



TK2023

Object-Oriented Software Engineering

[Cafe on Top]

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In an era defined by convenience and efficiency, the demand for streamlined solutions in the food industry continues to surge. Recognizing this growing need, CafeOnTop emerges as a revolutionary food ordering system designed to elevate the dining experience for both customers and businesses alike. This report delves into the development journey of CafeOnTop, highlighting its problem statement, functionalities, and the underlying technology driving its success.

With consumers increasingly opting for online and mobile ordering platforms, CafeOnTop fills a crucial gap by offering a seamless digital interface that empowers users to browse menus, place orders, and make payments with unparalleled ease. Leveraging cutting-edge software development practices and innovative design principles, CafeOnTop redefines the landscape of food ordering by prioritizing user experience and efficiency.

As we embark on this journey of software development for CafeOnTop, our aim is to revolutionize the food ordering experience and set new standards of excellence in the industry. With a commitment to innovation and customer-centricity at its core, CafeOnTop is poised to become the go-to platform for food enthusiasts and businesses seeking a modern, efficient, and delightful ordering solution.

1.2 PROBLEM STATEMENT

When customers dine out, they often encounter a range of frustrating problems that can diminish the overall experience. One such issue is the prevalence of receiving incorrect orders. This can happen due to miscommunication with the kitchen staff or other factors, leading to meals that don't align with the customer's expectations. Such errors can result in dissatisfaction and may even necessitate sending the dish back for corrections, causing further delays.

Slow service is another common grievance among diners. Extended wait times for food and beverages can be exasperating, particularly when customers are hungry or on a tight schedule. Slow service may result from inefficient kitchen operations or high customer demand during peak hours. Regardless of the cause, it can leave patrons feeling frustrated and less likely to return to the establishment.

Long queues are a recurring problem, especially during rush hours or weekends. Waiting in line for an extended period can be tiresome and discouraging, and it can discourage potential customers from even trying the place. Furthermore, the unavailability of specific menu items is a source of disappointment. When customers have a particular dish in mind and it's not available, they are faced with the dilemma of waiting for it to be prepared or settling for a less-desirable alternative.

1.3 PROPOSED SOLUTION

CafeOnTop revolutionizes the dining experience by addressing common pain points encountered by both customers and restaurant staff. Through its robust order management feature, the software minimizes errors and delays by facilitating direct communication between front-of-house staff and the kitchen, ensuring that orders are accurately transmitted and promptly fulfilled.

Moreover, the adoption of digital ordering methods empowers customers to place orders seamlessly, reducing the risk of inaccuracies and enhancing overall efficiency. The integration of reservation and queue management systems further optimizes restaurant operations by efficiently managing capacity and minimizing wait times, thus enhancing customer satisfaction. Additionally, the software's text notification feature keeps customers informed about their table status, allowing them to bypass long queues and enjoy a more convenient dining experience. With real-time menu updates, customers can check the availability of menu items in advance, reducing disappointments and ensuring a smoother dining experience.

Furthermore, CafeOnTop's flexibility in payment methods caters to diverse customer preferences, while its feedback system enables customers to provide valuable insights for continuous improvement. Overall, CafeOnTop elevates the dining experience for both customers and restaurant staff, fostering efficiency, satisfaction, and loyalty.

CHAPTER 2

REQUIREMENTS SPECIFICATION

2.1 INTRODUCTION

We will illustrate these requirements through the creation of a requirement model tailored to our application. This model aids developers and stakeholders in grasping the intricacies of the problem domain by visually depicting the entities, relationships, and behaviors inherent within the system. Such clarity is imperative for crafting software that precisely aligns with users' actual needs.

Furthermore, our domain model will be revealed for the proposed application. A domain model serves as a graphical representation of real-world concepts or processes, distinct from software or databases. Within this section, we will delineate and depict entities along with their interrelationships.

2.2 FUNCTIONAL REQUIREMENTS

The CafeOnTop software facilitates user authentication and access control, enabling secure login for administrators, staff, and customers. It should streamline order management, allowing staff to efficiently take and modify orders while ensuring accurate transmission to the kitchen. Reservation and queue management functionalities are essential, allowing customers to make reservations online and receive text notifications when their table is ready, optimizing table allocation and minimizing wait times. Real-time menu updates should be available to customers, who can also customize delivery methods and payment options, ensuring a seamless and personalized experience. A feedback system should enable customers to provide ratings and feedback, while administrators can access comprehensive reports and analytics for informed decision-making. The software must integrate with existing systems, scale easily, and prioritize data security and compliance with relevant regulations.

2.2.1 USER REQUIREMENTS

Users of CafeOnTop can expect an intuitive and accessible interface catering to both staff and customers, allowing for easy navigation and use across different devices. Customers can have the ability to customize their orders, view transparent pricing, receive real-time updates on order status, and make flexible reservations with prompt notifications along with a straightforward feedback submission process for customers.

2.2.2 SYSTEM REQUIREMENTS

The CafeOnTop requires compatibility with major operating systems such as Windows, macOS, iOS, and Android, ensuring accessibility across various devices, while minimum hardware specifications should be defined for optimal performance. Continuous internet connectivity is essential for accessing features like online ordering and reservation management. Robust database management is necessary to securely store and manage user accounts, orders, menus, and reservations. Integration with third-party services like payment gateways should be supported for seamless operations. User support channels and regular maintenance are also essential to assist users and ensure the software's reliability and functionality over time.

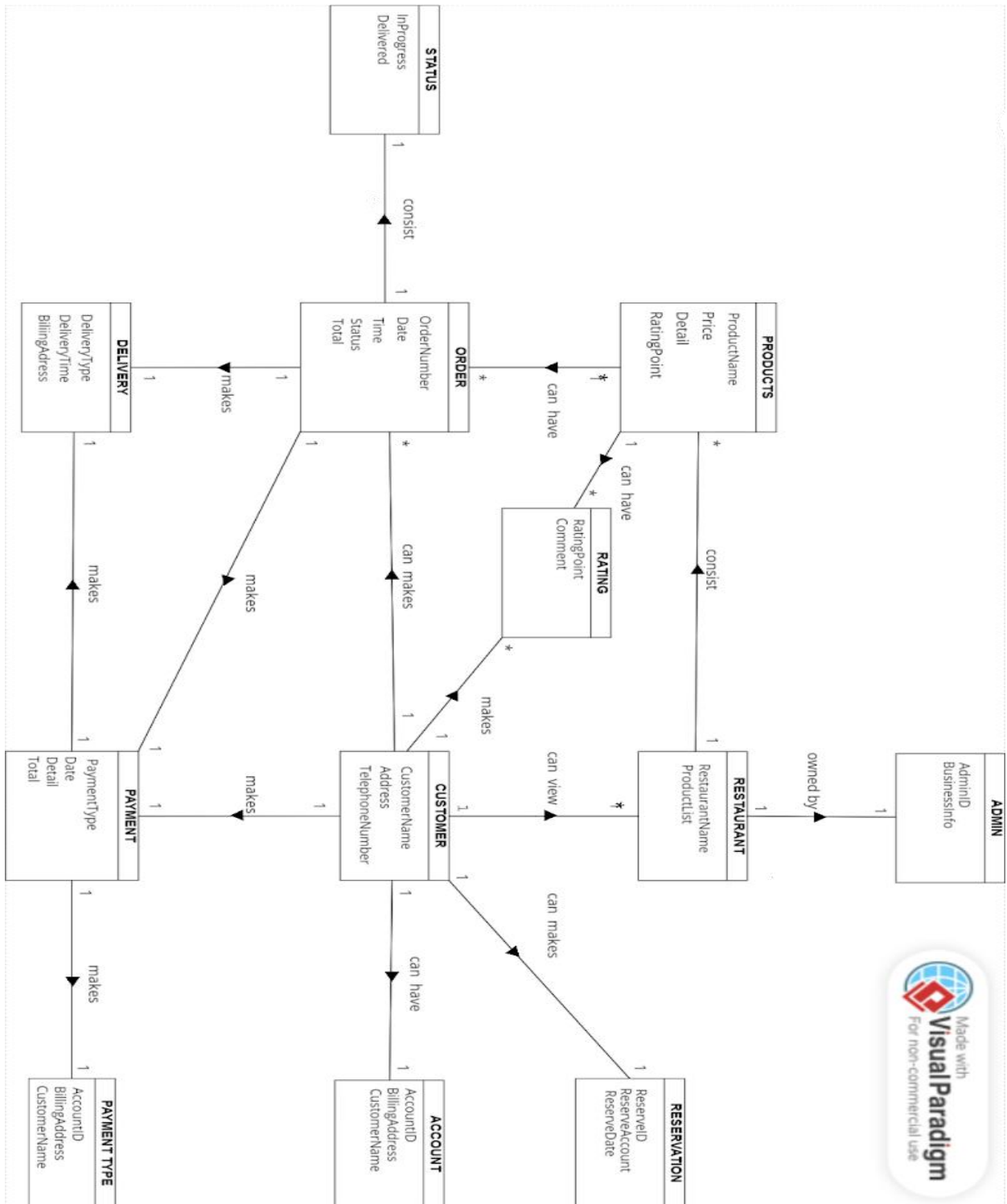
2.3 QUALITY REQUIREMENTS

The CafeOnTop software should prioritize reliability by ensuring consistent operation without frequent crashes or downtime, guaranteeing uninterrupted service for users. Performance should be optimized to provide fast response times, even during peak usage periods, ensuring efficient navigation through menus, orders, and reservations. Scalability is essential to accommodate increasing user numbers and transaction volumes while maintaining system performance. Usability is crucial, requiring an intuitive user interface that minimizes the need for extensive training. Accessibility standards must be met to ensure that users with disabilities can utilize the software effectively.

2.4 CONSTRAINTS

In crafting CafeOnTop, adherence to multiple constraints is imperative. These encompass technological limitations, encompassing compatibility with the existing hardware and software infrastructure within the café. Budgetary considerations also play a pivotal role, potentially restricting the breadth of features or customization options available. Time constraints loom over the development timeline, while regulatory compliance requirements, resource availability, and infrastructure limitations present additional hurdles. User preferences, security needs, and scalability concerns further shape the software's design and functionality, alongside considerations for localization and cultural nuances. Striking a delicate balance amidst these constraints is paramount to ensure the successful development, implementation, and sustained maintenance of the CafeOnTop software solution.

2.5 DOMAIN MODEL

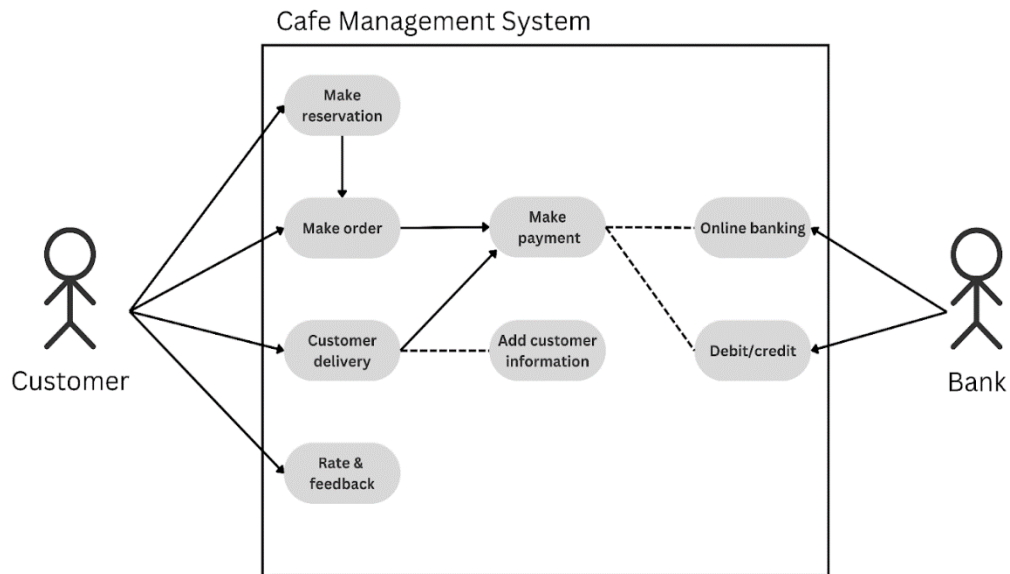


Domain Model Description:

1. One-to-Many (1:N) : One customer can view many restaurant
2. One-to-One (1:1) : One customer can makes one reservation
3. One-to-One (1:1) : One customer can have one account
4. One-to-One (1:1) : One customer can makes one payment
5. One-to-Many (1:N) : One customer can makes many orders
6. One-to-Many (1:N) : One customer can makes many ratings
7. One-to-One (1:1) : One restaurant owned by one admin
8. One-to-Many (1:N) : One restaurant consist many products
9. One-to-Many (1:N) : One product can have many ratings
10. Many-to-Many (N:N) : Many products can have many orders
11. One-to-One (1:1) : One order consist one status
12. One-to-One (1:1) : One order makes one delivery
13. One-to-One (1:1) : One order makes one payment
14. One-to-One (1:1) : One Payment makes one delivery
15. One-to-One (1:1) : One Payment consist one payment type

2.6 USE CASE

2.6.1 USE CASE DIAGRAM



Actor Action	System Response
User wants to schedule booking date, table, and number of pax	Reservation feature is use, booking date is store in the system
Make Order: Select Food and Beverages	Selected items details are sent to the system and received by the kitchen staff to prepare the foods.
Users select custom delivery	Restaurant rider will receive notification after delivery is confirmed
Users select payment method and pay	Payment is made, receipt is generated
Bank receives payment from user	The payment is confirmed
User can rate and give feedback after receiving or eating the food	Rate & Feedback features will pop up after receiving the food

2.6.2 USE CASE SPECIFICATIONS

ID:	UC001	
Title:	Ordering Food & Beverages	
Description:	The platform enables customers to easily order food and beverage online.	
Primary Actor:	Customer	
Precondition:	Customer should have a decent internet access	
Postcondition:	A customer successfully orders their gourmand.	
Main Success Scenario:	Actor	System
	<p>2. Customer enters name, contact number and password.</p> <p>4. Customers click the “Let’s Order” button.</p> <p>6. Customer can choose food & beverages listed on the page.</p> <p>7. Customer clicks the "Payment" button to fill the delivery information before make a payment.</p>	<p>1. The system prompts the customer to enter the name, contact number and password.</p> <p>If name, contact number and passwords is filled:</p> <p>3. System displays the main menu list.</p> <p>5. The system will prompt the order menu.</p>
Alternative Scenarios:	Actor	System

	<p>1. Customers do not fill in the name, contact number and passwords.</p> <p>3. Customer need to fill all related fields in login page to log in.</p>	<p>2. The system will prevent customers from logging in.</p>
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ID:	UC002	
Title:	Customer wants to reserve a table	
Description:	Reservations are for customers who are interested in booking a table to make it easier to consume food and beverages.	
Primary Actor:	Customer	
Precondition:	The customer wants to reserve a table by clicking the “Make a Reservation” button.	
Postcondition:	The customer successfully reserves a table of their choice.	
Main Success Scenario:	Actor	System
	<p>1. Customer click on “Make a Reservation”</p> <p>3. Customers fill out the form.</p> <p>4. Customers click on the “Make Reservation” button to execute the reservation.</p>	<p>2. The system provides a form that includes customer name, date, time, and table number to be filled by customers.</p>

ID:	UC003	
Title:	Customer wants delivery	
Description:	Delivery is for customers that want their ordered food or beverage to be sent to their homes.	
Primary Actor:	Customer	
Precondition:	Customers who do not feel like going out prefer to purchase food or beverages for delivery.	
Postcondition:	Customers get their order through delivery.	
Main Success Scenario:	Actor	System
	1. Customer click on “ 3. Customers enter their details in the form provided. 4. Customers click on the “Make Delivery” button.	2. The system provides the customer with options for entering the name, address, and telephone number as well as their order details.

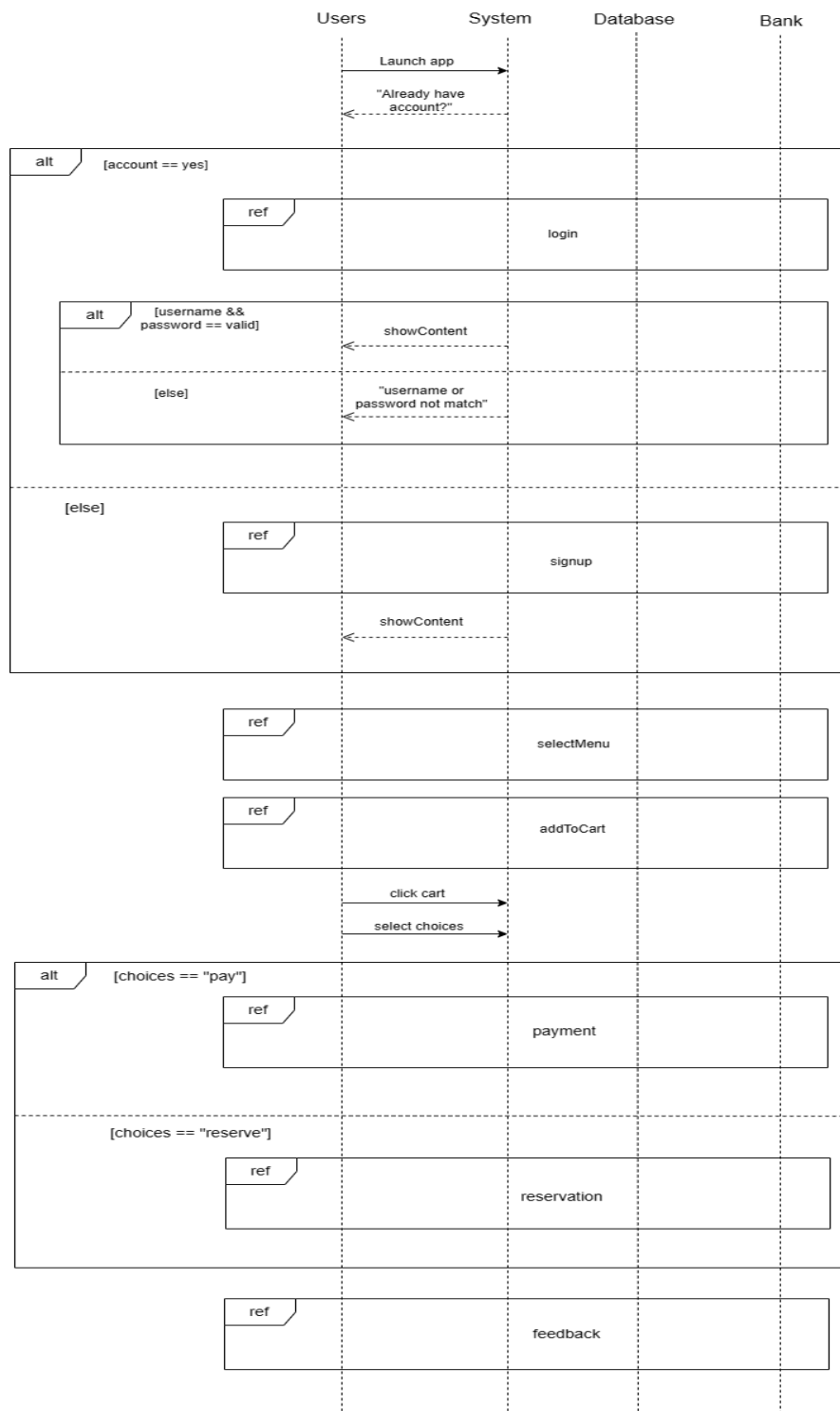
	6. Customers click the “Pay” button to purchase their order.	5. The system shows the order details for customers to recheck. 7. The system will direct the customer to the payment page.
Alternative Scenarios:	Actor	System

ID:	UC004	
Title:	Customer gives feedback	
Description:	Upon successful payment, customers can optionally give feedback to the restaurant by clicking on a dedicated “Share a feedback” button on the main menu page.	
Primary Actor:	Customer	
Precondition:		
Postcondition:	The customer successfully gives feedback on their experience through the platform.	
Main Success Scenario:	Actor	System
	1. Customer click on the "Share a feedback" 3. Customer enters their name, and provides an email address.	2. The system provides the customer with options for entering the name, email, star scale maximum at 5 and feedback form.

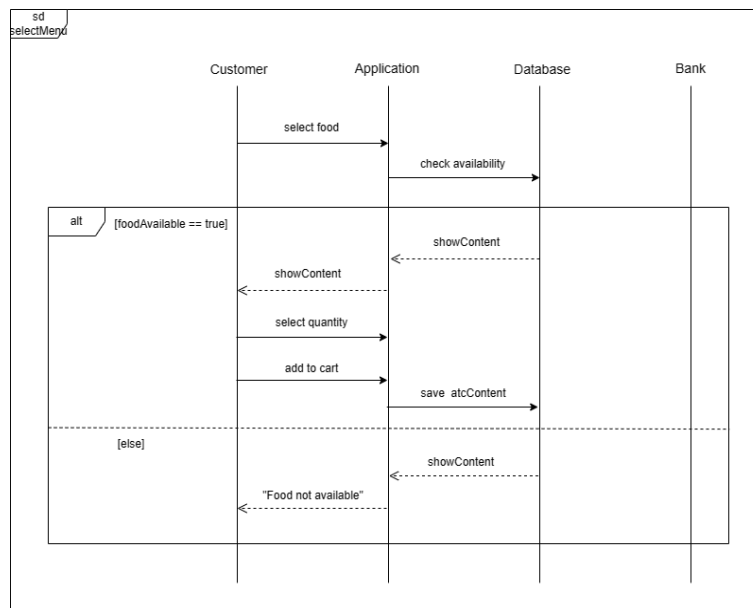
	<p>4. Customers give the feedback in the box given.</p> <p>5. Customers push the submit button when they finish giving feedback.</p>	<p>6.The system will display the message “Thank you for your feedback”.</p>
Alternative Scenarios:	Actor	System

2.6.3 SYSTEM SEQUENCE DIAGRAMS

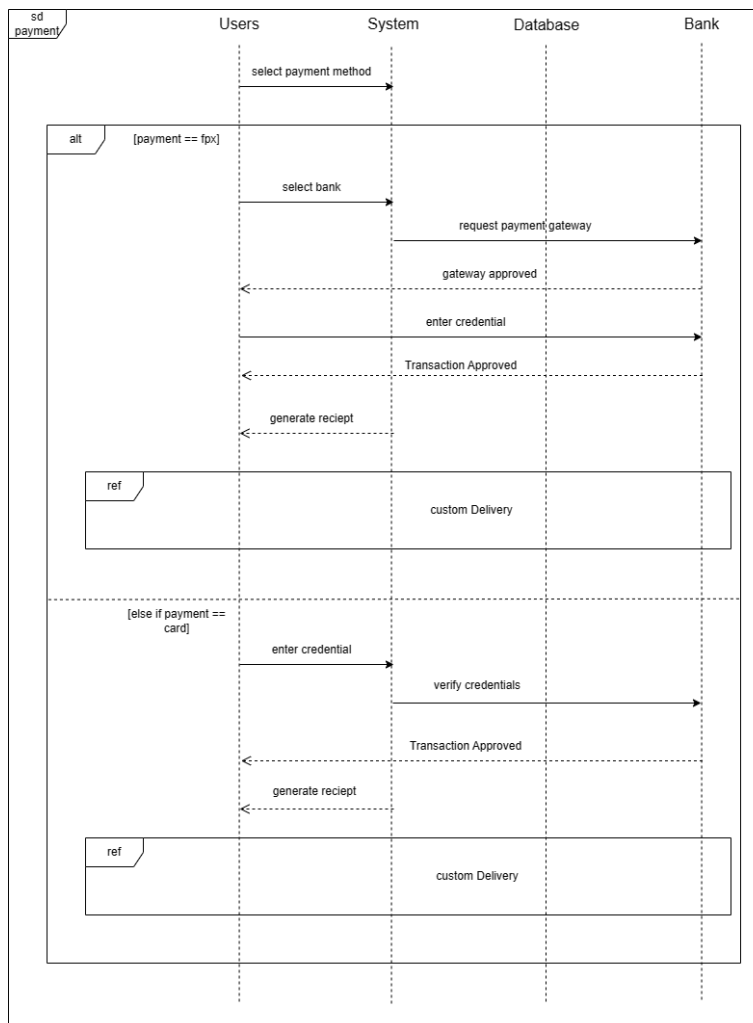
Cafe on Top



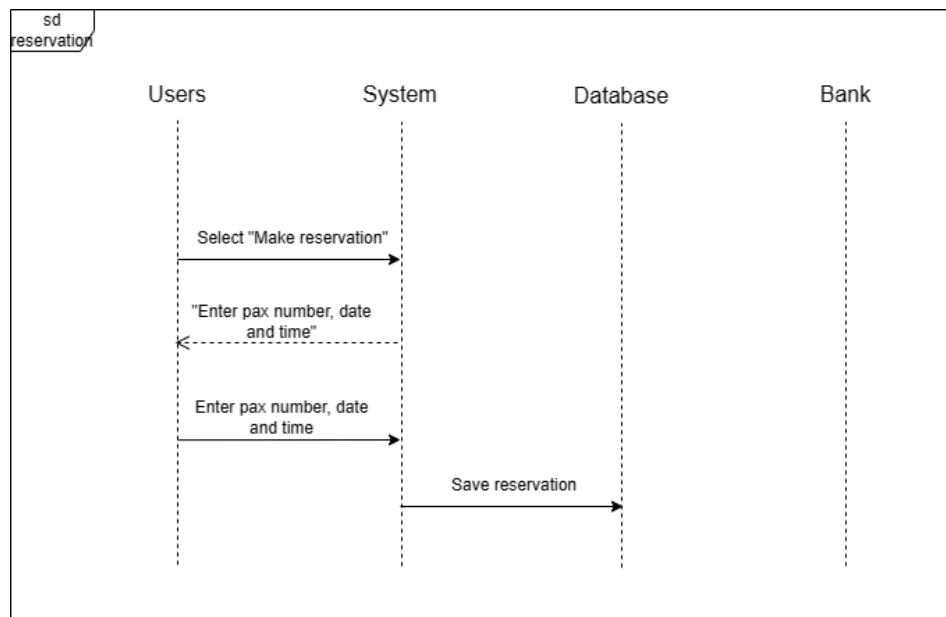
[UC001] Select Menu



[UC001] Payment

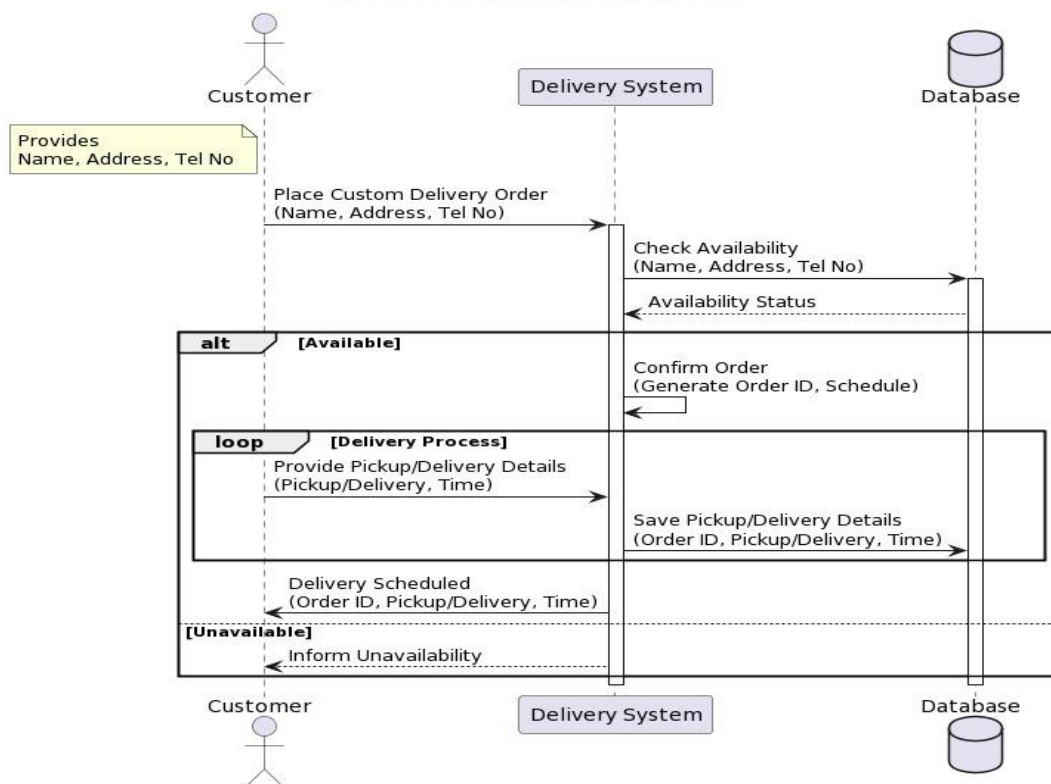


[UC002] Reservation System

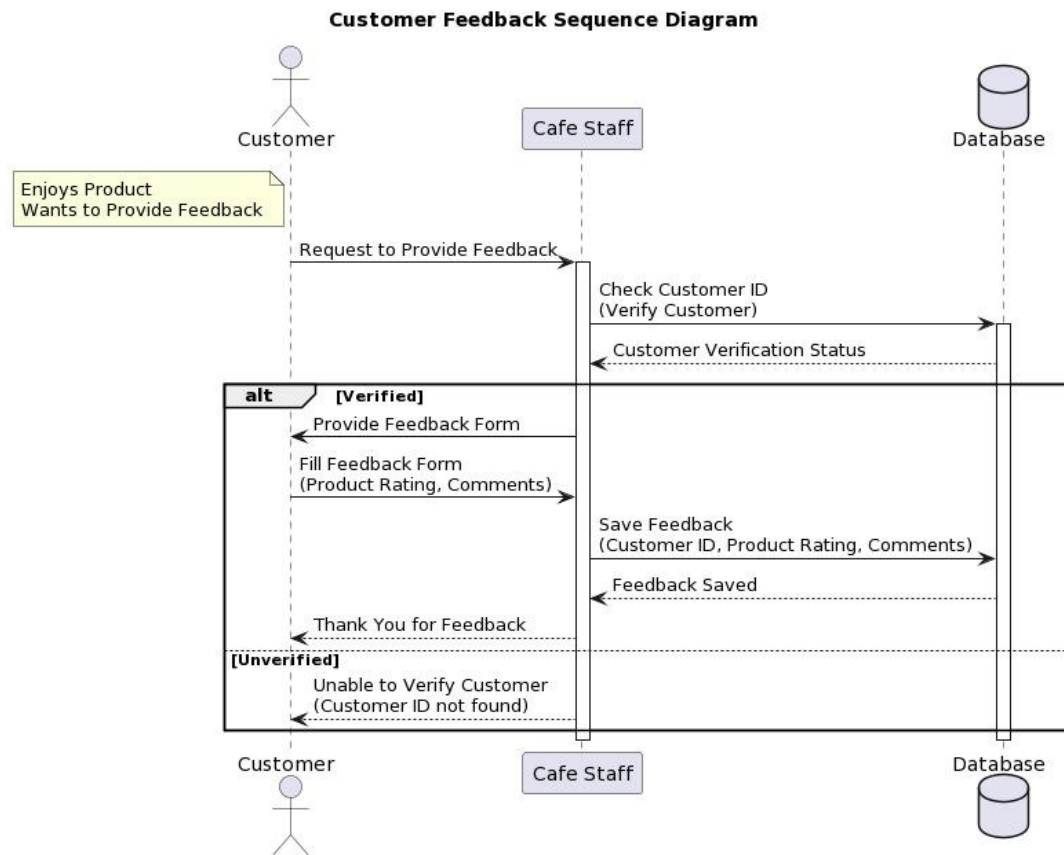


[UC003] Delivery

Custom Delivery Sequence Diagram



[UC004] Feedback



CHAPTER 3

DESIGN AND IMPLEMENTATION

3.1 INTRODUCTION

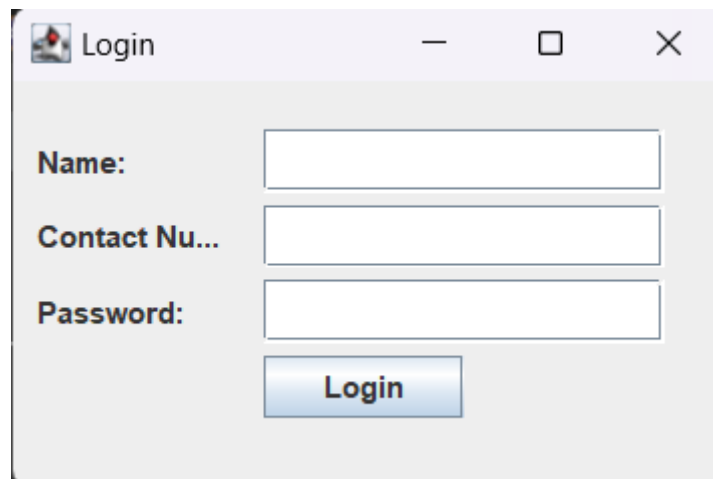
In transitioning from conceptualization to practical realization, CafeOnTop enters its design and implementation phase. This pivotal stage marks the transformation of ideas into functional applications tailored to address the needs outlined in preceding discussions. The design process encompasses a thorough examination of the system's architecture, user interfaces, and interactions, aiming to deliver an intuitive and efficient experience for both café customers and staff members. Subsequently, the implementation phase breathes life into the design by translating concepts into operational components through coding, programming, and technology integration.

At the core of CafeOnTop's design lies its capacity to streamline café operations, provide real-time information, and offer a range of payment options. The architectural framework is engineered to be scalable, reliable, and secure, while simultaneously meeting functional and quality standards. This chapter delves into essential components such as the user interface, reservation procedures, payment systems, and communication pathways. Each element undergoes thorough scrutiny to elucidate the decision-making process, technologies employed, and considerations taken to ensure the system's effectiveness and user satisfaction.

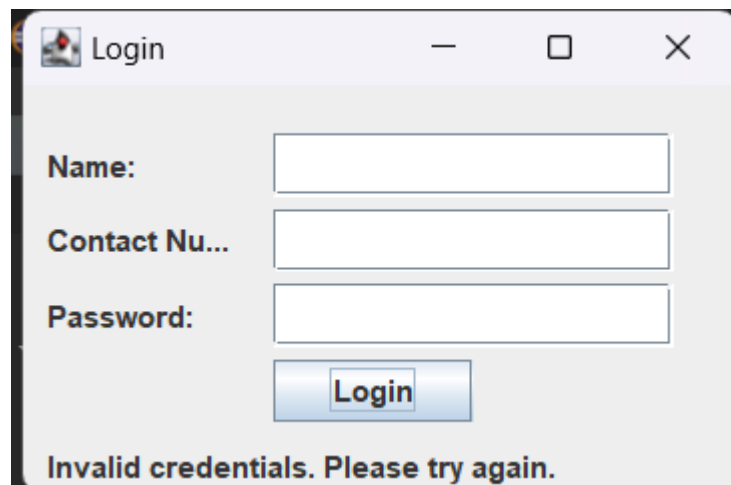
As we delve deeper into the technical aspects of CafeOnTop's design and implementation, the ambition to revolutionize the café management industry with innovative features and user-friendly interfaces becomes evident. This chapter serves as a comprehensive guide, offering insights into the methodology, design rationale, and strategic choices that underpin the system's functionality and seamless user experience.

3.2 CLASS DIAGRAM

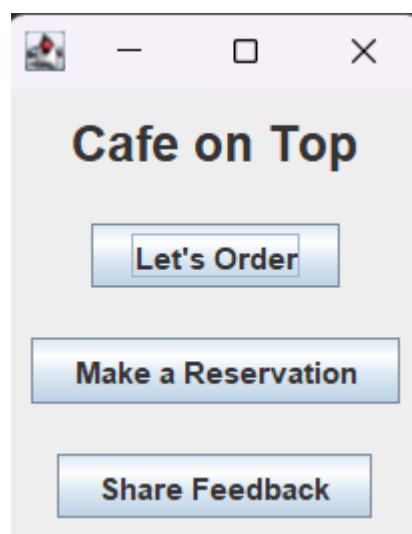
3.3 SAMPLE OUTPUT



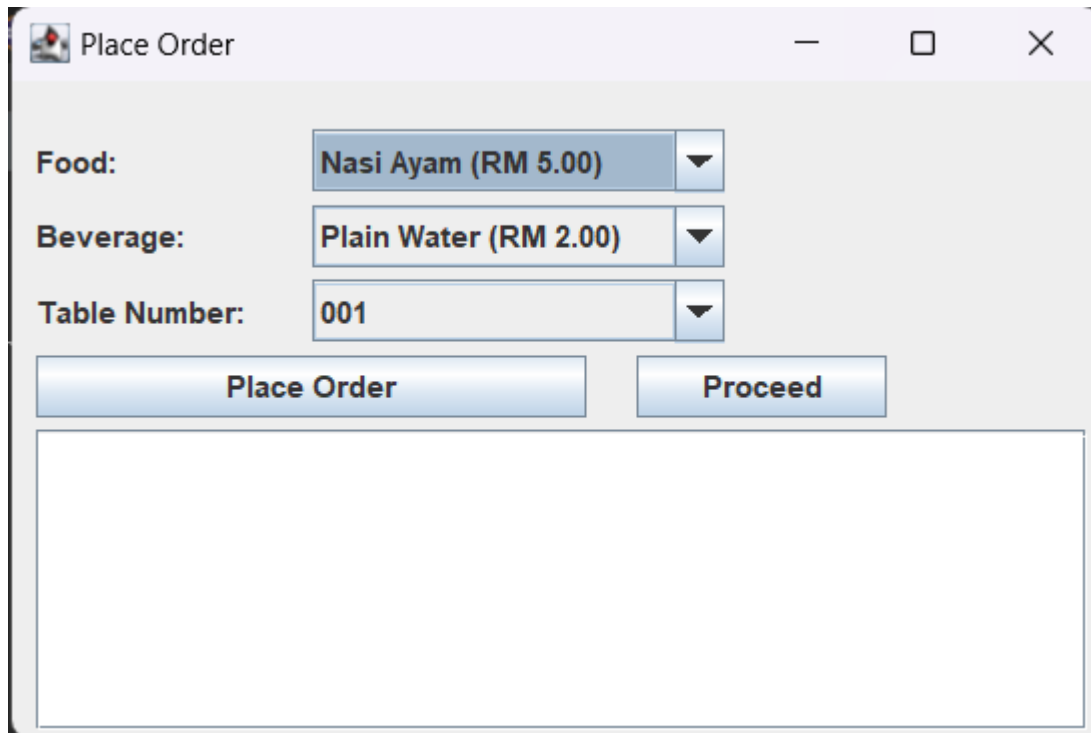
A screenshot of a Java Swing window titled "Login". The window has a standard title bar with a close button (X) and a maximize button (square). The main content area is light gray and contains three text input fields stacked vertically. The first field is labeled "Name:", the second "Contact Nu...", and the third "Password:". Below the fields is a blue button with the text "Login".



A screenshot of the same "Login" window, but with an error message displayed at the bottom: "Invalid credentials. Please try again." The input fields and the "Login" button are still visible above the message.



A screenshot of a Java Swing window titled "Cafe on Top". The window has a standard title bar with a close button (X) and a maximize button (square). The main content area is light gray and features the text "Cafe on Top" in a large, bold, black font. Below the text are three blue buttons stacked vertically: "Let's Order", "Make a Reservation", and "Share Feedback".



A screenshot of a Windows-style dialog box titled "Place Order". The dialog has a title bar with a small icon, the text "Place Order", and standard window controls (minimize, maximize, close). The main area contains three labels with corresponding dropdown menus: "Food:" with "Nasi Ayam (RM 5.00)", "Beverage:" with "Plain Water (RM 2.00)", and "Table Number:" with "001". Below these are two buttons: "Place Order" and "Proceed". At the bottom is a large, empty rectangular text area.

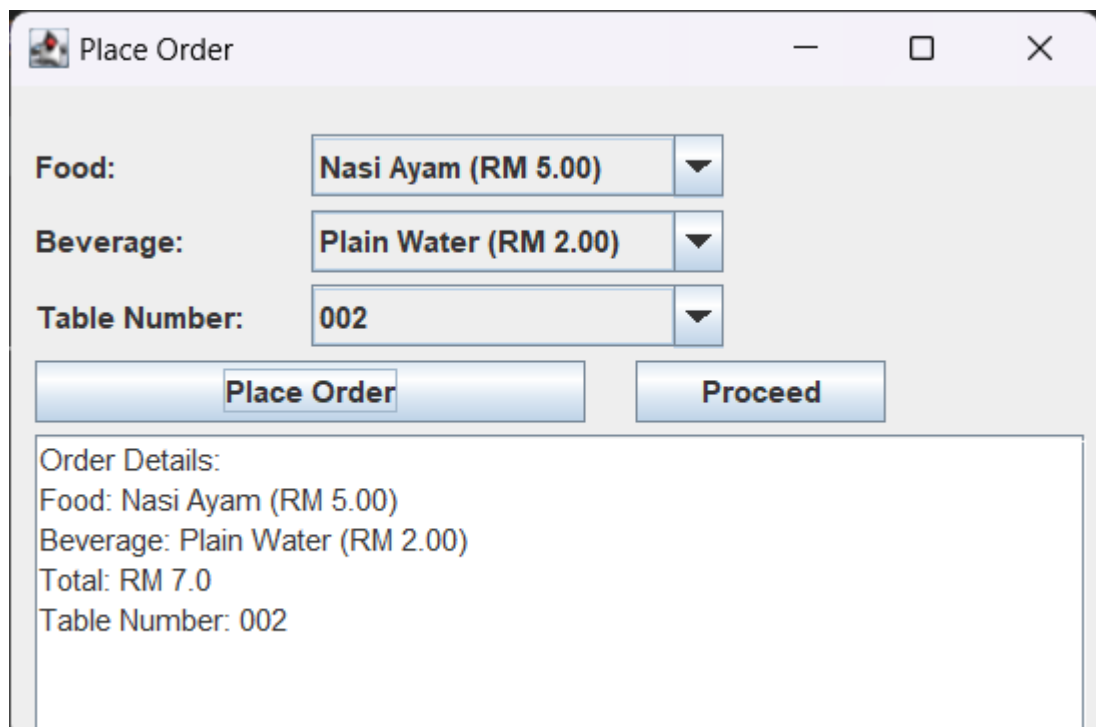
Place Order

Food: Nasi Ayam (RM 5.00) ▼

Beverage: Plain Water (RM 2.00) ▼

Table Number: 001 ▼

Place Order **Proceed**



A screenshot of a software window titled "Place Order". The window has a standard Windows-style title bar with a minimize button, a maximize button, and a close button. The main content area is divided into two sections. The top section contains three labels with corresponding dropdown menus: "Food:" with "Nasi Ayam (RM 5.00)", "Beverage:" with "Plain Water (RM 2.00)", and "Table Number:" with "002". Below these are two buttons: "Place Order" and "Proceed". The bottom section is a text area containing the following text: "Order Details:", "Food: Nasi Ayam (RM 5.00)", "Beverage: Plain Water (RM 2.00)", "Total: RM 7.0", and "Table Number: 002".

Place Order

Food: Nasi Ayam (RM 5.00)

Beverage: Plain Water (RM 2.00)

Table Number: 002

Place Order **Proceed**

Order Details:
Food: Nasi Ayam (RM 5.00)
Beverage: Plain Water (RM 2.00)
Total: RM 7.0
Table Number: 002

Delivery [Minimize] [Maximize] [Close]

Name:

Address:

Phone:

Food: Nasi Ayam (RM 5.00)

Beverage: Plain Water (RM 2.00)

Delivery Details:

Delivery [Minimize] [Maximize] [Close]

Name:

Address:

Phone:

Food: Nasi Ayam (RM 5.00)

Beverage: Plain Water (RM 2.00)

Delivery Details:

Delivery Details:
Name: Adam
Address: Kolej Ibrahim Yaakub
Phone Number: RM 0987654321
Food: Nasi Ayam (RM 5.00)
Beverage: Plain Water (RM 2.00)
Total: 7.0
Table Number: 002

Delivery

Name: Adam

Address: Kolej Ibrahim Yaakub

Phone: 0987654321

Food: Nasi Ayam (RM 5.00)

Beverage: Plain Water (RM 2.00)

Add **Confirm Delivery**

Delivery Message

Delivery
Name: A
Address:
Phone N
Food: Na
Beverage: Plain Water (RM 2.00)
Total: 7.0
Table Number: 002

Delivery confirmed for Table 002

OK

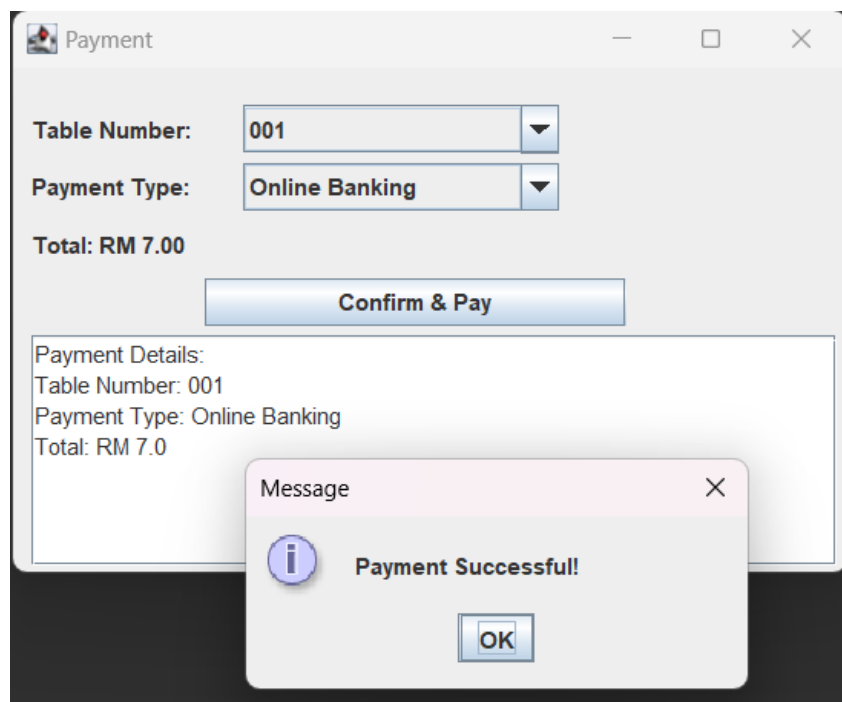
Payment

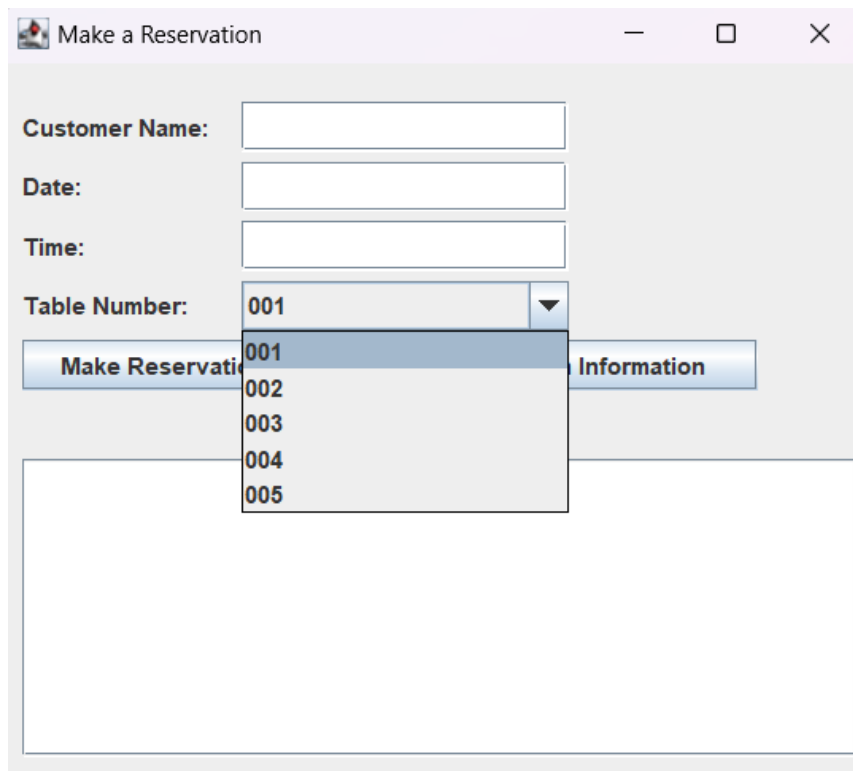
Table Number: 001

Payment Type: Card

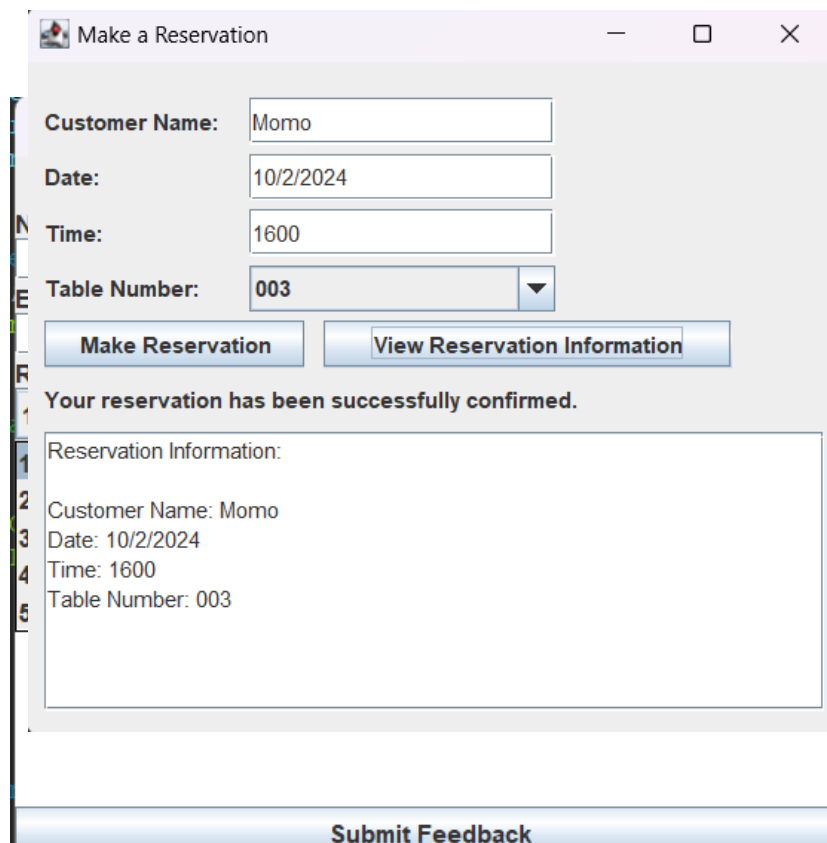
Total: RM 7.00

Card
Cash
Online Banking
QR





The screenshot shows a web form titled "Make a Reservation". It contains four input fields: "Customer Name:", "Date:", "Time:", and "Table Number:". The "Table Number:" dropdown menu is open, displaying a list of options: 001, 002, 003, 004, and 005. Below the input fields are two buttons: "Make Reservation" and "View Reservation Information".



The screenshot shows the "Make a Reservation" form after a successful reservation. The input fields are filled with the following data:

- Customer Name: Momo
- Date: 10/2/2024
- Time: 1600
- Table Number: 003

Below the input fields are two buttons: "Make Reservation" and "View Reservation Information". A confirmation message is displayed: "Your reservation has been successfully confirmed." Below this message is a section titled "Reservation Information:" which lists the reservation details:

- Customer Name: Momo
- Date: 10/2/2024
- Time: 1600
- Table Number: 003

At the bottom of the form is a button labeled "Submit Feedback".

Cafe on Top - Feedback System

Cafe on Top

Name:

Adam

Email:

a194333@ukm.sis.edu.my


Rating:

5

Please share your feedback:

The Nasi Lemak is GREATT!!!

Message



Thank you for your feedback, Adam!

OK

Submit Feedback

