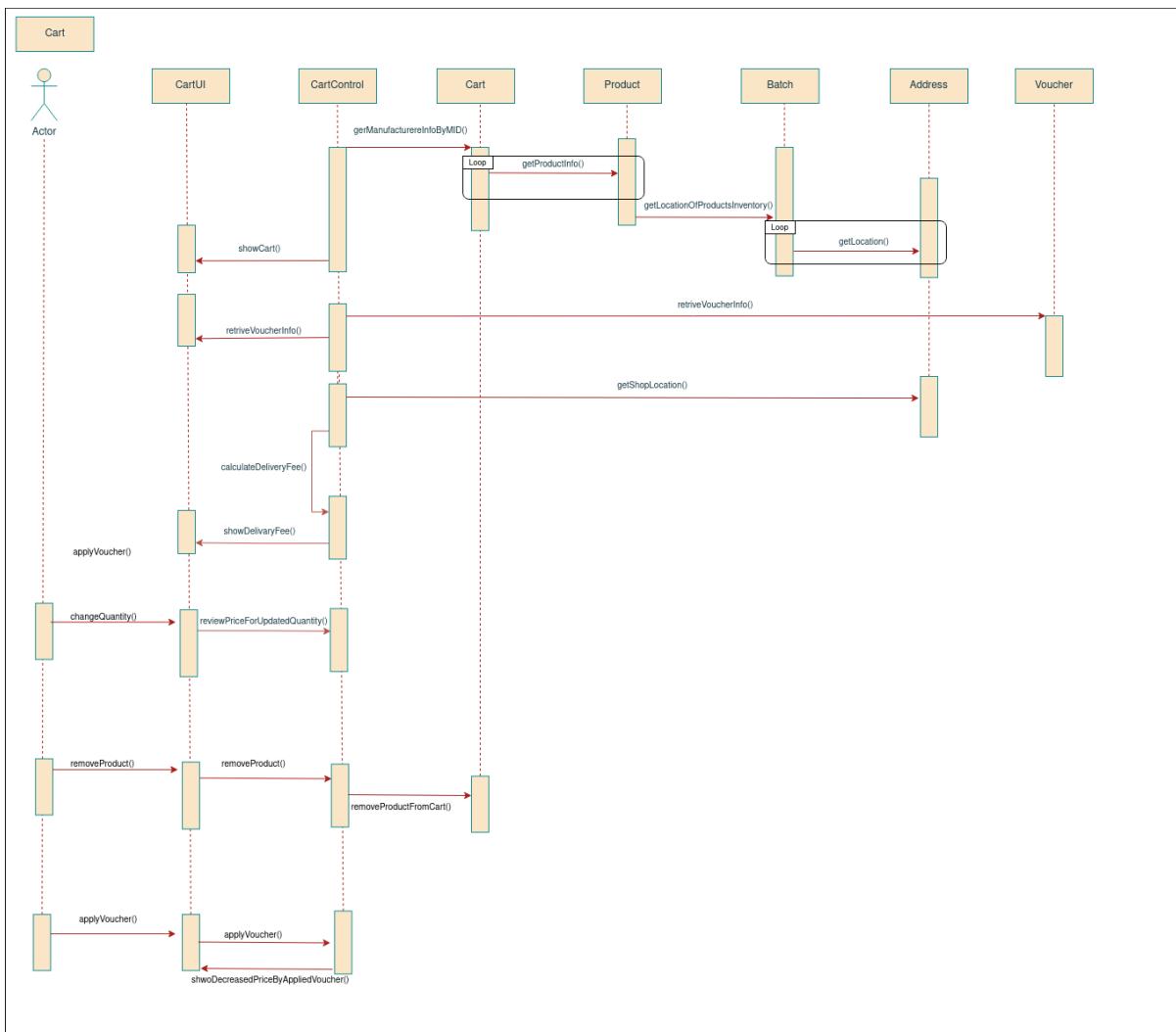


Figure 130: Cart

9.1.6 Confirm Order

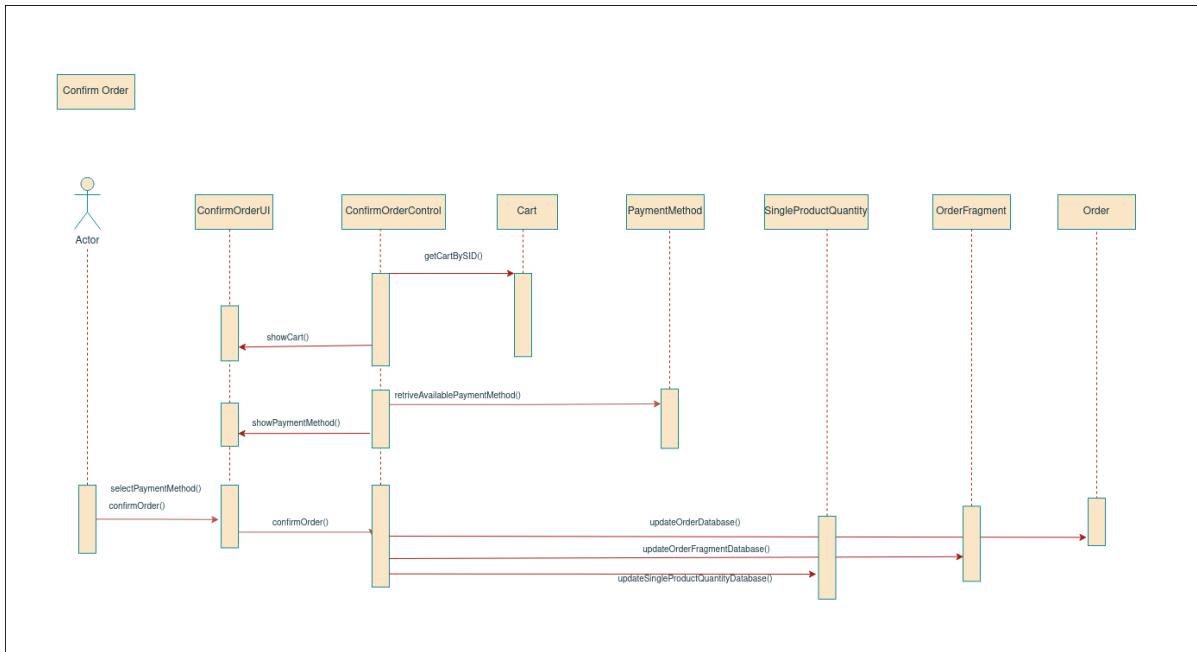


Figure 131: Confirm Order

9.1.7 Pay Later

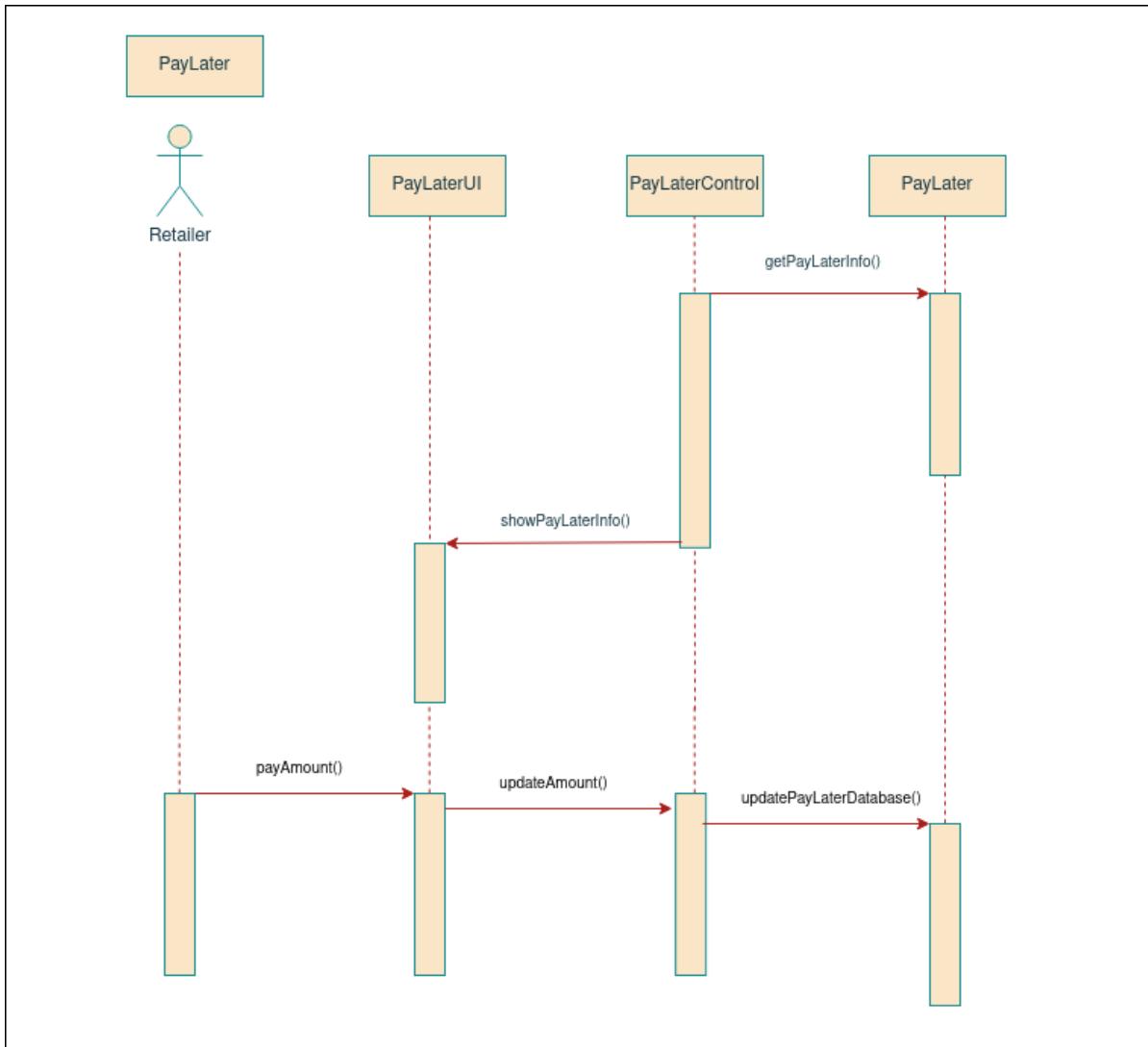


Figure 132: Pay Later

9.1.8 Order History & Rating

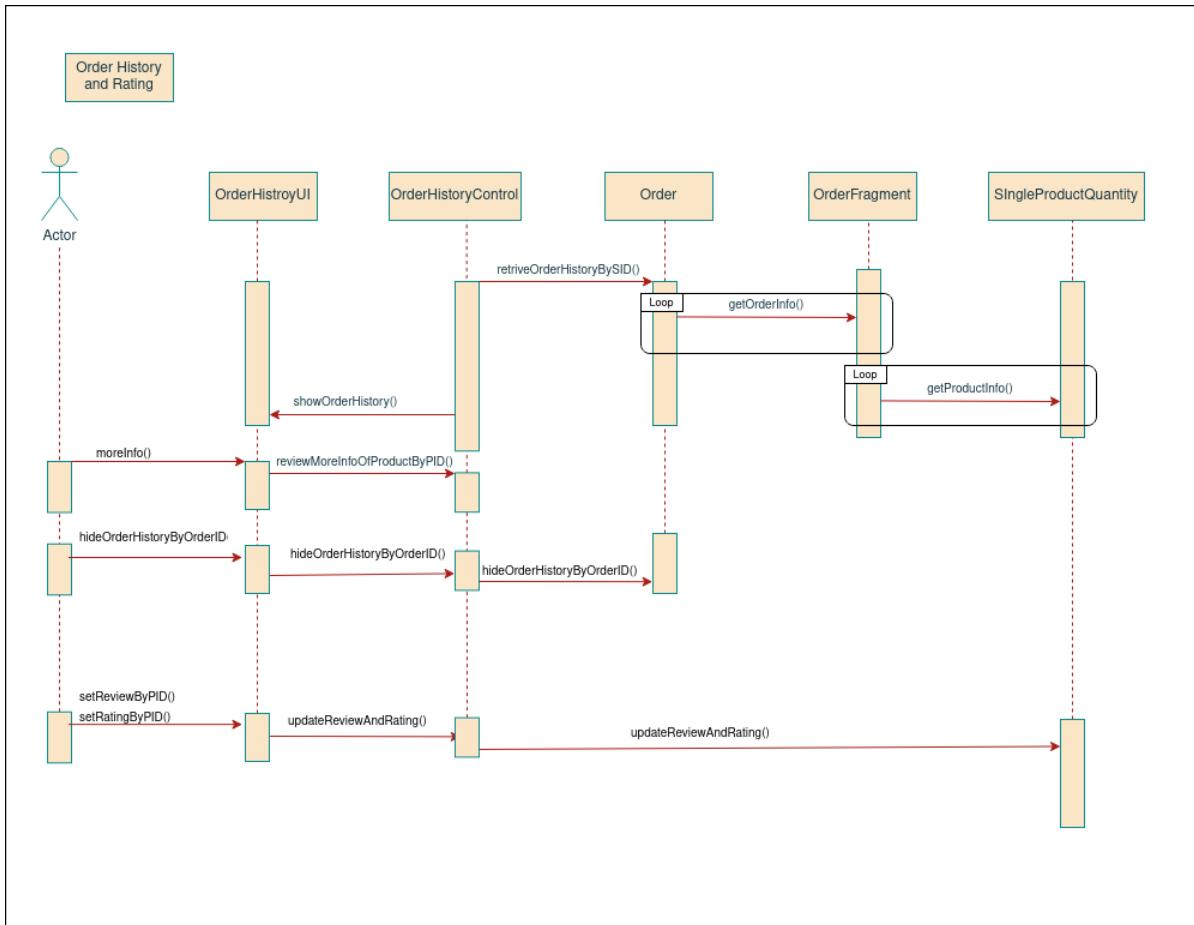


Figure 133: Order History & Rating

9.2. Manufacturer

9.2.1 View Inventory List

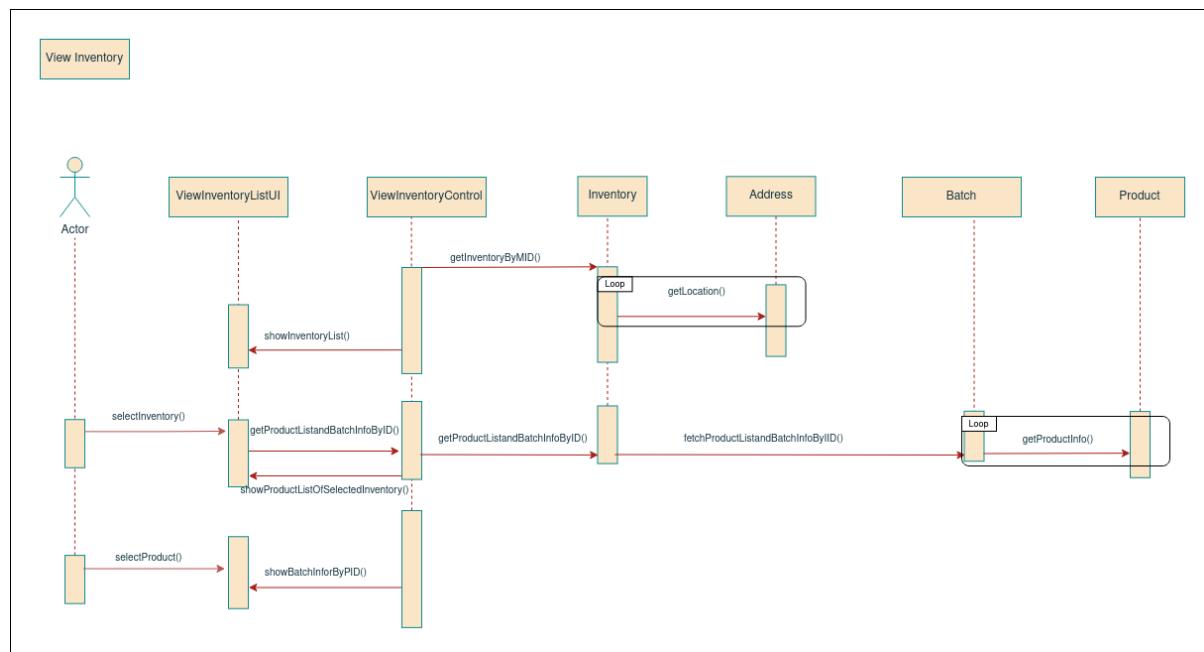


Figure 134: View Inventory List

9.2.2 Adding Inventory

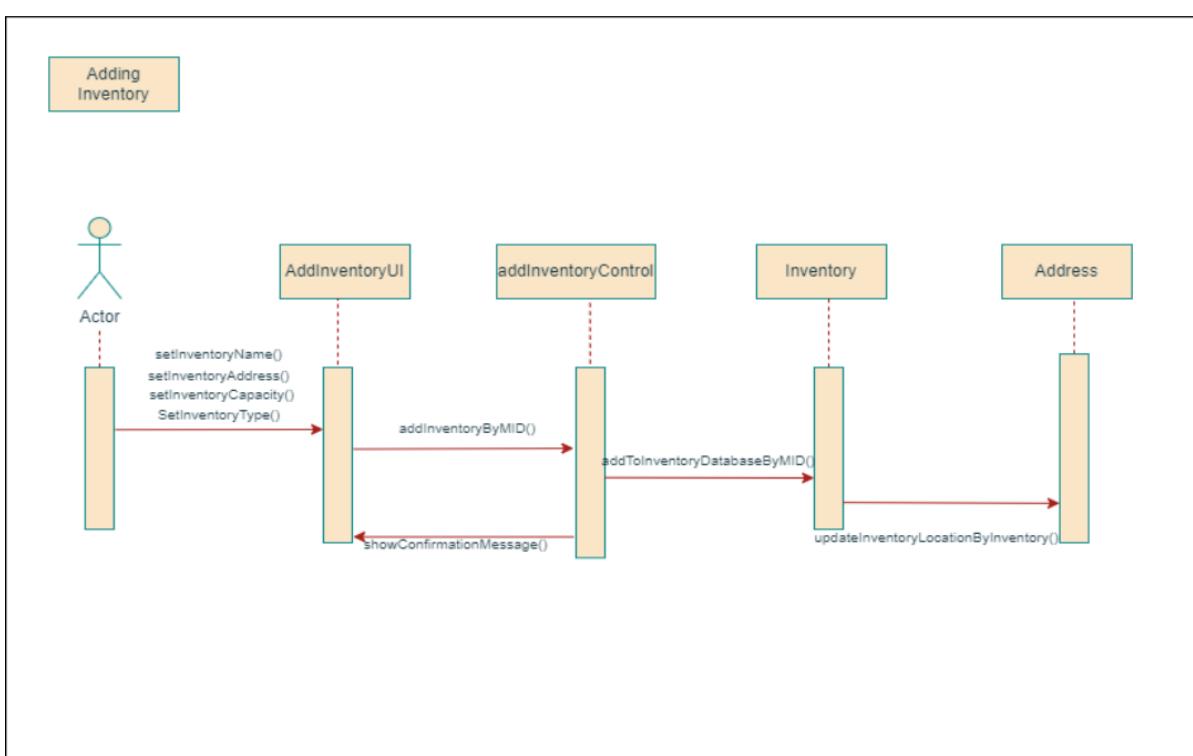


Figure 135: Adding Inventory

9.2.3 Give Lease

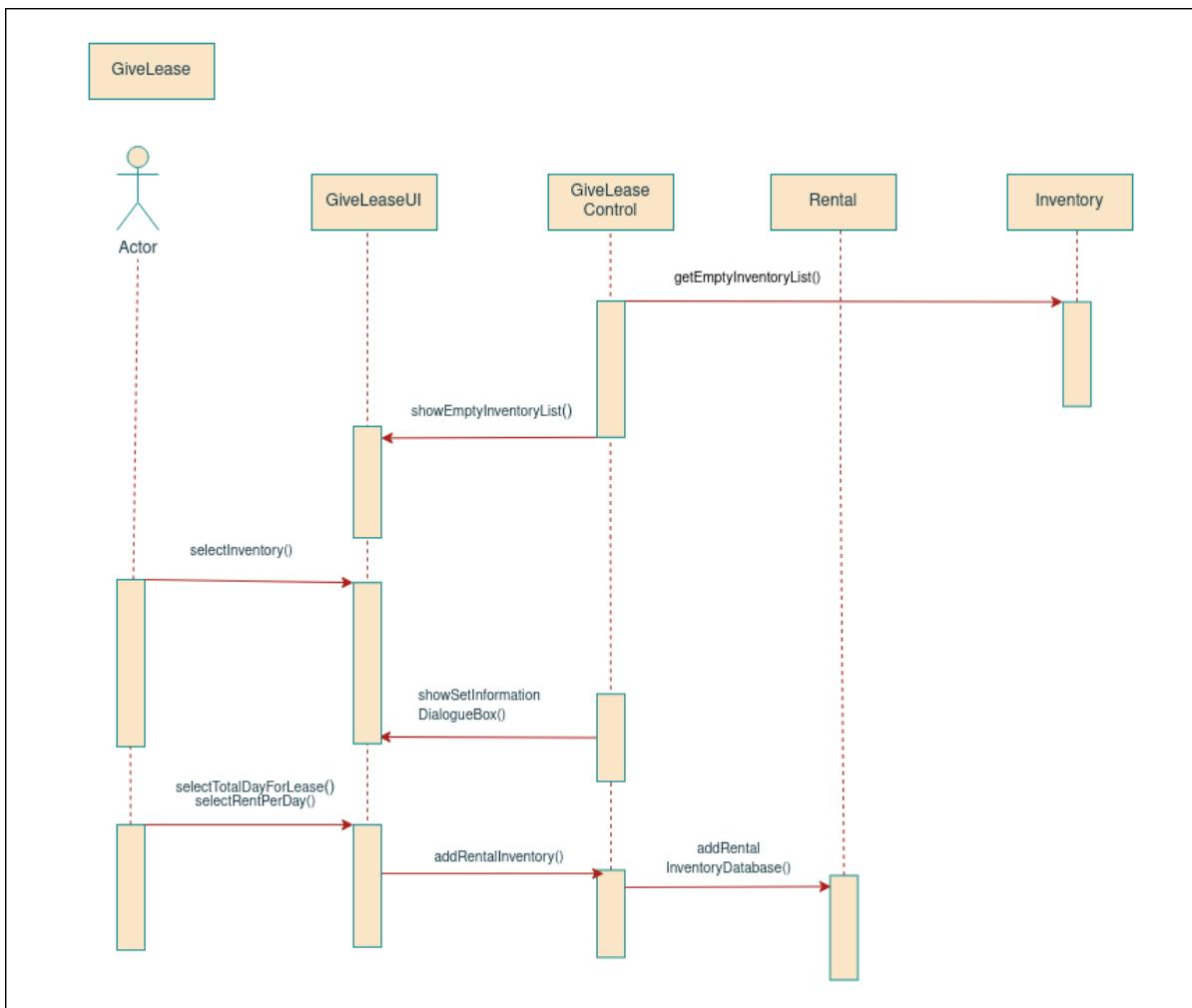


Figure 136: Give Lease

9.2.4 Take Lease

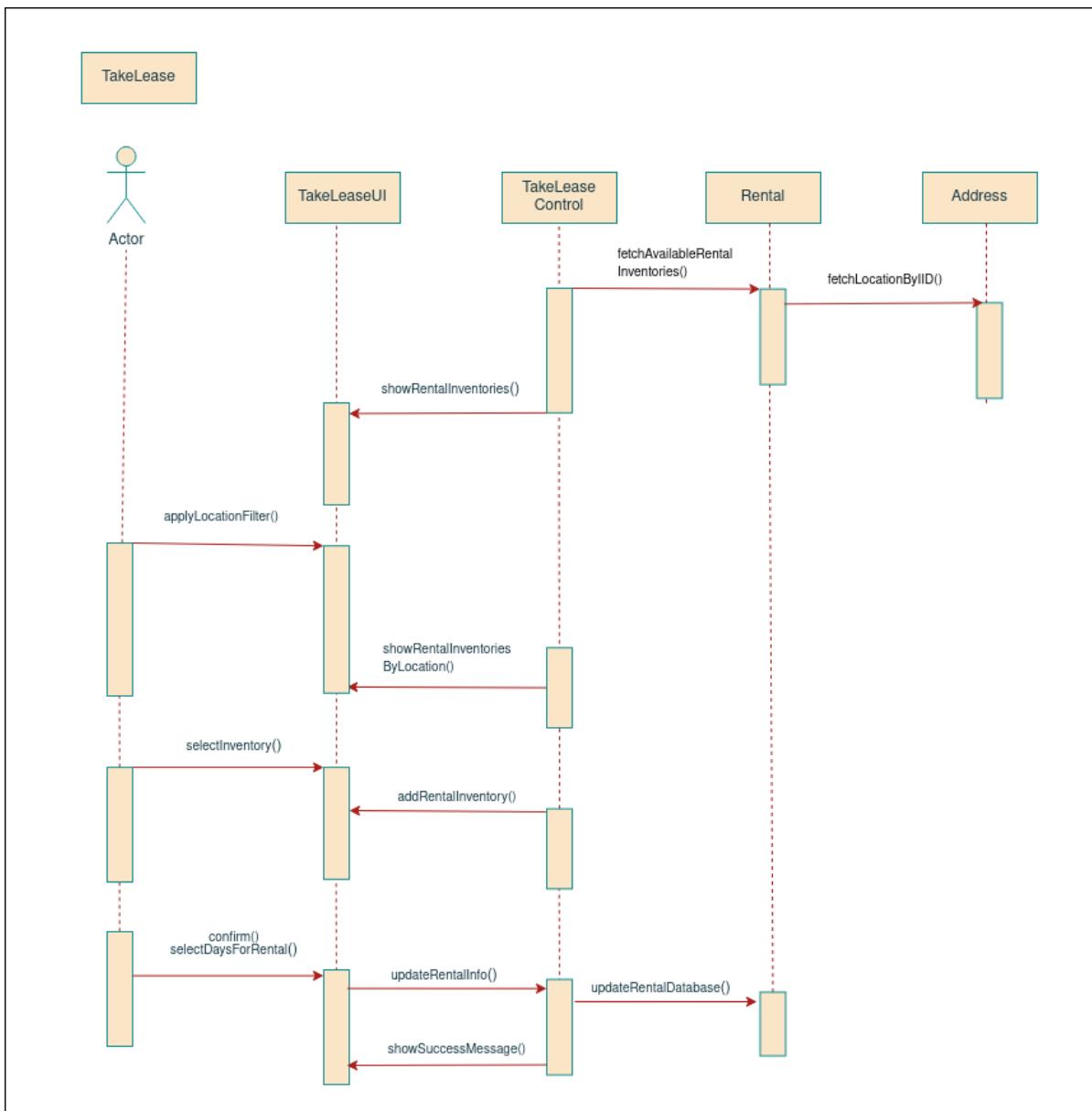


Figure 137: Take Lease

9.2.5 Lease Management

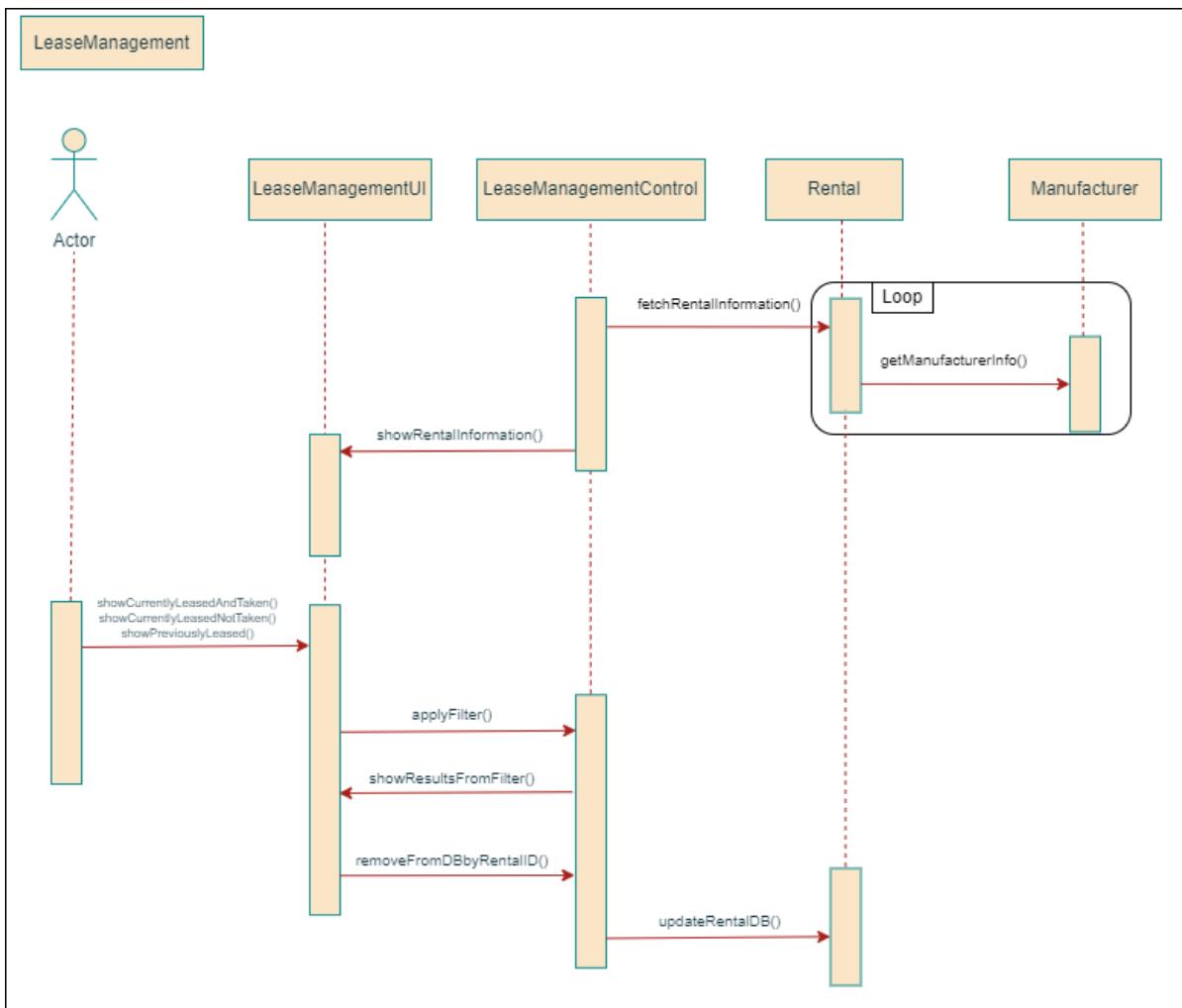


Figure 138: Lease Management

9.2.6 Shift Product

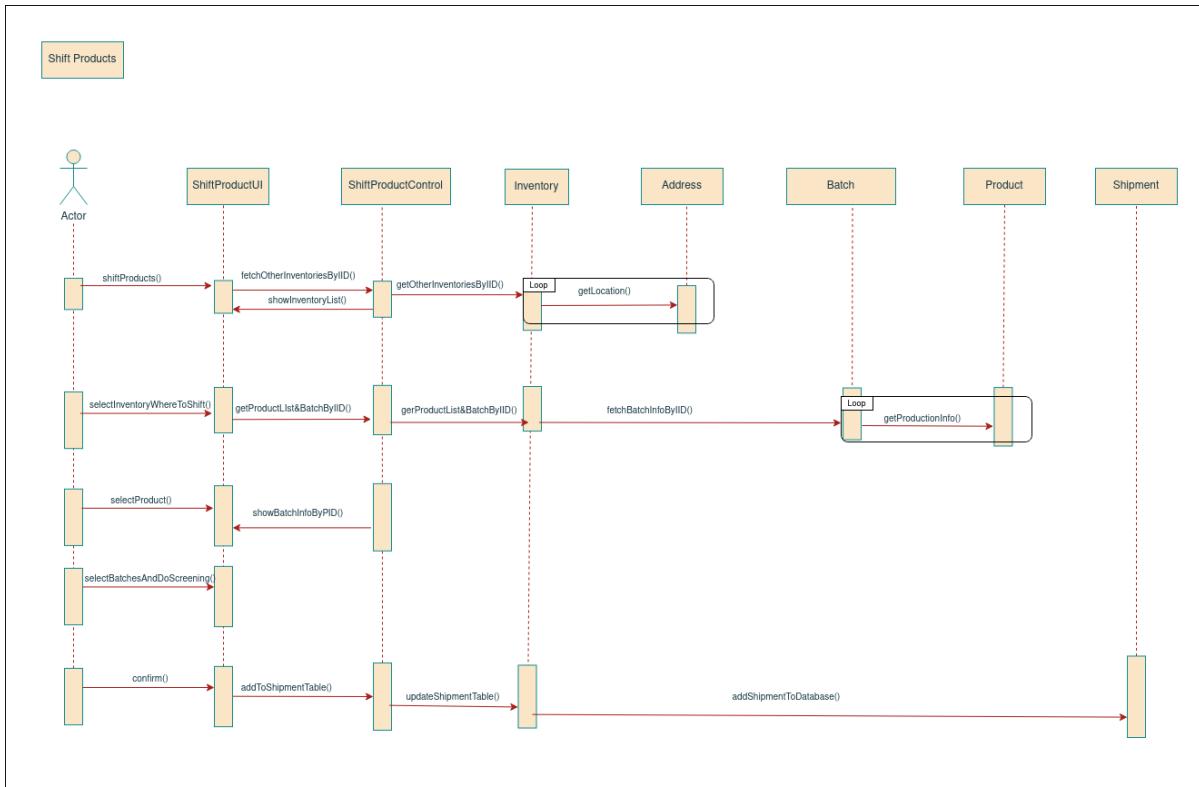


Figure 139: Shift Product

9.2.7 Restock

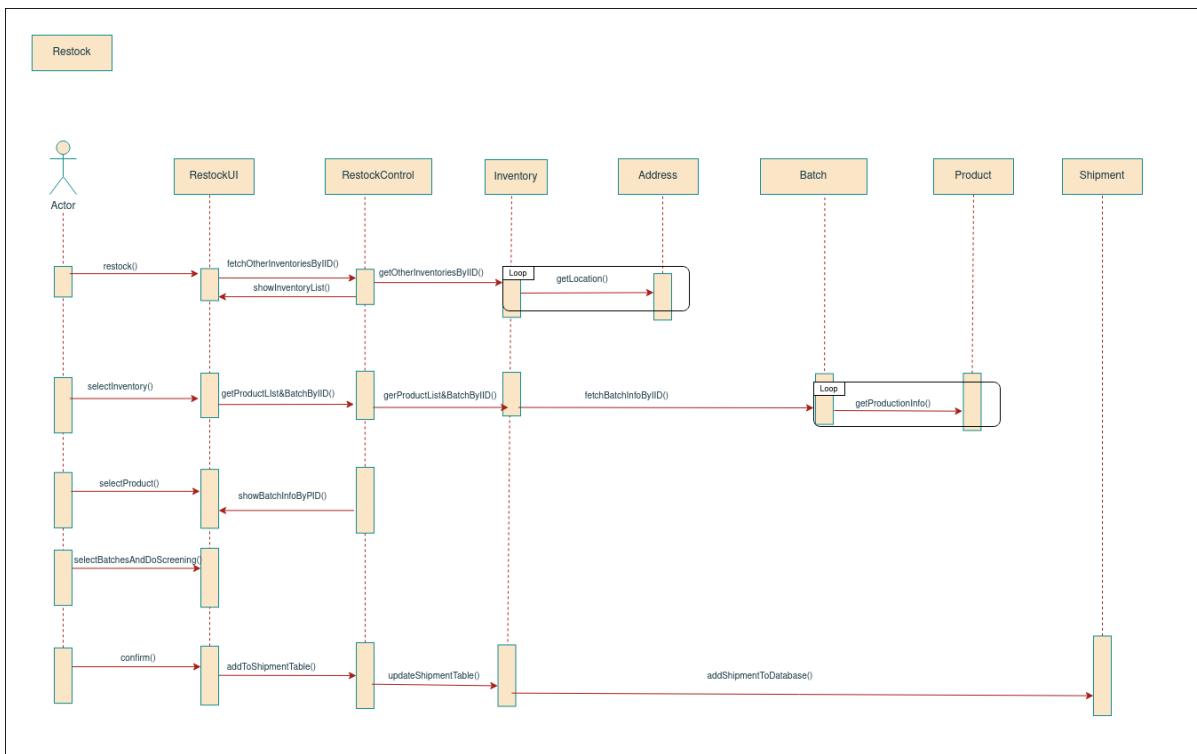


Figure 140: Restock

9.2.8 Product Screening

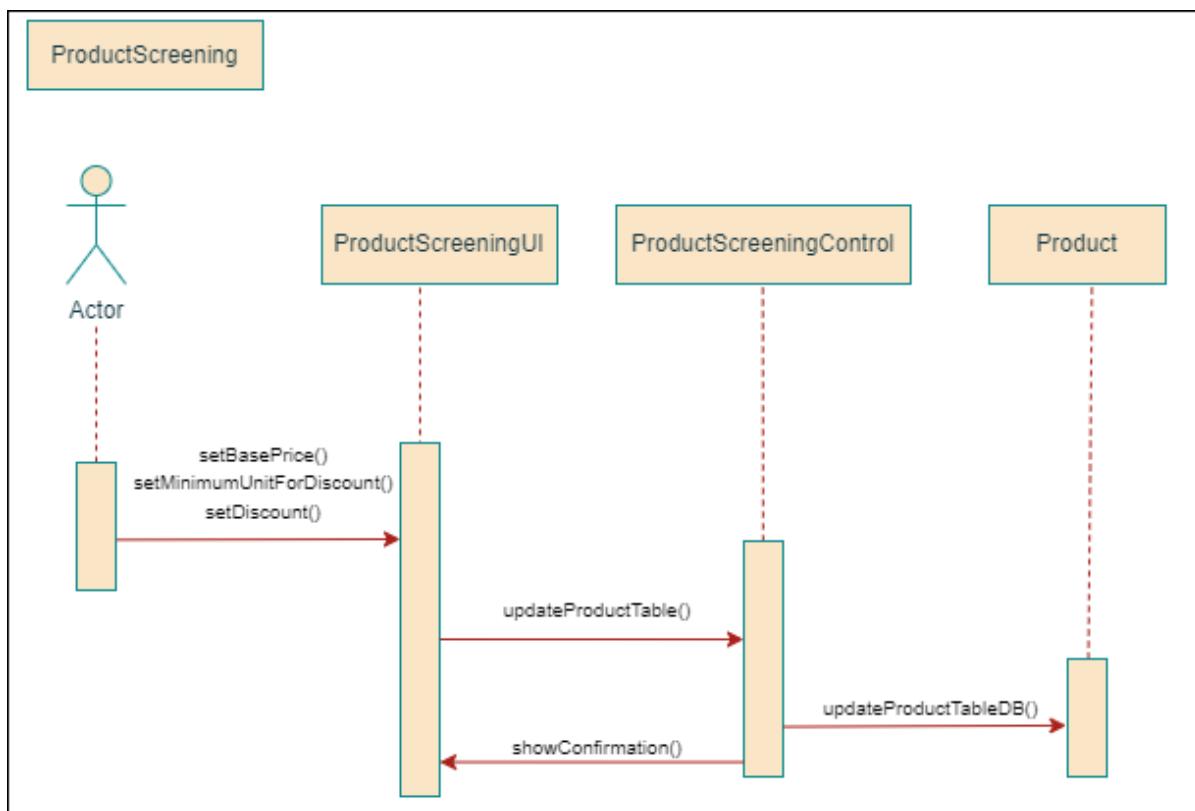


Figure 141: Product Screening

9.2.9 Batch Screening

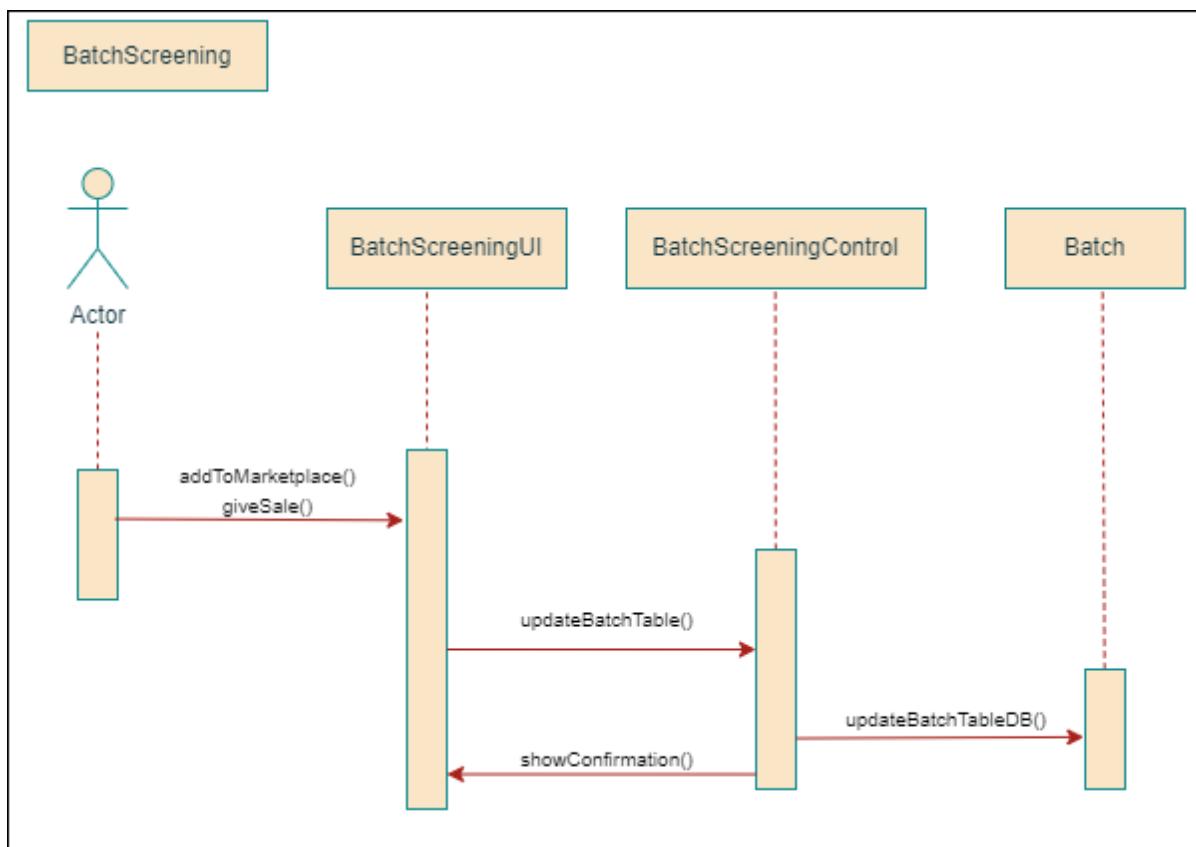


Figure 142: Batch Screening

9.2.10 View Production House

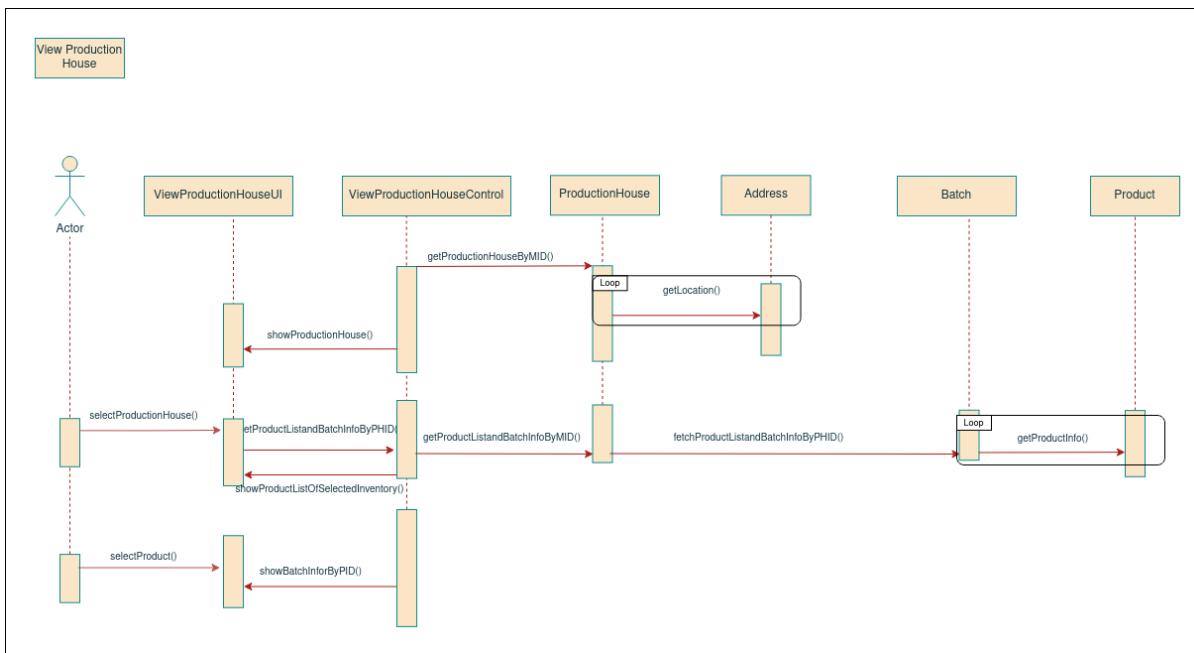


Figure 143: View Production House

9.2.11 Adding Production House

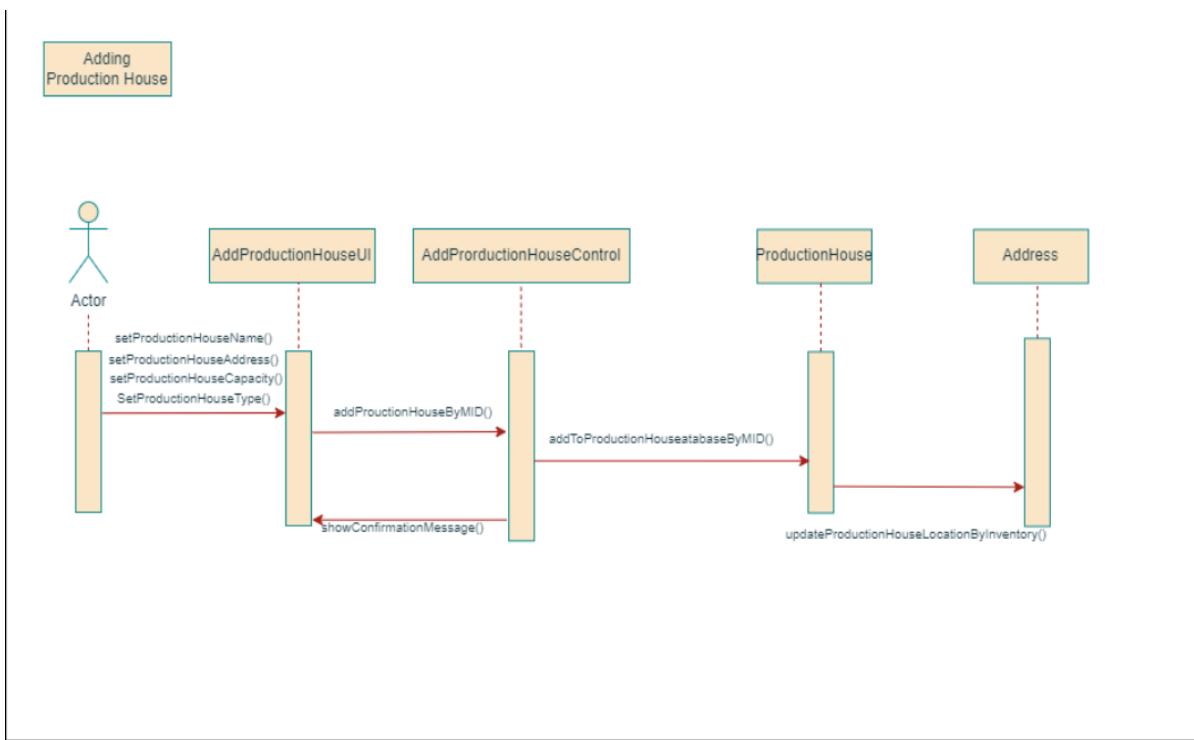


Figure 144: Adding Production House

9.2.12 Add New Product

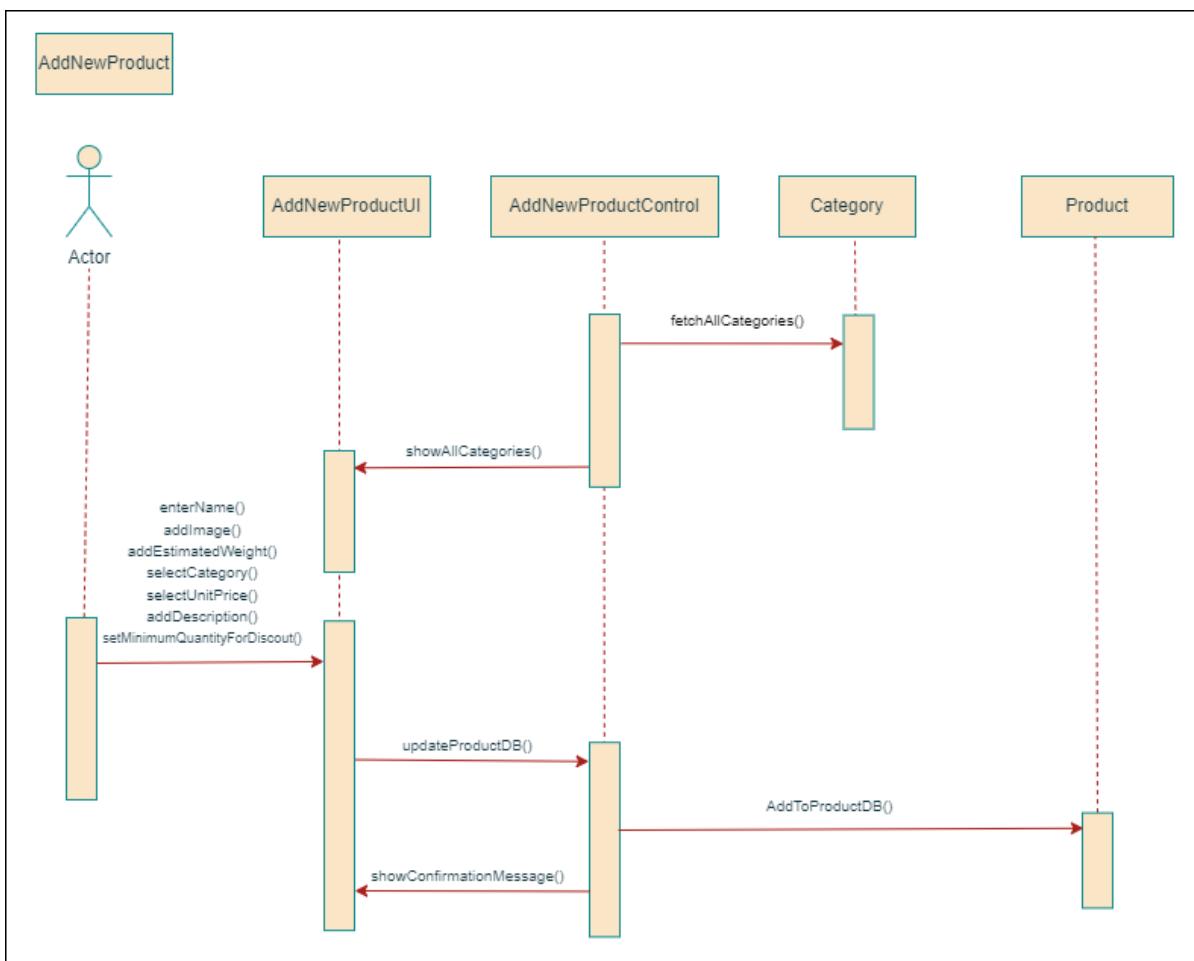


Figure 145: Add New Product

9.2.13 Add New Batch

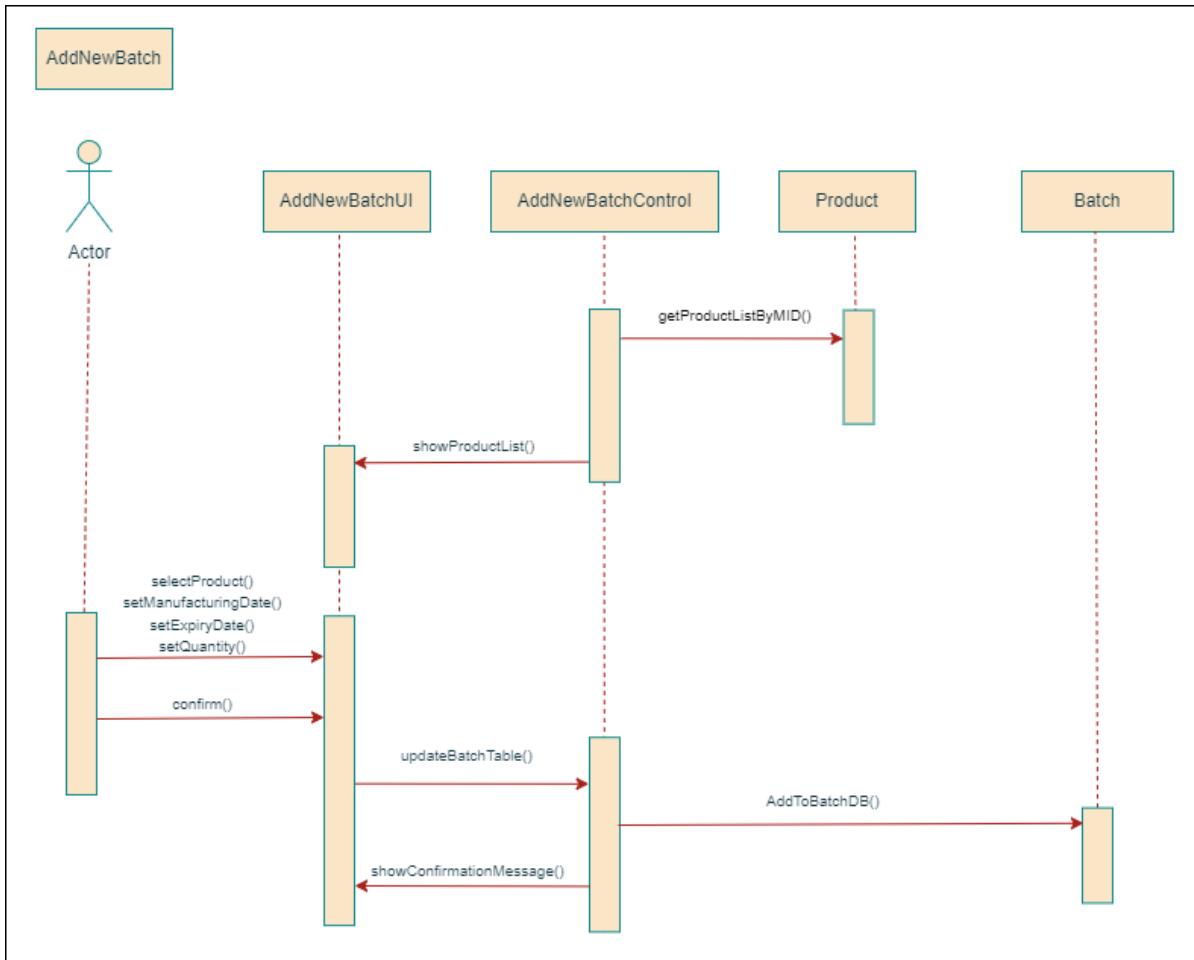


Figure 146: Add New Batch

9.2.14 Order History

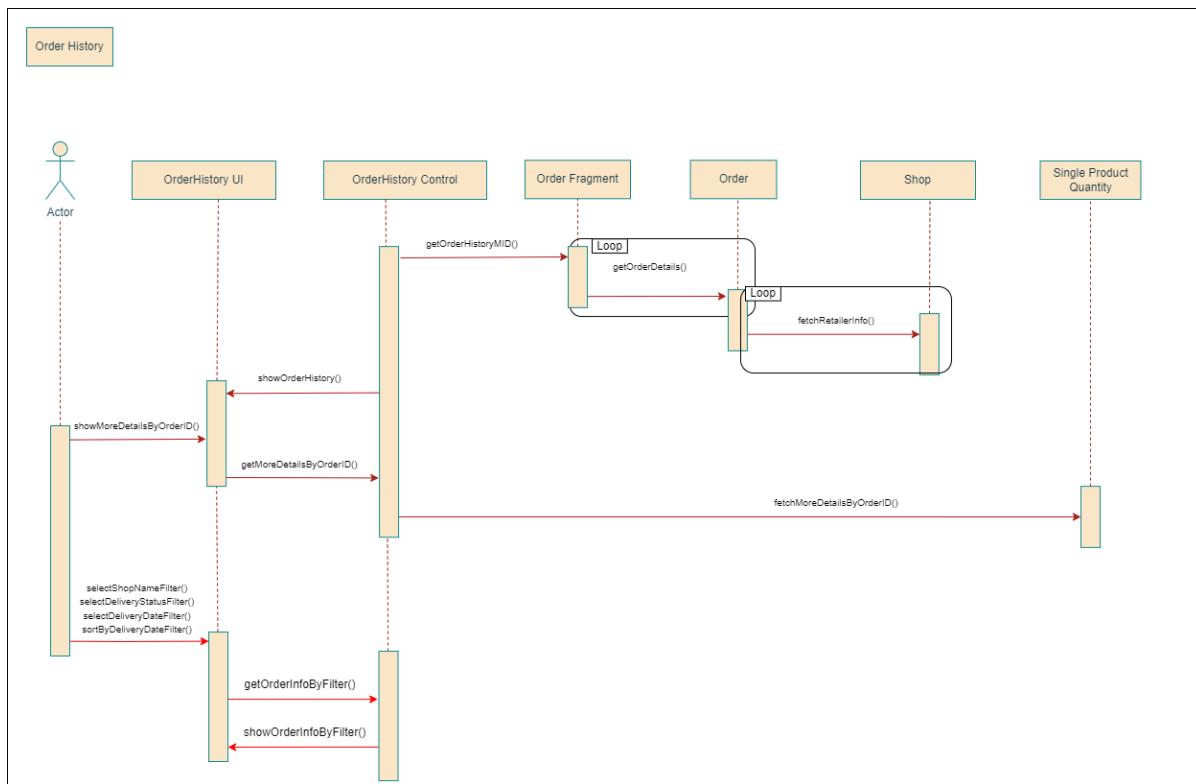


Figure 147: Order History

9.2.15 Data Analytics

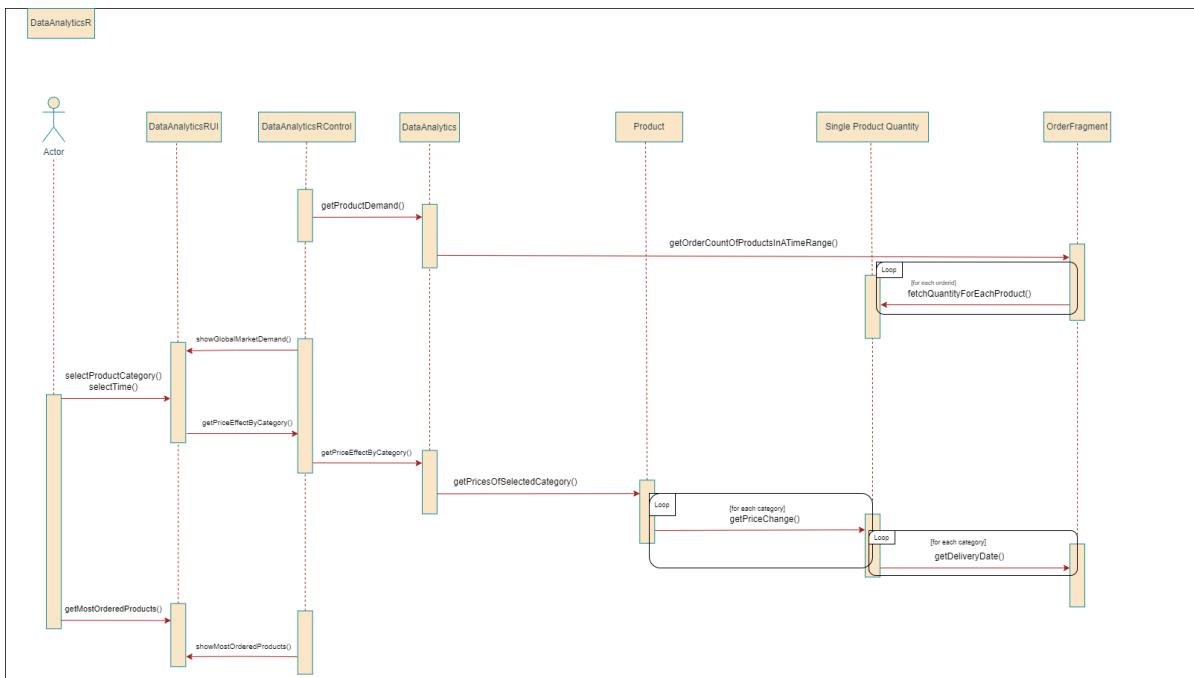


Figure 148: Data Analytics

State Diagram

10.1. Feedback Acknowledged

- Added a transition from OnLease state (Owner) to Empty state (Owner) in the inventory state diagram when lease time is over.

10.2. Order State

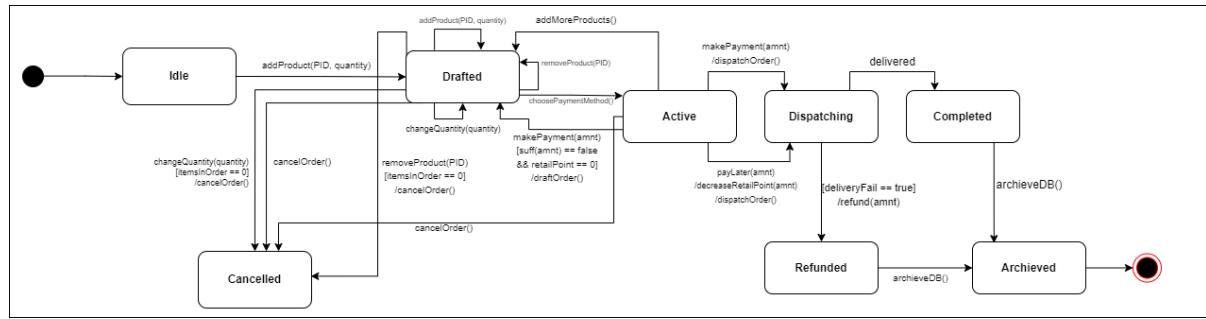


Figure 149: Order State

10.3. Inventory State

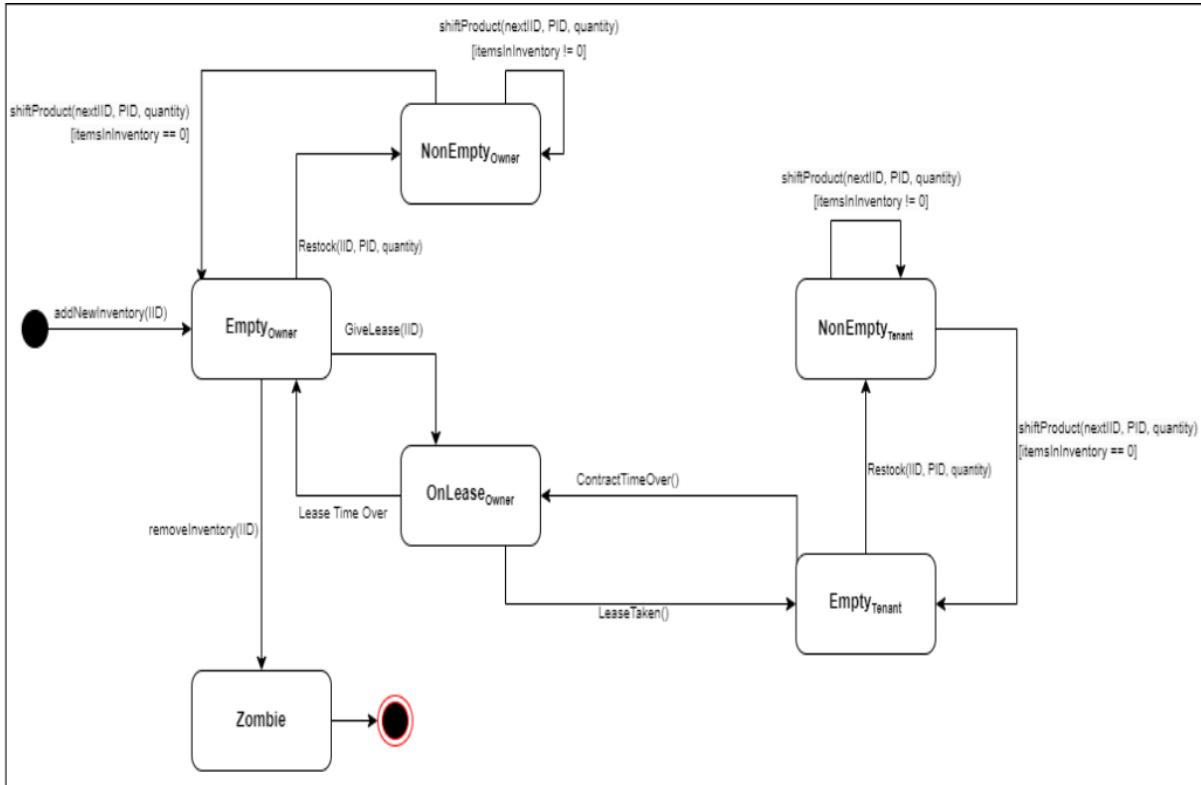


Figure 150: Inventory State

10.4. Product Whereabouts

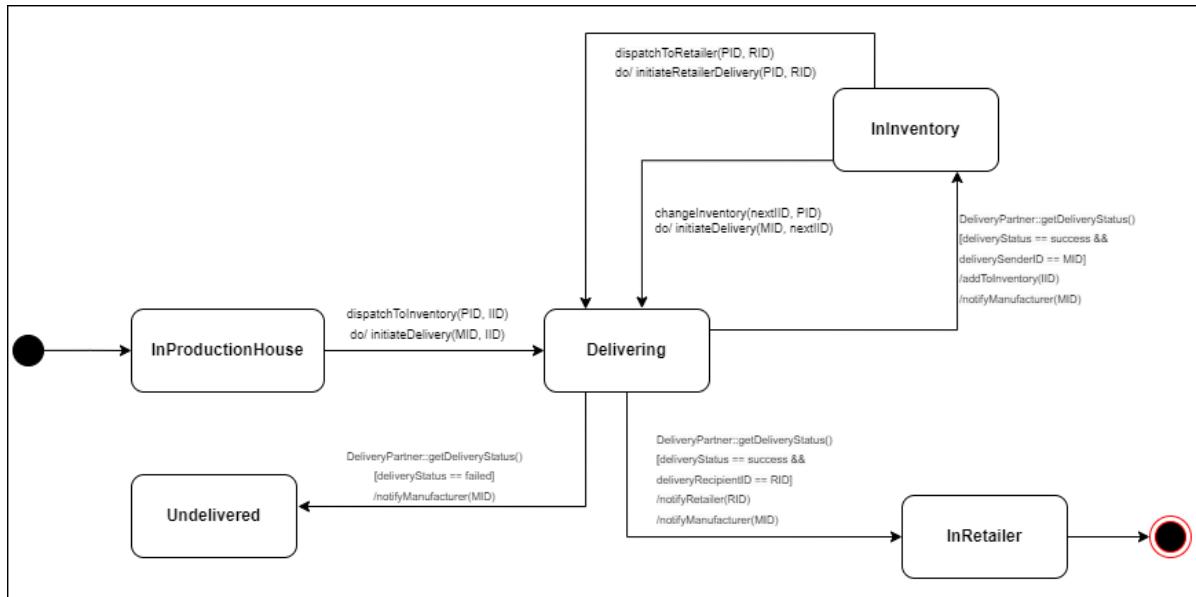


Figure 151: Product Whereabouts

Module Implementation

We implemented parts of inventory management module of Manufacturer side. The key features that are implemented are:

- Login & HomePage
- Show Inventories & Add Inventory
- Search & Filter Products In an Inventory
- Sorting Batches & Shifting

We used Postgresql as database. We built the frontend with Bootstrap and raw HTML, CSS, and Vanilla Javascript. We built the backend with Express JS. And hosted the site on render.com.

11.1. Login & HomePage

Login Page is the usual Manufacturer Login Page. The manufacturer has to insert their credentials (Email & Password) in this page. After they successfully login they will be redirected to the homepage. Homepage shows the total products & categories, number of total inventories & empty inventories, number of total production houses & empty production houses.

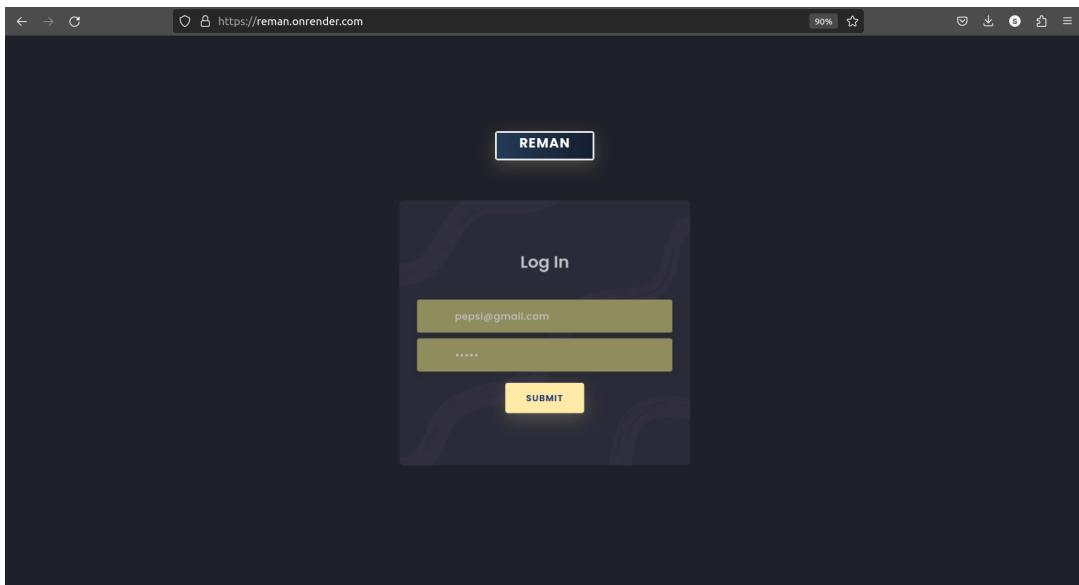


Figure 152: Login Page

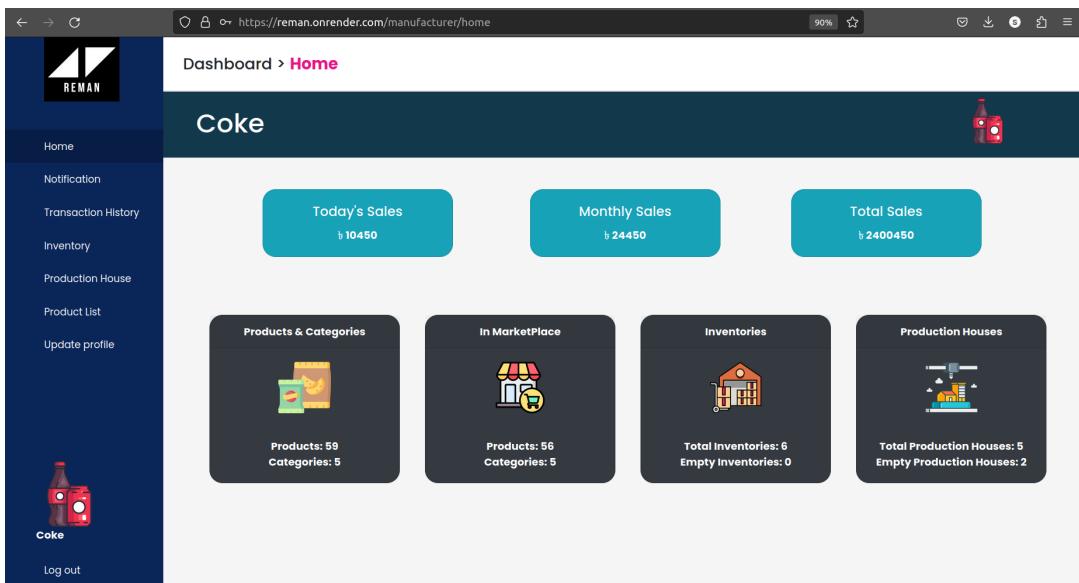


Figure 153: HomePage

11.2. Show Inventories & Add Inventory

By clicking on the Inventory we can go to the inventories. This shows all the inventories under the manufacturer. We can also add inventory by clicking on the '+' sign.

The screenshot shows the REMAN manufacturer dashboard with the URL <https://reman.onrender.com/manufacturer/showInventory>. The left sidebar includes links for Home, Notification, Transaction History, Inventory (which is selected), Production House, Product List, and Data Analytics. The main content area is titled "Inventory Management" and contains sections for "Take Lease" and "Give Lease". Below these are four inventory entries:

- Inventory8**: Location: Dhaka, Type: Cold Storage, Availability: 100%
- Inventoryyyyyyyyy**: Location: Dhaka, Type: Cold Storage, Availability: 100%
- Inventory7**: Location: Gazipur, Type: Raw Materials, Availability: 97%
- Inventory3**: Location: Dindigur, Type: Fruits Storage, Availability: 60%

Figure 154: Show Inventories

The screenshot shows the REMAN manufacturer dashboard with the URL <https://reman.onrender.com/manufacturer/getInventoryAddPage>. The left sidebar includes links for Home, Notification, Transaction History, Inventory (selected), Production House, Product List, and Data Analytics. The main content area is titled "Add Inventory" and contains a form with the following fields:
Inventory Name: New Inventory
Location:

- City: Rajshahi
- District: Rajshahi
- House No: 12
- Street No: 5
- Zip Code: 1000

Inventory Type: (dropdown menu)
To the right of the form is an illustration of a worker in a teal vest and black pants, holding a clipboard and pointing towards a stack of teal shipping boxes.

Figure 155: Add Inventory

11.3. Search & Filter Products In an Inventory

We can go inside a inventory by clicking on that inventory. We will be seeing the product list after going to inventory. We can filter this products by category and also search with sub-string.

The screenshot shows a web browser window for the REMAN platform. The URL is https://reman.onrender.com/manufacturer/getSingleInventoryView. The page title is "Dashboard > Inventory > Details". On the left, there's a sidebar with a REMAN logo and navigation links: Home, Notification, Transaction History, **Inventory**, Production House, Product List, Data Analytics, and Log out. The main content area displays an "Inventory" section with "Location : Dhaka" and "Storage Type : Raw Materials". Below this is a search bar with dropdown menus set to "Chocolates" and a search input field containing "Search for Product...". A "View Shifting Cart" button is also present. The main table lists four chocolate products:

Product Name	Category	Unit Size	Quantity	Base Price	Rating	Stars
Hershey's milk chocolate bar	Chocolates	25g	250	40 taka	2.9	★★★☆☆
Kinder Bueno Chocolate	Chocolates	55g	100	30 taka	4.7	★★★★☆
Amul Dark Chocolate	Chocolates	37g	700	20 taka	3.9	★★★☆☆
Nestle KitKat 2 Fingers Chocolate Mini Box	Chocolates	37g	600	40 taka	4.5	★★★★☆

Figure 156: Filter By Category

The screenshot shows a web browser window for the REMAN platform. The URL is https://reman.onrender.com/manufacturer/getSingleInventoryView. The page title is "Dashboard > Inventory > Details". The sidebar and inventory details are identical to Figure 156. The search bar dropdown is set to "category" and the search input field contains "Potato". The main table lists five potato chip products:

Product Name	Category	Unit Size	Quantity	Base Price	Rating	Stars
Pringles Sour Cream & Onion Potato Chips	Chips	55g	450	40 taka	4.1	★★★★☆
Mister Potato BBQ Crisps	Chips	37g	300	60 taka	4.8	★★★★☆
Mister Potato Original Crisps	Chips	113g	200	30 taka	4.4	★★★★☆
Pringles Cheesy Cheese Potato Chips	Chips	37g	150	40 taka	4.3	★★★★☆
Pringles Original Potato Crisps	Chips	10g	250	100 taka	3.7	★★★☆☆
Pringles Original Potato Chios	Chips	37g	600	30 taka	3.9	★★★★☆

Figure 157: Search

11.4. Sorting Batches & Shifting

We can go inside any product to see the batches. They are sorted by expiry date. We can select the batches for shifting. And by going to shifting cart, we can confirm the shift.

The screenshot shows the REMAN software interface. On the left, there is a dark sidebar with the REMAN logo at the top and a Pepsi logo below it. The sidebar contains links: Home, Notification, Transaction History, Inventory (which is selected), Production House, Product List, and Data Analytics. At the bottom of the sidebar is a Log out button. The main content area has a header "Dashboard > Inventory > Inventory Details > Batch List". Below the header, it says "Inventory", "Location: Dhaka", and "Storage Type: Raw Materials". A message indicates "Now showing the available batches of Product Name : Pringles Sour Cream & Onion Potato Chips". The data is presented in a table:

Batch No.	Product Name	Unit Quantity	Quantity	Expire Date	Status	Action
7000000202	Pringles Sour Cream & Onion Potato Chips	55g	200	2023-11-12T00:00:00.000Z	Moderate	<input type="checkbox"/>
7000000206	Pringles Sour Cream & Onion Potato Chips	55g	250	2023-12-05T00:00:00.000Z	Fresh	<input type="checkbox"/>

At the bottom of the table, there are two buttons: "Add to Shifting Cart" and "Add To Marketplace".

Figure 158: Show Batch List

This screenshot is identical to Figure 158, showing the REMAN software interface for the "Batch List" of Pringles Sour Cream & Onion Potato Chips. The data table and buttons are the same, but the second row (Batch No. 7000000206) now has its "Action" column checkbox checked, indicating it has been selected for shifting.

Figure 159: Select Batch To Shift

The screenshot shows a web-based inventory management system. On the left is a dark sidebar with the REMAN logo at the top and a Pepsi logo at the bottom. Below the REMAN logo are navigation links: Home, Notification, Transaction History, Inventory (which is highlighted in blue), Production House, Product List, and Data Analytics. At the bottom of the sidebar is a Log out link. The main content area has a header "Dashboard > Inventory > Shift Cart". Below this, a message says "Now showing the shift cart for: Inventory!". A table titled "Shift Cart" lists one item:

BATCH NO. OF PRODUCT	UNIT SIZE	QUANTITY	EXPIRE DATE	BATCH STATUS	REMOVE
Batch No : 7000000202	55g	200	2023-11-12	Moderate	

Below the table is a product detail section: "Product: Pringles Sour Cream & Onion Potato Chips" and "Category: Chips". At the bottom is a button labeled "Confirm Shift".

Figure 160: Shifting Cart

This screenshot is identical to Figure 160, showing the Shift Cart interface with one item listed. However, a large, solid black rectangular overlay covers the bottom half of the page, obscuring the "Confirm Shift" button and the footer area.

Figure 161: Confirm Shift

The screenshot shows a web-based application interface for managing inventory. On the left, there is a dark sidebar with the REMAN logo at the top and a Pepsi logo below it. The sidebar contains links: Home, Notification, Transaction History, **Inventory**, Production House, Product List, and Data Analytics. At the bottom of the sidebar is a 'Log out' button.

The main content area has a header 'Dashboard > Inventory > Inventory X > Shift Products'. Below this, the title 'Select Inventory to Shift' is displayed. A list of five inventory items is shown in a grid:

- Inventory8**: Location: Dhaka, Type: Cold Storage. Availability: 100% (green bar).
- Inventoryyyyyyy**: Location: Dhaka, Type: Cold Storage. Availability: 100% (green bar).
- Inventory7**: Location: Gazipur, Type: Raw Materials. Availability: 87% (green bar).
- Inventory3**: Location: Dinhajpur, Type: Fruits Storage. Availability: 60% (green bar).
- Inventory5**: Location: Dhaka, Type: Cold Storage. Availability: 97% (green bar).

Figure 162: Select Inventory To Shift To