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CS 5010
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Project 1: Object Oriented Programming

Problem Statement

UniHome is an application that allows people to buy and sell homemade products. It is an e-commerce platform designed to increase sellers' income while fulfilling buyers' shopping needs.

There are two types of target audiences: those who enjoy making products in their free time and want to profit from their value, and those who appreciate other people's products and want to own them.

Unlike traditional shopping platforms, *UniHome* allows buyers and sellers to bargain with each other. Since users are trading homemade and relatively “one-of-a-kind” items, some sellers feel their work is underestimated, while buyers think that the work is not worth a specific price. Therefore, the app lets both parties determine the price in order to avoid such circumstances. (Creative Feature)

UniHome supports only registered users, who can be either buyers or sellers. Buyers can browse listed products and place orders. If they find something that attracts them, they can either start a negotiation with the seller to talk about the price through the platform or directly purchase the item if they think it is worth it. Sellers can lay out their products, process orders, and negotiate with buyers. If both sides agree, a final price is set. After that, the rest will be just like a regular online shopping process.

Business Requirement

noun

verb

- ❖ Users must be able to register for accounts with emails.
- ❖ Users must be able to choose their account type (buyer or seller).
- ❖ Users should be able to delete their accounts.
- ❖ Buyers can browse listed homemade products.
- ❖ Buyers can send one bargaining offer to sellers with a new price and a reason.

- ❖ Buyers can agree with a seller's offer and place an order for the item at that price.
- ❖ Buyers may place an order for one item at the initial price.
- ❖ Buyers can check the status of their orders.
- ❖ Sellers can list their homemade products with images, names, descriptions, quantities, and initial prices.
- ❖ Sellers can agree with a buyer's bargaining offer and set it as the final price.
- ❖ Sellers can reply to a buyer's bargaining offer with a new price and a reason.
- ❖ Both buyers and sellers can only wait to send another offer until the other user responds.
- ❖ Buyers may bargain with different sellers for different items.
- ❖ Sellers may negotiate with multiple buyers about one item.
- ❖ Sellers can see order requests after buyers place them.
- ❖ Sellers can update processing orders.
- ❖ An invoice for a trade will be generated and given to the buyer and the seller.
- ❖ Both buyers and sellers can terminate the negotiation.
- ❖ Items will be removed as soon as they are sold out.
- ❖ Users must be able to use the app for free.

Noun

user, account, email, type, buyer, product, offer, price, reason, order, item, status, seller, image, name, description, quantity, request, invoice, trade, negotiation

Verb

register, choose, delete, browse, send, agree, place, check, list, set, reply, wait, respond, bargain, negotiate, see, update, generate, terminate, remove, use

Briefly Classifying Class & Attribute/Method

- User
 - Attribute: Email, Type
 - Method: Register, Choose, Delete
- Buyer
 - Method: Browse, Place, Check

- Seller
 - Method: List, Reply, Update
- Item
 - Attribute: Image, Name, Description, Quantity, Initial price
 - Method: Remove
- Negotiation
 - Attribute: Offer, Price, Reason
 - Method: Terminate
- Order
 - Attribute: Status, Invoice
 - Method: Generate

Challenge Question

- ➔ What can I use this app to do as a buyer or a seller?
- ➔ As a seller, how many buyers can I have negotiations with?
- ➔ As a seller, will I receive notifications if someone wants to bargain with me?
- ➔ As a buyer, how many items can I have in one order?
- ➔ How many times can I bargain with a seller about one item as a buyer?

Dimension

1. Intent (of using the app) – The reason and goal of users using this app.
2. Engagement Level – Frequency of a user using this platform.
3. Age Group – People of different ages.

User Persona

Persona 1 – Young Buyer Seeking Fashion

Name: Kyle Wang

Age: 25

Occupation: Graduate Student

Intent: Look for some unique items to show my style and taste

Engagement Level: Weekly (Medium)

Background:

Kyle is a young man with his own aesthetic. He used to seek unique ornaments for himself or as gifts to his girlfriend. He favors hand-forged necklaces, keychains, and more.

Scenario:

After finishing an academic project, Kyle lies on the bed and decides to reward himself by buying some ornaments. So he opens *UniHome* and looks for a new hand-forged necklace with unique patterns and decorations.

User Story:

1. As a buyer, I want to register a buyer account with my email and start using the app.
2. As a buyer, I want to browse the platform's listings for all kinds of products so that I can find what I like or need.
3. As a buyer, I want to bargain with the seller about an item that attracts me so that I may get a better price.
4. As a buyer, I want to accept the new price and place an order for the item I intend to purchase.
5. As a buyer, I want to check the status of my orders.

Persona 2 – Seller Loving Handcrafting

Name: Emma Smith

Age: 40

Occupation: Housewife

Intent: Try to sell handicrafts I made in my free time for extra money

Engagement Level: Daily (High)

Background:

Emma is a full-time housewife. After her child went to college, she started having more free time and became very into crafts, like knitting. Now, she wants to sell some of her work and make extra money.

Scenario:

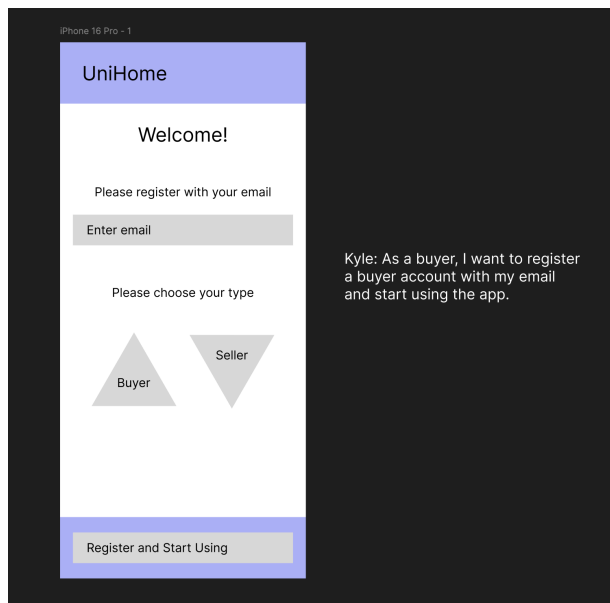
Emma displays the sweaters she made on the platform and is very welcoming to customers who want to buy them.

User Story:

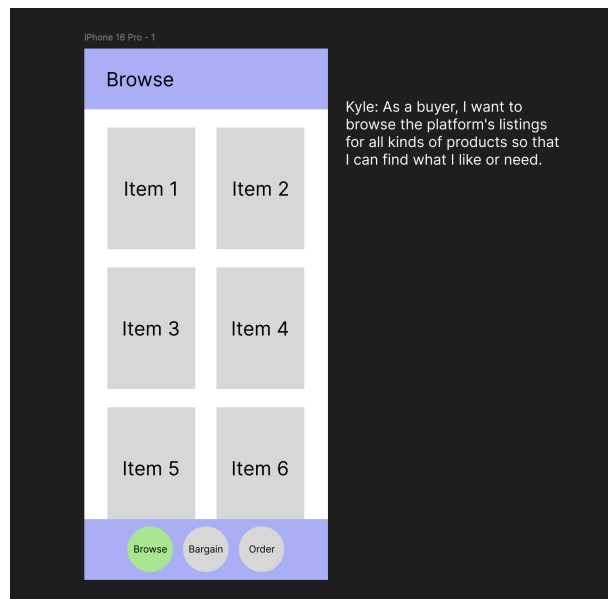
1. As a seller, I want to list my handicrafts as products on the platform so I can sell them.
2. As a seller, I want to reply to the buyer who tries to bargain with me and show the lowest price I can offer.
3. As a seller, I want to terminate a ridiculous negotiation with a less-than-sincere buyer.
4. As a seller, I want to update the status of the orders I am processing.

Interface Mockup

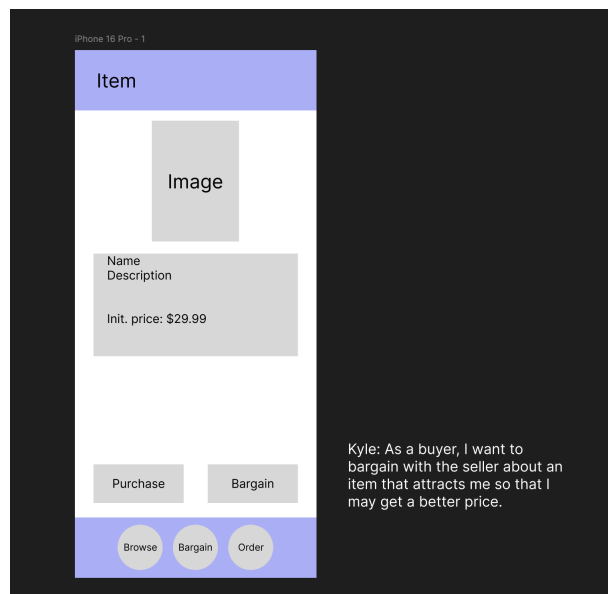
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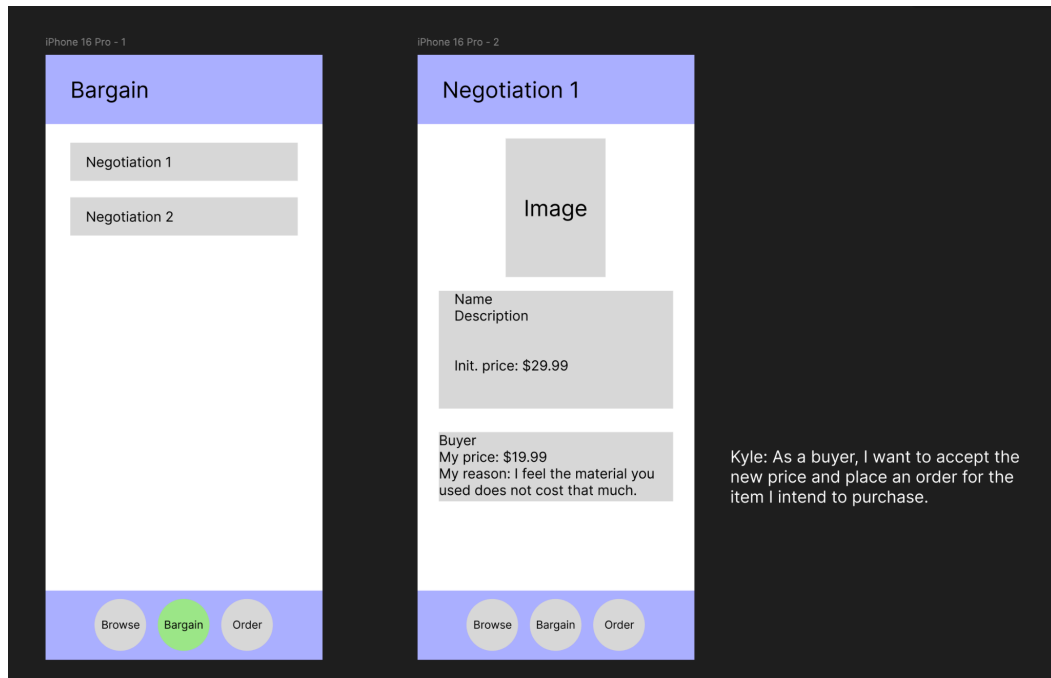
User Story Kyle 1



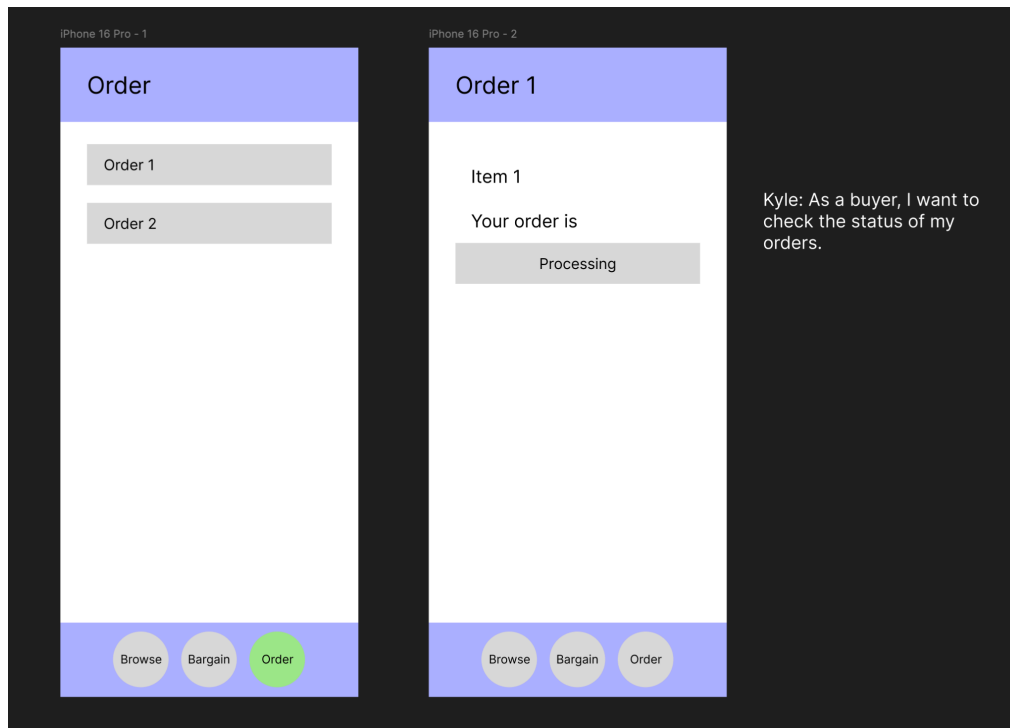
User Story Kyle 2



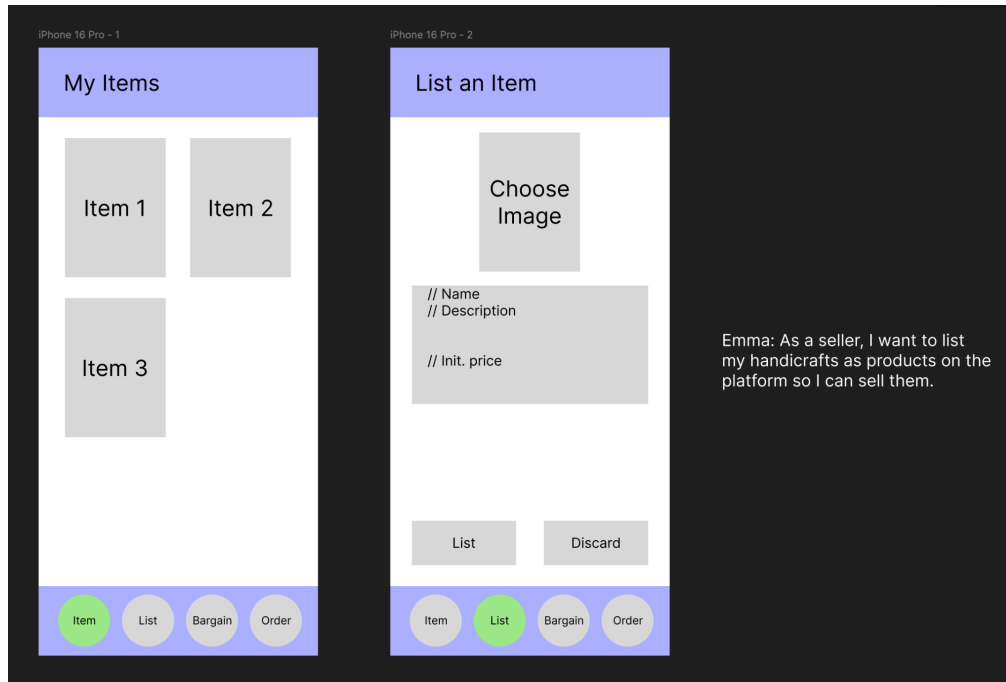
User Story Kyle 3



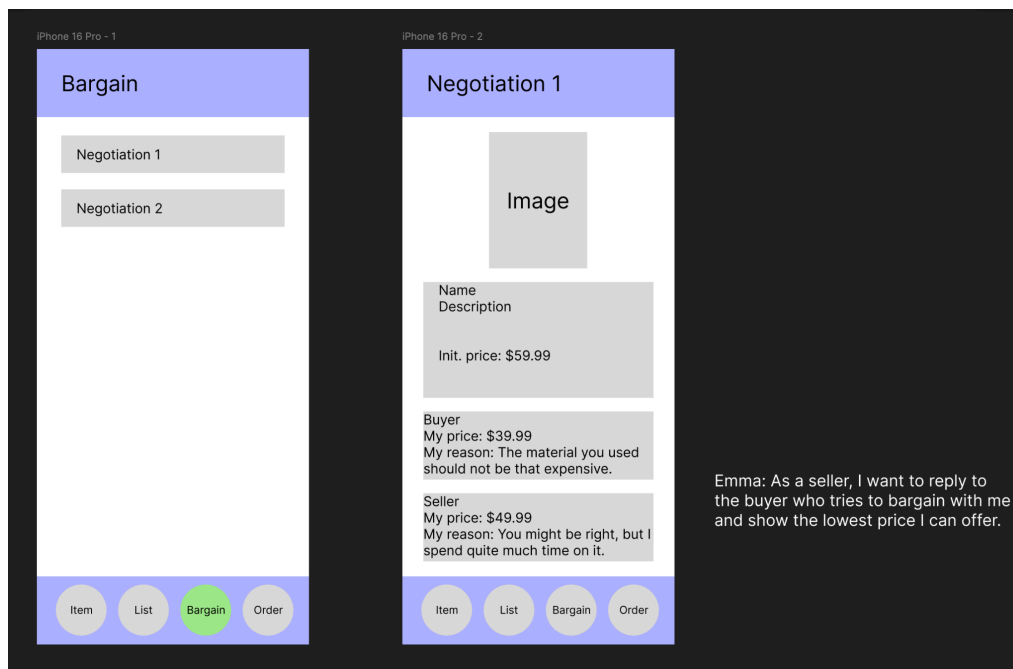
User Story Kyle 4



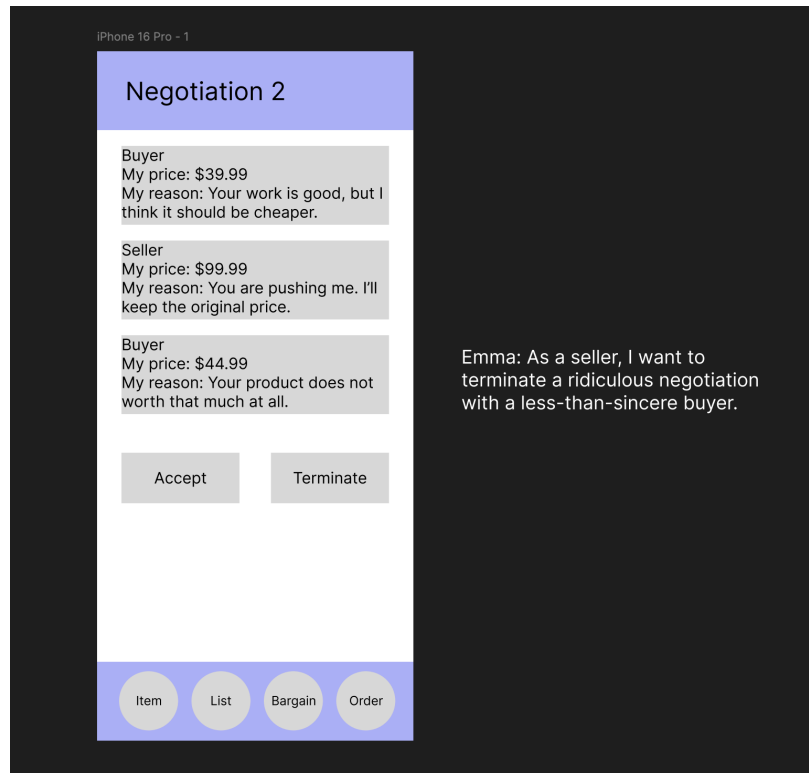
User Story Kyle 5



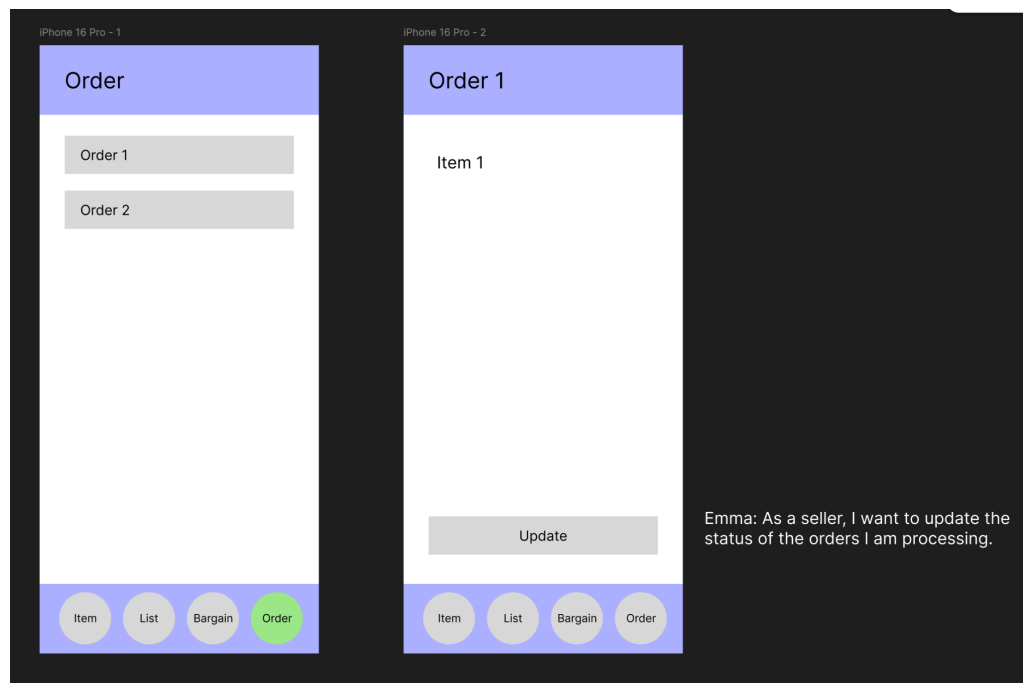
User Story Emma 1



User Story Emma 2



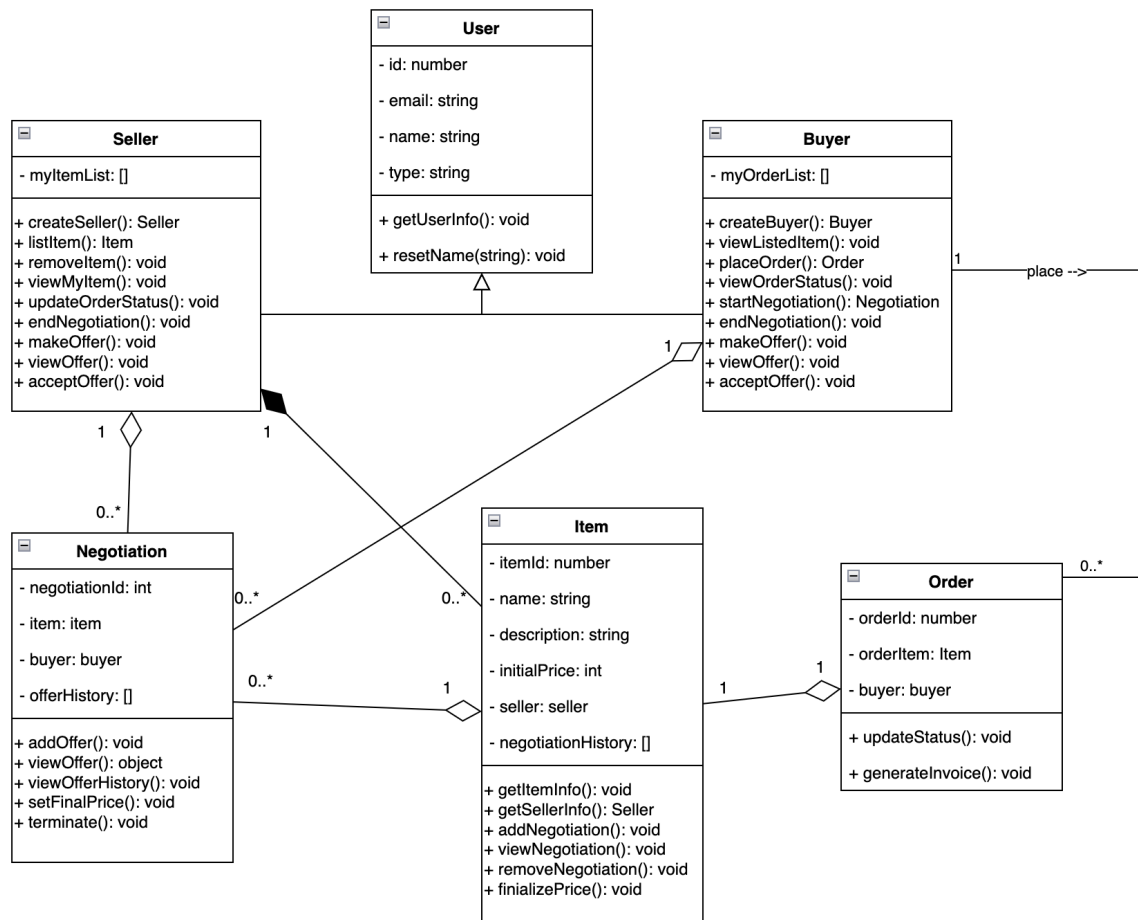
User Story Emma 3



User Story Emma 4

UML Class Diagram

<https://drive.google.com/file/d/10imWIV3EpTogxT4hzFL3bfvYc0fYWqcB/view?usp=sharing>



Gen AI Usage

→ I asked ChatGPT 4o about the relationships between class Negotiation and Buyer, Seller, and Item. I quoted and improved on its answer.

- ◆ Prompt: Suppose Seller strongly owns Item. Buyer can start a negotiation. Seller can reply buyer's bargain. What is the relationship between Buyer (or Seller) and Negotiation?

◆ Answers:

Entity	Relationship with Negotiation	Type
Buyer	Weakly owns Negotiation (Buyer can enter and leave negotiations freely)	Aggregation
Seller	Weakly owns Negotiation (Seller manages but does not create them)	Aggregation
Item	Weakly owns Negotiation (Items track ongoing negotiations)	Aggregation