

Lab Practical 3 – Software Design Document

1. Project Overview

The **Online Food Ordering App** allows customers to browse restaurant menus, place food orders, and make payments online. The system supports both web and mobile interfaces and enables restaurants to manage orders and menus efficiently.

2. Module Descriptions

| Module Name | Description / Responsibility |
|-------------------|---|
| User Management | Handles user registration, authentication, profile management, and login/logout functionality. Supports customer and restaurant accounts. |
| Menu Management | Allows restaurants to add, update, and delete menu items with prices, categories, and availability status. Customers can view menus. |
| Order Processing | Manages the order lifecycle – from placing an order, confirming it, tracking preparation, and delivering it. |
| Payment & Billing | Handles payment processing, invoice generation, and order payment confirmation through multiple payment gateways. |

3. UML Diagrams

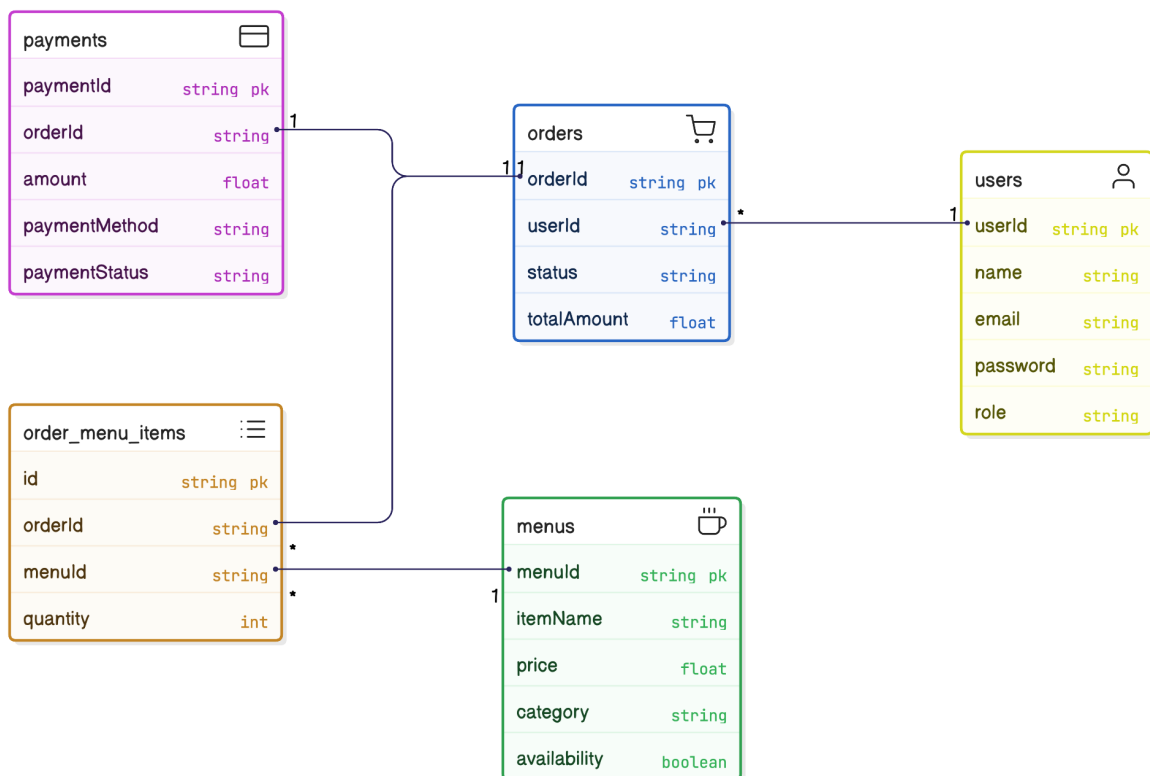
3.1 Class Diagram (Description)

Classes:

- **User**
 - Attributes: userId, name, email, password, role
 - Methods: login(), logout(), updateProfile()
- **Menu**
 - Attributes: menuId, itemName, price, category, availability
 - Methods: addItem(), updateItem(), removeItem(), getMenu()
- **Order**
 - Attributes: orderId, userId, menuItems[], status, totalAmount
 - Methods: placeOrder(), updateStatus(), getOrderDetails()
- **Payment**
 - Attributes: paymentId, orderId, amount, paymentMethod, paymentStatus
 - Methods: processPayment(), generateInvoice()

Relationships:

- User **places** Order (1-to-many)
- Order **contains** Menu items (many-to-many)
- Order **has** Payment (1-to-1)

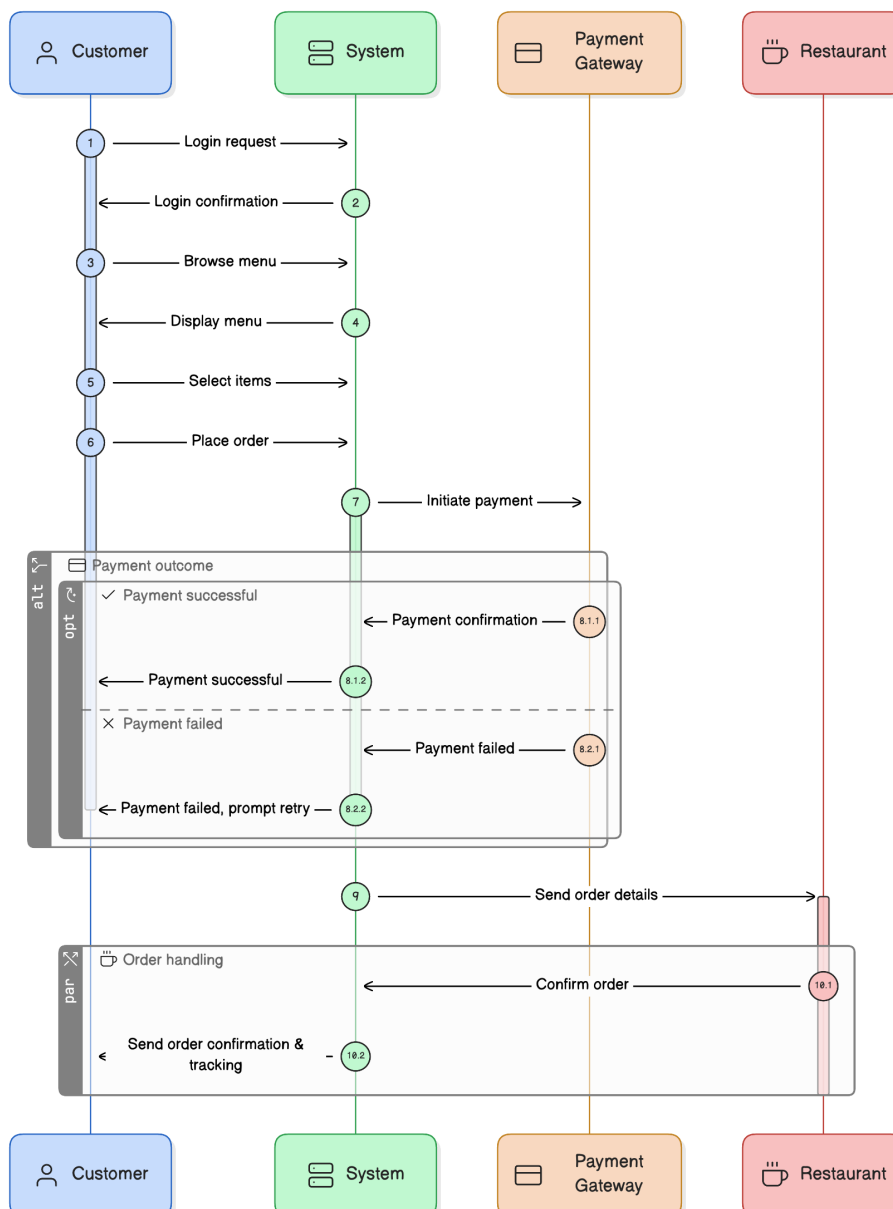


3.2 Sequence Diagram – Placing an Order

Actors: Customer, System, Payment Gateway, Restaurant

Flow:

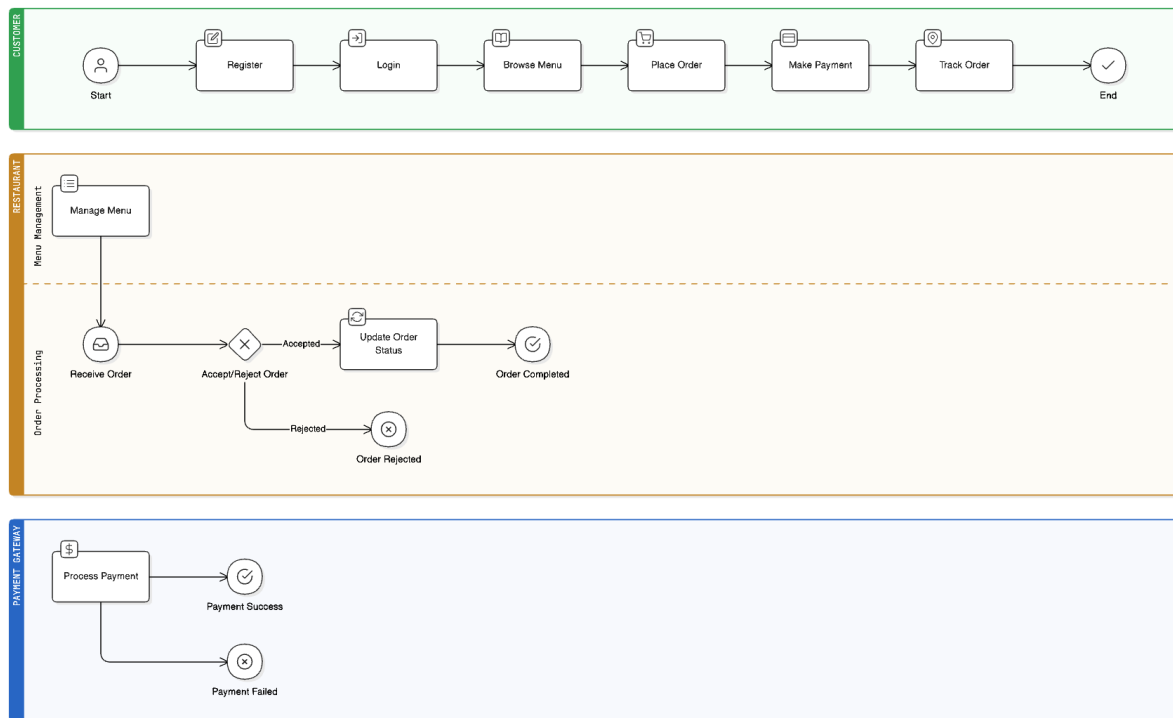
1. Customer → System: Login
2. Customer → System: Browse Menu
3. Customer → System: Select Items & Place Order
4. System → Payment Gateway: Process Payment
5. Payment Gateway → System: Payment Confirmation
6. System → Restaurant: Send Order Details
7. Restaurant → System: Confirm Order
8. System → Customer: Send Order Confirmation & Tracking



3.3 Use Case Diagram

Actors:

- **Customer** – Register, Login, Browse Menu, Place Order, Make Payment, Track Order
- **Restaurant** – Manage Menu, Accept/Reject Orders, Update Order Status
- **Payment Gateway** – Process Payments



4. Design Principles and Patterns Applied

4.1 Design Principles

- **Modularity:** System divided into independent modules (User Management, Menu Management, Order Processing, Payment).
- **Encapsulation:** Each class hides internal details and exposes only required methods.
- **Low Coupling:** Modules interact through defined interfaces, minimizing dependency.
- **High Cohesion:** Each module focuses on a single responsibility.

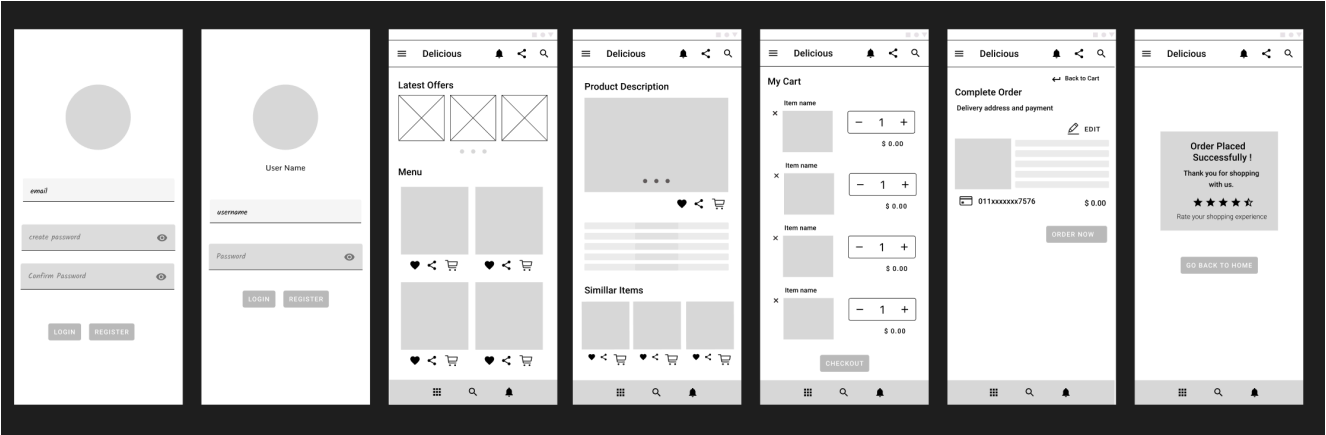
4.2 Design Patterns

- **MVC (Model-View-Controller):** Separates business logic (Model), interface (View), and control flow (Controller) for maintainability.
- **Singleton Pattern (for Database Connection):** Ensures only one instance of the database connection exists to improve resource usage.
- **Factory Pattern (for Payment Processing):** Creates payment objects based on selected payment method (e.g., CreditCard, PayPal).

5. UI Wireframe

Main Customer Screen:

- **Top:** App logo, Search bar
- **Center:** Restaurant list with menu preview
- **Bottom Navigation:** Home, Orders, Cart, Profile
- **UX Considerations:** Clear call-to-action buttons, easy navigation, minimal clicks for ordering.



| | | |
|-----|---|-----------|
| IMG | Pizza Palace ★ 4.5 ⌚ 25-30 min Margherita Pizza • Pepperoni • Caesar Salad | View Menu |
| IMG | Burger House ★ 4.2 ⌚ 20-25 min Classic Burger • Chicken Wings • Fries | View Menu |
| IMG | Sushi Express ★ 4.7 ⌚ 30-35 min California Roll • Salmon Sashimi • Miso Soup | View Menu |
| IMG | Taco Fiesta ★ 4.3 ⌚ 15-20 min Beef Tacos • Guacamole • Quesadillas | View Menu |
| IMG | Indian Spice ★ 4.6 ⌚ 35-40 min Butter Chicken • Naan Bread • Biryani | View Menu |
| IMG | Thai Garden ★ 4.4 ⌚ 25-30 min Pad Thai • Green Curry • Spring Rolls | View Menu |
| IMG | Mediterranean Grill ★ 4.5 ⌚ 30-35 min Grilled Chicken • Hummus • Greek Salad | View Menu |
| IMG | Chinese Kitchen ★ 4.1 ⌚ 20-25 min Sweet & Sour Pork • Fried Rice • Dumplings | View Menu |