Software Design and Architecture

Cropify

Submitted To:

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Cropify (An agri digital marketplace)

" When Farmers Win, We All Do "

1. Introduction

1.1 Purpose

This document aims to gather, analyze, and define high-level needs and features of the Farmer and buyer system. It focuses on the capabilities needed by the stakeholders, and the target users, and why these needs exist. The details of how the Agri Digital Marketplace fulfills these needs are detailed in the use case and supplementary specifications.

1.2 Scope

This Vision Document applies to the Agri Digital Marketplace that our team will create. Agri Digital Marketplace is the name of our web app that connects farmers and buyers of agricultural products on a digital B2B platform. It enables users to trade directly, negotiate fair prices, reduce transaction costs and risks, access a barter system, and join a thriving agricultural community.
Farmers who want to sell their agricultural products and buyers, such as exporters and major dealers, who want to buy these products directly from the farmers, will be the main users of this app. This app will be made keeping in mind an existing web application, Agrimp. The respective system will be controlled on phones or via laptops when connected to the internet.

1.3 Title

The title of the project is Cropify.

1.4 Objectives

The objective of the Cropify system is to revolutionize the agricultural trading landscape by addressing the longstanding challenges faced by farmers. Through the establishment of a digital B2B marketplace, Cropify aims to empower farmers by providing them with a platform to negotiate fair prices directly with buyers, thereby eliminating the need for costly intermediaries and increasing their profitability. Moreover, Cropify seeks to alleviate financial constraints experienced by farmers by introducing a barter system that allows for the exchange of produce for necessary inputs like pesticides. By streamlining trading processes and reducing transaction costs, Cropify not only enhances the financial stability and profitability of farmers but also fosters sustainable agricultural practices. Furthermore, Cropify endeavors to build a thriving agricultural community by facilitating communication and collaboration among stakeholders in the industry, ultimately contributing to the overall growth and development of the agricultural sector. Through these objectives, Cropify aims to transform the way agricultural products are bought, sold, and traded, ushering in a new era of efficiency and prosperity in the agricultural marketplace.

1.5 Problem Statement

The Problem	Farmers consistently put in hard work, but they face two major obstacles. - First, they don't get paid enough for their produce because middlemen and dealers demand astronomical commissions from buyers, lowering the farmers' take-home pay. - Second, due to financial limitations—farmers typically receive their income only at the end of the season—buying necessary pesticides during the farming season is challenging. Their financial stability and profitability are hampered by these problems collectively.
Affects	Farmers, who put in a lot of effort to produce agricultural products, are impacted by this problem.
The Impact Of which is	Due to this issue, farmers find it difficult to make a fair living from their labor-intensive farming activities, which over time may result in financial instability and decreased agricultural productivity. Additionally, it keeps farmers trapped in a cycle of poverty, impeding rural development.
A Successful Solution would Be	A successful solution would be a web app that allows farmers to communicate directly with buyers, such as exporters and large dealers, to negotiate fair prices for their produce, do away with expensive middlemen, and boost their overall profitability **by** using Agri Digital Marketplace. The web app should also include a barter system that enables farmers to trade their produce for necessary inputs like pesticides, easing their financial burdens and fostering sustainable agricultural methods **through** Agri Digital Marketplace. This solution would strengthen farmer autonomy, enhance their standard of living, and support the expansion of the agricultural industry as a whole **with** the **Agri** Digital Marketplace.

2. Overall Description

2.1 Product Perspective

The Cropify project is an innovative digital B2B agri marketplace designed to address the challenges faced by farmers in selling their produce efficiently and profitably. The product perspective of Cropify encompasses its role within the broader context of agricultural trading systems. Here's an elaboration on this. Cropify is positioned as a digital platform that revolutionizes the traditional agricultural trading methods. In contrast to existing systems, Cropify eliminates intermediaries, facilitating direct transactions between farmers and buyers. This shift from conventional trading practices to a digital marketplace signifies a significant advancement in the agricultural industry. Within the ecosystem of agricultural trading systems, Cropify stands out as a self-contained product, offering a comprehensive solution to the challenges faced by both farmers and buyers. It serves as an alternative to traditional methods, providing a seamless interface for users to engage in trading activities.

2.2 Product Function

Here's a high-level summary of the major functions that Cropify must perform or enable users to perform:

1. Profile Management:

   Users can customize and manage their profiles, including updating information and uploading profile pictures.

2. Cart Management:

   Buyers can add, delete, and update items in their shopping carts.

3. Post Management:

   Farmers can upload, delete, and update posts of agricultural commodities they are offering for sale.

4. Price Management:

   The system calculates prices of commodities based on their weight or other relevant factors.

5. Sample Ordering:

   Buyers can request samples of agricultural products before making purchasing decisions.

6. Barter System:

   Farmers can request barter exchanges for their produce, and exporters can accept or reject these requests.

7. Order Management:

   Users can track orders, cancel orders, and manage order statuses.

8. Bid Management:

Exporters can offer prices for agricultural products, and farmers can accept or reject these bids.

9. Searching and Filtration:

Users can search for specific agricultural products and apply filters to refine search results.

10. Inspection Report:

Exporters can request inspection reports for agricultural products, which Cropify generates.

11. User Verifications:

Cropify verifies users for security and authentication purposes.

12. Payment Management:

The system facilitates secure payment transactions between buyers and sellers.

These functions collectively enable Cropify to facilitate efficient and transparent trading between farmers and buyers in the agricultural marketplace.

2.3 List of Use cases

1. Managing user profile
2. Selecting commodity
3. Managing Bid
4. Listing commodity
5. Placing order
6. Managing commodity
7. Generating inspection Report

2.4 Extended Use cases

Searching and selecting commodities.

Section	Content
ID	UC-2.1
Name	Search and select commodities.
Scope	It enables the user (both buyer and seller) to efficiently search, filter, and select specific commodities based on their preferences.

Level	User-goal	
Primary Actor	User (Buyer or Seller)	
Stakeholders and Interests	- Buyer (Primary): Efficient identification of desired commodities based on specific criteria. - Seller (Primary): Increased product visibility and sales opportunities. - Platform Operator (Secondary): Enhanced user engagement and platform adoption.	
Pre-condition	- The user has a verified account on Cropify. - The user is logged in to their account.	
Post-condition	- The user has identified a suitable commodity listing that meets their requirements.	
Main Success Scenario	User Actions	System Responsibility

	1- The user navigates to the commodity search section. 3 - The user chooses from the commodity options and initiates the search. 5- The user selects filters to refine search results. 7- The user browses through the search results. 8- The user selects a commodity for more details. 10- The user decides to select the commodity.	2 -The system displays some default commodities. 4- The system displays relevant commodity listings. 6 -The system applies filters and updates the commodities accordingly. 9- The system provides a detailed view of that commodity. 11- The system adds the commodity to the user's favorites list.
Extensions	3a. The user does not find its desired commodity default options. 1. The system provides email to contact the customer support department. 4a.If there is no listing of selected commodity options. 1. The system displays the appropriate message. 6a. If the system fails to apply filters correctly. 1. The user can select the desired commodity from all the commodity listings.	
Special Requirements	- High-Performance Search Engine - Advanced filtering and sorting capabilities - Real-time inventory updates	
Technology and Data Variations List	- Searching algorithms - Real-time data syncing - Localization - Different units of measurements	

Frequency of occurrence	High Buyers and sellers constantly search for new opportunities, which means that they will frequently use this functionality to find commodities
Open Issues	- Integration with other systems for real-time data availability. - Scalability of search functionality. - Providing localization support.

Listing commodity:

Section	**Content**	
ID	UC-03	
Name	listing Commodity	
Scope	Cropify	
Level	High	
Primary Actor	Farmer and Buyer	
Stakeholders and Interests	Farmer wants to list its commodity on the system to get the potential buyer. The buyer wants to see The listed commodities to buy the desired one.	
Pre-condition	Both users are verified by Cropify and are logged in	
Post-condition	Commodity list successfully	
Main Success Scenario	User Actions	System Responsibility

	1. The user selects the new post option. 2. He selects the pictures of the commodity. 3. He enters the description of the commodity. 4. He enters the quantity he wants to list. 5. He confirms to publish a post..	2. The system takes him to the next page. 6. The post is listed on the profile successfully.
Extensions	If there is any error, 1. The system will display the error message. 2. The system will redirect the user to the previous page. If the farmer wants to update it later 1. The system will save it in the draft.	
Special Requirements	Easy to use and accurate	
Technology and Data Variations List	Save the data in the database.	
Frequency of occurrence	frequent (Farmer may use this option)	
Open Issues	All the post-related constraints are updated.	

Managing Bidding offer:

Section	Content	
ID	UC-04.1	
Name	Manage Bidding offers	
Scope	Cropify (Agri marketplace) It facilitates the buyer to submit a buying bid to their selected commodity selling offer and to the seller to accept the most suitable bid offer.	
Level	User Goal	
Primary Actor	User (Buyers And Sellers)	
Stakeholders and Interests	- Buyer (Primary): Secure the desired commodity at a competitive price. - Seller (Primary): Maximize their profit margin by receiving the highest price. - Platform Operator (Secondary): Facilitate successful transactions and platform usage.	
Pre-condition	- Buyer should select its desired commodity from available commodity listing offers. - Seller should submit its commodity selling offer.	
Post-condition	- The buyer got the message of successfully sending a bidding offer to the seller. - Seller received the bid offer from the buyer.	
Main Success Scenario	User Actions	System Responsibility
	1- Buyer selects its desired commodity from the selling offer. 3- Buyer initiates the new bidding offer.	2- The system displays the selected commodity details with bidding offers from different buyers.

	5- The buyer fills out the form and sends it to the seller.	4- The system displays the bidding form to the buyer. 6- The system displays the confirmation message to the buyer. 7- The system sends a notification to the seller of a new bidding offer.
Extensions	1a. Invalid commodity selection, the buyer attempts to submit a bid on a commodity that is no longer available. 1b. The commodity has been delisted by the seller 1c. The commodity is not eligible for bidding. 1* - The system displays an error message informing the buyer that the chosen commodity cannot be bid on. 2a. A technical issue prevents the system from displaying the bidding information for the chosen commodity. 1. The system displays an error message. 2. The system suggests the buyer refresh the page or try again later. 3a. The bidding time frame expires, and the buyer initiates a bid, but the system doesn't register it because the bidding period has already closed. 1. The system informs the buyer that the bidding window has ended. 5a. Invalid bid format, the buyer fills out the bid form that is not in the correct format. 1. The system highlights the error in the bidding form. 2. The system provides clear instructions on acceptable bid format. 3. The buyer corrects the format and resubmits. 7a. Network connectivity issue, the buyer successfully submits their bid, but the system fails to send the notification to the seller due to network problems. 1. The system displays and informs the buyer of the potential notification delay.	

Special Requirements	- Bid history visibility - Real-time bid update - Bidding timeframe flexibility
Technology and Data Variations List	- Commodity data - Bid data - Data validation
Frequency of occurrence	High It is the main gateway of the marketplace and every time it has to happen for every single transaction between buyer and seller.
Open Issues	- Dynamic pricing algorithm - Integration with other systems - Fraud detection and Prevention

Placing Order:

Section	**Content**
ID	UC-07
Name	Managing Order
Scope	Cropify (Agriculture digital marketplace platform)
Level	User Goal
Primary Actor	User(Buyer)
Stakeholders and Interests	Buyer: Wants an efficient process for ordering the product or commodities. Seller: Wants to efficiently manage the post of his product/commodity and get notified when it is purchased. System: Aims to facilitate the smooth process of order fulfillment.

<table>
<tr><td>Pre-condition</td><td colspan="2">The user logged in to the platform</td></tr>
<tr><td>Post-condition</td><td colspan="2">The order was successfully placed and delivered</td></tr>
<tr><td rowspan="2">Main Success Scenario</td><td>User Actions</td><td>System Responsibility</td></tr>
<tr><td>1. The Buyer browses and selects a product or commodity that he wants to purchase.

3. Buyer orders sample of the commodity

5. The buyer confirms the order

9. The seller acknowledges the order and ships the product
10. The seller shares the tracking details
11. Buyer receives the tracking details
12. The buyer receives the product.</td><td>2. Show the details of the product

4. Sends the sample ordering request to the seller

6. Initiates the payment process
7. Generates the order confirmation receipt
8. Notifies the seller of the order</td></tr>
<tr><td>Extensions</td><td colspan="2">*a. At any time, the system fails
1. The buyer requests the recovery of the order
2. Buyer restarts the ordering process
3a. Sample ordering use case initiates.
5a. Seller receives the sample request
5b. Seller sends the sample to the buyer
6a. User selects the payment method
1. The buyer selects the bank transfer
a. The buyer enters account details
b. The bank verifies the account details
c. The buyer makes the payment
2. The buyer selects Online payment
a. The buyer enters the card number</td></tr>
</table>

	b. Buyer enters cvv c. Buyer enters card expiry d. Bank validates card details e. buyer makes payment 3. The buyer selects cash on delivery
Special Requirements	- Real-time tracking details - Secure payment and shipment process
Technology and Data Variations List	6a. Secure platform for communication and payment processing 11a. Order tracking software such as ClickPost or AfterShip is used to track the order
Frequency of occurrence	Frequent, according to user involvement
Open Issues	Handling order cancellations

Generating inspection report:

Section	**Content**
ID	UC–09
Name	Generating Inspection Report
Scope	Cropify
Level	High
Primary Actor	Buyer and Cropify
Stakeholders and Interests	Buyer wants to have the quality report of the commodity so that he can decide whether to buy or not to buy the product.

	Cropify will provide the inspection report to the buyer so that he can buy good commodities. Farmers will help in creating inspection reports.	
Pre-condition	Users are logged in the system	
Post-condition	Requests sent successfully.	
Main Success Scenario	User Actions	System Responsibility
	1. Buyer searches for the desired product. 3. He selects the product which he likes. 5. He checks the details. 6. He forwards the request.	2. System shows the desired products. 4. The system displays the details of the product. 7. The system sends the request to Cropify for the report generation.
Extensions	a*.If the buyer faces any error. 1. The system takes him to the previous page. 2. The system shows him the error.	
Special Requirements	Ease to request and accurate	
Technology and Data Variations List	The Cropify team will provide the data of the report.	
Frequency of occurrence	Infrequent (buyer may use this option)	
Open Issues	The Cropify inspector should have adequate knowledge regarding the commodity inspection.	

Managing Price:

Section	Content	
ID	UC-10	
Name	Managing Price	
Scope	Cropify	
Level	High	
Primary Actor	Farmer and Buyer	
Stakeholders and Interests	Farmer wants to set or change the price to get a good buyer for his commodity. Buyer wants to see the prices of the commodities and order according to his capacity.	
Pre-condition	Users should be logged in to the system.	
Post-condition	Price Set successfully	
Main Success Scenario	User Actions	System Responsibility
	1.Farmer selects the set price option. 1. Farmers add the desired price or change the price. 2. Farmer confirms to update it.	2. System leads the farmer to the page where prices can be set. System receives the price entered by the user. System update the price entered by the user.
Extensions	1a. If at any point the system could not update the price. 1. System will display an error message. 2. User will get to the previous condition in case of any error.	

Special Requirements	Efficiency
Technology and Data Variations List	User data is stored in the platform database to ensure security of the data
Frequency of occurrence	Infrequent (whenever a user adds or updates the post)
Open Issues	- Dynamic Price calculation - Platform fee calculation

Managing Payments:

Section	**Content**
ID	UC-12.1
Name	Processing Online Payment
Scope	Cropify This use case details the steps involved in processing payments made through online methods like credit cards, debit cards, or secure online payment gateways.
Level	User Goal (Low-Level)
Primary Actor	Buyers
Stakeholders and Interests	- Buyer (Primary): Secure and successful completion of the purchase using an online payment method. - Seller (Secondary): Timely receipt of payment from the platform after successful online authorization. - Platform Operator (Secondary): Secure processing of the online payment, collection of platform fees, and crediting the remaining amount to the seller's account.

	- Payment Authorizer (Secondary): Verifying buyer information and authorizing the online transaction.	
Pre-condition	- Buyer has selected "Online Payment" as the preferred payment method during checkout. - Buyer has a valid credit card, debit card, or account with the chosen online payment gateway. - The buyer's internet connection is stable.	
Post-condition	- Buyer receives confirmation of successful payment. - Seller receives notification of successful payment from the platform. - The platform receives confirmation from the payment processor and deducts platform fees before crediting the seller's account.	
Main Success Scenario	User Actions	System Responsibility
	2- The buyer enters their payment information within the designated form on the Cropify platform.	1- The system displays the payment form 3- The system transmits the payment information to the chosen payment authorizer. 4- The payment authorizer verifies the buyer's information and authorizes the payment. 5- The system receives confirmation of successful payment from the payment authorizer. 6- The system updates order status. 7- The system sends notifications to both buyer

	8 - Buyer receives an email or notification with a downloadable invoice. 9- Seller receives notification of successful payment.	and seller confirming the successful payment.
Extensions	4a. The payment authorizer declines the transaction due to insufficient funds, invalid card information, or other reasons. 1. The system informs the buyer of the payment failure. 2. The system provides options to retry with a different payment method or explore alternative payment options. 5a. A temporary network issue disrupts communication with the payment authorizer during payment authorization. 1. The system displays an error message to the buyer. 2. The system allows the buyer to retry the payment or wait for a brief period before attempting again.	
Special Requirements	- Compliance with relevant payment security standards for online transactions.	
Technology and Data Variations List	- Secured encryption algorithms - Card details	
Frequency of occurrence	High As it will happen every time to complete every single transaction on the platform. So, it's the main gateway.	
Open Issues	- Integration with potential future online payment methods. - Development of fraud detection - Prevention mechanisms for online transactions.	

Managing Barter:

Section	Content	
ID	UC-16	
Name	Managing Barter Trade	
Scope	Cropify	
Level	High	
Primary Actor	Farmer and Buyer	
Stakeholders and Interests	**The Farmer** wants to have a barter system so that he can ask for any accessories from the Buyer during the crop season. **Buyer** wants to have a barter system so that he can get farmers' trust and get commodities at low prices.	
Pre-condition	Both users are verified by Cropify and are logged in	
Post-condition	Contract successful	
Main Success Scenario	**User Actions**	**System Responsibility**
	1. Farmers activate the barter option.	The system sends the request to the buyer regarding the barter system.
	2. The farmer selects the commodity he wants to have in barter trade. 3. He selects the buyer he wants to contact. 4. He sends the request.	The system displays the commodity requested by the farmer to the buyer.

Extensions	If the Buyer rejects the request, 1. The system will send messages to farmers. If the buyer accepts the request, 1. The system will send the message to farmer 2. The buyer will ask for the quantity of the requested commodity.	
Special Requirements	Easy to use Keeping records of the bartered items.	
Technology and Data Variations List	Save the data in the database.	
Frequency of occurrence	Infrequent (Farmer may use this option)	
Open Issues	Ensure the barter system complies with relevant legal regulations and user agreements.	

Tracking Order:

Section	**Content**
ID	UC-15.1
Name	Tracking Order
Scope	Cropify (Agri Marketplace) Focuses on the functionality of the tracking system within the delivery management process on Cropify.
Level	User Goal (Sub-function/Low Level)

Primary Actor	Buyer System (Cropify Platform)	
Stakeholders and Interests	**Buyer (Primary):** Gain real-time visibility into the delivery progress of their purchased commodity. **Platform Operator (Secondary):** Ensure smooth delivery flow and provide accurate tracking information to buyers. **Logistics Provider (Secondary):** (e.g., TCS) Fulfills delivery requests on behalf of the platform.	
Pre-condition	● A confirmed order exists on the platform with a chosen shipping method. ● The seller has provided the package to the logistics provider.	
Post-condition	- The buyer can keep track of their order delivery for the given timeframe of delivery.	
Main Success Scenario	User Actions	System Responsibility
	4- The system can view the updated order status.	**1**- The logistic provider's system transmits the initial tracking data (e.g., pickup confirmation, and estimated delivery time frame) to the Cropify platform. **2**- The system receives and stores the initial tracking data. **3**-The system updates the order status. **5**- The system displays the estimated delivery time

	7- The buyer keeps checking the tracking information.	frame to the buyer. **6-** The system displays the latest tracking information to the buyer
Extensions	a*. Unexpected events like extreme weather conditions, traffic disruptions, or damaged packages may cause delivery delays or require re-routing. **1.** The system receives the notification of the delivery exception from the logistics provider. **2.** The system updates the order status **3.** The system informs the buyer about the delay or rerouting. **2a.** There may be a delay in receiving tracking updates from the logistics provider due to technical issues or network connectivity problems. 1. The system may display a message informing the buyer about the temporary delay in tracking updates. 2. The system can also monitor for extended delays and potentially reach out to the logistics provider for clarification.	
Special Requirements	- Integration with logistic provider systems for seamless exchange of order details and real-time delivery status updates. - Robust tracking system to monitor delivery progress and provide visibility to buyers.	
Technology and Data Variations List	- logistic provider integration - Delivery tracking data	
Frequency of occurrence	Varies (depends on the number of successful deals agreement)	
Open Issues	- Last mile delivery challenges - International shipping	

Processing Delivery:

Section	Content
ID	UC-14.1
Name	Processing Delivery
Scope	Cropify (Agri Marketplace) Deals with managing deliveries on the Cropify platform, encompassing prepaid and COD transactions and order tracking.
Level	User Goal (High-Level)
Primary Actor	Buyer System (Cropify Platform)
Stakeholders and Interests	**Buyer (Primary):** Track order, timely and accurate delivery of their purchased commodity. **Seller (Secondary):** Secure shipment of their sold commodity to the buyer. **Platform Operator (Primary):** Efficient and reliable delivery management system to ensure successful order fulfillment. **Logistics Provider (Secondary):** (e.g., TCS) Fulfills delivery requests on behalf of the platform.
Pre-condition	● A confirmed order exists on the platform, with a chosen shipping method. ● The seller has packaged the purchased commodity for shipment.
Post-condition	● The buyer can keep track of their order delivery and receive the purchased commodity within the estimated timeframe.

	● The seller receives confirmation of successful delivery. ● The platform receives updates on the delivery status.	
Main Success Scenario	**User Actions**	**System Responsibility**
	1- The buyer selects the default logistic provider.	**2-** The platform transmits order details to the chosen delivery provider electronically. **3-** The logistic provider attempts delivery to the buyer's specified address.
	4- Upon successful delivery, the buyer confirms receipt of the commodity.	**5-** The system receives notification of successful delivery. **6-** The system updates the order status. **7-** The system notifies both buyer and seller confirming successful delivery.
Extensions	**a*.** If the delivery provider is unable to deliver the package after a certain number of attempts, the package may be returned to the seller or held at a delivery depot. 1. The system receives notification of the failed delivery attempt from the delivery provider. 2. The system updates the order status	

	3. The system informs the buyer about the failed delivery. **3a. UC-15** initiates. **3b.** The buyer refuses delivery or the delivery attempt is unsuccessful. **1.** The system receives the notification of delivery failure from the logistics provider. **2.** The system offers options for redelivery or initiating a refund process. **3c.** The delivery takes longer than the estimated timeframe. **1.** The system monitors delivery progress and proactively communicates any delays to the buyer.
Special Requirements	- Integration with logistic provider systems for seamless exchange of order details and real-time delivery status updates. - Robust tracking system to monitor delivery progress and provide visibility to buyers.
Technology and Data Variations List	- logistic provider integration - Delivery tracking data - Delivery cost calculation data
Frequency of occurrence	**Varies** (depends on the number of successful deals agreement)
Open Issues	- Delivery cost calculation - Last mile delivery challenges - International shipping

Processing Cash on delivery:

Section	**Content**
ID	UC-13.1

Name	Processing Cash On Delivery
Scope	Cropify (Agri Marketplace) Outlines the process for cash-on-delivery transactions on the Cropify platform, utilizing a partnered logistics provider like TCS for delivery and COD collection.
Level	User-Goal (Low-Level)
Primary Actor	Buyers
Stakeholders and Interests	**Buyer (Primary):** Purchase with COD option and pay cash upon successful delivery. **Seller (Secondary):** Receives payment in cash upon delivery of the commodity. **Platform Operator (Secondary):** Facilitates communication between buyer and seller for successful delivery and COD payment collection. **Logistics Provider (Secondary)** (TCS): Ensures delivery of the purchased commodity and collects the COD payment.
Pre-condition	- Buyer has selected "Cash on Delivery" as the preferred payment method during checkout. The buyer and seller have reviewed and confirmed the final purchase price, any applicable shipping fees, and the COD payment method.
Post-condition	- Buyer receives confirmation of their order with COD payment and estimated delivery time frame. - Seller receives notification of the confirmed order with COD payment method. - Buyer successfully receives the purchased commodity and pays the COD amount in cash to the delivery personnel from the TCS.

	- Seller receives confirmation of successful delivery and COD payment collection.	
Main Success Scenario	**User Actions**	**System Responsibility**
	1- The buyer selects "Cash on Delivery" as the preferred payment method during checkout. **2-** Buyer confirms the order details with COD payment.	**3-** The system updates the order status to "Cash on Delivery" and informs the buyer of the estimated delivery time frame. **4-** The System sends a notification to the seller confirming the order with the COD payment method. **5-** The system sends a notification to both buyer and seller confirming successful delivery and COD payment collection.
Extensions	**5a.** Initiates **UC-14** **5b.** The buyer is unable or unwilling to pay the COD amount upon delivery. 1. The delivery personnel from the logistics provider notify the platform of COD payment collection failure. 2. The system provides options for the seller to attempt to collect payment again. 3. The system may offer for the seller to return the	

	undelivered product.
Special Requirements	• Integration with the logistics provider's (e.g., TCS) system for the exchange of order details • Real-time delivery/COD collection status updates.
Technology and Data Variations List	- Delivery details - Logistics provider details
Frequency of occurrence	**High** As it will happen every time to complete every single transaction on the platform. So, it's the main gateway.
Open Issues	- Regulatory compliances. - System for managing and tracking COD transactions.

Processing Payment:

Section	**Content**
ID	UC-11
Name	Processing Payment
Scope	Cropify (Agri Marketplace) Focuses on the completion of payments between buyers and sellers after a successful transaction on the platform. It encompasses both online and offline methods: UC-12 and UC-13.
Level	User Goal (High-Level)

Primary Actor	Buyers	
Stakeholders and Interests	- **Buyer (Primary):** Secure and successful completion of the purchase at a previously agreed price. - **Seller (Secondary):** Timely and secure receipt of payment for their sold commodity. - **Platform Operator (Secondary):** Ensure smooth transaction flow, collect platform fees associated with the payment, and facilitate transactions through cash on delivery.	
Pre-condition	- Buyer has won a bid or agreed with the seller on a specific commodity. - The buyer and seller have reviewed and confirmed the final purchase price and the chosen payment method.	
Post-condition	- Buyer receives successful payment confirmation and can access or download their purchase invoice. - Seller receives notification of successful payment. - Platform receives and processes the payment, deducts any platform fees, credits the remaining amount to the seller's account, or facilitates communication for COD payment collection.	
Main Success Scenario	**User Actions**	**System Responsibility**
	2- Buyers select their payment method.	**1-** The system displays payment methods to the user.
Extensions	**2a.** UC-12 initiates. **2b.** UC-13 initiates.	
Special Requirements	- Integration with secure and reliable payment gateways for online payments. - Compliance with relevant payment security standards for	

	online transactions. - Secure storage of buyer payment information considering the data privacy regulations. - System for managing and tracking COD transactions.
Technology and Data Variations List	- Internationally accepted payment options - Card details - Bank Cheque details
Frequency of occurrence	**High** As it will happen every time to complete every single transaction on the platform. So, it's the main gateway.
Open Issues	- Integration of different online payment gateways. - Regulatory compliances. - Security and privacy concerns

Ordering Sample:

Section	**Content**
ID	UC-08
Name	Ordering Sample
Scope	Cropify (Agriculture digital marketplace platform)
Level	User goal
Primary Actor	User (Buyer)
Stakeholders and Interests	**Buyer:** Want to evaluate the commodity before making a bulk purchase. **Seller:** Wants to get notified when someone requests a sample.

<table>
<tr><td></td><td colspan="2">System: Enhance the user experience to request a sample easily.</td></tr>
<tr><td>Pre-condition</td><td colspan="2">The user is logged in on the platform</td></tr>
<tr><td>Post-condition</td><td colspan="2">The seller gets a sample ordering request</td></tr>
<tr><td rowspan="2">Main Success Scenario</td><td>User Actions</td><td>System Responsibility</td></tr>
<tr><td>1. Buyer browses a commodity that he wants to purchase

3. Buyer selects sample order from options

6. Buyer taps on proceed request</td><td>2. Displays the option of sample order and relevant details of the commodity

4. Initiates the shipping details process

5. Initiates the payment process for delivery charges
7. Confirms the sample order request
8. Notifies the seller</td></tr>
<tr><td>Extensions</td><td colspan="2">*a. At any time, the system fails
1. The buyer requests the recovery of the order
2. Buyer restarts the ordering process
*b. Seller unable to deliver sample
1. The system informs the buyer of the unavailability of the sample
4a. Buyer enters shipping details
1. Buyer enters address
2. Buyer enters contact details
5a. Payment processing use case initiates</td></tr>
<tr><td>Special Requirements</td><td colspan="2">- Secure and efficient communication between buyer and seller
- Easy to use</td></tr>
</table>

Technology and Data Variations List	A communication tool for effective communication between buyer and seller
Frequency of occurrence	Varies, based on buyer involvement/needs
Open Issues	Establishing guidelines for sample shipping cost and responsibilities

Managing Deals:

Section	**Content**	
ID	UC-06	
Name	Managing deals	
Scope	Cropify (Agriculture digital marketplace platform)	
Level	User goal	
Primary Actor	User (buyer or seller)	
Stakeholders and Interests	**User**: wants a detailed view of his orders, including confirmed, pending and canceled orders, to easily manage them **System**: aims to provide a user friendly interface so user can easily manage orders	
Pre-condition	User is logged in to the platform	
Post-condition	User successfully views and manages his order details, including confirmation and cancelation of orders	
Main Success Scenario	**User Actions**	**System Responsibility**
	1. User navigates to the “My deals” page	

	3. User selects confirmed orders to see details or submit a review 5. User selects pending orders 7.User selects canceled orders	2. The system displays a list of user orders marked as confirmed, pending, or canceled orders. 4. System updates seller ratings according to user review 6. System updates the order status according to user input 8.System displays a list of canceled orders and their details.
Extensions	*a. If a confirmed order is not delivered, then the system allows the user to report an issue or chat with the seller. 3a. 1. User select submit a review 2. System opens a review form 3. User rates the order and fills out a form 4. User submits the review 5. System saves the review in the database 5a. System displays option to either confirm or cancel the order 1. If the user selects confirm order a. The order fulfillment use case initiates 2. If the user selects cancel order a. The system shows a confirmation message b. The user confirms c. System cancels the orders and send the order in to the “Canceled orders” list in “My deals”	
Special Requirements	- User friendly interface for order management - Storage of reviews and order status in database	
Technology and Data Variations List	- User orders data is stored in the platform database to ensure security of the data	
Frequency of occurrence	Infrequent, buyer may use this option	

Open Issues	Handling issues related to orders 1. If the confirmed order does not deliver 2. If the stock of confirmed order is finished 3. User wants to re-order the canceled order

Managing Wishlist:

Section	**Content**	
ID	UC-05	
Name	Managing Wishlist	
Scope	Cropify	
Level	User goal	
Primary Actor	User (Buyer or seller)	
Stakeholders and Interests	User: wants to save and manage commodities System: aims to provide an easy and user-friendly interface for managing commodities	
Pre-condition	User is registered on platform	
Post-condition	User successfully manages their selected commodities	
Main Success Scenario	User Actions	System Responsibility
	1. The user navigates to “Saved List”. 3. The user views and manages the commodities.	2. The system displays the list of user-saved commodities

	4. The User selects any commodity 6. If the user selects the checkout. 8. If the user selects modification 10. If the user select removal	5. The system displays the commodity with options for checkout, modification, or removal of the commodity from the list. 7. System initiates the order fulfillment process 9. System updates the list according to user modification 11.System removes the save commodity from the wishlist.
Extensions	*a. If the wishlisted commodity becomes unavailable then the system automatically removes it from the wishlist and notifies the user. 8a. System gives access to the user to edit his save commodity e.g he can change quantity, contact details etc. 10a. 1. System shows confirmation message 2. User confirms to remove	
Special Requirements	Efficient handling of saved items / commodities	
Technology and Data Variations List	Integration with order fulfillment and payment processing system	
Frequency of occurrence	Frequent	
Open Issues	Integration with other systems	

2.5 Use Case Diagram

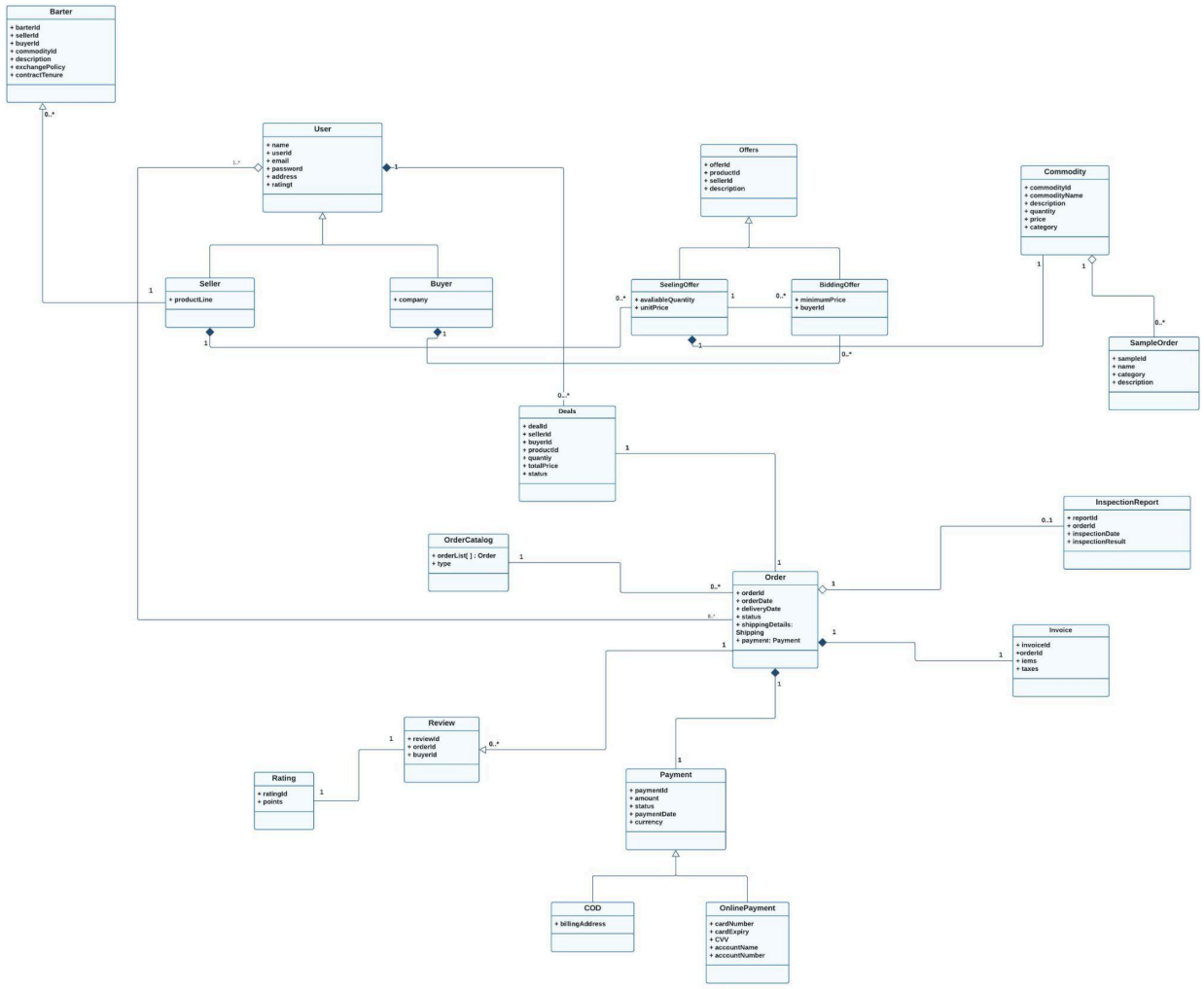
3. **Other Nonfunctional Requirement**

1. **Performance Requirements**
    - **Data Processing**: The system must process large datasets of agricultural produce information and transactions within acceptable time frames, ensuring efficient data handling.
2. **Reliability and Availability Requirements**
    - **Fault Tolerance**: The system must gracefully handle server failures and ensure no data loss. It should automatically redirect to backup servers in case of primary server failure.
3. **Security Requirements**
    - **Authentication and Authorization**: The system must enforce robust authentication and authorization mechanisms to ensure that only authorized users can access certain features and data.

4. **Usability Requirements**
    - **User Interface**: The system must have an intuitive and user-friendly interface that is easy to navigate for users with basic digital literacy.
    - **Accessibility**: The system must adhere to accessibility standards to ensure it is usable by people with disabilities.
    - **Multilingual Support**: The system must support multiple languages to cater to farmers and buyers.
5. **Maintainability and Supportability Requirements**
    - **Modular Design**: The system must be designed in a modular fashion to facilitate easy maintenance and future enhancements.
    - **Documentation**: The system must include comprehensive documentation, including user guides, API documentation.
6. **Interoperability Requirements**
    - **Data Formats**: The system must support standard data formats (e.g., JSON, XML) to ensure compatibility with external systems.
7. **Compliance Requirements**
    - **Regulatory Compliance**: The system must comply with all relevant agricultural, trade, and financial regulations in the regions where it operates.
8. **Localization Requirements**
    - **Local Currency Support**: The system must support transactions in multiple local currencies.
    - **Local Regulations**: The system must be adaptable to comply with local trade and agricultural regulations.
9. **Extensibility Requirements**
    - **Plugin Architecture**: The system must support a plugin architecture to allow third-party developers to add new features and functionalities.

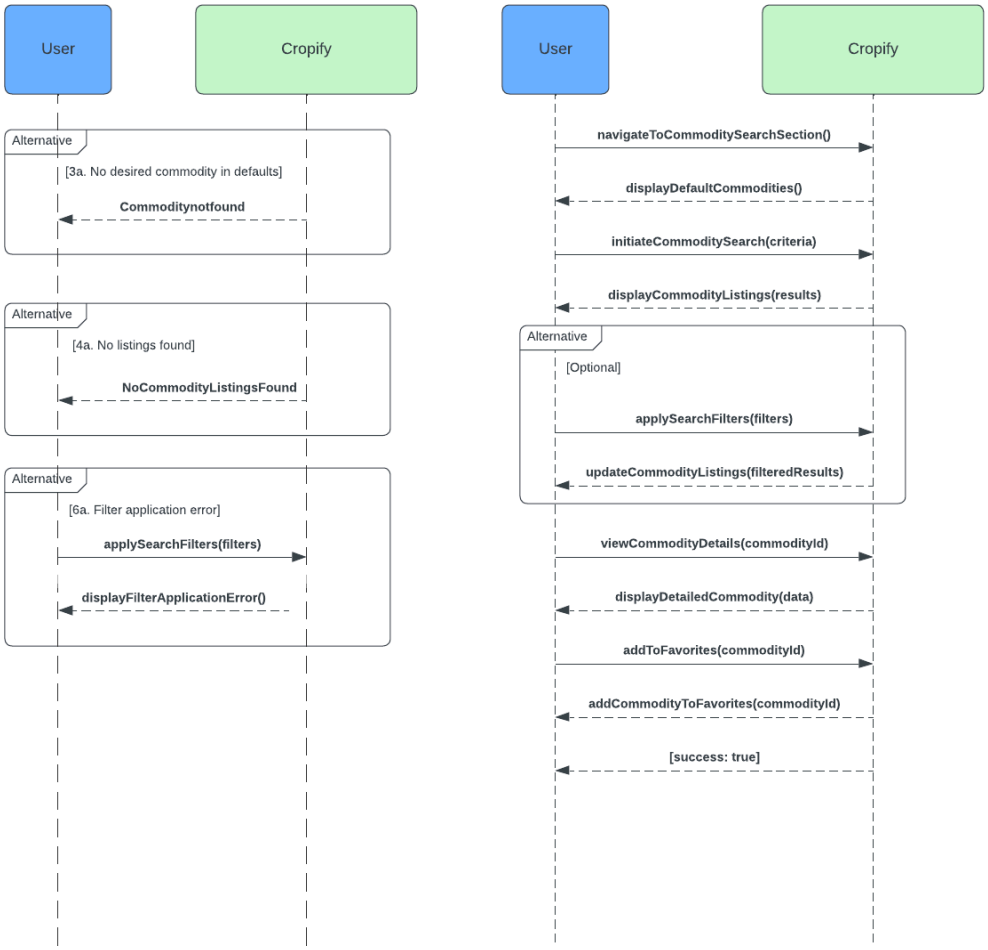
These non-functional requirements are essential for ensuring that the Cropify platform is robust, reliable, secure, and user-friendly, ultimately leading to a successful and sustainable solution for the challenges faced by farmers and buyers in the agricultural marketplace.

4. **Domain Model**

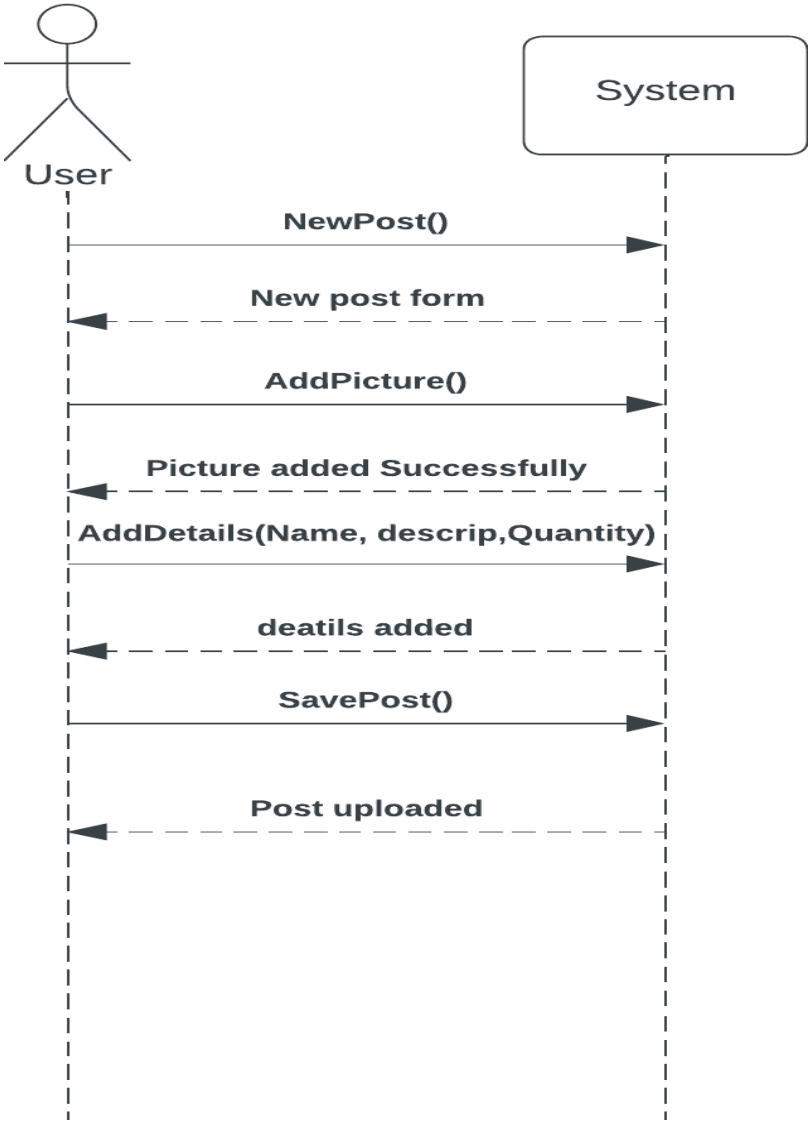


5. System sequence diagram

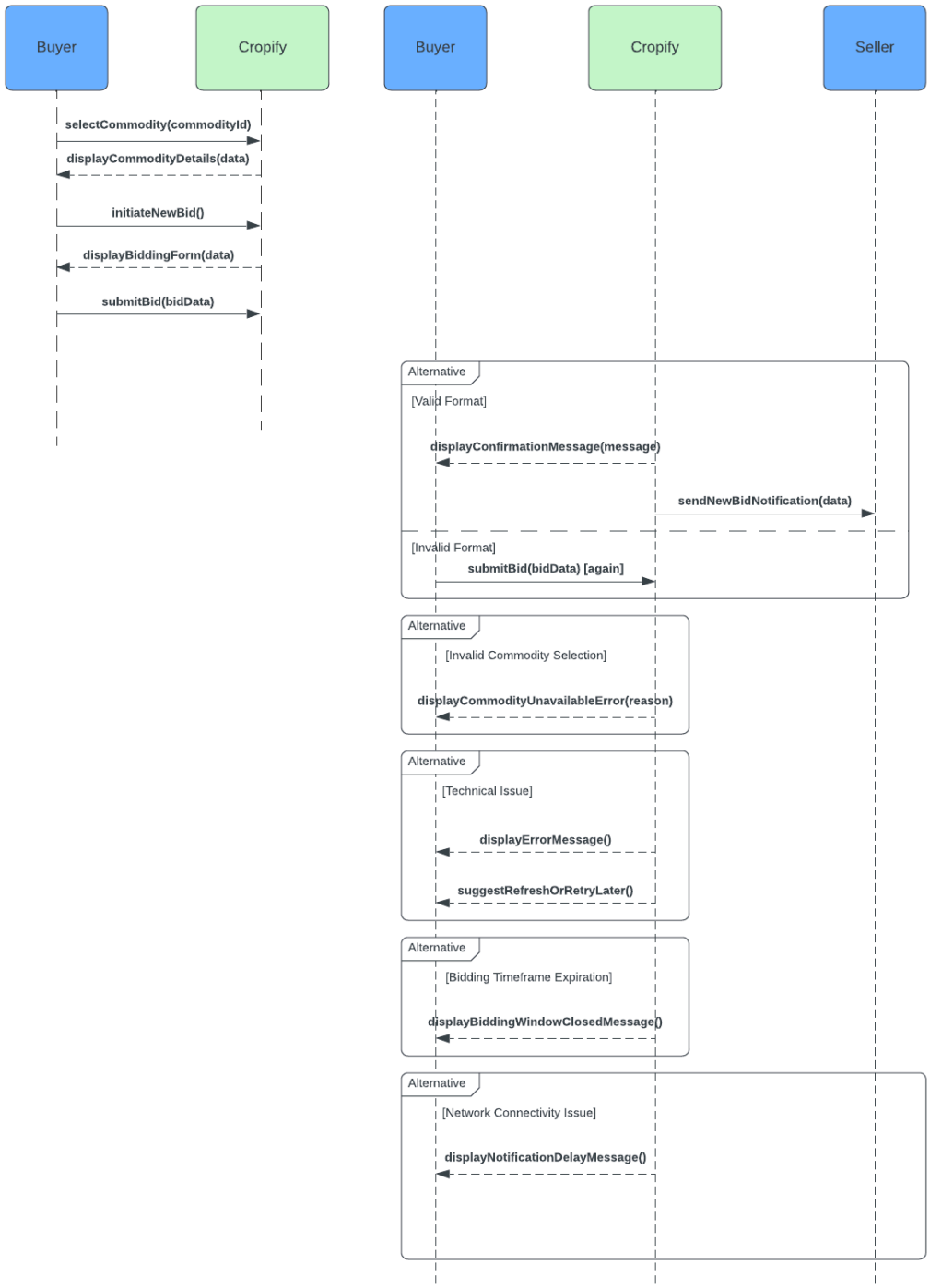
Search and select commodities:



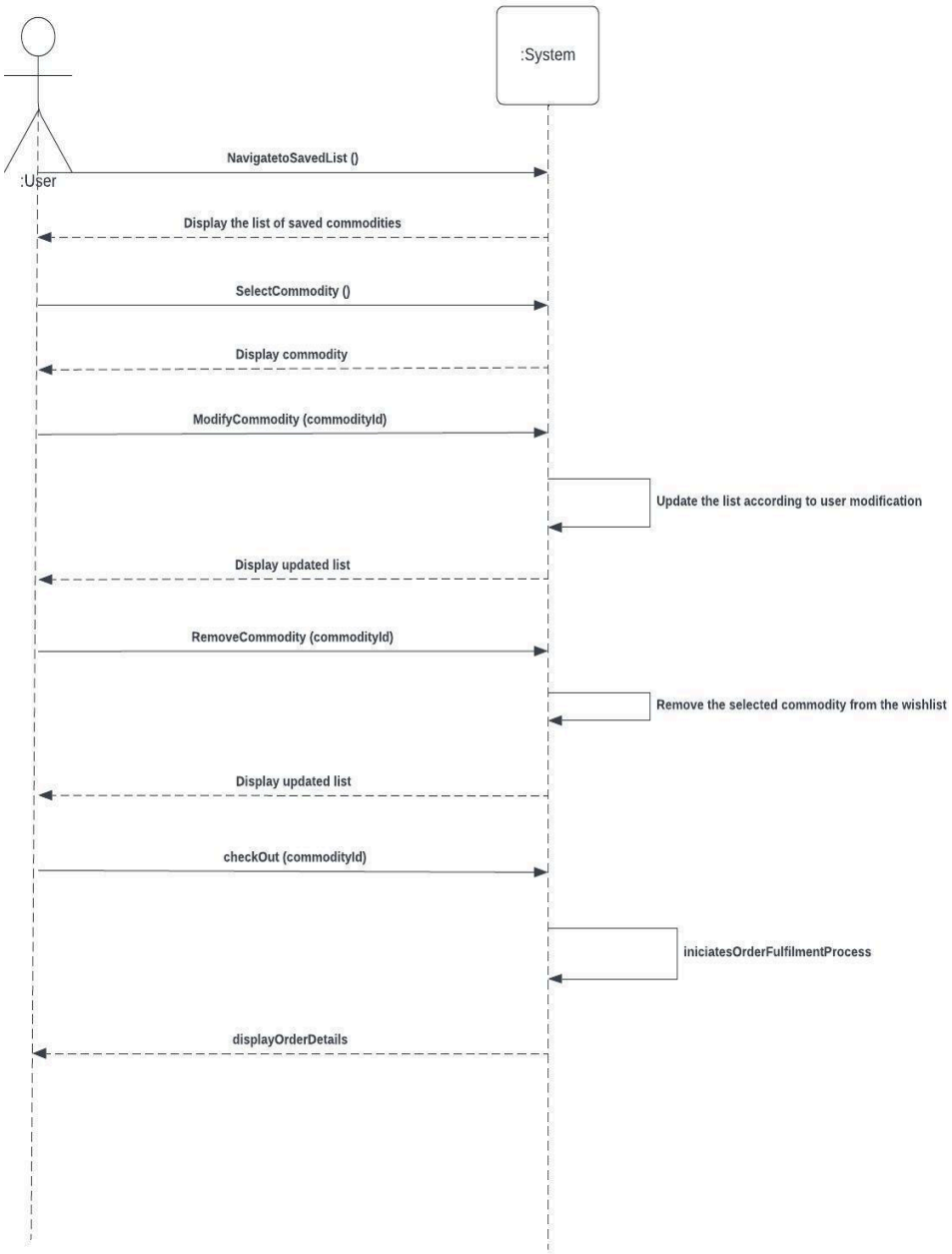
Listing Commodity:



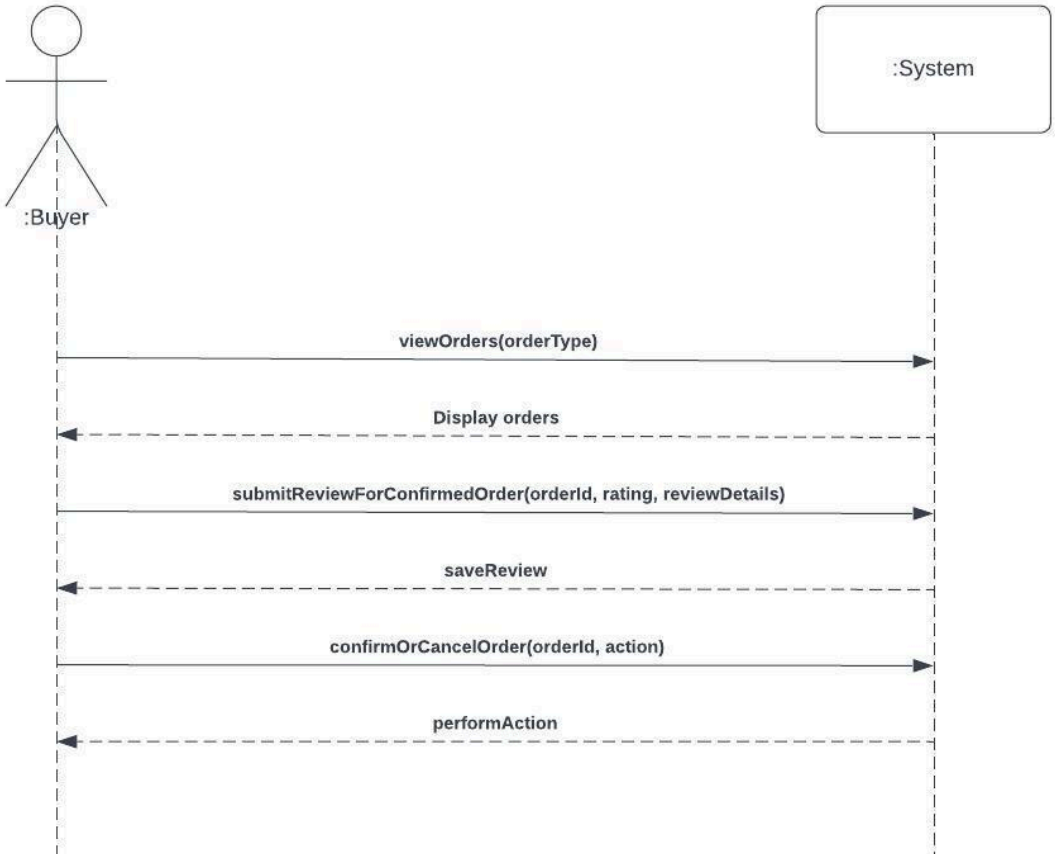
Manage Bidding Offers:



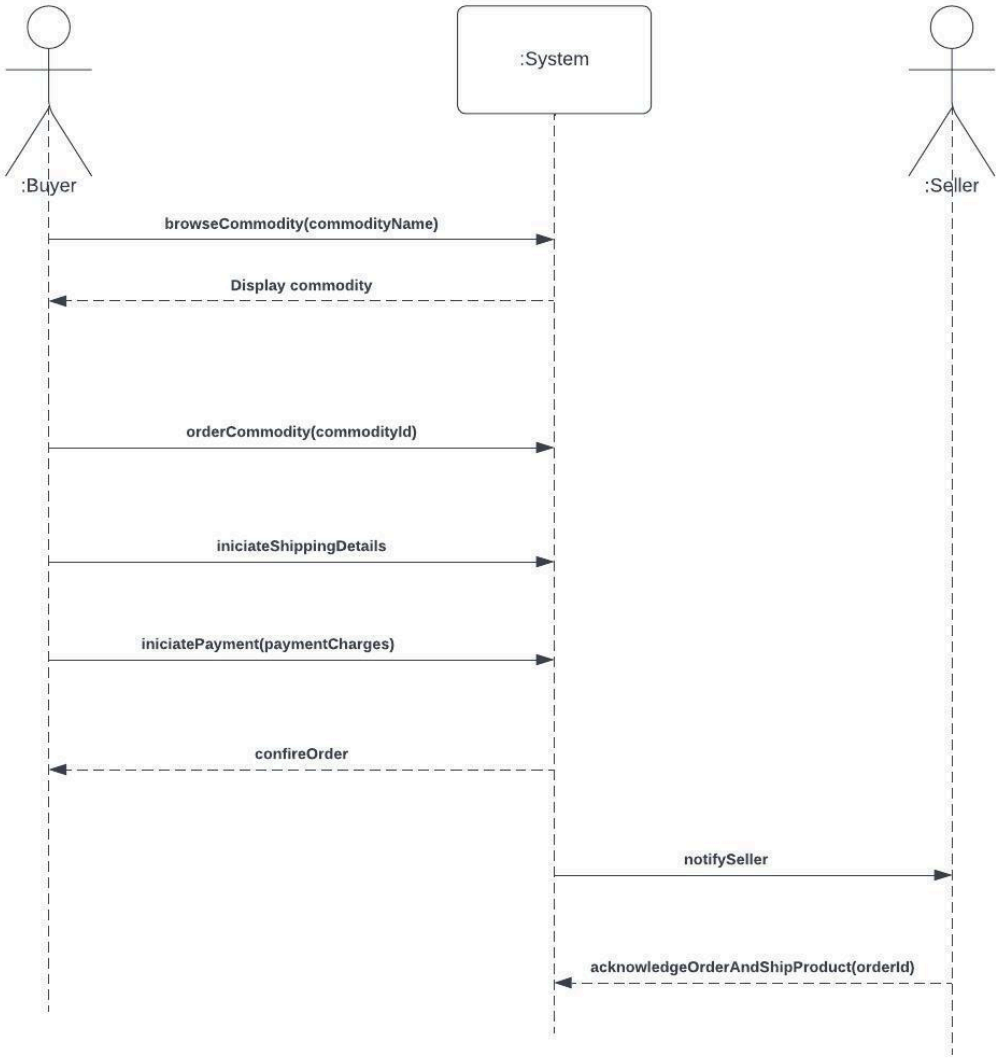
Manage wishlist:



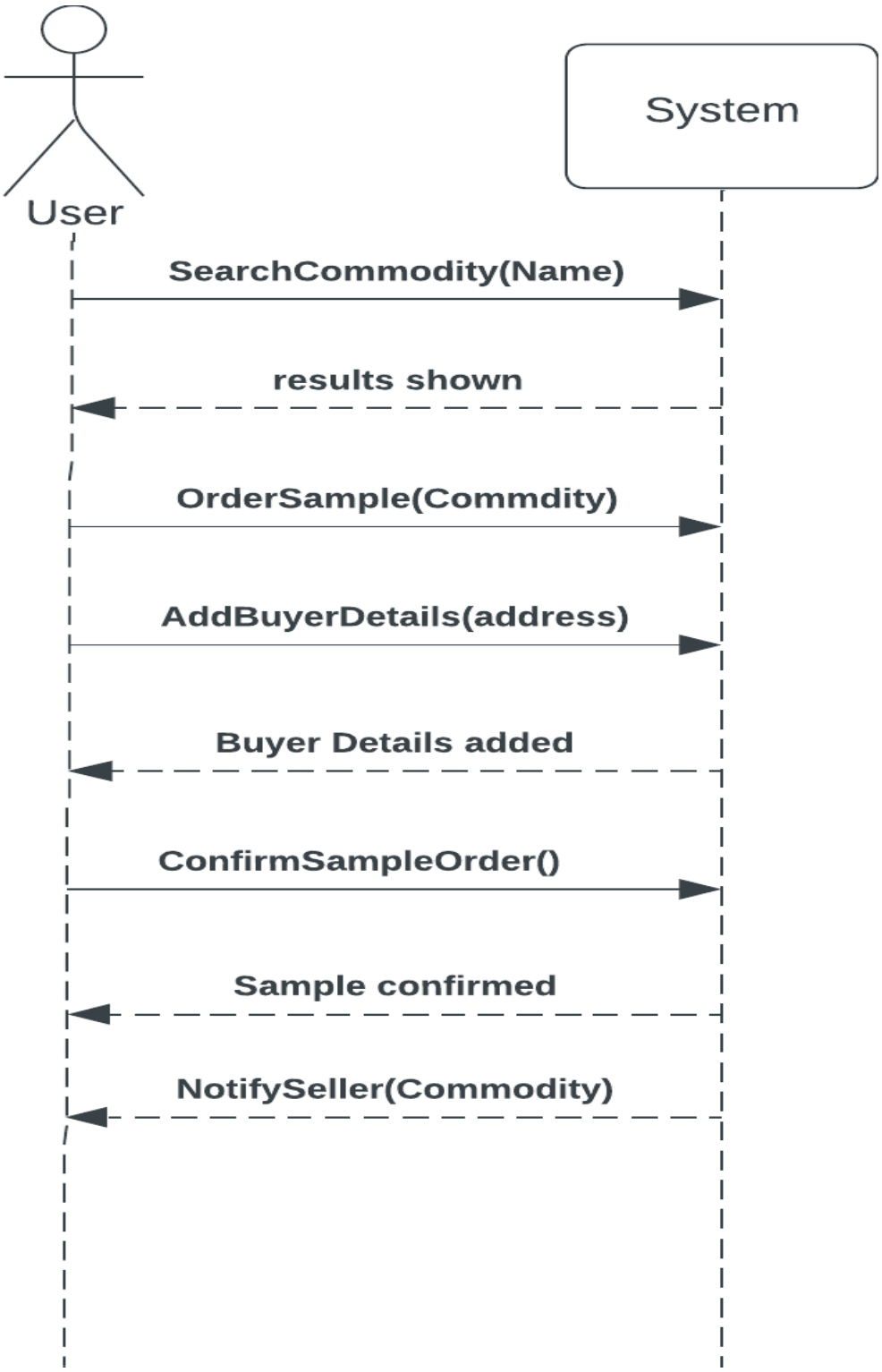
Managing deals:


:Buyer
:System
viewOrders(orderType)
Display orders
submitReviewForConfirmedOrder(orderId, rating, reviewDetails)
saveReview
confirmOrCancelOrder(orderId, action)
performAction

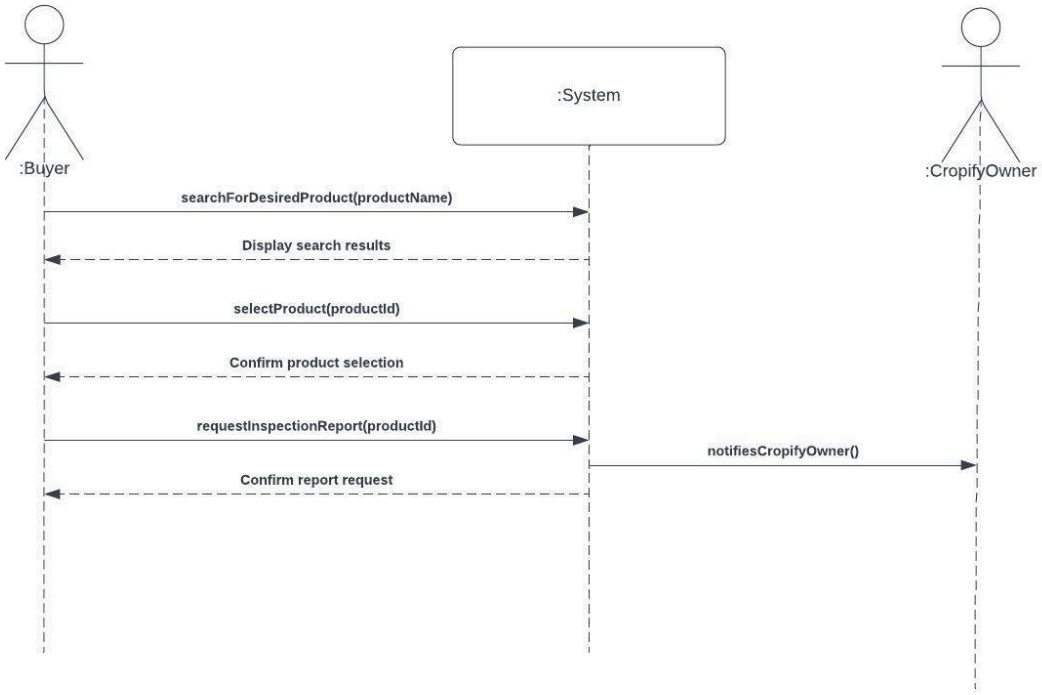
Fulfilling Order:



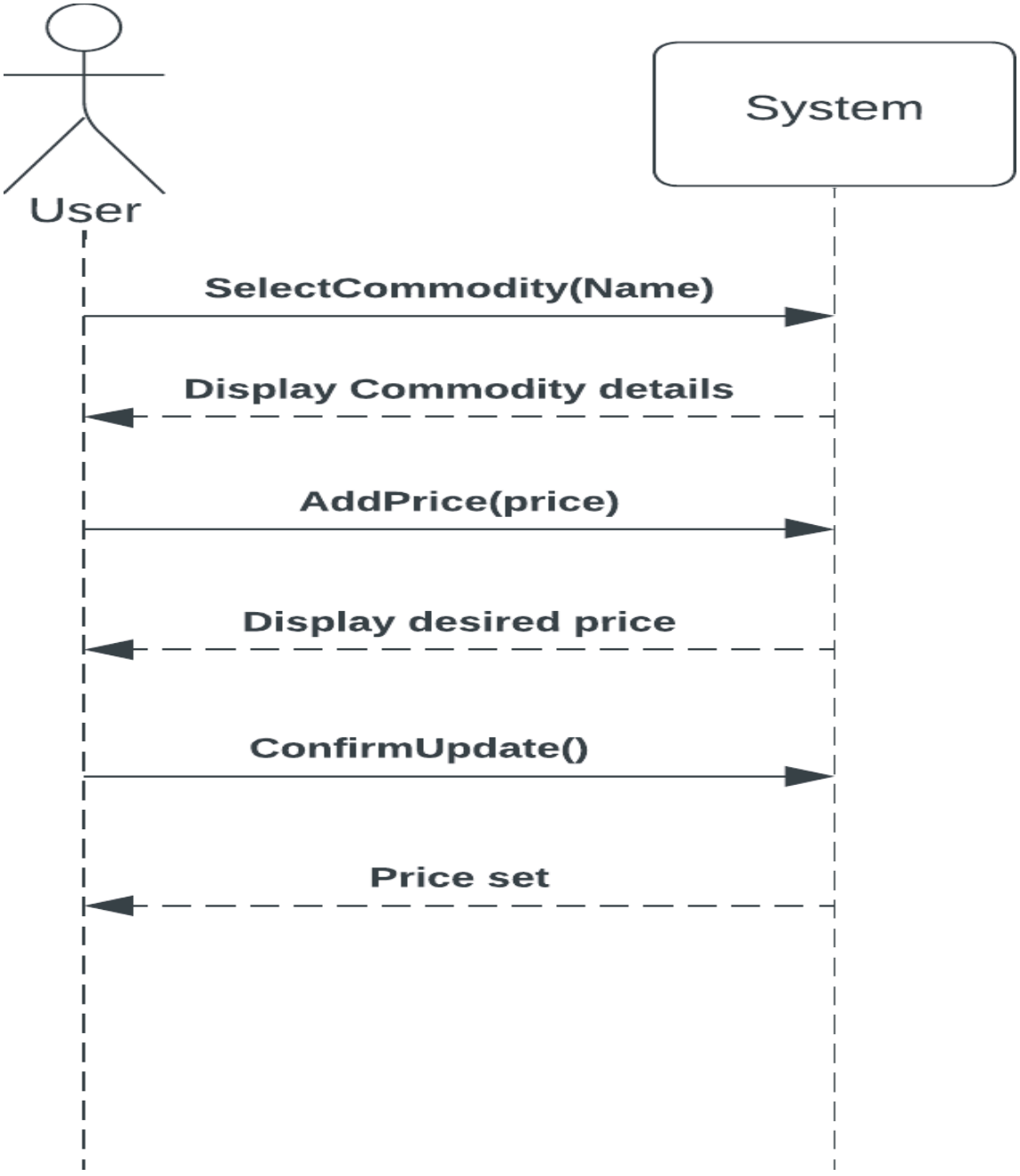
Ordering Sample:


User
System
SearchCommodity(Name)
results shown
OrderSample(Commdity)
AddBuyerDetails(address)
Buyer Details added
ConfirmSampleOrder()
Sample confirmed
NotifySeller(Commodity)

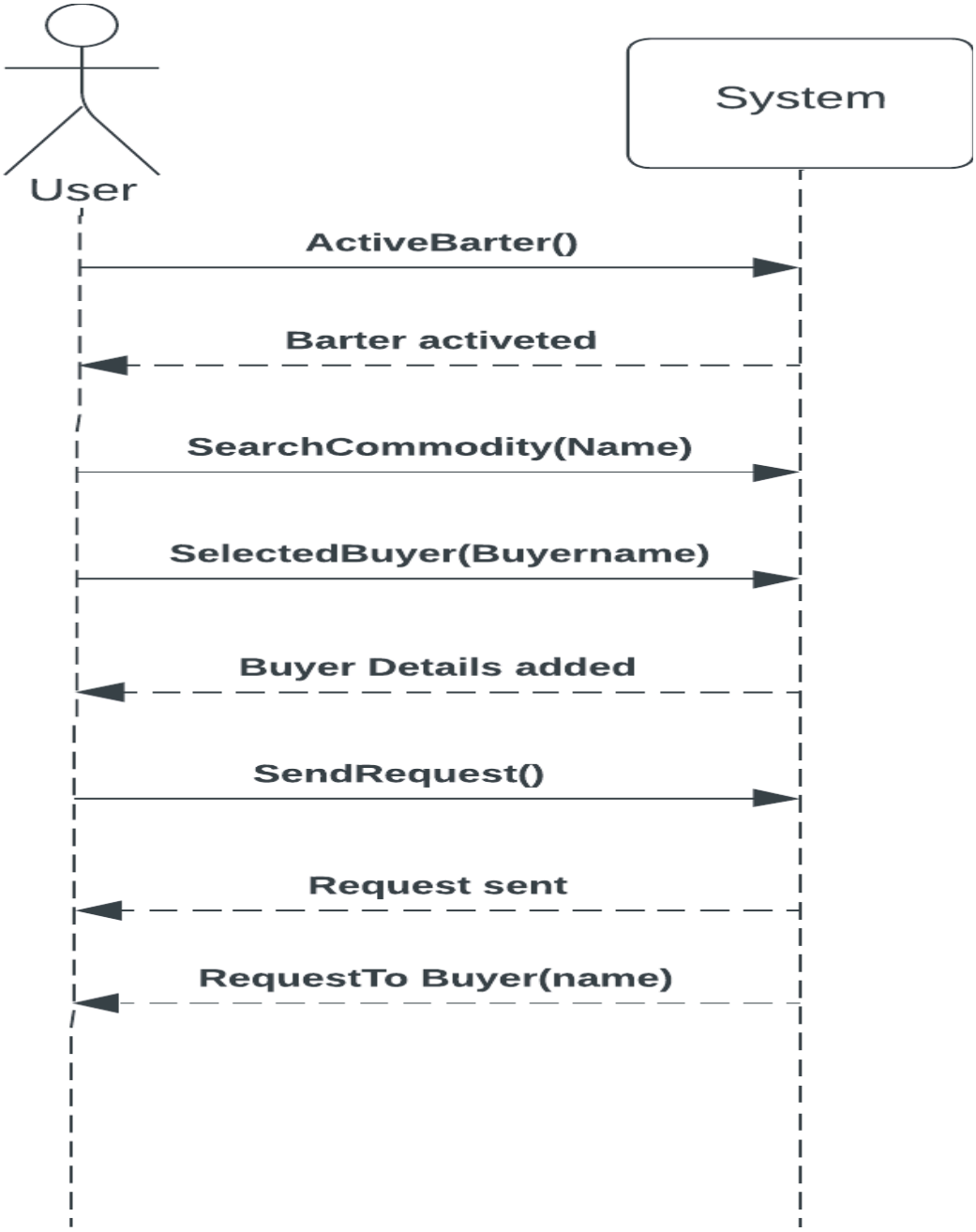
Requesting Inspection Report:



Managing Price:



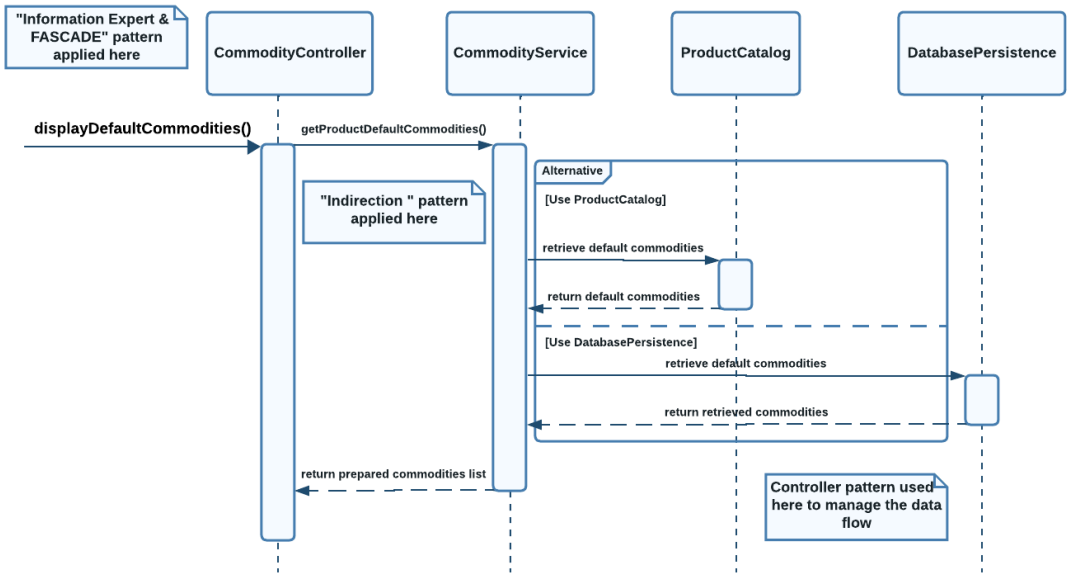
Managing Barter Trade:



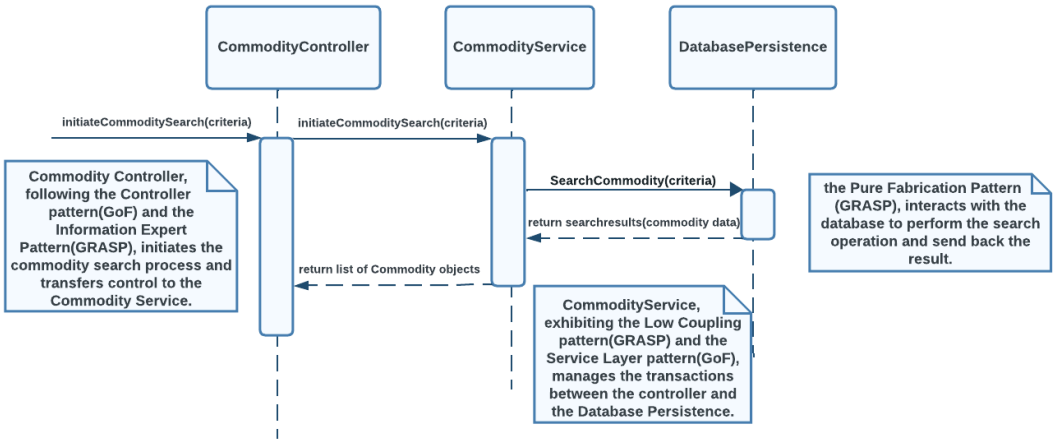
6. **Sequence Diagram**

Search and select commodities:

1. Sequence Diagram

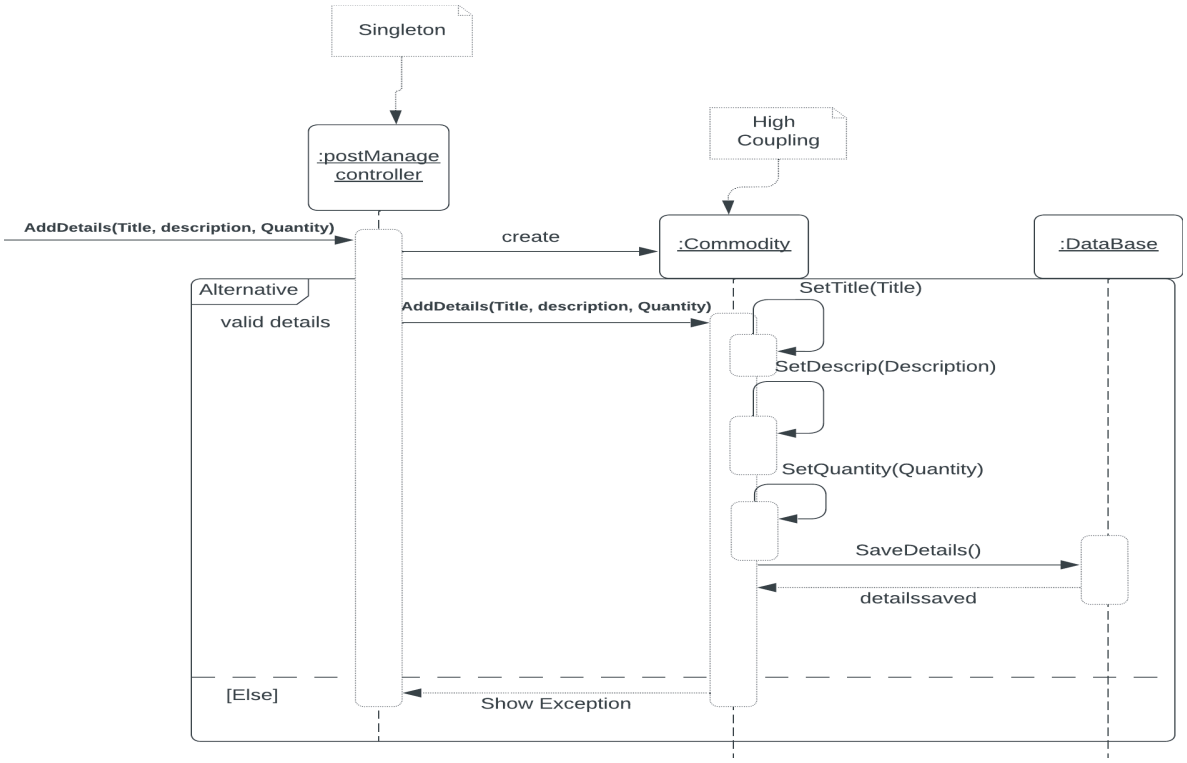


2. Sequence Diagram

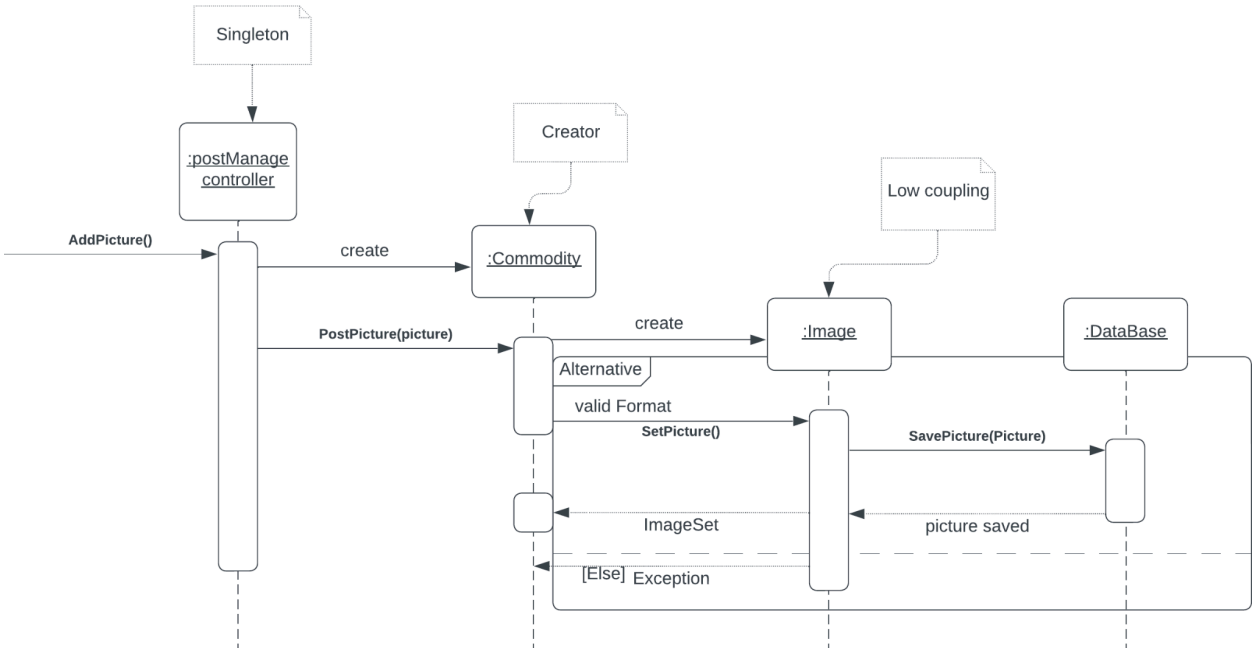


Listing commodity:

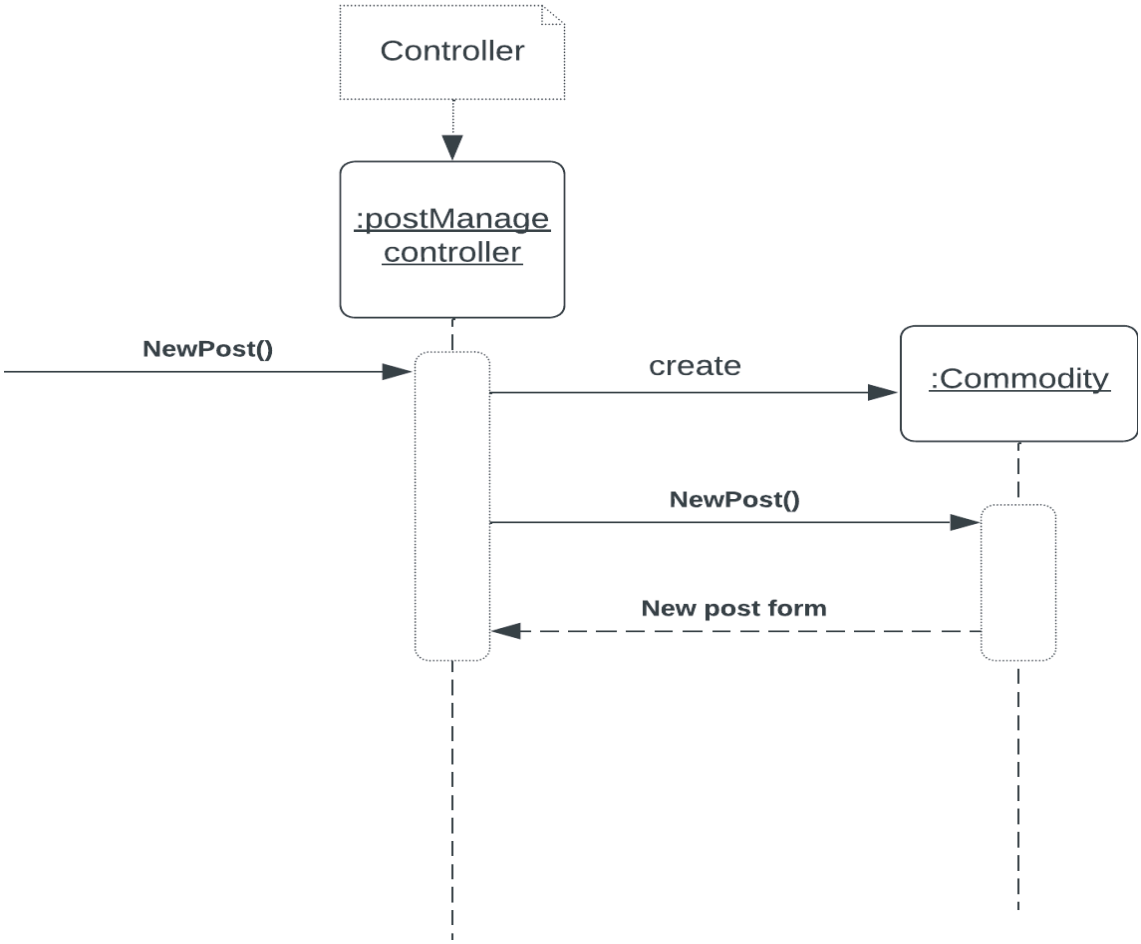
1. Sequence diagram



2. Sequence Diagram

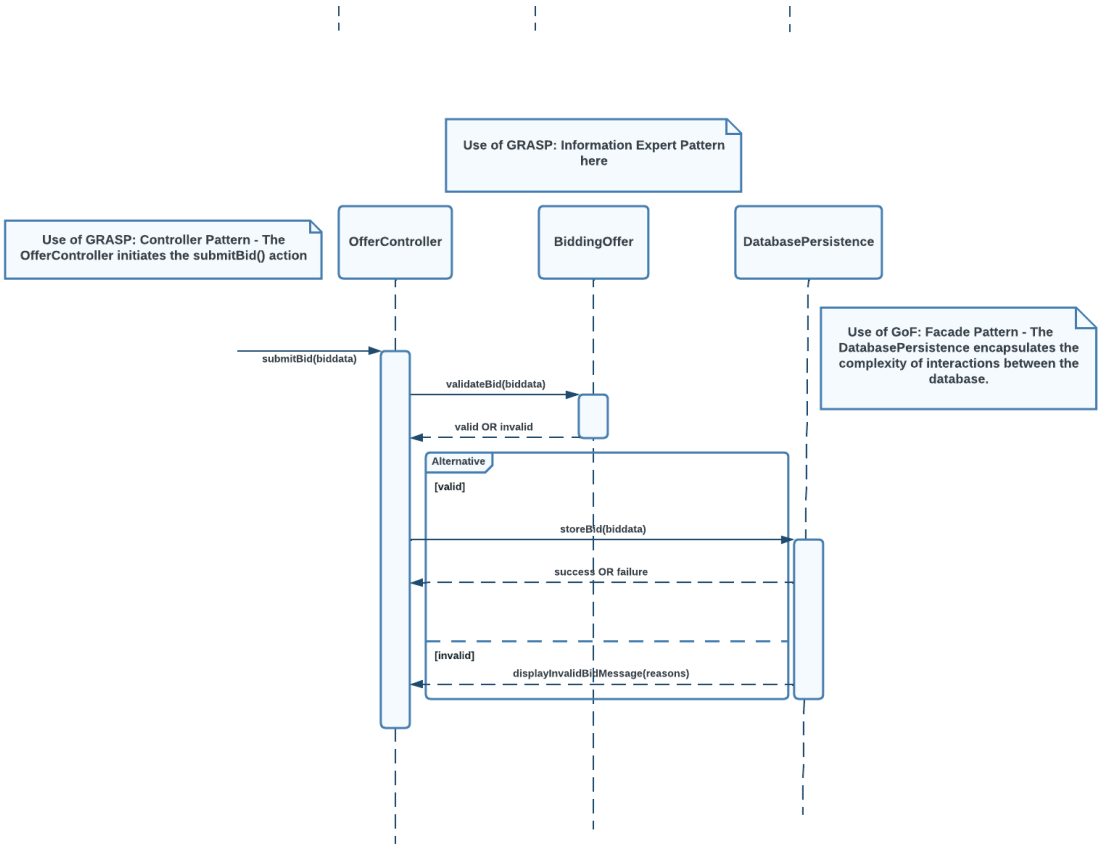


3. Sequence Diagram

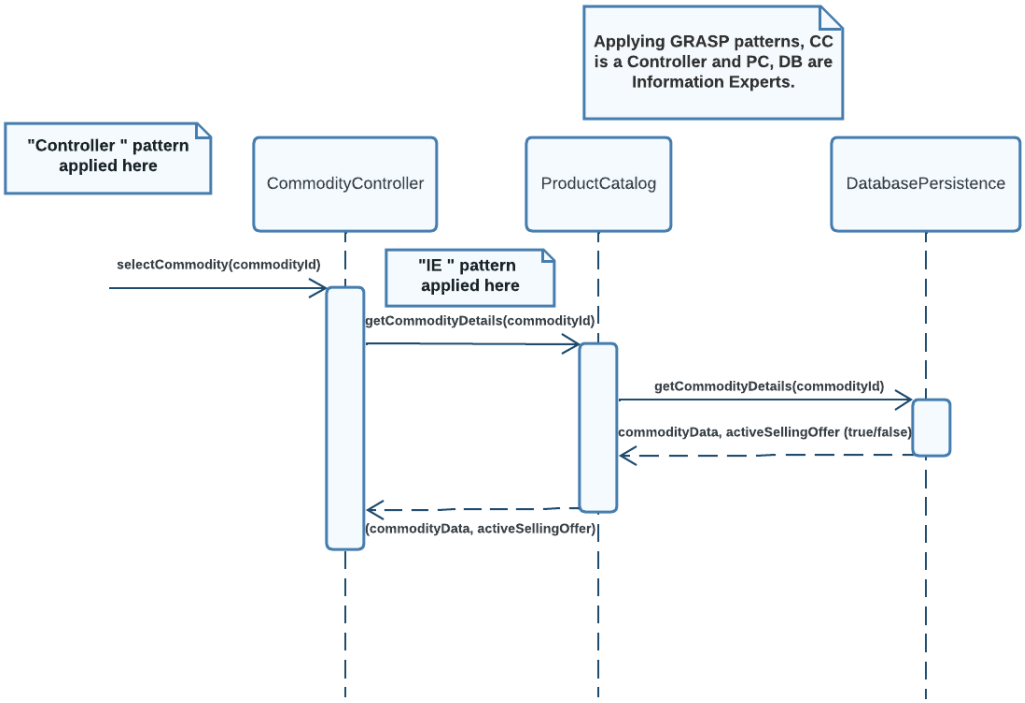


Managing bidding:

1. sequence diagram

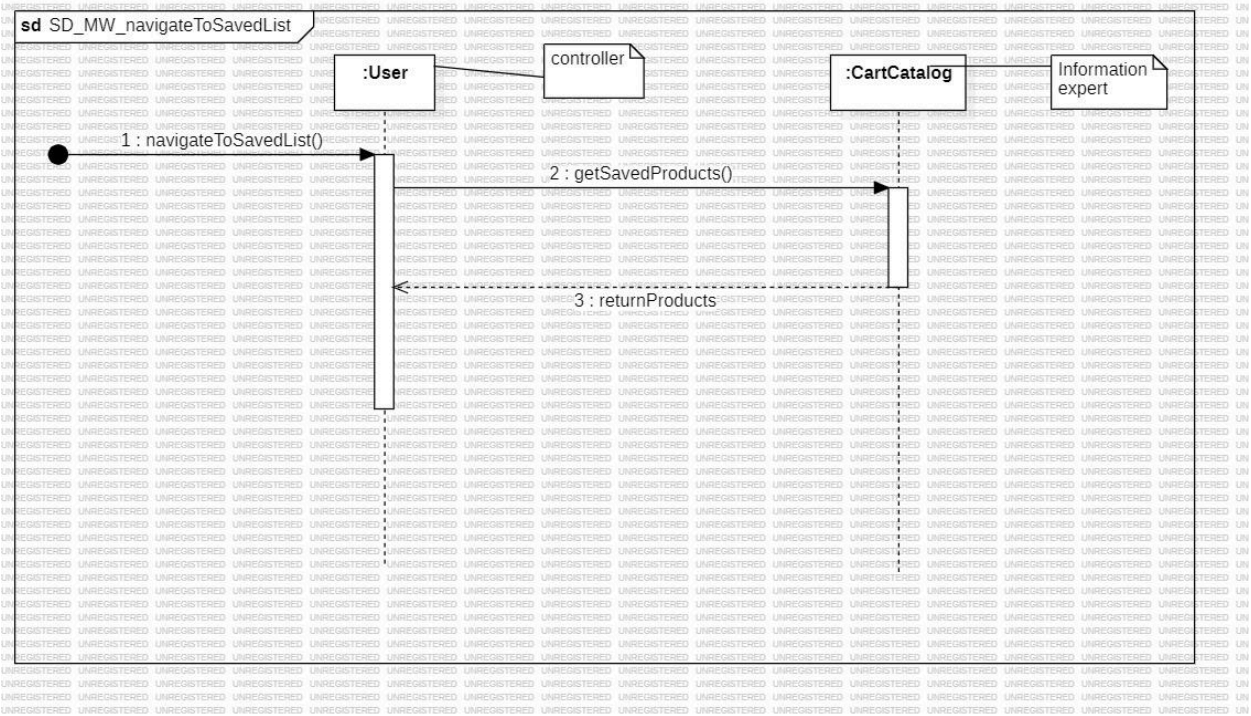

Use of GRASP: Information Expert Pattern here
Use of GRASP: Controller Pattern - The OfferController initiates the submitBid() action
OfferController
BiddingOffer
DatabasePersistence
Use of GoF: Facade Pattern - The DatabasePersistence encapsulates the complexity of interactions between the database.
submitBid(biddata)
validateBid(biddata)
valid OR invalid
Alternative
[valid]
storeBid(biddata)
success OR failure
[invalid]
displayInvalidBidMessage(reasons)

2. Sequence diagram

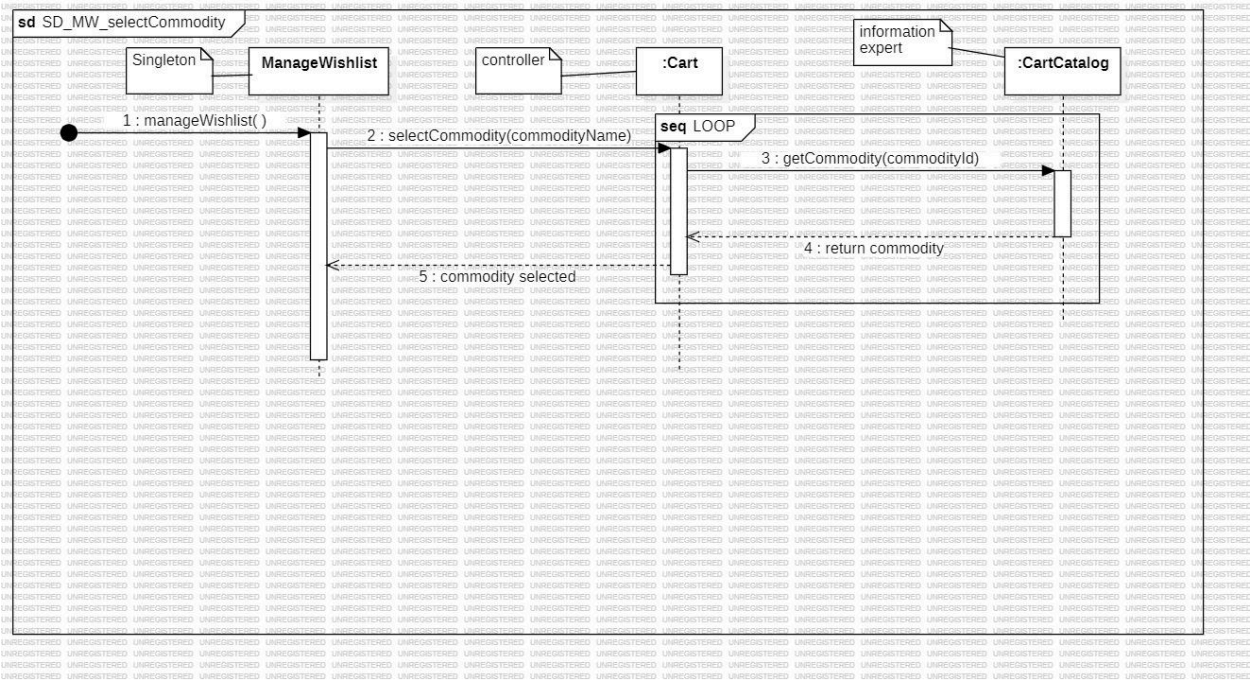


Managing Wishlist:

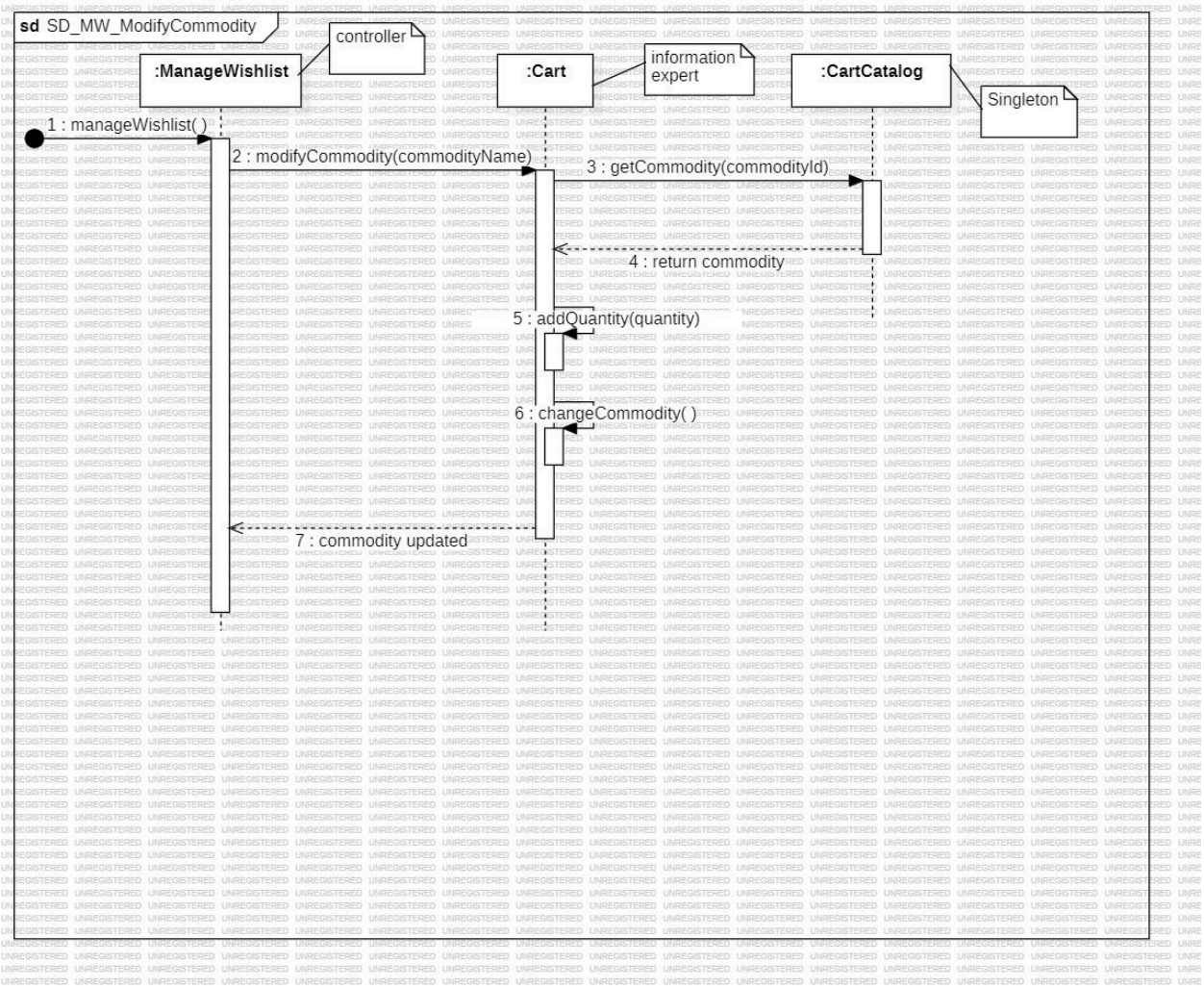
1. Sequence diagram



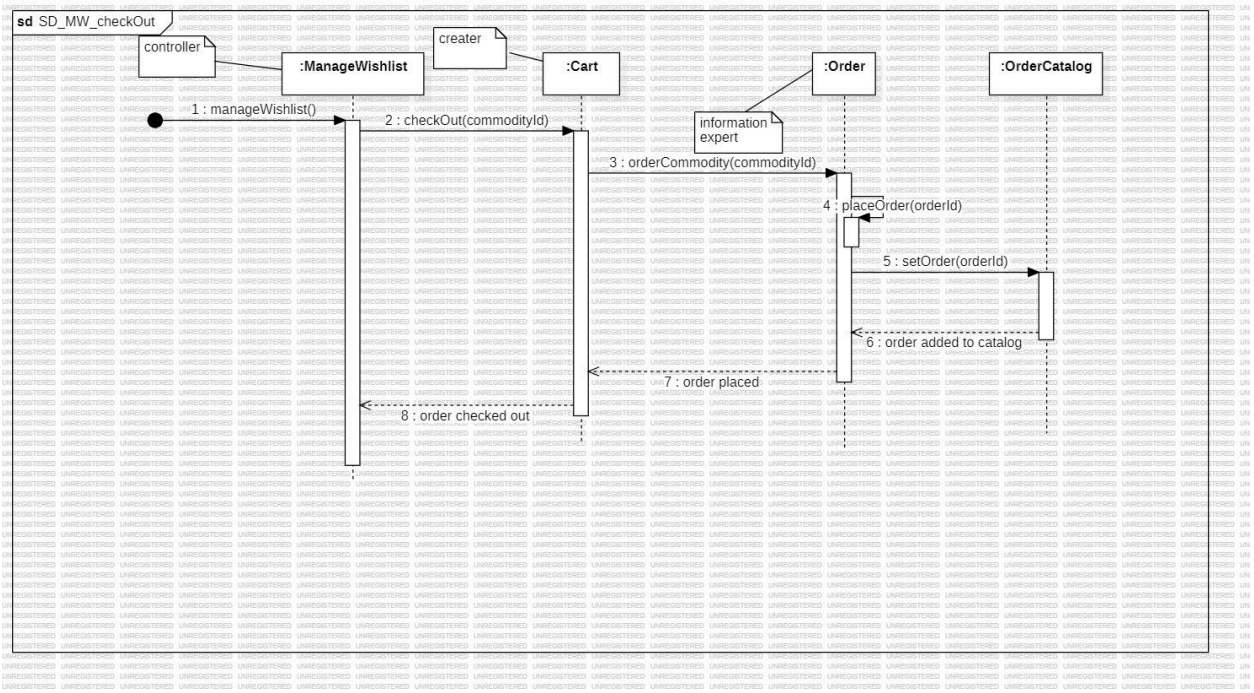
2. Sequence Diagram



3. Sequence diagram

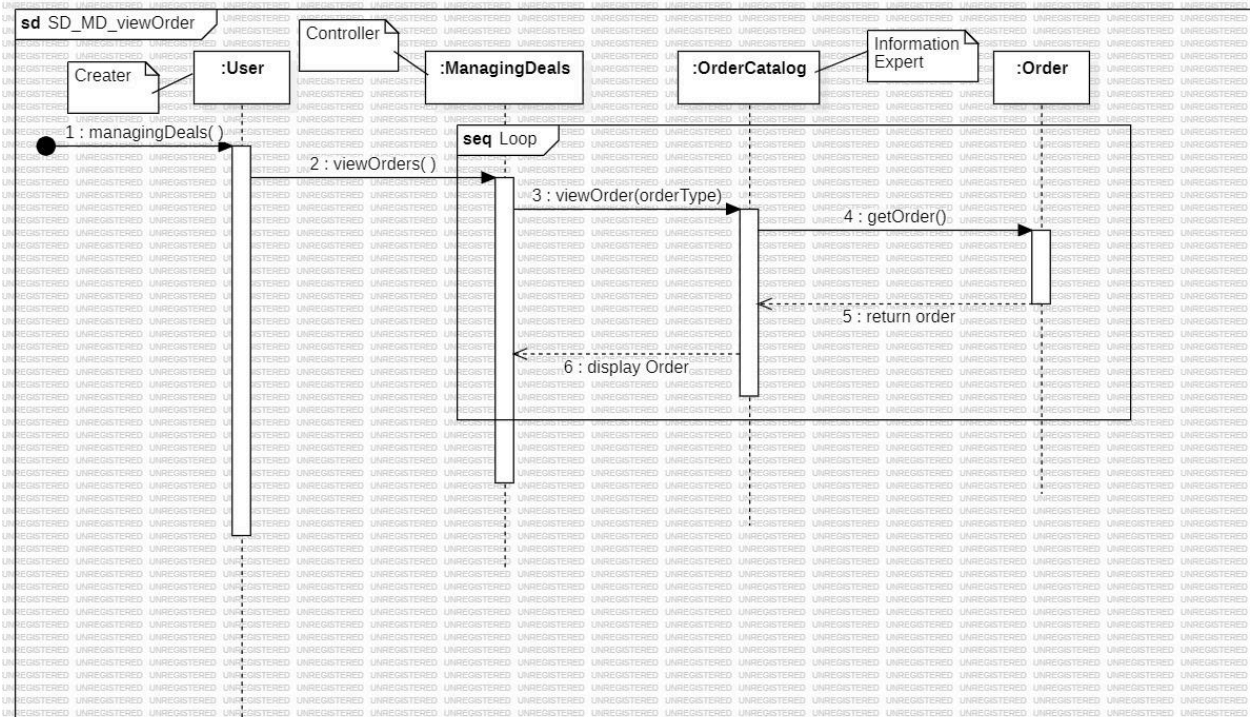


4. Sequence diagram

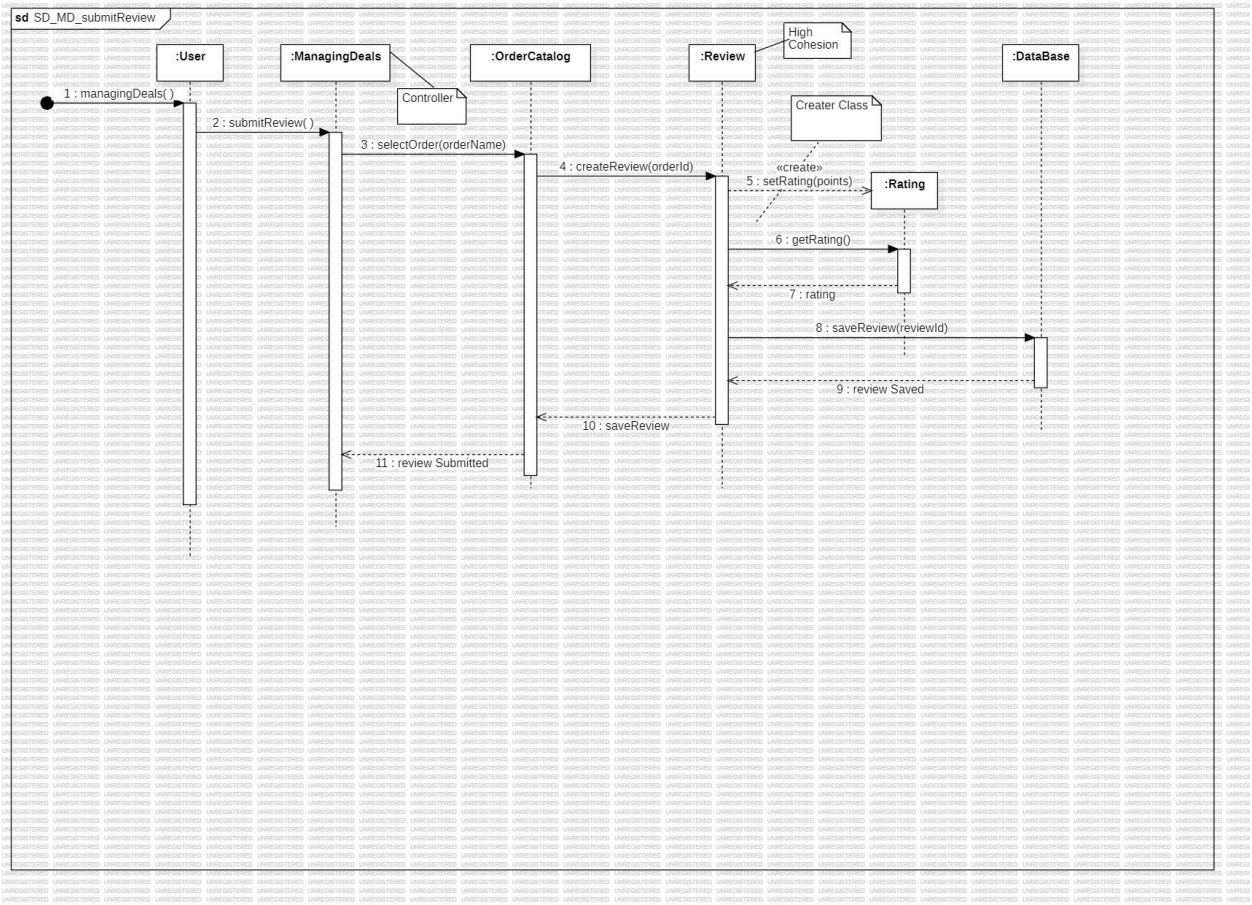


Managing Deals:

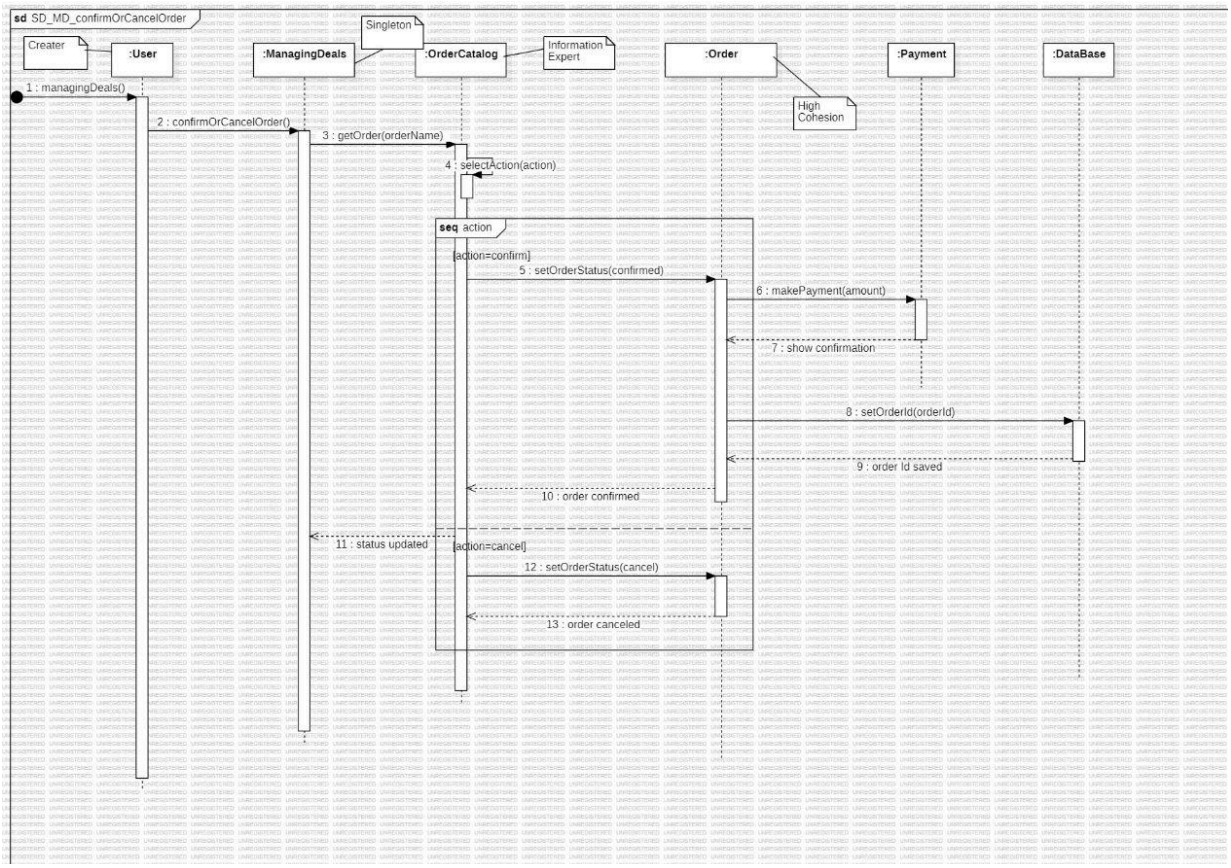
1. Sequence diagram



2. Sequence diagram

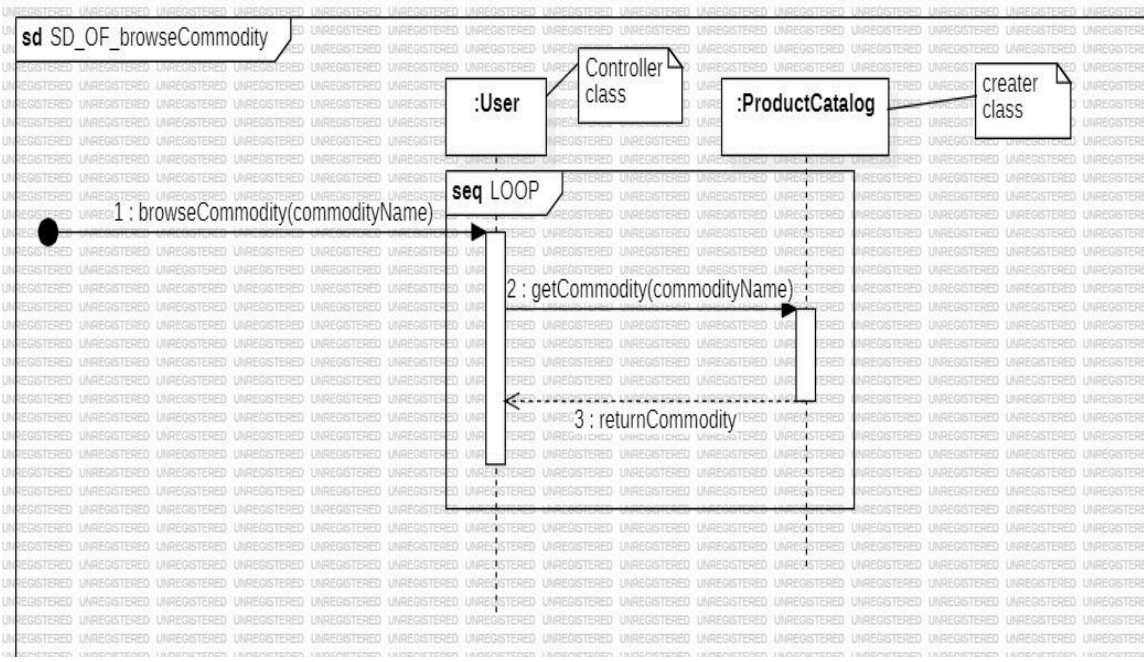


3. Sequence diagram

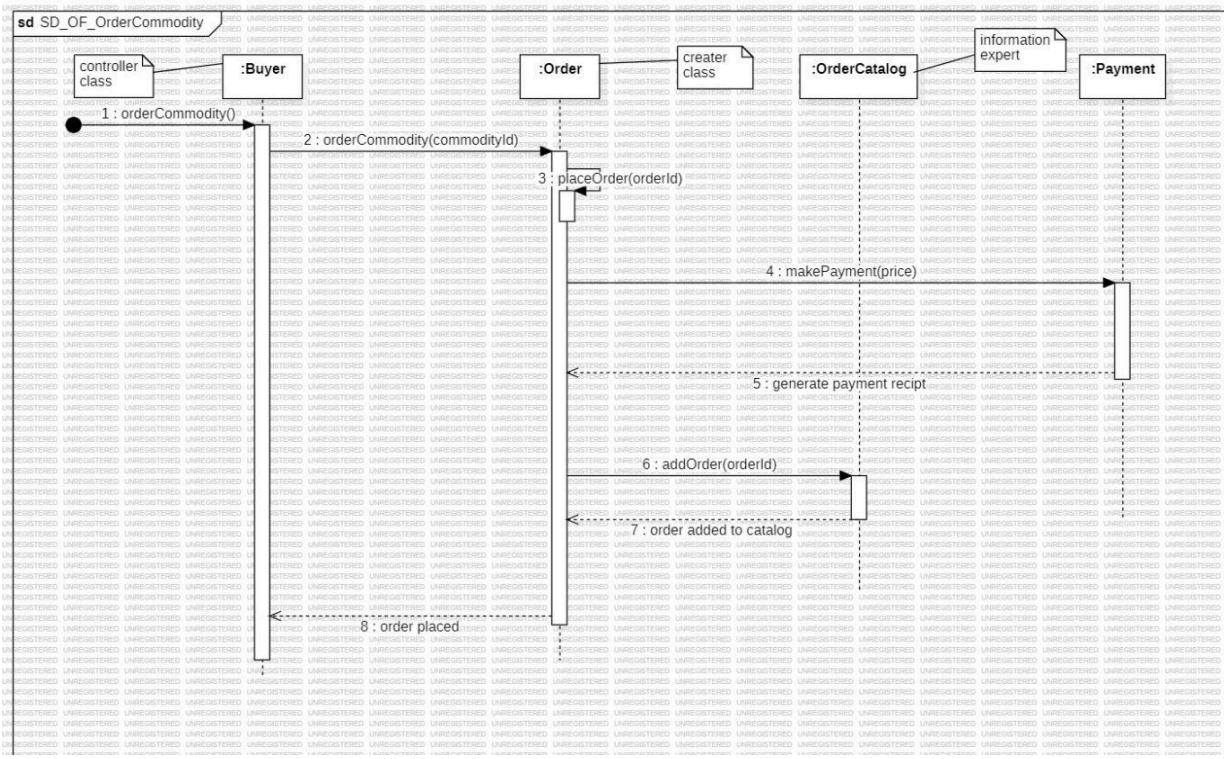


Fulfilling order:

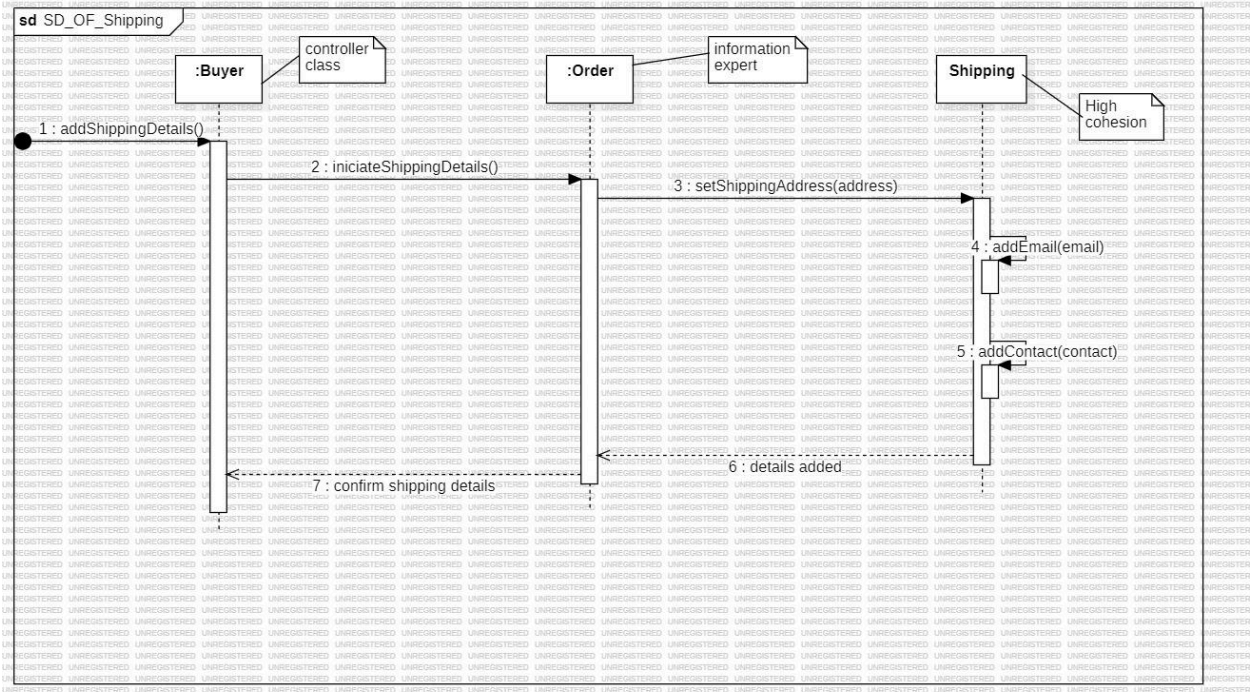
1. sequence diagram



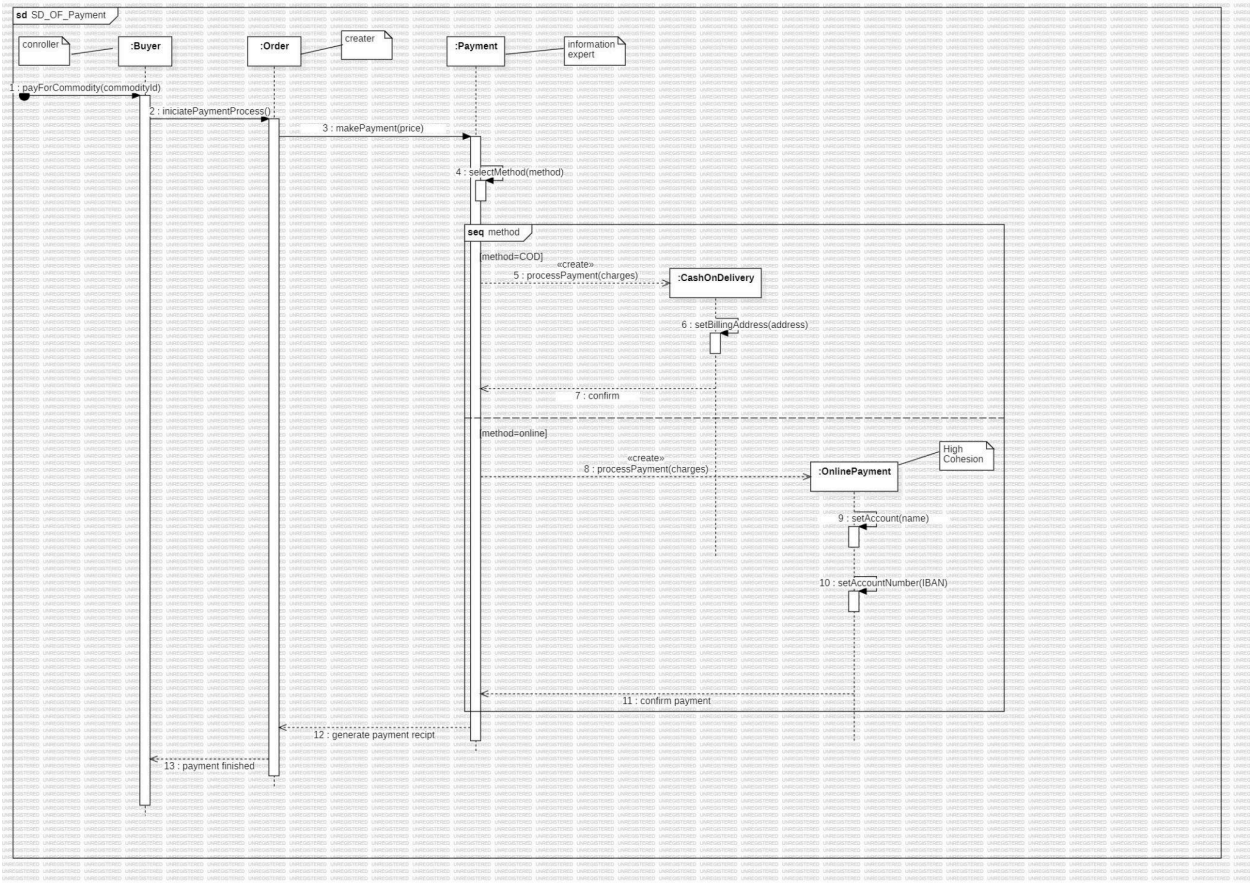
2. Sequence diagram



3. Sequence diagram

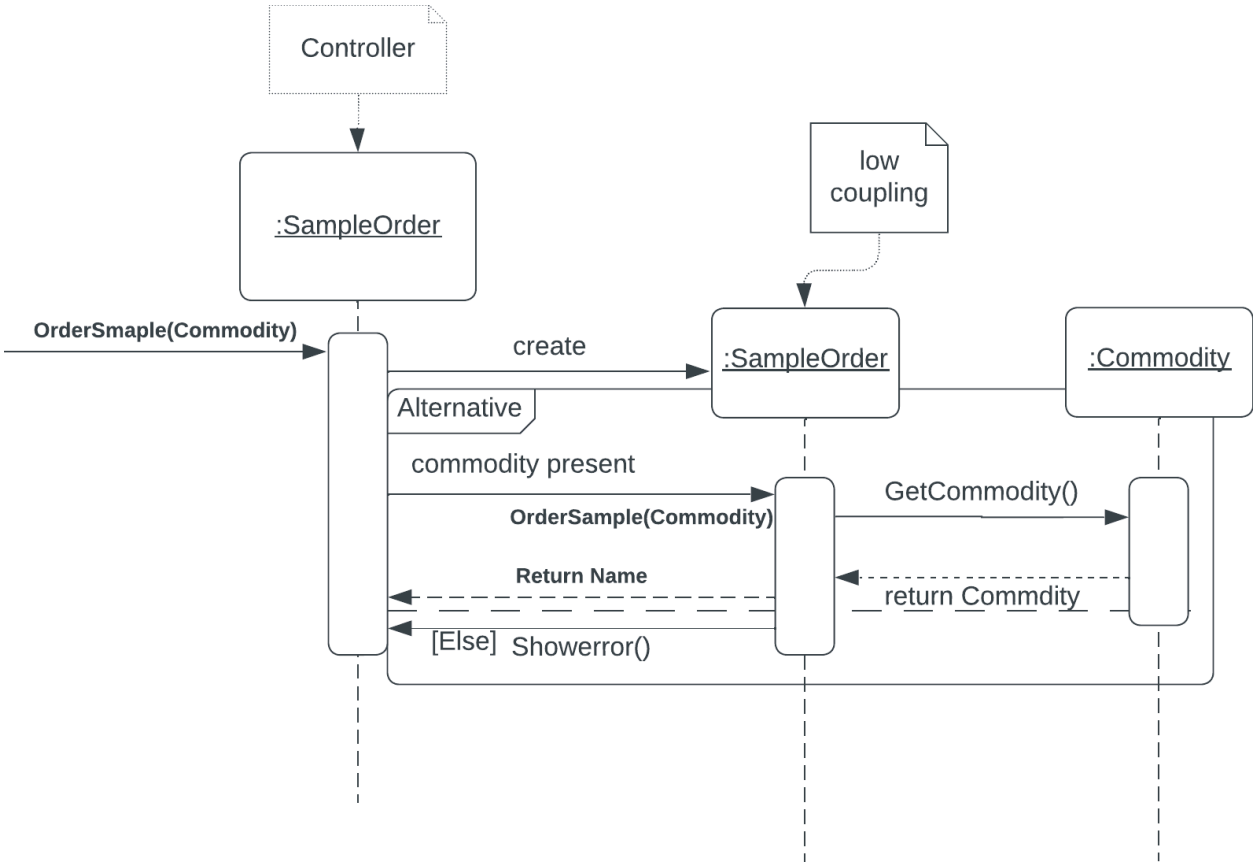


4. Sequence Diagram

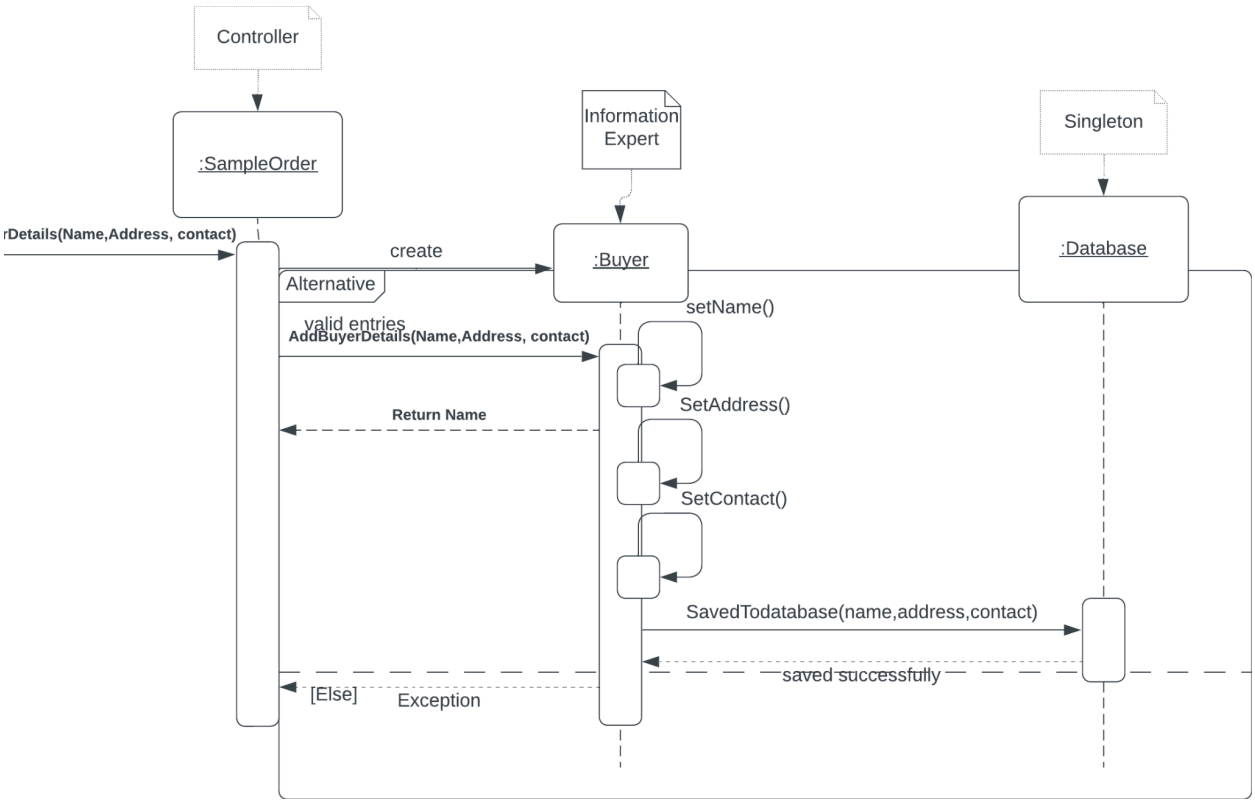


Ordering Sample:

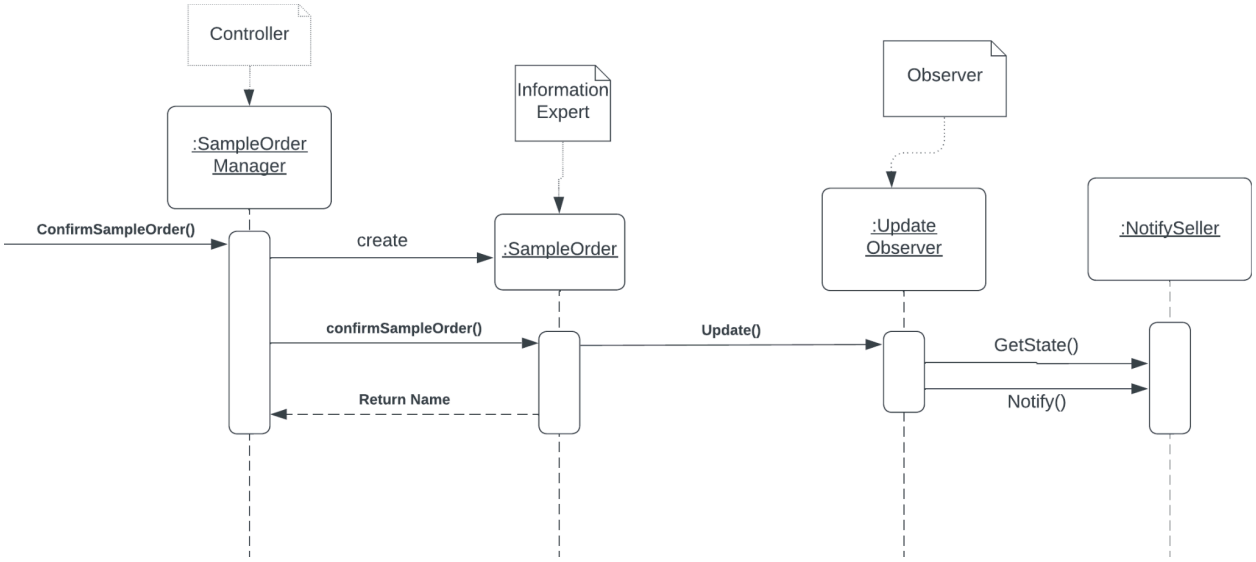
1. sequence diagram



2. sequence diagram

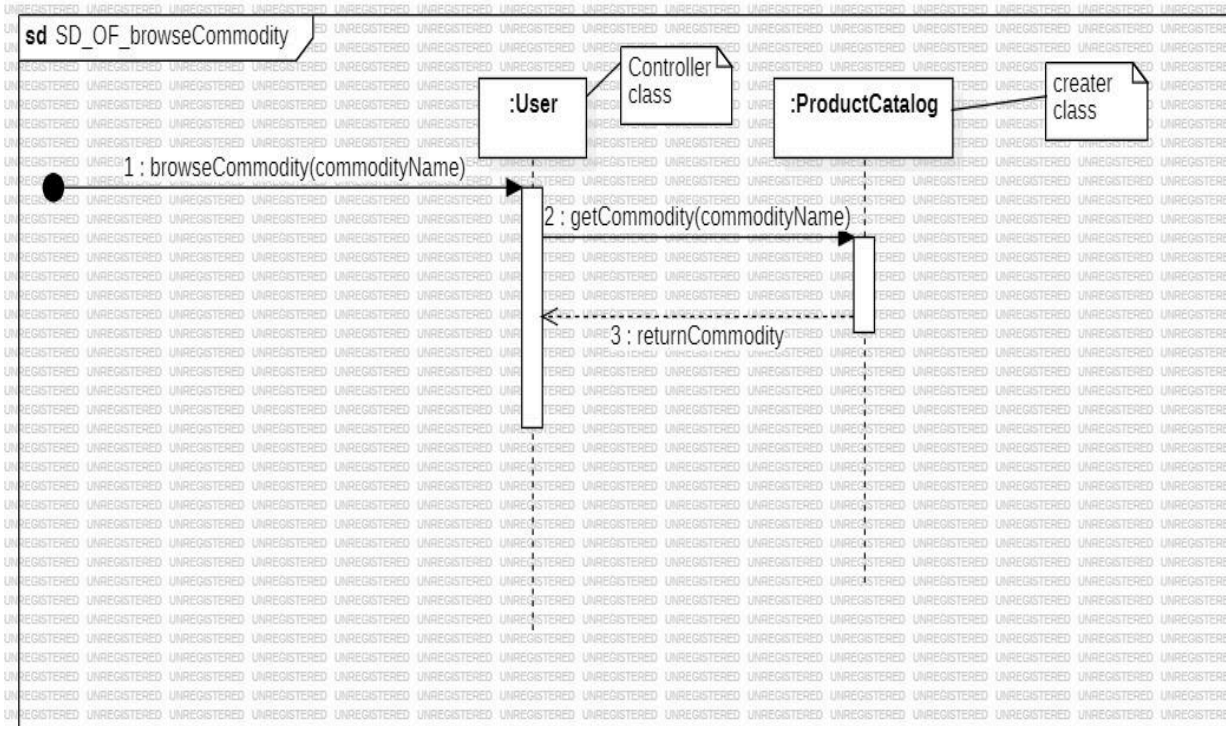


3. sequence diagram

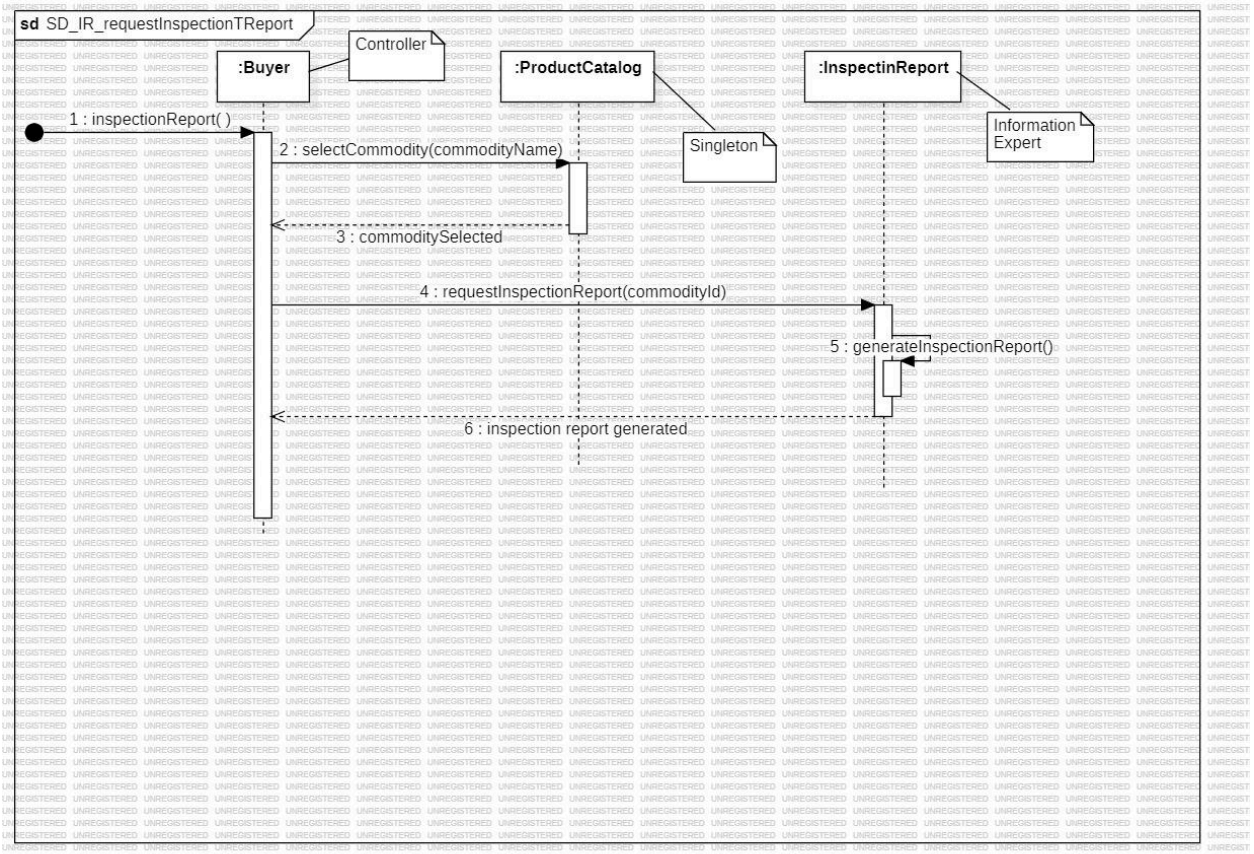


Generating inspection report:

1. Sequence diagram

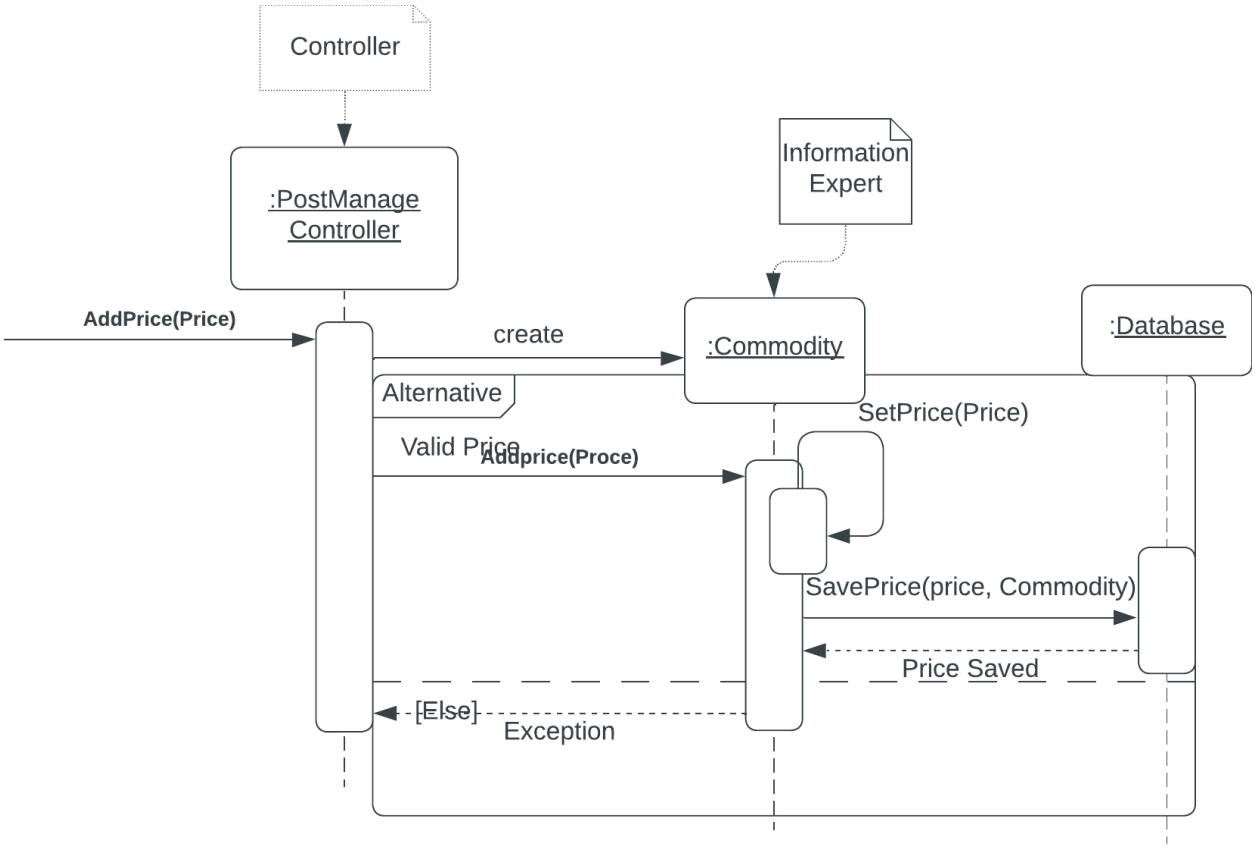


2. Sequence diagram

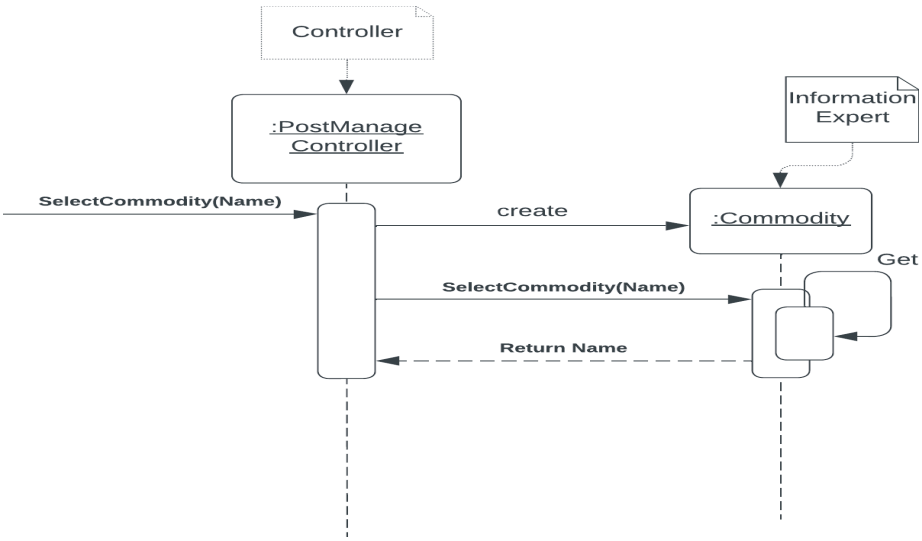


Managing Price:

1. sequence diagram

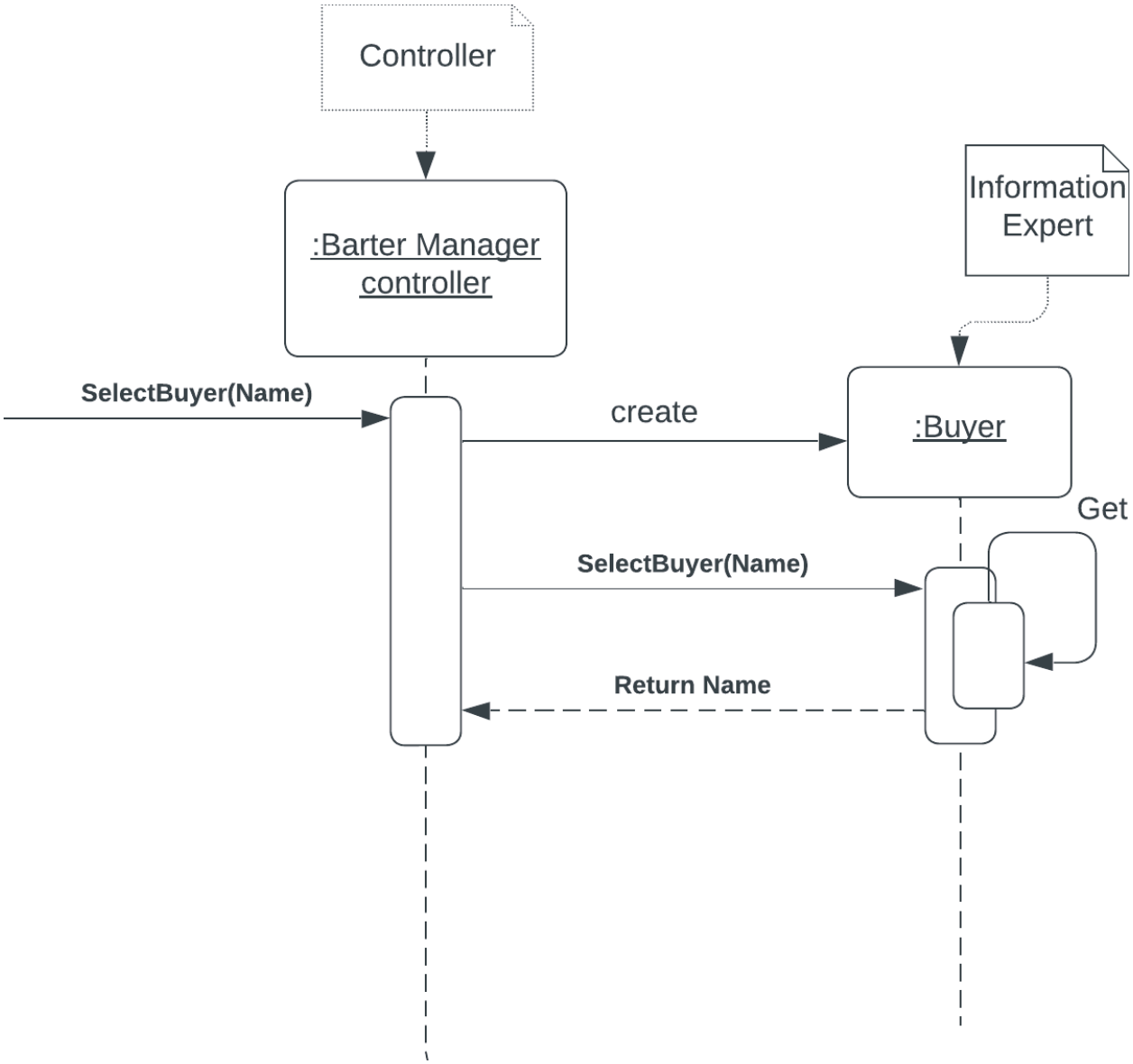


2. sequence diagram

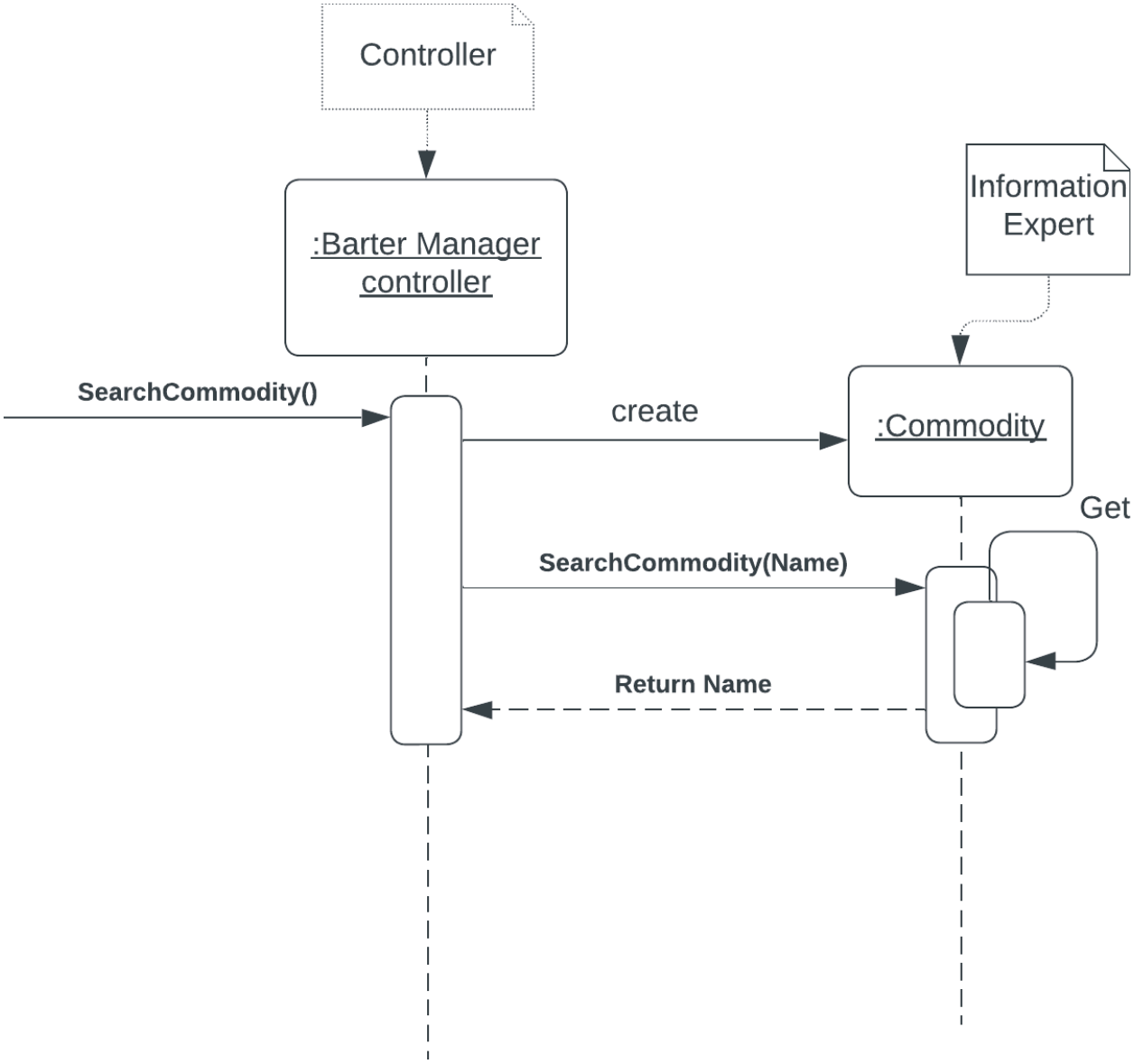


Managing Barter

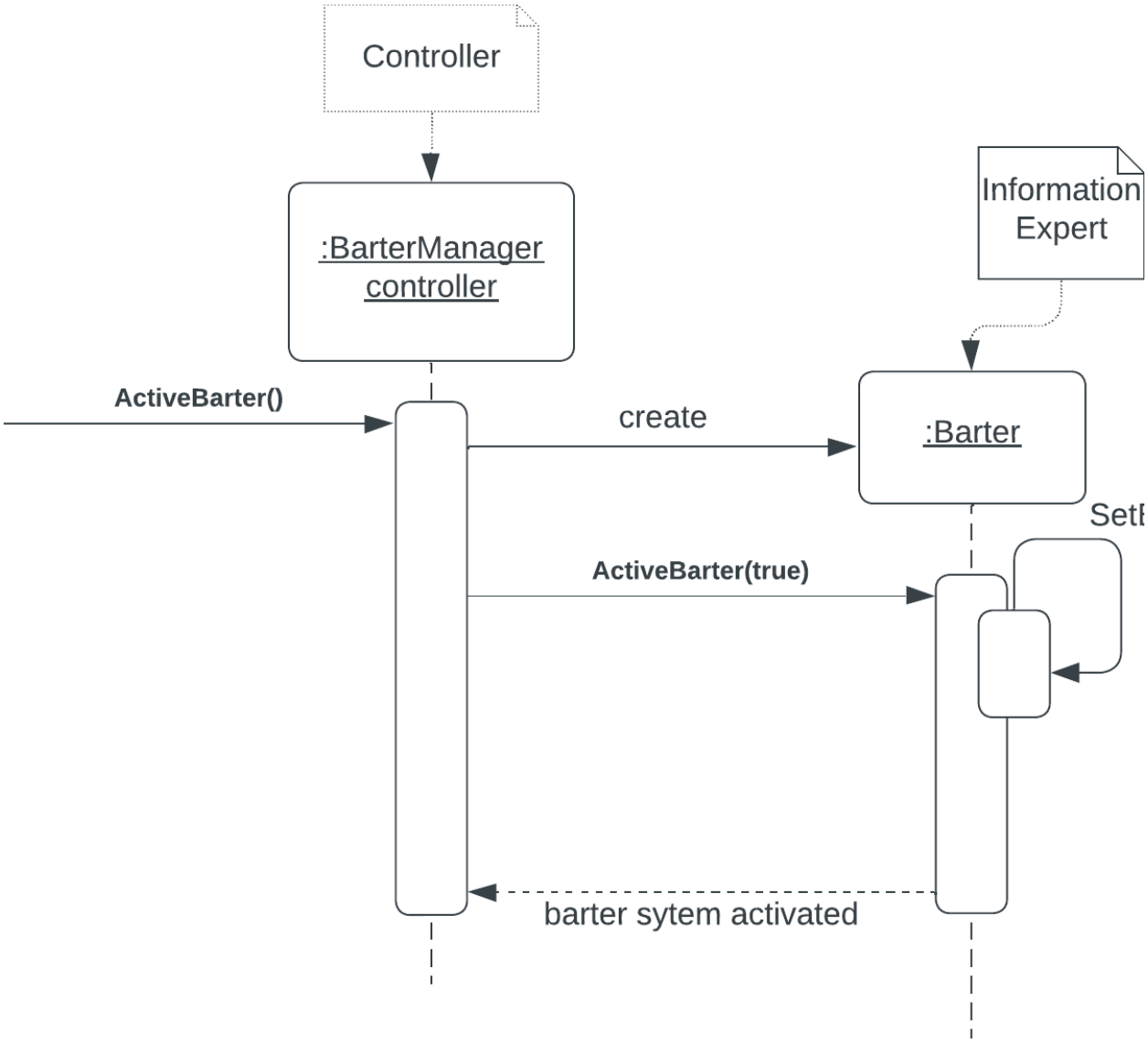
1. sequence diagram



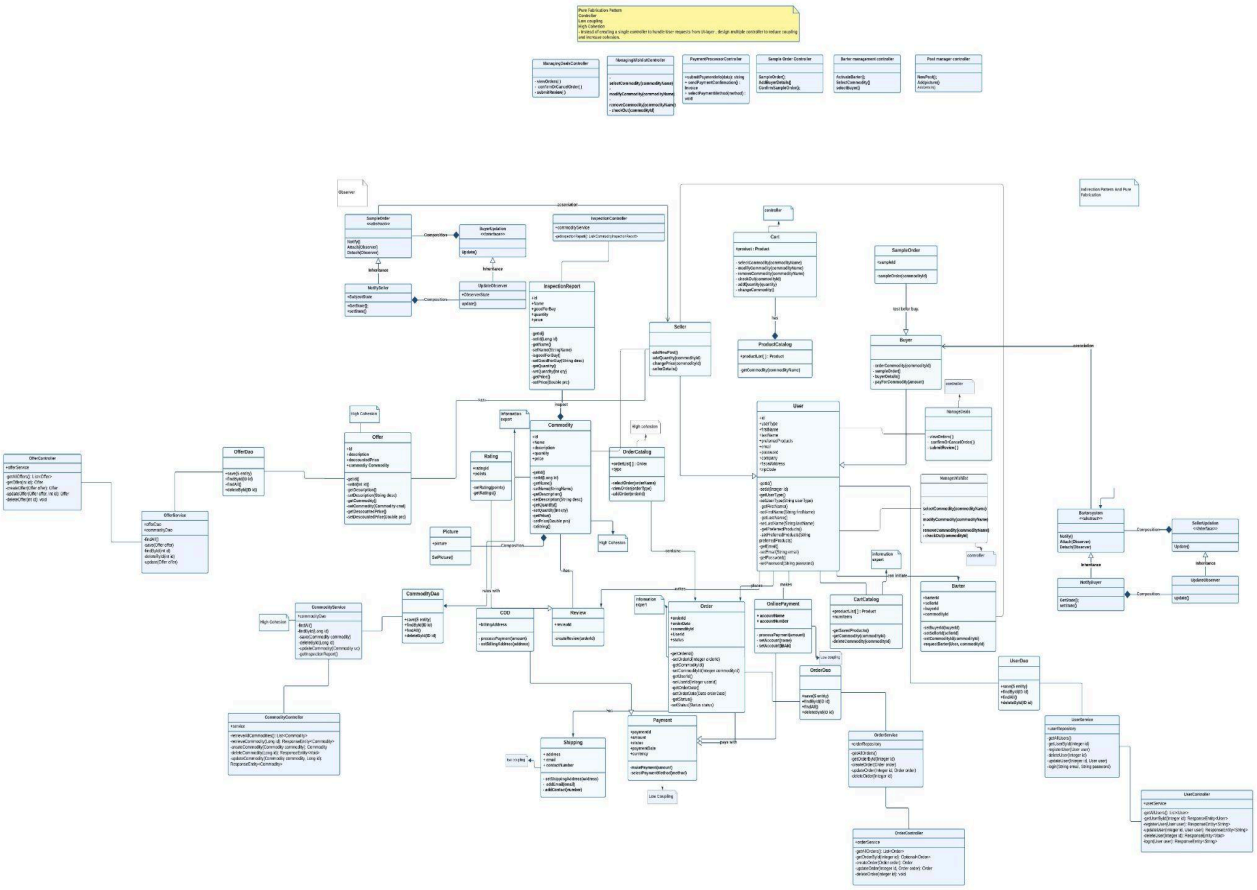
2. Sequence Diagram


Controller
:Barter Manager controller
Information Expert
SearchCommodity()
create
:Commodity
Get
SearchCommodity(Name)
Return Name

3. Sequence diagram

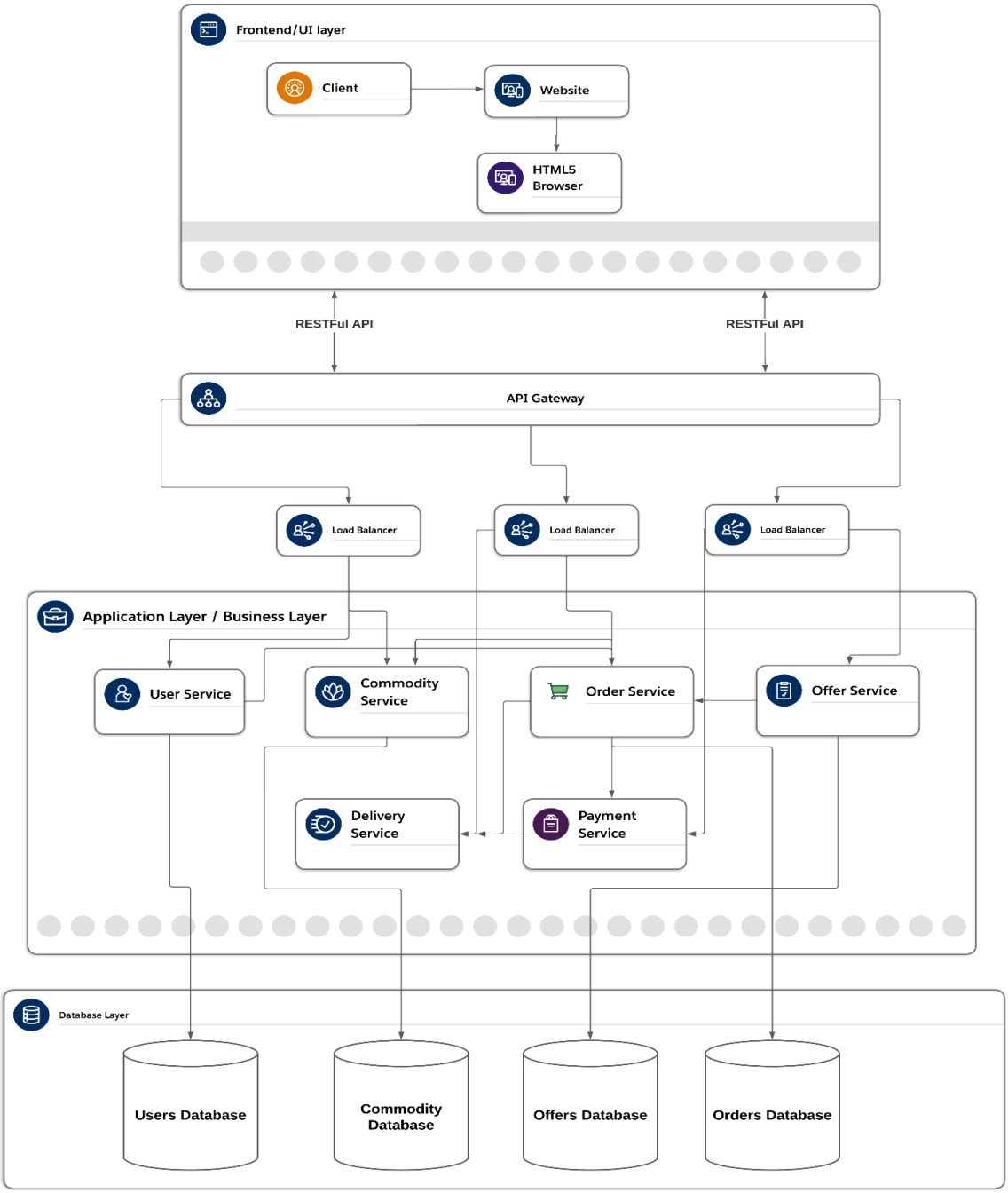


7. **Class Diagram:**

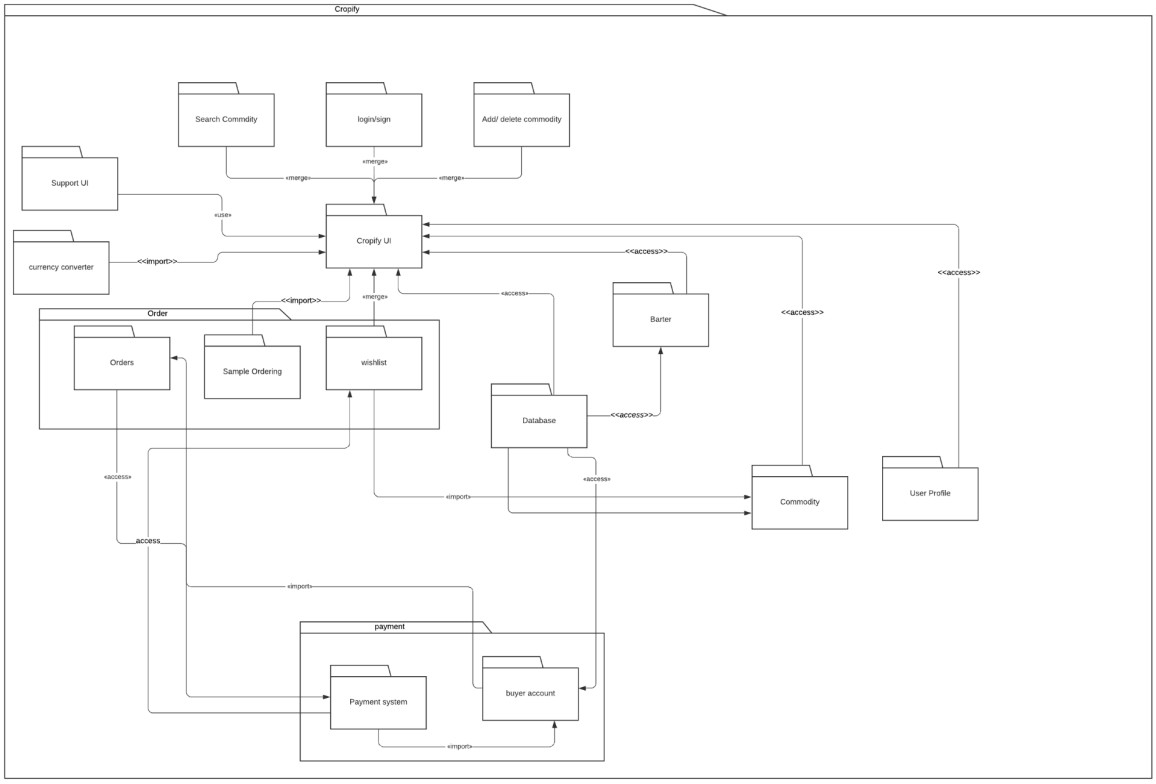


8. **High Level architecture**

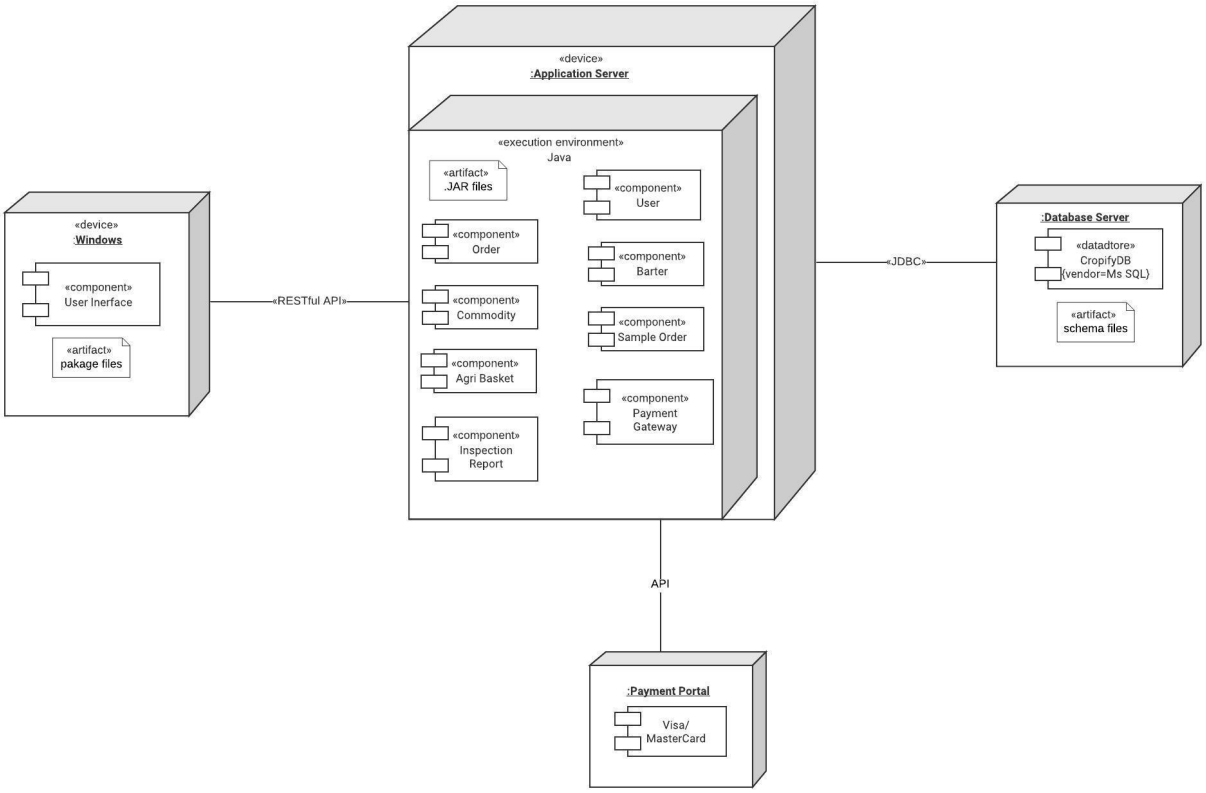
Agri Digital Marketplace *Cropify*
Three - Tier SOA based Architecture



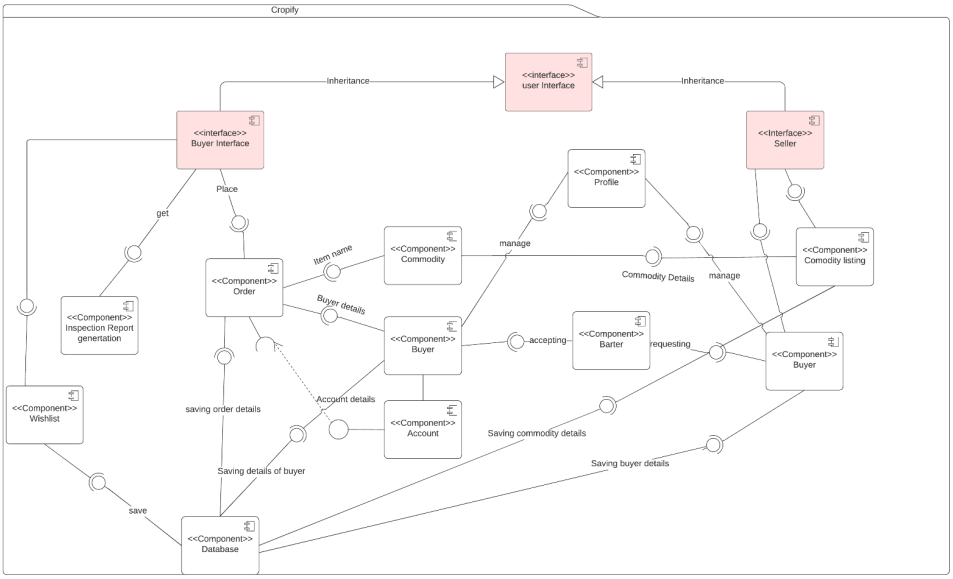
8.1 Package diagram



8.2 Deployment Diagram



8.3 Component Diagram



9. **Work division**

Serial Number	Name	Work Done
1	Tayyab Attiq	● Updated class diagram ● Implemented commodity management Use Case ● Implemented offer bidding use case ● Helped in creating document ● Helped in implementing managing order use case
2	Ammad Ashraf	● Implemented Managing User Use case ● Updated component diagram ● Updated deployment diagram ● Helped in creating document
3	Waheed Gulzar	● Created Document and maintained the complete details ● Updated package diagram ● Helped in implementing Order management use case