Software Requirements and Design Document

for

Restaurant Management System

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● Introduction

○ Purpose

The software requirements specified in this document pertain to the "Restaurant Management System." The document outlines the features, objectives, and scope of the system. However, without specific information about the revision or release number, it's challenging to pinpoint the exact version of the software requirements.

The scope of the product is the entire Restaurant Management System. The system includes features such as a Dietary Recommendation Engine, Constraint Recording System, Efficient Ingredient Information, Personalized Dessert Menus, and User Authentication.

○ Product Scope

Objective:
The Restaurant Management System aims to revolutionize the dining experience by addressing the dietary and health constraints of customers. The system focuses on providing personalized dessert recommendations for individuals with diabetes, heart conditions, allergies, or specific dietary preferences.
Features:

Dietary Recommendation Engine:
- Develop an intelligent recommendation system for desserts based on individual health constraints and preferences.

Constraint Recording System:
- Implement a robust database to store and manage customer profiles, including detailed information about dietary restrictions and preferences.

Efficient Ingredient Information:
- Integrate a user-friendly interface to provide customers with quick access to comprehensive ingredient information for each dessert item on the menu.

Personalized Dessert Menus:
- Generate customized dessert menus for customers, ensuring a seamless and efficient ordering process.

Feasibility:
The feasibility of the Restaurant Management System is supported by the growing demand for tailored dining experiences and the increasing awareness of individual dietary needs. The system aligns with market trends towards customization, enhancing customer satisfaction and loyalty. Efficient constraint management contributes to a streamlined dining

process, making the system not only innovative but also practical and viable in the current culinary landscape.

○ Title :

Restaurant Management System

○ Objectives

1- Recommend deserts which people can eat freely even if they are having any disease or restrictions. For example, a person who works out every day and is diet conscious can eat Blueberry-Lemon Energy Balls or Banana Protein Muffins, which gives you a sufficient amount of proteins and can fulfill your craving for deserts.

2- Allow people who are diabetic, heart patient or allergic to any other food to eat desserts without any constraints.

3- Keep record of people who are having any constraints, so that the next time a person comes, we will have a list of recommendations a person can eat as per his preferences.

4- Provide convenience and efficiency for people who have to ask people for ingredients all the time.

○ Problem Statement

The major reason for choosing this project is to address the growing concern for health-conscious individuals and those with dietary restrictions. In today's world, where people are becoming increasingly conscious of their health and nutritional needs, a restaurant management system that caters to specific dietary requirements becomes crucial. The problem being addressed is the inconvenience faced by individuals with health conditions or dietary restrictions when it comes to enjoying desserts at a restaurant.
This project aims to mitigate the challenges faced by people with diabetes, heart conditions, allergies, or specific dietary preferences. By providing a seamless recommendation system, the restaurant ensures that customers can indulge in delicious desserts without compromising their health or violating any dietary restrictions. The system's efficiency lies in maintaining a detailed record of customers' constraints, allowing for personalized recommendations and a streamlined dining experience. The feasibility of this project is supported by the increasing demand for healthier food options and the need for restaurants to adapt to diverse dietary needs, ensuring customer satisfaction and loyalty.

● Overall Description

○ Product Perspective

The project specified is a new, self-contained product known as the "Restaurant Management System." This system is designed to revolutionize the dining experience by addressing the dietary and health constraints of customers, providing personalized dessert recommendations. It is not a replacement for any existing systems but rather a novel solution to cater to the evolving needs of health-conscious individuals and those with specific dietary requirements.

Context and Origin:
The origin of the project stems from the increasing demand for healthier dining options and the growing awareness of individual dietary needs. The Restaurant Management System is envisioned as a stand-alone product that enhances the efficiency of restaurant operations and improves customer satisfaction by offering tailored dessert recommendations.

○ Product Functions

- Dietary Recommendation:
  Provide intelligent dessert recommendations based on individual health constraints and preferences.
- Constraint Recording:
  Maintain a comprehensive database to store and manage customer profiles, including detailed information about dietary restrictions and preferences.
- Ingredient Information:
  Offer a user-friendly interface for customers to access detailed ingredient information for each dessert item on the menu.
- Personalized Dessert Menus:
  Generate customized dessert menus for customers, streamlining the ordering process and enhancing the dining experience.
- User Authentication and Security:
  Implement a secure user authentication system to protect customer information and ensure data privacy.

○ List of Use Cases

1- Registration
2- Book Seat
3- Modify Booking
4- Cancel Booking
5- Show Menu and Take Order
6- Pay Bill
7- Give Feedback
8- Manage Inventory
9- Customer Loyalty
10- Sales and Revenue

○ Extended Use Cases

Use Case: Registration

Asjad Rauf

Description: Customers can go through the registration process so their activity can be recorded for better use.

Use Case Section	**Comments**
Use Case Name:	Registration
Scope	Restaurant Management System
Level	User
Primary Actor	Customer
Stakeholders and Interests	Customer: He/She can register through the system smoothly. System: No problem is faced by the user.
Pre-Conditions	Customer wants to order something. Customer opens the system.
Post-Conditions	Customer can register
Main Success Scenario	● Customer opens the system ● Enter his credentials ● Successfully registers
Extensions	● The System is not working

	• Incorrect credentials are given.

Use Case: Book Seat

Zain Rizwan

Description: Customers will book their seats in advance so they can find their seats empty at their time.

Use Case Section	**Comments**
Use Case Name:	Book Seat
Scope	Restaurant Management System
Level	User
Primary Actor	Customer
Stakeholders and Interests	Customer: Seats are available
Pre-Conditions	Customer must have registered and login to the system
Post-Conditions	Customer can book seats
Main Success Scenario	Customer successfully logins to the system and books the seat
Extensions	• Customer hasn't registered • Customer forgot username or password • Seats are already booked

Use Case: Modify Booking

Asjad Rauf

Description: Customers can change the number of seats they have reserved for their themselves and guests by asking the Staff.

Use Case Section	Comments
Use Case Name:	Modify Booking
Scope	Restaurant Management System
Level	User
Primary Actor	Staff
Stakeholders and Interests	Customer: Seats are available so that all their guests can be accommodated. Staff: Seats are available to avoid any inconvenience.
Pre-Conditions	Customer logins and has already booked the seats.
Post-Conditions	Customer can change the number of people.
Main Success Scenario	Staff has successfully updated the booking as per Customer requirement.
Extensions	● No other seats are available to increase number of guests. ● Seats not available at the required time

Use Case: Cancel Booking

Asjad Rauf

Description: Customers can cancel the seats they have reserved for their themselves and guests by asking the Staff or by logging in.

Use Case Section	Comments
Use Case Name:	Cancel Booking
Scope	Restaurant Management System

Level	User
Primary Actor	Customer and Staff
Stakeholders and Interests	Customer: They want to cancel their seats without any hindrance. Staff: They don't want customers to cancel their seats at the last minute.
Pre-Conditions	Customer logins and has already booked the seats.
Post-Conditions	Customer can cancel their seats.
Main Success Scenario	Staff or Customer has successfully cancelled the booking.
Extensions	• System is not working • They are already late.

Use Case: Show Menu and Take Order

Asjad Rauf

Description: Customers can see the Menu. They gave the order which is within the Menu.

Use Case Section	**Comments**
Use Case Name:	Show Menu and Take Order
Scope	Restaurant Management System
Level	User
Primary Actor	Customer and Staff
Stakeholders and Interests	Customer: They want their order to be taken. Staff: They want customers to order as many things possible.
Pre-Conditions	Customer logins and has already booked the seats. Customer views the Menu.

Post-Conditions	Customer has given the order.
Main Success Scenario	Customer has successfully given the order as per his desire.
Extensions	● The dessert they want is not available or out of stock. ● The Customer cannot eat the dessert due to any disease.

Use Case: Pay Bill

Zain Rizwan

Description: Customers can go through their products and confirm them, and then they will go through payment process to pay the bill.

Use Case Section	**Comments**
Use Case Name:	Pay Bill
Scope	Restaurant Management System
Level	User
Primary Actor	Customer
Stakeholders and Interests	Staff: They want money. Customer: They want their checkout to be as smooth as possible.
Pre-Conditions	● Customer logins ● Orders products from menu ● Eaten their Meal.
Post-Conditions	Customer pays the bill

Main Success Scenario	Customer logins and orders products, then they confirm the order and choose the payment type and pays the bill.
Extensions	● Customer don't have enough credits. ● The card system is not working.

Use Case: Give Feedback

Zain Rizwan

Description: Customers can give their reviews about the services and products.

Use Case Section	**Comments**
Use Case Name:	Give Feedback
Scope	Restaurant Management System
Level	User
Primary Actor	Customer
Stakeholders and Interests	Staff: They want their customer to give them the best feedback.
Pre-Conditions	Customer must login and pays the bill.
Post-Conditions	Customer gives feedback and review.
Main Success Scenario	Customer tests the product and gives a feedback
Extensions	● The system is not working. ● Feedback is not being submitted due to too much traffic.

Use Case: Manage Inventory

Zain Rizwan

Description: The staff can see the current inventory and can add or remove products according to their will.

Use Case Section	**Comments**
Use Case Name:	Inventory Management
Scope	Restaurant Management System
Level	User
Primary Actor	Staff
Stakeholders and Interests	Staff: They want to have all the products available. Customer: They want the product to in inventory.
Pre-Conditions	A Staff member must login to access inventory
Post-Conditions	The manager will see, add the products if they are available in the inventory physically.
Main Success Scenario	The Staff successfully login and access the inventory and updates the inventory
Extensions	● The manager forgot his username or password ● Physically the item is not available.

Use Case: Customer loyalty

Zain Rizwan

Description: System will track customer id and their receipts, giving them discounts, free items and coupons if they are repeat ones

Use Case Section	**Comments**
Use Case Name:	Customer Loyalty
Scope	Restaurant Management System
Level	User
Primary Actor	Customer
Stakeholders and Interests	Customer; They want to avail the discount and save money as they are applicable for it.
Pre-Conditions	● Customer must have registered ● Customer should have more than 5 purchases
Post-Conditions	Customer will get rewards like coupons, discounts, free items etc.
Main Success Scenario	Customer have more than 5 purchases and gets rewards on next purchases.
Extensions	● Customer is new ● Customer is not a repeat customer ● Customer has not registered ● Customer has not made 5 purchases.

Use Case: Manage Sales and Revenue

Asjad Rauf

Description: Manager can go through the profits and sales to check the final revenue.

Use Case Section	Comments
Use Case Name:	Sales and Revenue
Scope	Restaurant Management System
Level	User
Primary Actor	Staff
Stakeholders and Interests	Staff: They want information about how many sales they are making daily, weekly or monthly.
Pre-Conditions	● Staff must login. ● Sales must be made
Post-Conditions	Staff checks the revenue
Main Success Scenario	Manager successfully logins and checks the sales and revenue
Extensions	● Staff forgot username or password. ● Sales weren't made. ● Error in the system.

Use Case: Manage Product

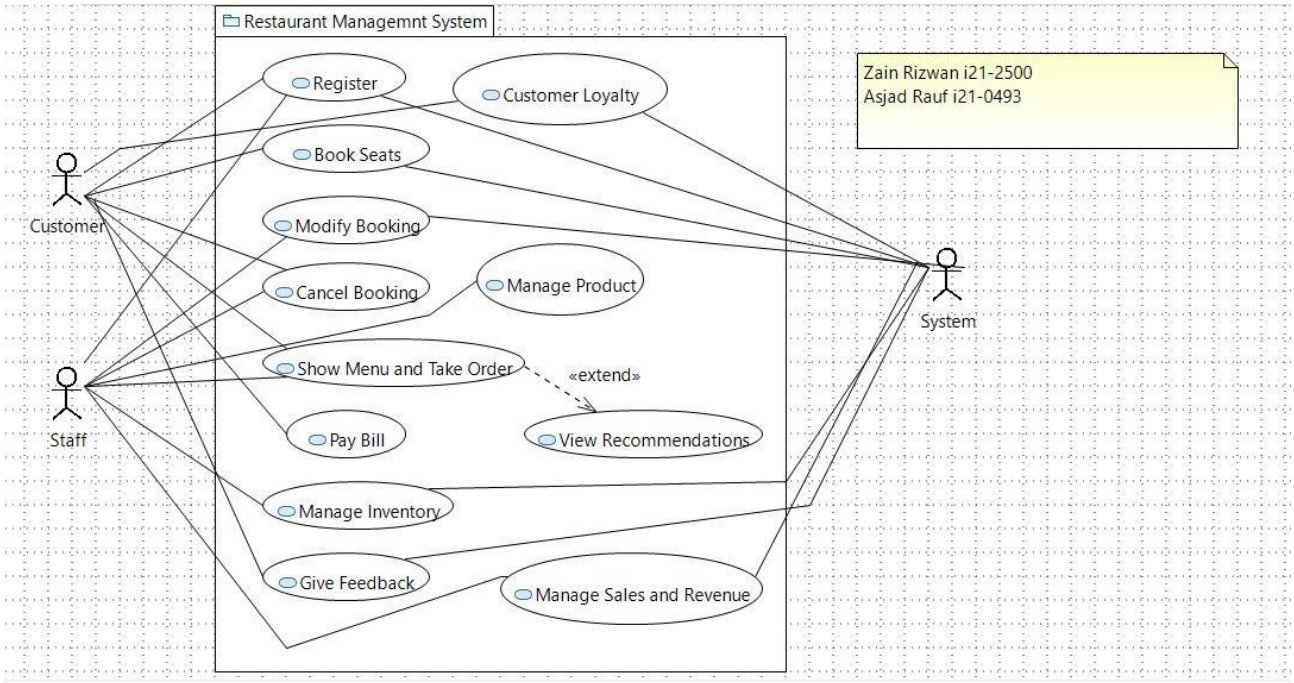
Asjad Rauf

Description: Manager can add or remove any dessert item, depending whether they are being sold or not.

Use Case Section	Comments
Use Case Name:	Manage Product
Scope	Restaurant Management System
Level	User
Primary Actor	Staff
Stakeholders and Interests	Customer: Wants new product in the Menu.

	Staff: Wants to add products which can generate money, and remove products which are not selling.
Pre-Conditions	● Any product is not selling. ● Staff logins and checks the sales. ● Staff goes to manage products.
Post-Conditions	Staff adds or removes any product from the menu.
Main Success Scenario	● Staff opens the system ● Enter his credentials ● Successfully registers ● Removes/Adds the item.
Extensions	● The System is not working ● Incorrect credentials are given.

- **Use Case Diagram**



● Other Nonfunctional Requirements

○ Performance Requirements

Swift Response Time:

- The system should respond to user queries and generate dessert recommendations within 2 seconds under normal operating conditions at the local level. This ensures a quick and efficient user experience for customers dining in the restaurant.

Local Scalability:

- The system should be capable of handling a minimum of 50 concurrent users within the restaurant premises without any noticeable slowdown. This local scalability ensures optimal performance during peak dining hours.

Efficient Database Retrieval:

- Database queries for customer profiles and dessert information should have an average response time of less than 0.5 seconds locally. Quick access to local data is critical for providing instant and accurate recommendations.

Low Security Overhead:

- The authentication and security processes should introduce minimal overhead, with the login/authentication process taking no more than 0.5 seconds at the local level. This ensures a secure yet swift user authentication experience.

Real-time Local Updates:

- For real-time systems within the restaurant, dessert recommendations should be updated instantly when a customer updates their dietary preferences. This real-time responsiveness ensures that customers within the premises always receive the latest recommendations.

Rationale:

- Enhanced Dining Experience: Fast response times and efficient local scalability contribute to an enhanced dining experience for customers within the restaurant.
- Optimized Database Retrieval: Quick access to local data is crucial for providing on-the-spot and relevant dessert recommendations to customers.
- Minimal Security Overhead: Balancing security measures with minimal impact on local performance is essential for maintaining a smooth and hassle-free dining process.
- Real-time Local Updates: In a restaurant setting, real-time updates for recommendations ensure that customers receive timely and tailored suggestions based on their latest preferences while dining in.

○ Safety Requirements

● Allergen Awareness:
○ The system must prominently display allergen information for each dessert to prevent potential harm to customers with allergies.
○ Safeguard: Ensure that the allergen information is clearly visible in the user interface, and cross-verify with customers about specific allergies before finalizing recommendations.
● Accurate Dietary Recommendations:
○ The system must provide accurate dietary recommendations to avoid any harm resulting from misinformation.
○ Safeguard: Implement regular updates to the recommendation engine based on the latest nutritional information and dietary guidelines.
● Secure Customer Data Handling:
○ Safeguard customer health information to prevent data breaches and uphold privacy.
○ Safeguard: Implement robust encryption protocols and adhere to data protection regulations to ensure the secure handling of customer data.
● Prevention of Unauthorized Access:
○ Prevent unauthorized access to the system to avoid misuse or tampering with customer profiles.
○ Safeguard: Implement strong user authentication mechanisms and access controls to ensure that only authorized personnel can access and modify system data.
● Compliance with Food Safety Regulations:

○ Adhere to external policies and regulations related to food safety and allergen information.
○ Safeguard: Regularly update the system to align with any changes in food safety regulations and guidelines.
● Safety Certification:
○ Obtain and maintain relevant safety certifications, if applicable, to demonstrate compliance with industry standards.
○ Safeguard: Regularly review and update the system to meet the criteria specified by safety certification authorities.

○ Security Requirements

● User Authentication:
○ Users must undergo a secure authentication process before accessing the system to ensure the protection of customer data.
○ Requirement: Implement a multi-factor authentication system, such as a combination of passwords.
● Data Encryption:
○ All sensitive data, including customer profiles and health information, must be encrypted during transmission and storage.
○ Requirement: Utilize database to store the information of the users.
● Access Controls:
○ Define and enforce access controls to restrict system access based on user roles and responsibilities.
○ Requirement: Checking the user type at login time to give them different functions.

○ Software Quality Attributes

Usability:
● The system must achieve a usability rating of at least 90% in user satisfaction surveys conducted quarterly.
● Verification: Conduct regular user surveys and analyze feedback to ensure high user satisfaction with the system's usability.

Adaptability:
- The system should adapt to changes in dietary guidelines and nutritional information promptly, with updates implemented.

Robustness:
- The system should handle unexpected inputs or user behaviors gracefully, with no user interactions resulting in system errors.

- Verification: Monitor system logs and user feedback to identify and address any issues related to unexpected inputs or behaviors.

○ Business Rules

● User Roles:
○ Admin/Manager:
Can access and modify all functionalities, including system settings, user roles, and menu configurations.
○ Staff/Customer Service:
Can access customer profiles, process orders, and view dessert information.
○ Customer:
Can create and update personal profiles, view dessert recommendations, and place orders.
● Authentication Levels:
○ All users, including staff and customers, must undergo a secure authentication process before accessing the system.
● Dietary Profile Update:
○ Customers have the autonomy to update their dietary profiles at any time to receive personalized dessert recommendations.
● Order Processing:
○ Only staff members are authorized to process customer orders, ensuring accurate fulfillment and efficient service.
● Menu Configuration:
○ Admin/Manager roles have the exclusive authority to update and configure the dessert menu, including ingredient information and nutritional details.

○ Operating Environment

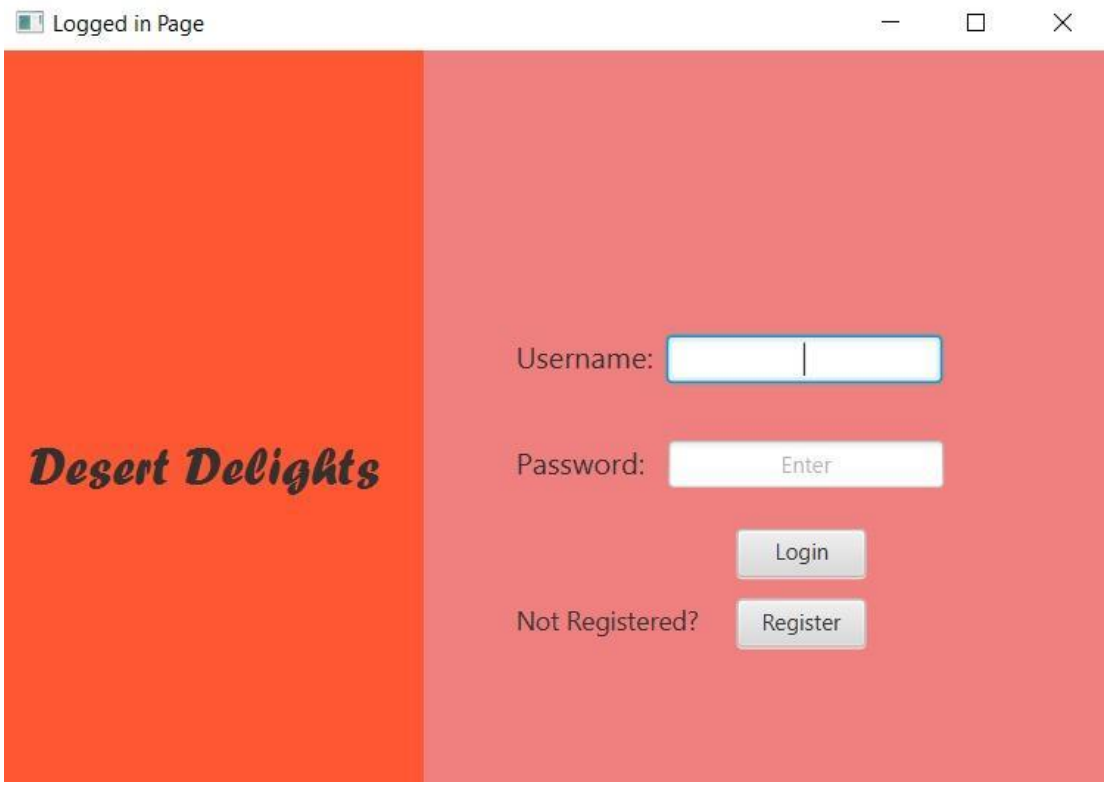
Hardware Platform:
○ The software will operate on standard x86-64 architecture servers.
○ The servers should have a minimum of 8GB RAM and a quad-core processor to ensure optimal performance.

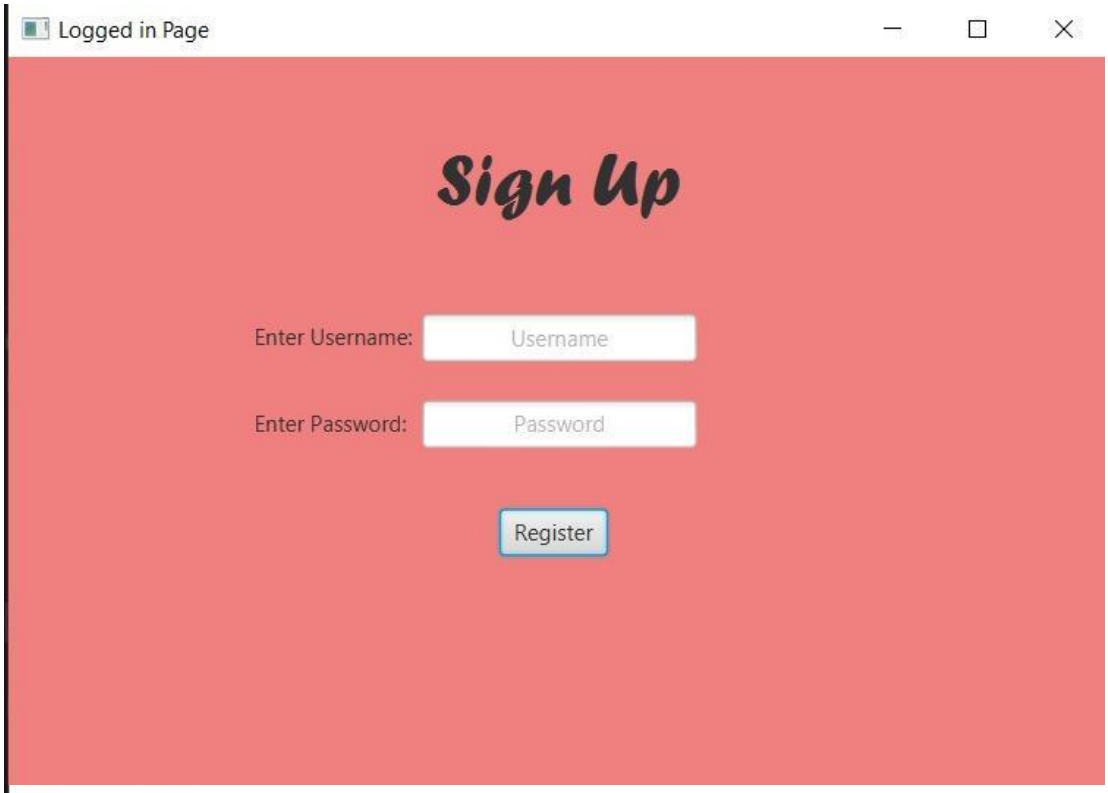
Operating System:
○ The system is compatible with Windows 7 or higher.

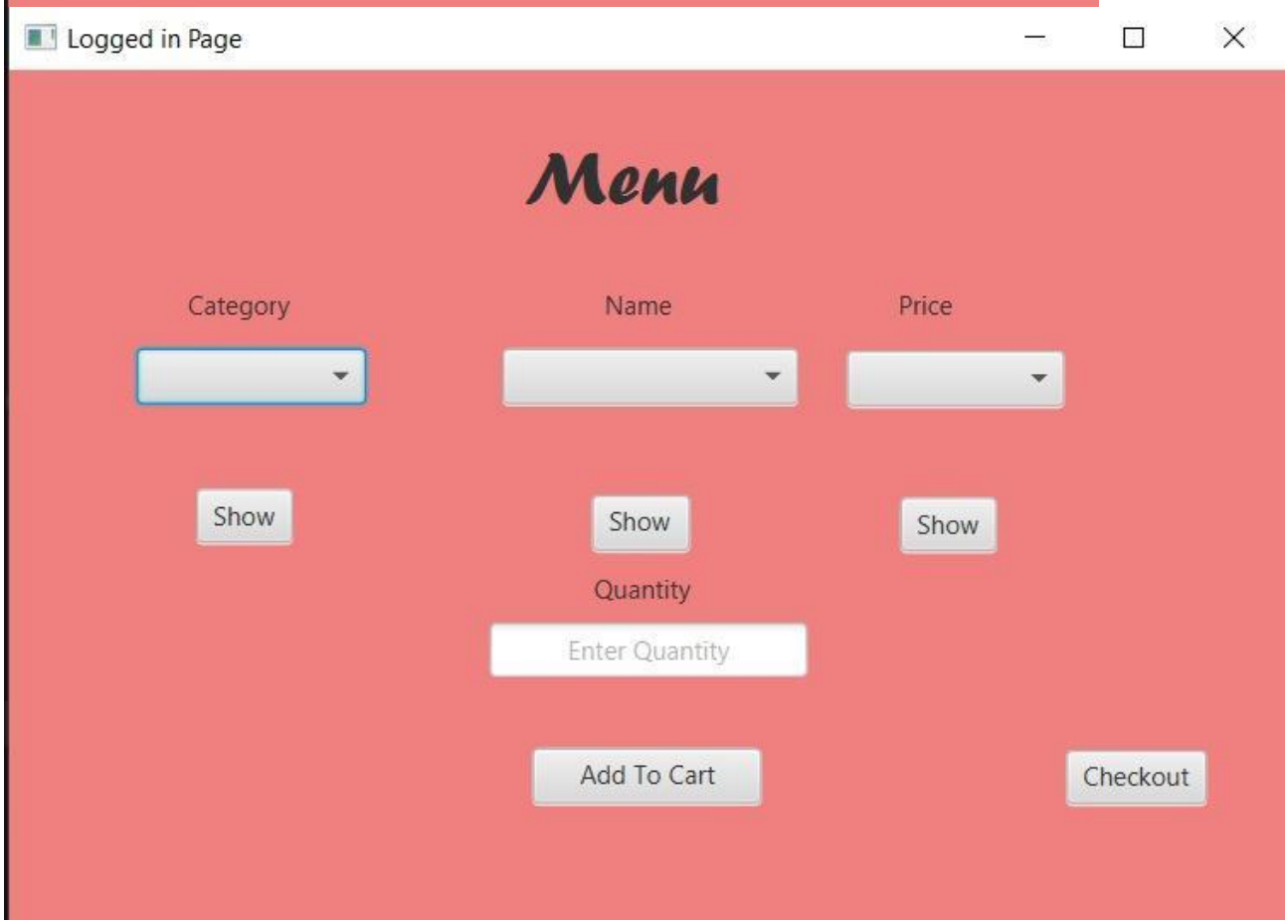
Database Management System (DBMS):

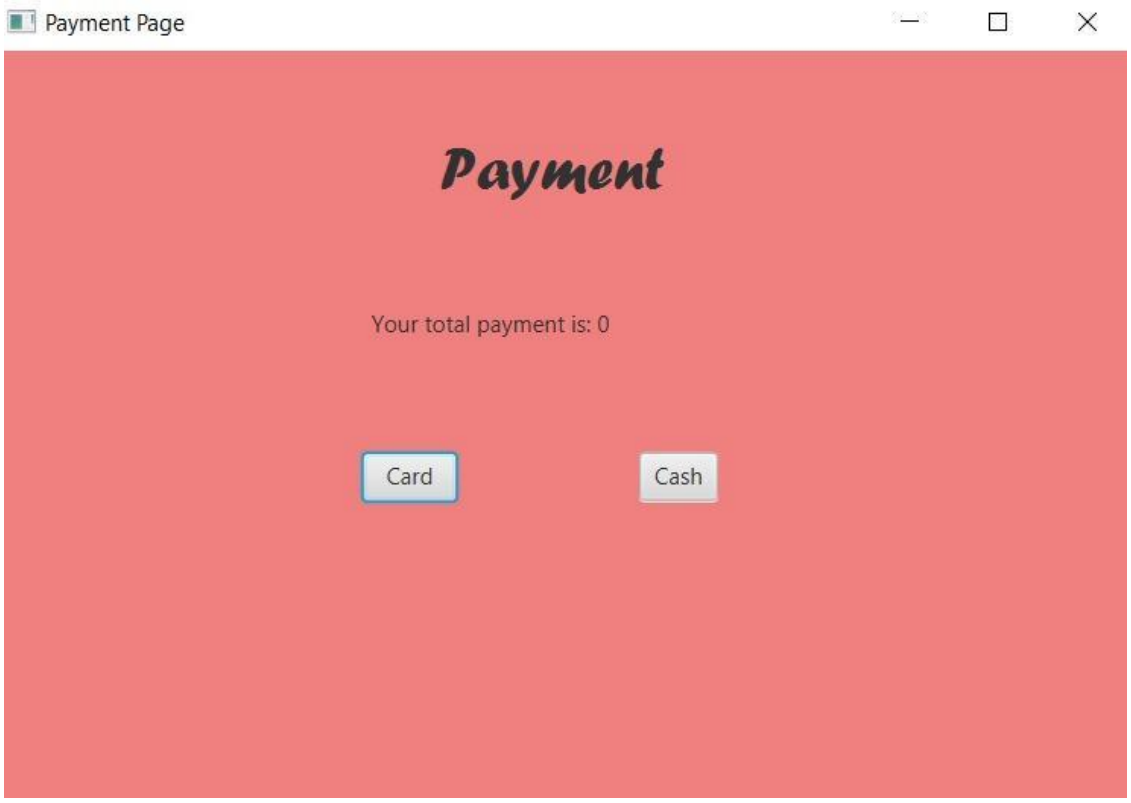
- The system is designed to work with theMySQL relational database management system.

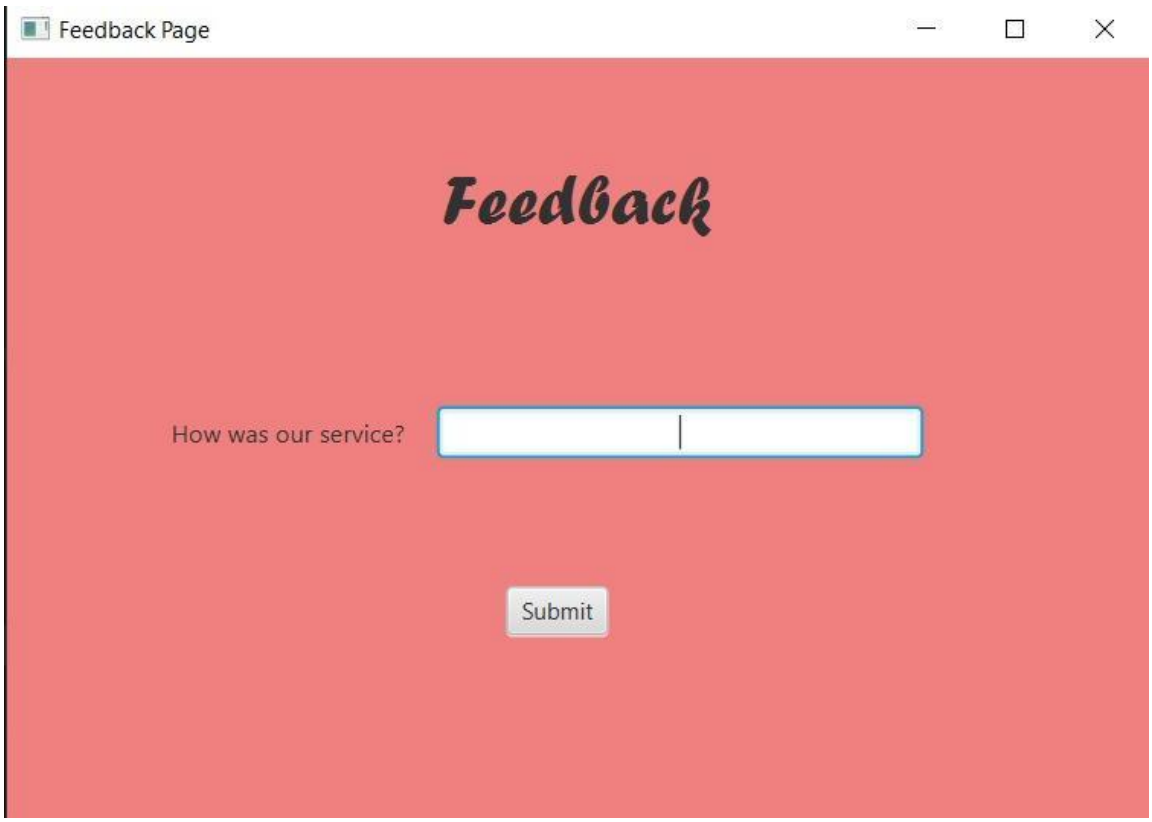
○ User Interfaces



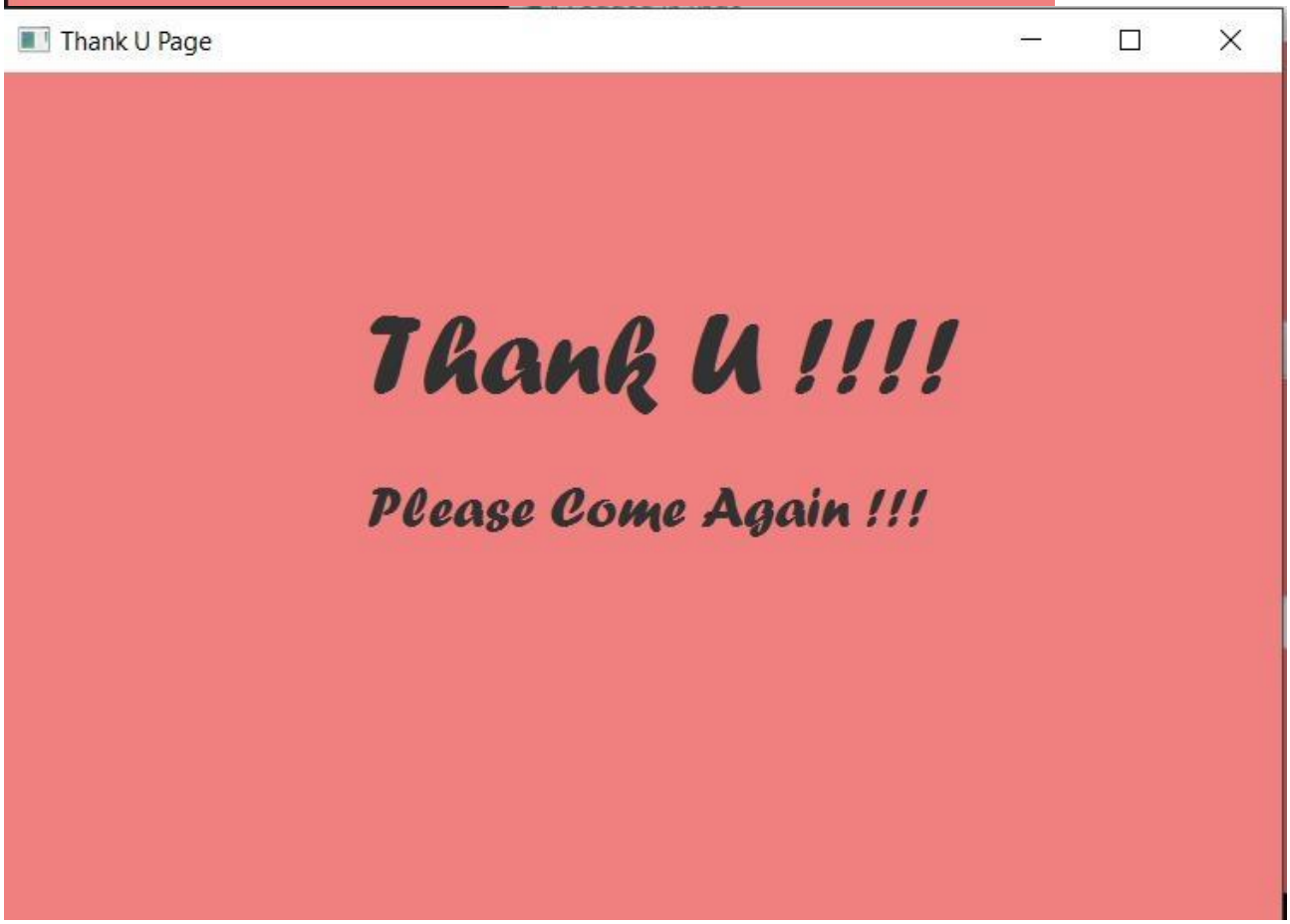

Logged in Page
Sign Up
Enter Username:
Username
Enter Password:
Password
Register


Logged in Page
Menu
Category
Name
Price
Show
Show
Show
Quantity
Enter Quantity
Add To Cart
Checkout

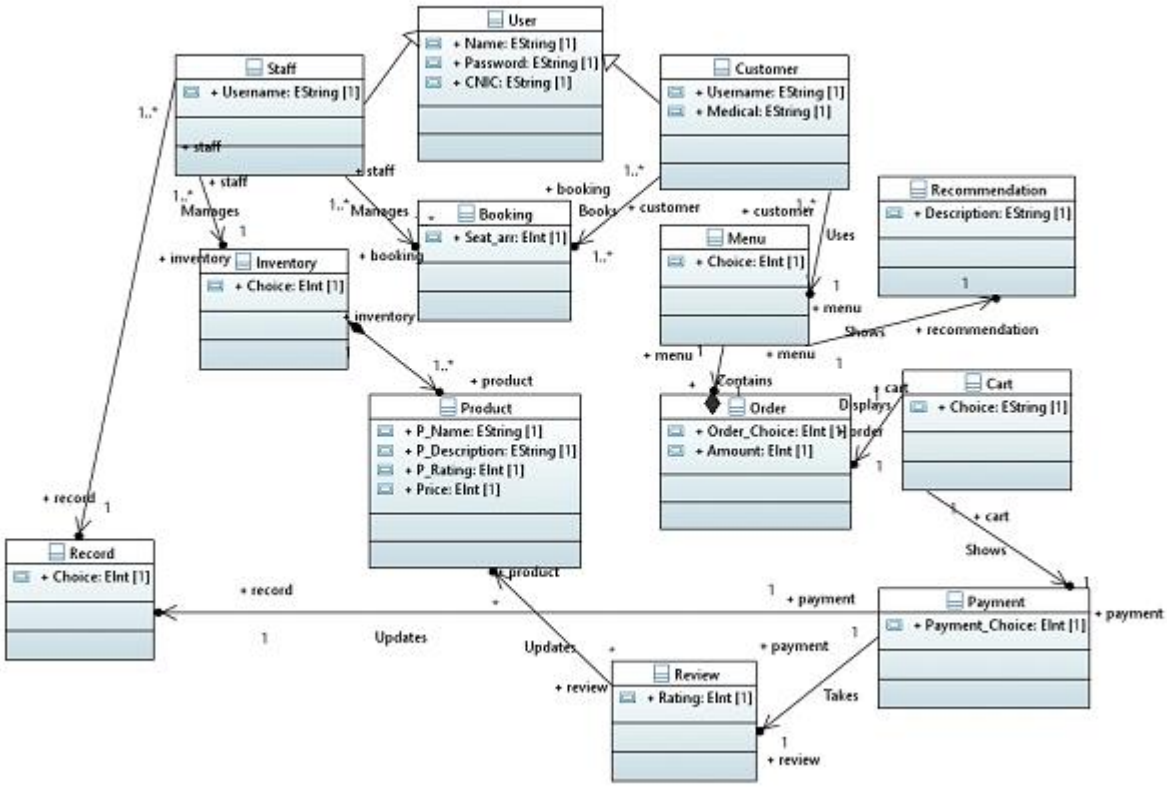

Payment Page
Payment
Your total payment is: 0
Card
Cash


Feedback Page
Feedback
How was our service?
Submit

Staff Page
Staff Page
Manange Sales
Manage Products

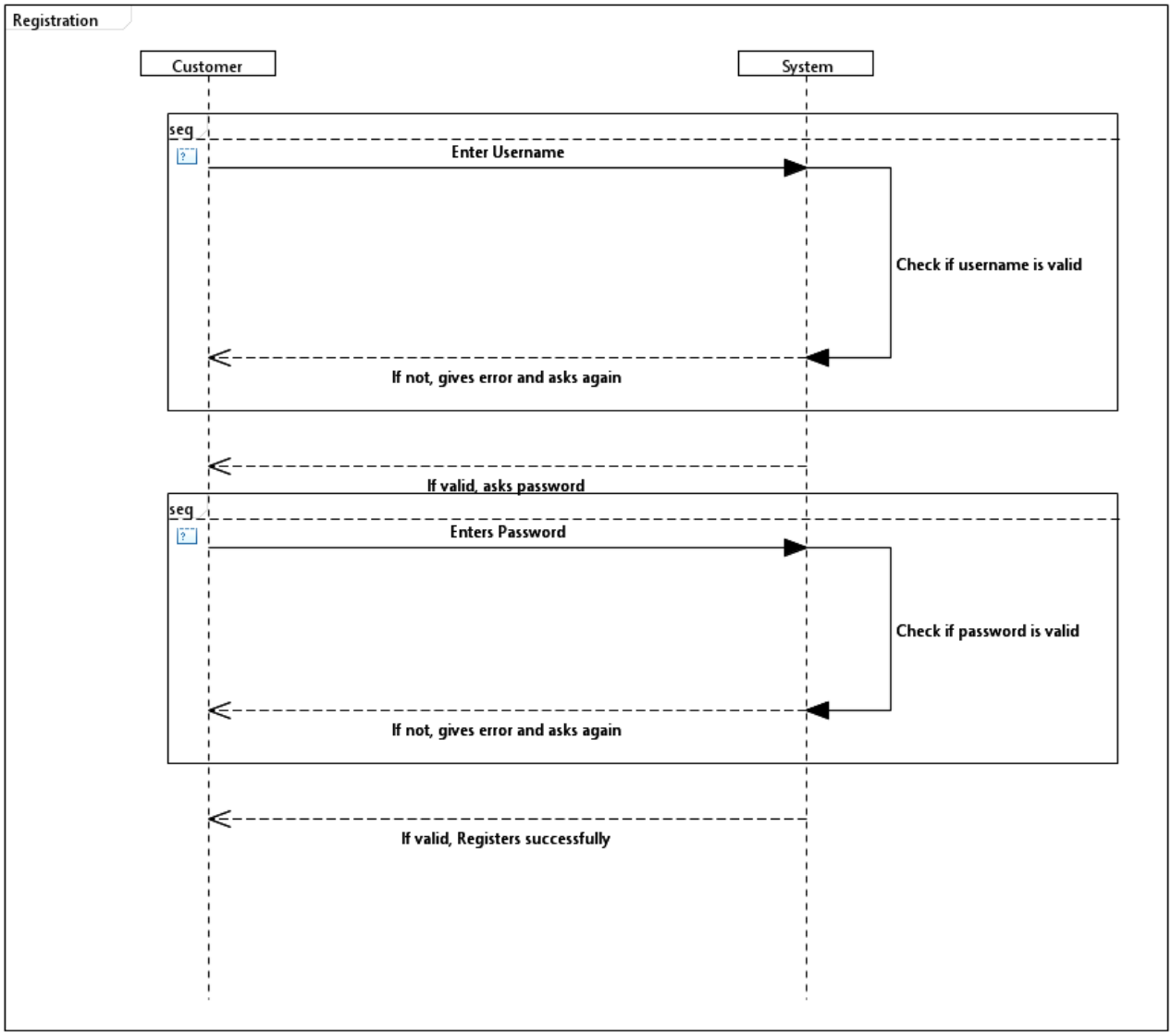

Thank U Page
Thank U !!!!
Please Come Again !!!

● Domain Model

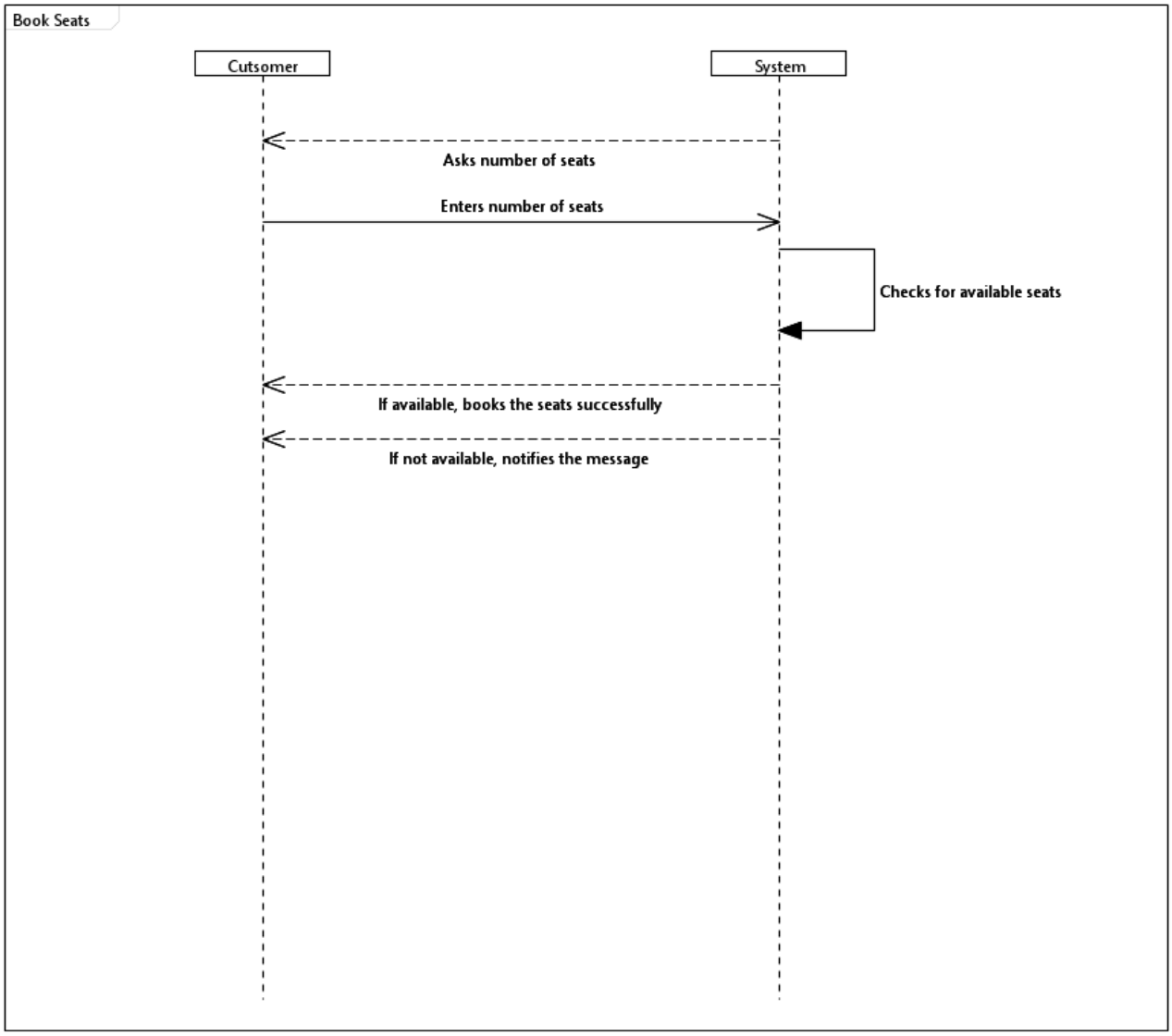


● System Sequence Diagram

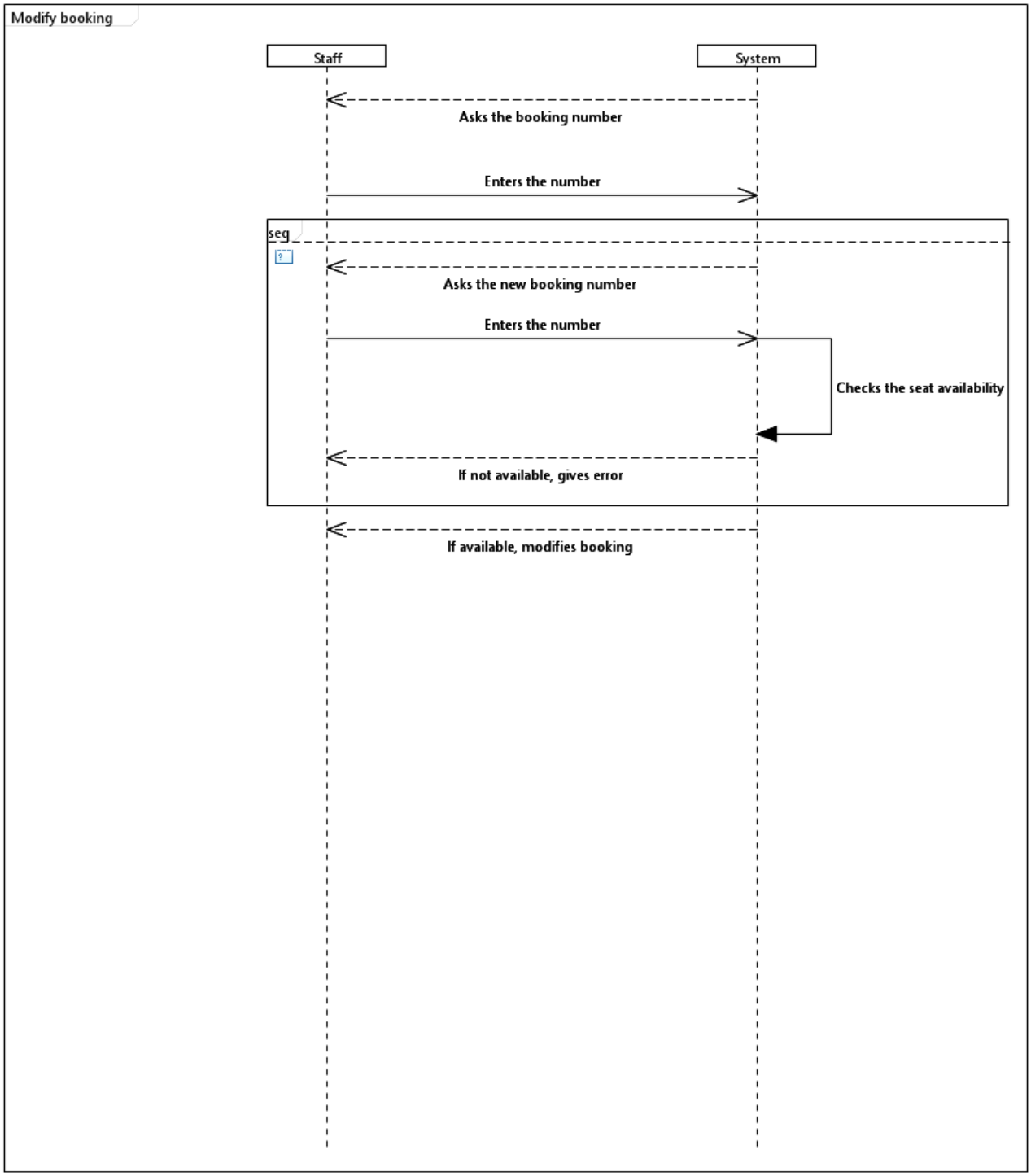
Registration


Registration
Customer
System
seg
Enter Username
Check if username is valid
If not, gives error and asks again
If valid, asks password
seg
Enters Password
Check if password is valid
If not, gives error and asks again
If valid, Registers successfully

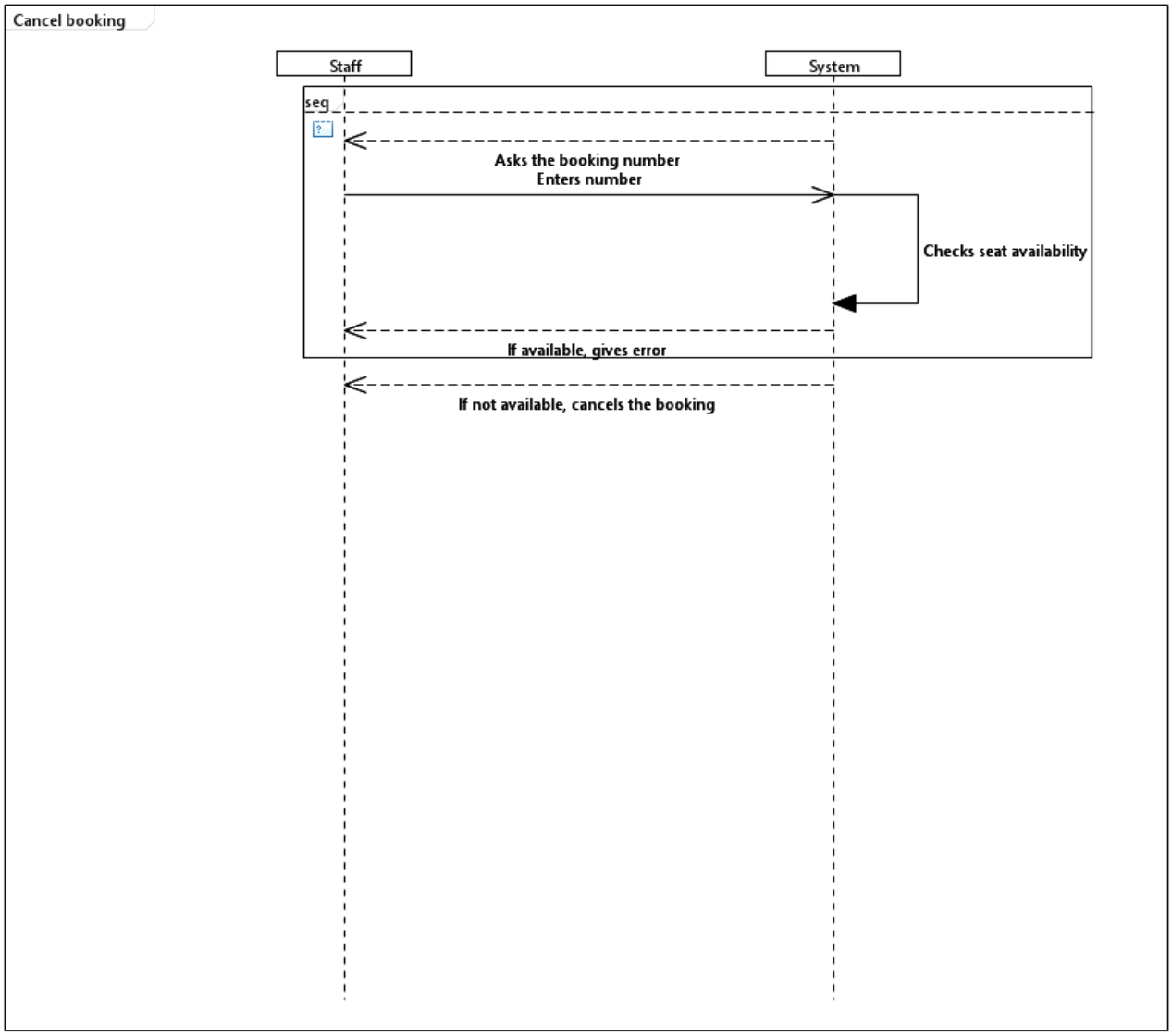
Book Seats



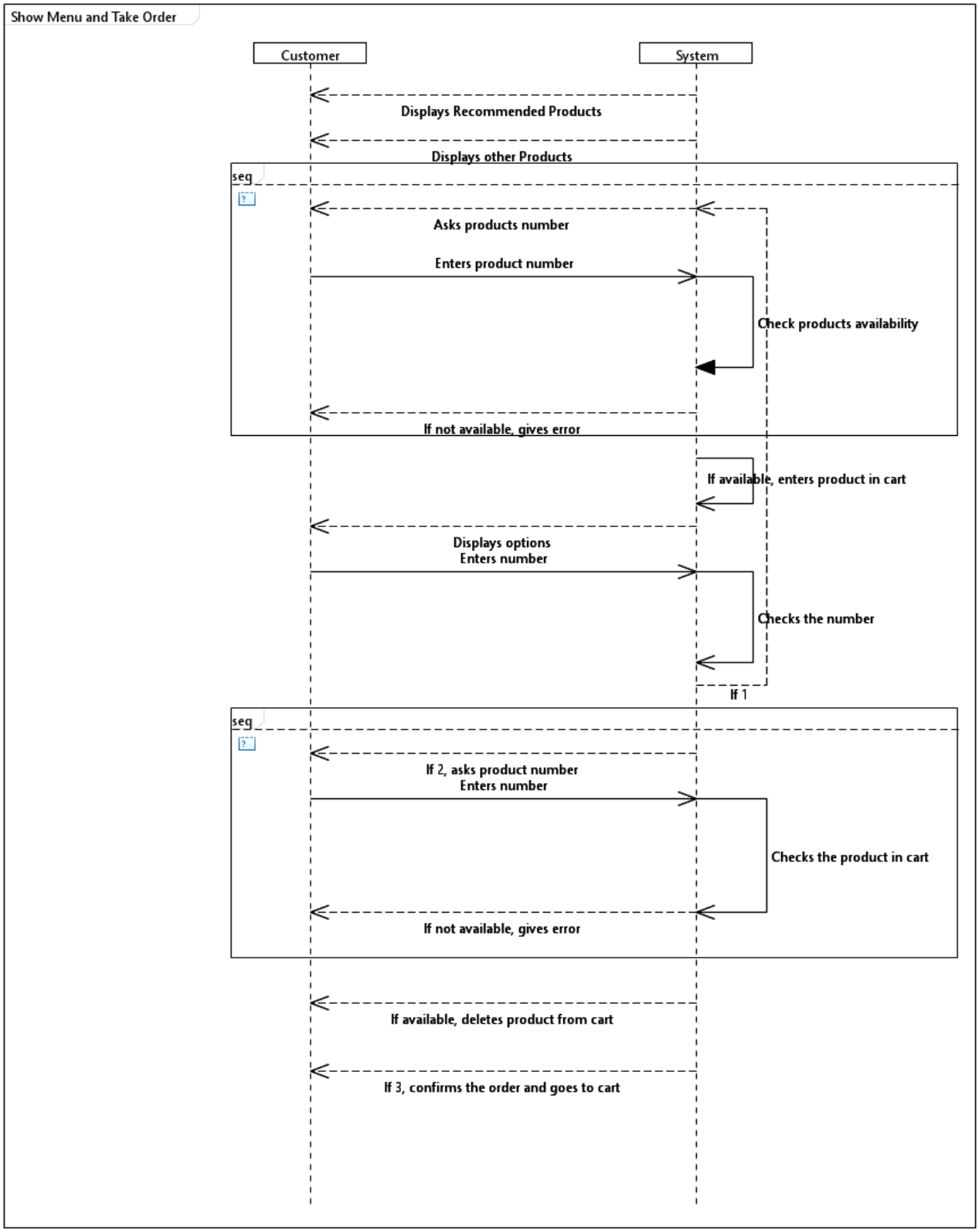
Modify Booking



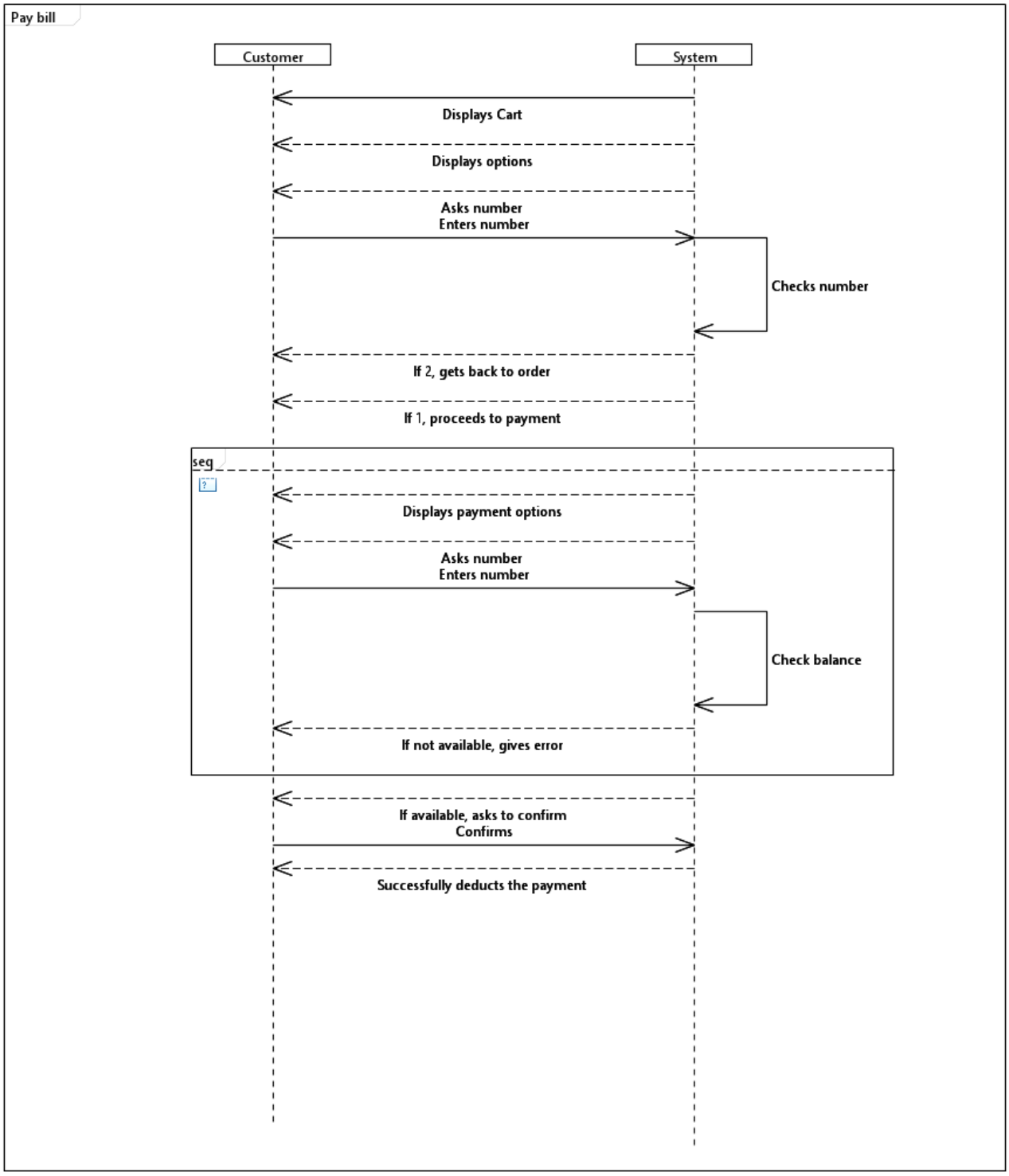
Cancel Booking



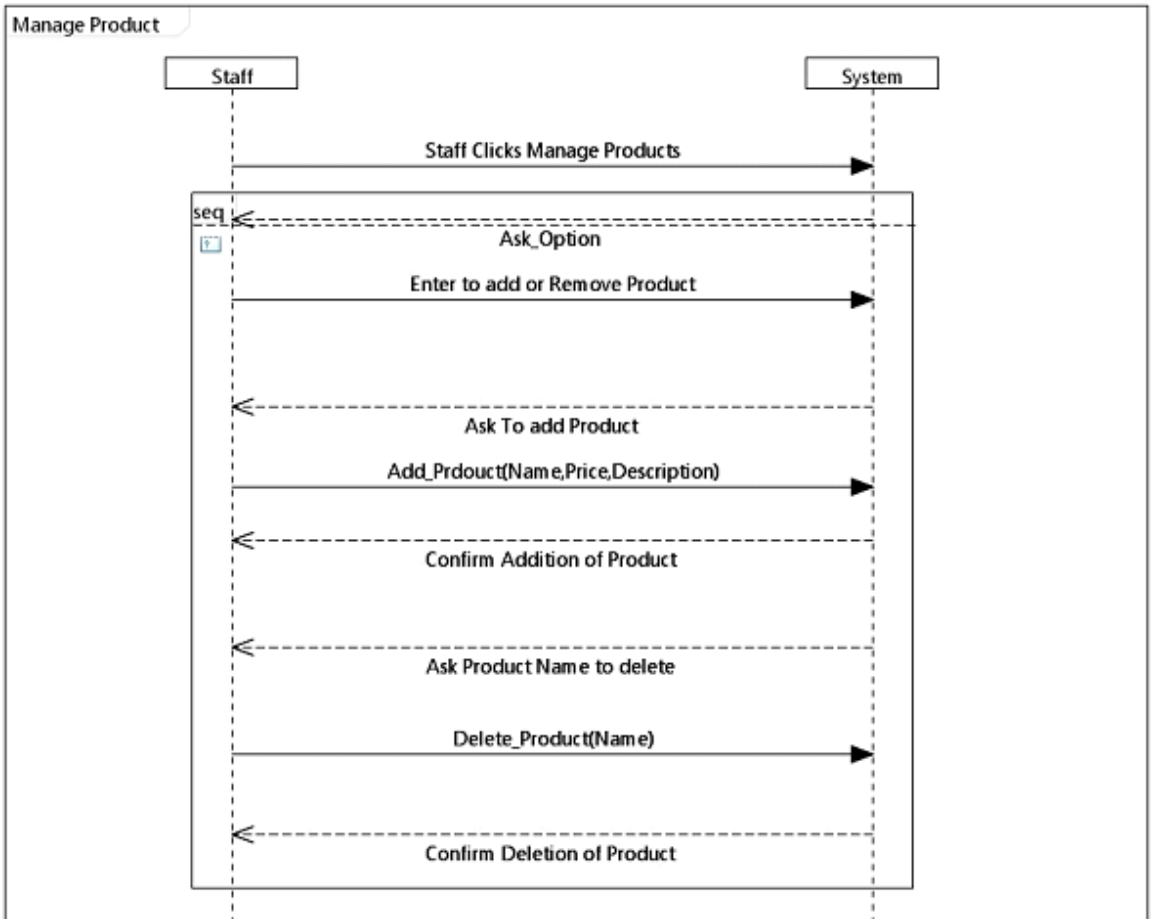
Show Menu and Take Order


Show Menu and Take Order
Customer
System
Displays Recommended Products
Displays other Products
seg
Asks products number
Enters product number
Check products availability
If not available, gives error
If available, enters product in cart
Displays options
Enters number
Checks the number
If 1
seg
If 2, asks product number
Enters number
Checks the product in cart
If not available, gives error
If available, deletes product from cart
If 3, confirms the order and goes to cart

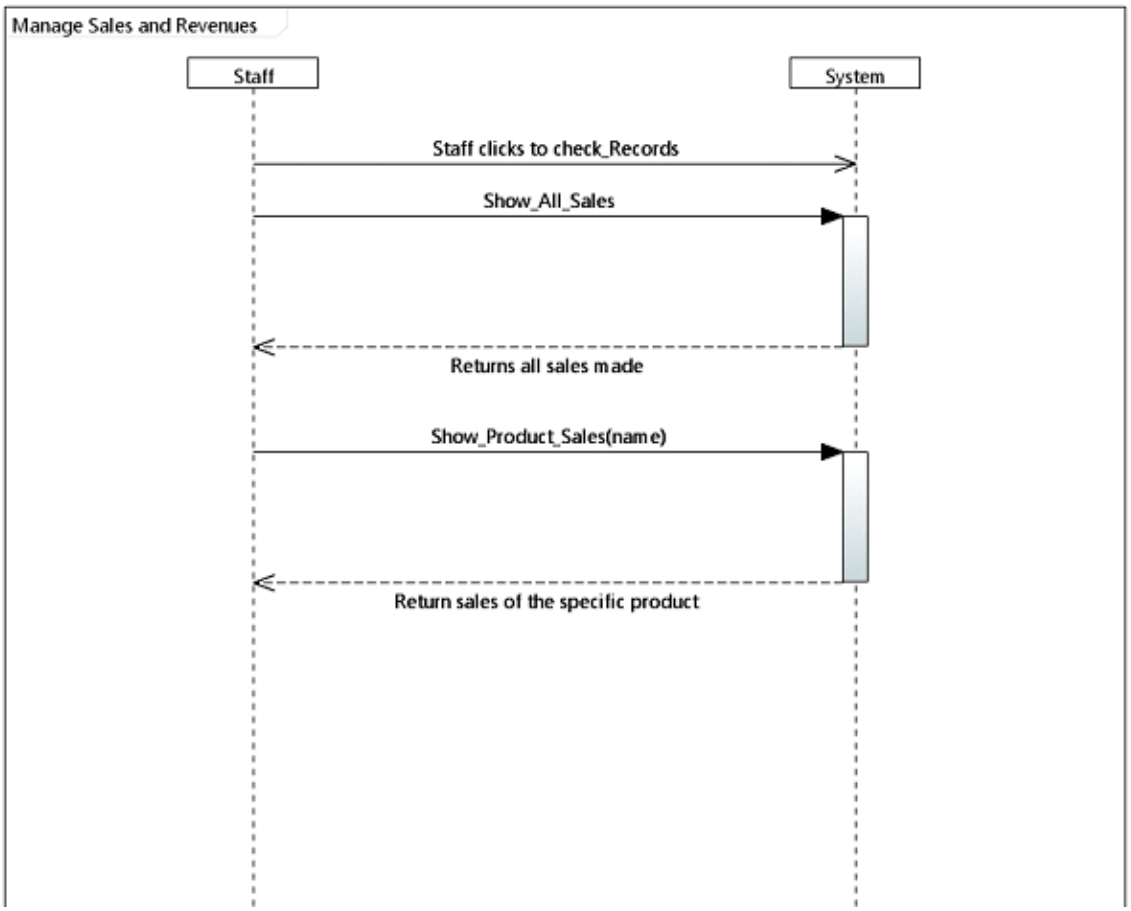
Pay Bill



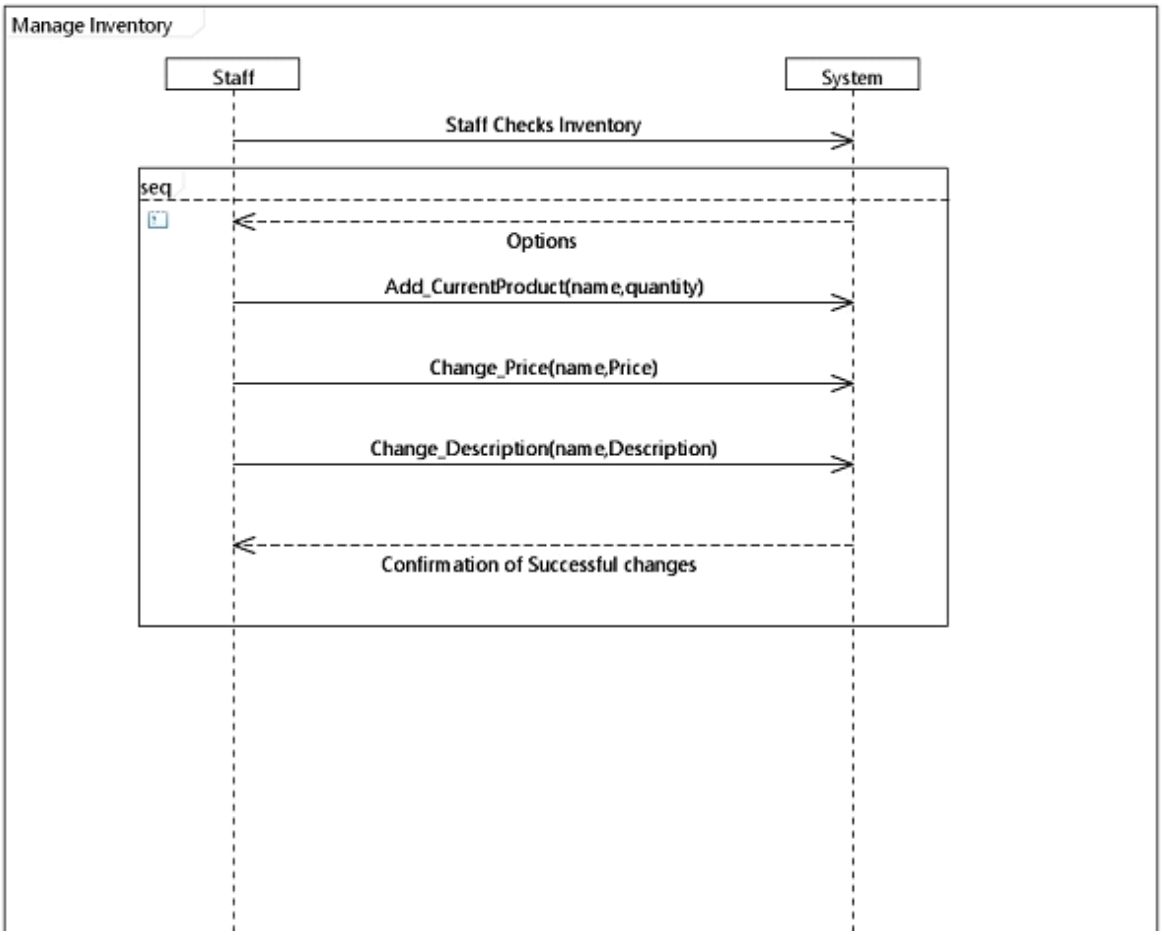
Manage Product



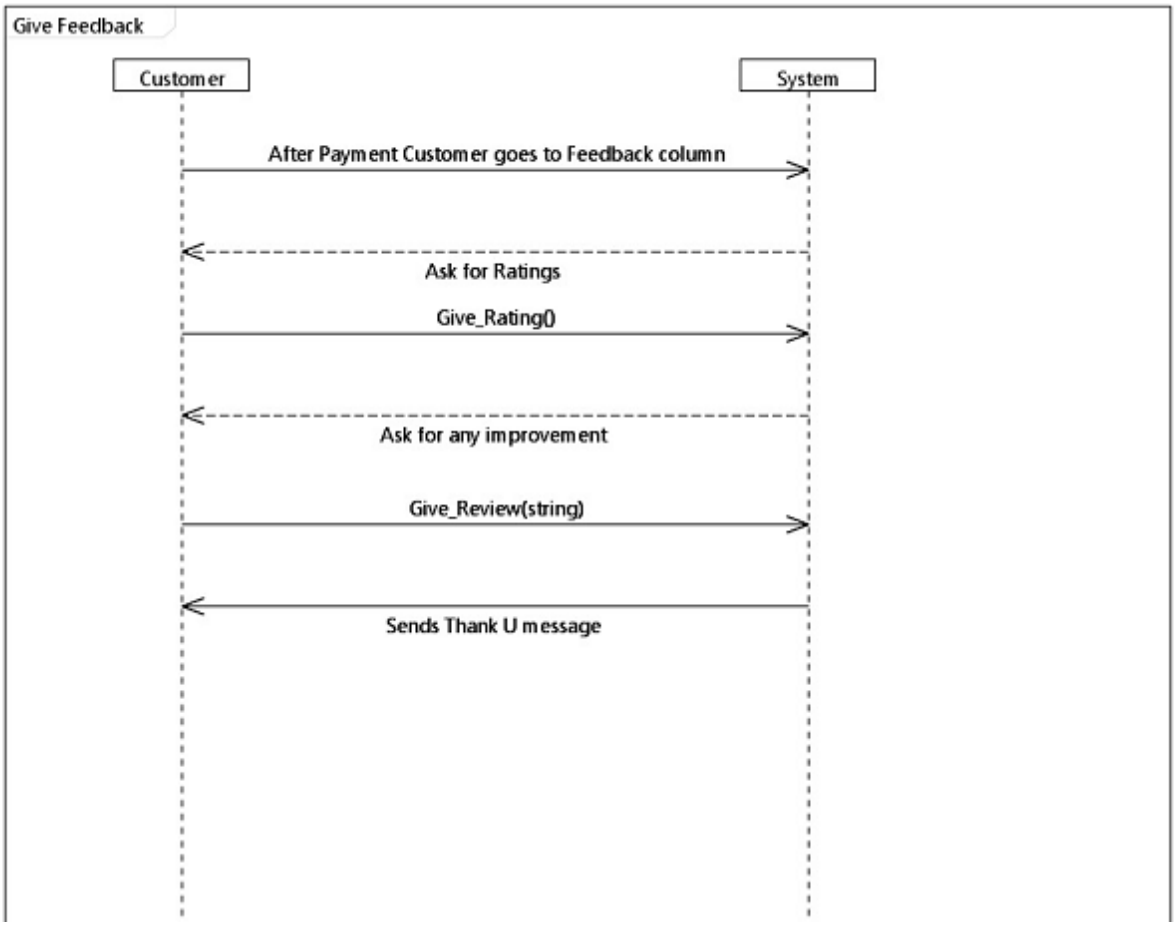
Manage Sales and Revenue



Manage Inventory

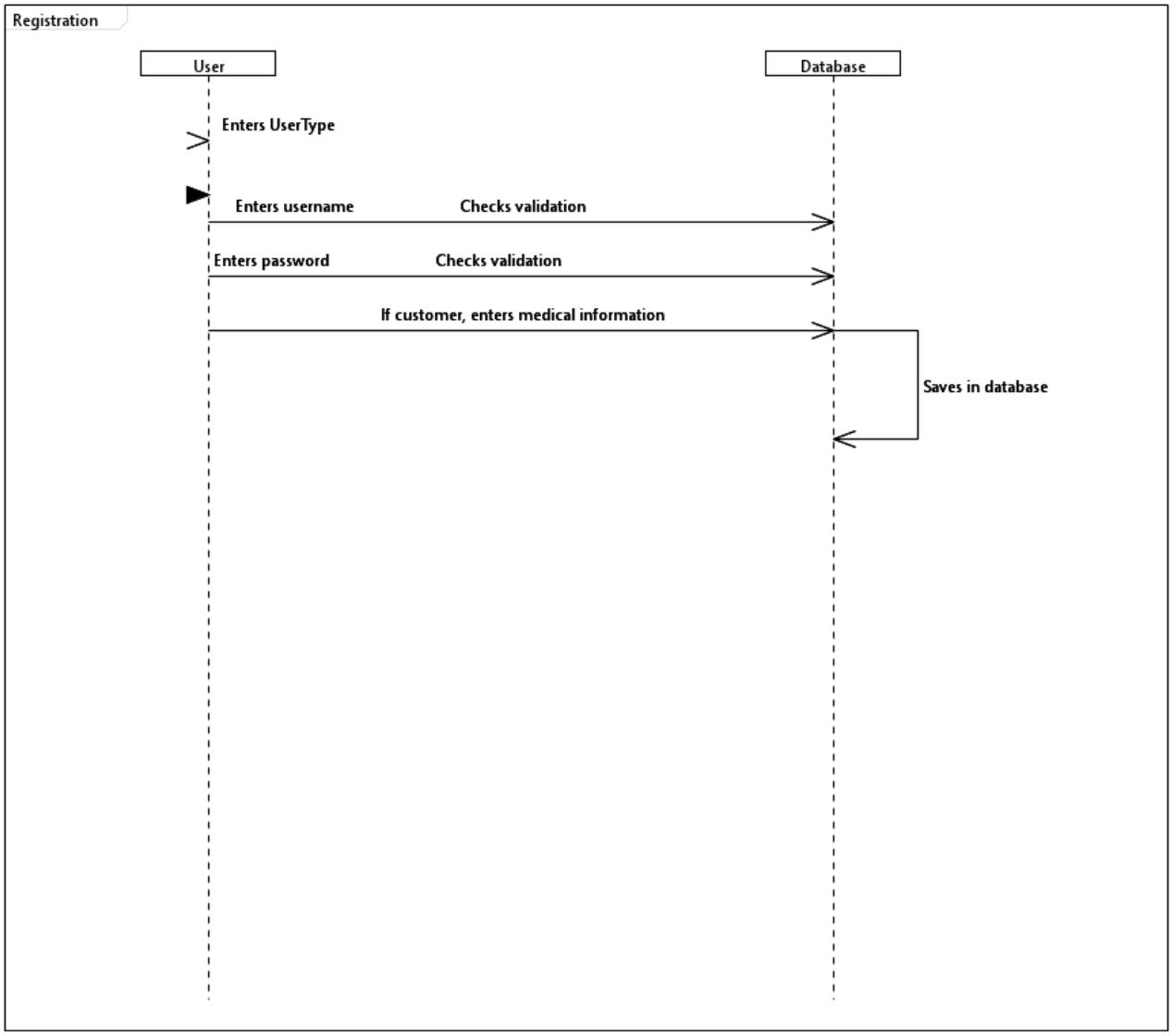


Give FeedBack

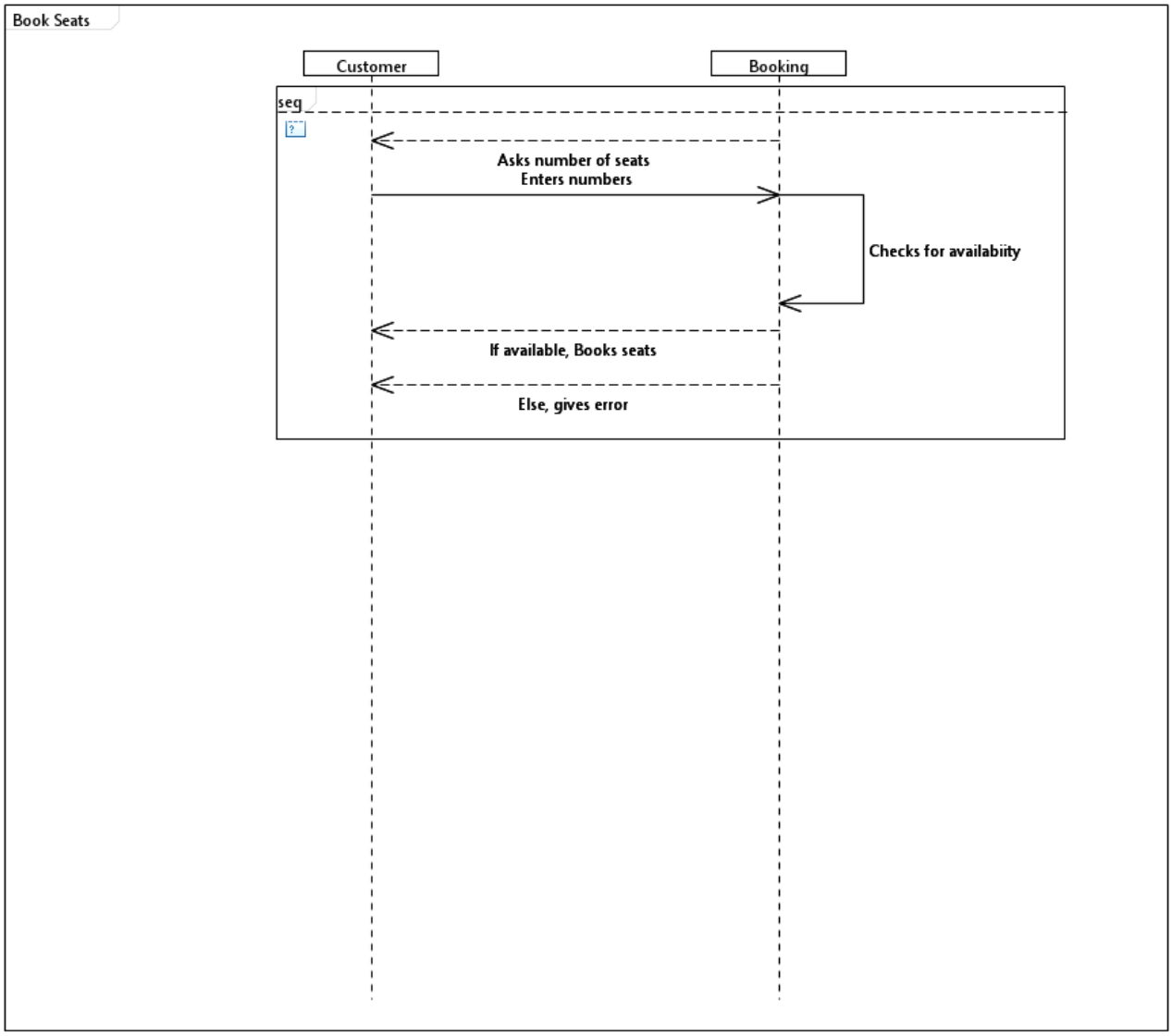


- **Sequence Diagram**

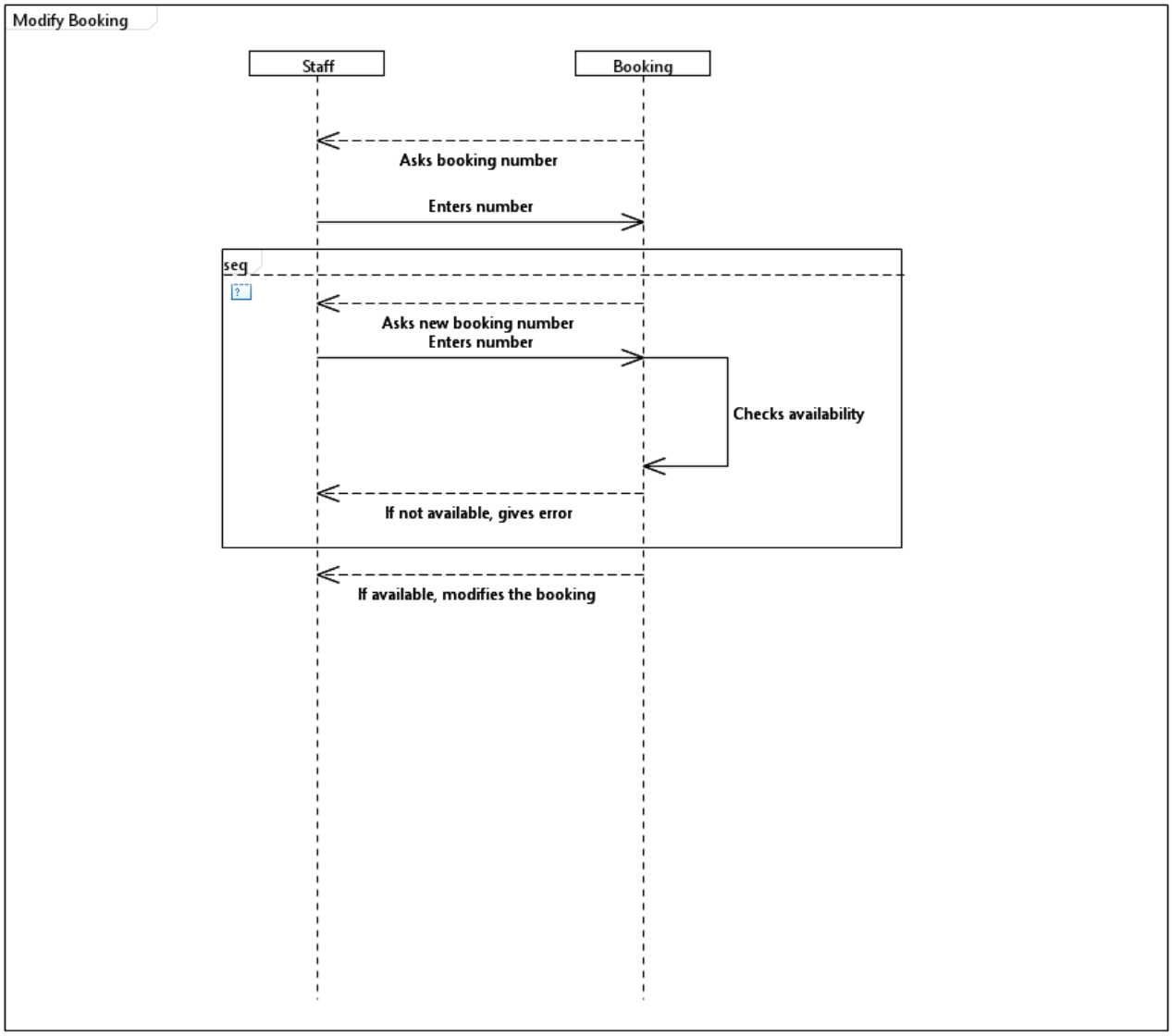
Registration:


Registration
User
Database
Enters UserType
Enters username
Checks validation
Enters password
Checks validation
If customer, enters medical information
Saves in database

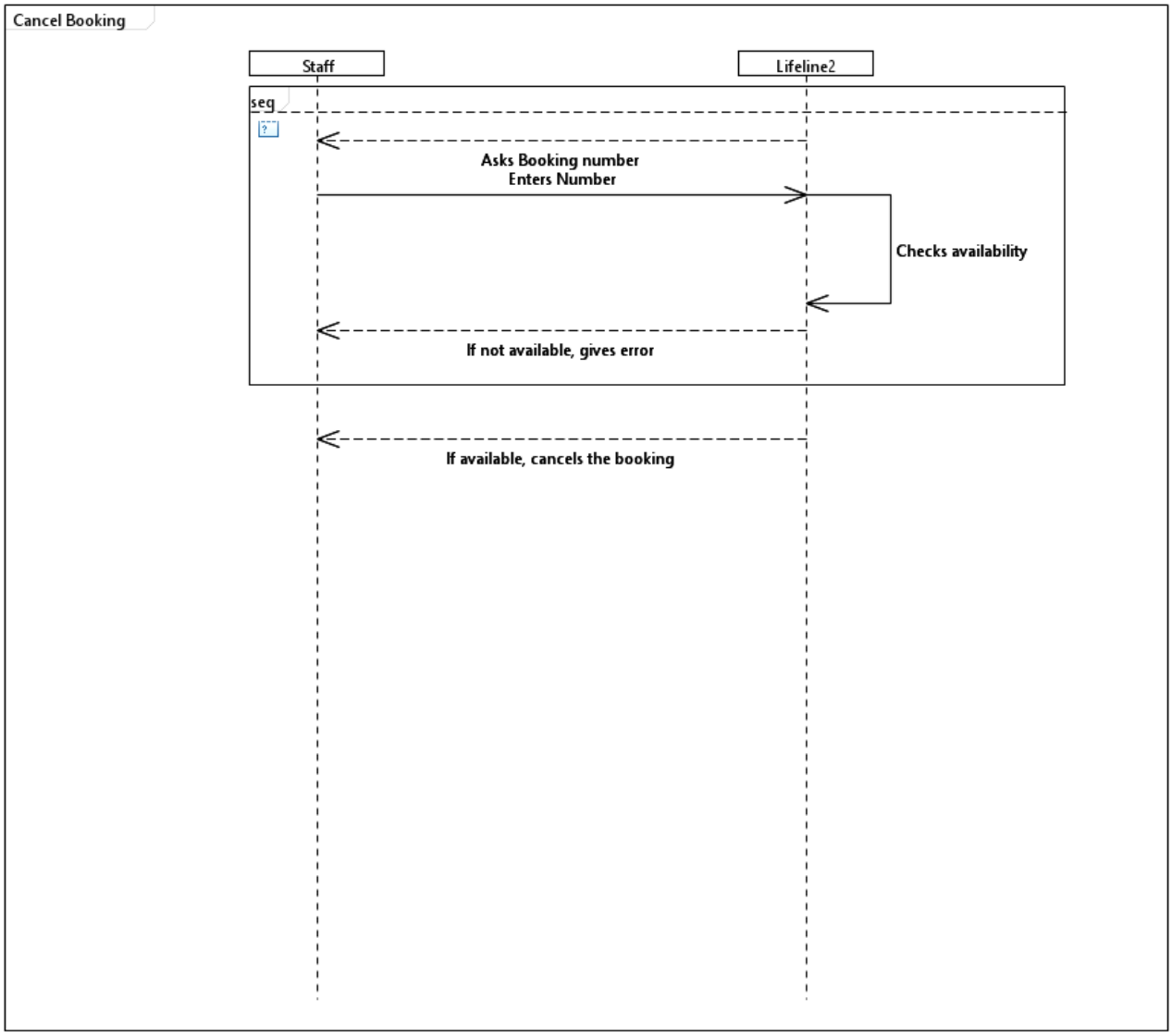
Book Seats:



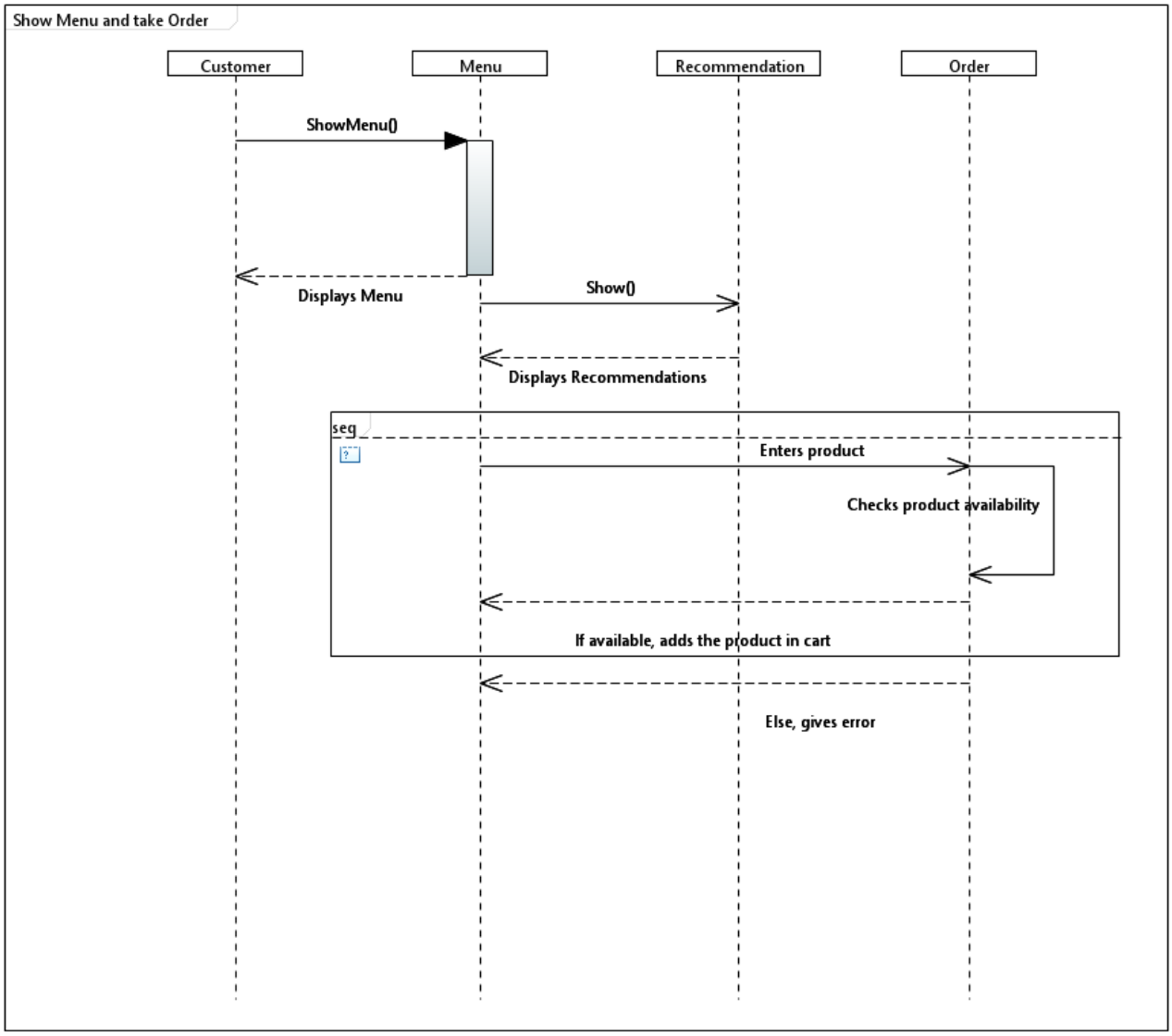
Modify Booking



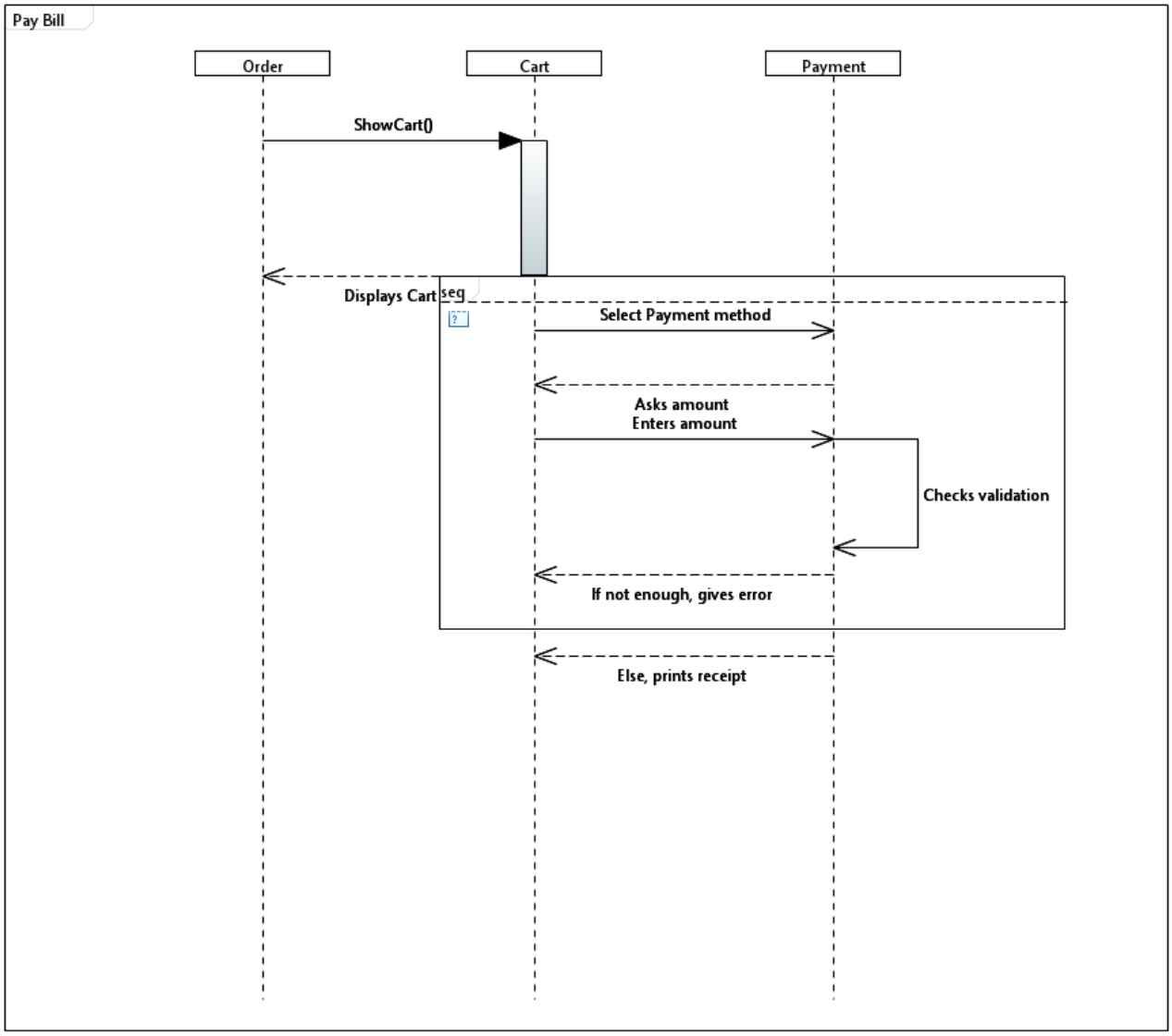
Cancel Booking



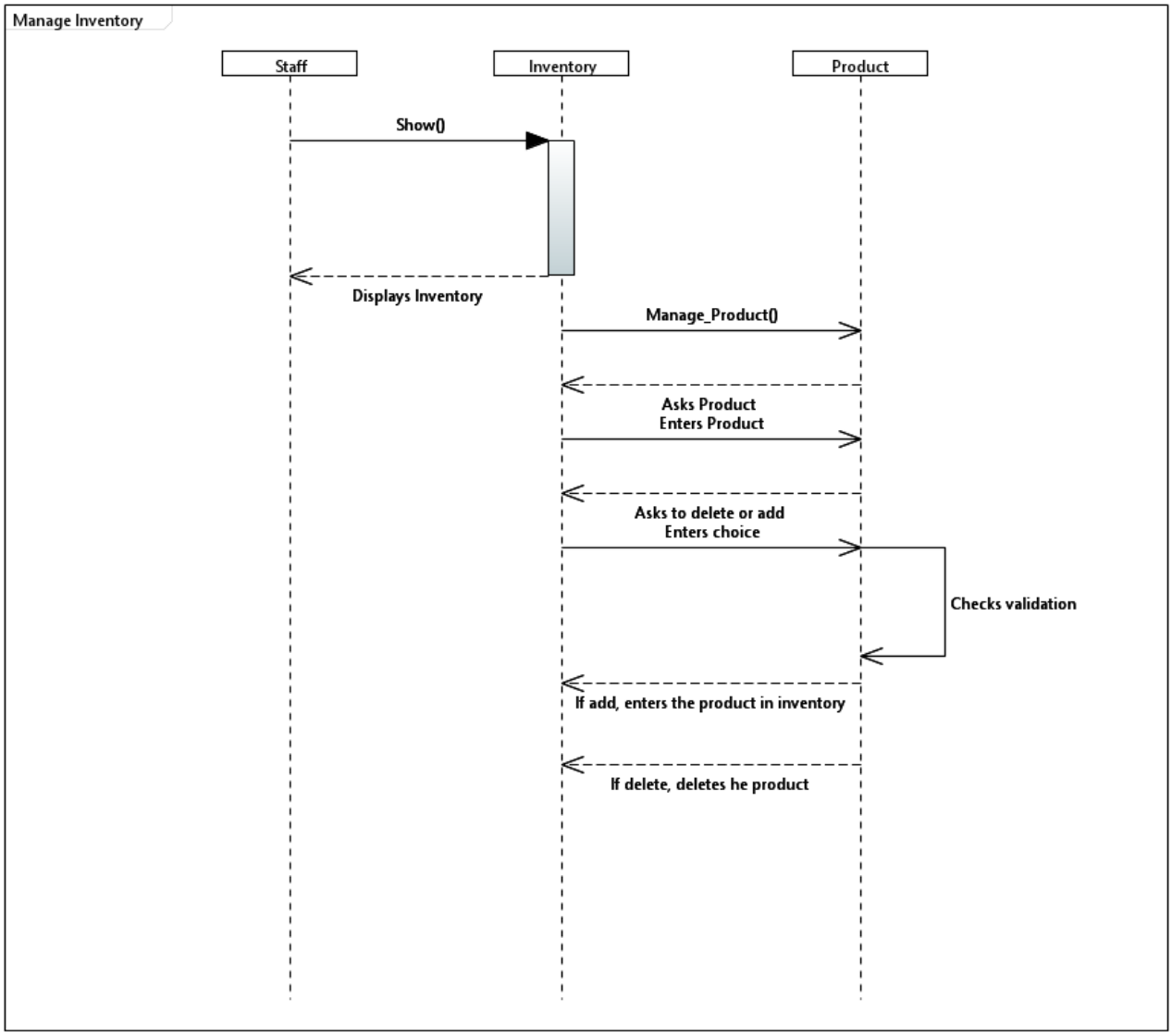
Show Menu and Take Order


Show Menu and take Order
Customer
Menu
Recommendation
Order
ShowMenu()
Displays Menu
Show()
Displays Recommendations
seg
Enters product
Checks product availability
If available, adds the product in cart
Else, gives error

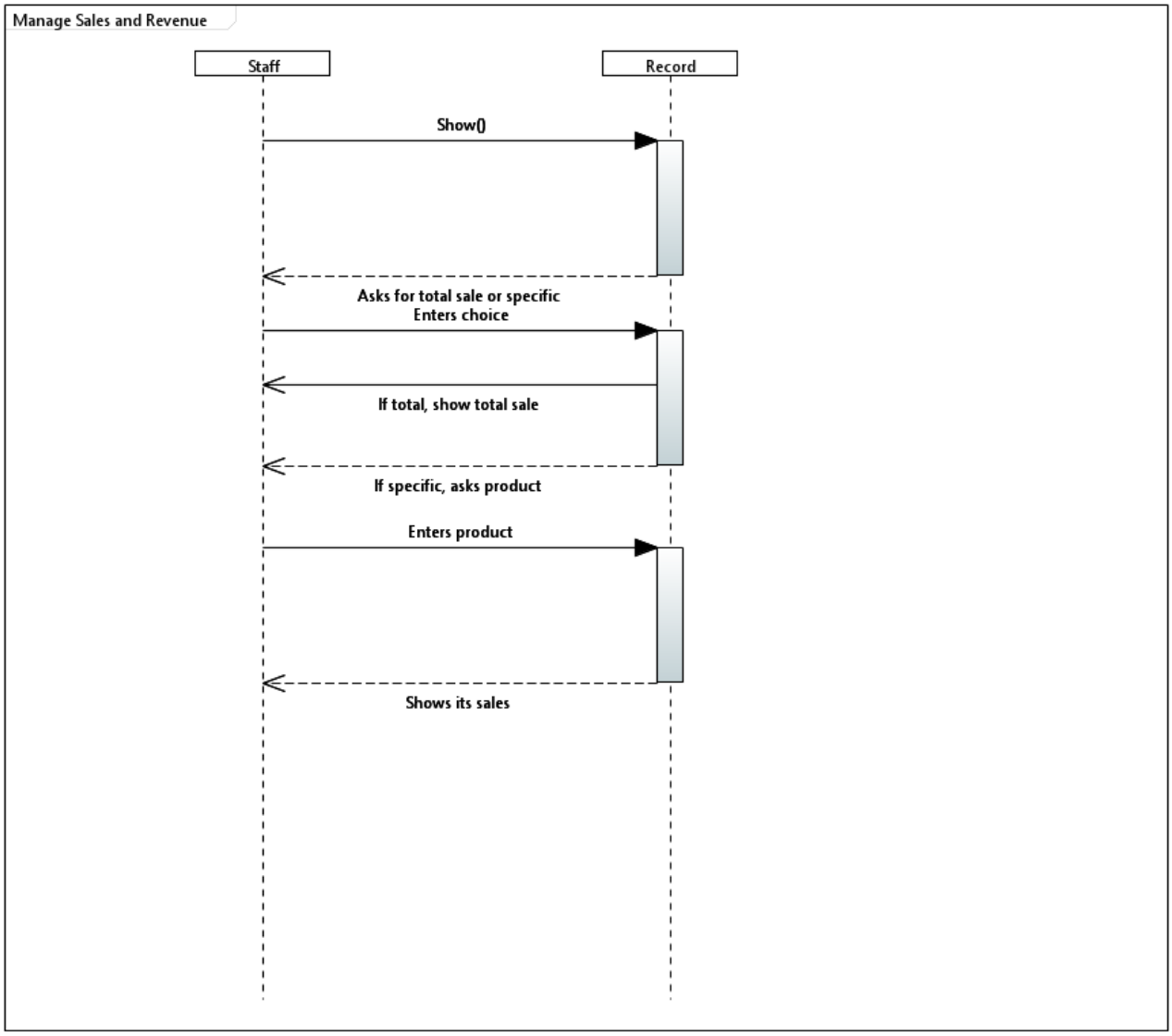
Pay Bill



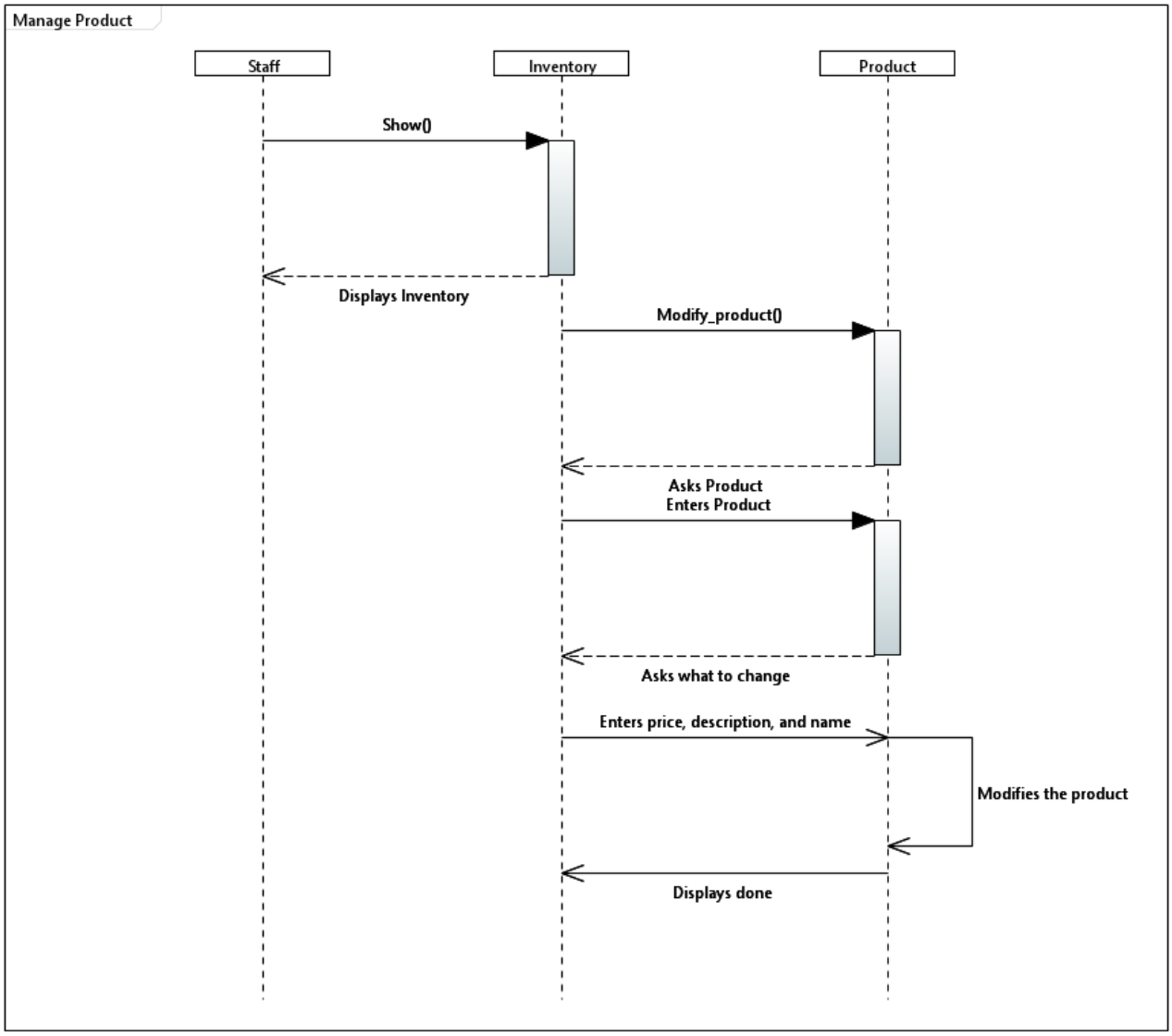
Manage Inventory



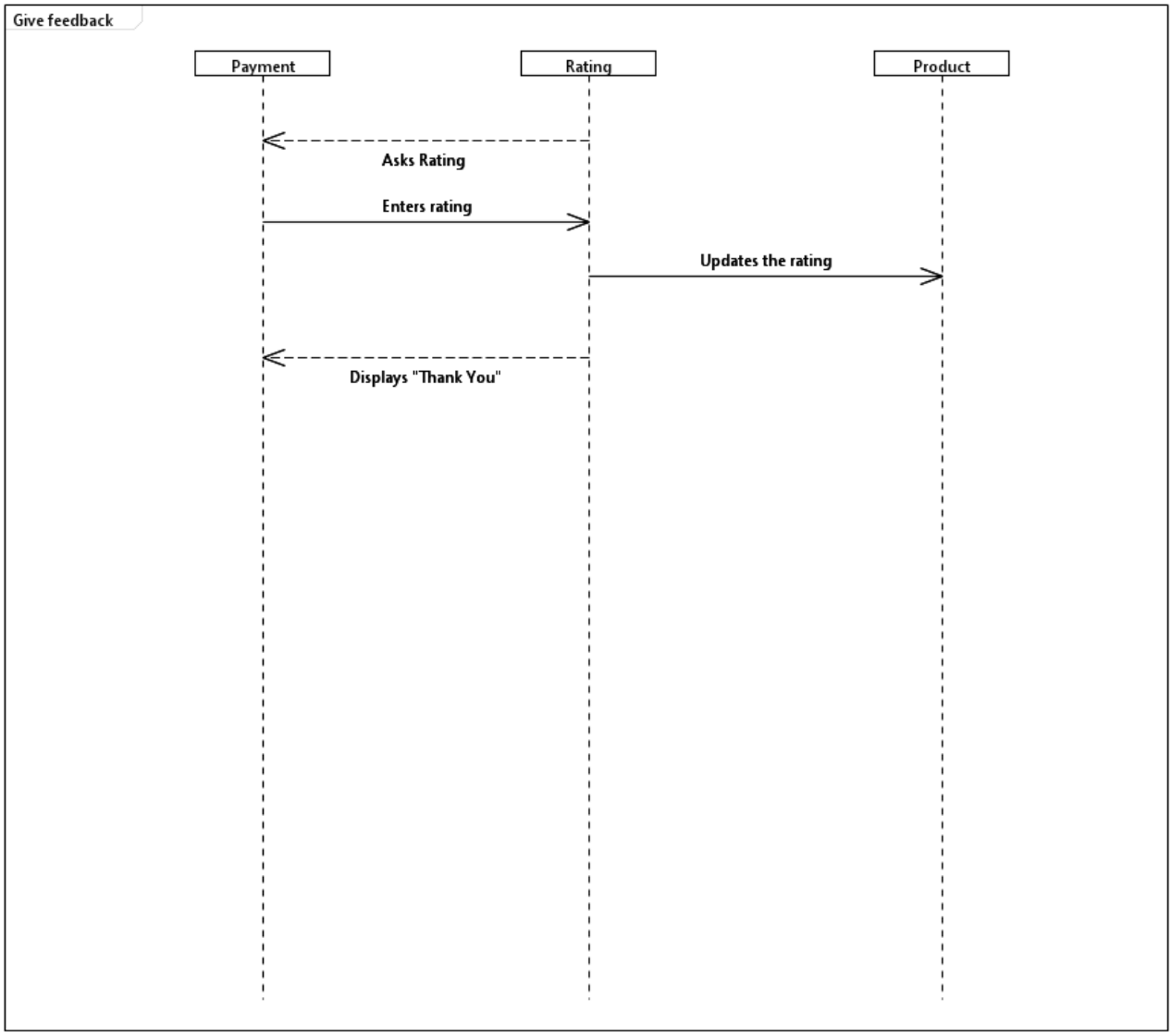
Manage Sales and Revenue



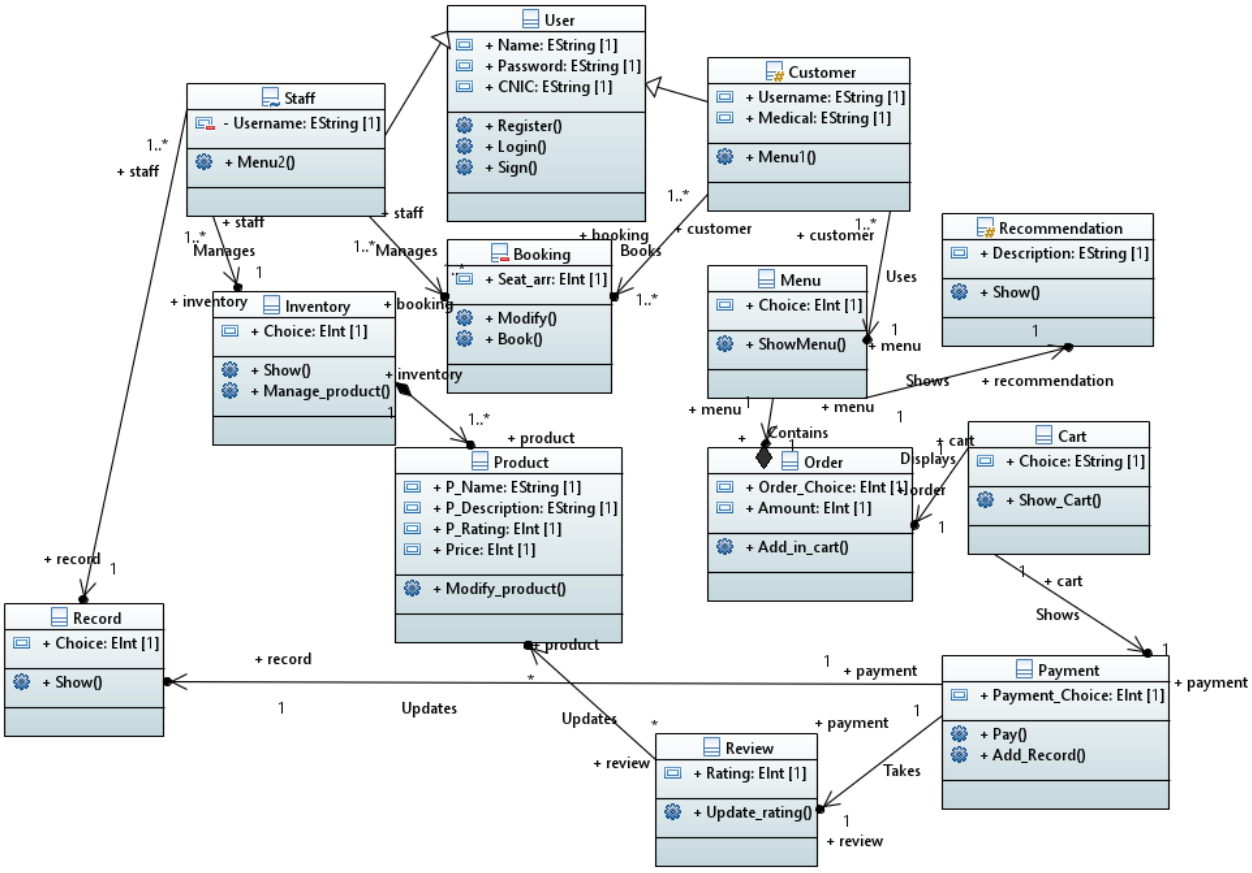
Manage Product



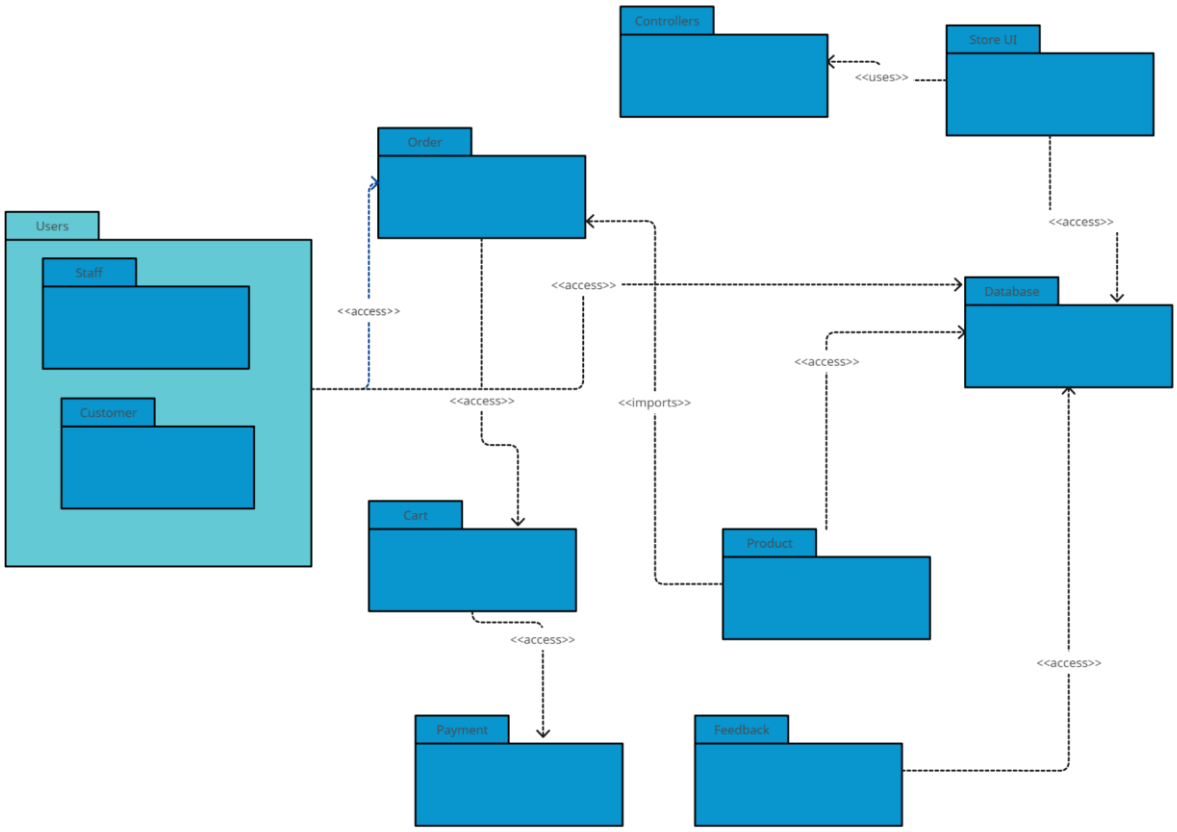
Give FeedBack

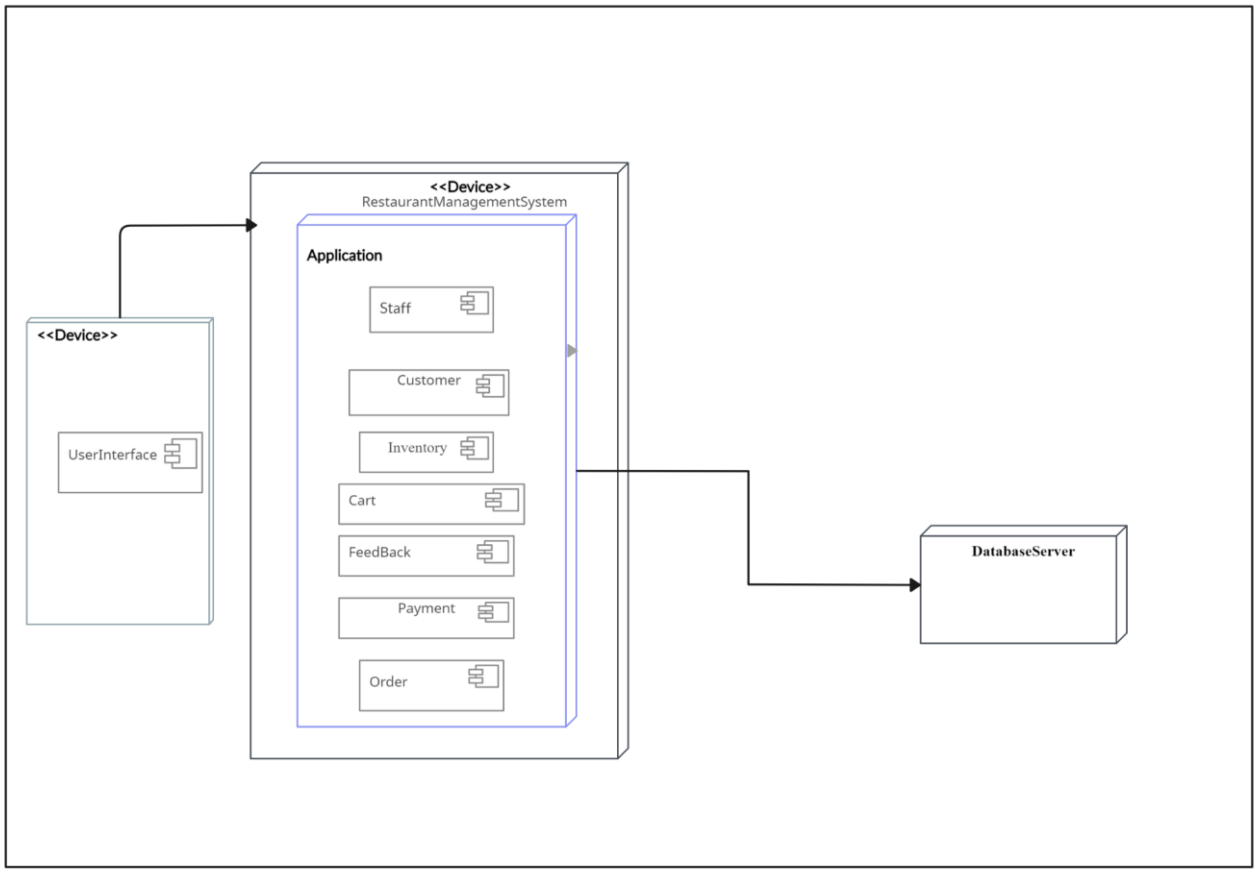


- **Class Diagram**


User
+ Name: EString [1]
+ Password: EString [1]
+ CNIC: EString [1]
+ Register()
+ Login()
+ Sign()
Staff
- Username: EString [1]
+ Menu2()
Customer
+ Username: EString [1]
+ Medical: EString [1]
+ Menu1()
Recommendation
+ Description: EString [1]
+ Show()
Booking
+ Seat_arr: EInt [1]
+ Modify()
+ Book()
Inventory
+ Choice: EInt [1]
+ Show()
+ Manage_product()
Menu
+ Choice: EInt [1]
+ ShowMenu()
Product
+ P_Name: EString [1]
+ P_Description: EString [1]
+ P_Rating: EInt [1]
+ Price: EInt [1]
+ Modify_product()
Order
+ Order_Choice: EInt [1]
+ Amount: EInt [1]
+ Add_in_cart()
Cart
+ Choice: EString [1]
+ Show_Cart()
Record
+ Choice: EInt [1]
+ Show()
Payment
+ Payment_Choice: EInt [1]
+ Pay()
+ Add_Record()
Review
+ Rating: EInt [1]
+ Update_rating()
Manages
Books
Uses
Shows
Contains
Displays
Updates
Takes
+ staff
+ booking
+ customer
+ menu
+ recommendation
+ inventory
+ product
+ record
+ cart
+ order
+ payment
+ review

- # Package Diagram



- # Deployment Diagram

Restaurant Management System