Faculty of Engineering and Technology

Software Engineering

COMP433

Final Report

Cake Shop Online System

Instructor: Dr. Ahmad Sabbah

Section: 4

Group Name: The Overthinkers

Group Number: 3

Students:	**IDs:**
Hanadi Asfour	1210209
Amani Sayyad	1212289
Jeneen Jaber	1212160
Worood Assi	1210412

Date: 22/06/2024

Contents

Tables

Figures

Group Members

Meet The Overthinkers

Hanadi Asfour
Project Manager

Amani Sayyad
Business Analyst

Worood Assi
Lead Developer

Jeneen Jaber
Documentation Specialist

Group Member Roles

- **Hanadi Asfour as Project Manager**:

  Overseeing the project, ensuring it stays on track, managing deadlines, coordinating between team members, and handling communication with stakeholders.

- **Worood Assi as Lead Developer**:

  Providing technical direction, making high-level design decisions, ensuring code quality, and mentoring other developers.

- **Amani Sayyad as Business Analyst**:

  Gathering requirements, analyzing business processes, ensuring the project aligns with business goals, and communicating with stakeholders.

- **Jeneen Jaber as Documentation Specialist**:

  Creating and maintaining project documentation, ensuring all project information is accurately recorded, and writing user manuals and technical guides.

Meetings

Meetings were made multiple times a week, lasting 4 - 5 hours each. Most meetings were done at 8PM or 10AM. All meetings were made through Google Meets. Every member contributed to sharing their thoughts and ideas to the rest of the group, and every idea was taken into consideration depending on its relevance and correctness.

Phase 1

Business Requirement

The online cake shop prides itself on having a user-friendly website designed to offer customers an immersive experience while exploring a diverse catalog of delectable cakes. The ordering process is straightforward: customers select and customize their desired cakes, add them to a virtual cart, and seamlessly provide delivery details during checkout. Although creating an account is optional, it proves beneficial for customers by saving their information for future orders.

After completing a secure payment, customers promptly receive an email confirmation, assuring them of a successful transaction. Behind the scenes, the shop diligently processes orders, collaborating with local bakeries to ensure the production of high-quality, artisanal cakes. The delivery process is carefully orchestrated, with completed cakes reaching customers at specified dates and times, contributing to a reliable and punctual service.

The business actively encourages customer engagement and seeks feedback to enhance its offerings and address any concerns. A robust customer support system is in place, accessible through email or phone, ensuring that any inquiries or issues are promptly attended to.

The success of the online cake shop is intricately tied to the quality of its products, the efficiency of its delivery processes, and the overall satisfaction of its customers. The shop's commitment to excellence is evident in its dedication to providing a seamless online cake shopping experience, emphasizing not only the delicious end product but also the journey of customization, ordering, and receiving a delightful cake tailored to each customer's preferences.

Customers can easily order meals by selecting items from the online menu without the need to create an account. They can simply request a meal, fill out a form with their names, phone numbers, email addresses, location, and payment details (credit card, Mastercard, Upon receipt, or PayPal). After submitting the form, our customer service will approve the order, provide an estimated delivery time, and receive the payment. If customers choose to sign in, they can have their information saved for future orders and share reviews about their meal experiences.

The online cake shop involves customers seeking a delightful ordering experience, skilled bakers crafting perfect cakes, delivery personnel ensuring timely deliveries, and customer support. Together, they create a seamless and enjoyable online cake shopping experience.

The cake shop operates in a lively space, featuring a user-friendly website, a bustling kitchen with skilled bakers crafting delicious cakes, well-organized delivery routes, efficient communication tools, spaces for valuable customer feedback, and a secure online payment system. In terms of business details and demands, the shop caters to a diverse customer base, serving approximately 50 customers daily seeking a delightful cake shopping experience. The operation involves a dedicated team of employees, including skilled bakers, delivery personnel, and managerial staff. The effectiveness of the shop is evident in its ability to promptly address customer feedback and utilize designated spaces to adapt to preferences, refine offerings, and maintain a high level of customer satisfaction. Prioritizing the safety of online transactions, the cake shop ensures a secure way for customers to pay, contributing to a trustworthy and reliable online shopping experience.

Phase 2

Task 2.1: User Requirements

UR.1) The cake shop should allow customers to create accounts to save personal information and order history.

UR.2) System users shall be able to search and filter the predesigned cakes to find the suitable option while browsing.

UR.3) The customer should be able to view details about the cake upon selection.

UR.4) The system should allow customers to give ratings on purchased items.

UR.5) The system shall provide a customization process to allow customers to create their own desired cake by selecting options for size, shape, flavor, filling, and frosting color.

UR.6) The customer shall be able to place an order for a single item or the whole cart.

UR.7) The customer shall be allowed to cancel their placed order requests.

UR.8) The system shall provide support to customers by enabling them to report issues.

UR.9) The manager shall be able to update, edit, and delete content on the website, as well as view business reports on stocks and sales.

Task 2.2: System Requirements

UR.1) The cake shop should allow customers to create accounts to save personal information and order history.

SR.1.1: The customer should be able to create a new account by entering their first name, last name, email address, and phone number to the associated fields.

SR.1.2: If the customer already has an account, they should login using their account email and password.

SR.1.3: If the customer forgets their password, they should be able to reset it using a verification code sent via phone number or email.

SR.1.4: The customer should be able to resend the code if they didn't receive it within 30 seconds.

SR.1.5: All data fields defined in SR1.1 shall be validated by the system.

SR.1.5.1: The first and last name fields shall only contain characters, and no single spaces.

SR.1.5.2: The email address field shall only contain a valid email address, meaning it must have a username, followed by the "@" symbol, and the domain name.

SR.1.5.3: If email is already associated with an account, the customer should be asked to sign in to that account if they already own it or use another email address.

SR.1.5.4: The phone number field shall only contain 10 number digits.

SR.1.5.5: The password entered shall contain a combination of 8 special and alphanumeric characters.

SR.1.6: The customer's information defined in SR1.4, order history, ratings, and cart items shall be saved only when owning an account.

SR.1.7: The customer should be able to change their information including their first name, last name, and phone number.

UR.2) System users shall be able to search and filter the predesigned cakes to find the suitable option while browsing.

SR.2.1: System users including customers and managers shall be able to search the cakes and view the results accordingly.

SR.2.1.1: System users defined in SR2.1 should be able to search for cakes by one of the following: cake category, theme, flavor, filling, shape, size, and frosting color, or by a combination of them.

SR.2.1.2: The search results should contain the cakes' picture, name, price, and star rating.

SR.2.2: System users (SR2.1) shall be able to filter the search results.

SR.2.2.1: The filters should include cake category, increasing or decreasing price, theme, frosting color, flavor, size, filling, and shape.

SR.2.3: The category refers to the classification of the baked goods offered by the cake shop, which should include classic cakes, cupcakes, pastries, cookies, and cheesecakes.

SR.2.4: The themes refer to the occasion the cake is for. This should include birthdays, weddings, graduations, baby showers, anniversaries, and gender reveal.

SR.2.5: If the customer wants a certain theme not specified by the ones already available, they should be able to customize it on their own in the customization section defined in SR.5.

SR.2.6: The cake flavors are defined by their batter, this should include chocolate, vanilla, and red velvet.

SR.2.7: The cake shapes should include a circle, rectangle, and heart.

SR.2.8: The cake fillings should include Nutella, fruit, butter cream, caramel, jelly, and Lotus.

SR.2.9: The cake sizes should include large which serves between 21 to 30 people inclusive, medium which serves between 13 to 20 people inclusive, small serving between 6 to 12 people inclusive, and mini cakes serving between 3 to 5 people inclusive.

SR.2.10: Items including cupcakes, pastries, and cookies should be sold by quantity and not by sizes defined in SR.2.9.

UR.3) The customer should be able to view details about the cake upon selection.

SR.3.1: The customer shall be able to view full information. This information includes flavor, filling, sizes available, allergens, time needed for preparation, and star ratings.

SR.3.2: The customer shall be able to select the preferred cake size and quantity.

SR.3.3: The price of the selected item shall change depending on the specified quantity. NewPrice = Price * Quantity.

SR.3.4: The customer should be able to add the cake item to their virtual cart or place a direct order.

UR.4) The system should allow customers to give ratings on purchased items.

SR.4.1: The system should allow customers to rate the product quality by selecting a certain number of stars 1 to 5 inclusive.

SR.4.2: The customer shall be signed into their account to add a rating.

SR.4.3: The customer shall be allowed to add a rating only if they have purchased that certain item.

SR.4.4: The customer shall be allowed to change or remove their rating of an item at any time.

UR.5) The system shall provide a customization process to allow customers to create their own desired cake by selecting options for size, shape, flavor, filling, and frosting color.

SR.5.1: The customer shall be prompted with a series of questions about their personalized cake.

SR.5.2: The customer should be asked to specify the flavor, frosting color, size, filling, and shape by typing it to the associated fields below each question.

SR.5.3: The customer should be able to add a note for more details and special requests.

SR.5.4: The customer shall be able to add their customized cake item to their virtual cart or place a direct order request.

UR.6) The customer shall be able to place an order for a single item or the whole cart.

SR.6.1: The customer should add their address, select their payment method, and delivery date when placing an order.

SR.6.2: The system shall calculate the time needed to prepare the order by selecting the longest preparation time needed amongst its items.

SR.6.3: The customer shall not be allowed to pick a delivery date less than the calculated preparation time of the order.

SR.6.4: The payment methods should include credit cards (PalPay, Reflect, and MasterCard) or cash payment.

SR.6.5: The payment should be a single transaction meaning the customer should pay the full price amount at once.

SR.6.6: The customer should be presented with a report containing the order items, amount to be paid, expected delivery date, and delivery address. Then asked to confirm the order request.

SR.6.7: If the customer doesn't give confirmation of the order, the order process is canceled, and no payment is made. Else, the ordering process continues.

SR.6.8: The system should validate the credit card information before completing the transaction.

SR.6.8.1: The card information includes the card number, expiration date, billing address, and security code.

SR.6.8.2: The system shall verify the card information through a payment gate.

SR.6.8.3: The system shall verify that the amount being paid matches the price specified for the order.

SR.6.8.4: If the transaction declined, the customer should be notified, and no payment is made.

SR.6.8.5: If the transaction was approved, the system should send a confirmation message indicating payment completion.

SR.6.9: The system should automatically send a receipt through email showcasing the order contents, amount paid, expected delivery date, and delivery address.

UR.7) The customer shall be allowed to cancel their placed order requests.

SR.7.1: Customers shall be able to cancel their placed order requests.

SR.7.2: The customer should receive a full refund if they cancel the order 2 or more days prior to delivery time.

SR.7.3: The customer should receive a full refund if a manager cancels their order for them.

SR.7.4: Customers should be informed by email of any order cancelation done.

SR.7.5: The system should not allow any order cancelations after the order delivery date.

UR.8) The system shall provide support to customers by enabling them to report issues.

SR.8.1: The customer shall be signed into their account to report an issue.

SR.8.2: The customer should be able to write a description of the problem faced and upload an image.

SR.8.3: The system should provide a dedicated phone line and email address for further assistance.

SR.8.4: The system should send a confirmation email informing the customer that their issue will be resolved by the manager through email or phone.

UR.9) The manager shall be able to update, edit, and delete content on the website, as well as view business reports on stocks and sales.

SR.9.1: The manager shall sign in with an administrative account to access managerial features.

SR.9.2: The managerial features include adding new items, removing discontinued items, editing existing items, answering issue reports, and handling order refunds.

SR.9.3: The manager shall be able to add a new item by specifying the category and theme it falls into, the shape, sizes it supports, flavor, frosting color, upload images of the cake, the price, add allergen information, and preparation time.

SR.9.4: The new cake item added by the manager in SR.9.3 shall be added to the catalog available for customer purchase.

SR.9.5: The manager shall be able to remove an item from the catalog, making it a no longer option for the customers to order.

SR.9.5.1: The deletion of the item in SR.9.5 should not cause cancellations on previously placed orders.

SR.9.6: The manager shall be able to edit any cake information fields defined in SR2.3 through SR2.8.

SR.9.7: The manager should be able to process the issues by replying through email or phone number.

SR.9.8: The manager shall be able to cancel any order.

SR.9.9 The manager should be able to generate stock reports and sales reports to make better decisions.

Task 2.3: Effort & Cost Estimation

Acronyms: **pw**= person week; **pm**= person month; **w**= week; **m**= month
effort= the effort required for a person employed all month/week long(day: 8 hours, week: 7 days, month: 30 days)
Schedule time= actual time needed to complete the work, based on working days only (not including holidays, etc.).

Table 1: Effort and Cost Estimation

UR	Estimated No of Developers can work concurrently on UR	Estimated Effort (average/developers)	Total Effort (for One Developer)
UR1	1	1 pw	1*1 = 1 pw
UR2	2	1 pw	2*1 = 2 pw
UR3	1	2 pw	1*2 = 2 pw
UR4	1	1 pw	1*1 = 1 pw
UR5	1	1 pw	1*1 = 1 pw
UR6	3	3 pw	3*3 = 9 pw
UR7	1	1 pw	1*1 = 1 pw
UR8	1	1 pw	1*1 = 1 pw
UR9	3	3 pw	3*3 = 9 pw
Total effort/avg	14/9 = 1.56 dev on avg needed	14 pw	27 pw
Schedule time 30%		14 * 1.3 = 18.2 w (min time to complete)	27 * 1.3 = 35.1 w (max time to complete)
Cost		Avg salary/w = $560	35.1 * 560 = $19,656
Profit margin (min=10%, max=30%)		Min cost => Max cost =>	19,656 * 1.1 = $21,661.6 19,656 * 1.3 = $25,552.8

Agreed price $25,000 | 35 pw | A team of 6 developers.

Phase 3:

Task 3.1: Scenario Analysis

Student: Hanadi Asfour 1210209

Scenario: Searching and Filtering Pre Designed Cakes

Initial Assumption:

A user is accessing the cake shop's website on their computer with an internet connection. This user is at the “Browse Cakes” section of the website.

Normal Flow:

1. The user selects the option to search for cakes and enters (free text input) their desired criteria for searching, such as cake category, theme, flavor, filling, shape, size, or frosting color, or a combination of any of them.
2. The cake shop system retrieves all the cakes matching any of the specified criteria and displays them on the screen.
3. The user browses through the search results, viewing the cakes' pictures, names, prices, and star ratings.
4. Then user then applies filters to refine the search results, by cake category (dropdown menu), theme (dropdown menu), frosting color (color picker), flavor (dropdown menu), size (dropdown menu), filling (dropdown menu), shape (dropdown menu), increasing or decreasing price (dropdown menu).
5. The cake shop system updates the search results based on the applied filters by sorting by price and removing all cakes that don’t have features matching the ones specified by the filters.

What Can Go Wrong:

Alternative Flows

If the user’s criteria do not match any available cakes, the cake shop system will display a message informing them that no cakes match those criteria. The user can adjust their search criteria and repeat the search.

Error Flows

If there is a technical issue with retrieving the cakes from the database, the system should display an error message informing the user about this issue. The user could try again later or contact customer support for assistance.

Additionally, if there is a problem displaying the search results, like images are not loading or incomplete information is being shown, the system will show an error message asking the user to refresh the page or try again later.

In cases of slow response time due to high traffic or server issues, the system will display a message indicating that the results may take longer to load and ask the user to be patient or try again later.

Other Activities:

The user has the option to clear the search text and/or reset the filters, allowing the system to present a broader selection of cakes again.

The user is prompted with an option to customize their own cake while browsing.

System State on Completion:

The system displays the filtered search results list of cakes based on the users' criteria. They can continue to explore cakes with other features or proceed with selecting a cake for more details.

Student: Jeneen Jaber 1212160

Scenario: Customer Rating

Initial Assumption:

The customer has received their ordered cake from an online cake shop and wants to give that cake a rating based on its taste, appearance, and freshness. The customer is logged in to the website and is rating the received cake.

Normal:

The customer receives the cake delivery and checks the taste, appearance, and condition of the cake. The customer is logged in to the website and now able to give their rating on a scale of 1 to 5 stars depending on how satisfied they are with the result. They can rate simply by clicking on an add rating button on the website and choosing the number of stars they want.

What can go wrong:

- The customer wants to give a rating and the rating doesn't go through the database. There could be technical issues like software bugs, server issues, or connectivity problems that prevent the rating from being submitted correctly.
- The customer wants to give a rating for a cake that's not on their previous orders list or for a cake before the delivery date of it. This means their rating is unreliable and would be giving dishonest feedback. The online cake shop does not approve this to happen. The customer is allowed to rate a cake only if that cake is on their previous orders list and after the specified delivery date.

Other Activities:

The customer may leave a written review along with the rating, providing additional feedback.

The online cake shop may send a follow-up email to the customer, thanking them for their purchase and inviting them to add rating/provide feedback if they haven't already.

System State on Completion:

The customer is logged in. The customer's rating and any additional review are recorded in the online cake shop's database.

The average rating for the cake may be updated based on the customer's input.

Student: Amani Sayyad 1212289

Scenario: Place Order

Initial Assumption:

The customer already has an account on our system and is logged in to it, and they have clicked the "Place Order" button after selecting items to purchase.

Normal Flow:

1. The system prompts the user to enter order details including delivery address, payment method, and delivery date.
2. The customer enters their delivery address and confirms it (free text).
3. The customer selects a payment method from a dropdown menu (credit card via PalPay, Reflect, or MasterCard, or cash payment upon delivery).
4. The customer selects their preferred delivery date from the available options (date picker).
5. The total payment for the customer includes order cost in addition to the delivery fee.
6. The system presents the customer with a summary of the order, including items, amount to be paid, expected delivery date, and delivery address, and asks the customer to confirm the payment.
7. The customer confirms the order.
8. If the customer selects a credit card payment, the system validates the card information through a payment gateway.
9. The system verifies the card number, expiration date, billing address, and security code.
10. The system ensures the amount being paid matches the specified price.
11. If the transaction is approved, the system sends a confirmation message indicating payment completion.
12. The system sends a receipt via email showcasing the order contents, amount paid, expected delivery date, and delivery address.

What can go wrong:

- The credit card transaction is declined, the system notifies the customer of the declined transaction and asks them to retry with a different payment method.
- Internet connection problems occur during the payment process, the process is canceled, and no money is paid. The system notifies the customer to try again.
- The card information entered is incorrect or invalid, the system prompts the customer to re-enter the card details and to try again.

Other Activities:

- The customer can cancel the order at any moment they desire and receive refunds.
- The customer can review past orders on their account.

System State on Completion:

- The order is recorded in the system.
- The customer receives an email confirmation with the order details.
- The customer can place more orders if they want.

Student: Worood Assi 1210412

Scenario: Create a New Account.

Initial Assumption:

The user should have access to a device with an internet connection and does not already have an account associated with the provided email address.

Normal:

1. The user accesses the cake online shop.
2. The user navigates to the "Create Account" page.
3. The system displays the registration form with fields for first name, last name, email address, phone number, and password.
4. The user enters their first name, last name, email address, phone number, and password.
5. The user submits the registration form.
6. The system verifies the accuracy of the entered data, such as (first and last name are made up of only letters, correct email, valid phone number, and strong password).
7. The system sends a verification email with a verification code to the user.
8. The user receives the verification email and enters the verification code.
9. The system verifies the verification code and then creates a new account.
10. The system displays a message on the screen indicating the success of the operation.
11. An email is sent to the user's email address to confirm the successful creation of the account, containing the username, phone number, and email.
12. The user is redirected to the login page to access their account.

What can go wrong:

Alternative Flow:

1. If the user enters a first and last name incorrectly, an error message should be displayed prompting them to enter it correctly, ensuring it consists of characters, and single spaces.
2. If the email is already associated with another account, the user should be prompted to either proceed to log in or choose another email.
3. If the user enters the phone number in the wrong way, the cake shop system will display an error, making it have exactly 10 digits.
4. If the user enters a weak password, the cake shop system will warn them to enter a stronger one. It should have at least 8 characters.

Error Flow:

5. If there is an issue connecting to the Database server, the cake shop system should display a message to try another time to create an account.

6. If the user enters the wrong confirmation code, the cake shop system displays an error message and allows them to retry up to three times.
7. If the user enters an email incorrectly, an error message should be displayed prompting them to enter it correctly, including a username followed by the '@' symbol, and the domain name.
8. If the user enters an inactive email, they should be prompted to select a valid and activated email.

Other Activities:

1. Successful server connection.
2. Validate the user's email address.
3. Browse cake shops.

System State on Completion:

After successfully verifying their details, a user account is created and they are seamlessly directed to the main page where they can log in, access website features, place orders and edit their personal information

Task 3.2: Actors and Use case (Diagram) Analysis & Modelling

- **Actors' Roles and Semantic Descriptions:**

Table 2:Actors Roles and Semantic Descriptions

Actor	Description
Primary Actors	
Customer	This actor represents individuals who visit the cake shop website to browse available cakes, customize their own, place and track orders, register, and manage their personal information.
Manager	The manager represents an authorized user within the cake shop organization which has administrative access to the system. Managers can perform tasks like adding, editing, and removing cakes, canceling customer orders, and monitoring system and customer issues
Secondary Actors	
Emailing System	This actor represents the email service used by the cake shop system to send order receipts to customers, verification codes for account security measures, and a method for communication between cake shop and customers.
Payment Gateway	This actor represents the third-party payment service which can handle payments from customers. This actor supports multiple payment methods such as credit cards and cash.
Phone Service	This actor is the third-party phone service provider that is used as a direct communication between the cake shop and its customers, and to send SMS messages for account verification.
Delivery Service	This actor represents the delivery team responsible for transporting cake orders from the cake shop to the addresses specified by customers.
Excel Editor	An external system tool that interacts with the manager by importing and exporting data for generating graphs and reports on stocks and sales.

- **Overall/Main Business USE-CASE Diagram**

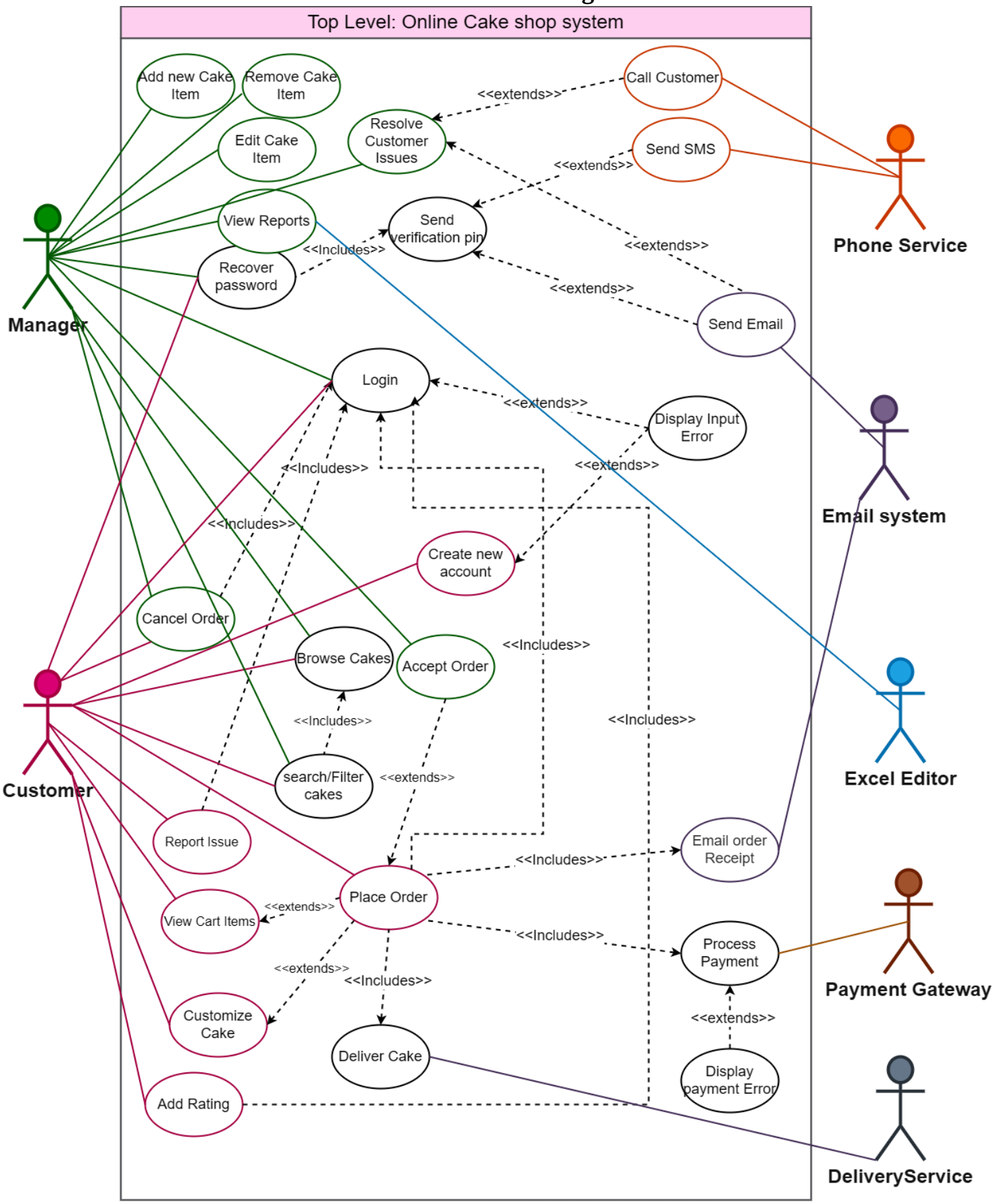

Figure 1:Main Business USE-CASE Diagram

Task 3.3: Use case Description

Student: Hanadi Asfour 1210209

Table 3: Cake Customization Use Case Description

Online Cake Shopping System Use Case: CUSTOMIZE CAKE	
Actors:	• Customer: Initiates the cake customization process by interacting with the cake shop system. • Manager: Reviews and approves customized cake requests before confirming orders.
Description:	The cake customization use case allows customers to create their own cakes by selecting its flavor, frosting color, size, filling, and shape. The customers have the option to attach an image to be clearer about their designs. However, before confirming the order, the customized cake must be accepted by the manager who makes sure the request aligns with the bakery's capabilities and scope. If it doesn't, the manager will cancel the order request.
Pre-conditions:	• The customer has access to an internet connection and a smart device to be able to access the online cake shop system. • The customer is logged into their account on the cake shop system. • The customer can locate and access the cake customization feature from the website.
Sequence/Flow of Events:	1. The customer selects the "Customize Cake" option from the shop website. 2. The system presents a series of questions to the customer about their cake, including flavor, frosting color, size, filling, and shape. 3. The customer inputs each question by selecting options from a dropdown menu or entering text in a field. 4. The customer can add an additional note in a text field or attach an image to clarify their request. 5. The customer reviews and confirms their choices. 6. The system validates the customer's selections and inputs for errors or empty fields. 7. The customer submits the order request, which is then reviewed by the manager. 8. The manager decides if the cake request aligns with the bakery's capabilities. 9. If the manager approves the request, the customer's order is confirmed, and they proceed to checkout. If the request is rejected, the customer will be informed of it and will not be charged.

Data:	Cake customization inputs and options: flavor, frosting color, size, filling, shape, additional notes, image attachment.
Stimulus/Trigger:	The customer selects the "Customize Cake" option from the shop website.
Post-conditions/Response:	When successfully completing the cake customization process and the manager approves, the customer's order is confirmed, and they can proceed to checkout. If the request is rejected by the manager, the customer is informed, and the order is canceled.
Comments:	The customer can register for a new account if they don't have a previous one already then login with this newly created account.

Student: Jeneen Jaber 1212160

Table 4: Add to Cart Use Case Description

Online Cake Shop System Use Case: ADD ITEMS TO CART	
Actors	**Customer**
Description	A customer may add one or more items to their shopping cart on the online cake shop's website.
Pre-conditions	The customer is logged in to their account on the online cake shop's platform.
Sequence/Flow of Events	1. The customer logs in to their account if they have one, and if not, they have an option to create an account. 2. The cake shop system presents a list of available cake designs along with their images, names, descriptions, and prices. 3. The customer browses the website for the desired cake or uses the search/filter functionality. If the customer can't find what they want, they can choose to customize their desired cake. 4. After selecting the desired cake by clicking on its image or customizing their own, the customer clicks on the "Add to Cart" button. 5. The system adds the item to the customer's shopping cart. 6. The system then updates the cart summary to show the newly added item, including the total number of items in the cart and the subtotal.
Data	Customer's account information, Cake details, Cart contents
Stimulus/Trigger	Customer's action of clicking the "Add to Cart" button.
Post-conditions/Response	1. The selected/customized cake is successfully added to the customer's shopping cart. 2. The cart summary is updated to show the addition of the new item. 3. The customer may continue shopping or proceed to checkout.
Comments	The customer has the option to view and edit the contents of their cart before proceeding to checkout.

Student: Amani Sayyad 1212289

Table 5: Password Recovery Use Case Description

Online Cake Shop System Use Case: RECOVER PASSWORD	
Actors	Customer, emailing system, phone service.
Description	The customer may forget their account's existing password, they can reset it through typing in a verification pin received from the emailing system or the phone service.
Pre-conditions	1. The customer must have a previously registered account on our system. 2. The customer must have forgotten their password.
Flow of Events	1-Customer tries logging into their existing account but enters an incorrect password. 2-Customer clicks on the "Forgot Password" link. 3-The system prompts the customer with options to choose between receiving a verification code via email or via SMS to their registered phone number. 4-Customer initiates sending a verification message to their email or phone number. 5-A verification code is sent to the customer's email or phone number. • Exception: If there are technical issues preventing the system from sending the verification code, the system displays an error message telling the user to try again. 6-The customer receives the verification code either in their email inbox or via SMS on their phone number. • If a customer chooses email, they enter the email pin. • If a customer chooses a phone number, they enter the SMS pin. 7-The system validates the pins. 8-The system prompts the customer to enter a new password and confirm it by entering it twice. • Exception: If the pin is invalid or password confirmation is denied(due to not entering a strong password or not entering the same one twice) , the system provides error messages and prompts customer to retry. 9-The system displays a message indicating a successful password reset. 10-The customer can now use their new password when logging in to their account.
Data	Customer registration information including email and phone number.
Stimulus/Trigger	The customer tries to login to their account but enters an incorrect password.
Post-conditions	The customer's password has been reset successfully, and they can log in to their account using the new password.
Comments	Possible future update: Allow customers to use a two-step authentication method for extra security during the password reset process.

Student: Worood Assi 1210412

Table 6: Login Use Case Description

Online Cake Shop System Use Case: LOGIN	
Actors	• Customer: is the object interacting with the program that will perform the login process. • Emailing System: is responsible for sending the customer verification code.
Description	The user (customer or employee) can log in to the cake shop website if they have an account on our server, or they must first create an account. Afterward, the user must enter the email and password correctly to access their account. In case they forget their password, they can recover it after verifying their identity via email.
Pre-conditions	The customer has an account.
Sequence/Flow of Events	1. The user enters the cake shop website and proceeds to the login page. 2. The user enters a valid email address and password. 3. The system displays an error message to the user to re-enter the information if the email and password are entered incorrectly. 4. The system allows the user to recover their password after verifying their identity if the user forgets their password. 5. The system prompts the user to create an account if the email address is not associated with any existing account.
Data	Email and Password
Stimulus/Trigger	User's action of clicking the "Login" button.
Post-conditions/ Response	• Upon successful login, the user will be able to access their account. • Upon unsuccessful login due to entering the wrong email address and password, an error message appears for the user to re-enter the data correctly, and after five incorrect attempts, the account is locked for three hours to prevent unauthorized access.
Comments	Once logged in successfully, users will be able to place and track orders easily and edit their personal information.

Task 3.4: Activity Model/Diagram Analysis & Modelling

Online Cake Shopping System Activity Diagram

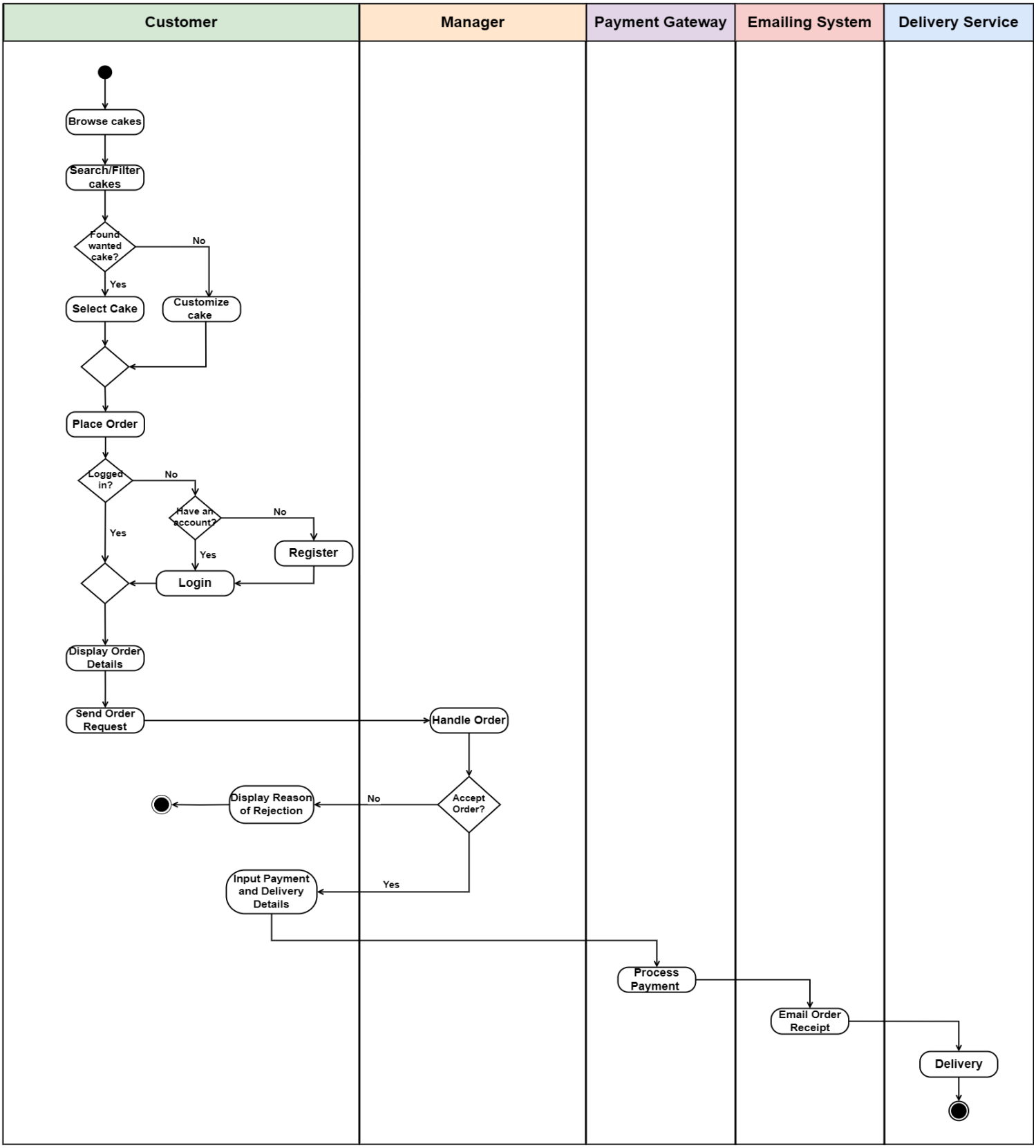

Figure 2: System Activity Diagram

Task 3.5: Instance Activity Diagrams

Student: Hanadi Asfour 1210209

Instance Activity Diagram for Use Case: Customize Cake

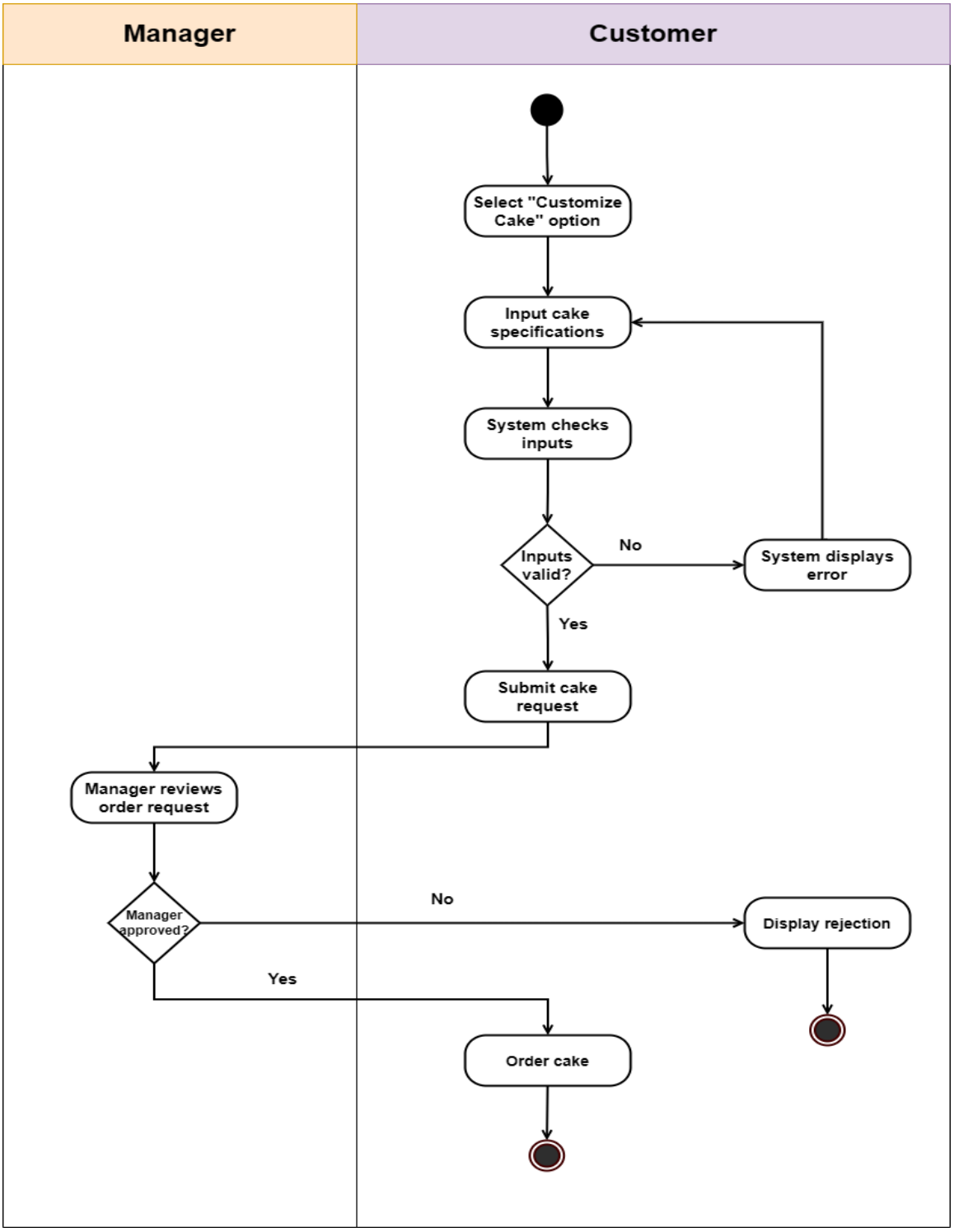

Figure 3: Customize Cake Instance Activity Diagram

Student: Jeneen Jaber 1212160

Instance Activity Diagram for Use Case: Add Item to Cart

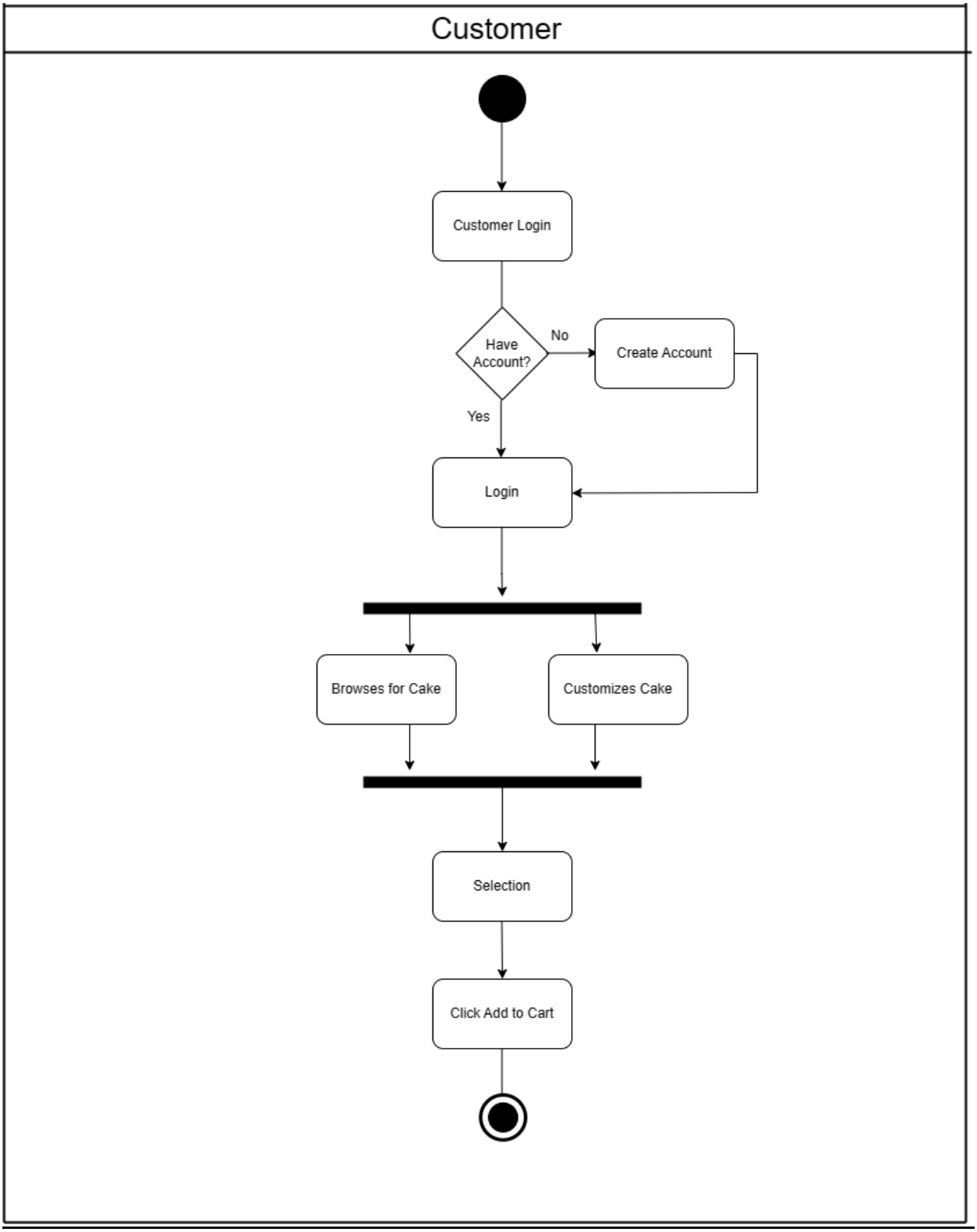

Figure 4: Add to Cart Instance Activity Diagram

Student: Amani Sayyad 1212289

Instance Activity Diagram for Use Case: Recover Password

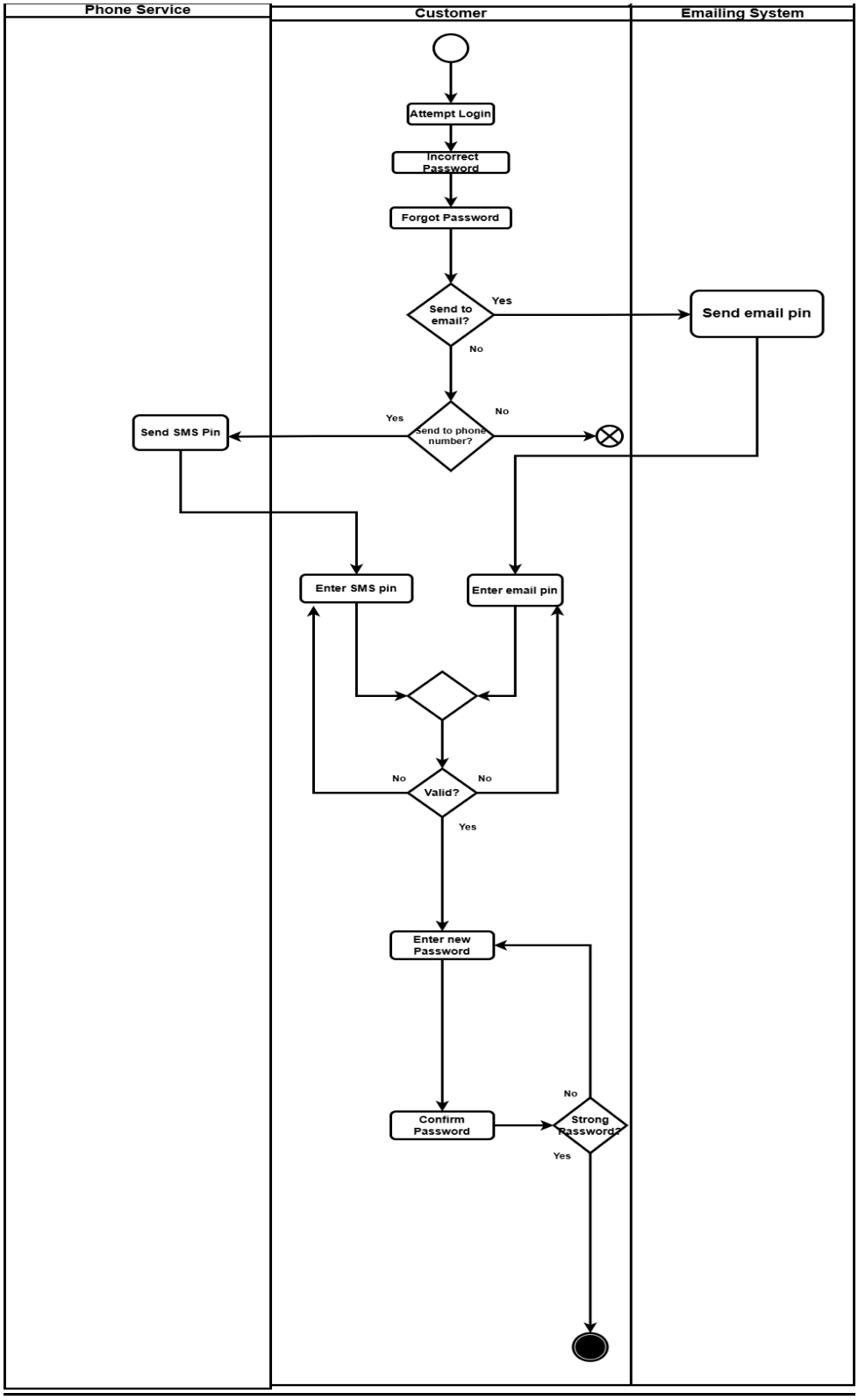

Figure 5: Recover Password Instance Activity Diagram

Student: Worood Assi 1210412

Instance Activity Diagram for Use Case: Login

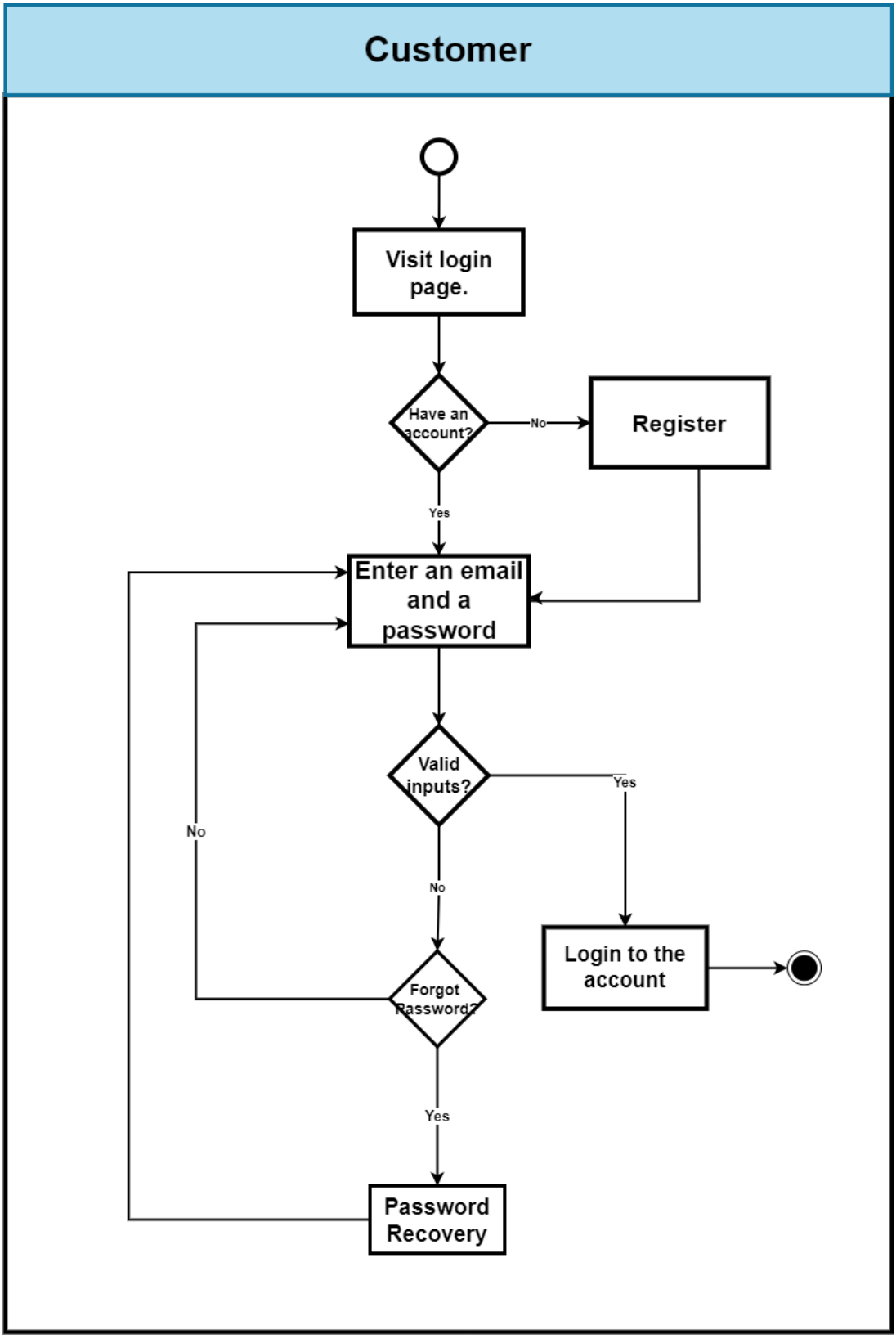

Figure 6: Login Instance Activity Diagram

Phase 4:

Task 4.1: System Class Modelling and Analysis

Class Descriptions:

- Account: Manages user authentication and profile details.
- Manager: Represents administrative users who manage content and orders.
- Customer: Represents a user who interacts with the system to browse, customize, order cakes, and places ratings.
- Cake: Represents a predesigned cake available for purchase.
- Order: Manages customer orders, including order details, status, and payment.
- Rating: Manages customer ratings for purchased cakes.
- Payment: Payment for orders.
- Issue: Represents the customer support requests and issues.
- Cart: Represents the container that holds cakes the customer is interested in ordering later on.
- Customized Cake: Represents a cake designed by the customer with specific preferences not found in the catalog.
- Cash: One of the payment methods adopted by the system to process customer payments.
- Card: One of the payment methods that interacts with the payment gateway to process customer payments.

Association Classes:

- CartItem: between Cart and Cake.
- OrderItem: between Order and Cake.

Abstract Class Diagram:

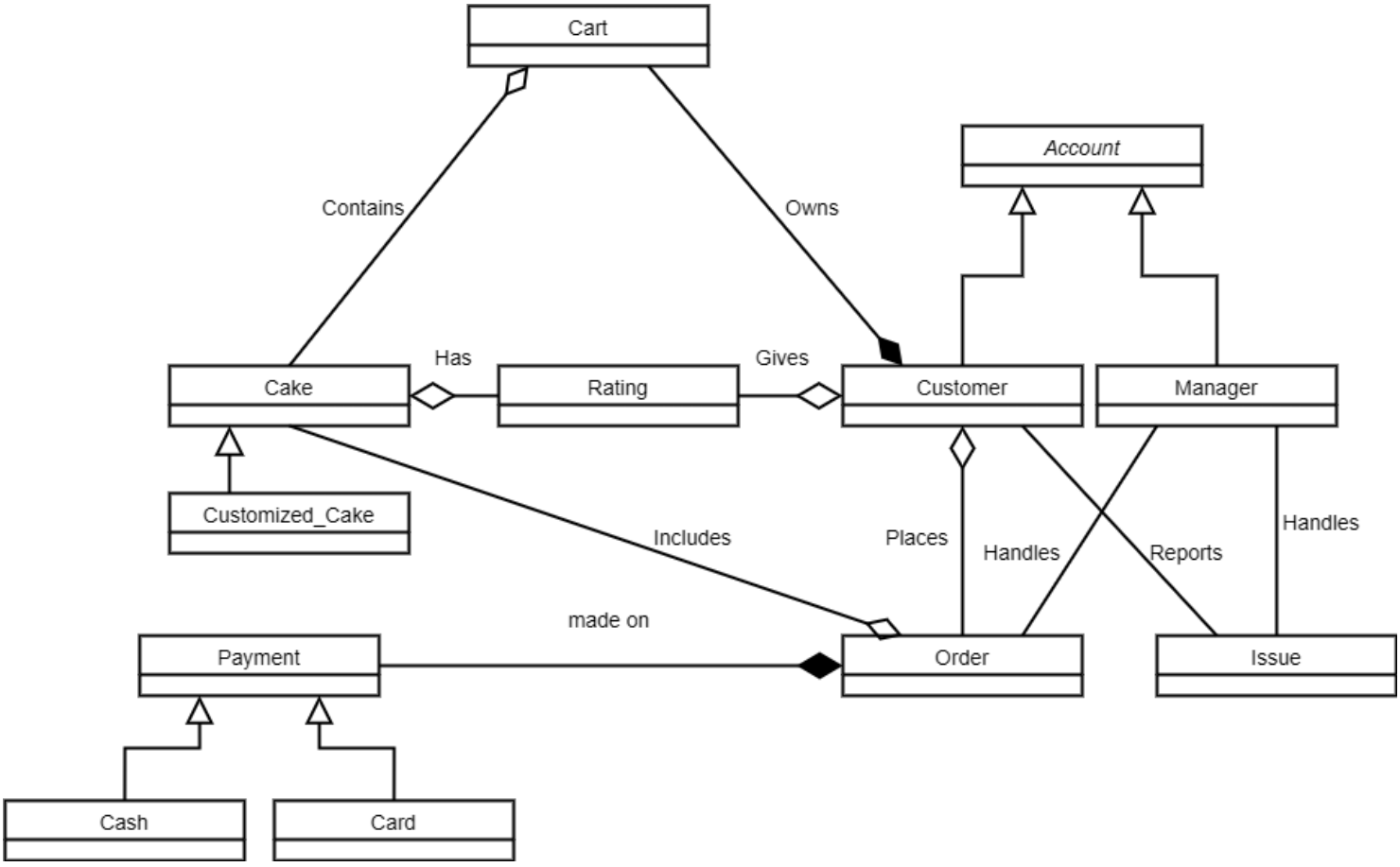

Figure 7: Abstract Class Diagram

Detailed Class Diagram

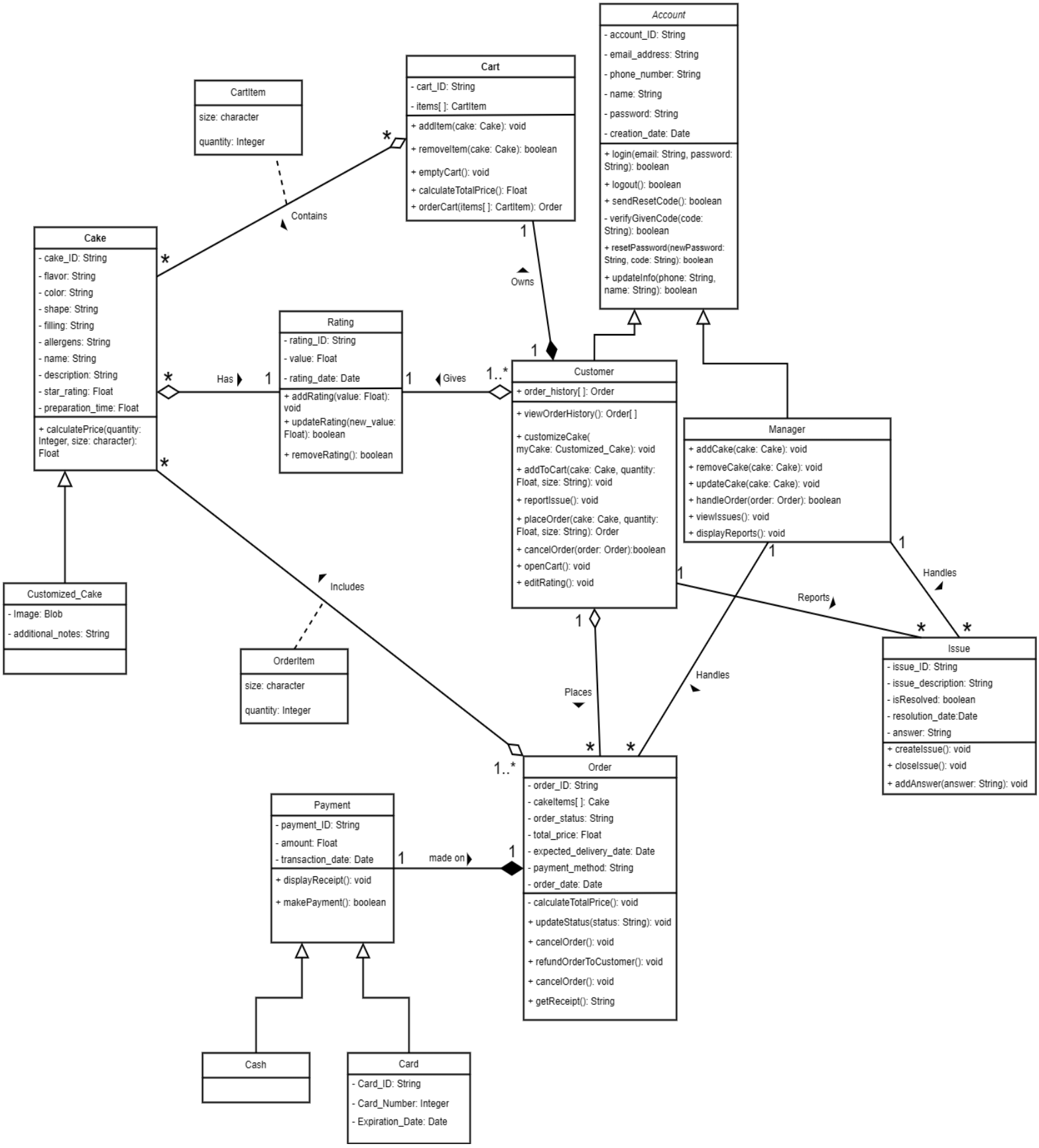

Figure 8: Detailed Class Diagram

Task 4.2: System Sequence Modelling and Analysis

Student: Hanadi Asfour 1210209

Sequence Diagram : Customize Cake

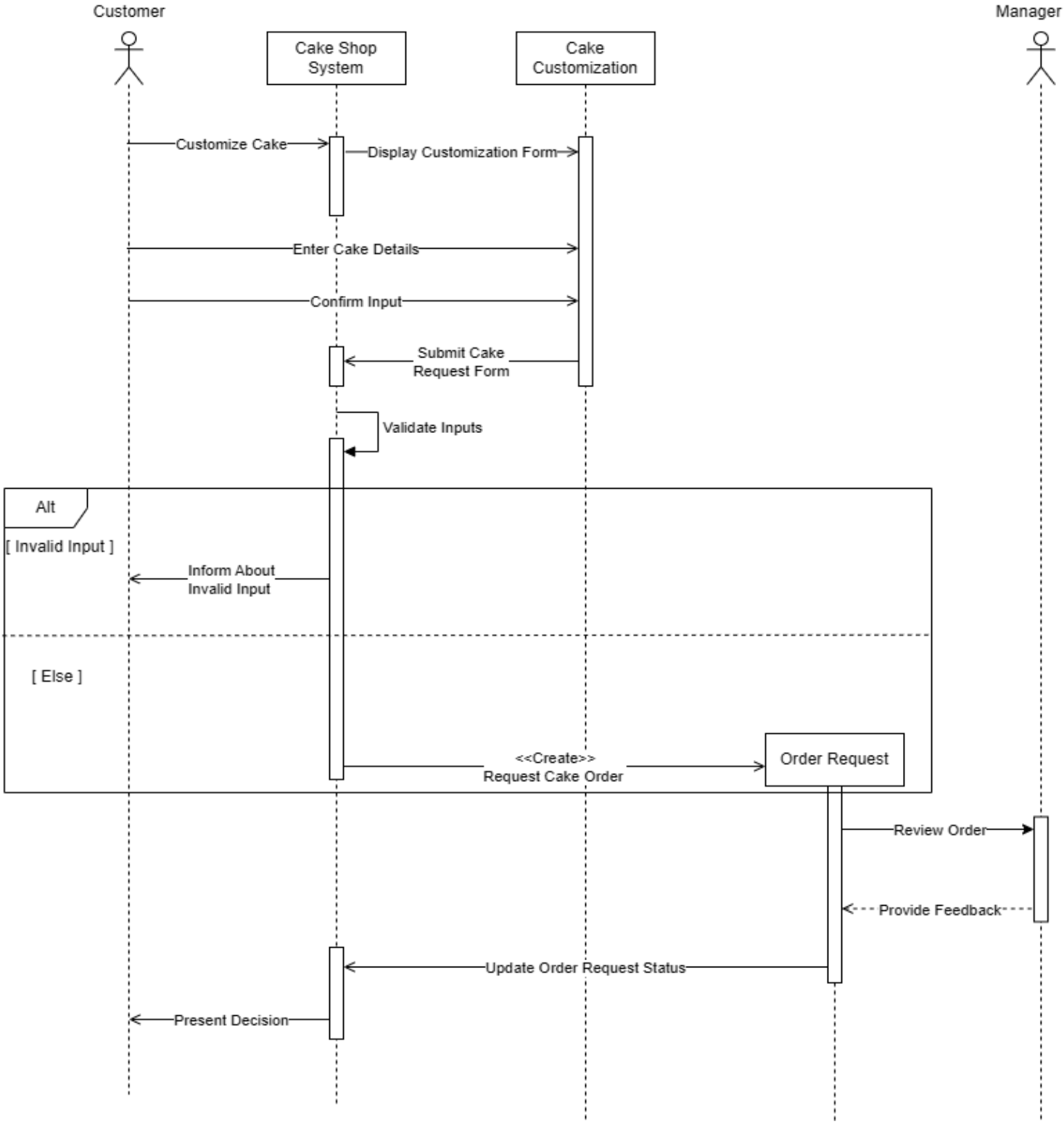

Figure 9: Customize Cake Sequence Diagram

Student: Jeneen Jaber 1212160

Sequence Diagram : Add to Cart

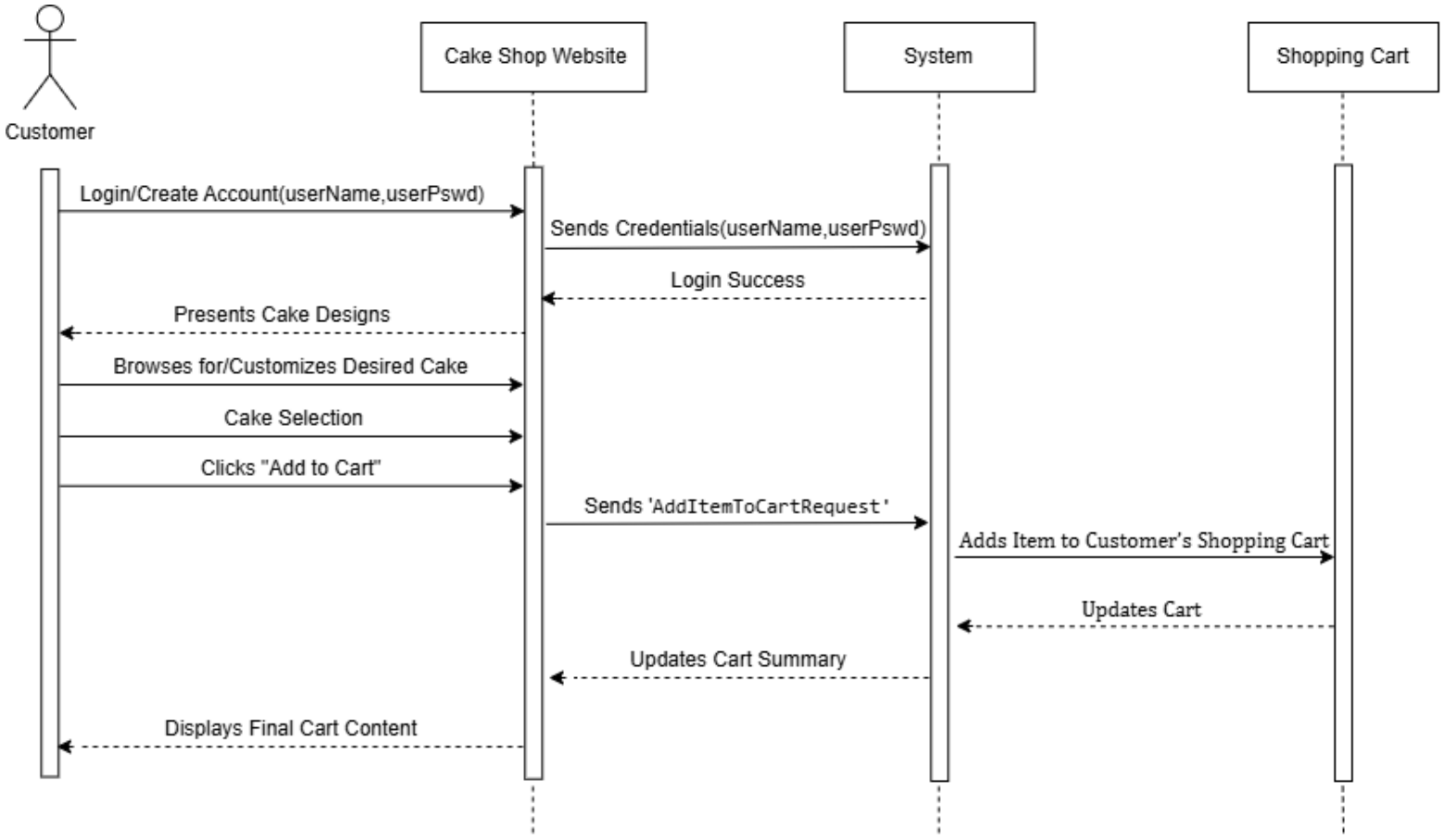

Figure 10: Add to Cart Sequence Diagram

Student: Amani Sayyad 1212289

Sequence Diagram : Recover Password

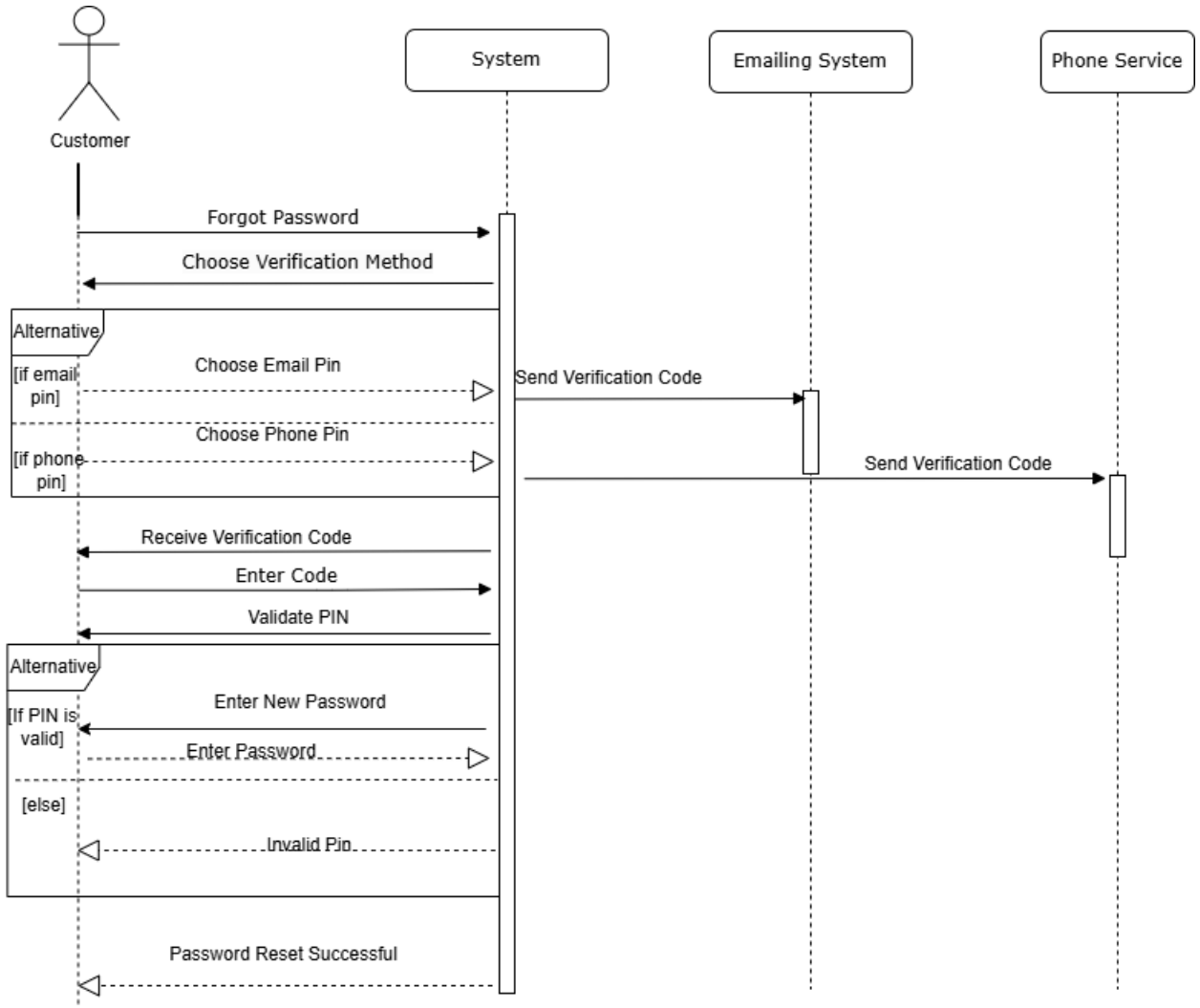

Figure 11: Recover Password Sequence Diagram

Student: Worood Assi 1210412

Sequence Diagram : Login

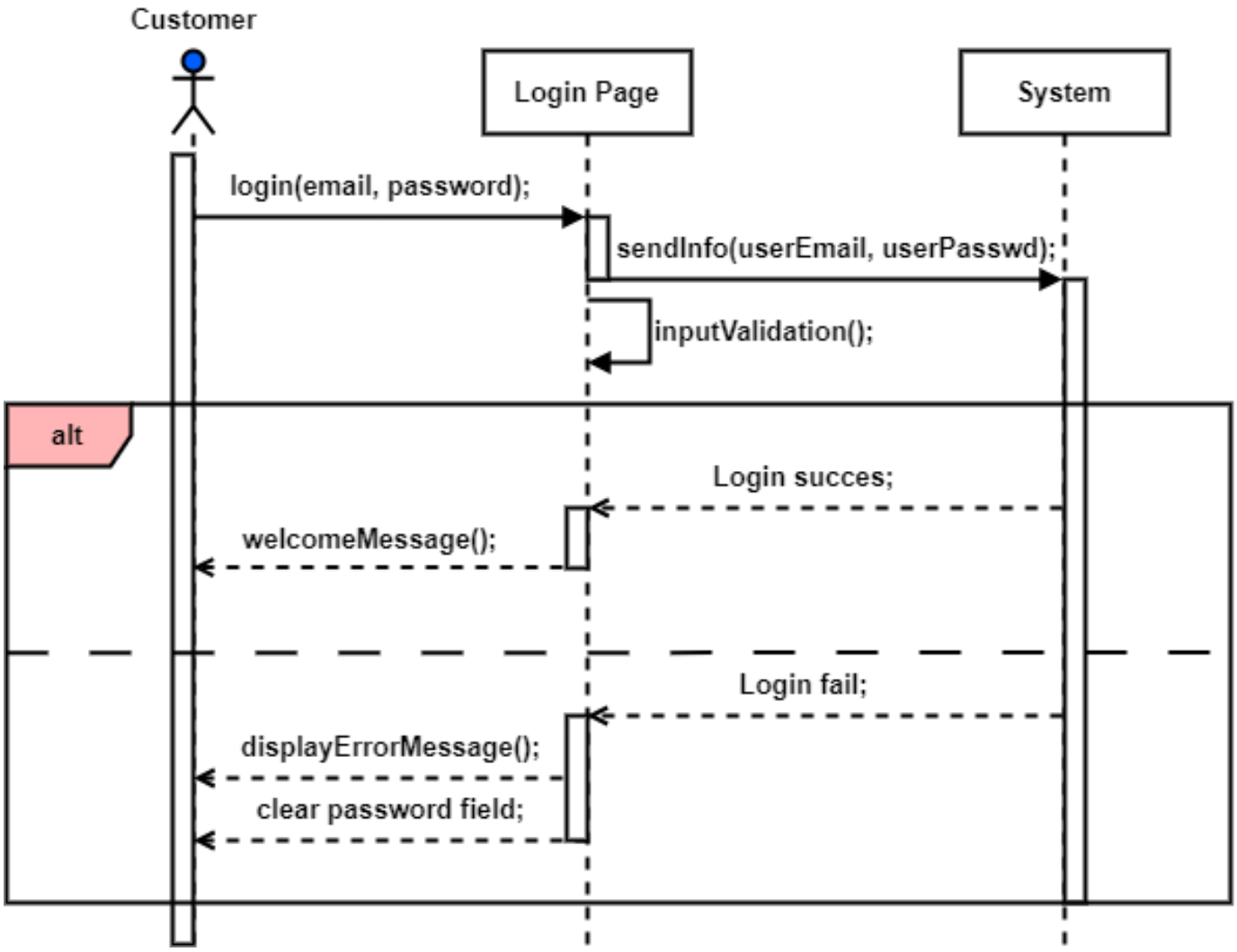

Figure 12: Login Sequence Diagram

Task 4.3: System Design Goals

General Design Goals

1- **Low Coupling**: Refers to maintaining a minimal dependency between different parts of a system so that any change done in one part has minimal impact on the others. This way, there is an enhancement in the flexibility and maintainability of the system.

Techniques of Implementation:

- For example, when components communicate through APIs, services are allowed to be developed, tested, and deployed independently from each other. Such as APIs for obtaining account information after logging in.
- Using private fields and public getter/setter methods prevents direct access to objects internal data. This way they remain unaware of each other's internal implementation details, reducing their dependency on each other.

2- **High Cohesion**: When functions and data within a class are closely related and focused on a single related task, reducing the system's complexity making it easier to maintain and extend.

Techniques of Implementation:

- For example, when each class has one responsibility only. Like when the Customer class handles customer-related functionalities, while the Order class manages order-related tasks.
- In addition, related functionalities should be grouped together into modules. For example, all payment-related functionalities are grouped into a payment module, and all order-related functionalities into an order module.

Specific Design Goals

1- **Scalability**: When the system can handle the growing number of users, orders, and data without compromising its performance.

Techniques of Implementation:

- For example, adding more servers as the user base grows balances the load by distributing traffic across them.
- Using caching mechanisms to store frequently accessed data reduces the load on the database.

2- **Usability**: By making the system easy to use and ensuring a positive user experience.

Techniques of Implementation:

- The user interface should be intuitive with clear navigation ensuring users can easily find what they need and understand how to use the system. In addition, appropriate design patterns and elements should be used to create a visually appealing UI.
- Conduct user experience studies to understand the different customer preferences. This way the system can be enhanced to satisfy its customers' needs.
- Ensuring fast load times and responsive interactions by using efficient algorithms.

Task 4.4: System Architectural Design

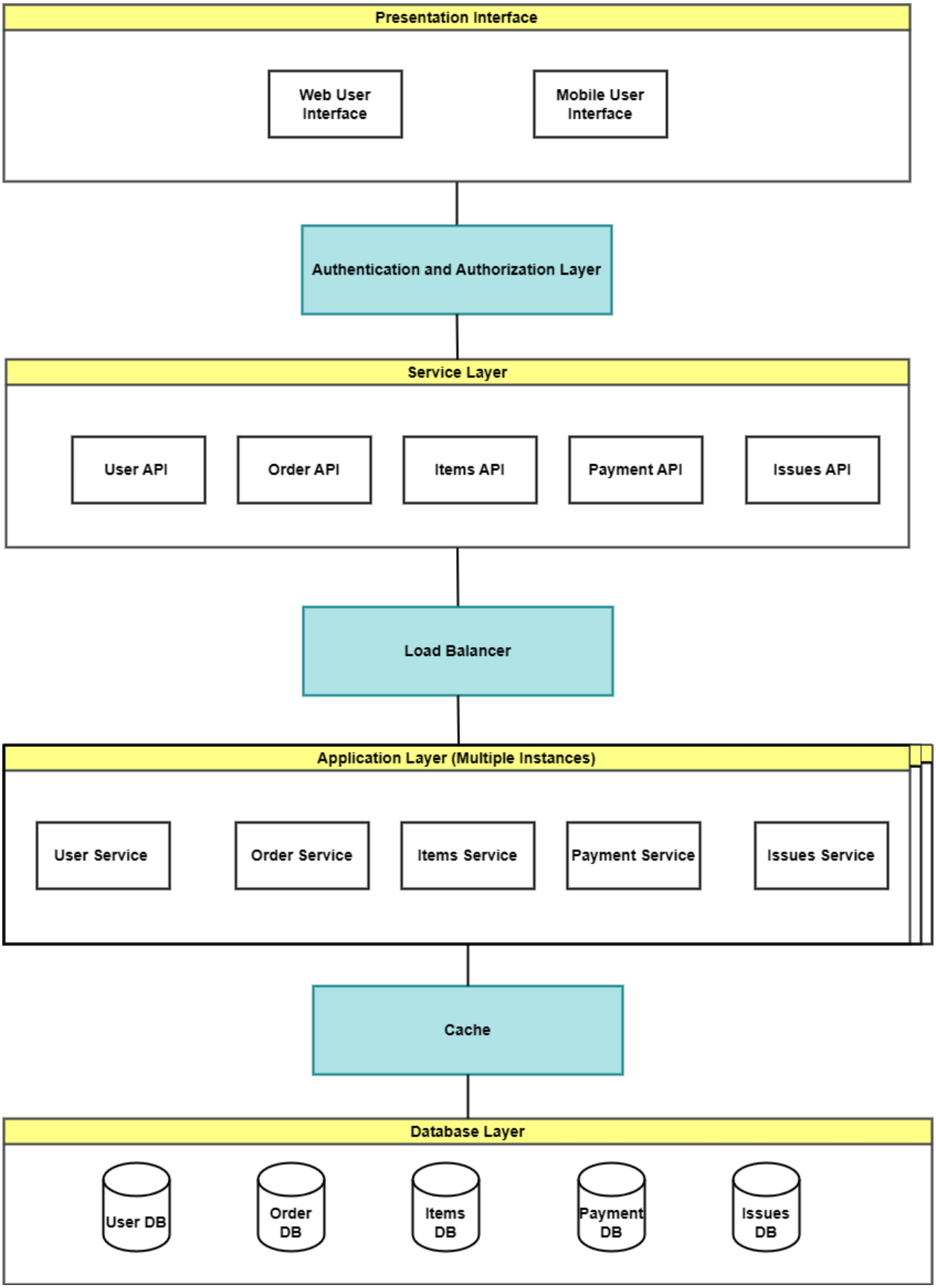

Figure 13: Architecture Design

Task 4.5: System Component Design

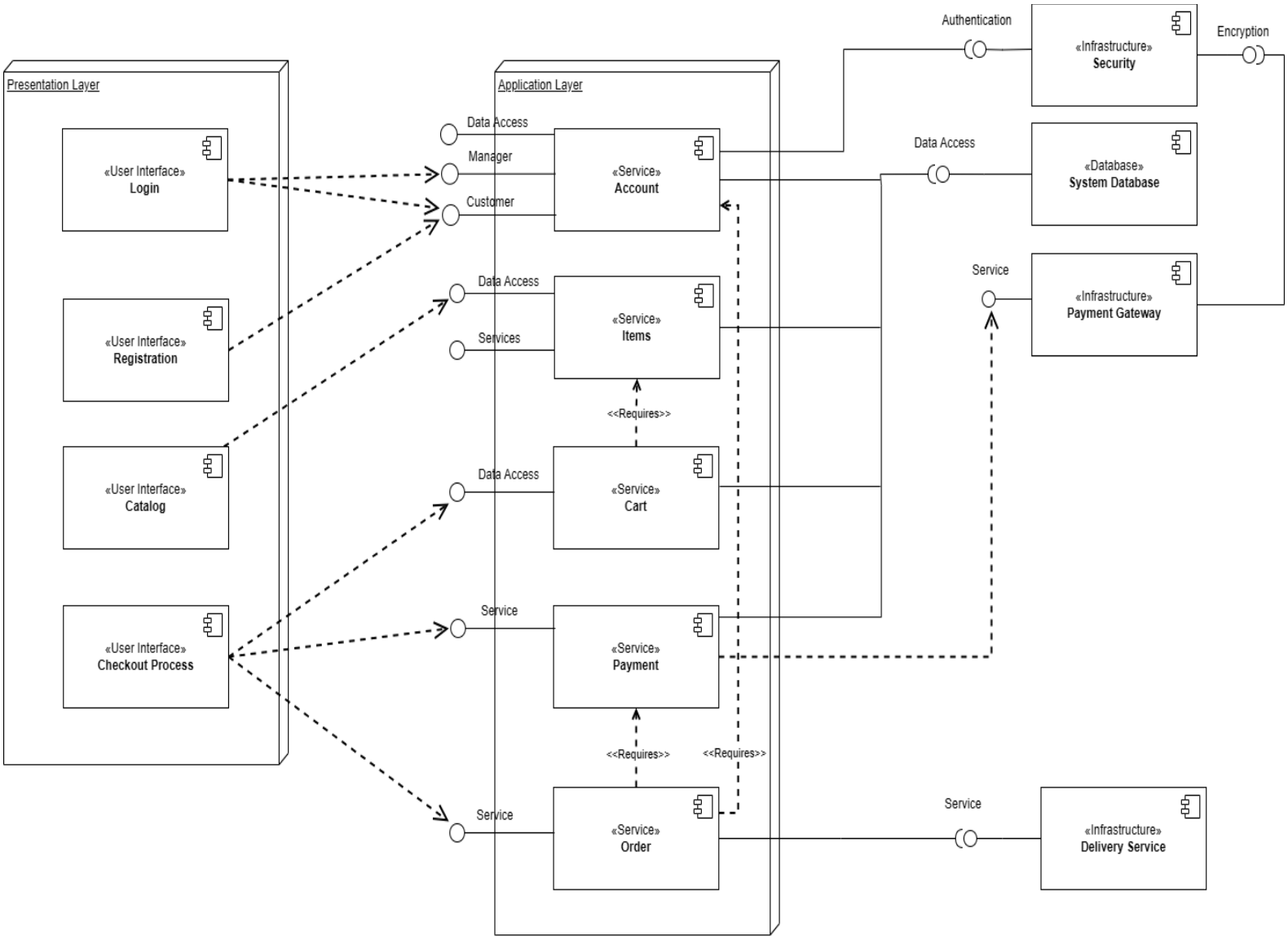

Figure 14: Component Diagram

Task 4.6: System Deployment Design

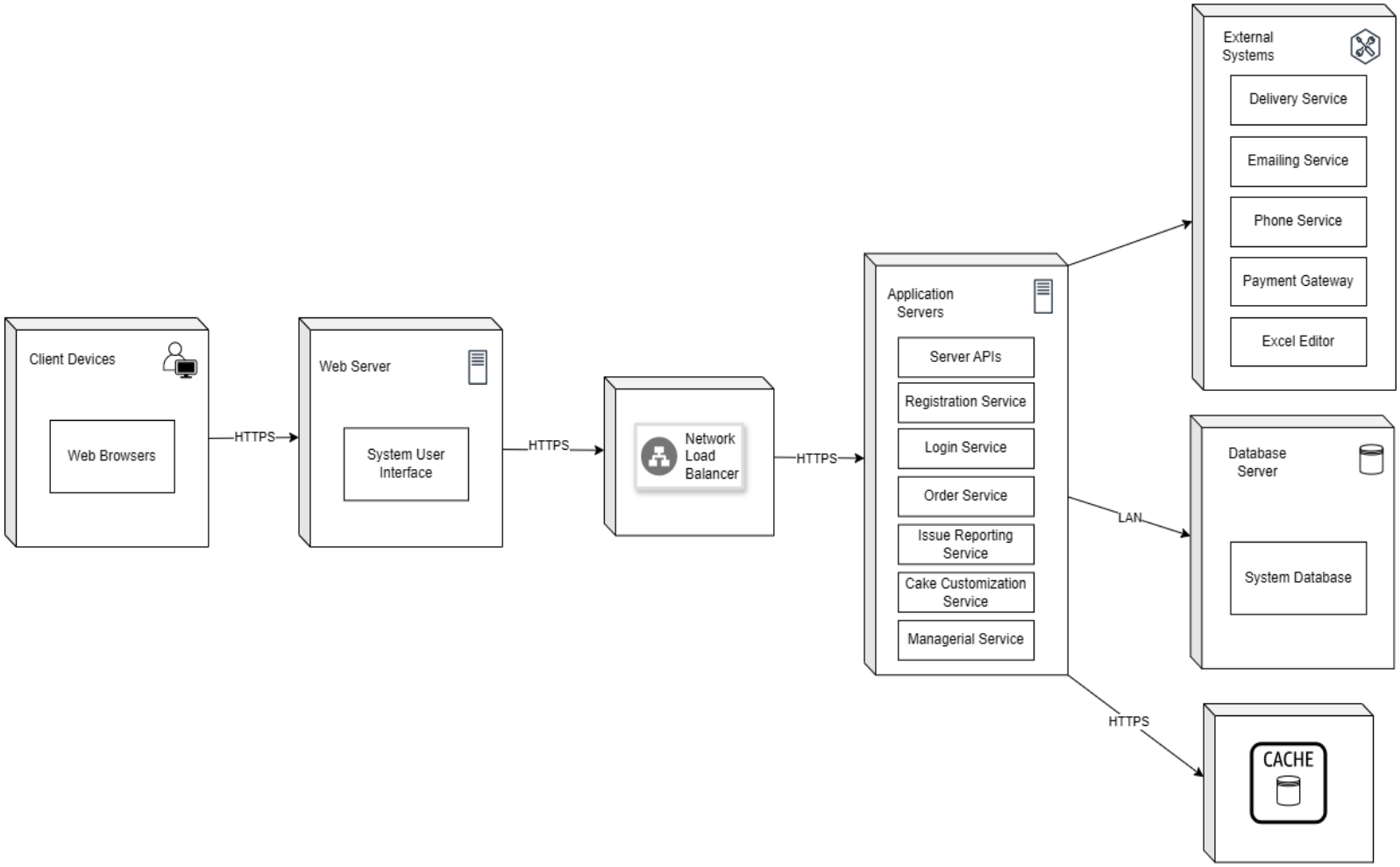

Figure 15: Deployment Diagram