Computer Science Department
Software Engineering Comp433 Project Report
Group 9 - Five Star Companions
Baby Products Shope
Second Semester 2023/2024

Prepared By:

Nour Manasrah 1211163

Enas Hamayel 1210632

Muna Ali 1210628

Doua Beirat   1211372

Instructor: Ahmad Sabbah

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Phase 1: Project Planning

the summery of project:

As customers, we expect you to build an easy-to-use electronic system specifically designed to meet the needs of photography enthusiasts. Our goal is to make it easier for them to access a wide range of cameras and photography accessories.

1.1 User requirements:
*Create an account and log in:

   - Allow the creation of accounts with different access levels. For example (manager, accountant, client, etc.)

   - The ability to create accounts using email and password.

   - Providing ways to recover the password when you forget it, such as using email or phone number.

   - The ability to update account information, such as modifying the email or user name, for example

*Ability to search for and browse the product:

   - Allow the user to search for a product based on price, brand, resolution, type, zoom range, and ratings. With the availability of a tool that filters products based on these characteristics.

   - Provide a detailed description of the product features (price, brand, resolution, type, zoom range) with high-quality images and attach user ratings to help them make purchasing decisions.

* Shopping cart and payment:

   - Providing a shopping cart that enables the user to add and delete items before purchasing.

   - Providing a secure, in-person or electronic payment process using Pay Pal or credit cards while providing complete security for the purchase process.

1.2 Order management:
- Sending emails to confirm the order details.

- Sending regular updates about the order status from processing to delivery.

- Giving the user an electronic receipt after making the purchase.

1.3 User feedback and ratings:
- Allowing the buyer to evaluate his purchases and include his comments on them. Verify the validity of the review by going to his purchase list and confirming whether he purchased the product he evaluated.

1.4 Preparing reports:
- The system's ability to track sales and manage inventory, and provide reports on the best-selling products to infer user preferences or reports that identify low inventory to refill.

1.5 Marketing and promotion tools:
- Providing tools that create and efficiently manage promotions and discounts to attract customers and increase sales.

1.6 maintainability:
- High system performance in the presence of many users at the same time, ensuring fast response times and efficient processing of user actions.

- Scalable architecture to accommodate growing inventory and customer base.

1.7 Security :
- Implement security protocols to protect user data and prevent unauthorized access.

- Adherence to e-commerce systems and data protection laws to ensure user confidence.

Phase 2: Requirements Engineering- Elicitation & Discovery:

2.1 User Requirements:

1. The system shall provide the ability to create an account.

2. The user can search for varieties of baby products.

3. The system shall provide a cart feature for users.

4. The system shall inform customers about preparation and delivery details.

5. The system shall provide communication channels for users.

6. Your online baby products shop will support a range of secure payment options.

7. The customer must be able to evaluate the system from all aspects, such service and quality of baby products.

8. The system must contain a general and fast communication method.

9. The system creates a list of sales every week.

2.2 System Requirements:

2.2.1 The system shall provide the ability to create an account.

1.1 The system shall present users with a registration form including fields for name, password, email, and phone number during the account creation process.

1.2. Upon submitting the registration form, the system shall validate the user's information securely.

1.3. A confirmation email shall be sent to the user's provided email address for account verification.

1.4. T The system should provide the option to reset the password after entering it 3 times in the wrong way by sending the verification code to the registered email address

2.2.2 The user can search for varieties of baby products :

2.1. The system shall provide Language Selection

2. 2 The search result should have high accuracy

2.3 User testing will confirm that the products added to the wish list are stocked and easily accessible to the Customer.

2.2.3 The system shall provide a cart feature for users:

3.1 Users can add selected products to the cart.

3.2 The cart should display the updated price when a products was selected.

3.3 Users can add multiple products from various items to the cart.

 3.4 Users can delete any item from the cart.

3.5 The cart shall have a summary, including the number of selected baby products and the total price.

2.2.4 The system shall inform customers about preparation and delivery details:

4.1 Clear delivery information and cost for each location shall be displayed on the website.

4.2 After selecting an item and payment method, the user shall receive a confirmation message with details about delivery time, delivery method, and the final price.

2.2.5 The system shall provide communication channels for users:

When the order is confirmed, the system sends a message containing all the details of the order in terms of price, quantity, delivery date ... A specific email or phone number must be provided to users to inquire about

2.2.6 The online baby products shop should support a variety of secure payment options

6.1 Online payment options by Visa, and PayPal shall be available.

 6.2 If any error happens while making the payment it shall not exceed 10 seconds and no money will be taken from the user

6.3 If the user chooses to pay online, his or her card information must be saved and secured for future payments.

 6.4 For any online payment the user shall receive the payment detail

2.2.7 The customer shall be able to rate each item of products as well as the service.

7.1 The system offers two different types of evaluation, one directed at evaluating each type of product, and the other specific to the service in general. The rating is represented by numbers from 1 to 5, which provides a quick overview of customer satisfaction .

7.2 The system continuously collects ratings for each type of product, providing the goods administrator with better visibility into the result of the products it offers. For example: if the product evaluation and quality are poor, the goods officer should provide better quality, if the delivery evaluation is poor, the service employee should improve the service and so on.

7.3 The system updates average ratings in real time as soon as customers submit their ratings, providing live feedback and improving performance.

7.4 The system displays an instant confirmation message to customers when a review is successfully submitted, to reinforce positive communication and valuable customer engagement.

2.2.8 The system must contain a general and fast communication method

8.1 For inquiries or messages, please reach out via email.

8.2 Our contact details are prominently displayed, with a readily available phone number and a clearly visible email address.

8.3 Obtain information on the expected timeframe for timely responses to customer inquiries.

8.4 Integrate direct social media links for baby products shop.

2.2.9 The system creates a list of sales every week.

9.1-The system shall automatically generate a comprehensive weekly sales report at a 7:00pm , summarizing all transactions within last 7 days period.

9.2-The weekly sales report should include details such as total revenue, the number of orders processed, and a breakdown of sales by product or category.

9.3-The generated sales list should be available for review by authorized personnel at the beginning of week day

2.3 Effort Estimations:

pw= person week; pm= person month; w= week; m= month effort= the effort required for a person employed all month/week long Schedule time = time needed to complete including based on working days only (including holidays etc.).

based on working days only (including holidays etc.).

UR	Estimation Effort	Estimation No. of Developers	Total Effort
UR1- registration	1 pw	2	2*1=2
UR2- search	1 pw	1	1*1=1
UR3- add to cart	2 pw	2	2*2=4
UR4- Estimated Time/Cost	1 pw	2	1*2=2
UR5- Payment	2 pw	2	2*2=4
UR6- rating	1 pw	1	1*1=1
UR7- Contact us	2 pw	2	2*2=4
UR8- report	1 pw	2	1*2=2
total effort average	11 pw	14/8=1.7	20
Schedule time 30%	11*1.30=14.3 w (min time to complete)		20*1.30=26w (max time to complete)
Cost		AVG salary=700$	700*26 w=18200$
Profit Margin (min=10% ,max=30%)		Min cost ⟶ Max cost ⟶	18200*1.10=20020$ 18200*1.30=23660$

Phase 3: Requirements Analysis and Modelling
3.1: [Individual Task] Scenario Analysis

Enas Hamayel 1210632.

Place order :

Initial assumption: Once the customer has added the items to the cart,.

Normal : After adding the items to their cart, customers can easily confirm their order by simply clicking on the "Confirm Order" button. At this stage, they will be prompted to select their preferred delivery location. Once the order is confirmed, a notification will appear on the system, stating, "Order confirmed! Your estimated preparation time is X minutes, delivery time is Y minutes, and the total cost is Z$. Please provide your delivery information below." Following this, a form will be displayed, where customers are kindly requested to fill in their name, address, and phone number. It is important for customers to complete this form and choose the "pay by cash" option. Once these steps are completed, a heartfelt message will pop up, expressing gratitude to the customer for their order and assuring them that their cake will be delivered within Y minutes. Additionally, the message mentions that a phone call will be made upon the arrival of the delivery, ensuring a seamless experience for the customer.

What can do Wrong?

Alternative Flows:

If the customer opts to personally collect their order, a message appears saying, "Order confirmed! Your estimated preparation time is X minutes, and the total cost is Z$." The customer can choose to pay by cash, prompting a message expressing gratitude and confirming the cake will be ready within Y minutes. Alternatively, the customer can pay with a card, and the system will redirect them to a secure payment gateway. Upon successful payment, a message appears confirming the order and preparation time. If the payment fails, the system informs the customer and provides options to retry or select another payment method.

Error Handling:

If the customer does not provide required information for pickup, the system prompts for the missing details. If the payment gateway is unavailable, the system notifies the customer and provides options to retry later or choose "Cash on Delivery." If multiple payment attempts fail, the system suggests checking card details or contacting their bank. If the customer does not receive the confirmation message, they can contact customer support for assistance. This comprehensive flow ensures a seamless ordering process with clear steps and error handling to address potential issues

Nour Manasrah 1211163

Scenario: Pay for Order by Credit Card in an Online Baby Product Shop

Initial Assumption:

A customer who wants to buy baby products explores and orders items from an online baby product shop.

Normal Flow:

1. After carefully selecting the products, the customer proceeds to the checkout phase.

2. At the checkout, the customer is asked to choose a payment method and selects "Credit Card."

3. The customer securely enters their credit card details, including the card number, expiration date, CVV (The Card Verification Value is a 3 or 4-digit code used as an additional security measure to verify that the cardholder has the physical card during online or phone transactions), and billing address.

4. The system thoroughly validates the credit card information by checking the card number format, expiration date, and CVV to ensure accuracy and completeness

5. Once validation is successful, the system securely communicates with the external bank to authorize the credit card transaction, ensuring that the card has sufficient funds and is not flagged for fraud.

6. If the authorization is successful, the specified amount is deducted from the customer's credit card, and the order status is updated to "Paid."

7. The customer receives an on-screen confirmation of the successful payment, and a detailed email containing the order summary and delivery information is sent.

8. All transaction details are securely logged for future reference, ensuring data integrity and confidentiality, and the Shop Manager can access them for reporting purposes.

What Can Go Wrong?

Alternative Flow

If there are any issues with the credit card transaction during authorization, the system displays a clear error message to the customer, guiding them to review and correct their details or choose an alternative payment method such as:

1.Debit card

2.PayPal

3.Bank transfer

4.Mobile payment apps (e.g., Apple Pay, Google Pay)

Error Flow:

If the customer enters invalid credit card information, the system provides specific error messages, guiding them to correct the errors seamlessly with detailed instructions. This ensures a smooth and error-free transaction.

Mona AbuFalah 1210628

Scenario: How to access the account? (login)

Initial Assumption:

The customer or employee needs to access their account to perform certain tasks (e.g., placing an order, updating account information).

Normal Flow:

Scenario: If the customer does not have an existing account, the system will initiate the account setup procedure. The customer will be asked to enter basic personal details such as name, phone number, password, address, and email address to securely create a new account in the system. Once the necessary information is provided, the system will create a unique account for the customer and the user will receive a confirmation email at the provided email address to confirm their account. In cases where customers already have an account, the system will perform an authorization check. The customer will need to log in with their credentials, such as username and password. After successful authentication, the system will confirm the client's authorization status. Once authorized, the customer will be able to start the ordering process.

The employee can also log in through the employee's page, and if they are a new employee, a new account is created for them by the employee responsible for that.

Error Scenario: -

Case: Database Connection Failure

Scenario: A user (customer or employee) attempts to create an account. However, due to a failure in the database connection, the system is unable to store the user's information. The system displays an error message indicating that the account creation process cannot be completed at the moment and advises the user to try again later. This ensures that the user is aware of the system issue and can attempt the process again once the issue is resolved.

Case: Email Service Failure

Scenario: After a user (customer or employee) submits the registration form, the system attempts to send a confirmation email. However, due to an email service failure, the confirmation email cannot be sent. The system displays an error message notifying the user of the issue and advises them to check their email later or contact support. Once the email service is restored, the system can automatically resend the confirmation email.

Case: Incorrect Password

Scenario: A user (customer or employee) tries to log in to their account but enters an incorrect password. The system detects the error and displays an error message, notifying the user of the incorrect password. The user re-enters their password correctly and successfully logs in.

Alternative Scenario: -

Case: Account Lockout After Multiple Failed Login Attempts

Scenario: A user (customer or employee) attempts to log in to their account but enters the wrong password multiple times. To prevent unauthorized access, the system locks the account after a certain number of failed login attempts. The user receives a notification indicating that their account has been locked due to multiple failed login attempts. The user is then prompted to reset their password through a password reset link sent to their registered email address. Once the user resets their password, they can regain access to their account and continue using the platform.

Other Case: Restrict access to personal files Scenario: Scenario: The system restricts access to user accounts and the system rejects unauthorized attempts to access personal files, ensuring sensitive information remains protected

Doua' Beirat   1211372

Scenario: Product Search

Initial Assumption: The customer has accessed the baby products e-commerce website and is on the page where the search bar with filtering options is available.

Normal Flow:

1- Client: Goes to the search bar on the system.
2- System: Displays a search bar with filtering options (category, price range, brand, age group, rating and material).
3- Customer: Enters search keywords and selects filters (e.g., "kids clothing", price range "$50-$100").
4- System: Processes the search query and retrieves matching products from the system's database.
5- System: Displays search results with product details (name, price, rating, user comments, images, availability quantity if it is about to expire, and a link showing products similar to this product).
6- Customer: Views and interacts with search results (for example, sorting by price or rating, modifying filters).
7- Customer: Selects a product to view with its detailed information.

What Can Go Wrong?

Alternative Flows:

Alternative 1: Customer search updates

- Customer: update search filters (for example, changing the price range, selecting different categories or any changes to current filters).
- System: Updates search results based on modified filters and displays them.

Alternative 2: No matching products

- System: Displays a message indicating that there are no products matching your search criteria: **"No products were found matching your search criteria. Please try different keywords or filters."** With displaying a link containing similar products.
- Customer: change search criteria (e.g., expand price range, remove specific filters) and resubmits search.

Error Flows:

Error 1: System error while searching:

- The system got an error while processing the search query.
- System: Displays a message: **"We are currently experiencing technical difficulties. Please try again later."**
- Client: may wait or try again later.

Error 2: Network failure:

- Customer: After entering the keywords and setting the filters, the customer clicks on the search button. But a network error occurs.
- System: Displays a message: **"Network error. Please check the connection and try again."**
- Client: Solves network problems and re-presses the Search button.

3.2: [Group Task] Actors and Use case Analysis & Modelling
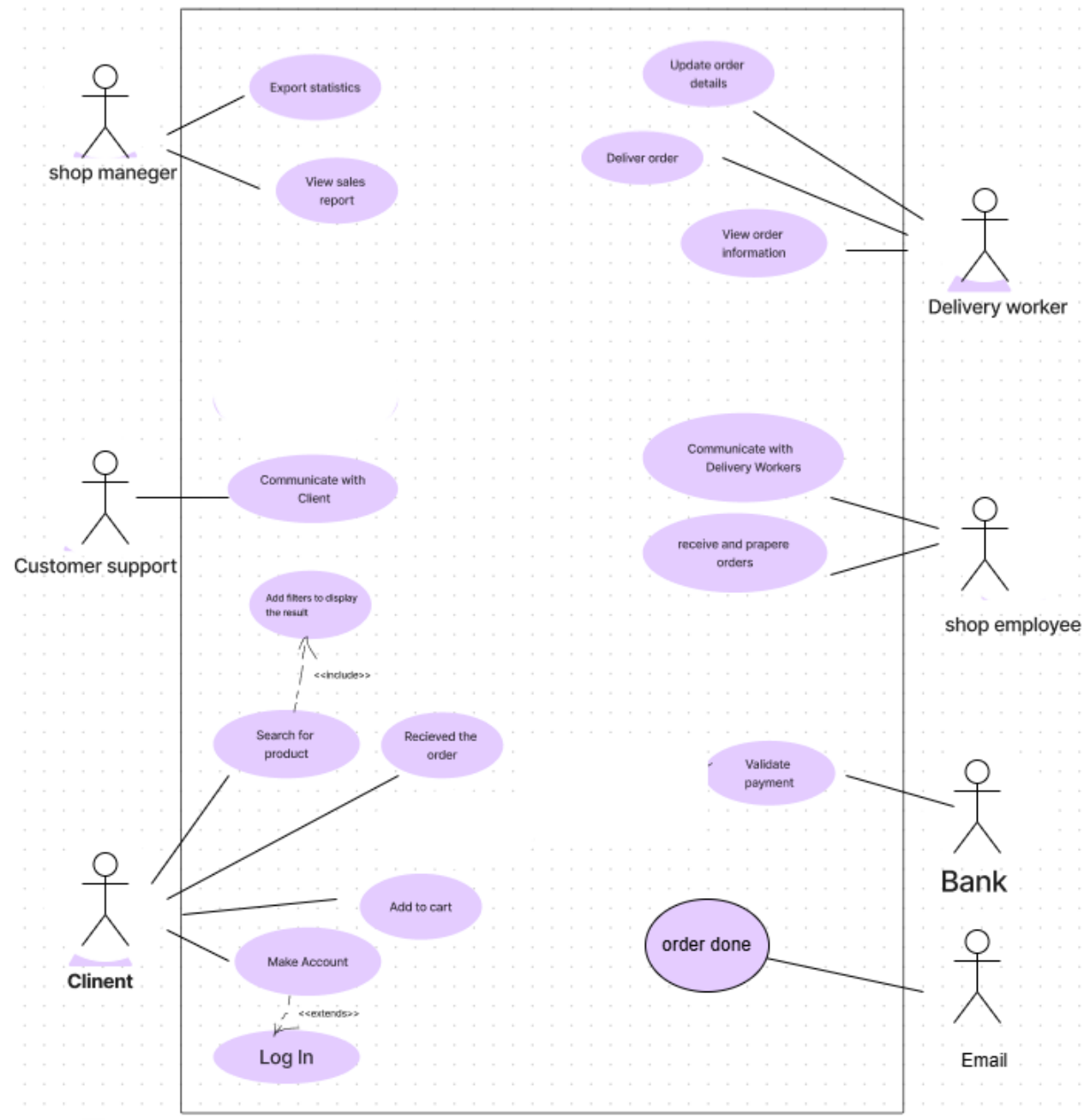
3.3: [Individual Task] Use case Description

Enas Hamayel 1210632

Use-Case Description (Place an order in an Online Baby Product Shop):

Title	Place Order
Purpose	to order the items in the cart to customer
Description	Customers finish their shopping by clicking on "Confirm Order", decide between using a card or cash for payment, select their preferred method of receipt, either have the order delivered to them or pick it up, and then complete their purchase.
Actors	Client
Pre-conditions	1. Customer has added the items to the shopping cart. 2. Customer clicks the " confirm order " button on the cart page.
Sequence/Flow of Events	1. The customer selects "Confirm Order". 2. The system displays the order details, including prices, delivery options, and the total cost. 3. The customer has the option to review and update the order items. 4. If the customer chooses delivery, a message appears on the system saying, "Order confirmed! Your estimated preparation time is X minutes, delivery time is Y minutes, and the total cost is Z$. Please provide your delivery information in the form below." A form with fields for name, address, and phone number opens. 5. The system provides payment methods: "Pay Online" or "Cash on Delivery." **For "Pay Online":** 5.1. The customer is redirected to the online payment gateway. 5.2. The customer enters their card information. 5.3. If the payment is successful, the order status is updated to "Paid," a confirmation message is sent, and baking begins. 5.4. If the payment fails, the system informs the customer and allows them to retry or choose another payment method. **For "Cash on Delivery":** 5.5. The order status is updated to "Pending Payment," and a confirmation message is sent. 6. A confirmation message with the estimated delivery time is displayed.

	7. Baking begins. **Alternative Flows and Error Handling** • If the customer chooses pickup instead of delivery, the system displays a message saying, "Order confirmed! Your estimated preparation time is X minutes, and the total cost is Z\$. Please proceed to the pickup location." • If the payment gateway is unavailable, the system notifies the customer and provides options to either retry later or choose "Cash on Delivery." • If multiple payment attempts fail, the system suggests checking card details or contacting their bank. • |If the customer does not receive the confirmation message, they can contact customer support for assistance.
Data	Shopping cart items, Customer information (optional for cash on delivery), Payment details (for online payment)
Post-conditions/ Response	The customer receives a message confirming his order and order details. The shop employee receives the order details and begins preparing and assembling the order

Nour Manasrah 1211163

Use-Case Description (Pay for Order by Credit Card in an Online Baby Product Shop)

Title	(Bank) :Credit Card Payment for Online Baby Product Orders
Purpose	To ensure safe and secure payment for baby product orders using a credit card.
Description	Customers select and add baby products to their cart, then proceed to pay using a credit card. This details the steps for completing the payment process.
Actors	Customer, Bank, Shop Manager,email
Pre-conditions	-Customer is logged into the online baby product shop. -Customer has selected and added baby products to their cart.
Sequence of Events	1. Customer starts payment: 1.1. Customer goes to checkout after adding baby products to the cart. 1.2. System asks Customer to choose a payment method, and Customer picks "Credit Card." 2. Entering Credit Card Details: 2.1 Customer securely inputs credit card details. 3. Verification and Approval: 3.1. System checks the credit card information for accuracy. 3.2. After successful verification, the system contacts the external bank. 3.3. External bank approves the credit card transaction.

	4. Transaction Confirmation: 4.1. If approval is successful: 4.1.1. The system confirms the transaction and displays the final price, including delivery costs. 4.1.2. The order status updates to "Paid." 4.2. An on-screen confirmation assures the customer of the successful payment. 5. Email Confirmation: 5.1. At the same time, the customer receives a comprehensive email with the order summary and delivery details. 6. Logging Transaction Details: 6.1. The system logs transaction details for future reference. 6.2. The Shop Manager can access this information for reporting.
Data	1.Customer account information. 2.Chosen infant item. 3.Payment card information. 4.Transaction information.
Stimulus/Trigger	Customer interacts with the payment interface.
Comments	1. The system guarantees the safety and privacy of credit card details. 2. Customers are provided with helpful instructions to resolve any payment process problems. 3. The payment interface is designed to be easy to use, with clear messages to confirm transactions.

Mona AbuFalah 1210628

Use case Description

How to access the account? (login)

Actors	Customer & Employee
Description	The customer visits the website of the online baby product shop to create an account, which allows them to browse and purchase products. The system provides a user-friendly interface for the customer to enter necessary information and complete the account creation process. Employees can also log in to manage customer accounts and assist customers as needed
Pre-conditions	The user (customer or employee) has accessed the online baby product shop website.
Sequence/Flow of Events	**Create Customer Account:** • Customer initiates the account creation process. • System displays a registration form with fields for name, email, and password. • Customer enters their details (name, email, password). • System validates the entered information. • Upon successful validation, the system creates a new customer account. • Customer receives a confirmation email to verify their account. **Login to Customer Account:** • Customer navigates to the login page. • Customer enters their registered email and password. • System verifies the entered credentials. • Upon successful authentication, customer gains access to their account dashboard
Data	• Required: Name, email, password. • Optional: date of birth.
Stimulus/Trigger	• Once the customer has successfully logged into the online baby product shop website, they will be directed to the homepage or dashboard. To start browsing for products, the customer can either go to the product catalog or explore specific product categories.

|	
	• The system will then show a comprehensive list of baby products, including important information such as the product name, description, and price. • The customer can take their time browsing through the products, checking out the product details and images to make an informed decision. • If they find something they like, they have the option to add the products to their shopping cart or wishlist, depending on their preference.
Post-conditions/ Response	After the customer successfully logs in and confirms the order, they must log out of the system while confirming the information. If there is a defect or lack of information, a message is given to the customer, and after addressing the issue, they can proceed to log out
comments	This use case focuses on the customer's ability to create an account on the online baby product shop website, ensuring a smooth and user-friendly registration process. Employees may also assist in this process if the customer encounters any issues

Doua' Beirat _1211372
Use-Case Description (Search product)

Title	Product search
Purpose	To enable customers to search for and filter baby products quickly and efficiently.
Description	Customers can search for baby products using keywords and filter options. The system processes the search query and displays matching products with details about them(name, price, rating and user-comments, images, availability quantity if it's about to expire , and a link showing products similar to this product).
Actors	• Customer: The primary user who searches for baby products. • System: The e-commerce system that processes the search queries and displays results.
Pre-conditions	• The customer is on the website. • The website has a database of baby products.
Sequence of Events	1- Client: Goes to the search bar on the system. 2- System: Displays a search bar with filtering options (category, price range, brand, age group, rating and material). 3- Customer: Enters search keywords and selects filters (e.g., "kids clothing", price range "$50-$100"). 4- System: Processes the search query and retrieves matching products from the system's database. 5- System: Displays search results with product details (name, price, rating, user comments, images, availability quantity if it is about to expire, and a link showing products similar to this product). 6- Customer: Views and interacts with search results (for example, sorting by price or rating, modifying filters). 7- Customer: Selects a product to view with its detailed information.
Data	▪ Search keywords ▪ Filter criteria ▪ Product details including the(name, price, rating and user-comments, images, availability

	quantity if it's about to expire , and a link showing products similar to this product).
Stimulus/Trigger	The customer decides to search for baby products on the website.
Post-conditions	- The customer can view the list of products matching the search keywords and filters he has chosen. - The customer can interact with the search results, such as sorting them or modifying the filters on them.

3.5: [Individual Task] Instance Activity Diagrams
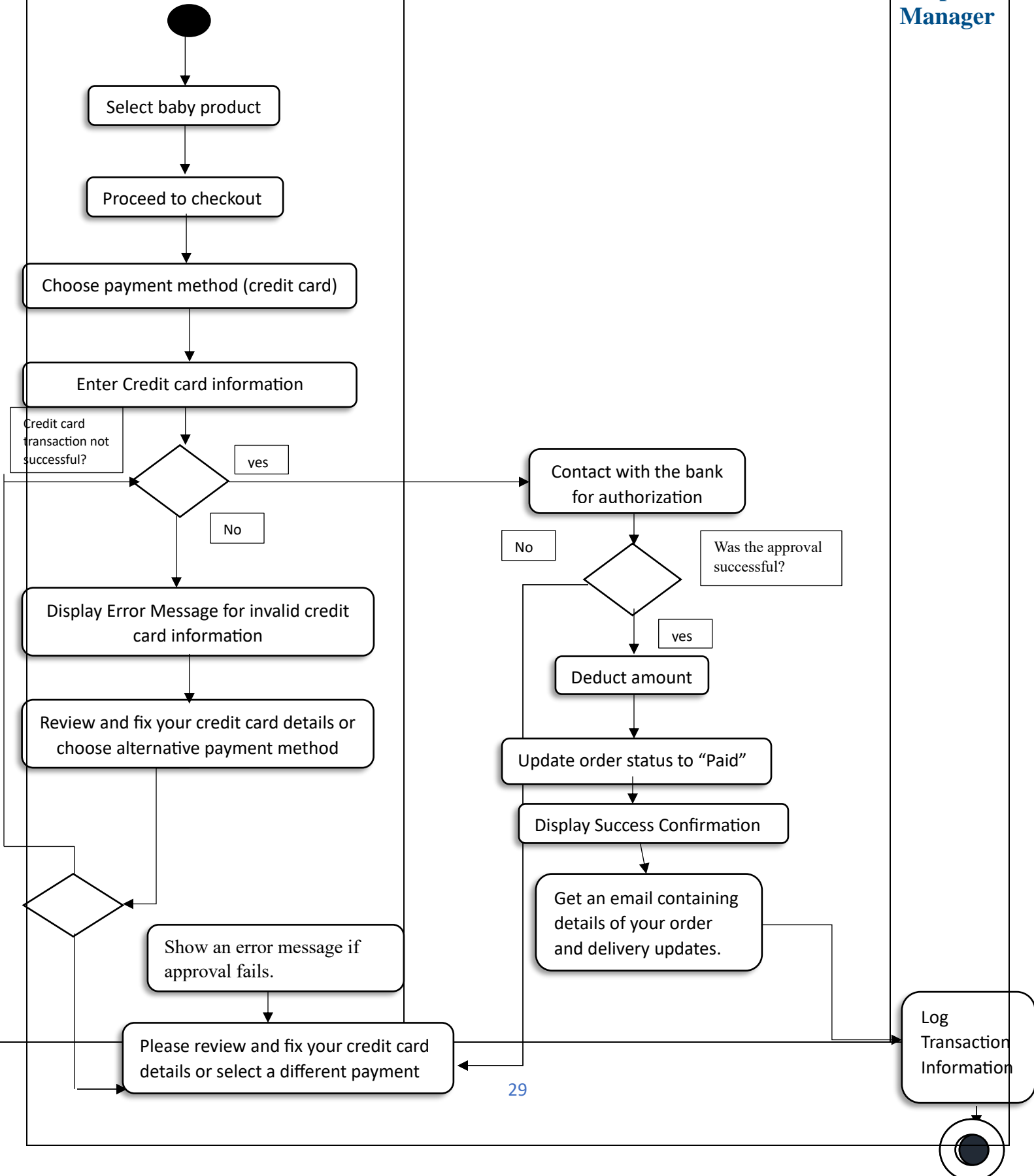**Enas Hamayel 1210632 ,Activity Diagrams for Place an order in an Online Baby Product Shop:**
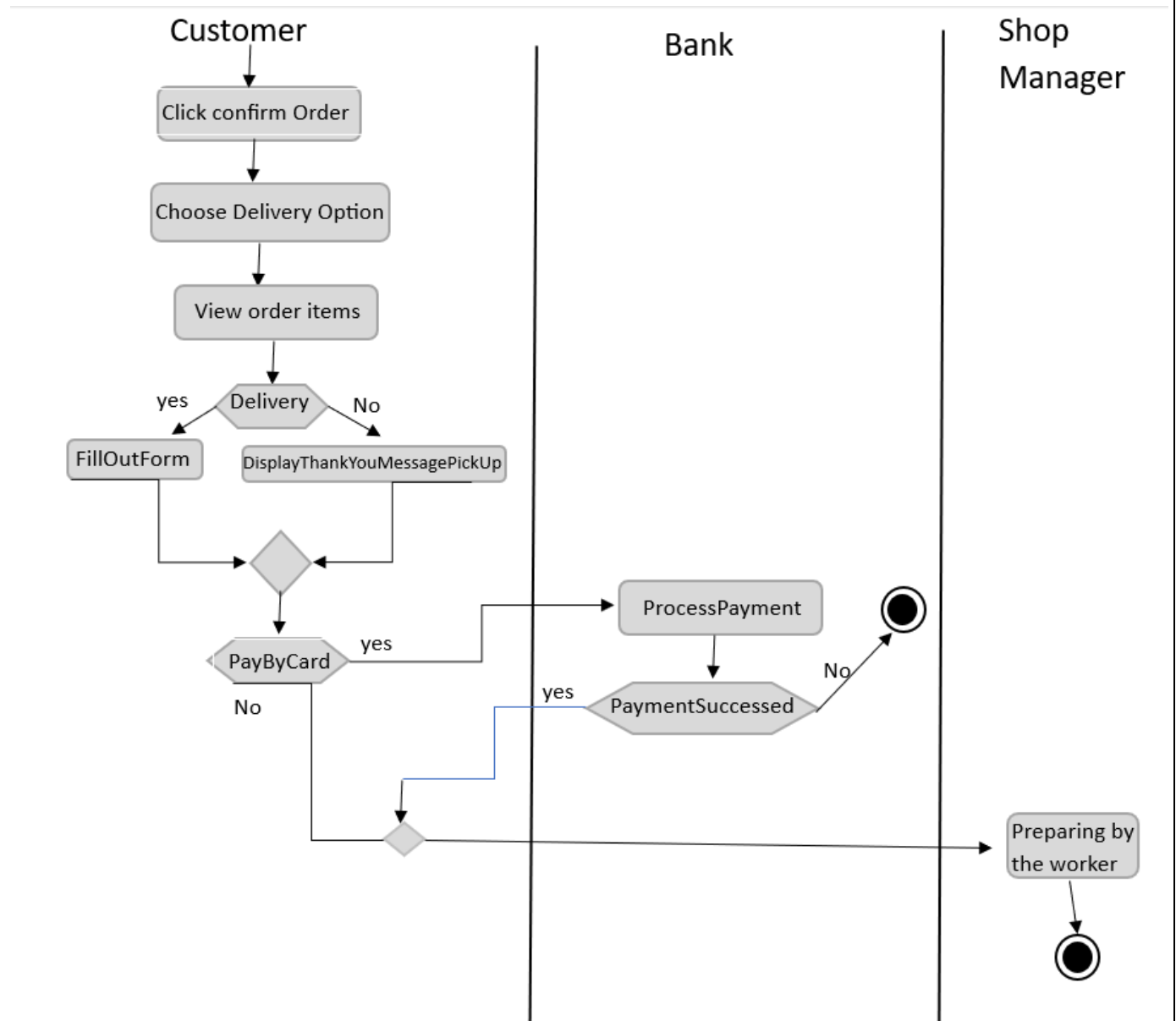
Nour Manasrah 1211163 , Activity Diagrams for Pay for Order by Credit Card:

Customer

Bank

Shop Manager

Select baby product

Proceed to checkout

Choose payment method (credit card)

Enter Credit card information

Credit card transaction not successful?

yes

No

Display Error Message for invalid credit card information

Review and fix your credit card details or choose alternative payment method

Contact with the bank for authorization

No

Was the approval successful?

yes

Deduct amount

Update order status to "Paid"

Display Success Confirmation

Get an email containing details of your order and delivery updates.

Show an error message if approval fails.

Please review and fix your credit card details or select a different payment

Log Transaction Information

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Mona AbuFalah 1210628, (How to access the account? (login):

Click On "Login"

Re_enter login details

Enter e_mail

Enter password

Valid membership

Invalid

Valid

Display Error Message

Ask User to Re_enter or reset password

forgot password

Click on "Reset Password" button

Send a verification to the e-mail

Submit verification code

check validity of the verification code

Valid

invalid

prompt User Account

Allow user to reset Password

give re-try option

Enter new password

Confirm new Password

Doua' Beirat_1211372(Search product)

customer

System

Start

Display the search bar with filters options

Enter Search Keywords and Select Filters

Press the Search button → Process Search Query

View Search Results ← Retrieve Matching Products from Database

modify Search (if needed)

Select Product

End

PHASE
4

Phase 4: System Modelling and Design

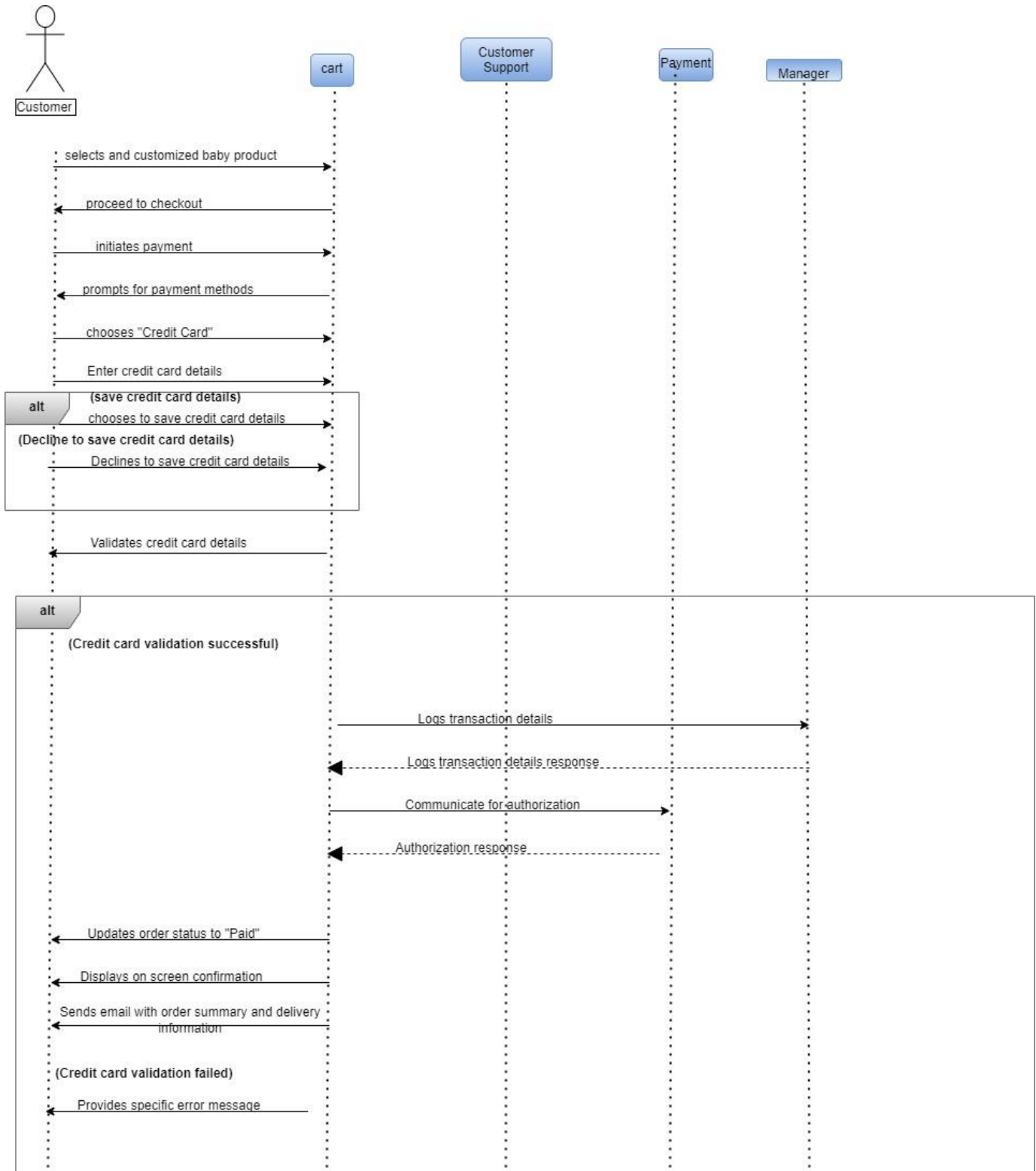## 4.1: [Group Task] System Class modelling and Analysis:

4.2: [Individual Task]: System Sequence modelling and Analysis
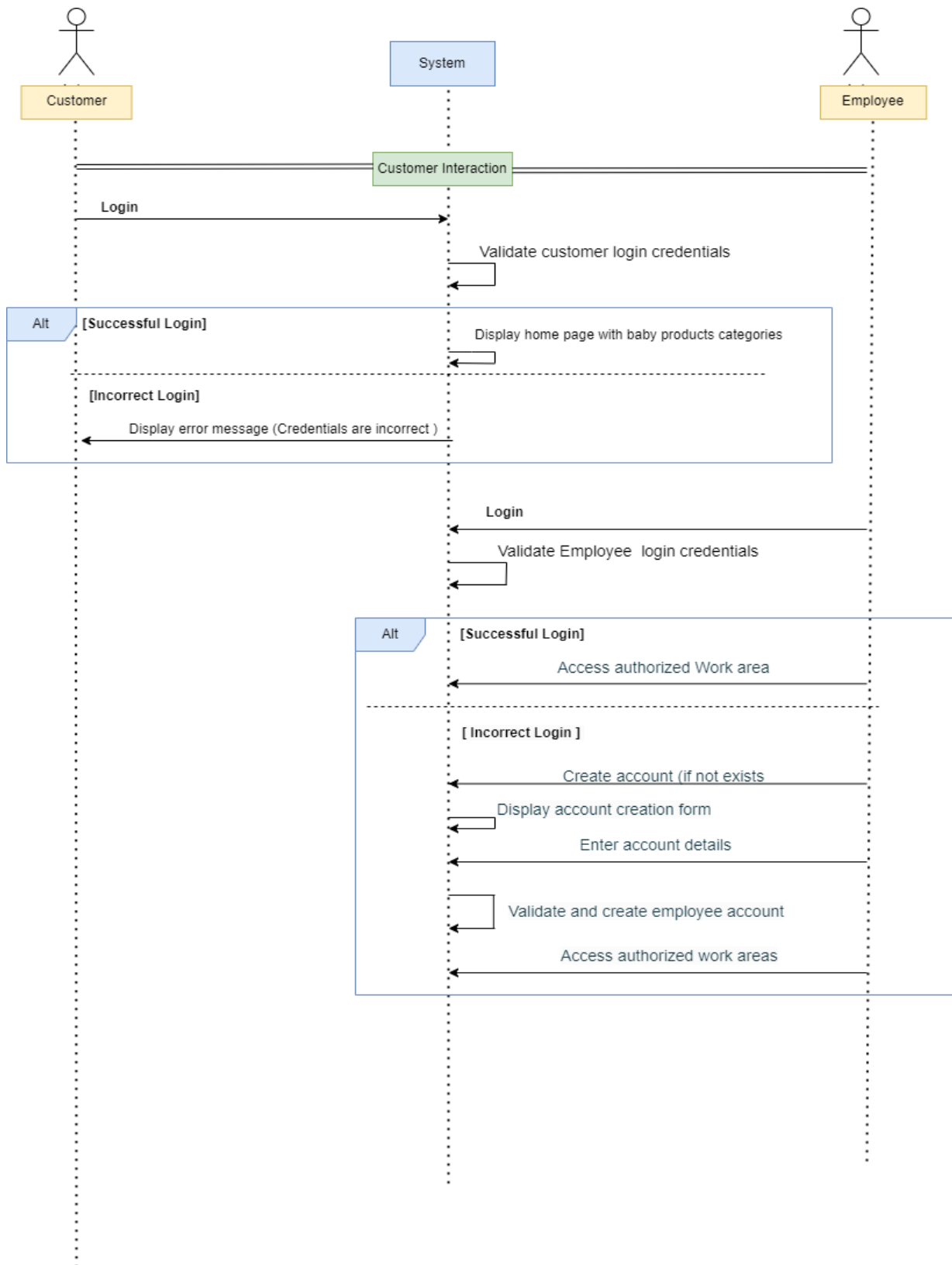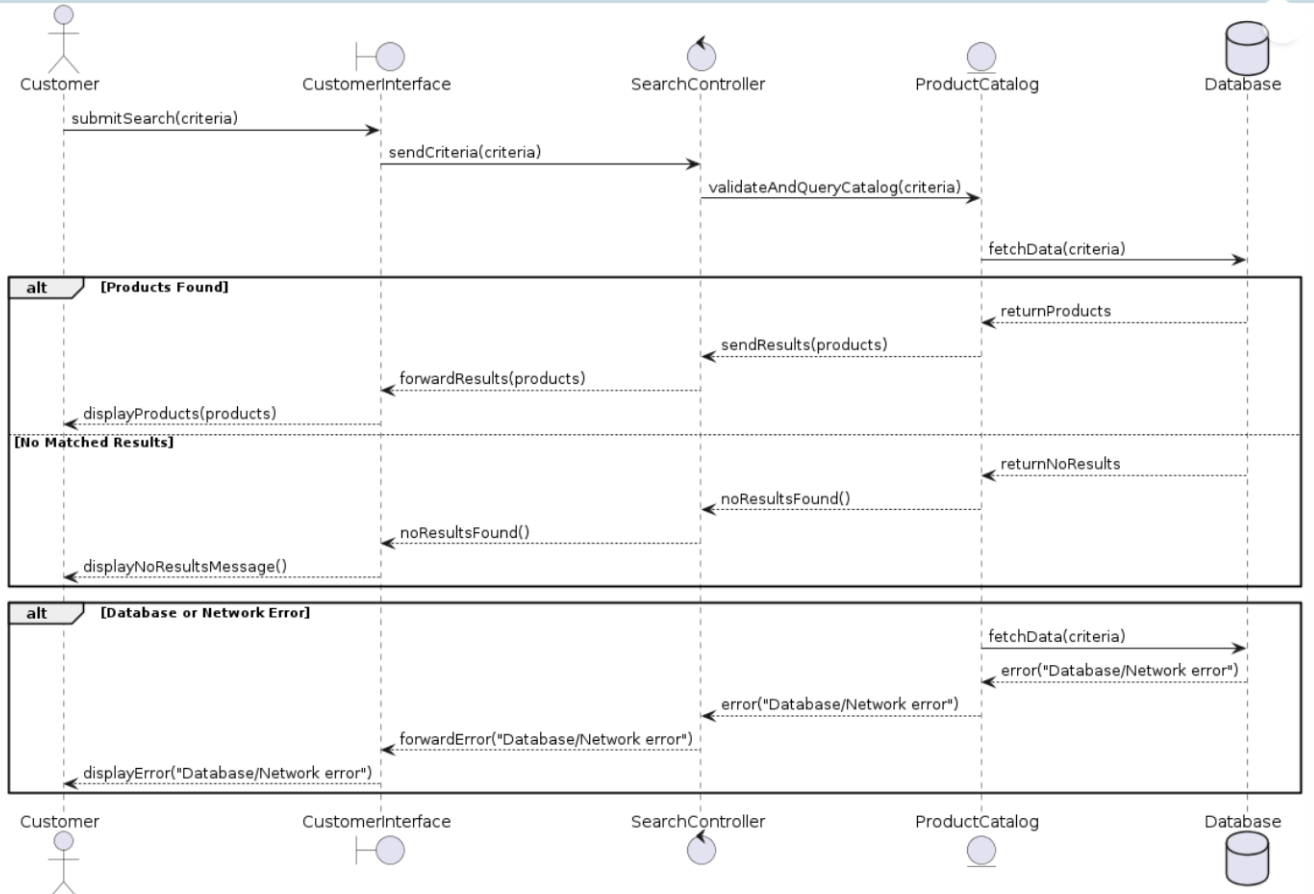## Enas Hamayel 1210632 : (Place an order).
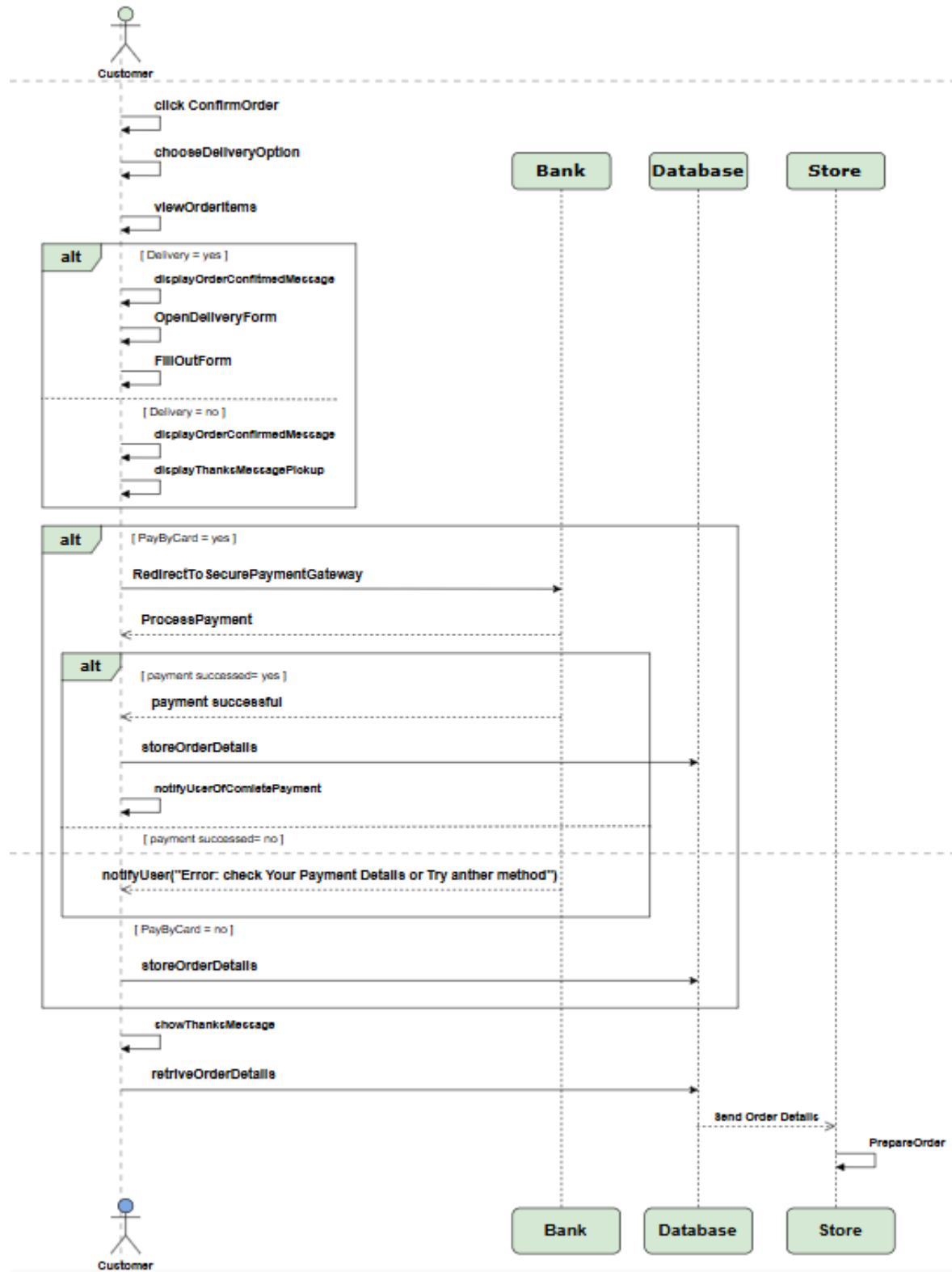
Nour Manasrah 1211163 :

(Pay for Order by Credit Card in an Online Cake Shop):

Mona AbuFalah 1210628

4.3: [Group Task] System Design Goals:
General Design Goals:

1. **Low Coupling:**
   • Objective: Minimize interdependencies to enhance flexibility and maintainability.
   • Implementation: Design classes and components strategically, highlighting benefits for adaptability and seamless enhancements.

2. **High Cohesion:**
   • Objective: Organize system components with a focus on distinct functionality to reduce complexity.
   • Implementation: Recommend separation based on unique functionalities, emphasizing benefits for better system manageability.
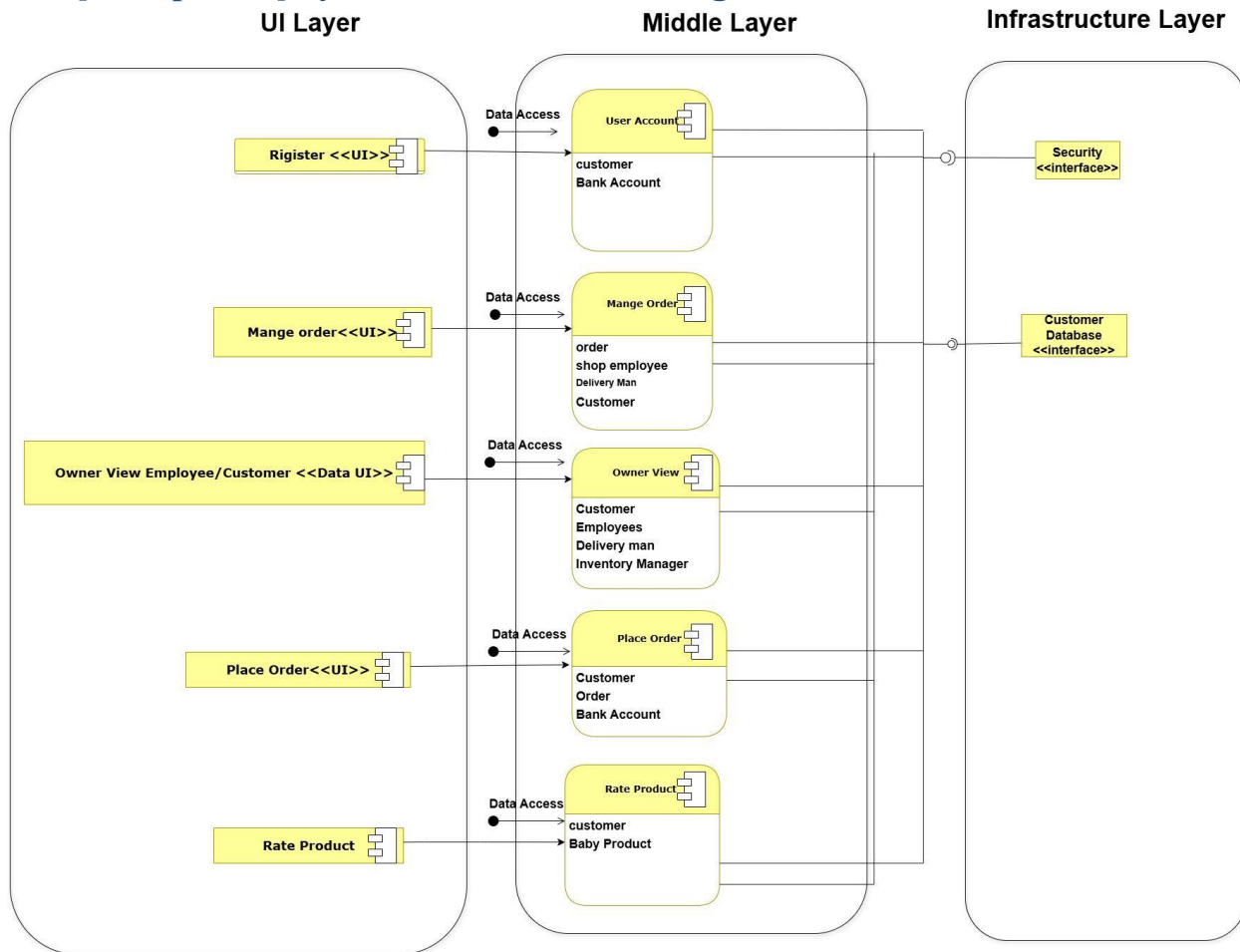
3. **Scalability:**
   • Objective: Design the system to handle an increasing number of users, orders, and data without compromising performance.
   • Implementation: Utilize scalable architecture, such as cloud services, and implement load balancing to ensure the system scales seamlessly with growing demand.
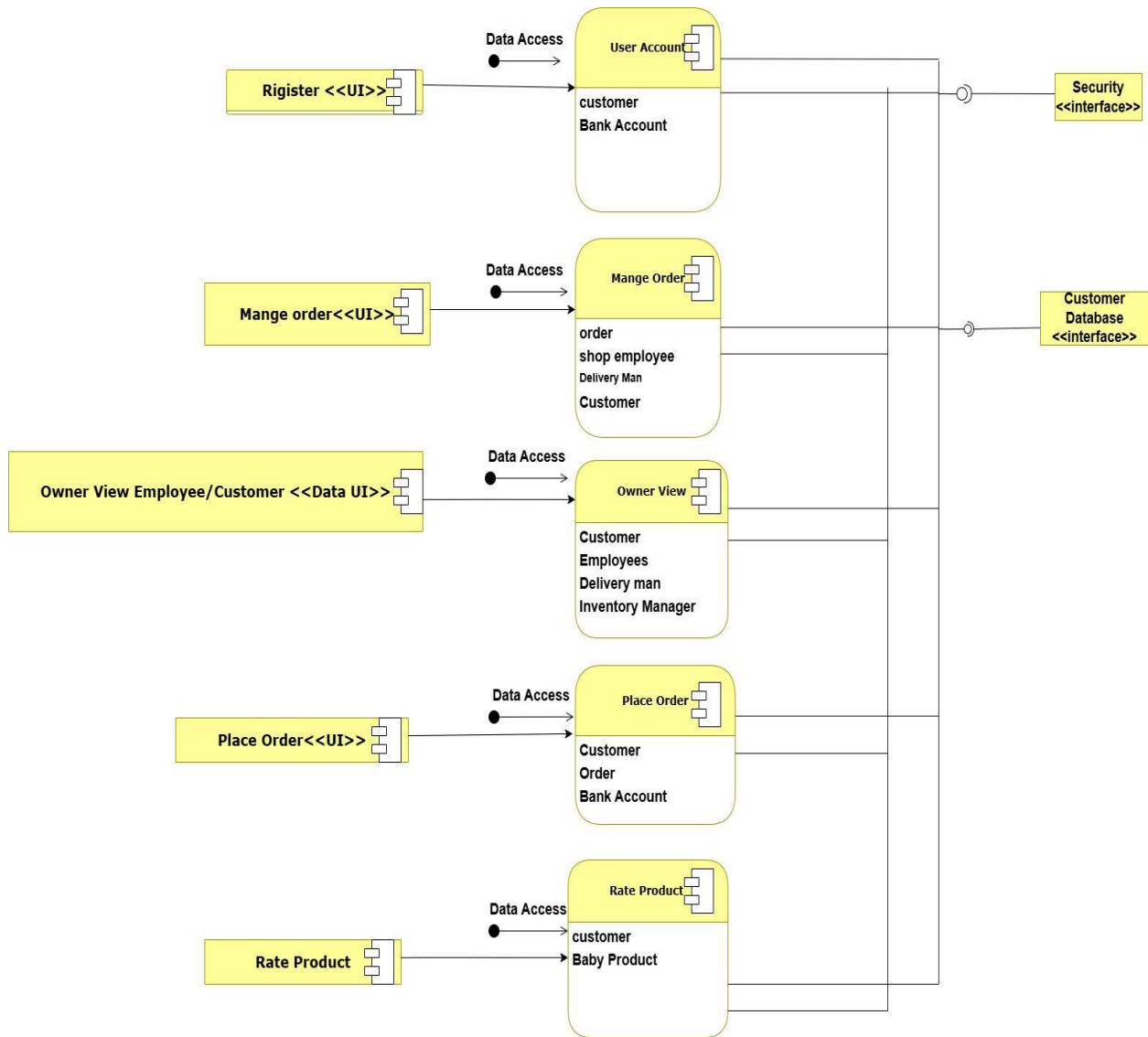
Specific System Design Goal:

4. **User-Friendly Interface:**
   • Objective: Ensure a user-friendly interface for seamless navigation and an enjoyable customer experience.
   • Implementation: Conduct user experience (UX) studies to understand customer preferences. Design an intuitive and visually appealing interface with easy navigation. Implement responsive design for compatibility across different devices. Provide clear and concise messaging to guide users through the ordering process.

4.4: [Group Task] System Architectural Design

UI Layer

Middle Layer

Infrastructure Layer

Rigister <<UI>>

Data Access

User Account

customer
Bank Account

Security
<<interface>>

Mange order<<UI>>

Data Access

Mange Order

order
shop employee
Delivery Man
Customer

Customer
Database
<<interface>>

Owner View Employee/Customer <<Data UI>>

Data Access

Owner View

Customer
Employees
Delivery man
Inventory Manager

Place Order<<UI>>

Data Access

Place Order

Customer
Order
Bank Account

Rate Product

Data Access

Rate Product

customer
Baby Product

4.5: [Group Task] System and component modeling

4.6: [Group Task] System Deployment Design