Golden Fork

FULLSTACK WEB PROJECT

Waterlily Labs Assessment

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https://github.com/wathsalaggg/product-dashboard.git

Contents

Introduction

This document provides comprehensive technical documentation for the **Product Dashboard and Shopping Cart system**, a hybrid web application leveraging both ASP.NET MVC with Razor Views and React.js for the user interface. This solution represents a modern approach to web development, combining the strengths of server-side rendering with client-side interactivity.

The application serves as a product management dashboard with integrated e-commerce functionality, allowing users to browse, search, and filter products while maintaining a shopping cart across sessions. The implementation follows industry best practices for scalability, maintainability, and performance.

Project Objectives

Primary Business Objectives

1. **Create an intuitive product management dashboard** that allows users to efficiently browse, search, and manage product inventory
2. **Implement a seamless shopping experience** with persistent cart functionality across sessions
3. **Deliver a responsive application** that provides consistent user experience across desktop, tablet, and mobile devices
4. **Increase conversion rates** through improved product discovery and streamlined checkout process

Technical Objectives

1. **Implement hybrid architecture** leveraging both ASP.NET MVC Razor Views and React.js for optimal performance and developer experience
2. **Establish clear separation of concerns** between presentation logic (React/Razor) and business logic (.NET controllers/services)
3. **Create reusable component library** for consistent UI patterns and reduced

Project Overview

- Hybrid Architecture
    - Utilizes both server-rendered Razor Views and client-side React components
- Responsive Design

    - Fully functional across desktop, tablet, and mobile devices
- Dynamic Functionality
    - Implements real-time search, filtering, and cart management
- Modern Development Practices
    - Incorporates reusable components, AJAX communication, and clean separation of concerns

Technology Stack

Backend Technology Stack (.NET)

Core Framework:

- .NET 8.0
- ASP.NET Core MVC
- Entity Framework Core 8.x

Database:

- MySQL 8.0+ (via Pomelo.EntityFrameworkCore.MySql)
- Database migrations with EF Core

API & Services:

- RESTful API Controllers
- JSON serialization with System.Text.Json
- Swagger/OpenAPI documentation

Session Management:

- Distributed memory cache
- Session state management

Development Tools:

- Swagger UI for API testing
- EF Core migrations for database management

Frontend Technology Stack (Dual UI Approach)

Primary: Razor Views

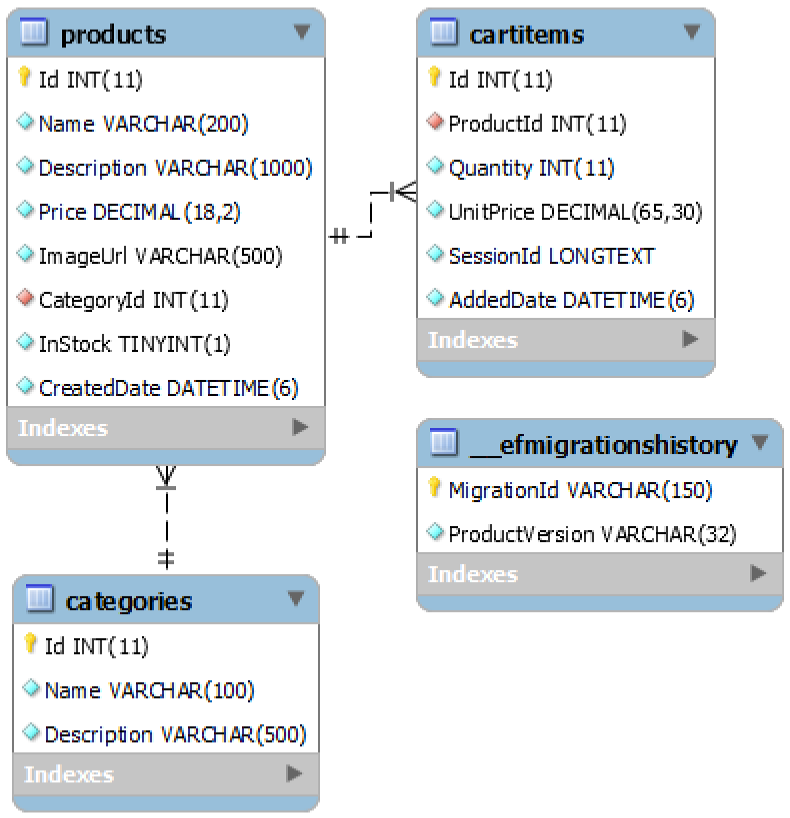
- ASP.NET Core Razor Pages
- Server-side rendering

- jQuery (implied by assessment requirements)
- Bootstrap or custom CSS (implied by responsive requirements)

Optional: React SPA

- React 19.1.1
- TypeScript
- Vite (build tool)
- Tailwind CSS 4.x
- Headless UI components
- Heroicons
- Framer Motion (animations)
- TanStack React Query (data fetching)
- React Router DOM 7.x
- Axios (HTTP client)

Entity Relationship Diagram (ERD)



Architecture Patterns

Backend

- MVC Pattern (Controllers, Views)
- Service Layer (ProductService)
- Repository Pattern (EF Core)
- Dependency Injection

Frontend

- **Razor Views**: Traditional server-rendered pages with jQuery AJAX
- **React**: Component-based SPA (optional alternative)
- Shared API endpoints serving both UIs

Key Integration Points

1. Razor Views as Primary UI
   - Main application uses server-rendered Razor views
2. React as Optional SPA
   - Alternative UI available but not required
3. Shared API Backend
   - Both UIs consume the same .NET API endpoints
4. Session Management
   - Shopping cart stored in server sessions for both UIs
5. Database Integration
   - EF Core with MySQL for data persistence

Development Workflow

1. **Primary Development**: Razor Views with jQuery
2. **Optional React Path**: Parallel SPA development
3. **API-First Approach**: Backend serves both UI approaches
4. **Database Management**: EF Core migrations with MySQL

Implemented Features

Core Requirements Met

- **Product List**: Responsive grid with pagination (>10 items) using partial views
- **Search Functionality**: Real-time filtering with text highlighting
- **Category Filtering**: AJAX-based filtering without page refresh
- **Shopping Cart**: Add/remove items, quantity management, total price calculation
- **Reusable JS Functions**: Generic modal and AJAX helpers
- **Responsive Layout**: Mobile, tablet, and desktop compatible
- **Details Preview**: Modal-based product details with image download

Technical Implementation

- MVC separation with proper controller/view structure
- jQuery AJAX for dynamic content loading
- Partial views for pagination and product rendering
- Session-based cart management
- React alternative UI (optional)

Responsiveness Implementation

Breakpoints Handled:

- **Mobile**: < 768px (vertical layout, hamburger menu)
- **Tablet**: 768px - 1024px (adjusted grid, compact navigation)
- **Desktop**: > 1024px (full grid, sidebar filters)

Responsive Techniques:

- CSS Flexbox/Grid for product layout
- Media queries for adaptive styling
- Touch-friendly interfaces for mobile
- Conditional rendering based on screen size

Challenges Faced & Solutions

Backend Challenges

1. **Database Integration**
    - Challenge: MySQL compatibility with EF Core
    - Solution: Used Pomelo.EntityFrameworkCore.MySql provider
2. **Session Management**
    - Challenge: Maintaining cart state across requests
    - Solution: Implemented distributed memory cache with session
3. **API Design**

    - Challenge: Creating endpoints for both Razor and React
    - Solution: RESTful design with consistent JSON responses

Frontend Challenges

1. **Dual UI Approach**
    - Challenge: Maintaining two frontend implementations
    - Solution: Shared API endpoints with UI-specific adaptations
2. **Real-time Search**
    - Challenge: Performance with large product catalogs
    - Solution: Debounced API calls with server-side filtering
3. **Cart Synchronization**
    - Challenge: Keeping UI in sync with server state
    - Solution: jQuery DOM manipulation after AJAX calls
4. **Modal Management**
    - Challenge: Reusable modal system
    - Solution: Created generic JavaScript modal controller

React-Specific Challenges

1. **Data Fetching**
    - Challenge: Efficient API calls with caching
    - Solution: Used TanStack React Query

Error Handling

Client-Side Errors

- AJAX error handling with user feedback
- Form validation with clear error messages
- Fallback UI for failed API calls

Server-Side Errors

- Global exception handling middleware
- Structured error responses
- Logging implementation

Development & Build Tools

Backend

- .NET CLI
- Entity Framework Core CLI

Frontend

- Vite (for React build)
- TypeScript compiler
- ESLint + Prettier
- Tailwind CSS

Performance Optimizations

Implemented

- Pagination to limit data transfer
- Debounced search to reduce API calls
- EF Core query optimization
- Bundle splitting for React build

Future Improvements

- Response caching for static data
- CDN for static assets
- Database indexing optimization

Assessment Requirement Validation

Requirement	Status	Implementation Details
MVC Structure	Done	Proper separation with controllers, views, models
jQuery Usage	Done	AJAX calls, DOM manipulation, event handling
Responsiveness	Done	Mobile-first design with breakpoints
UI/UX Design	Done	Clean, professional interface
Code Quality	Done	Reusable functions, comments, standards
Functionality	Done	All required features implemented

Getting Started

Prerequisites:

- .NET 8.0 SDK
- Node.js 18+ (for React build)
- MySQL 8.0+
- Git

Installation:

1. Clone repository: git clone https://github.com/wathsalaggg/product-dashboard.git
2. Database setup: dotnet ef database update
3. Seed data: dotnet run SeedData
4. Run application: dotnet run
5. Or use .net run option

To see the frontend

1. In the terminal run "npm install"
2. Run -> dotnet run --environment Development --project ProductDashboardBackend.csproj
3. Go to http://localhost:49783/swagger/index.html
4. Run "npm run dev" in vs code

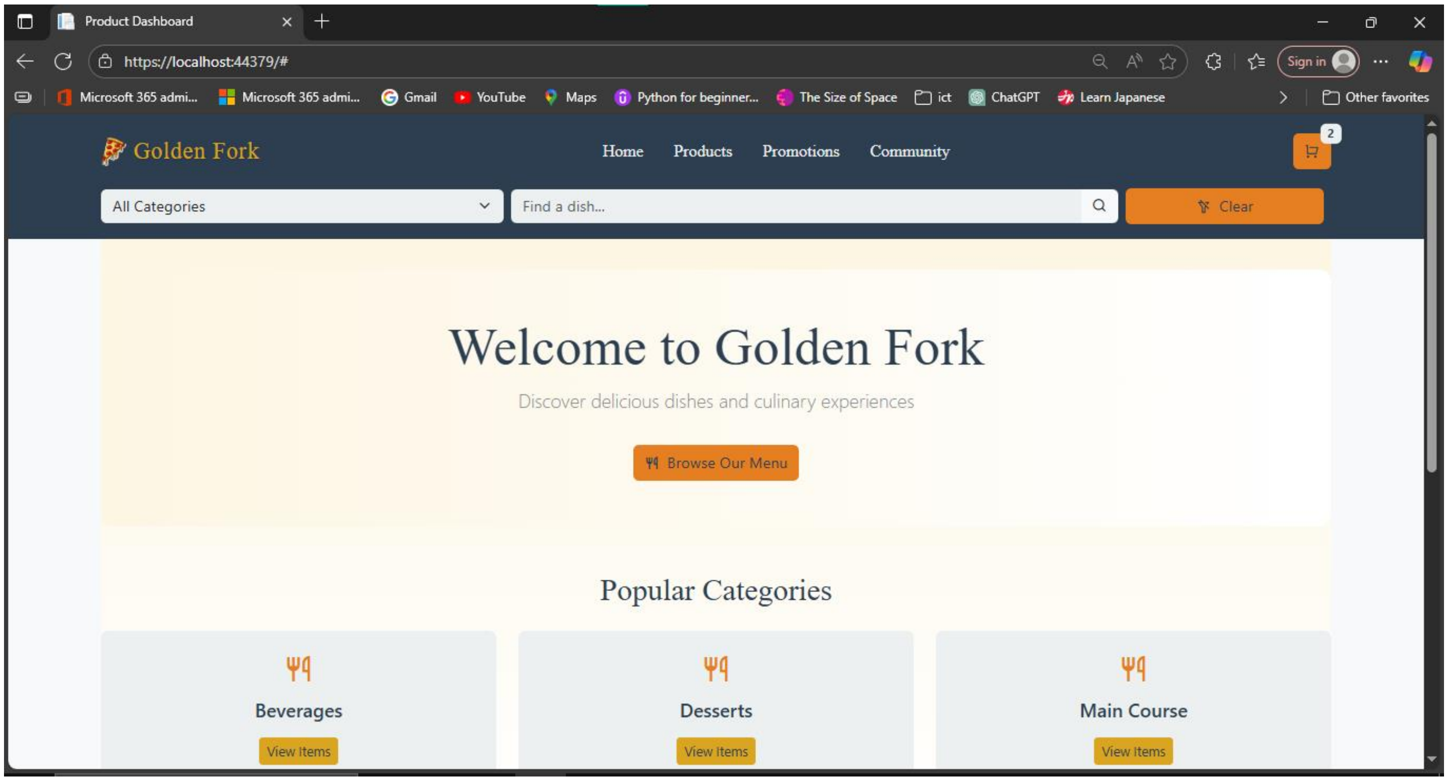
Future Enhancements

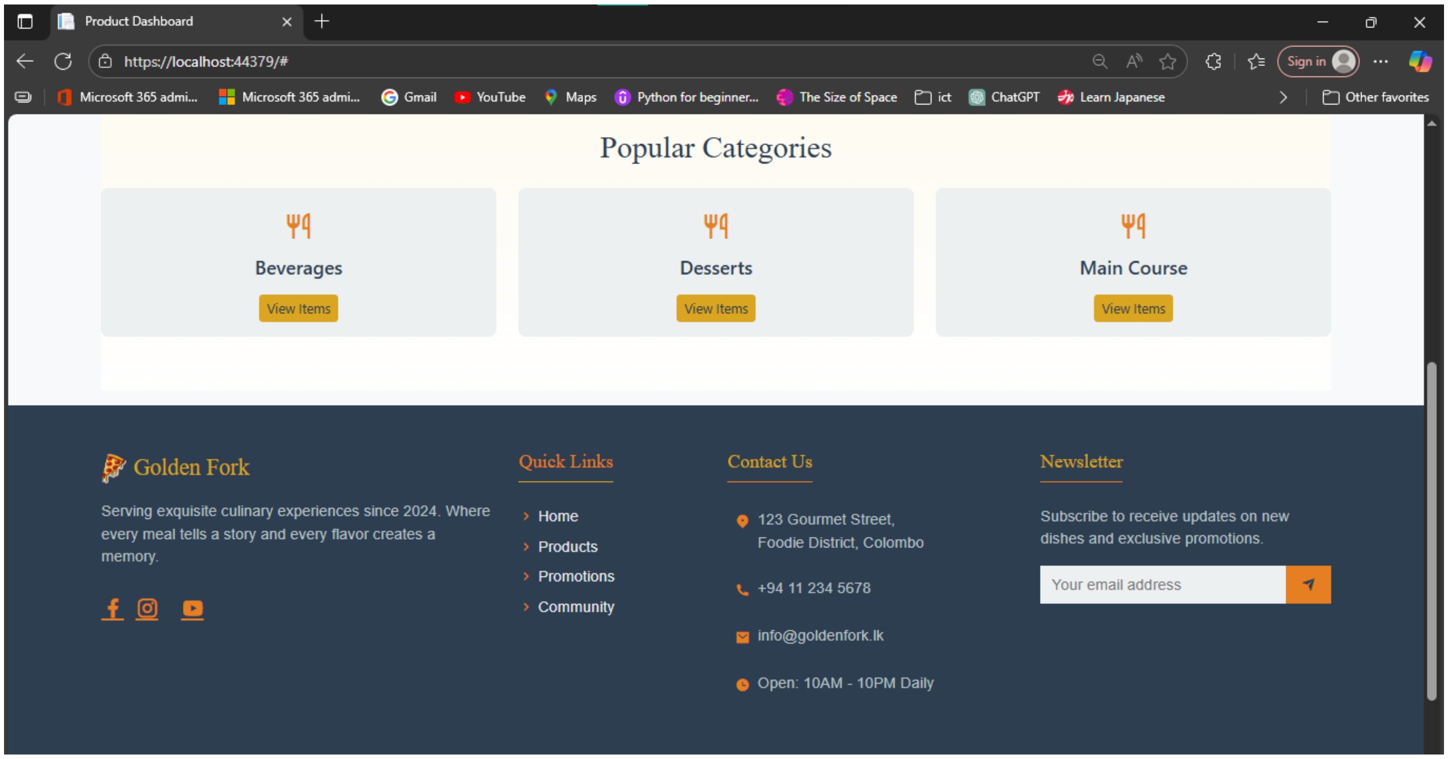
Planned Features:

- User authentication and profiles
- Payment integration
- Order history and tracking
- Product reviews and ratings
- Admin dashboard for product management

Screenshots

Home page





Serving exquisite culinary experiences since 2024. Where every meal tells a story and every flavor creates a memory.

123 Gourmet Street, Foodie District, Colombo

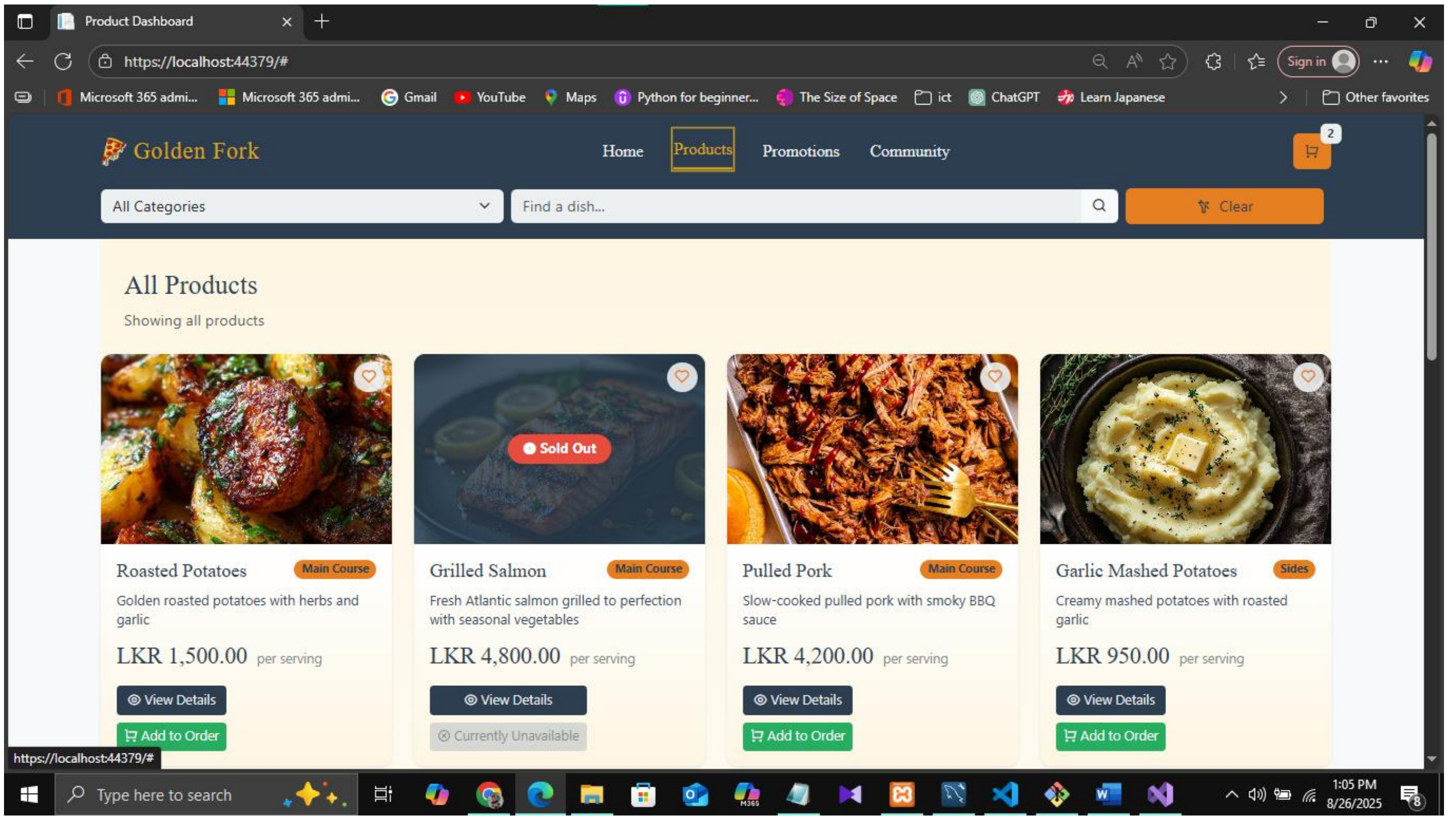
+94 11 234 5678

info@goldenfork.lk

Open: 10AM - 10PM Daily

Subscribe to receive updates on new dishes and exclusive promotions.

Products page



All Products

Showing all products

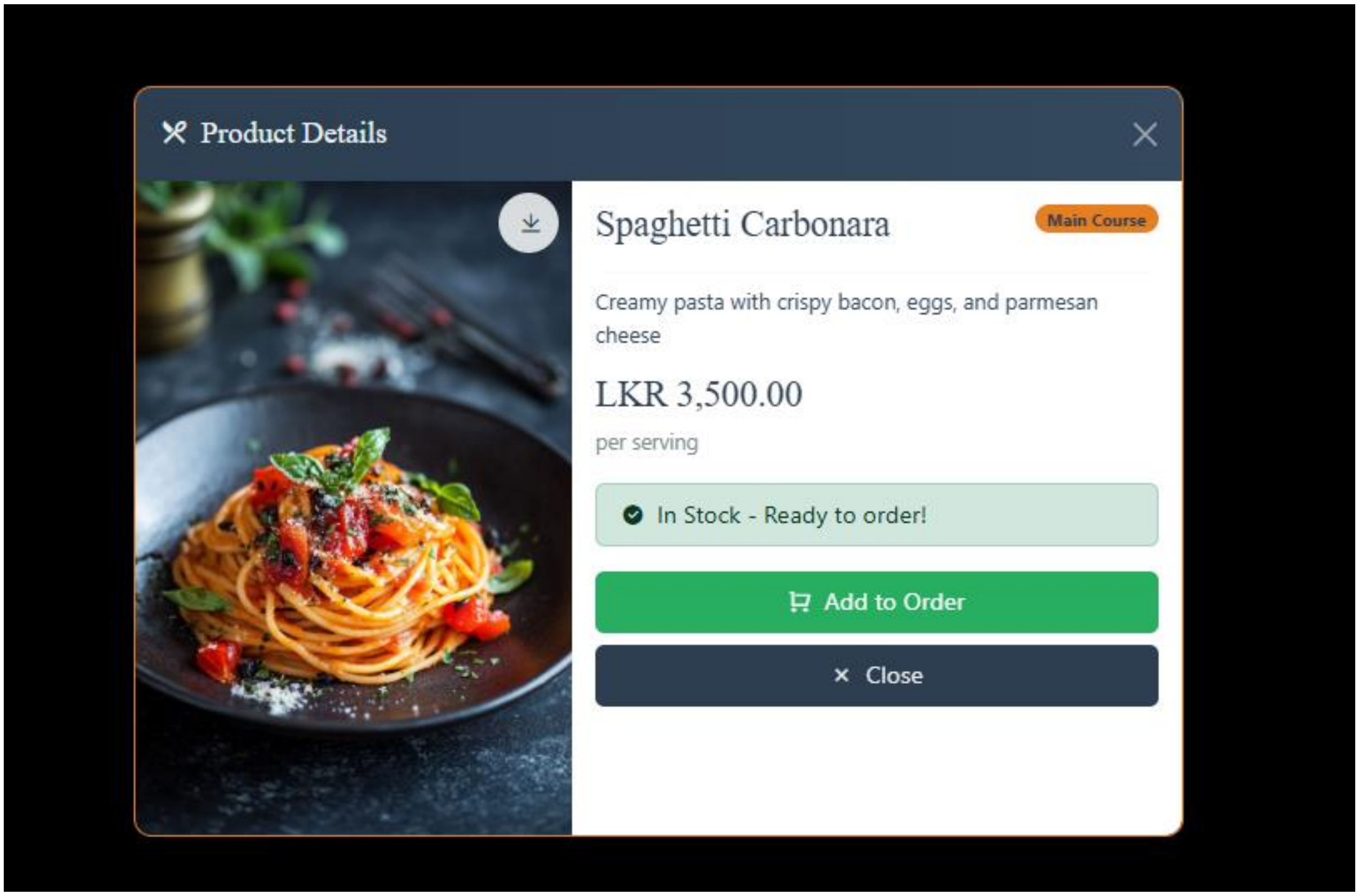
Roasted Potatoes — Main Course
Golden roasted potatoes with herbs and garlic
LKR 1,500.00 per serving

Grilled Salmon — Main Course
Fresh Atlantic salmon grilled to perfection with seasonal vegetables
LKR 4,800.00 per serving

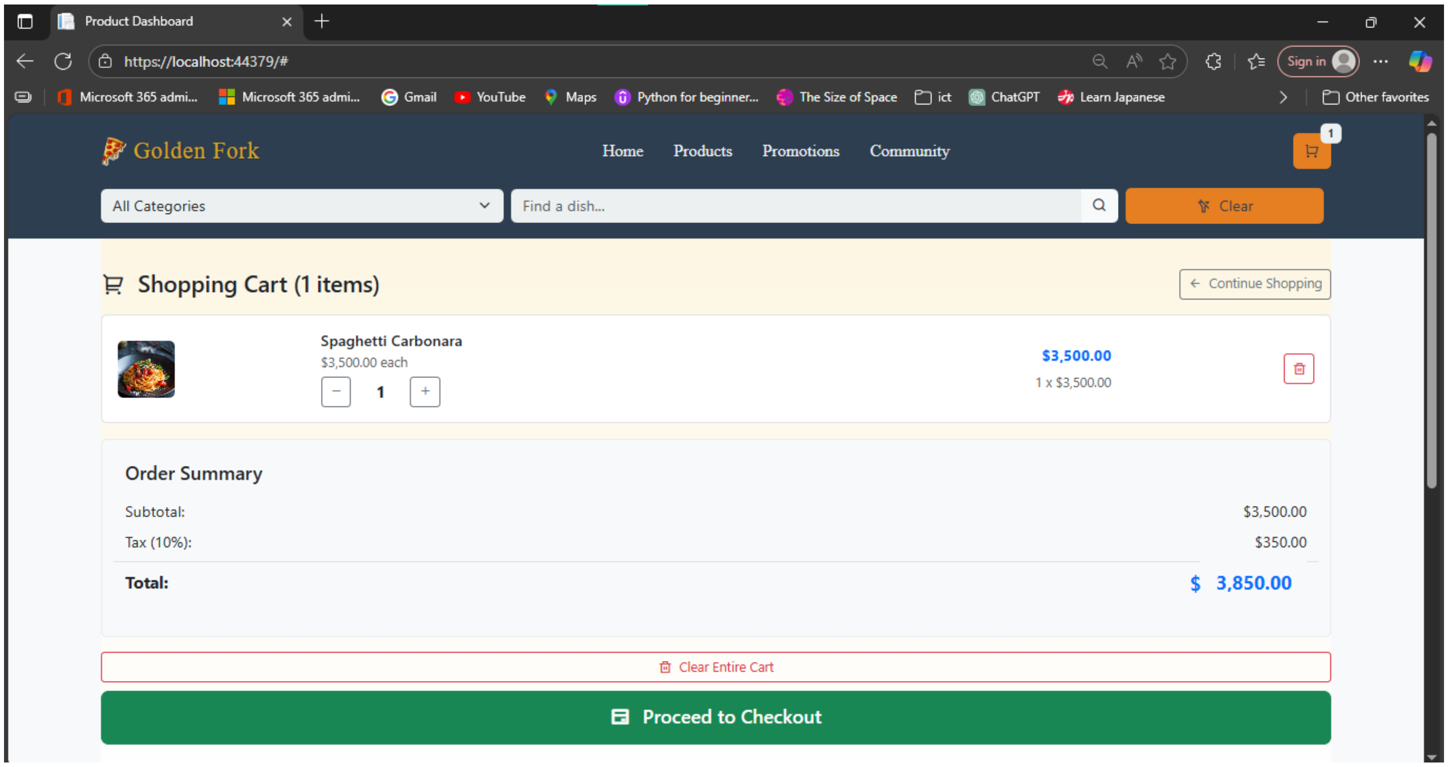
Pulled Pork — Main Course
Slow-cooked pulled pork with smoky BBQ sauce
LKR 4,200.00 per serving

Garlic Mashed Potatoes — Sides
Creamy mashed potatoes with roasted garlic
LKR 950.00 per serving

Modal


Product Details
Spaghetti Carbonara
Main Course
Creamy pasta with crispy bacon, eggs, and parmesan cheese
LKR 3,500.00
per serving
In Stock - Ready to order!
Add to Order
Close

Cart



Product Dashboard

https://localhost:44379/#

Golden Fork

Home Products Promotions Community

All Categories | Find a dish... | Clear

Shopping Cart (1 items)

Continue Shopping

Spaghetti Carbonara
$3,500.00 each
1

$3,500.00
1 x $3,500.00

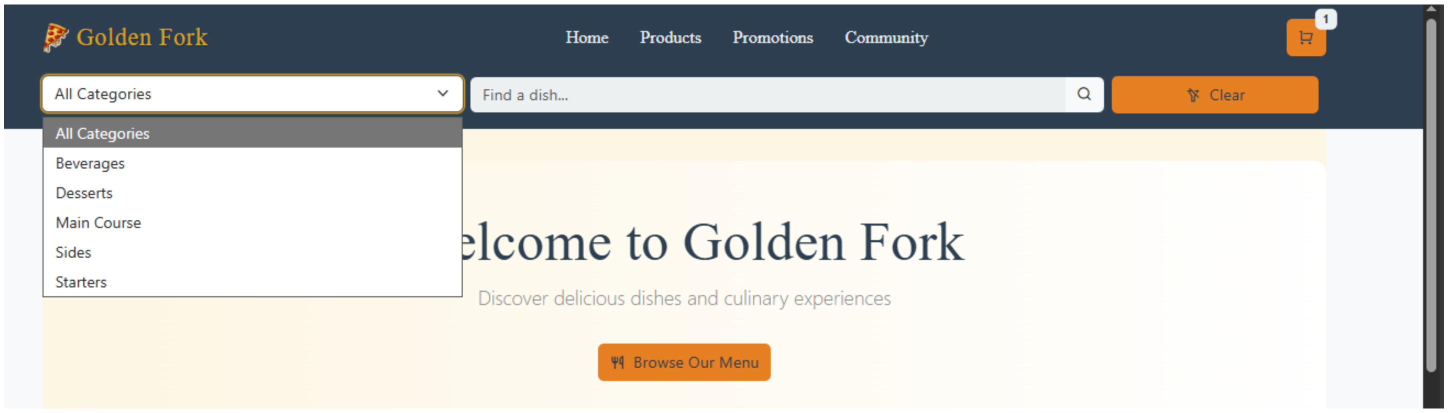
Order Summary

Subtotal:	$3,500.00
Tax (10%):	$350.00
Total:	$ 3,850.00

Clear Entire Cart

Proceed to Checkout

Filters



Golden Fork

Home Products Promotions Community

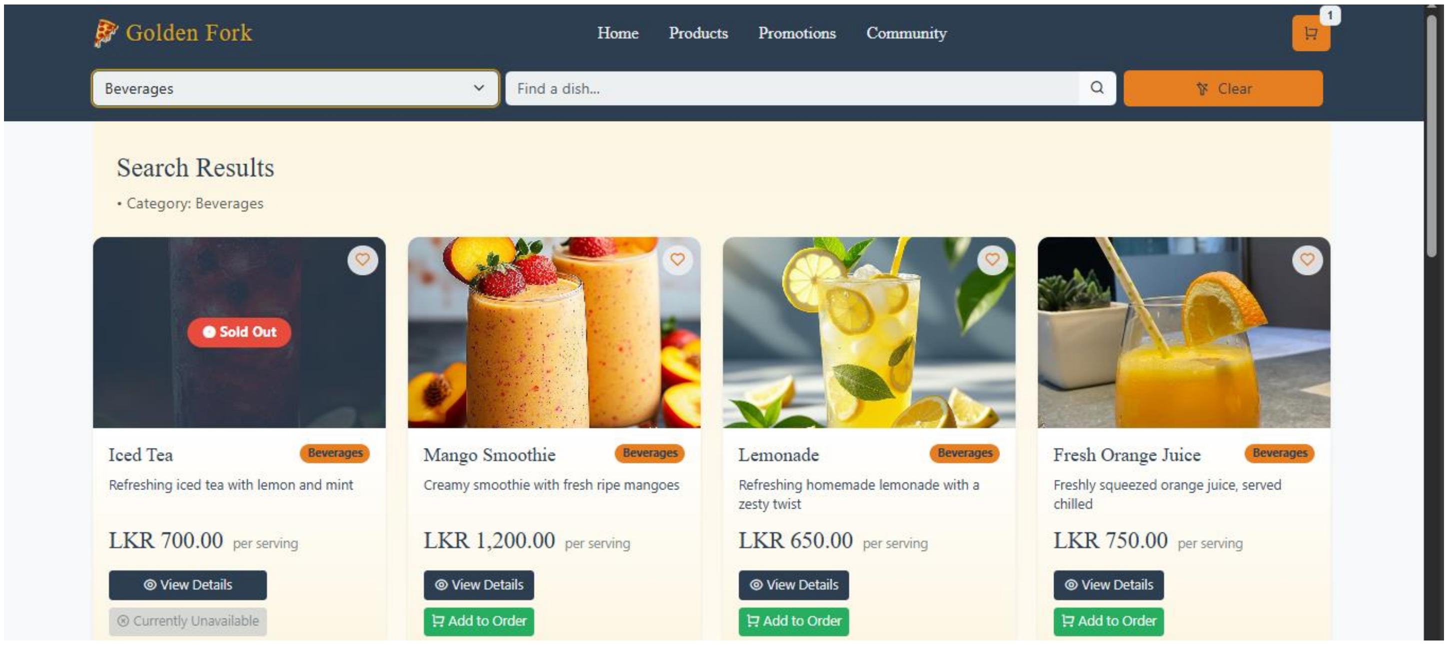
All Categories | Find a dish... | Clear

- All Categories
- Beverages
- Desserts
- Main Course
- Sides
- Starters

elcome to Golden Fork

Discover delicious dishes and culinary experiences

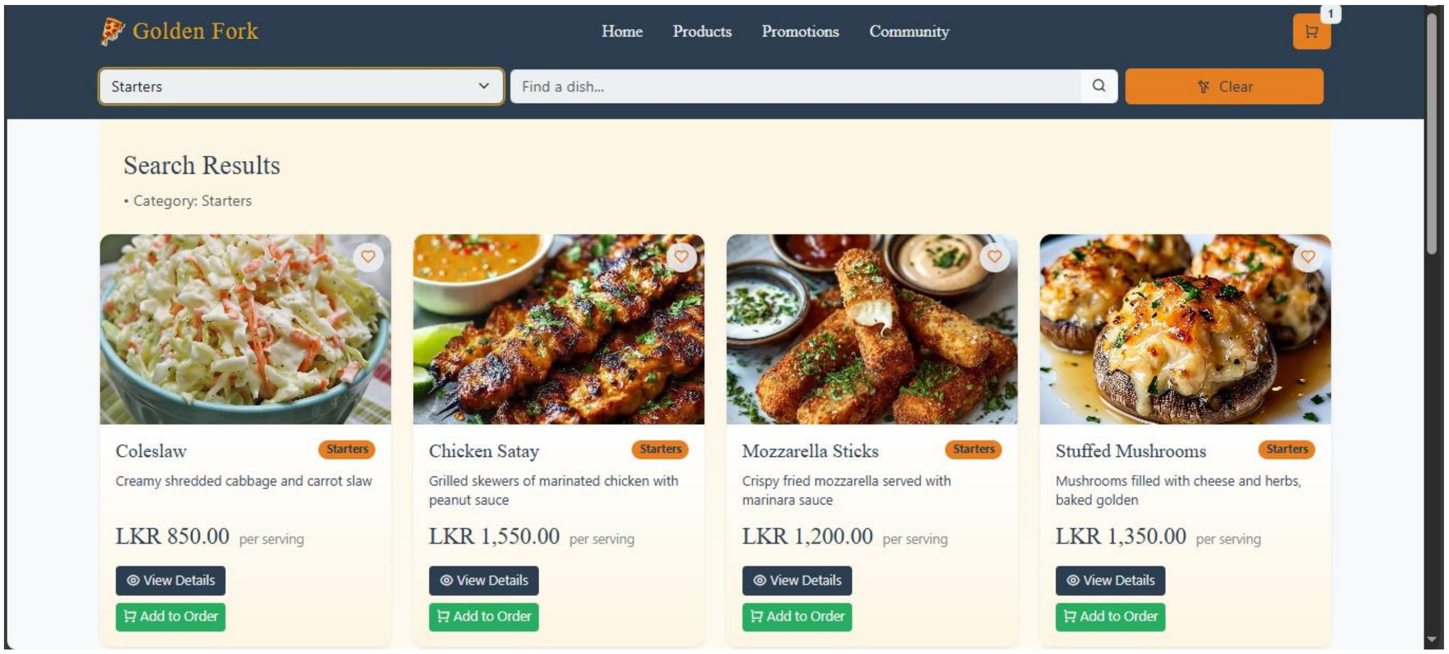
Browse Our Menu



Search Results

• Category: Beverages

Iced Tea · Beverages	Mango Smoothie · Beverages	Lemonade · Beverages	Fresh Orange Juice · Beverages
Refreshing iced tea with lemon and mint	Creamy smoothie with fresh ripe mangoes	Refreshing homemade lemonade with a zesty twist	Freshly squeezed orange juice, served chilled
LKR 700.00 per serving	LKR 1,200.00 per serving	LKR 650.00 per serving	LKR 750.00 per serving
View Details	View Details	View Details	View Details
Currently Unavailable	Add to Order	Add to Order	Add to Order

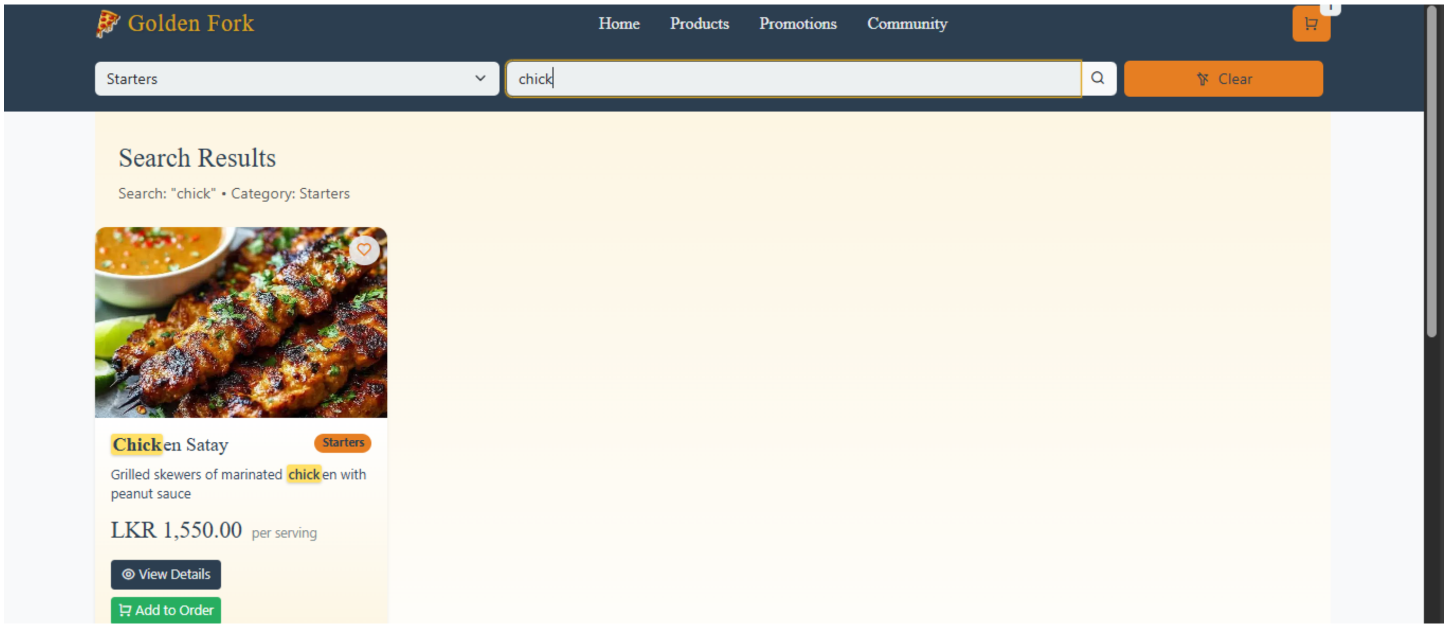


Search Results

• Category: Starters

Coleslaw · Starters	Chicken Satay · Starters	Mozzarella Sticks · Starters	Stuffed Mushrooms · Starters
Creamy shredded cabbage and carrot slaw	Grilled skewers of marinated chicken with peanut sauce	Crispy fried mozzarella served with marinara sauce	Mushrooms filled with cheese and herbs, baked golden
LKR 850.00 per serving	LKR 1,550.00 per serving	LKR 1,200.00 per serving	LKR 1,350.00 per serving
View Details	View Details	View Details	View Details
Add to Order	Add to Order	Add to Order	Add to Order

Highlight the keyword



Search Results

Search: "chick" • Category: Starters

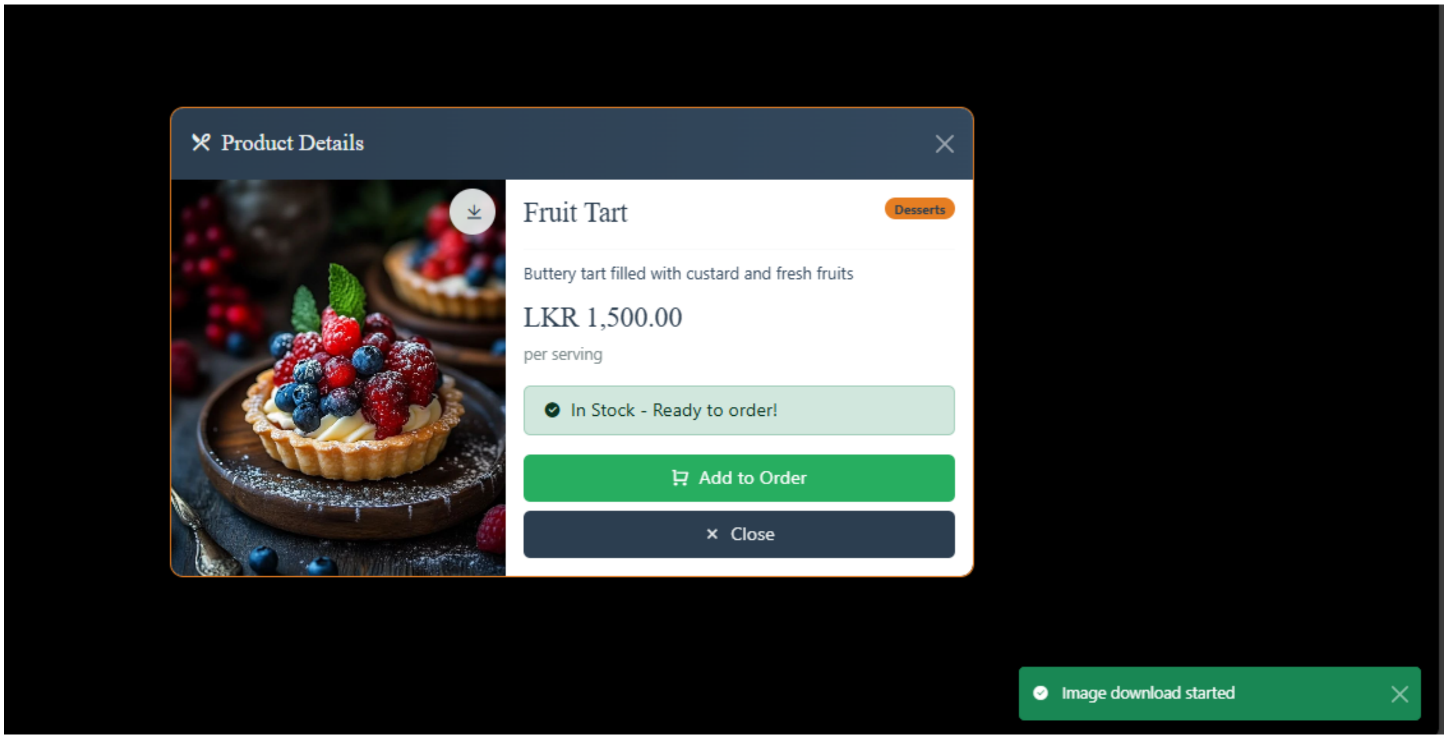
Chicken Satay

Starters

Grilled skewers of marinated chicken with peanut sauce

LKR 1,550.00 per serving

Download product image



Fruit Tart

Desserts

Buttery tart filled with custard and fresh fruits

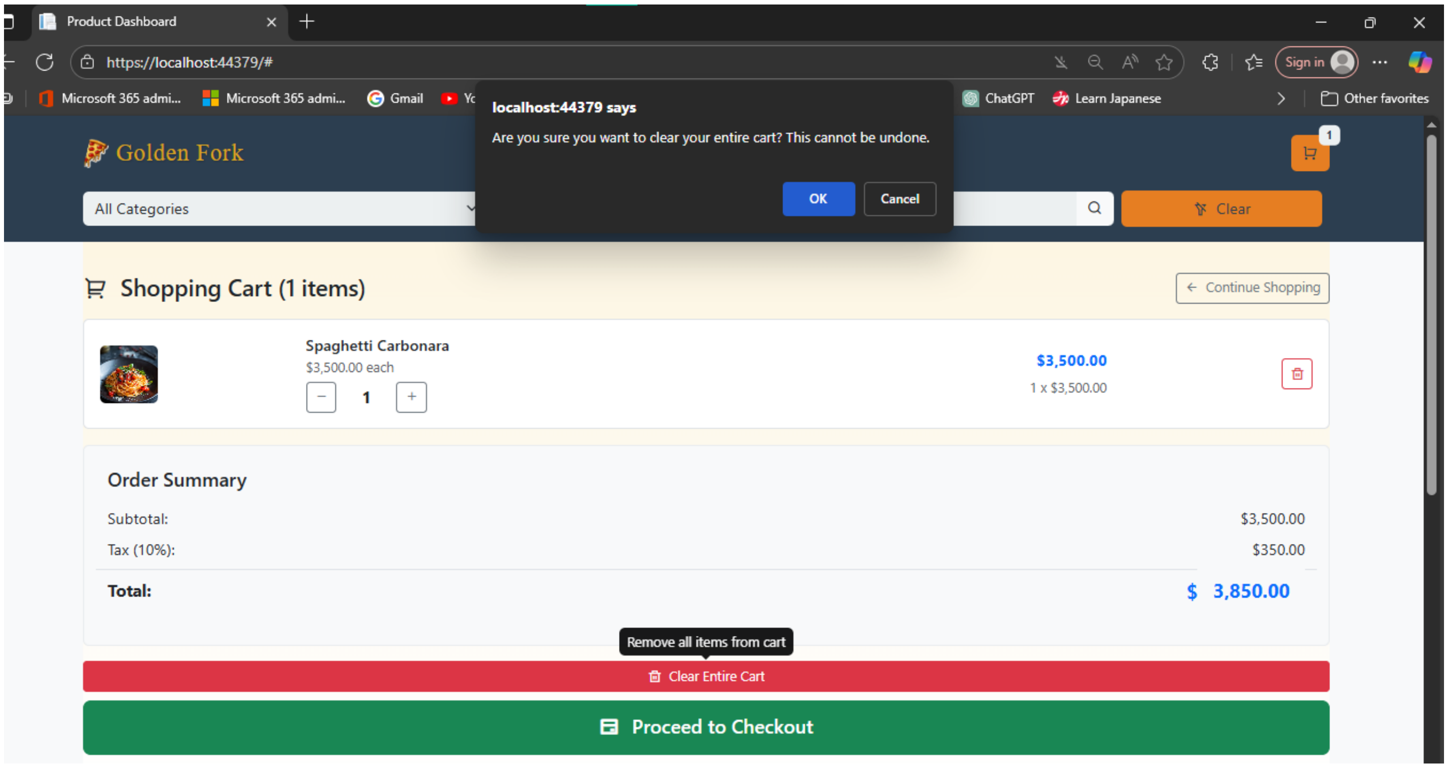
LKR 1,500.00

per serving

In Stock - Ready to order!

Image download started

Added tooltips



localhost:44379 says

Are you sure you want to clear your entire cart? This cannot be undone.

Shopping Cart (1 items)

Spaghetti Carbonara
$3,500.00 each
1

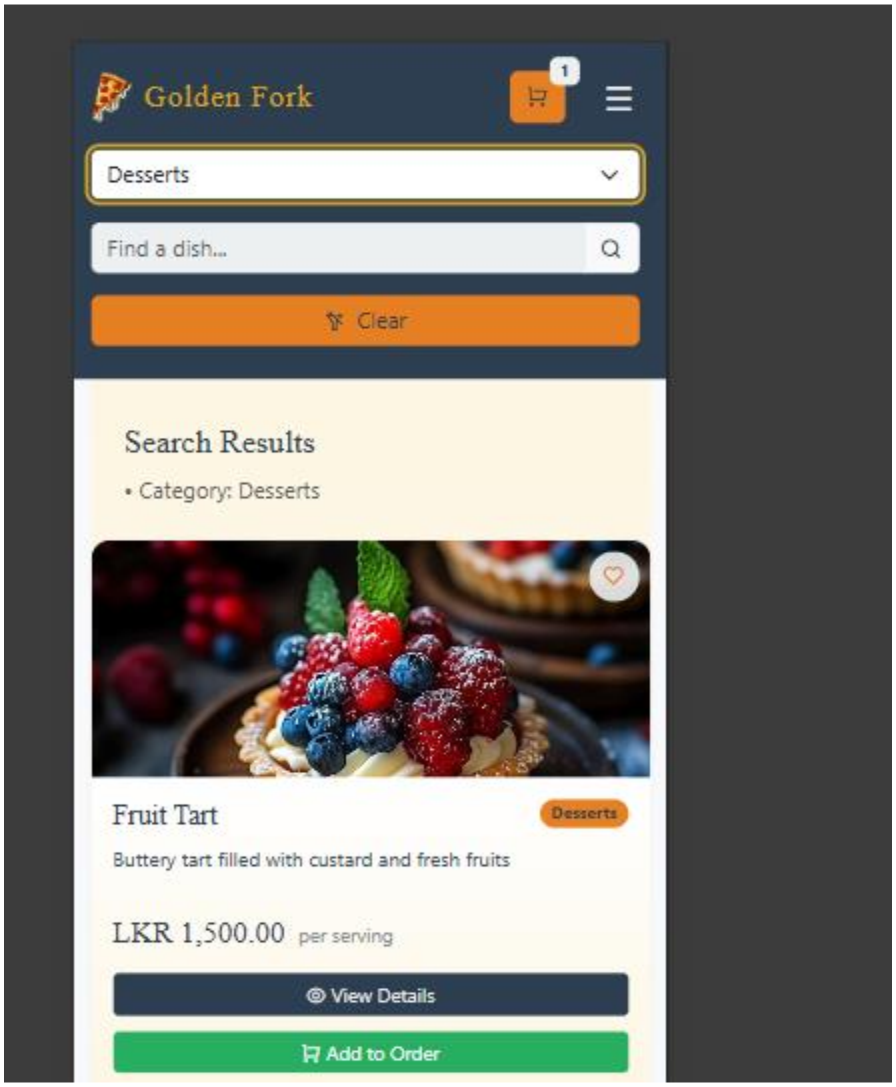
$3,500.00
1 x $3,500.00

Order Summary

Subtotal:	$3,500.00
Tax (10%):	$350.00
Total:	$ 3,850.00

Remove all items from cart

Mobile ui

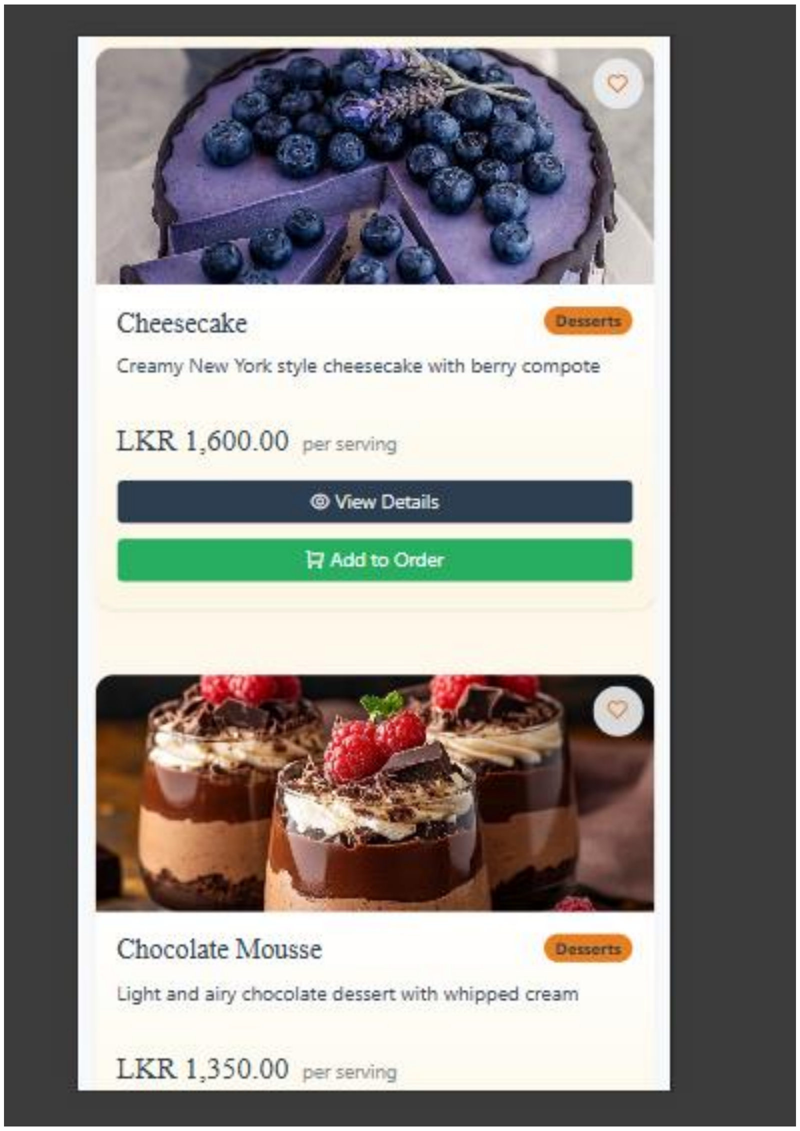


Search Results

• Category: Desserts

Buttery tart filled with custard and fresh fruits

LKR 1,500.00 per serving


Cheesecake

Desserts

Creamy New York style cheesecake with berry compote

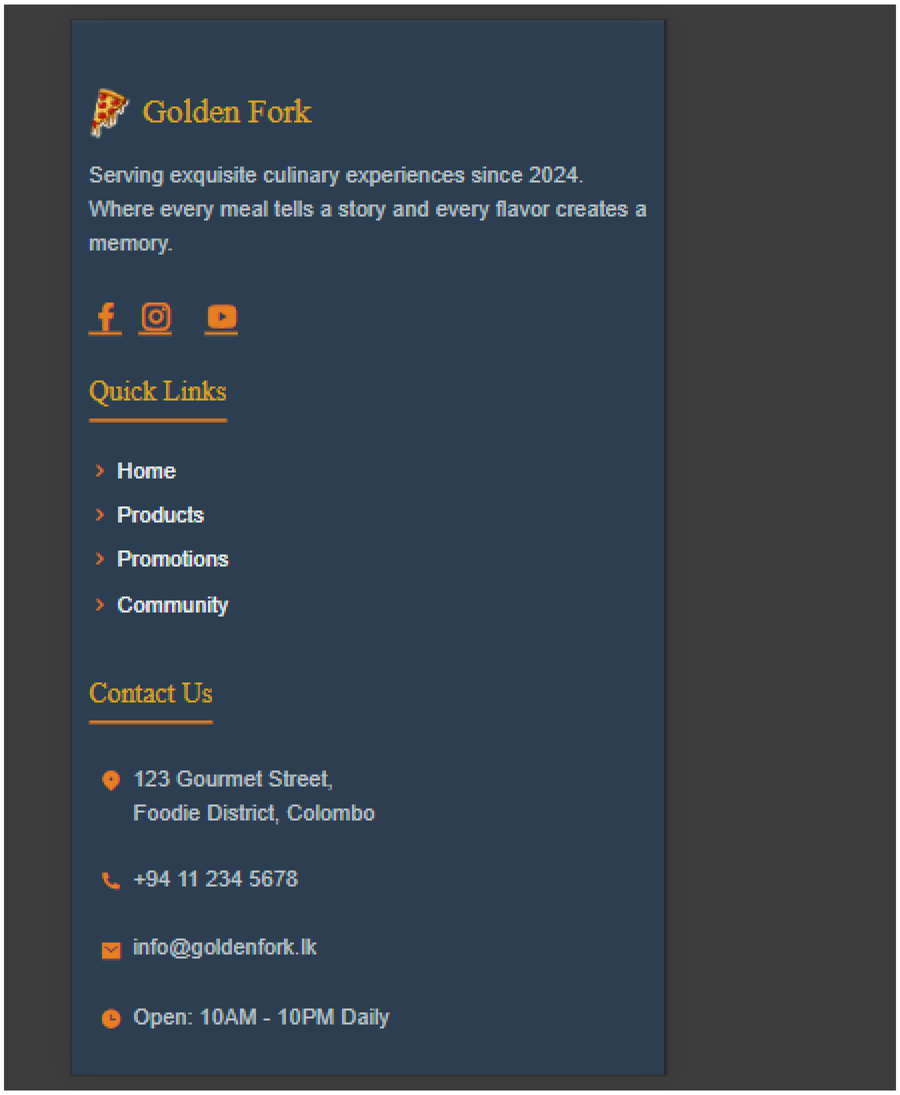
LKR 1,600.00 per serving

Chocolate Mousse

Desserts

Light and airy chocolate dessert with whipped cream

LKR 1,350.00 per serving



Golden Fork

Serving exquisite culinary experiences since 2024. Where every meal tells a story and every flavor creates a memory.

Quick Links

- Home
- Products
- Promotions
- Community

Contact Us

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Foodie District, Colombo

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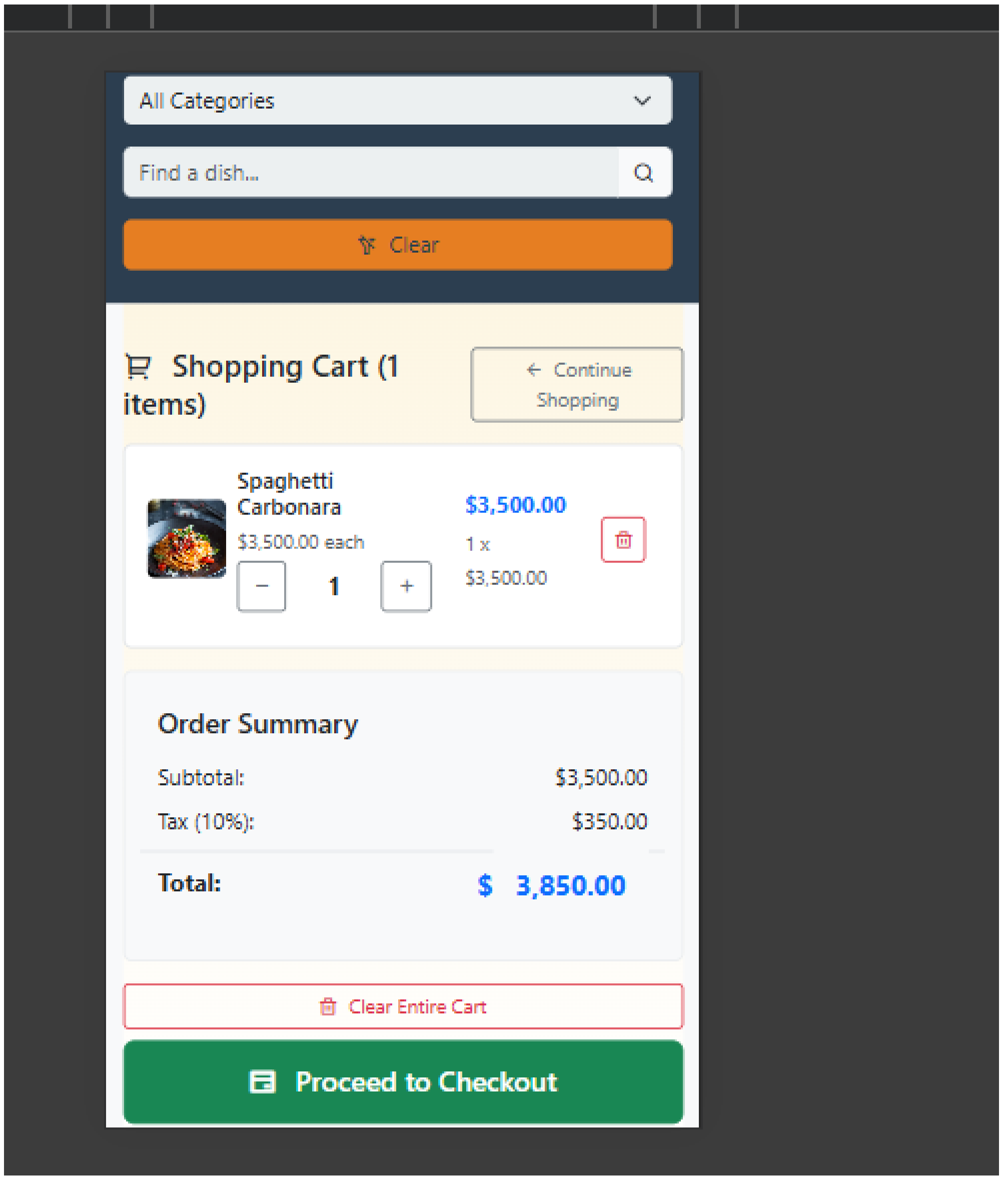
Open: 10AM - 10PM Daily


All Categories

Find a dish...

Clear

Shopping Cart (1 items)

Continue Shopping

Spaghetti Carbonara

$3,500.00 each

1

$3,500.00

1 x $3,500.00

Order Summary

Subtotal: $3,500.00

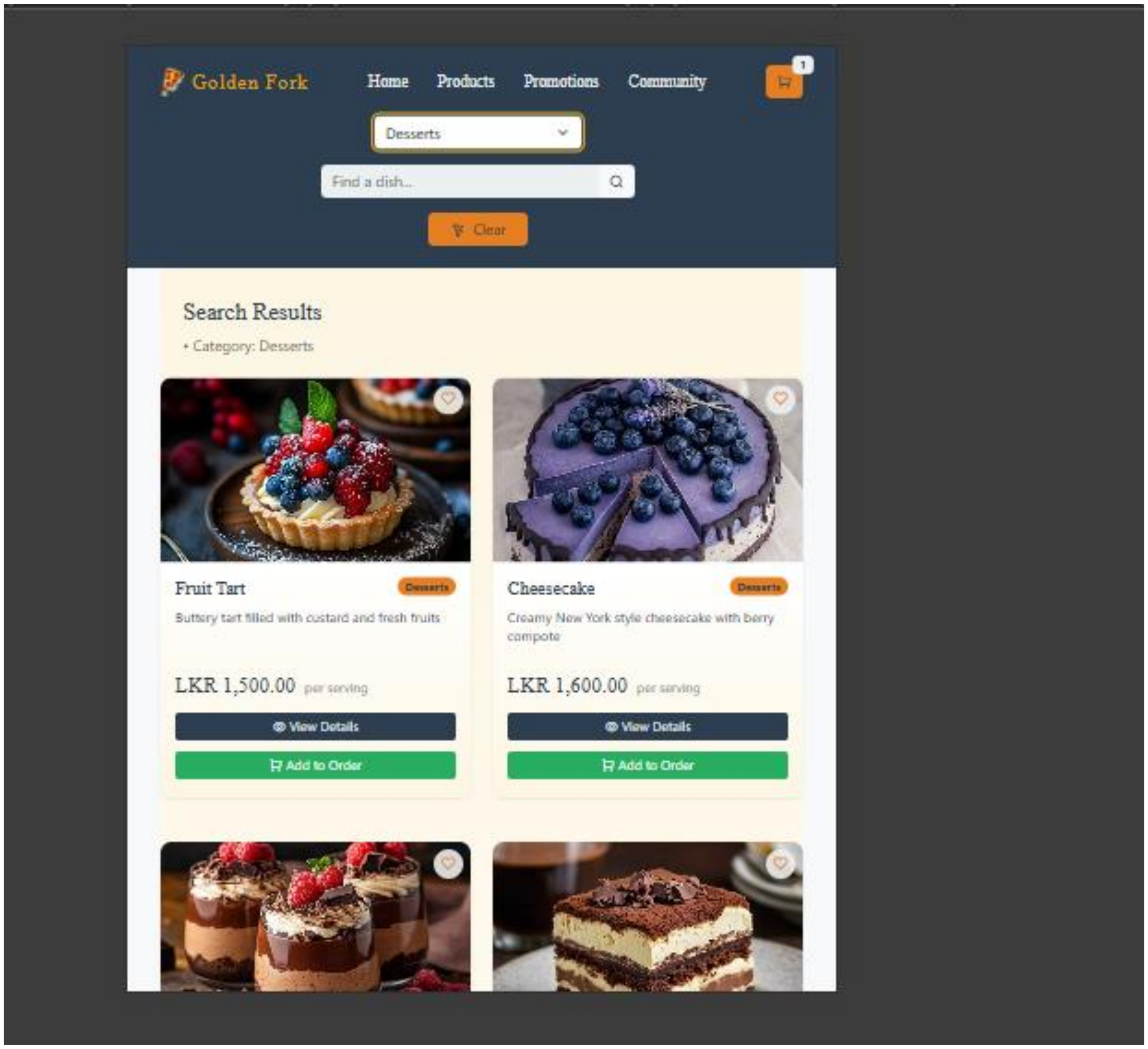
Tax (10%): $350.00

Total: $ 3,850.00

Clear Entire Cart

Proceed to Checkout

Tab ui



Search Results

• Category: Desserts

Fruit Tart — Desserts

Buttery tart filled with custard and fresh fruits

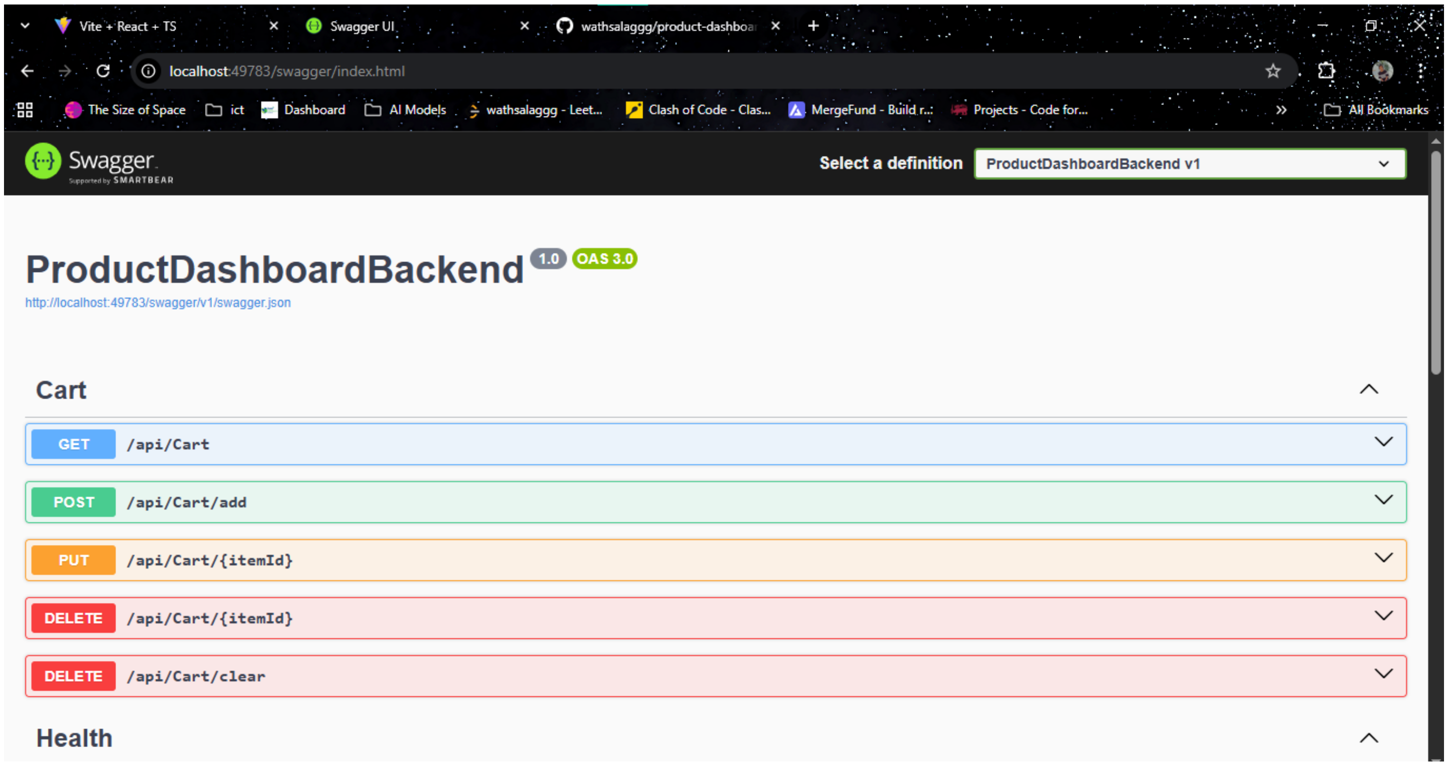
LKR 1,500.00 per serving

Cheesecake — Desserts

Creamy New York style cheesecake with berry compote

LKR 1,600.00 per serving

Swagger ui



ProductDashboardBackend 1.0 OAS 3.0

http://localhost:49783/swagger/v1/swagger.json

Cart

GET /api/Cart

POST /api/Cart/add

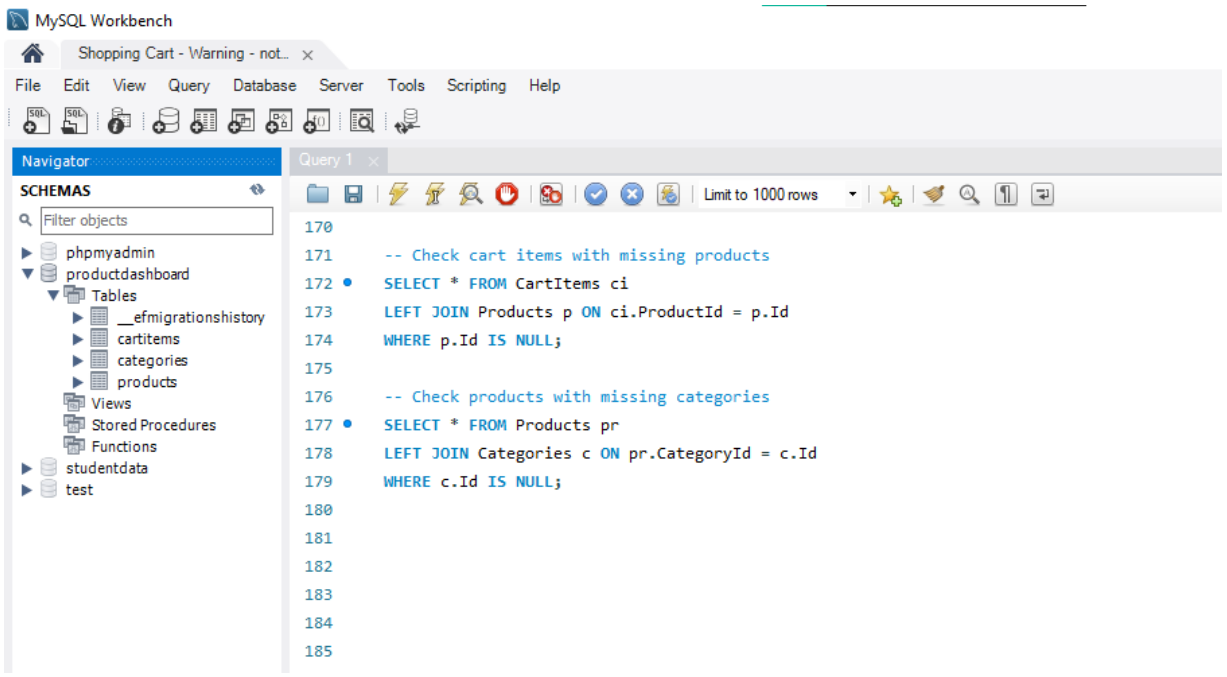
PUT /api/Cart/{itemId}

DELETE /api/Cart/{itemId}

DELETE /api/Cart/clear

Health

DB

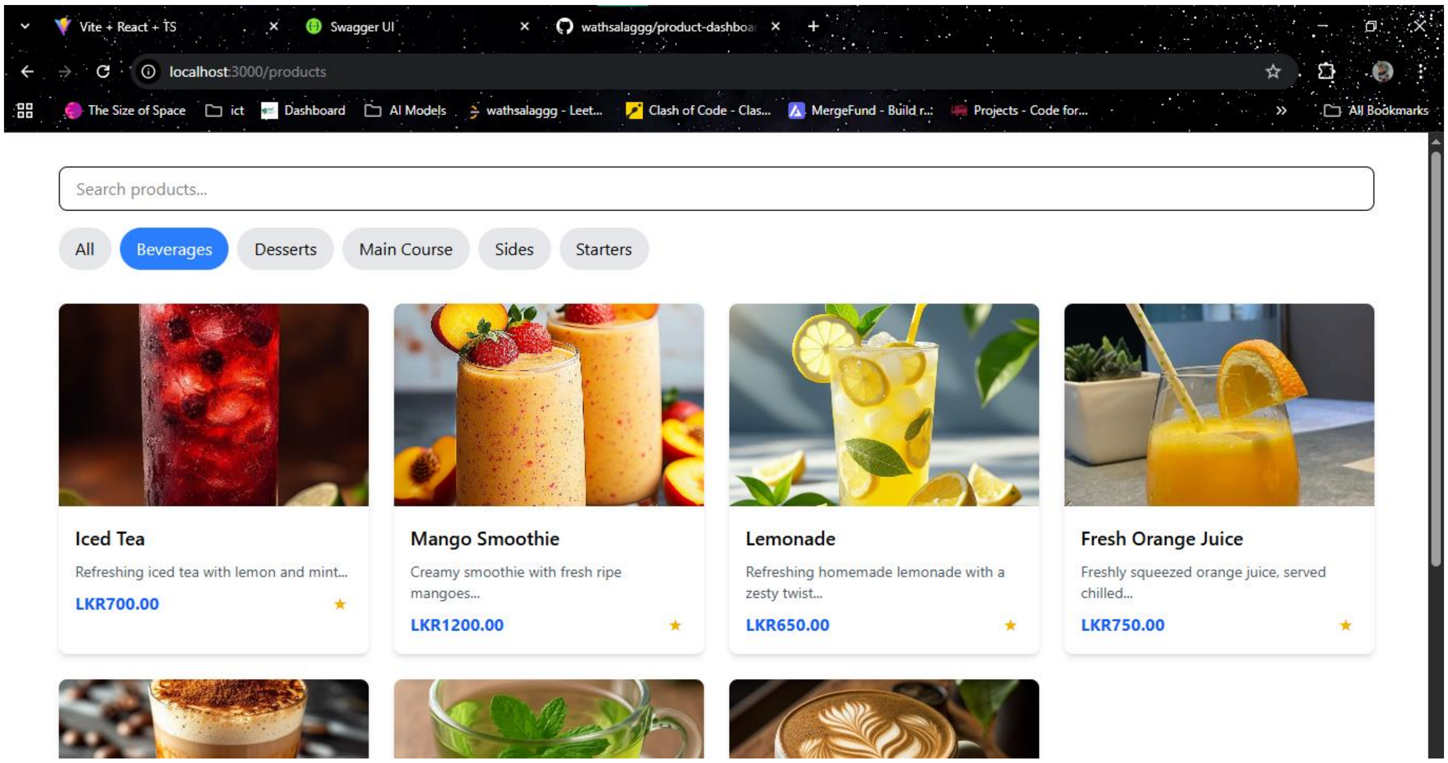


```sql

-- Check cart items with missing products
SELECT * FROM CartItems ci
LEFT JOIN Products p ON ci.ProductId = p.Id
WHERE p.Id IS NULL;

-- Check products with missing categories
SELECT * FROM Products pr
LEFT JOIN Categories c ON pr.CategoryId = c.Id
WHERE c.Id IS NULL;
```

React ui – didn't have enough time to complete this


localhost:3000/products

Search products...

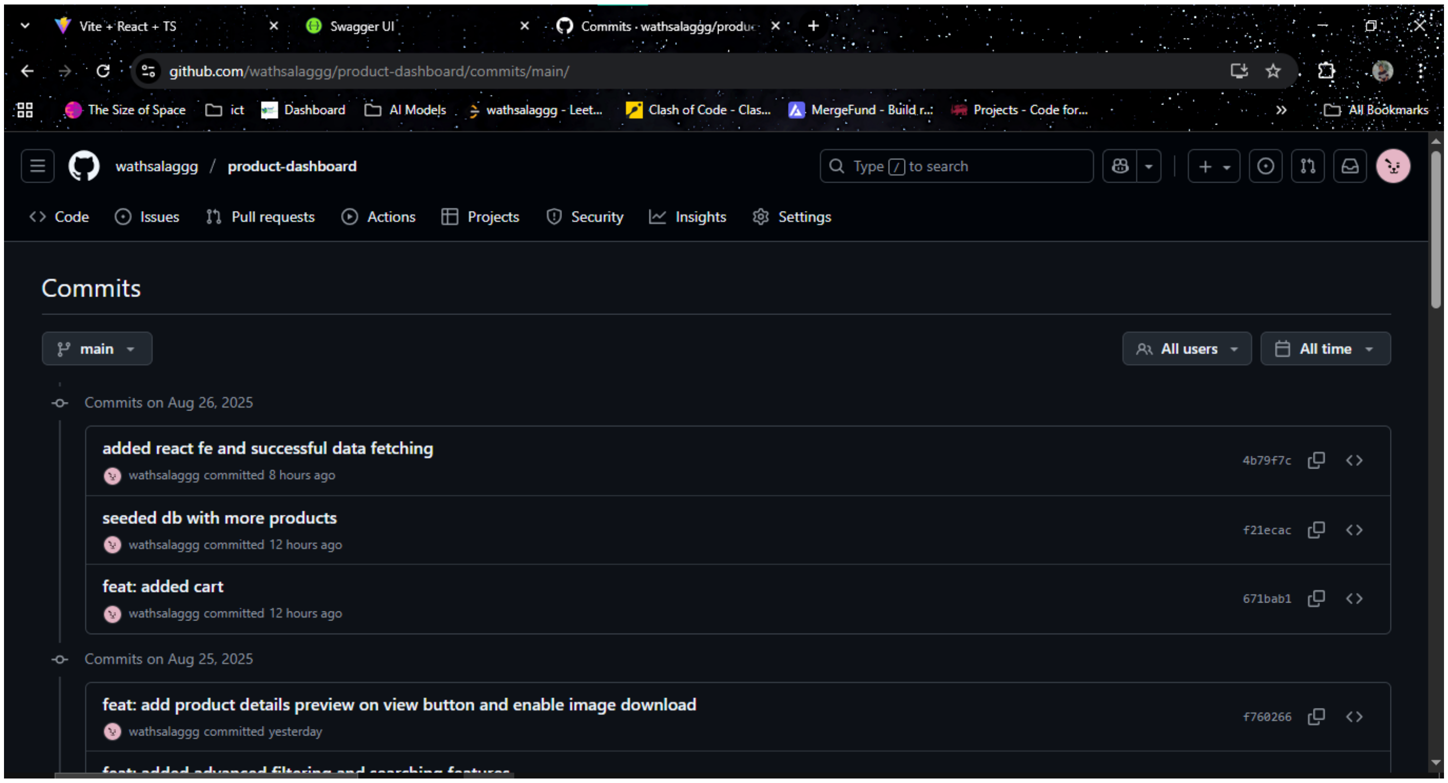
Iced Tea
Refreshing iced tea with lemon and mint...
LKR700.00

Mango Smoothie
Creamy smoothie with fresh ripe mangoes...
LKR1200.00

Lemonade
Refreshing homemade lemonade with a zesty twist...
LKR650.00

Fresh Orange Juice
Freshly squeezed orange juice, served chilled...
LKR750.00

Github work ss


github.com/wathsalaggg/product-dashboard/commits/main/

wathsalaggg / product-dashboard

Commits

Commits on Aug 26, 2025

added react fe and successful data fetching
wathsalaggg committed 8 hours ago — 4b79f7c

seeded db with more products
wathsalaggg committed 12 hours ago — f21ecac

feat: added cart
wathsalaggg committed 12 hours ago — 671bab1

Commits on Aug 25, 2025

feat: add product details preview on view button and enable image download
wathsalaggg committed yesterday — f760266