Laravel-Based E-Commerce System
Final Project Report

Course: **Web Application Development with PHP**

Instructor: **Vitalii Bohudskyi**

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Team Members:

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Outline

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2. Problem Statement
3. Methodology
4. Results Discussion
5. Issues Identified and Resolved
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1. Introduction and Motivations

This Laravel-based Food Business Management Platform was designed as a comprehensive solution to digitize and streamline operations for small to mid-sized food service businesses, including restaurants, cafes, and takeaway services. Unlike traditional e-commerce systems focused on product-based retail, this platform addresses the unique challenges of managing food menus, processing dynamic customer orders, handling real-time inventory changes, and integrating fast, secure payments.

The development team was motivated by the growing demand for digital transformation in the food industry, where efficiency, responsiveness, and user experience are critical. The system includes core modules such as role-based access (admin, staff, customer), real-time order tracking, kitchen status updates, dynamic menu configuration, and automated customer notifications via email.

The project also served as a practical implementation of full-stack Laravel development, improving team members' skills in authentication, ORM, routing, RESTful APIs, Blade templating, and containerized deployment using Podman.

2. Problem Statement

Food businesses face unique operational issues that cannot be solved by generic e-commerce platforms. These include:

- Dynamic order handling with real-time kitchen updates
- Frequent menu changes with item availability
- Timely communication with customers for order status
- Admin oversight over multiple user roles and responsibilities
- Integration with secure payment processors like Stripe
- Mobile accessibility for both customers and staff (e.g., kitchen staff viewing orders on tablets)

This project set out to develop a platform that addresses these needs by offering:

- A responsive interface for browsing menus and placing orders
- Role-based dashboards for staff (order processing) and admin (menu, inventory, analytics)
- Secure login and optional two-factor authentication
- Real-time order status updates (e.g., "In Preparation", "Ready for Pickup")
- Stripe-based secure checkout
- Email alerts for order confirmations and changes
- Deployment-ready containers using Podman for modularity

The platform also emphasizes flexibility, allowing it to be scaled and adapted for different food business models.

3. Methodology

To build a robust, scalable, and secure platform tailored for food business operations, the development team followed the Software Development Life Cycle (SDLC), structured into four main phases: **Planning**, **Development**, **Testing**, and **Deployment**.

Planning

- Defined the specific operational workflows of food businesses (e.g., menu updates, kitchen processing, multi-role user access).
- Identified essential user stories: placing an order, managing a menu, updating order statuses, and processing payments.
- Designed UI wireframes for different user roles (Customer, Staff, Admin).

Development

- **Framework:** Laravel 11.x was selected for its strong MVC architecture, built-in security features, and developer productivity.
- **Frontend:** Blade templating was used to build responsive, reusable views for customer and admin interfaces.
- **Backend:** Business logic was implemented using Laravel controllers and services to ensure separation of concerns.
- **ORM:** Eloquent simplified database modeling, relationships (e.g., Orders linked to Users and Menu Items), and migrations.
- **Role-Based Access:** Laravel middleware was utilized to protect routes and ensure correct views and actions for each user type.
- **Real-Time Functionality:** Order statuses were updated dynamically to reflect real-time kitchen processes.
- **Payment Integration:** Stripe's API was integrated for secure checkout experiences, handling both valid and invalid transactions.
- **Email Notifications:** Laravel's Mail service was used to send confirmation and order update emails.

Testing

- **Unit and Feature Testing:** PHPUnit was used with an emphasis on core features such as login, menu updates, and order flows.
- **Code Coverage:** Achieved approximately 88% code coverage across the critical components.
- **Manual QA:** Conducted role-based scenario testing for both customer and admin sides, including edge cases (e.g., out-of-stock items).
- **Device and Browser Testing:** Ensured UI responsiveness and functionality on desktops, tablets, and smartphones, and across Chrome, Firefox, and Safari.

Deployment

- **Containerization:** Used Podman to containerize the application for easy deployment and environment replication.
- **Version Control:** GitHub was used for source code management, issue tracking, and team collaboration.
- **Database:** MySQL was used for relational data storage with normalized tables for users, orders, menu items, etc.

- **Testing Tools:** Postman was used to verify API endpoints, and Chrome Developer Tools helped identify and fix front-end issues.

4. Results Discussion

The platform achieved key goals in creating a reliable, user-friendly experience for all roles in a food business environment:

Customer Module:

- Customers could register, log in, and browse categorized menu items.
- Items could be added to a dynamic cart with support for quantity and special instructions (e.g., "no onions").
- Checkout via Stripe was smooth, with validation for failed transactions.
- Real-time order confirmation emails were automatically sent after checkout.

Staff/Admin Modules:

- Staff members could view active orders in real-time and update their status (e.g., Preparing, Ready).
- Admins could manage the digital menu, update prices, availability, or item descriptions.
- Product images and categories were handled through an intuitive interface.
- Orders were logged and displayed with filters for completed, pending, and canceled orders.
- Mobile responsiveness ensured usability on phones and tablets used by kitchen or front-desk staff.

Overall, the system was tested across browsers, devices, and scenarios to confirm stability and performance.

5. Issues Identified and Resolved

During testing and development, several issues were encountered that impacted functionality, user experience, and reliability. These were identified through both manual QA and automated testing processes. Below is a summary of the key issues and their resolutions:

Issue ID	Description	Severity	Resolution
AUTH-002	Email verification was missing for new users	Medium	Implemented 2FA via email verification upon registration
ORDER-004	Order status updates not reflected in real-time	High	Added AJAX-based polling and order status push updates
STAFF-001	Kitchen staff could access admin-only features	High	Added role-based route restrictions and middleware guards
MENU-002	Menu updates not appearing for customers immediately	Medium	Implemented cache busting and live menu refresh via AJAX
ORDER-005	Orders not cleared from session after completion	High	Stripe webhook and callback updated to properly clear session and notify user
UI-004	Layout broke on mobile for order summary page	Low	Applied responsive CSS and media queries for mobile views
PAY-003	Stripe failed payments not logged for review	Medium	Introduced server-side error logging and alert system for admins
ITEM-006	Negative or zero quantities could be submitted	Medium	Added both client-side and server-side validation
NOTIFY-007	Customers were not receiving order status updates	Medium	Integrated email and in-dashboard notifications triggered on each status change

These resolutions contributed significantly to system stability and usability, especially in real-time order processing and multi-role management, which are crucial in food business workflows.

6. Limitations

Despite successfully implementing the core functionalities, the platform currently has the following limitations:

- **No automated browser-based end-to-end testing:** Manual testing was done, but Laravel Dusk or Cypress has not been implemented to simulate real-world usage scenarios.
- **Limited reporting and analytics:** The admin dashboard lacks in-depth analytics such as daily sales, top-performing menu items, or customer order trends.
- **No ingredient or stock-level tracking:** The system does not track inventory or notify admins of low stock for ingredients or menu items.
- **No dedicated kitchen display system (KDS):** Orders are updated in the dashboard but not shown in a separate real-time view optimized for kitchen staff.
- **Manual deployment only:** The application does not use CI/CD pipelines. All deployments are handled manually using Podman.
- **No support for CSV menu import/export:** Adding or updating the menu must be done item by item through the admin panel.

7. Conclusion

The Laravel-Based Food Business Management Platform successfully fulfills the operational and customer engagement needs of modern food service businesses. By offering specialized features such as real-time order updates, customizable menus, and secure payments, the platform goes beyond basic e-commerce functionality to support day-to-day restaurant workflows.

The system's flexible and modular architecture makes it suitable for a wide range of establishments—from quick-service takeaways to dine-in restaurants. It also provides a solid foundation for future enhancements, such as:

- Integration with delivery services (Uber Eats, DoorDash APIs)
- Low-stock alerts and ingredient tracking
- Table reservations or queue systems
- Visual kitchen display system (KDS) for back-of-house operations
- Real-time reporting and sales analytics

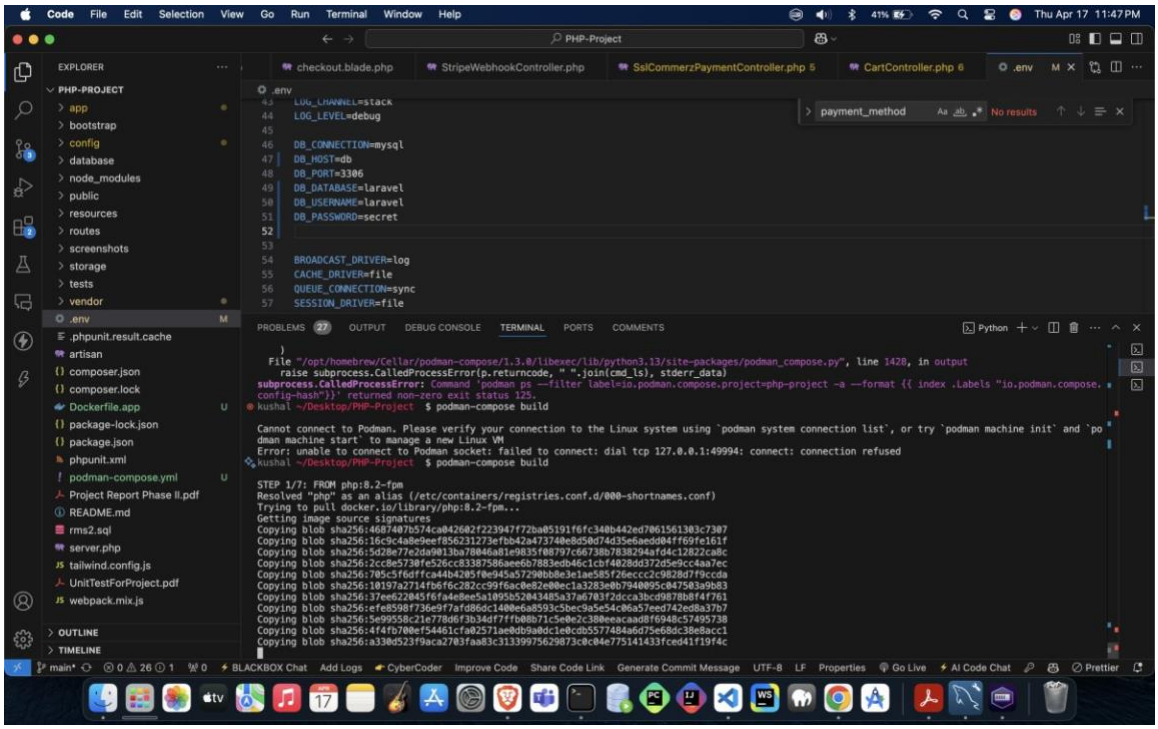
In conclusion, this project not only demonstrated technical expertise in Laravel development but also delivered a real-world solution that reflects current trends and demands in the food industry. It showcases how thoughtful design and modern web frameworks can significantly improve business efficiency and customer satisfaction.

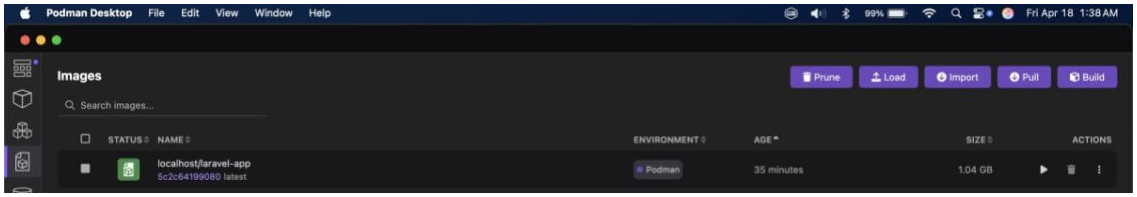
8. Recommendations

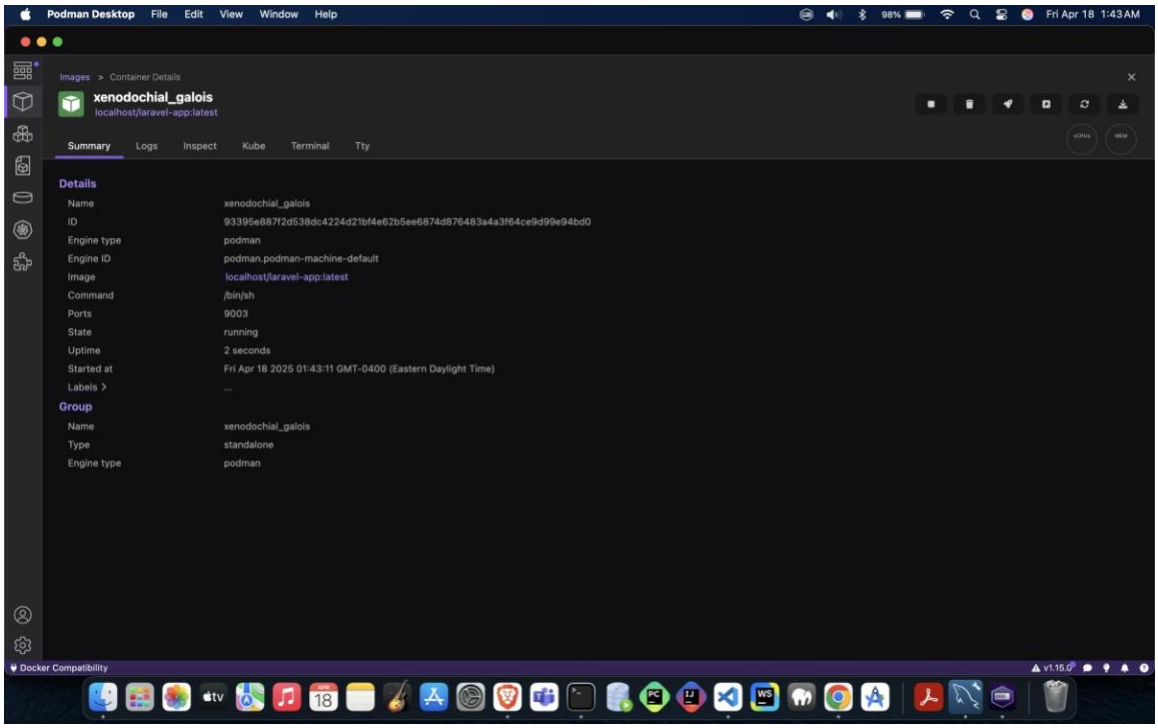
To improve system usability, scalability, and commercial readiness, the following enhancements are recommended:

- **Implement Laravel Dusk or Cypress for automated end-to-end testing**, ensuring smoother regression testing and fewer UI bugs during future updates.
- **Add analytics and reporting tools** to help admins understand sales trends, customer behavior, and performance metrics.
- **Introduce inventory management**, including ingredient-level tracking and low-stock alerts for efficient kitchen operations.
- **Develop a dedicated Kitchen Display System (KDS)** module with real-time updates and touchscreen support for kitchen staff.
- **Integrate a CI/CD pipeline** using GitHub Actions or GitLab CI for automated builds, testing, and deployment.
- **Enable CSV import/export** for bulk menu updates to support fast changes and migrations.
- **Consider building a mobile app interface** using Laravel Sanctum or Flutter, to improve customer and staff convenience.

Code Screenshots



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localhost/laravel-app:latest
Summary Logs Inspect Kube Terminal Tty
Details
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State running
Uptime 2 seconds
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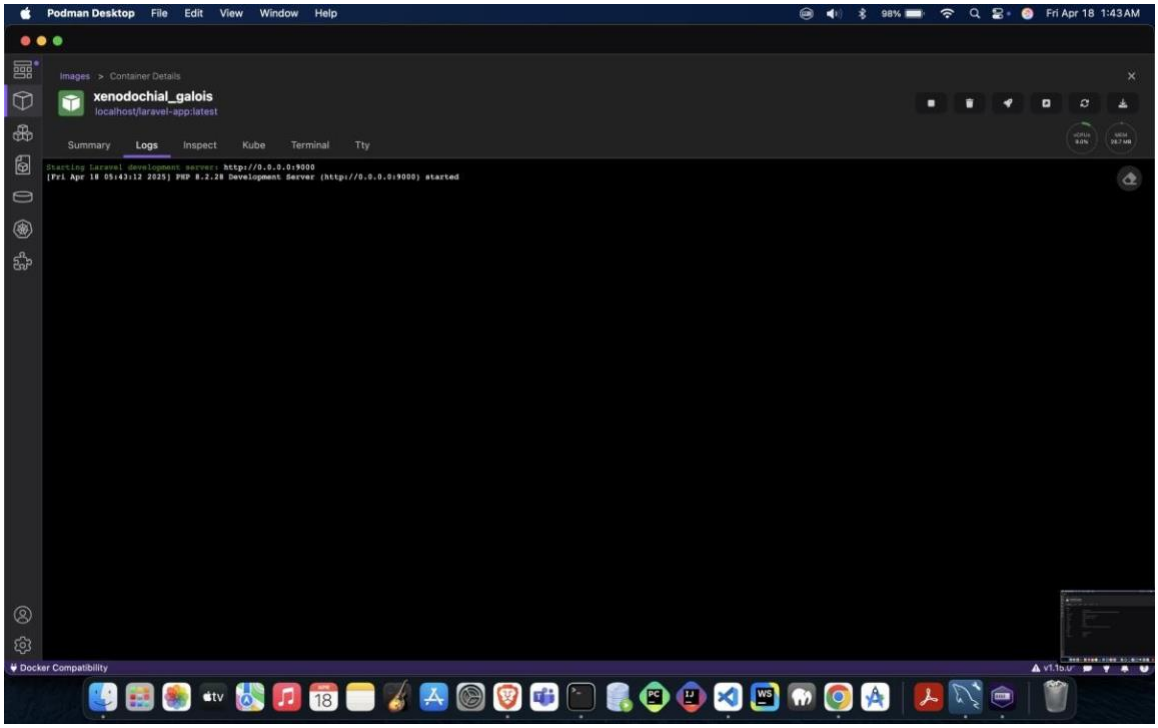
Group
Name xenodochial_galois
Type standalone
Engine type podman
Docker Compatibility


Podman Desktop File Edit View Window Help
Fri Apr 18 1:43 AM
Images > Container Details
xenodochial_galois
localhost/laravel-app:latest
Summary Logs Inspect Kube Terminal Tty
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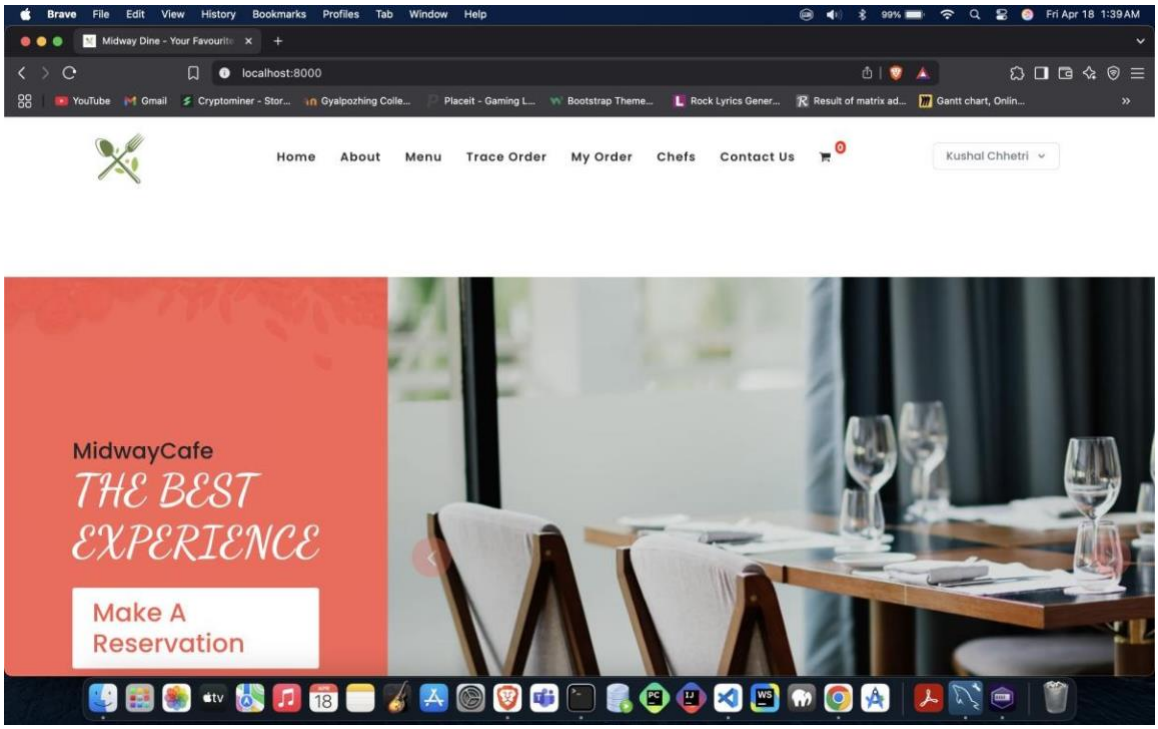
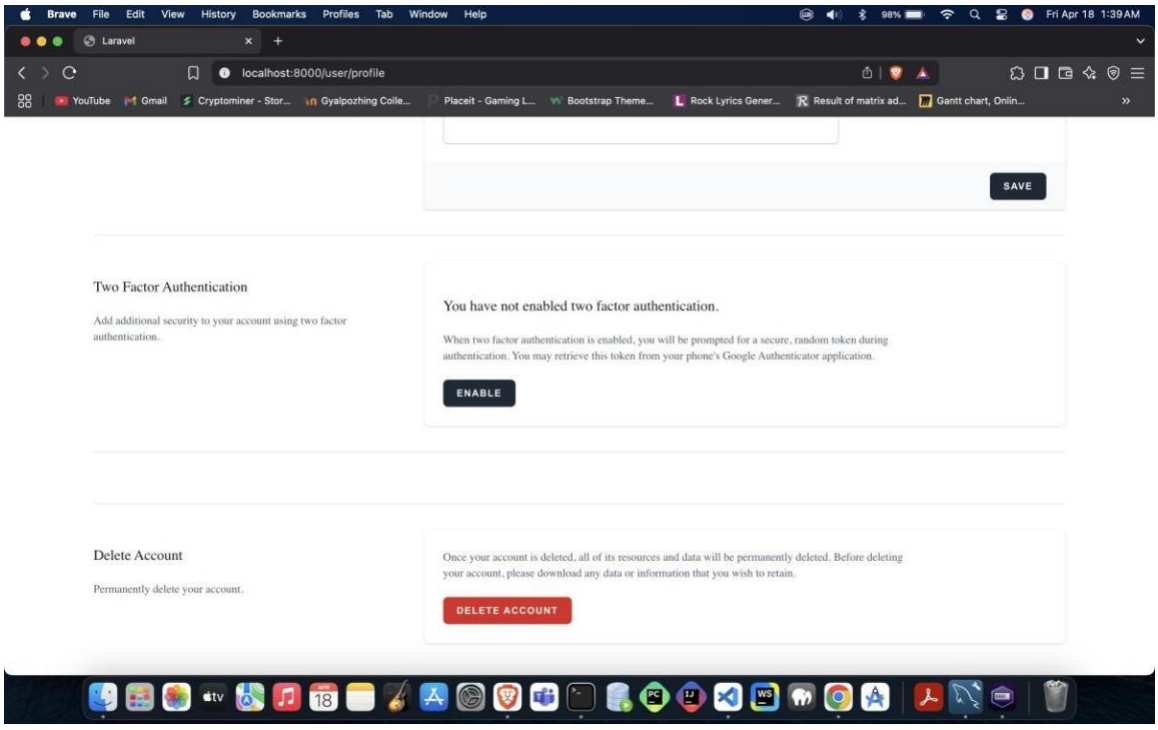
[Fri Apr 18 05:43:12 2025] PHP 8.2.28 Development Server (http://0.0.0.0:9000) started
Docker Compatibility

Application Screenshots

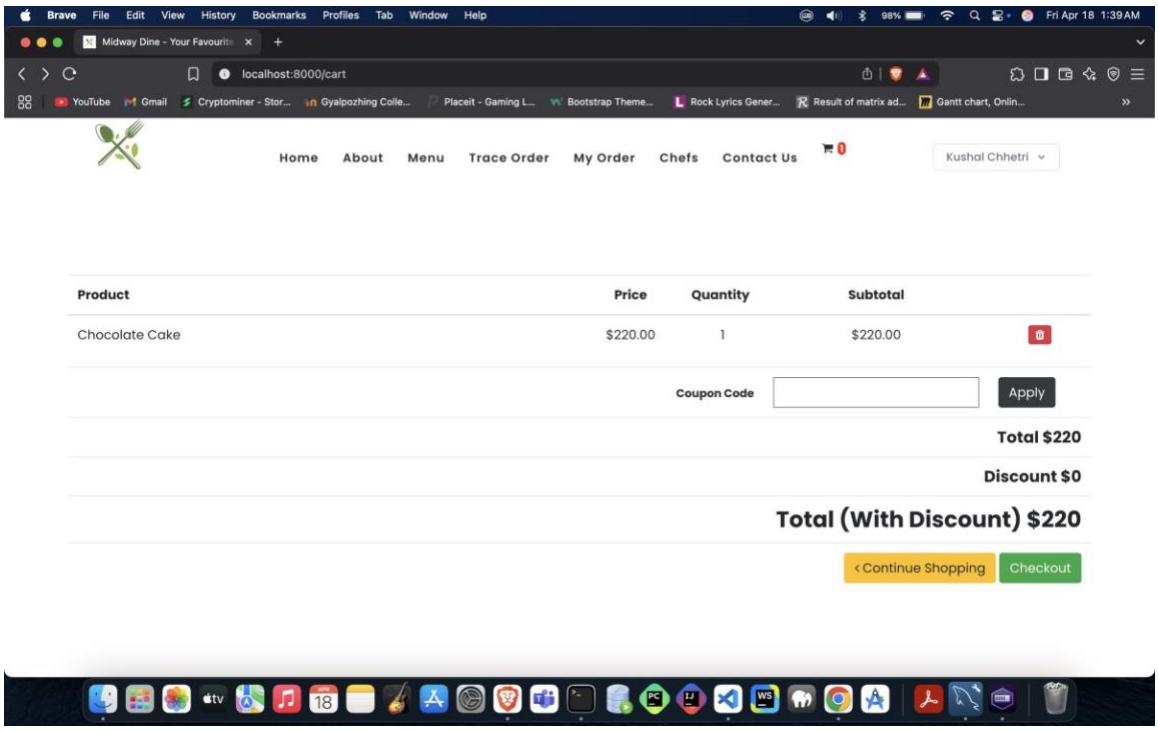
The following screenshots visually demonstrate the core functionalities of the Laravel E-Commerce System:

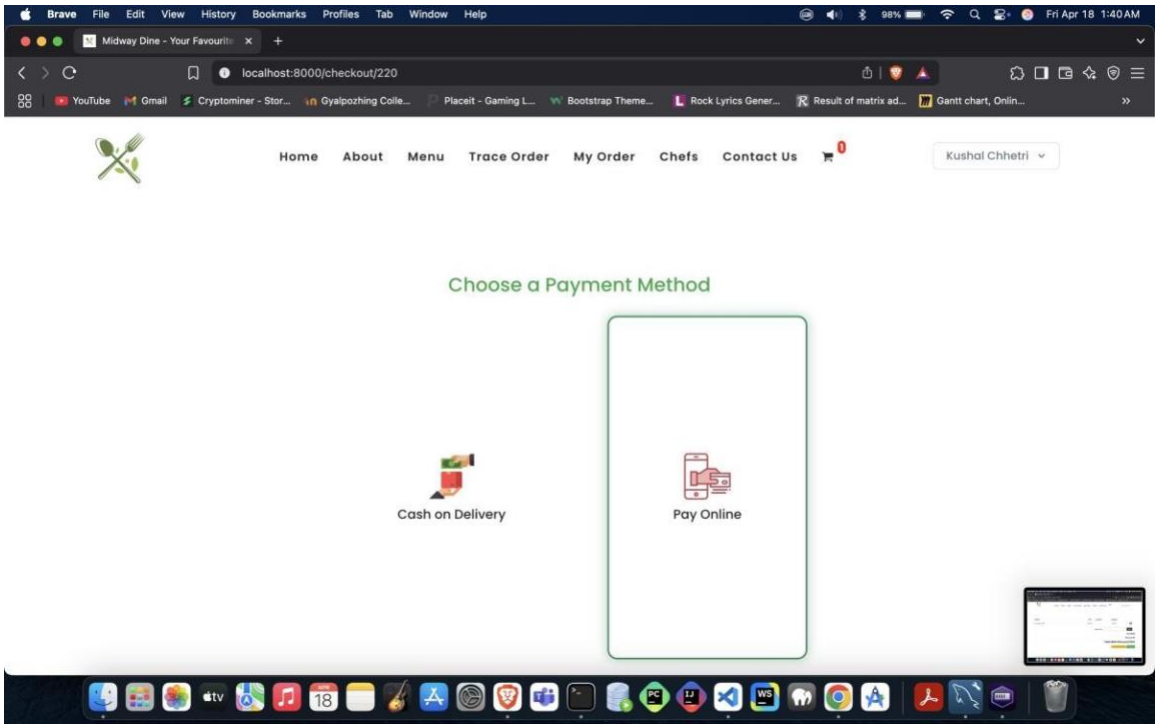
Home Page:



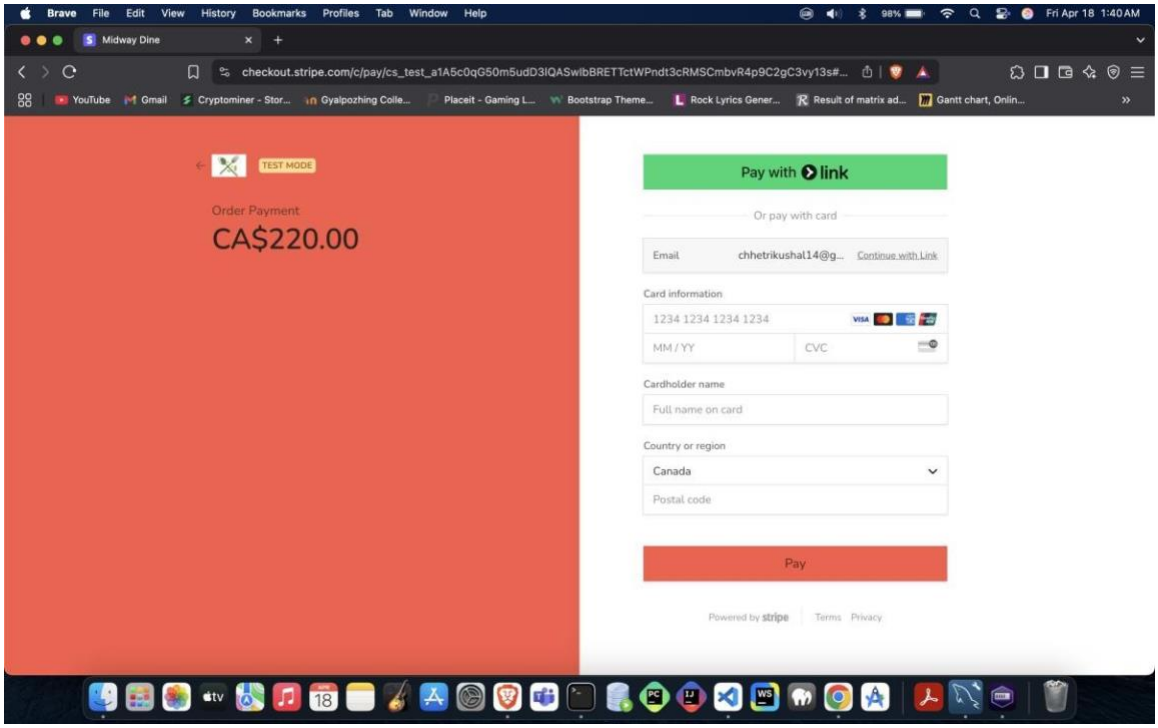

Laravel
localhost:8000/user/profile
SAVE
Two Factor Authentication
Add additional security to your account using two factor authentication.
You have not enabled two factor authentication.
When two factor authentication is enabled, you will be prompted for a secure, random token during authentication. You may retrieve this token from your phone's Google Authenticator application.
ENABLE
Delete Account
Permanently delete your account.
Once your account is deleted, all of its resources and data will be permanently deleted. Before deleting your account, please download any data or information that you wish to retain.
DELETE ACCOUNT

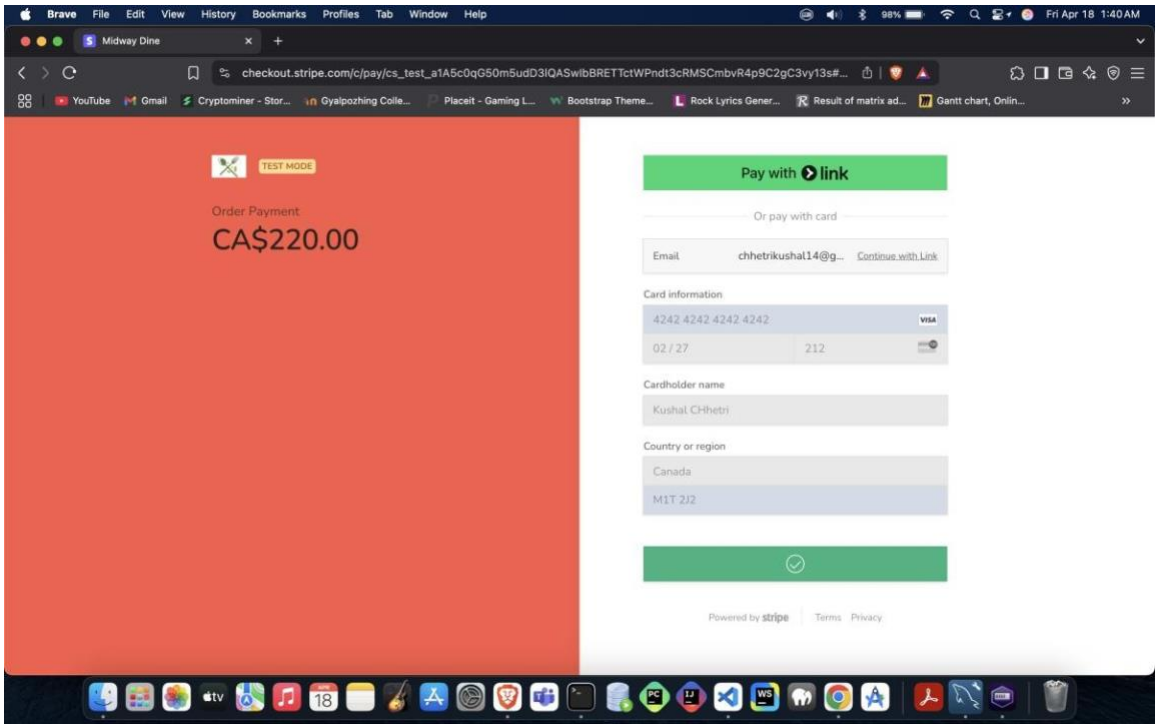
Checkout:


localhost:8000/cart
Home
About
Menu
Trace Order
My Order
Chefs
Contact Us
0
Kushal Chhetri
Product
Price
Quantity
Subtotal
Chocolate Cake
$220.00
1
$220.00
Coupon Code
Apply
Total $220
Discount $0
Total (With Discount) $220
Continue Shopping
Checkout



Payment Gateway:




Midway Dine
checkout.stripe.com/c/pay/cs_test_a1A5c0qG50m5udD3IQASwlbBRETTctWPndt3cRMSCmbvR4p9C2gC3vy13s#...
TEST MODE
Order Payment
CA$220.00
Pay with link
Or pay with card
Email
chhetrikushal14@g...
Continue with Link
Card information
4242 4242 4242 4242
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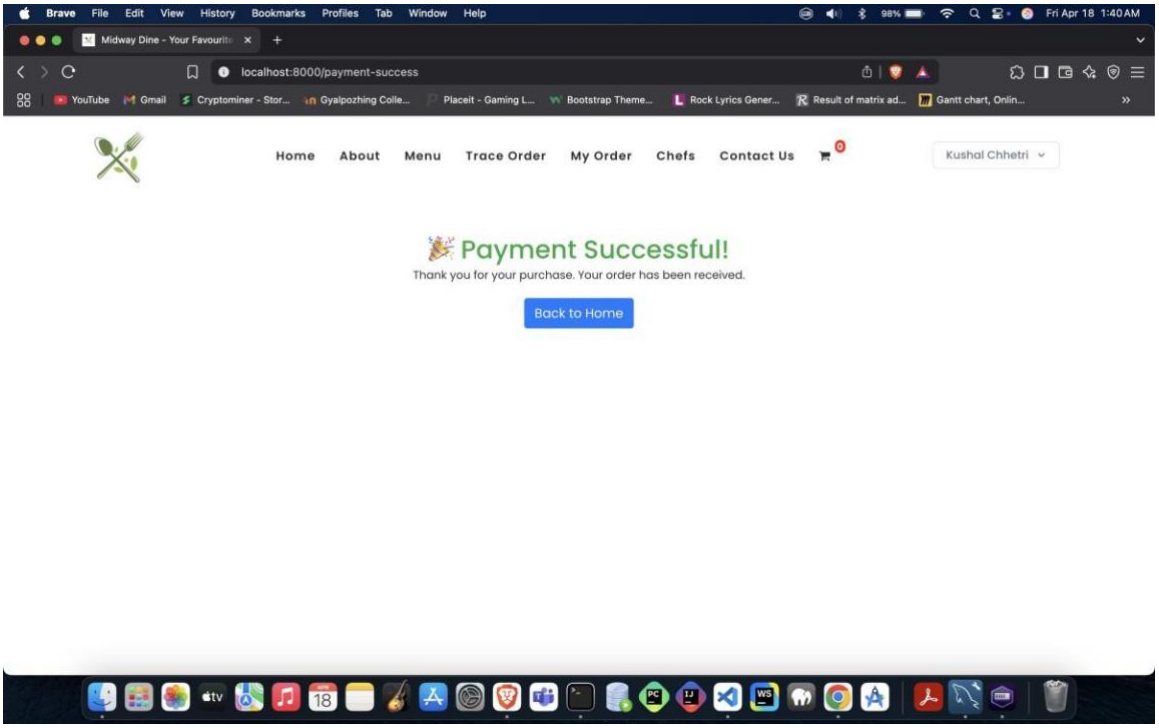
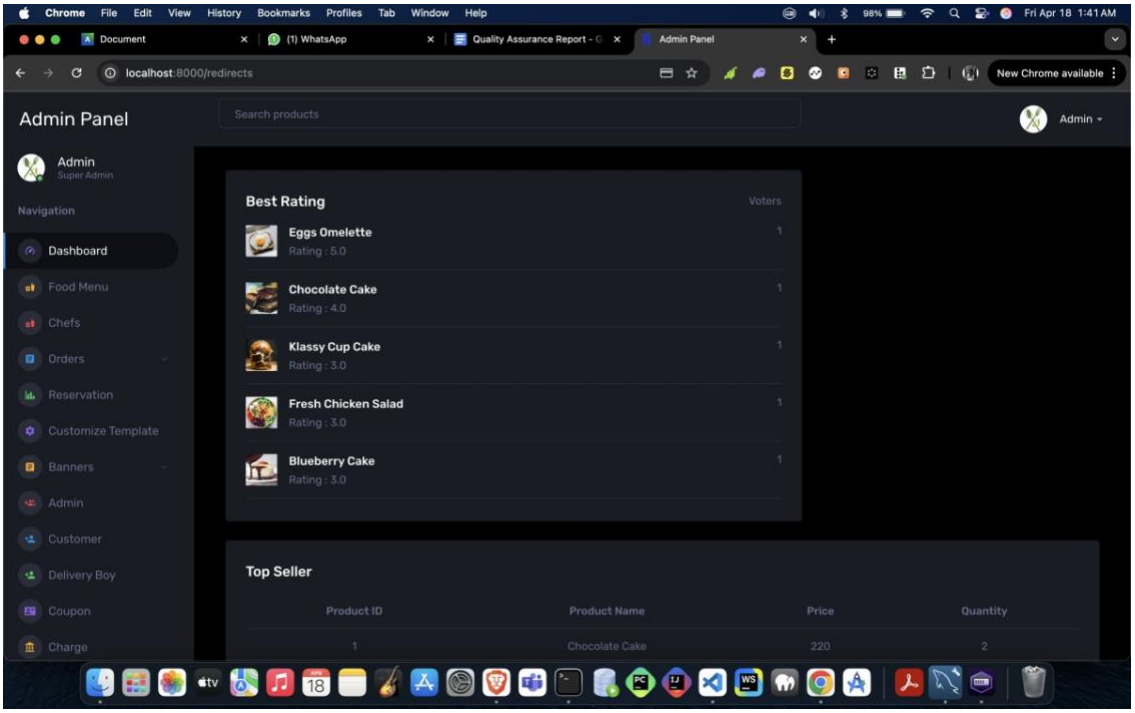

Midway Dine - Your Favourite
localhost:8000/payment-success
Home
About
Menu
Trace Order
My Order
Chefs
Contact Us
Kushal Chhetri
Payment Successful!
Thank you for your purchase. Your order has been received.
Back to Home

Admin Panel:


Admin Panel
Search products
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Customize Template
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Delivery Boy
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Charge
Best Rating
Voters
Eggs Omelette
Rating : 5.0
Chocolate Cake
Rating : 4.0
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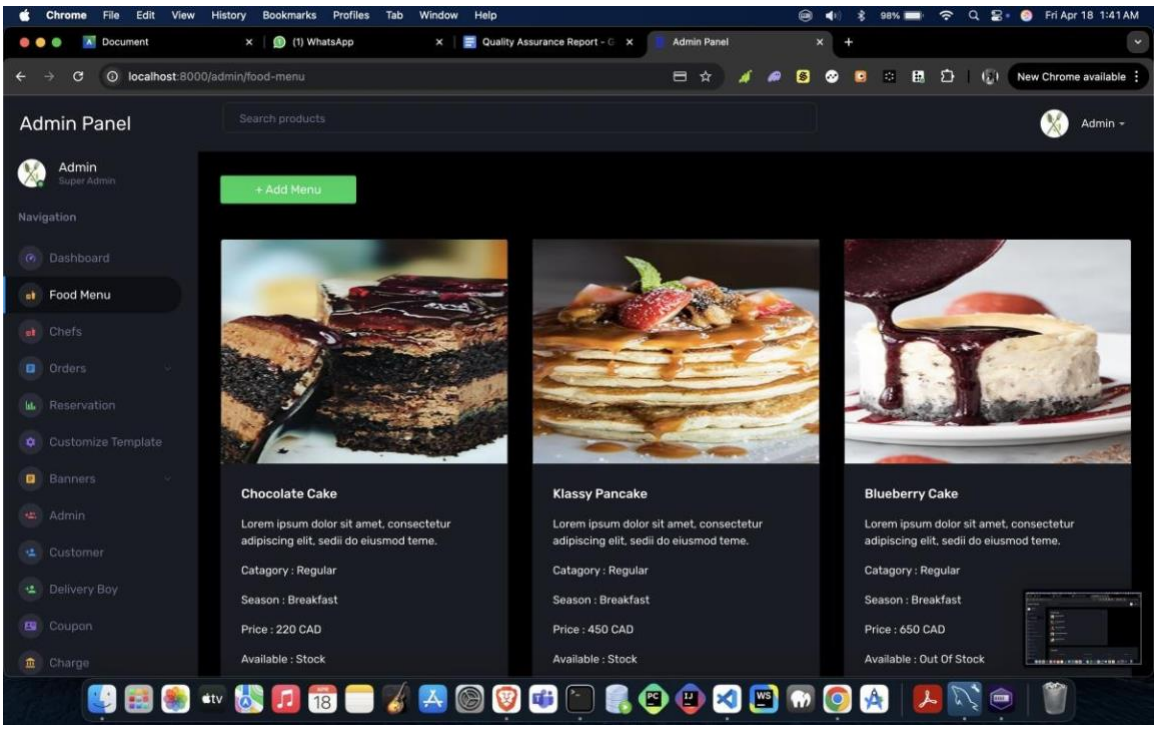
Rating : 3.0
Top Seller
Product ID
Product Name
Price
Quantity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Chocolate Cake
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Catagory : Regular
Season : Breakfast
Price : 220 CAD
Available : Stock
Klassy Pancake
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Catagory : Regular
Season : Breakfast
Price : 450 CAD
Available : Stock
Blueberry Cake
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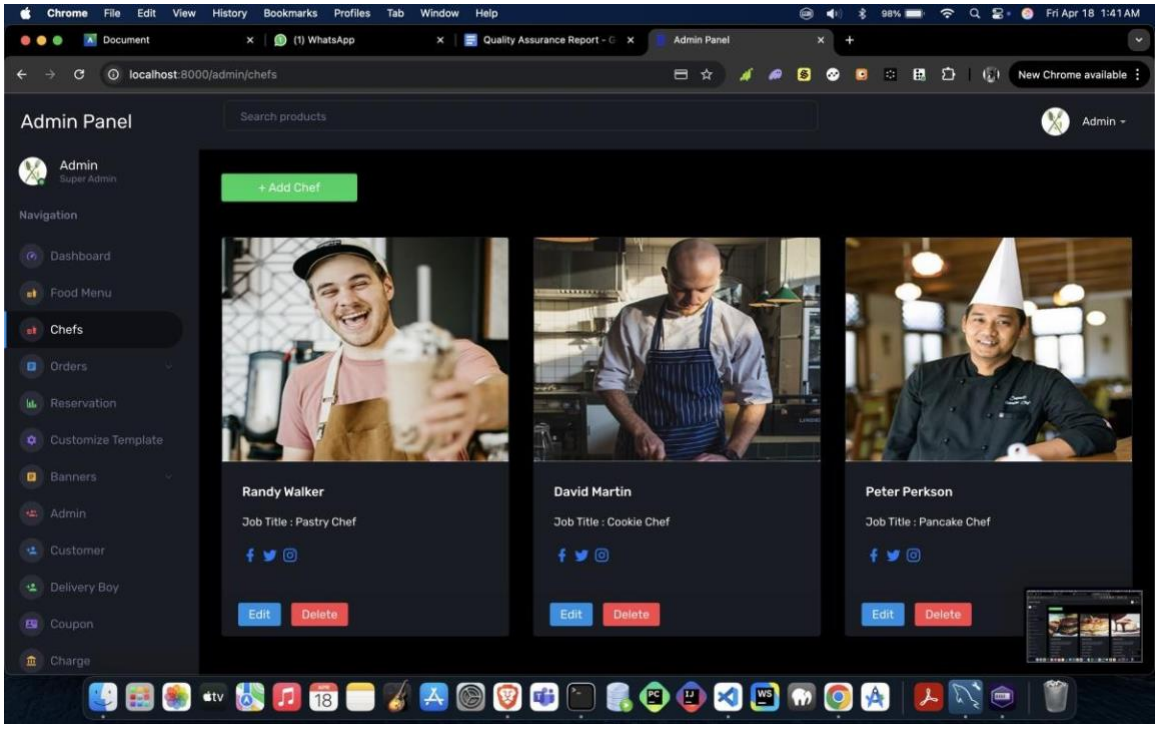
Catagory : Regular
Season : Breakfast
Price : 650 CAD
Available : Out Of Stock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Charge
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Edit
Delete
Peter Perkson
Job Title : Pancake Chef
Edit
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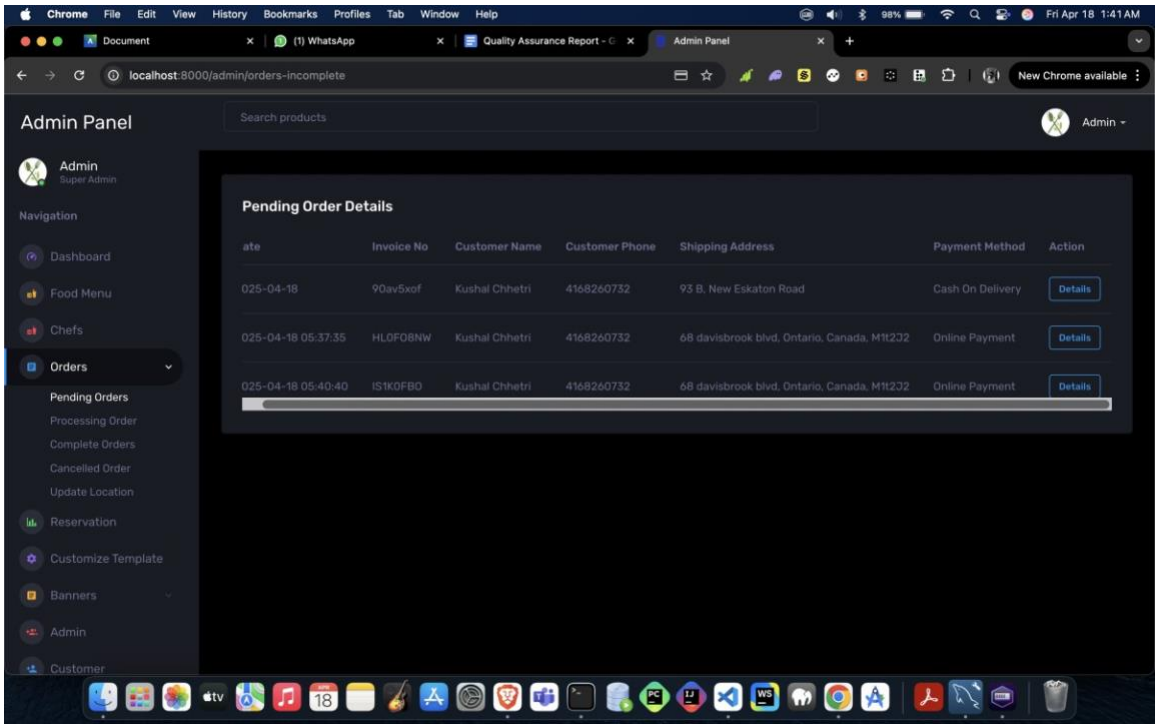
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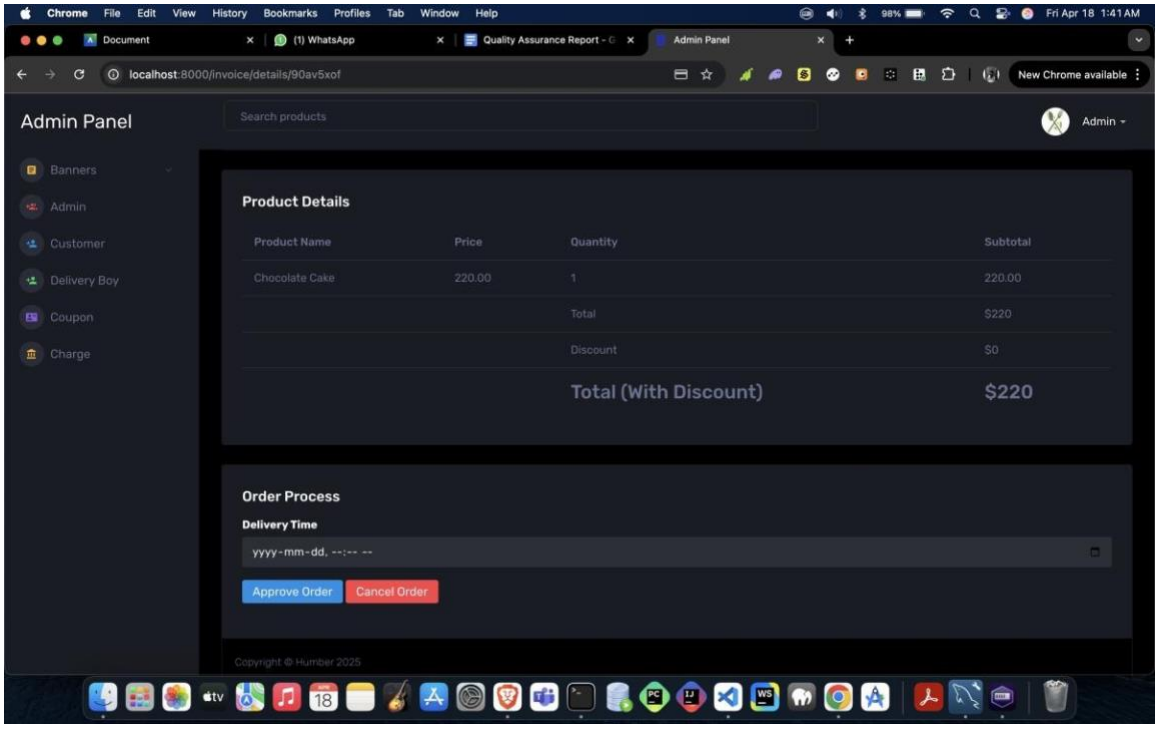
Admin Panel
Search products
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Product Details
Product Name
Price
Quantity
Subtotal
Chocolate Cake
220.00
1
220.00
Total
$220
Discount
$0
Total (With Discount)
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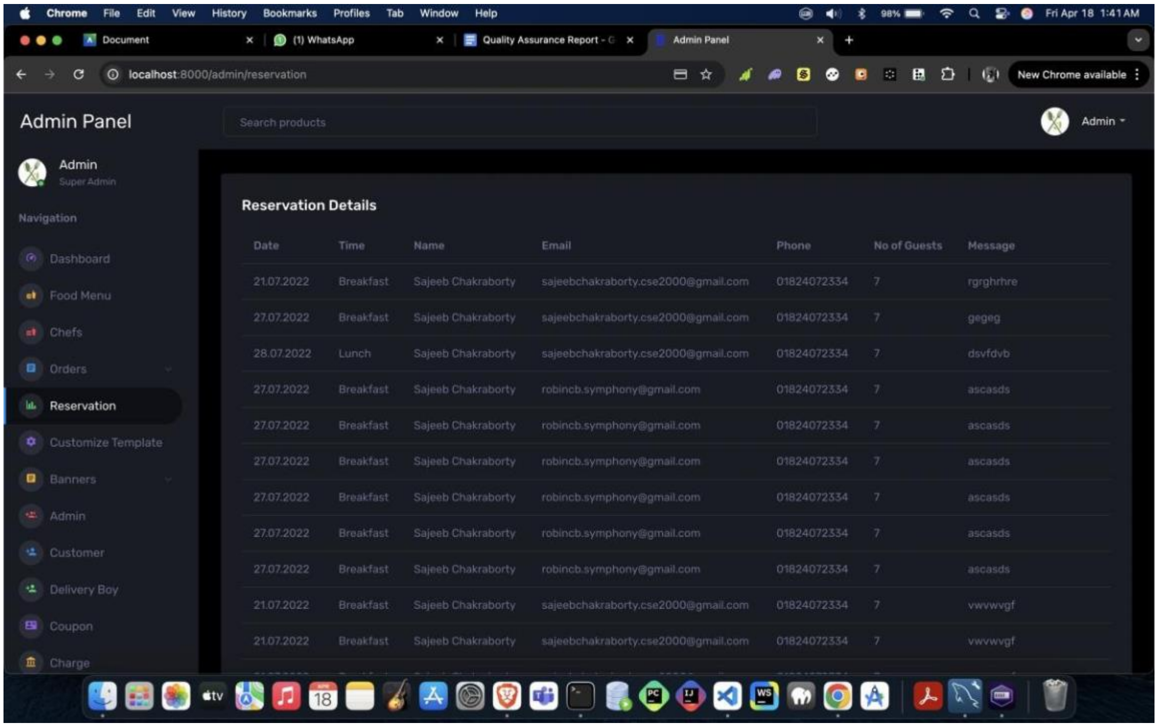
Order Process
Delivery Time
yyyy-mm-dd, --:-- --
Approve Order
Cancel Order
Copyright © Humber 2025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Charge
Reservation Details
Date Time Name Email Phone No of Guests Message
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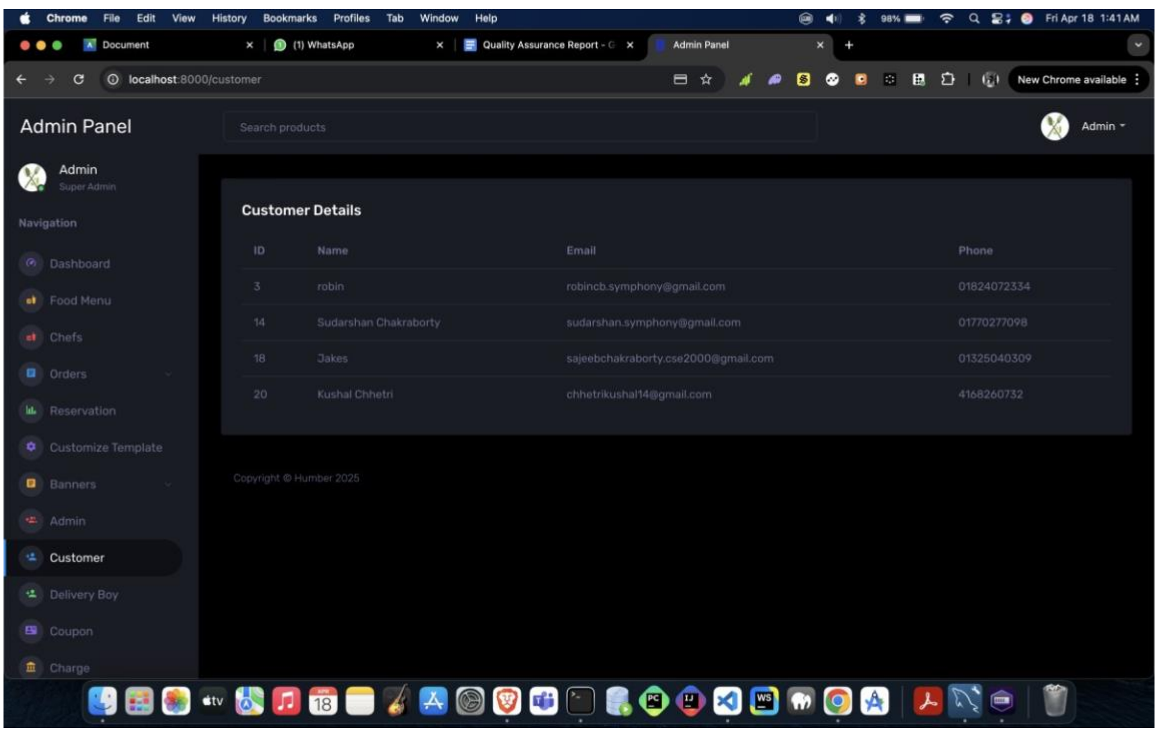
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Delivery Boy
Coupon
Charge
Customer Details
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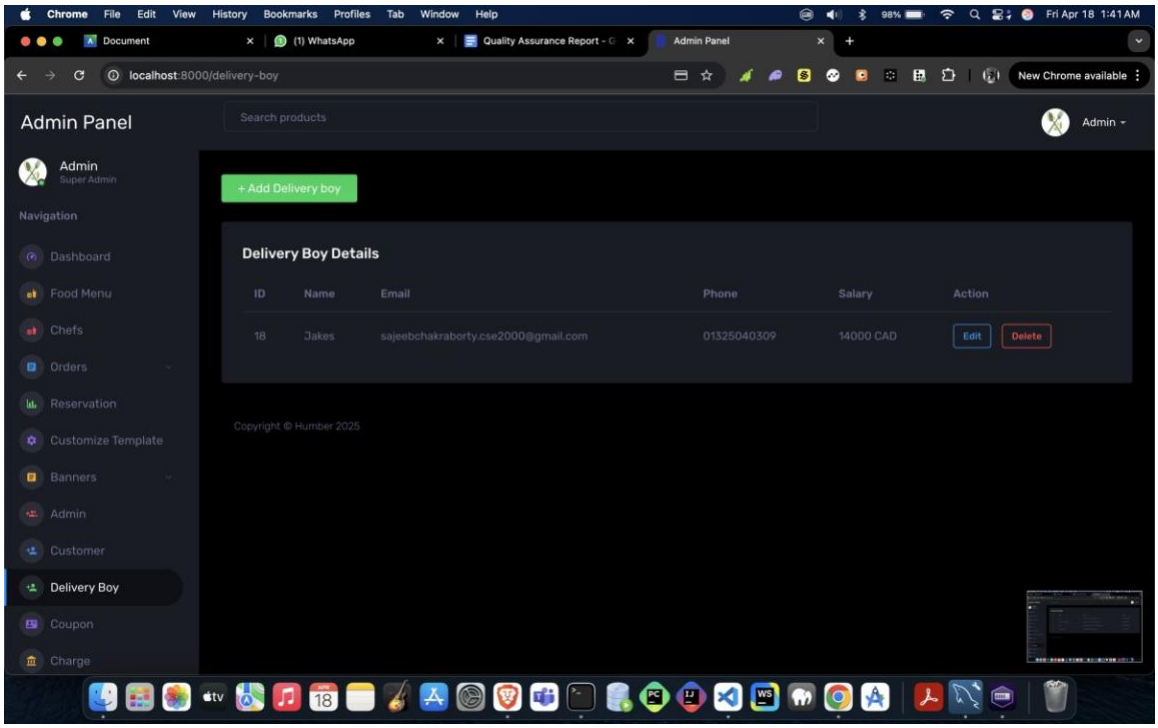
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Coupon
Charge
+ Add Delivery boy
Delivery Boy Details
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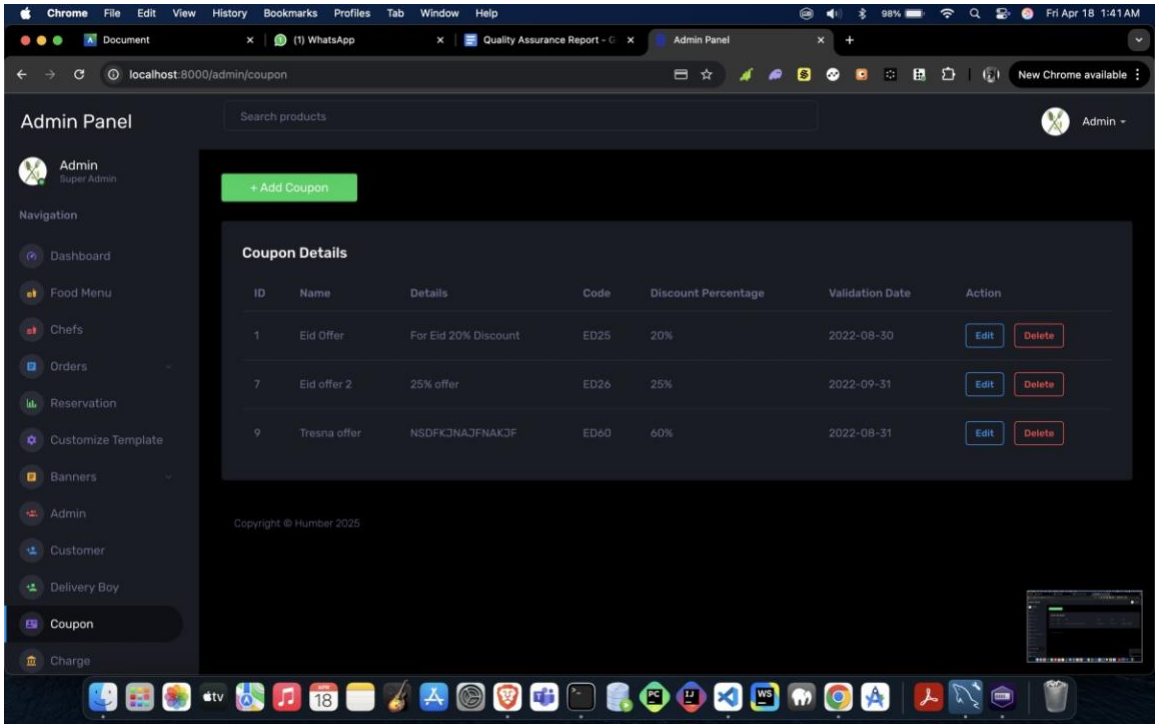
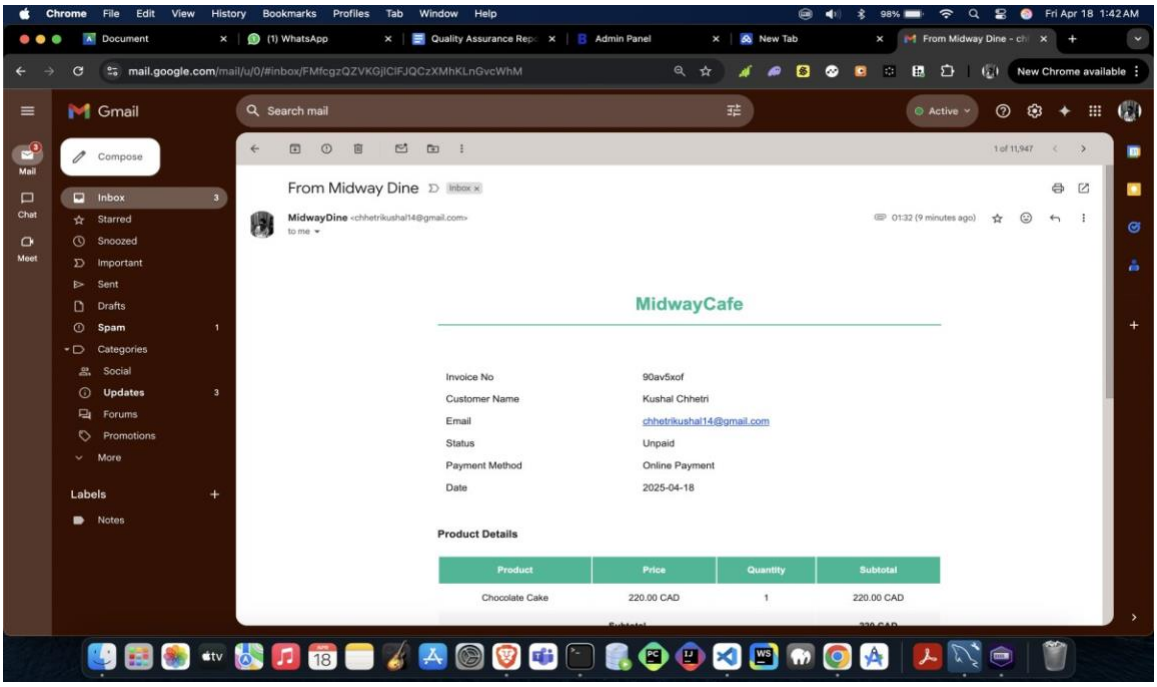
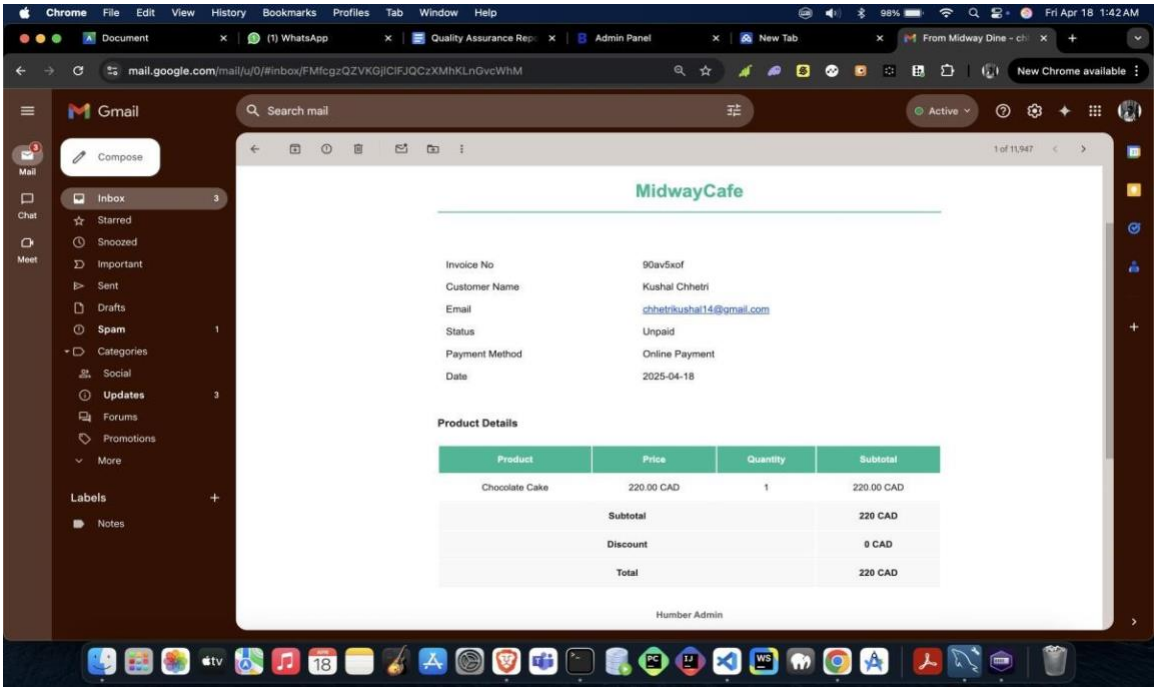
Delete
Copyright © Humber 2025
localhost:8000/delivery-boy
New Chrome available


Admin Panel
Search products
Admin
Admin
Super Admin
Navigation
Dashboard
Food Menu
Chefs
Orders
Reservation
Customize Template
Banners
Admin
Customer
Delivery Boy
Coupon
Charge
+ Add Coupon
Coupon Details
ID
Name
Details
Code
Discount Percentage
Validation Date
Action
1
Eid Offer
For Eid 20% Discount
ED25
20%
2022-08-30
Edit
Delete
7
Eid offer 2
25% offer
ED26
25%
2022-09-31
Edit
Delete
9
Tresna offer
NSDFKJNAJFNAKJF
ED60
60%
2022-08-31
Edit
Delete
Copyright © Humber 2025
localhost:8000/admin/coupon
New Chrome available

Email Notification:





Order Receipt: