



School of Computer Science and Engineering UNSW
COMP 3900 Information Technology Project
P75 Food Delivery Mobile Application
Project Proposal

Team: 3900-W16A-Banana

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1. Background

1.1. Problem Domain

With the growing demand for on-demand food delivery, restaurants are seeking efficient solutions to connect with customers and manage orders seamlessly. Many current food delivery platforms face challenges such as inefficient order management, poor communication between customers, restaurants, and delivery drivers.

To address these issues, this project proposes a food delivery mobile application that provides a seamless and user-friendly experience for all participants. We will present our solutions to improve order efficiency, enhance communication, and optimize the delivery process, ensuring a smooth and reliable service for both businesses and customers.

In addition, we integrate the ChatGPT API. We encourage restaurant managers to build their own chatbots for automated customer interaction during ordering and menu recommendations. Furthermore, customers can also use the chatbots to get quick responses to common queries, such as order status and payment inquiries.

1.2. Existing Related Works

Here we compare our proposed solution with the Uber Eats and Menulog, both are leading food delivery applications in the industry.

Uber Eats offers a full-service food delivery platform. And it is one of the first few platforms that start this industry. It has many strengths. For example, the real-time order tracking allows customers to track their orders while waiting. This ensures that the customer is aware of the estimated delivery time. Our system will integrate a similar tracking feature using Google Maps API to improve delivery transparency. The second strength is that the platform has a fantastic UI, making it easy for customers to navigate, browse, and place orders. We will follow a clean and responsive UI design using ReactJS. And lastly, Uber Eats can efficiently handle large-scale transactions and API requests, making no processing delays during peak time. Our backend will use Flask-RESTx and adopt a modular API structure to ensure scalability and efficient request handling.

However, Uber Eats does not catch up with the AI trend. The platform contains limited AI assistance. It relies primarily on static FAQ pages and human-based customer support. In contrast, our system will attempt to integrate a ChatGPT-powered chatbot that can provide automated human-like responses to common customer inquiries. And also, we will

encourage restaurant managers to use our pipelines provided to build automated restaurant chatbots that can assist customers with menu inquiries, food recommendations, etc.

Menulog is another widely used food delivery platform. Unlike Uber Eats, Menulog offers flexibility to restaurants, allowing them to choose either the Menulog drivers or restaurant-hired drivers to carry out the delivery. However, one major limitation of Menulog is that it does not fully support real-time order tracking, especially when the delivery is carried out via the restaurant's own drivers. That leads to uncertainty about the delivery process and estimated arrival times.

Our platform aims to solve this issue by ensuring that all drivers are integrated into a unified real-time tracking system. We will improve the driver sign-up and onboarding process to make it easier for all delivery personnel to register and access our tracking system. That prompts a consistent and transparent delivery experience for all customers.

2. User Stories and Sprints

2.1. User Stories

There are four groups of users in the project. They are the customers, restaurant managers, delivery drivers, and administrators. The following lists the user stories related to each member of the project. In addition, the platform will include the restaurant chatbot and system chatbot to enhance customer experience and streamline common operations.

2.1.1 Customers

- US1. As a customer, I want to sign up and login to the application securely so that I can access my account.
- US2. As a customer, I want to update my profile information so that my contact details and preferences stay up to date.
- US3. As a customer, I want to browse restaurants menus so that I can add food to my shopping cart.
- US4. As a customer, I want to search and filter food items so that I can quickly find the food.
- US5. As a customer, I want to add food items into my cart and remove items from the cart so that I can check out later.
- US6. As a customer, I want to check out my cart and make the payment so that I can receive my order.

- US7. As a customer, I want to track my order status in real-time so that I know when to expect my delivery.
- US8. As a customer, I want to cancel an order within the allowed time so that I can make changes.
- US9. As a customer, I want to have in-app messaging order-related queries to the restaurants and the drivers.
- US10. As a customer, I want to receive invoices and access my transaction history so that I can keep track of my expenses.
- US11. As a customer, I want to rate and review restaurants and drivers so that I can share my experiences.
- US12. As a customer, I want to view aggregated ratings and feedback of the restaurants so that I can choose the restaurants wisely.
- US13. As a customer, I want to add restaurants to my favorites so that I can easily access and re-order in the future.

2.1.2 Restaurant Managers

- US14. As a restaurant manager, I want to register our restaurant account and upload documents on the application so that customers can find my business.
- US15. As a restaurant manager, I want to manage my restaurant profile so that people can view the latest profile.
- US16. As a restaurant manager, I want to upload and update the menus in real-time so that customers can always access the latest information.
- US17. As a restaurant manager, I want to receive and manage orders so that all orders are finalized on time.
- US18. As a restaurant manager, I want to update order statuses so that customers and drivers know the progress of their orders.
- US19. As a restaurant manager, I want to monitor the order volume so that I can manage the demand efficiently and effectively.
- US20. As a restaurant manager, I want to create and manage special offers and promotions so that I can attract more customers.
- US21. As a restaurant manager, I want to add comments to the customer reviews so that I can improve customer satisfaction.

2.1.3 Delivery Drivers

- US22. As a delivery driver, I want to register my account and upload my ID documents so that I can work as a delivery driver.
- US23. As a delivery driver, I want to upload my vehicle details so that the application can match me with suitable orders.
- US24. As a delivery driver, I want to view the available orders so that I can choose the ones that match my availability and location.
- US25. As a delivery driver, I want to accept suitable orders so that I can complete the delivery on time.
- US26. As a delivery driver, I want to update the order status so that customers and restaurants can view real-time progress.
- US27. As a delivery driver, I want to access the GPS navigation system with the best route so that I can finish the delivery on time.
- US28. As a delivery driver, I want to monitor earnings so that I know how much I earn.
- US29. As a delivery driver, I want to view customer ratings and feedback so that I can improve my service.

2.1.4 Administrators

- US30. As an administrator, I want to oversee customers, restaurants, and driver accounts so that I can ensure a well-regulated platform.
- US31. As an administrator, I want to approve new restaurants and drivers' accounts so that I can ensure a well-regulated platform.
- US32. As an administrator, I want to monitor daily sales so that I can track the business.
- US33. As an administrator, I want to monitor and analyze performance metrics of orders, restaurants, and drivers, so that I can improve the service.
- US34. As an administrator, I want to set and adjust pricing models based on the sales so that restaurants and drivers can enjoy competitive pricing.
- US35. As an administrator, I want to create and manage platform-wide promotional campaigns so that I can attract more users.

2.1.5 Chatbots

- US36. As a restaurant manager, I want to set up a chatbot for my restaurant so that it can introduce my menu and assist customers with placing orders.
- US37. As a customer, I want to talk with a system chatbot so that I can get quick help with order status, payments, and common account-related issues.

2.2. Jira Screenshots of User Stories

<input type="checkbox"/>	▼ W16ABANA 冲刺 1 8 Mar – 18 Mar (10 issues)	0 10 0 Complete sprint ...
Setup the GitHub repository and CI/CD pipeline. Create database scheme and import some default data. Implement user authentication including sign-up, login, and logout. Implement driver ID verification and restaurant verification processes. Implement profile management. Im...		
<input checked="" type="checkbox"/>	W16ABANANA-1 As a customer, I want to sign up and login to the application securely so that I can access my account.	IN PROGRESS WY
<input type="checkbox"/>	<input checked="" type="checkbox"/> W16ABANANA-2 As a customer, I want to update my profile information so that my contact details and preferences stay up to date.	IN PROGRESS NS
<input checked="" type="checkbox"/>	W16ABANANA-3 As a customer, I want to browse restaurants menus so that I can add food to my shopping cart.	IN PROGRESS TD
<input checked="" type="checkbox"/>	W16ABANANA-4 As a customer, I want to search and filter food items so that I can quickly find the food.	IN PROGRESS XC
<input checked="" type="checkbox"/>	W16ABANANA-5 As a customer, I want to add food items into my cart and remove items from the cart so that I can check out later.	IN PROGRESS QZ
<input checked="" type="checkbox"/>	W16ABANANA-14 As a restaurant manager, I want to register our restaurant account and upload documents on the application so that customers can find my bu...	IN PROGRESS SY
<input checked="" type="checkbox"/>	W16ABANANA-15 As a restaurant manager, I want to manage my restaurant profile so that people can view the latest profile.	IN PROGRESS WY
<input checked="" type="checkbox"/>	W16ABANANA-16 As a restaurant manager, I want to upload and update the menus in real-time so that customers can always access the latest information.	IN PROGRESS NS
<input checked="" type="checkbox"/>	W16ABANANA-22 As a delivery driver, I want to register my account and upload my ID documents so that I can work as a delivery driver.	IN PROGRESS TD
<input checked="" type="checkbox"/>	W16ABANANA-23 As a delivery driver, I want to upload my vehicle details so that the application can match me with suitable orders.	IN PROGRESS XC
+ Create issue		

Figure 1 Jira screenshot of sprint 1.

<input type="checkbox"/>	▼ W16ABANA 冲刺 2 18 Mar – 8 Apr (13 issues)	13 0 0 Start sprint ...
Implement order tracking system. Implement payment system. Implement GPS navigation and route calculation for drivers. Implement in-app messaging. Develop chatbot. Conduct unit tests.		
<input checked="" type="checkbox"/>	W16ABANANA-6 As a customer, I want to check out my cart and make the payment so that I can receive my order.	TO DO QZ
<input checked="" type="checkbox"/>	W16ABANANA-7 As a customer, I want to track my order status in real-time so that I know when to expect my delivery.	TO DO SY
<input type="checkbox"/>	<input checked="" type="checkbox"/> W16ABANANA-8 As a customer, I want to cancel an order within the allowed time so that I can make changes.	TO DO WY
<input checked="" type="checkbox"/>	W16ABANANA-9 As a customer, I want to have in-app messaging order-related queries to the restaurants and the drivers.	TO DO KS
<input checked="" type="checkbox"/>	W16ABANANA-10 As a customer, I want to receive invoices and access my transaction history so that I can keep track of my expenses.	TO DO TD
<input checked="" type="checkbox"/>	W16ABANANA-11 As a customer, I want to rate and review restaurants and drivers so that I can share my experiences.	TO DO XC
<input checked="" type="checkbox"/>	W16ABANANA-12 As a customer, I want to view aggregated ratings and feedback of the restaurants so that I can choose the restaurants wisely.	TO DO QZ
<input checked="" type="checkbox"/>	W16ABANANA-13 As a customer, I want to add restaurants to my favorites so that I can easily access and re-order in the future.	TO DO SY
<input checked="" type="checkbox"/>	W16ABANANA-17 As a restaurant manager, I want to receive and manage orders so that all orders are finalized on time.	TO DO WY
<input checked="" type="checkbox"/>	W16ABANANA-18 As a restaurant manager, I want to update order statuses so that customers and drivers know the progress of their orders.	TO DO KS
<input checked="" type="checkbox"/>	W16ABANANA-19 As a restaurant manager, I want to monitor the order volume so that I can manage the demand efficiently and effectively.	TO DO TD
<input checked="" type="checkbox"/>	W16ABANANA-20 As a restaurant manager, I want to create and manage special offers and promotions so that I can attract more customers.	TO DO XC
<input checked="" type="checkbox"/>	W16ABANANA-21 As a restaurant manager, I want to add comments to the customer reviews so that I can improve customer satisfaction.	TO DO QZ

Figure 2 Jira screenshot of sprint 2.

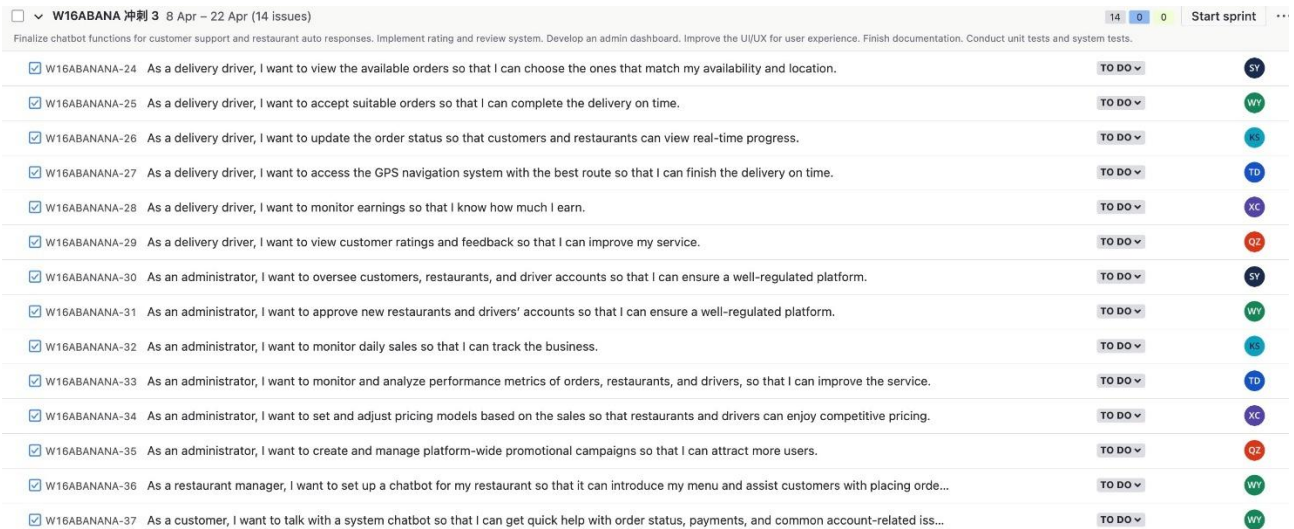


Figure 3 Jira screenshot of sprint 3.

2.3. Sprints

2.3.1 Sprint 1

Duration	Week 3 lab to Week 5 lab 04/03/2025 – 18/03/2025
Milestone	<ul style="list-style-type: none"> Setup the GitHub repository and CI/CD pipeline. Create database scheme and import some default data. Implement user authentication including sign-up, login, and logout. Implement driver ID verification and restaurant verification processes. Implement profile management. Implement menu viewing and food ordering process. Conduct unit tests.
Output	Demo A (18/03/2025) Retrospective report A (23/03/2025)

2.3.2 Sprint 2

Duration	Week 5 lab to Week 8 lab 18/03/2025 – 08/04/2025
Milestone	<ul style="list-style-type: none">• Implement order tracking system.• Implement payment system.• Implement GPS navigation and route calculation for drivers.• Implement in-app messaging.• Develop chatbot.• Conduct unit tests.
Output	Demo B (08/04/2025) Retrospective report B (13/04/2025)

2.3.3 Sprint 3

Duration	Week 8 lab to Week 10 lab 08/04/2025 – 22/04/2025
Milestone	<ul style="list-style-type: none">• Finalize chatbot functions for customer support and restaurant auto responses.• Implement rating and review system.• Develop an admin dashboard.• Improve the UI/UX for user experience.• Finish documentation.• Conduct unit tests and system tests.
Output	Final presentation (22/04/2025) Final project report submission (27/04/2025) Code and documents submission (27/04/2025)

2.4. User Stories in Scope for the Sprint 1

User Story	US1. As a customer, I want to sign up and login to the application securely so that I can access my account.
Priority	High
Estimated Implementation Time	6 hours
Acceptance Criteria	<ol style="list-style-type: none">1. Customers must be able to sign up with a valid email address, mobile phone number, and password.2. Customers must be able to log in using either the email or mobile number, along with their password.3. Customers must be able to log out of the platform from their devices.4. All passwords must be securely stored using salting and hashing to protect from data breaches.5. The data transmission between the frontend and backend must be secured to prevent unauthorized access.
Assigned Members	Wen Yi, Xianyu Cai

User Story	US2. As a customer, I want to update my profile information so that my contact details and preferences stay up to date.
Priority	High
Estimated Implementation Time	6 hours
Acceptance Criteria	<ol style="list-style-type: none">1. Customers must be able to update their profile information, including name, email, mobile phone number, and delivery address.2. Customers must be able to update their password.3. The platform must validate all input fields before saving.
Assigned Members	Wen Yi, Xianyu Cai

User Story	US3. As a customer, I want to browse restaurants menus so that I can add food to my shopping cart.
Priority	Medium
Estimated Implementation Time	12 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Customers must be able to view a list of available restaurants, including their name, logo, address, contact number, and ratings. 2. Customers must be able to view the restaurants' menus, including images, descriptions, ingredients, and prices. 3. The restaurant profile with the full menu should be loaded within 2 seconds to increase the user experience.
Assigned Members	Kwok Yu Siu, Qiyao Zhou

User Story	US4. As a customer, I want to search and filter food items so that I can quickly find the food.
Priority	Medium
Estimated Implementation Time	8 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Searching function includes keyword searching, location searching, and restaurant category searching. 2. Filtering function includes filtering on rating and price range. 3. The search results should be rendered within 2 seconds. 4. The searching and filtering must be intuitive and easy to use.
Assigned Members	Kwok Yu Siu, Qiyao Zhou

User Story	US5. As a customer, I want to add food items into my cart and remove items from the cart so that I can check out later.
Priority	Medium
Estimated Implementation Time	8 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Customers must be able to add food items from a menu to the shopping cart. 2. Customers must be able to remove items from the shopping cart. 3. The cart must persist the selected items and display the total amounts in real-time during modification.
Assigned Members	Tong Ding, Seokho Yang

User Story	US14. As a restaurant manager, I want to register our restaurant account and upload documents on the application so that customers can find my business.
Priority	High
Estimated Implementation Time	10 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Managers must be able to register their restaurant account on the platform. 2. Managers must upload required business documents, including ABN (Australian Business Number) and Food Business License for verification. 3. The administrator receives notification for new business registration on the platform. 4. The administrator must be able to view submitted documents and approve the new account registration. 5. The documents should be securely stored on the backend server.
Assigned Members	Tong Ding, Seokho Yang

User Story	US15. As a restaurant manager, I want to manage my restaurant profile so that people can view the latest profile.
Priority	12 hours
Estimated Implementation Time	High
Acceptance Criteria	<ol style="list-style-type: none"> 1. Managers must be able to update the restaurant details, including name, description, opening hours, contact information, and address. 2. Managers must be able to upload and change branding elements including logo and images. 3. All changes are validated before submission and the changes must be reflected on the platform in real-time for browsing.
Assigned Members	Wen Yi, Xianyu Cai

User Story	US16. As a restaurant manager, I want to upload and update the menus in real-time so that customers can always access the latest information.
Priority	Medium
Estimated Implementation Time	10 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Managers must be able to upload and update menu items, including item name, description, ingredients, price, and availability. 2. Managers must be able to add images to items. 3. Managers can remove items at any time. 4. Any updates on the menu must be saved and reflected on the platform in real-time.
Assigned Members	Wen Yi, Xianyu Cai

User Story	US22. As a delivery driver, I want to register my account and upload my ID documents so that I can work as a delivery driver.
Priority	High
Estimated Implementation Time	6 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Drivers must be able to register an account by providing a name, email, mobile phone number, and password. 2. Drivers must be able to upload ID documents including driver license and health check documents. 3. The system must validate the uploaded documents and notify for successful submission. 4. The administrator must be able to receive an in-app notification for the new driver sign up. And the administrator must be able to review these documents and approve the new account.
Assigned Members	Kwok Yu Siu, Qiyao Zhou

User Story	US23. As a delivery driver, I want to upload my vehicle details so that the application can match me with suitable orders.
Priority	High
Estimated Implementation Time	6 hours
Acceptance Criteria	<ol style="list-style-type: none"> 1. Drivers must be able to provide vehicle details, including vehicle plate number, car registration documents, and car insurance documents. 2. The administrator must be able to receive an in-app notification for the document submission. And the administrator must be able to review these documents and approve the car details. 3. The documents must be stored securely on the backend server.
Assigned Members	Kwok Yu Siu, Qiyao Zhou

3. Technical Design

3.1. System Architecture Diagram

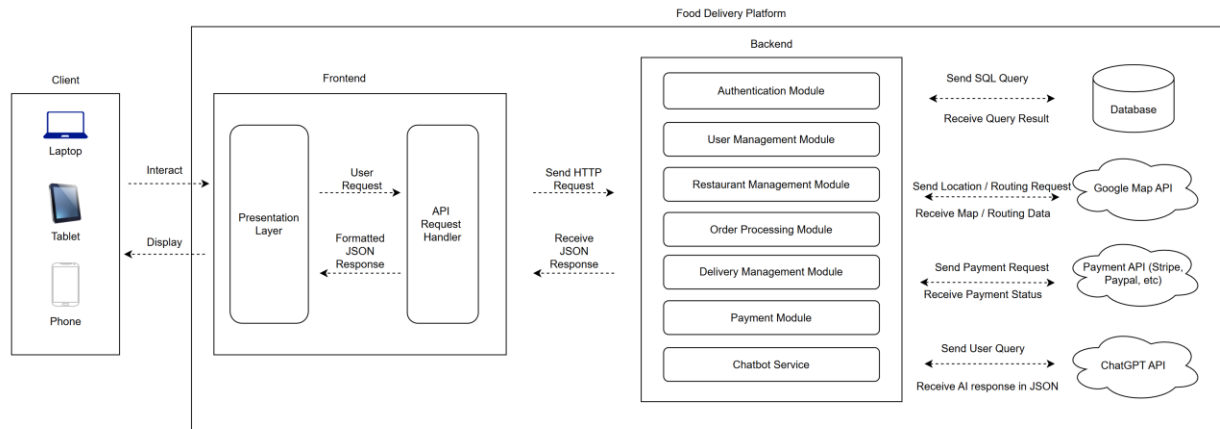


Figure 4 System Architecture Diagram

The solution proposed in our project is built using a React Native frontend, a Python Flask-RESTx backend, and a PostgreSQL database for storage. We also use several third-party APIs for specific functionalities. The platform is designed to be a modern, scalable, and efficient solution for a food delivery application, following a client-server architecture.

The frontend serves as the user interface for customers, restaurant managers, delivery drivers, and administrators. Since the application will primarily be used on mobile devices, we have chosen React Native to build a cross-platform mobile app that works seamlessly on both iOS and Android. This ensures a consistent user experience across devices, reducing development effort while maintaining high performance. The main project client requirement is to focus on developing a mobile app. However, we will also explore responsive web page design, ensuring that while the mobile app is the primary focus, the web version is optimized for tablets and laptops. This will allow delivery drivers and customers to use the mobile app efficiently, while restaurant managers and administrators can comfortably manage operations on a larger screen. The frontend handles API requests, sending structured data to the backend and receiving responses in JSON format to update the interface dynamically.

The backend is built using the Python Flask-RESTx framework, following a modular architecture for better maintainability. The backend is divided into different modules handling authentication, user management, order processing, delivery management, payment processing, and chatbot services. The backend enforces robust security

measures, including JWT (JSON Web Token)-based authentication, encrypted data transmission, and secure password hashing to protect user information.

The PostgreSQL database is used as the primary storage solution, chosen for its scalability, reliability, and support for concurrent transactions. Unlike SQLite, PostgreSQL is better suited for handling large-scale applications with complex queries and high data throughput. However, we will also explore alternatives using Firebase, a cloud-based NoSQL solution that offers real-time data synchronization, automatic scaling, and built-in authentication. Firebase can be useful for reducing backend management overhead, improving real-time interactions between customers, restaurants, and delivery drivers.

To accomplish specific tasks, we integrate several third-party APIs:

- Google Maps API: Enables real-time location tracking, route optimization, map display, and navigation for delivery drivers and customers.
- Payment APIs (Stripe, PayPal, etc.): Ensure secure and efficient online transactions for order payments.
- ChatGPT API: Powers an AI-driven chatbot, assisting customers with menu recommendations, order status updates, and answering common queries without human intervention.

Additionally, at the end of Sprint 3, we will explore hosting the backend on the cloud, such as AWS, Google Cloud, or Azure. Cloud deployment offers several advantages, including improved scalability, better performance, automated backups, enhanced security, and global availability. Hosting on a cloud provider will ensure that our backend can handle increased traffic, minimize downtime, and provide a seamless user experience as the platform grows.

3.2. Interface Storyboarding

We have designed some pages using Figma and they are shown below.

3.2.1 Customer

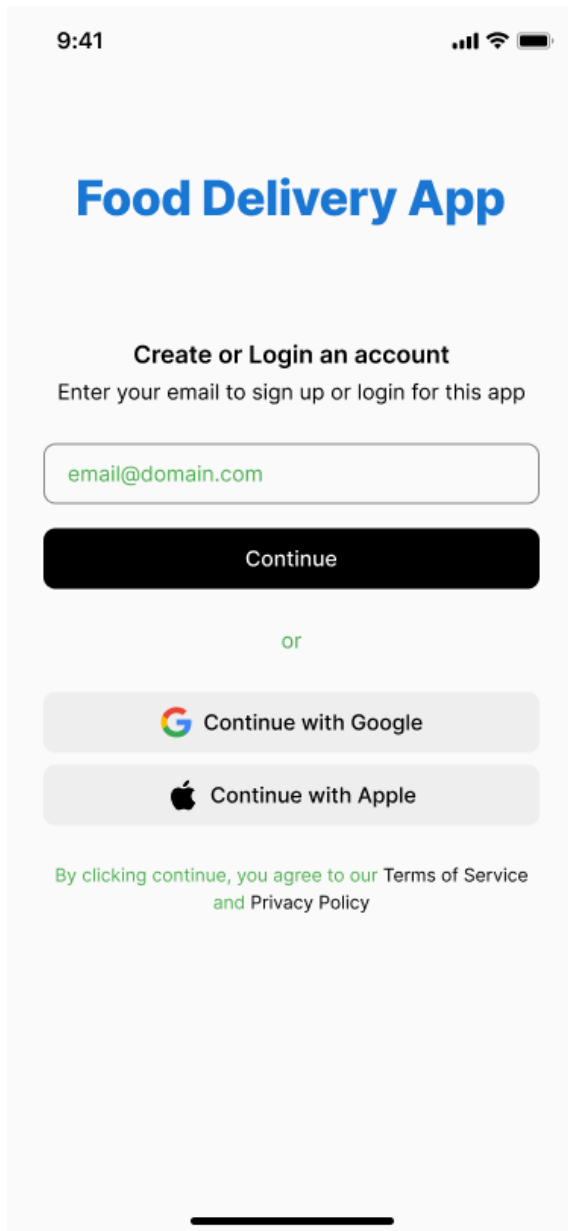


Figure 5 Customer sign up page.

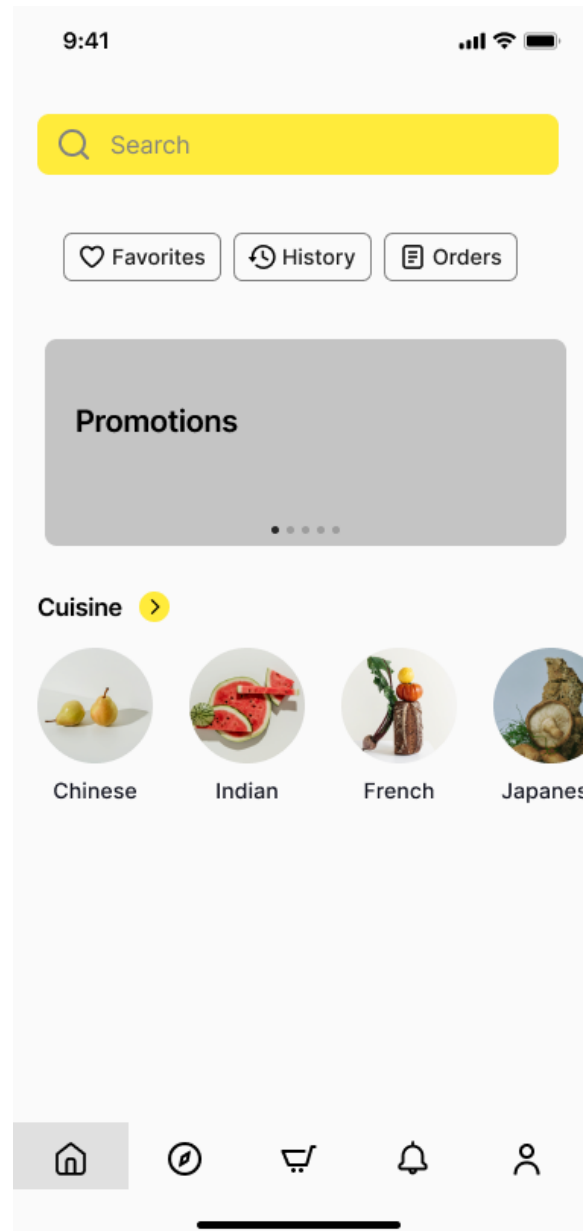


Figure 6 Customer main page.

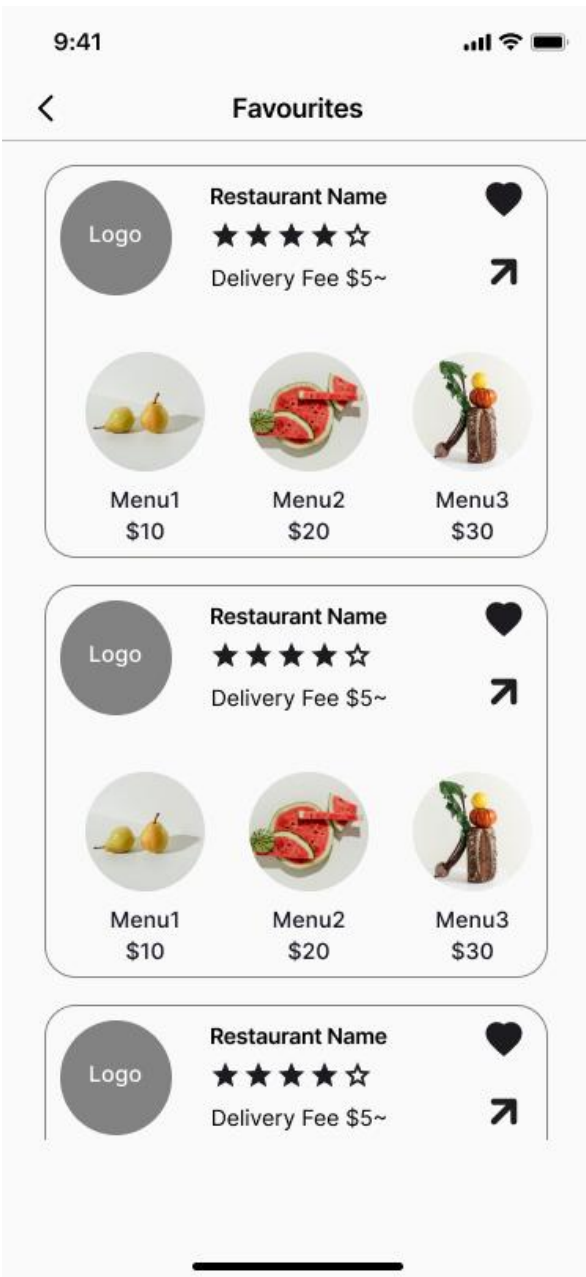


Figure 7 Customer favourites page.

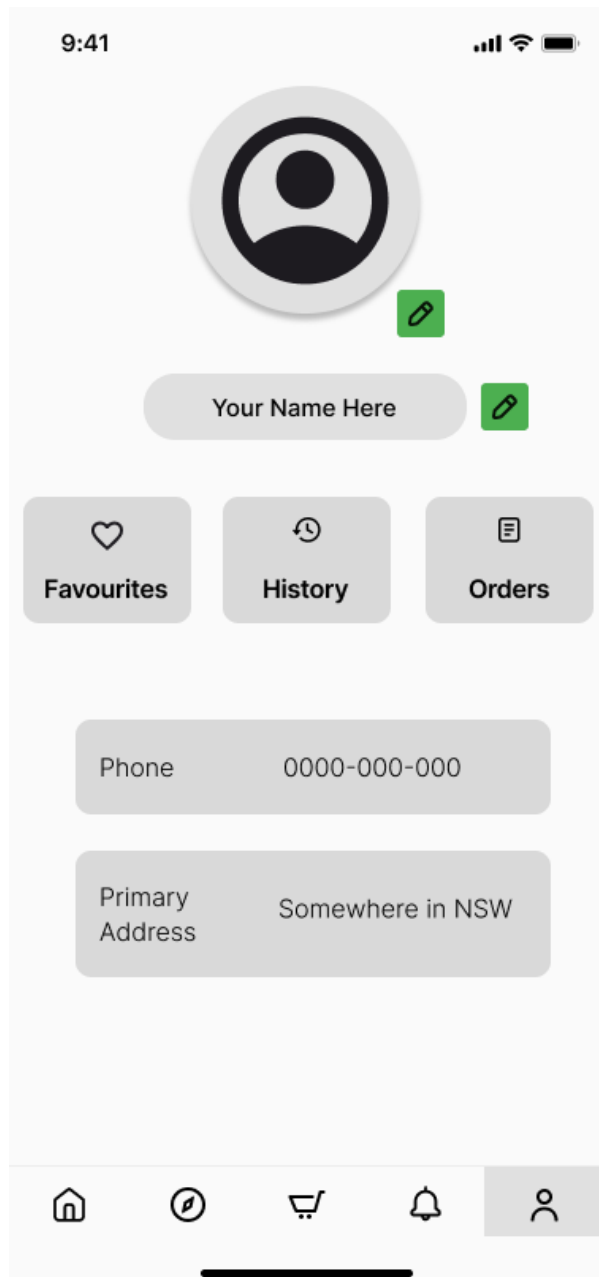


Figure 8 Customer profile page.

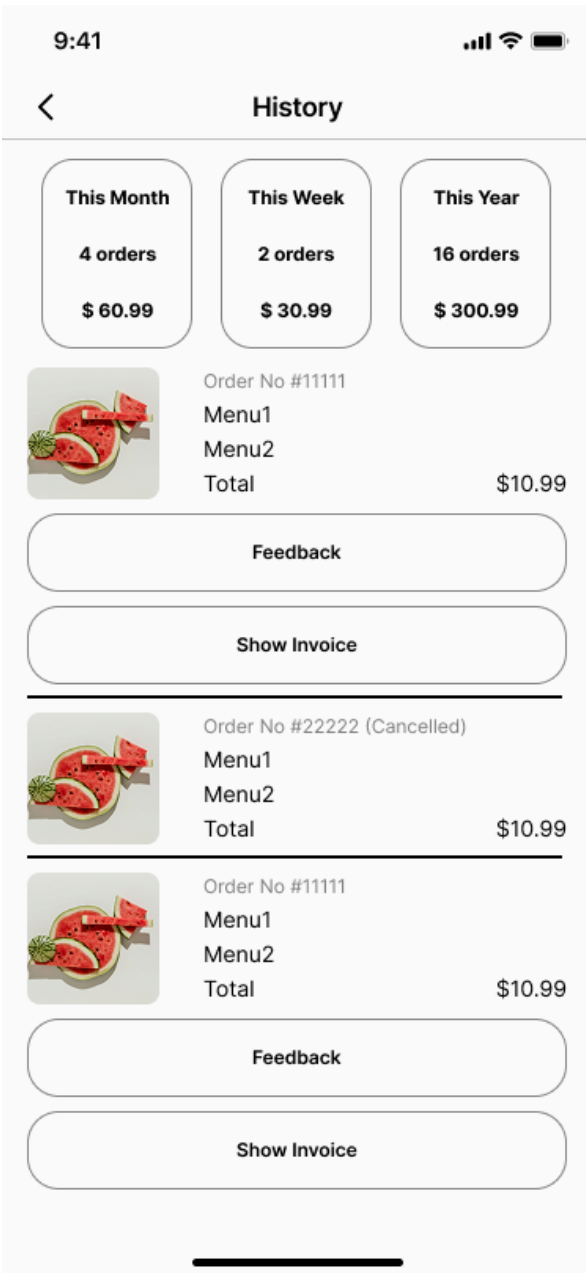


Figure 9 Customer order history page.

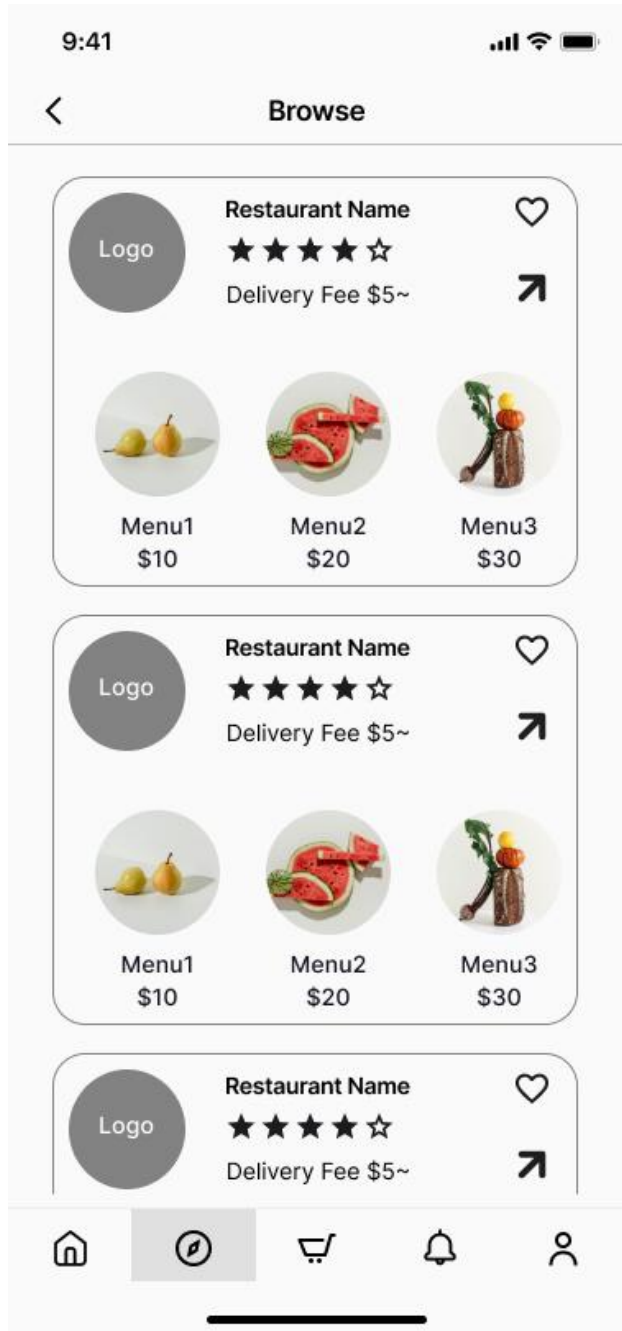


Figure 10 Customer search page.

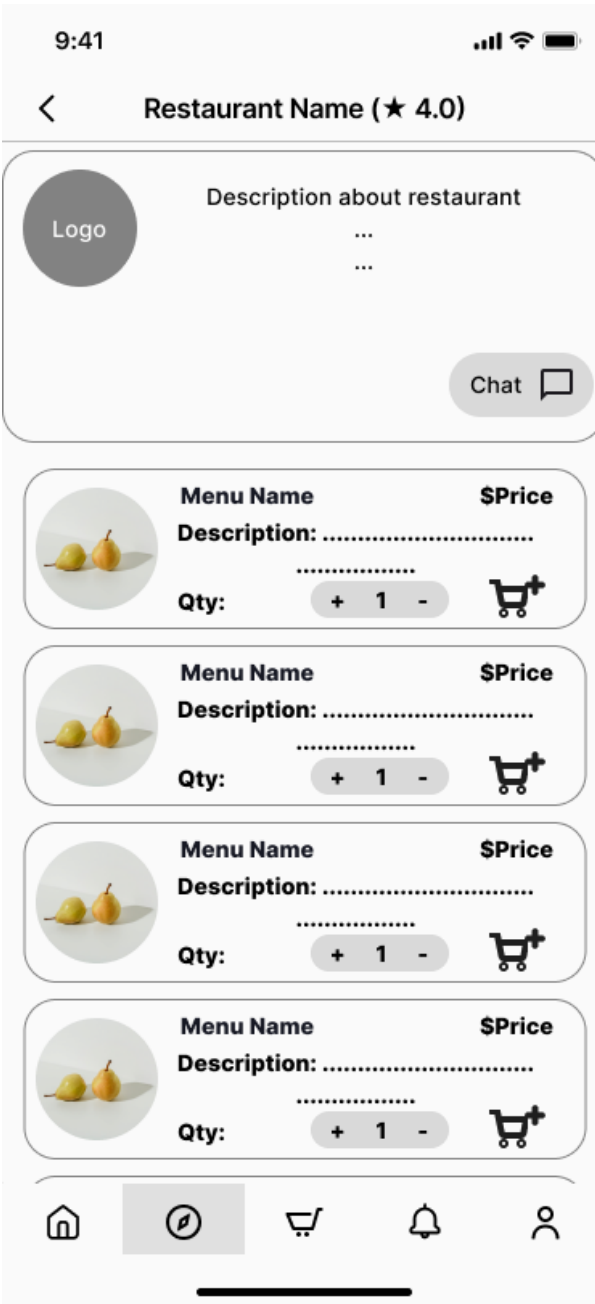


Figure 11 Restaurant page.

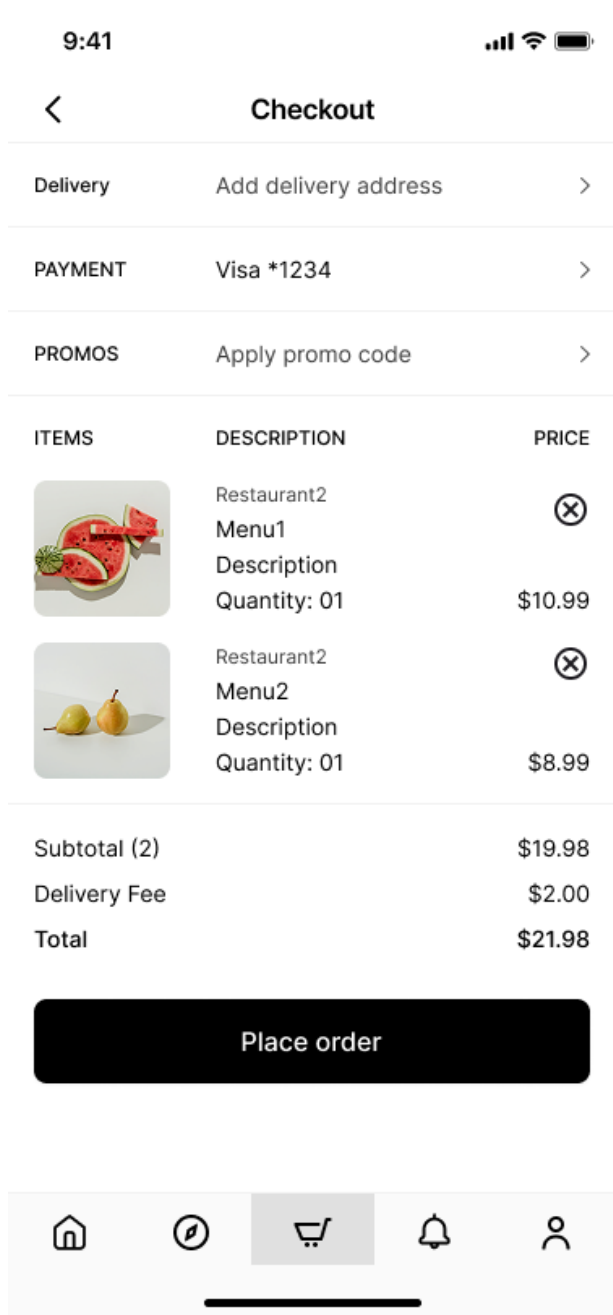


Figure 12 Customer checkout page.

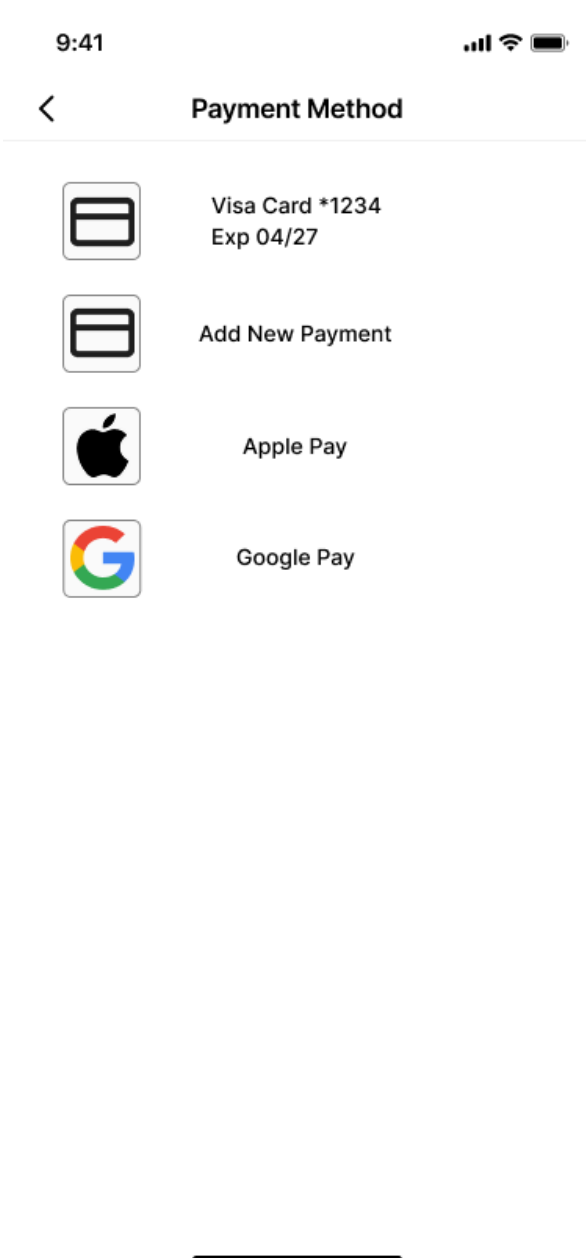


Figure 13 Customer payment method page.

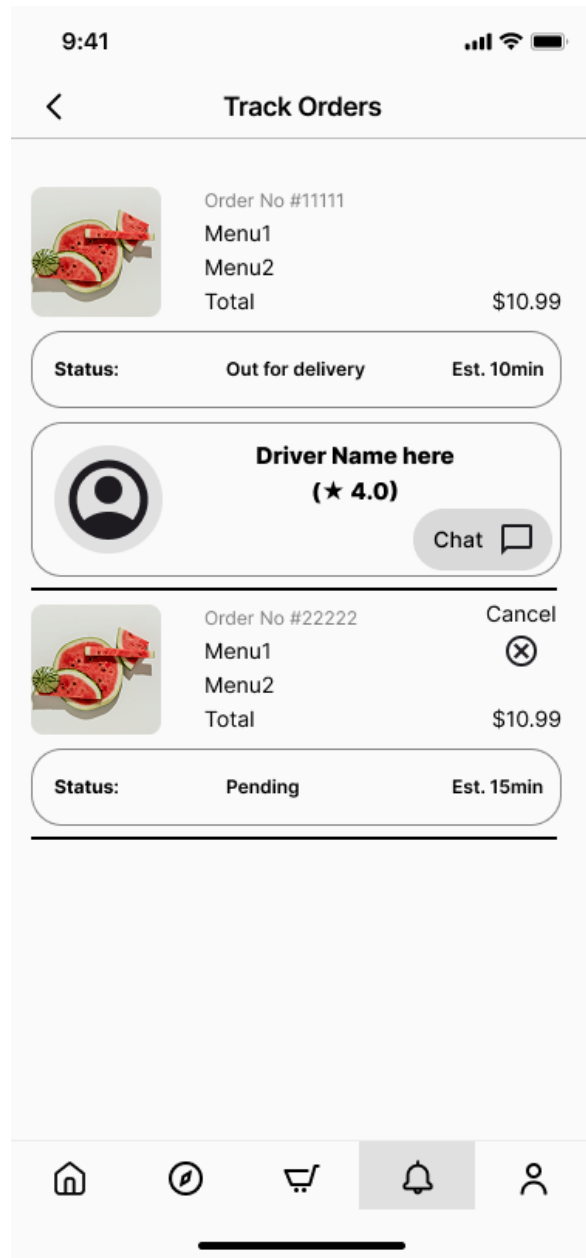


Figure 14 Customer track order page.

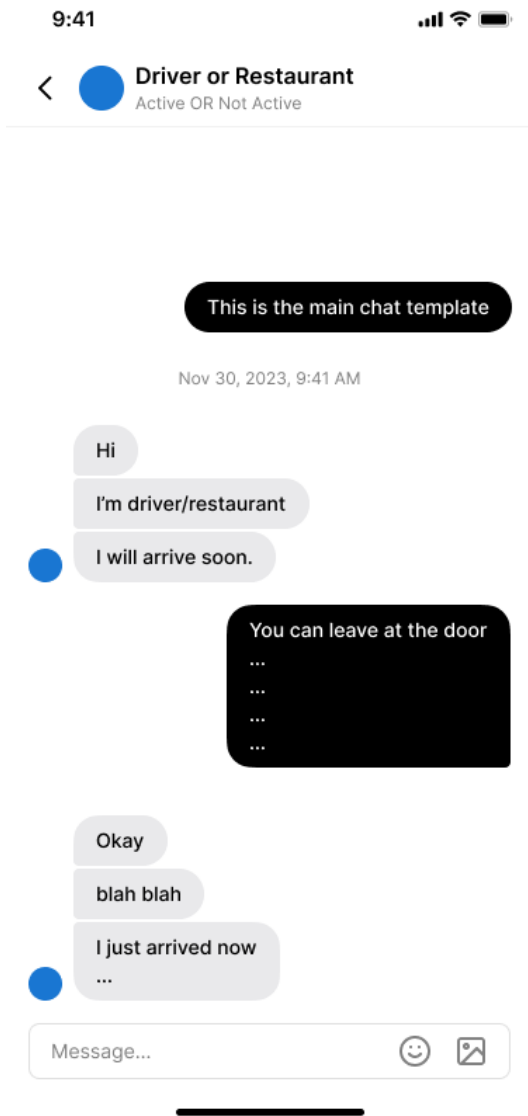


Figure 15 Chat page between customer and driver / restaurant.

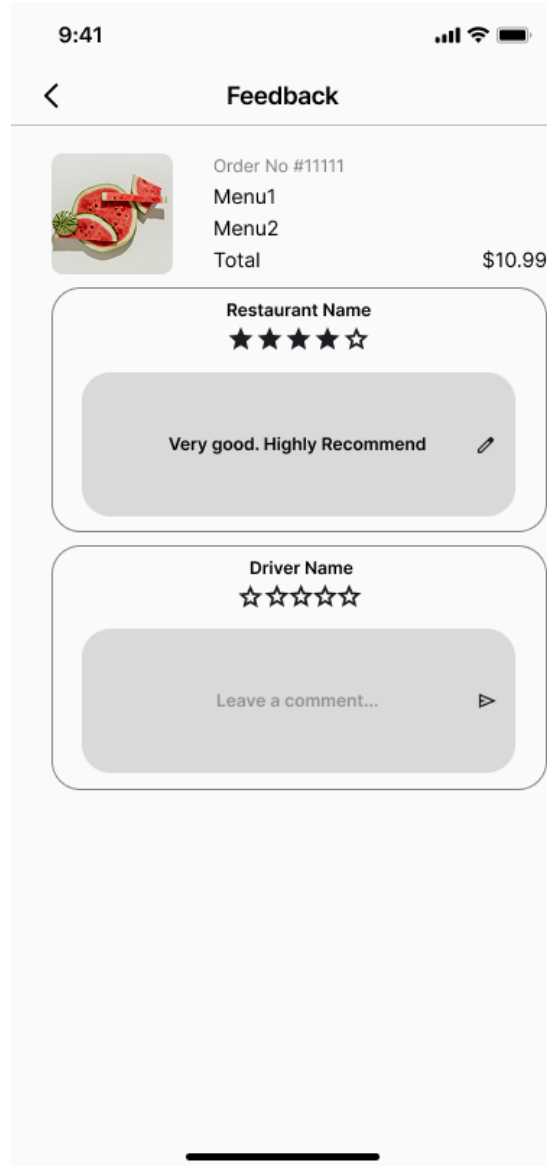


Figure 16 Customer feedback form.

3.2.2 Driver

9:41


Food Delivery App for Driver


Create or Login an account
Enter your email to sign up or login for this app

email@domain.com

Continue

or

 Continue with Google

 Continue with Apple

By clicking continue, you agree to our [Terms of Service](#)
and [Privacy Policy](#)

Figure 17 Driver first page before logging in.

9:41

Email domain@email.com

Password qwerty1234

Phone 0000-000-000

Driver Name DriverName

ABN ABN Number

Driver License No. Driver License No

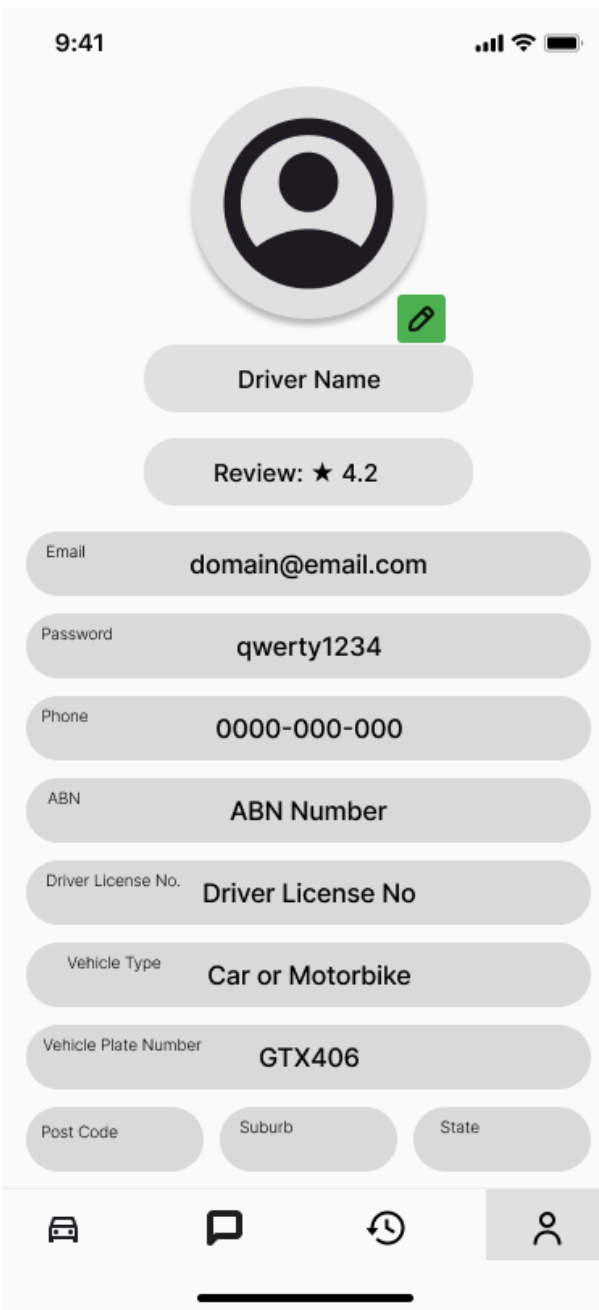
Vehicle Type Car or Motorbike

Vehicle Plate Number GTX406


Post Code Suburb State


Continue

Figure 18 Driver signing up form.



9:41





Driver Name

Review: ★ 4.2

Email domain@email.com

Password qwerty1234

Phone 0000-000-000

ABN ABN Number

Driver License No. Driver License No

Vehicle Type Car or Motorbike

Vehicle Plate Number GTX406

Post Code Suburb State





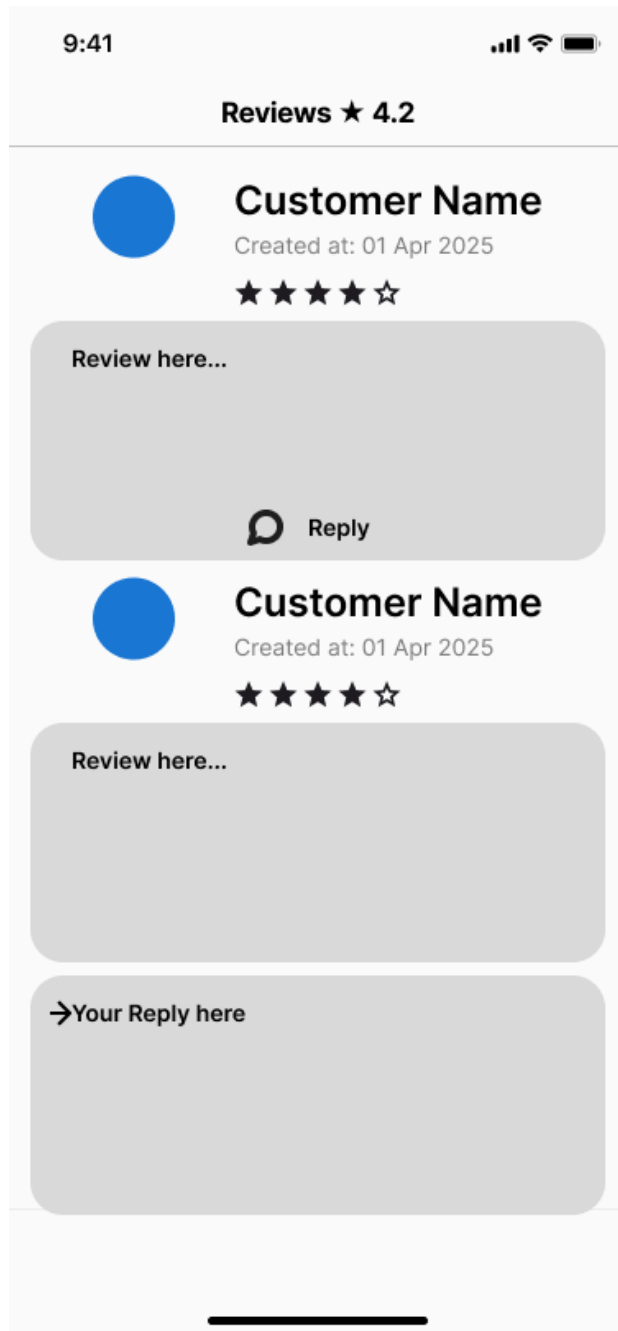

   

Figure 19 Driver profile page.





9:41

Reviews ★ 4.2

 **Customer Name**
Created at: 01 Apr 2025
★★★★☆

Review here...

 Reply

 **Customer Name**
Created at: 01 Apr 2025
★★★★☆

Review here...

→Your Reply here

Figure 20 Driver review order page.

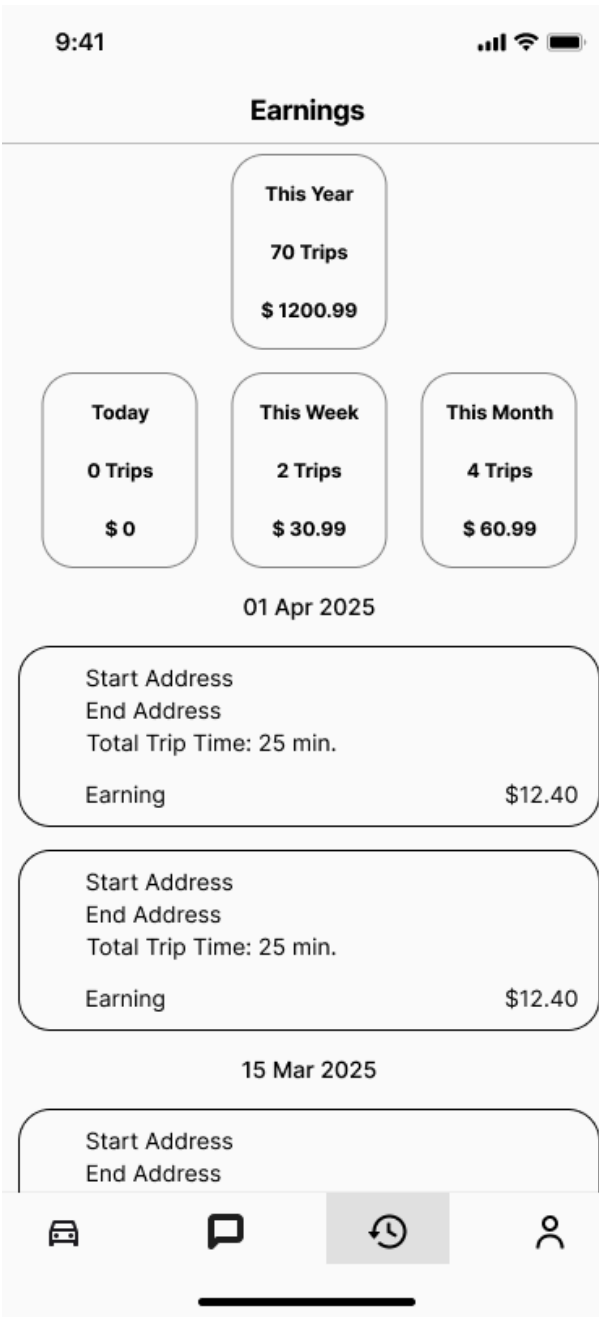


Figure 21 Earnings page.

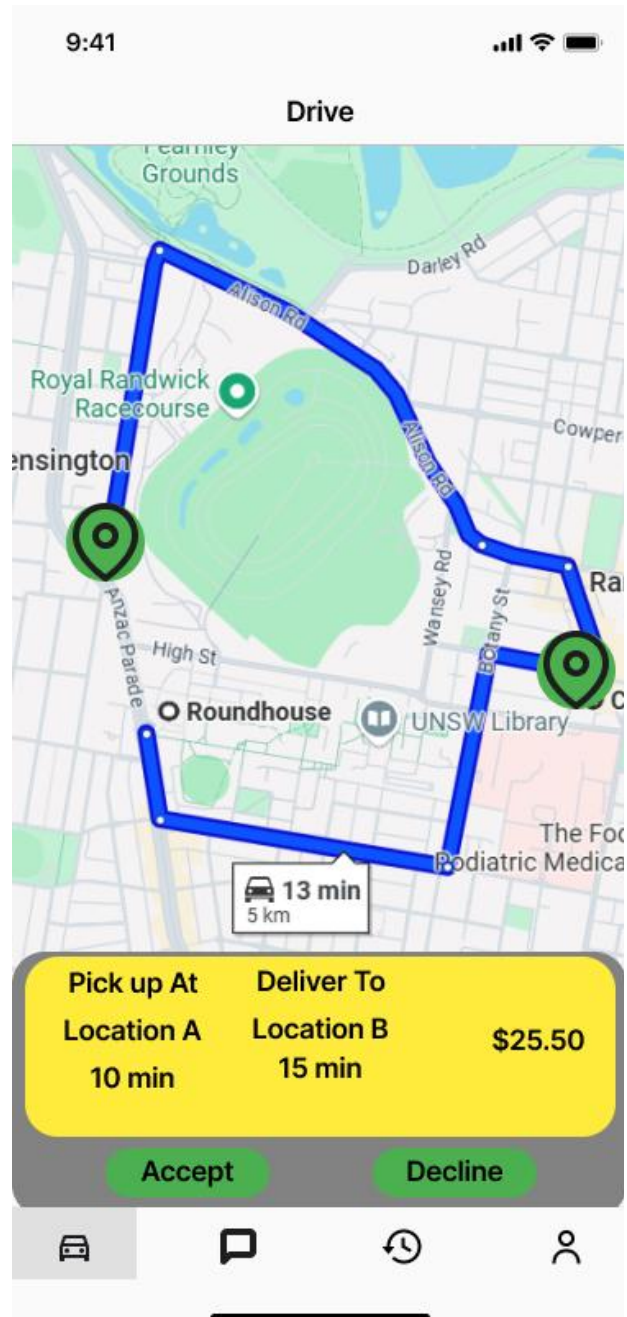


Figure 22 Driver select order page.



Figure 23 Delivery starting page.

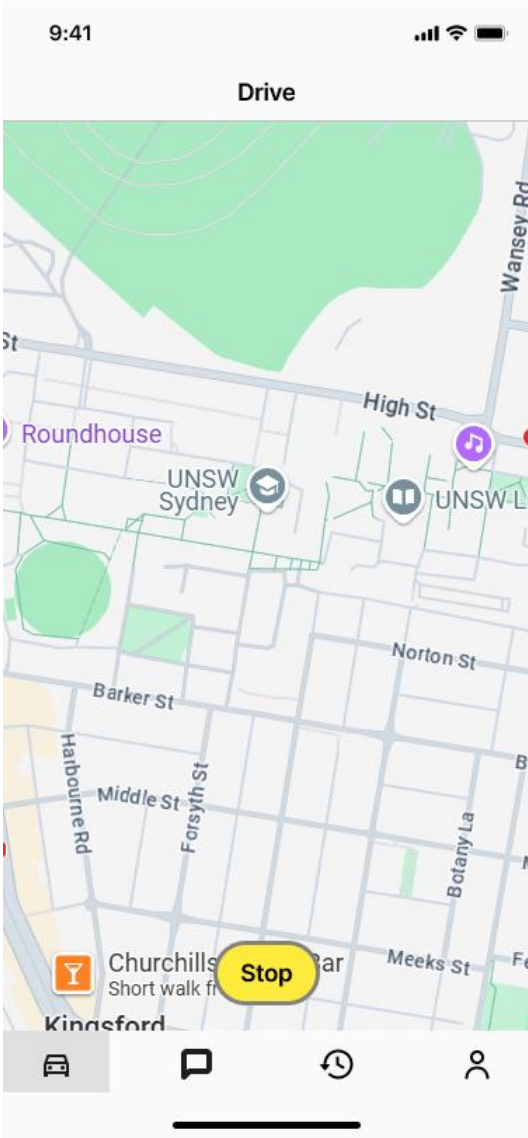


Figure 24 Delivery ending page.

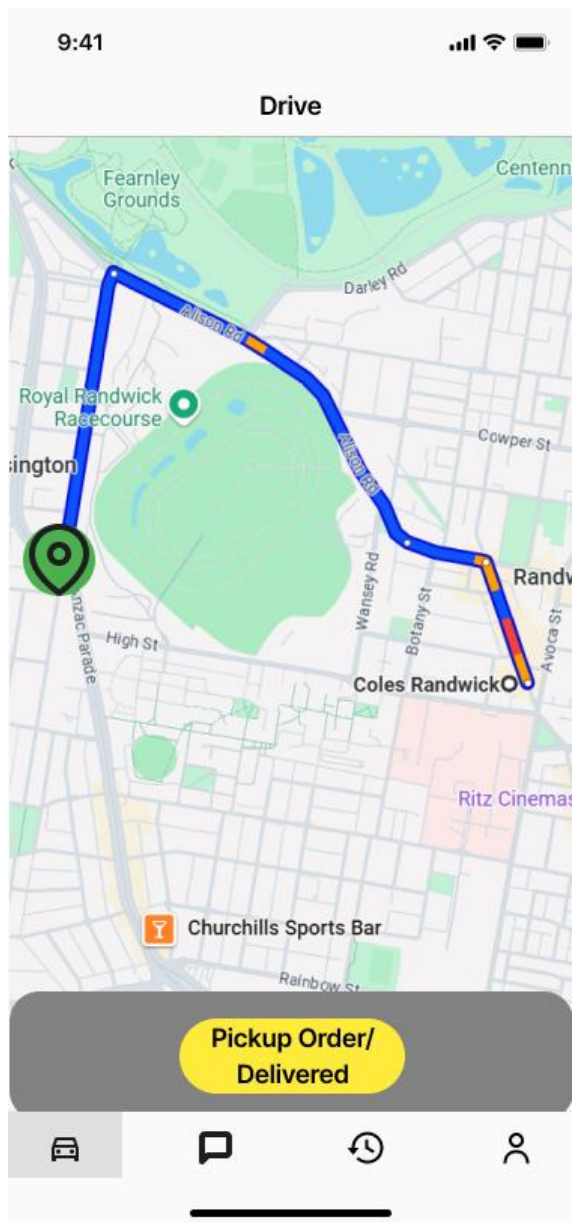
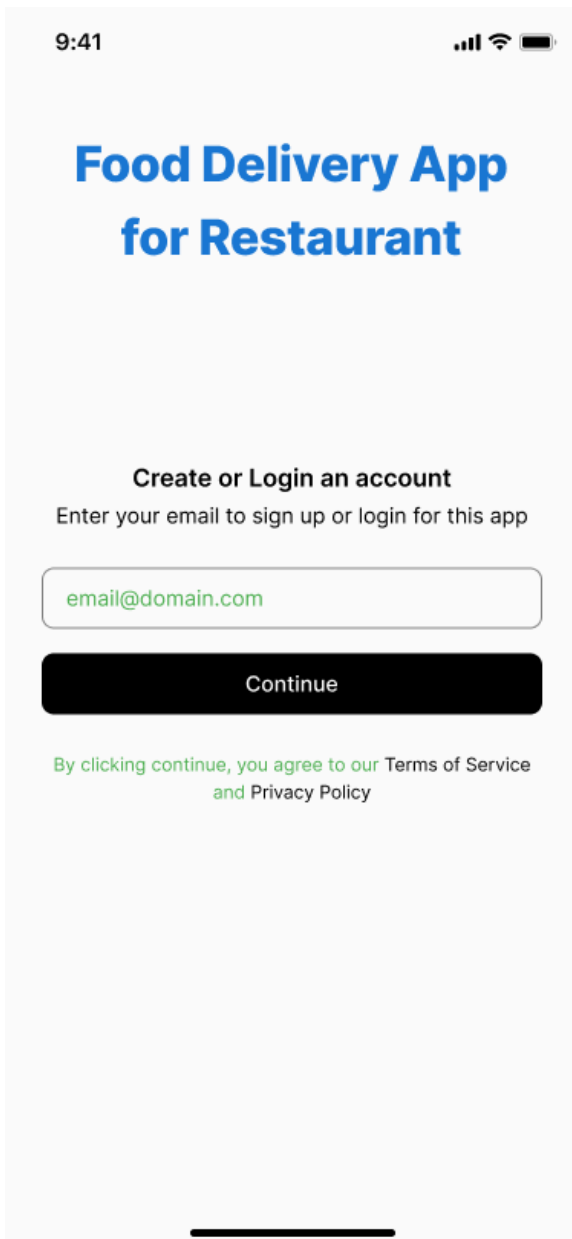


Figure 25 Delivery finalization page.

3.2.3 Restaurant Manager



9:41

Food Delivery App for Restaurant

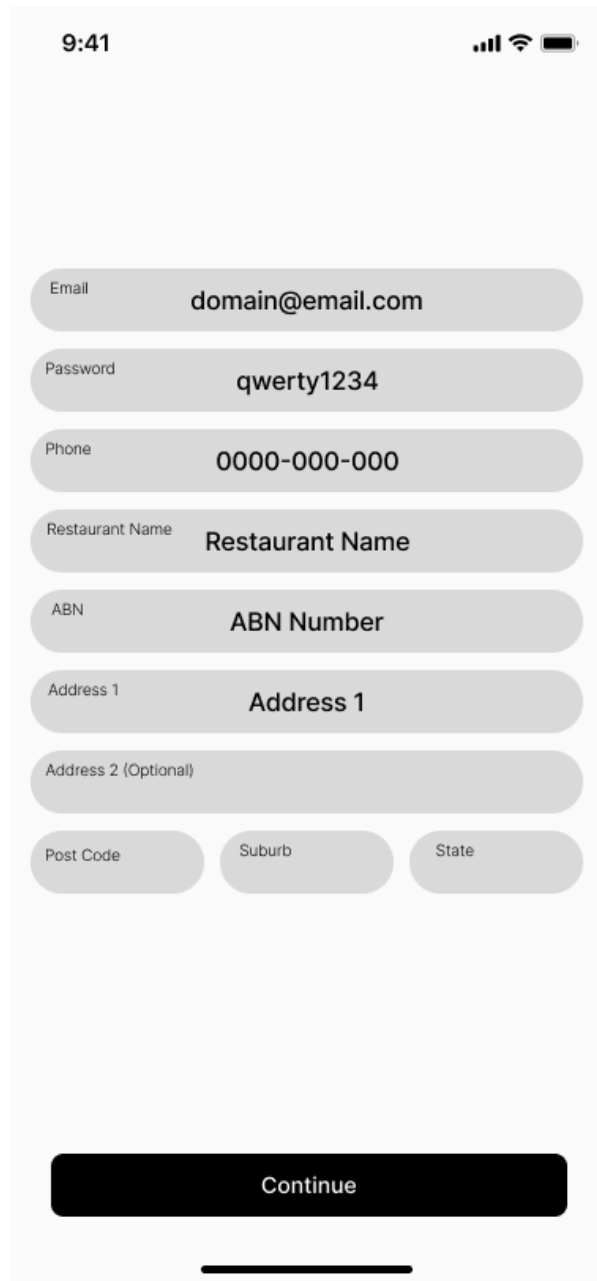
Create or Login an account
Enter your email to sign up or login for this app

email@domain.com

Continue

By clicking continue, you agree to our [Terms of Service](#) and [Privacy Policy](#)

Figure 26 Manager first page before signing up and logging in



9:41

Email domain@email.com

Password qwerty1234

Phone 0000-000-000

Restaurant Name Restaurant Name

ABN ABN Number




Address 1 Address 1


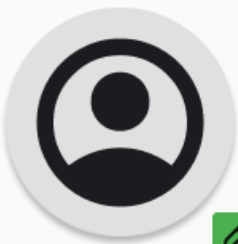
Address 2 (Optional)

Post Code Suburb State

Continue

Figure 27 Manager sign up page.

9:41   



Restaurant Name

Review: ★ 4.2

Email domain@email.com

Password *****

Phone 0000-000-000

ABN ABN Number

Address 1 Address 1

Address 2 (Optional)

Post Code Suburb State










    

Figure 28 Restaurant profile page.


9:41   


Reviews ★ 4.2



Customer Name
Created at: 01 Apr 2025
★★★★☆

Review here...

 Reply



Customer Name
Created at: 01 Apr 2025
★★★★☆

Review here...

→Your Reply here

Figure 29 Customer review page.

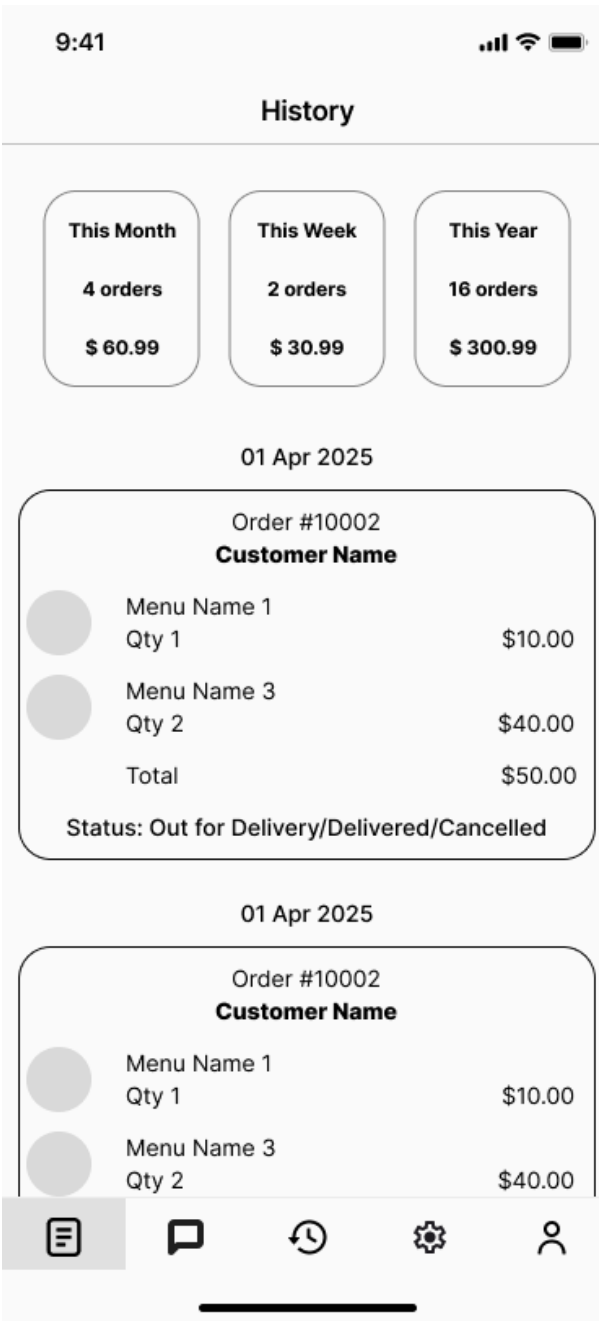


Figure 30 Restaurant order history page.

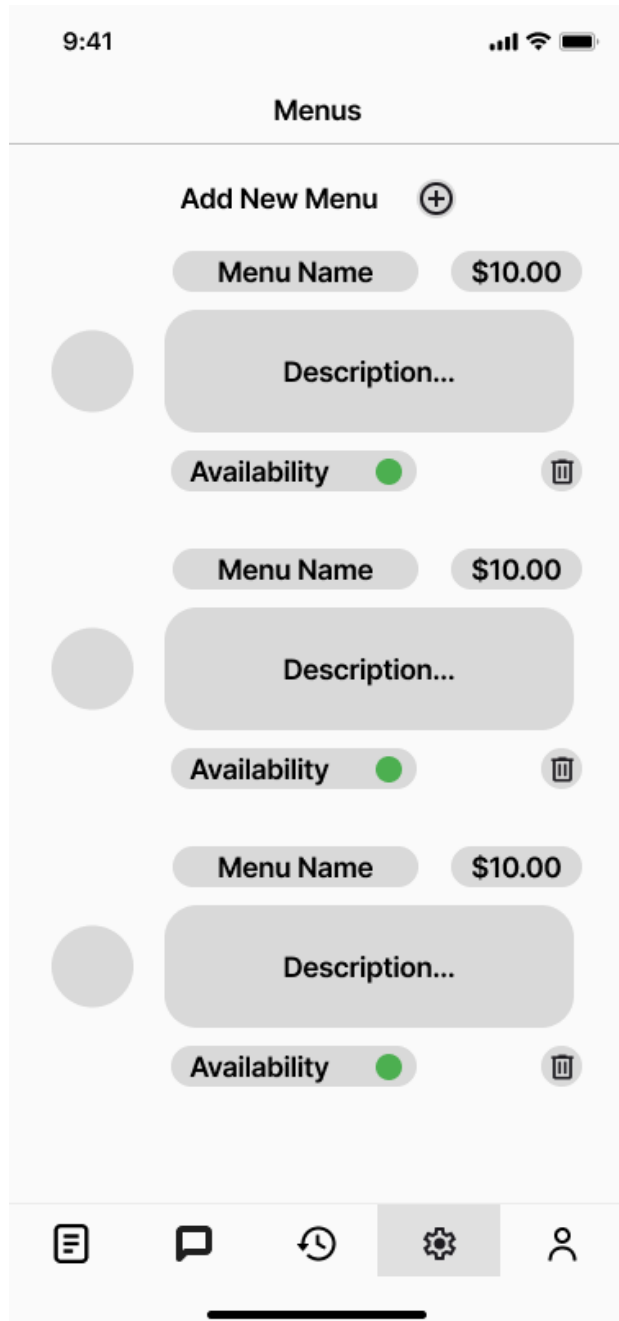


Figure 31 Restaurant menu page.

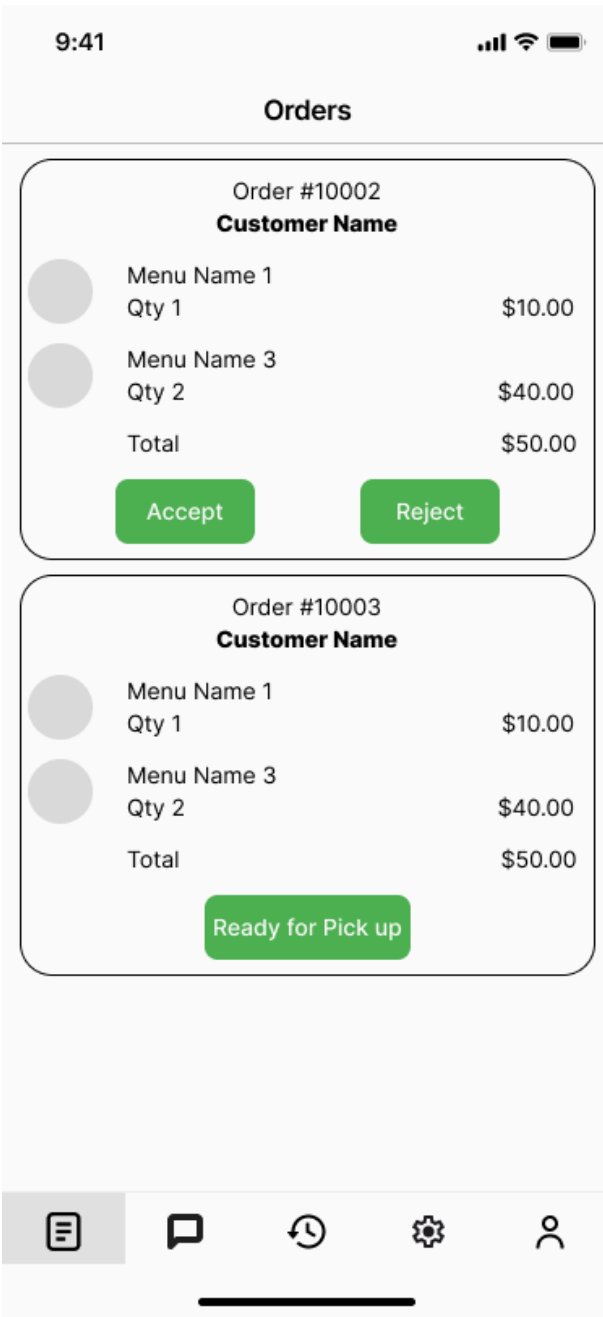


Figure 32 Orders page

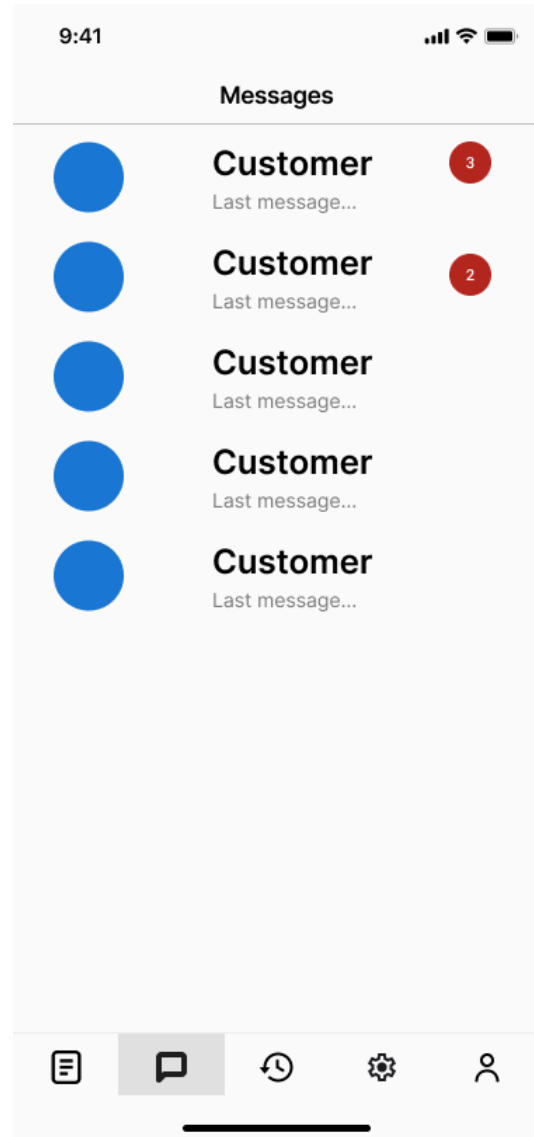


Figure 33 Communication page.

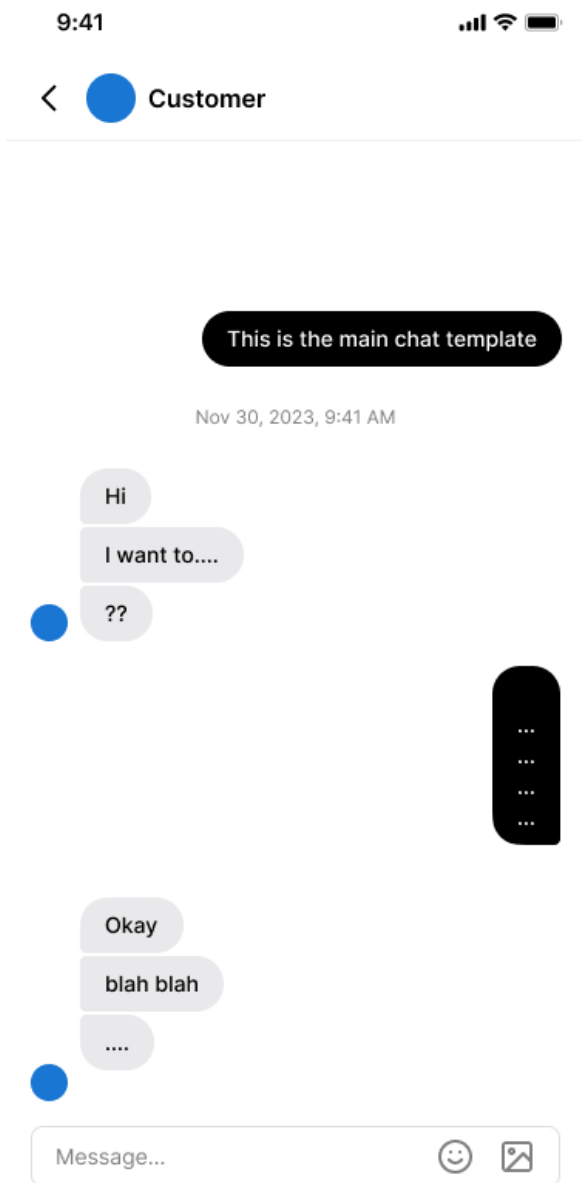


Figure 34 Chat page.

3.3. Design Justifications

Subproblem	Detail	Solution
User Management & Authentication	The system requires a secure and efficient authentication process to manage access for different types of users, including customers, restaurant managers, and delivery drivers. Ensuring data privacy and controlled access is essential to protect user information and prevent unauthorized actions.	<ul style="list-style-type: none">• Implement JWT-based authentication to provide secure, token-based access control for all users.• User passwords will be hashed and salted before storage to prevent security breaches, ensuring that even if database access is compromised, user credentials remain protected.• Additionally, role-based access control (RBAC) will be enforced so that each user type can only access certain pages and functions.
Restaurant Discovery & Order Placement	Customers need an intuitive and efficient interface to browse restaurant menus, apply filters, and place orders seamlessly. A well-structured and real-time updating system is necessary to ensure that customers always see accurate menu listings, availability, and pricing.	<ul style="list-style-type: none">• Develop a ReactJS-based frontend that provides fast, user-friendly navigation for restaurant discovery.• Customers will be able to search for restaurants by name, category, or location and filter food items based on dietary preferences, price range, or ratings.• Restaurants will have real-time control over their menus, allowing them to update prices, mark items as unavailable, or introduce special offers instantly, ensuring that customers always view the latest information when ordering.

Subproblem	Detail	Solution
Real-Time Order Tracking & Delivery Management	Customers expect real-time tracking of their deliveries to stay informed about estimated arrival times, while delivery drivers need optimized routes to ensure timely deliveries. Many existing platforms lack consistent tracking across all drivers, especially when restaurants manage their own delivery personnel.	<ul style="list-style-type: none"> • Integrate device GPS and Google Maps API to provide live GPS tracking for all active orders. • Regardless of whether a restaurant uses its own drivers or third-party delivery services, all deliveries will be linked to a centralized tracking system, ensuring that customers receive accurate real-time updates on their order's status. • Drivers will be provided with optimized navigation routes, reducing delivery time and improving efficiency. • Customers will also have access to a delivery progress screen, allowing them to see their driver's live location and estimated arrival time.
Secure Transaction	Customers need a secure and reliable way to complete transactions, ensuring payments are processed efficiently and orders are confirmed only after successful payment.	<ul style="list-style-type: none"> • We will only implement a basic simulated transaction system to allow customers to checkout and receive order confirmation without actual payment processing. • In the future development, the backend should link Stripe or PayPal API to ensure secure and encrypted payment processing for real-world deployments.
Scalability & Performance Optimization	The system needs to be developed within 7 weeks. But for real-world deployment, the platform must be scalable to handle potential large traffic and concurrent transactions.	<ul style="list-style-type: none"> • The current solution is chosen for rapid development only. This is a drawback of our project design. For example, SQLite is chosen for its easy setup and lightweight nature. The future of the project should involve sophisticated database like MySQL or cloud database hosting such as Firebase.

Here we continue to discuss some more complex subproblem: how to provide better customer engagement and customer support while reducing platform reliance on human labor.

One of the key challenges in food delivery platforms is providing timely and efficient customer support. Customers frequently have questions about menu options, order status, delivery times, and payment issues, while restaurant managers often need to handle customer inquiries about food availability and promotions. A manual customer service system can be time-consuming and inefficient, leading to delayed responses and poor user experiences. To address this, the system aims to integrate an AI-powered chatbot that provides automated customer support for both customers and restaurant managers.

A rule-based chatbot was considered as an alternative. Such chatbot uses regular expressions to match user's input and compare with programmed queries. And such an approach lacks adaptability and scalability. The chatbot frequently fail to understand or provide inaccurate response. Luckily today we have many LLM (Large Language Model) models. They can interpret complex queries and generate human-like responses.

Our system chooses to integrate the ChatGPT API, which leverages natural language processing and AI-driven responses to create a more flexible and interactive chatbot experience. Unlike existing platforms like Uber Eats or Menulog, which rely on static FAQ pages and human-operated customer support, our system introduces two AI-powered chatbots with distinct functions:

- **AI Chatbot for Restaurant Managers:** Our platform allows restaurants to build and customize their own AI-driven chatbots that assist customers with menu inquiries, food recommendations, promotions, and order assistance. This reduces the need for restaurant staff to manually respond to customer messages, streamlining operations.
- **AI Chatbot for Customers:** Customers can interact with the platform's AI assistant to get real-time order status updates, estimated delivery times, and instant responses to frequently asked questions. This eliminates wait times for human support, ensuring a seamless and automated customer service experience.

By integrating ChatGPT-powered AI chatbots, our solution introduces a novel functionality beyond existing food delivery platforms. Unlike Uber Eats and Menulog, which rely primarily on human-operated support, our system ensures that restaurants and customers have access to instant, AI-driven assistance at all times. This approach enhances customer engagement, reduces operational workload, and provides a more intelligent and automated service.

3.4. Project Objectives and Functionalities with User Stories

Table 1 summarizes the mapping between project objectives and user stories.

Table 1 Connection between project objectives and user stories.

User Group	Functionality	User Stories
Customer	User authentication and profile management	US1. As a customer, I want to sign up and login to the application securely so that I can access my account. US2. As a customer, I want to update my profile information so that my contact details and preferences stay up to date.
	View restaurants and menus	US3. As a customer, I want to browse restaurants menus so that I can add food to my shopping cart. US4. As a customer, I want to search and filter food items so that I can quickly find the food.
	Shopping cart and checkout process	US5. As a customer, I want to add food items into my cart and remove items from the cart so that I can check out later. US6. As a customer, I want to check out my cart and make the payment so that I can receive my order.
	Order tracking and management	US7. As a customer, I want to track my order status in real-time so that I know when to expect my delivery. US8. As a customer, I want to cancel an order within the allowed time so that I can make changes.
	Communication and support	US9. As a customer, I want to have in-app messaging order-related queries to the restaurants and the drivers. US10. As a customer, I want to receive invoices and access my transaction history so that I can keep track of my expenses.
	Reviews and favorites	US11. As a customer, I want to rate and review restaurants and drivers so that I can share my experiences. US12. As a customer, I want to view aggregated ratings and feedback of the restaurants so that I can choose the restaurants wisely. US13. As a customer, I want to add restaurants to my favorites so that I can easily access and re-order in the future.

User Group	Functionality	User Stories
Restaurant manager	Restaurant registration and profile management	<p>US14. As a restaurant manager, I want to register our restaurant account and upload documents on the application so that customers can find my business.</p> <p>US15. As a restaurant manager, I want to manage my restaurant profile so that people can view the latest profile.</p>
	Menu and order management	<p>US16. As a restaurant manager, I want to upload and update the menus in real-time so that customers can always access the latest information.</p> <p>US17. As a restaurant manager, I want to receive and manage orders so that all orders are finalized on time.</p> <p>US18. As a restaurant manager, I want to update order statuses so that customers and drivers know the progress of their orders.</p>
	Sales and customer service	<p>US19. As a restaurant manager, I want to monitor the order volume so that I can manage the demand efficiently and effectively.</p> <p>US20. As a restaurant manager, I want to create and manage special offers and promotions so that I can attract more customers.</p> <p>US21. As a restaurant manager, I want to add comments to the customer reviews so that I can improve customer satisfaction.</p>
Delivery driver	Driver registration and vehicle set up	<p>US22. As a delivery driver, I want to register my account and upload my ID documents so that I can work as a delivery driver.</p> <p>US23. As a delivery driver, I want to upload my vehicle details so that the application can match me with suitable orders.</p>
	Order assignment and navigation	<p>US24. As a delivery driver, I want to view the available orders so that I can choose the ones that match my availability and location.</p> <p>US25. As a delivery driver, I want to accept suitable orders so that I can complete the delivery on time.</p> <p>US27. As a delivery driver, I want to access the GPS navigation system with the best route so that I can finish the delivery on time.</p>

User Group	Functionality	User Stories
	Delivery service	US26. As a delivery driver, I want to update the order status so that customers and restaurants can view real-time progress.
	Earnings and customer service	US28. As a delivery driver, I want to monitor earnings so that I know how much I earn. US29. As a delivery driver, I want to view customer ratings and feedback so that I can improve my service.
Administrator	User and business management	US30. As an administrator, I want to oversee customers, restaurants, and driver accounts so that I can ensure a well-regulated platform. US31. As an administrator, I want to approve new restaurants and drivers' accounts so that I can ensure a well-regulated platform.
	Business, pricing, and platform performance	US32. As an administrator, I want to monitor daily sales so that I can track the business. US33. As an administrator, I want to monitor and analyze performance metrics of orders, restaurants, and drivers, so that I can improve the service. US34. As an administrator, I want to set and adjust pricing models based on the sales so that restaurants and drivers can enjoy competitive pricing. US35. As an administrator, I want to create and manage platform-wide promotional campaigns so that I can attract more users.
All users	AI chatbot service	US36. As a restaurant manager, I want to set up a chatbot for my restaurant so that it can introduce my menu and assist customers with placing orders. US37. As a customer, I want to talk with a system chatbot so that I can get quick help with order status, payments, and common account-related issues.