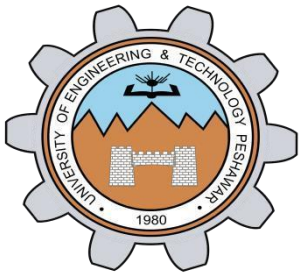
Key Milestone 4



DBMS Final Project

Submitted By: Muhammad Saad Amjad Khan

Project Group #19:

Muhammad Ehzaz Khan (22pwcse2108)

Muhammad Saad Amjad Khan (22pwcse2133)

Muhammad Kamil Khan (22pwcse2174)

Section: B

Submitted to: Engr. Sumayyea Salahuddin

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work"

Department of Computer Systems Engineering

University of Engineering and Technology Peshawar

Project: Restaurant Management System

Implementation Details of Restaurant Management System

Introduction

The Restaurant Management System (RMS) is a web-based application developed using Laravel (PHP framework) to streamline and digitize the operations of a restaurant. It handles orders, invoices, menus, customer details, and table bookings efficiently while ensuring a user-friendly interface for both admins and customers.

Technologies Used

- Backend: PHP (Laravel 12)
- Frontend: HTML, CSS, Blade Templates
- Database: MySQL
- Tools: VS Code, XAMPP, Composer
- Libraries: Bootstrap (for UI), Laravel Eloquent ORM

Modules Implemented

User Authentication

- Users can register and log in using Laravel's built-in authentication.
- Admin has privileges to view and manage all modules.
-

Food/Menu Management

- Admin can add, update, and delete food items.
- Each food item includes:
    - Name
    - Description
    - Price
    - Category
    - Image (uploaded and stored in public folder)

Order Management:

- Users can place orders from the available food menu.
- Orders are stored in the database and linked to both user and food entities.
    - Admin can view all orders placed with details such as:
    - Food ordered
    - Quantity
    - Customer information
    - Total cost
    - Order status

Invoice Generation

- Admin can generate invoices for completed orders.
- Each invoice includes:
    - Invoice ID
    - Linked order details
    - Date & time
    - Total bill amount
    - Payment status

Table Reservation

- Users can reserve tables by providing:
    - Name
    - Phone number
    - Date and time
    - Number of people
    - Admin can manage all reservations and mark them as confirmed or cancelled.

Review & Feedback

- Users can submit reviews and feedback after ordering.
- Admin can view and moderate these reviews.

Database Design

Main Tables

- users: Stores user information (id, name, email, password, phone, address).
- foods: Stores menu items (id, name, price, description, image).
- orders: Links users to food items with quantity and status.
- invoices: Generated for completed orders.
- reservations: Stores table booking information.
- reviews: Stores customer reviews for food or service.

Admin Dashboard

- Displays key metrics:
- Total Orders
- Completed Orders
- Revenue Generated
- Reservations Count
- Provides quick links to manage each module.
- Uses Laravel Blade templates with Bootstrap components.

User Interface

- Built using HTML/CSS with Laravel Blade.

- Clean navigation bar.
- Food menu displayed as responsive cards.
- Reservation and order forms with validation.
- Admin pages with tables and actionable buttons.

Error Handling and Validation

- Server-side validation using Laravel's validate() method.
- Try-catch blocks implemented for database operations.
- Custom error pages for 404 and 500.

Security Measures

- Passwords hashed using Laravel's built-in bcrypt().
- Middleware used to protect admin routes.
- CSRF protection enabled by default.
- Mass assignment protection using $fillable.

Testing and Deployment

- Manual testing performed on:
- Order placement
- Invoice generation
- Reservation booking
- Deployed locally using XAMPP.
- Database migrations handled via Laravel Artisan.

Business Rules for Restaurant Management System:

1. users

Business Role:
Stores the details of customers who use the restaurant system. Each user can browse the menu, add items to their cart, place orders, leave reviews, and book tables.

Key Functional Rules:

- One user can have multiple orders.
- One user can post multiple reviews.
- One user can have multiple invoices and carts.
- Each user is uniquely identified by their ID.

2. employees

Business Role:
Manages records of restaurant staff such as waiters, chefs, and managers. Employees are assigned to handle orders and work shifts.

Key Functional Rules:

- Each employee has a designated shift.
- Employees may be linked to handling one or more orders.

3. food

Business Role:
Maintains the master list of food items offered by the restaurant. This includes information like name, description, price, and image for display.

Key Functional Rules:

- Food items appear in the menu.
- Food items are referenced in orders, cart, and reviews.

4. orders

Business Role:
Stores all placed orders made by users. Each order links a user to a food item and the employee responsible for fulfilling it. Contains the order's current status and amount.

Key Functional Rules:

- Each order belongs to one user.
- Each order is assigned to one employee.
- Each order is for one food item (in flattened design).
- Order statuses include: Pending, Completed, Cancelled.

5. tables

Business Role:
Stores information about the physical dining tables in the restaurant including their seating capacity and current availability status.

Key Functional Rules:

- Each table can be reserved (linked via books).
- Table status can be: Available, Reserved, Occupied.

6. books

Business Role:
Manages customer reservations for dining tables. Tracks which user reserved which table at what date and time, for how many guests.

Key Functional Rules:

- A user can make multiple bookings.
- A table can have multiple bookings (on different dates/times).
- Booking includes time and number of guests.

7. reviews

Business Role:
Captures feedback from users about food items. Each review includes a rating and review text, tied to a specific food item.

Key Functional Rules:

- A user can review multiple food items.
- A food item can have many reviews.
- Ratings help in calculating average food quality scores.

8. carts

Business Role:
Temporarily stores food items that a user is planning to order. Acts like a shopping basket before converting to an order.

Key Functional Rules:

- A cart is user-specific.
- Items in the cart are not yet part of any official order.
- Cart is cleared when the order is placed.

9. invoice

Business Role:
Keeps a financial record of each completed order. Used for billing, accounting, and payment tracking.

Key Functional Rules:

- Each invoice belongs to a user and an order.
- Invoices store final amount, status (e.g., Paid, Unpaid), and timestamp.
- One invoice per order.

Main Entities & Their Description:

1. users:

Attributes	Datatypes	Name in Database
id (PK)	Integer	id
name	String	name
phone	String	phone
email	String	email
address	String	address
password	string	password

2. employees:

Attributes	Datatypes	Name in Database
id (PK)	Integer	id
name	String	name
role	String	role
phone	String	phone
salary	Integer	salary
shift_timing	DateTime	shift
date_of_joining	Date	date_joining

3. foods:

Attributes	Datatypes	Name in Database
id (PK)	Integer	id
title	String	title
detail	String	detail

price	Integer	price
image	String	image

4. orders:

Attributes	Datatypes	Name in Database
id (PK)	Integer	id
user_id (FK)	Integer	user_id
food_id (FK)	Integer	food_id
Employee_id (FK)	integer	Employee_id
amount	Integer	amount
status	String	status

5. tables:

Attributes	Datatypes	Name in Database
id(PK)	Integer	id
capacity	Integer	capacity
details	String	detail
status	String	status

6. books:

Attributes	Datatypes	Name in Database
id (PK)	Integer	id
table_id (FK)	Integer	table_id
phone	String	phone
guests	Integer	guests
date	DateTime	date
time	DateTime	time

7. reviews:

Attributes	Datatypes	Name in Database
id (PK)	Integer	id
food_id (FK)	Integer	food_id
review	String	review
rating	Integer	rating
date	DateTime	date

8. carts:

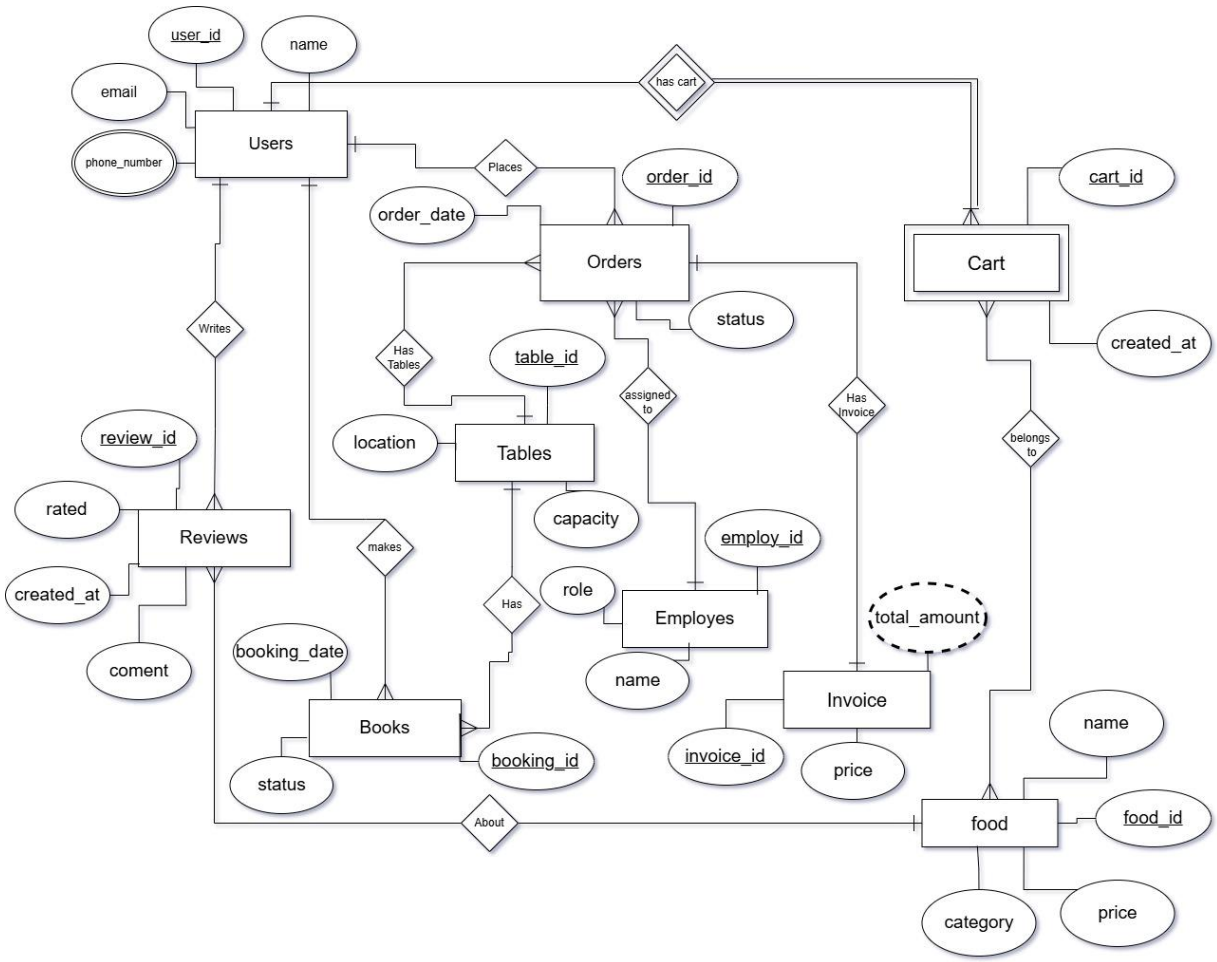
Attributes	Datatypes	Name in Database
id (PK)	Integer	id
user_id (FK)	Integer	user_id
food_id (FK)	Integer	food_id
quantity	Integer	quantity

9. invoice:

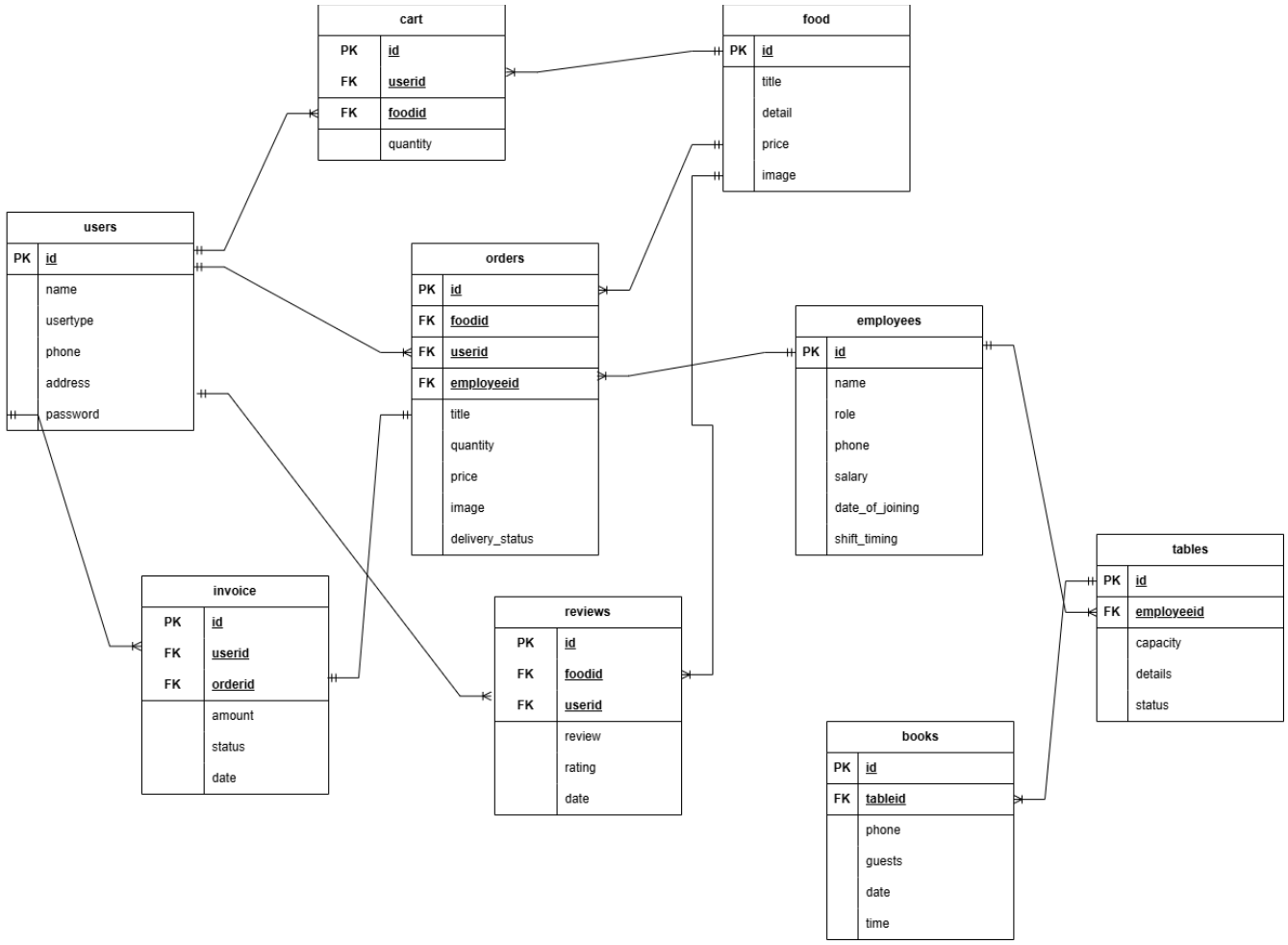
Attributes	Datatypes	Name in Database
id (PK)	Integer	id
order_id (FK)	Integer	order_id
user_id (FK)	Integer	user_id
amount	Integer	amount
status	String	status
date	DateTime	date

Finalized Conceptual Schema:

ERD (Entity Relationship Diagram):



EERD (Enhanced Entity Relationship Diagram):



Final Normalized Forms:

users(id PK, name, phone, email, address, password)

employees(id PK, name, role, phone, salary, date_of_joining, shift_timing)

books(id PK, table_id FK, phone, guests, date)

carts(id PK, user_id FK, food_id FK, quantity)

tables(id PK, details, capacity, status)

orders(id PK, food_id FK, user_id FK, employee_id FK, total_amount, order_status)

reviews(id PK, food_id FK, user_id FK, review, rating, date)

invoice(id PK, order_id FK, user_id FK, amount, status, date)

Conclusion

The Restaurant Management System simplifies restaurant operations and enhances the customer experience. With a modular architecture and modern technologies, it can be extended further by integrating features like online payments, notification emails, or multi-branch support.

References:

- ChatGPT
- Youtube
- Draw.io
- Cursor AI
- Claude