

# CAR RENTAL SYSTEM

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## Welcome to CarRental

Your premier destination for quality car rentals

Login

Register

### Our Fleet



## 1. SYSTEM OVERVIEW

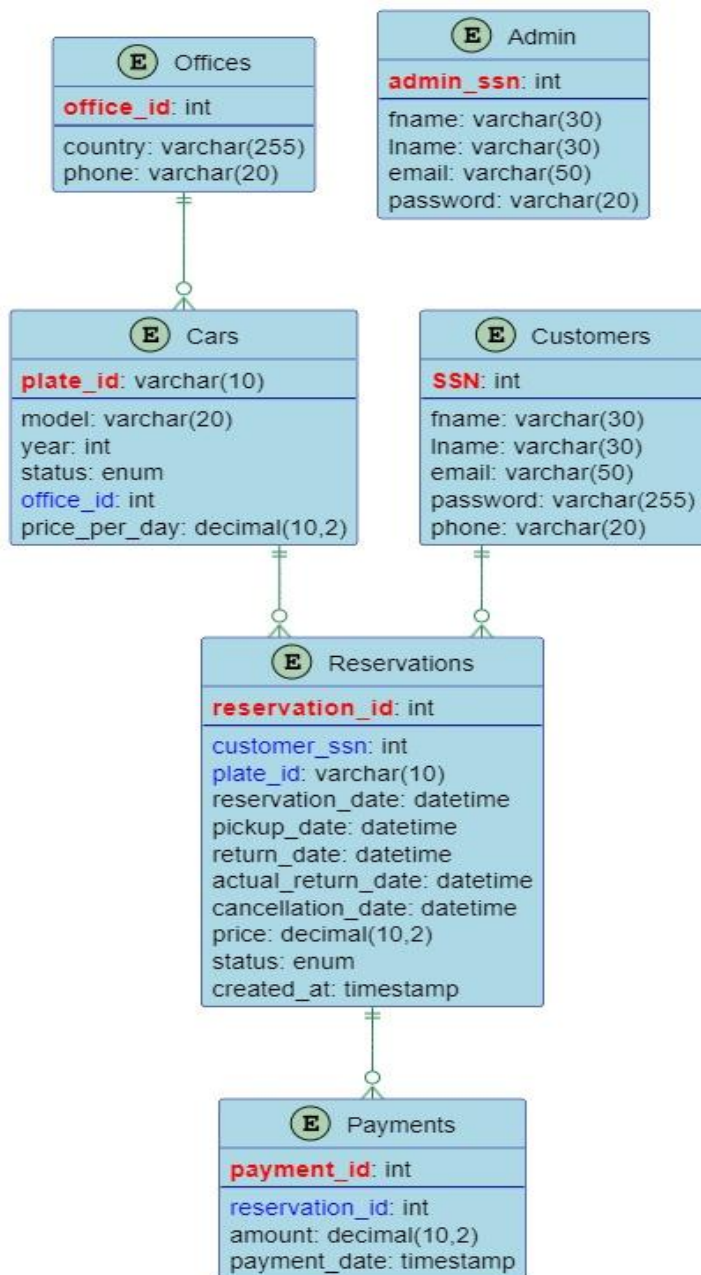
Our Car Rental System is a web-based application that manages car rentals across multiple offices.

It supports two user types:

- Customers: Can browse cars, make reservations, and manage their bookings
- Administrators: Can manage cars, view reports, and oversee the system

## 2. ENTITY RELATIONSHIP DIAGRAM

ERD Diagram



### DATABASE SCHEMA

**-Customer:** Stores user account information and credentials

**-Car:** Maintains car inventory and details

**-Reservation:** Tracks booking information

**-Payment:** Records transaction details

**-Office:** Manages multiple rental locations

**-Admin:** Stores administrator accounts

### 3. IMPLEMENTED FEATURES

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#### CUSTOMER FEATURES

- Account Registration and Login
- Car Search and Filtering
- Reservation Management
  - Create new reservations
  - View active reservations
  - Cancel reservations
- Secure Authentication

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#### ADMIN FEATURES

- Secure Admin Login
- Dashboard with Statistics
- Car Management
  - Add new cars
  - Update car status
- Comprehensive Reporting
  - Reservation reports
  - Revenue analysis
  - Car status tracking
  - Payment history

## 4. SCREEN-BY-SCREEN DESCRIPTION

### CUSTOMER SCREENS

#### REGISTRATION PAGE (/CUSTOMER/REGISTER)

- Purpose: New customer account creation
- Fields:
  - First Name, Last Name
  - Email (with validation)
  - Phone (11 digits)
  - Password (with complexity requirements)
- Validation: Client-side and server-side input validation

The screenshot shows the 'Register New Account' page for CarRental. The header includes the CarRental logo and links for 'Customer Login' and 'Admin Login'. The main form area is titled 'Register New Account' and contains the following fields and labels:

- First Name
- Last Name
- Email
- Phone Number (11 digits)
- Phone number must be exactly 11 digits
- Password
- Must be at least 8 characters with uppercase, lowercase and numbers

#### CUSTOMER LOGIN (/CUSTOMER/LOGIN)

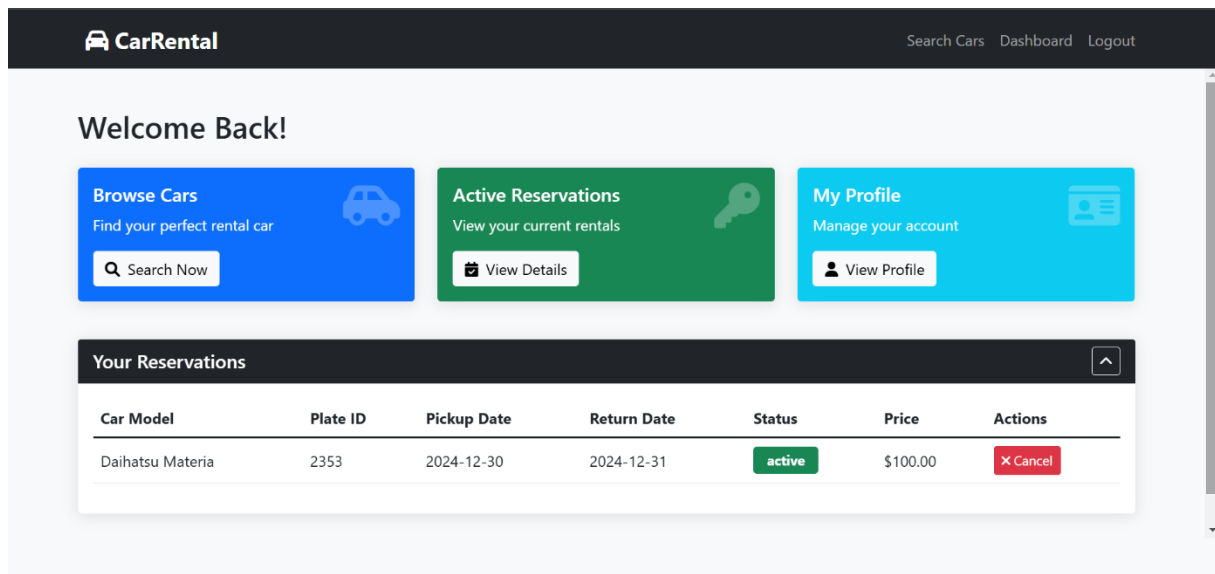
- Purpose: Authenticate existing customers
- Features:
  - Email/password authentication
  - Error handling

The screenshot shows the 'Customer Login' page for CarRental. The header includes the CarRental logo and links for 'Customer Login' and 'Admin Login'. The main form area is titled 'Customer Login' and contains the following fields and labels:

- Email
- Password
- Login
- Register New Account

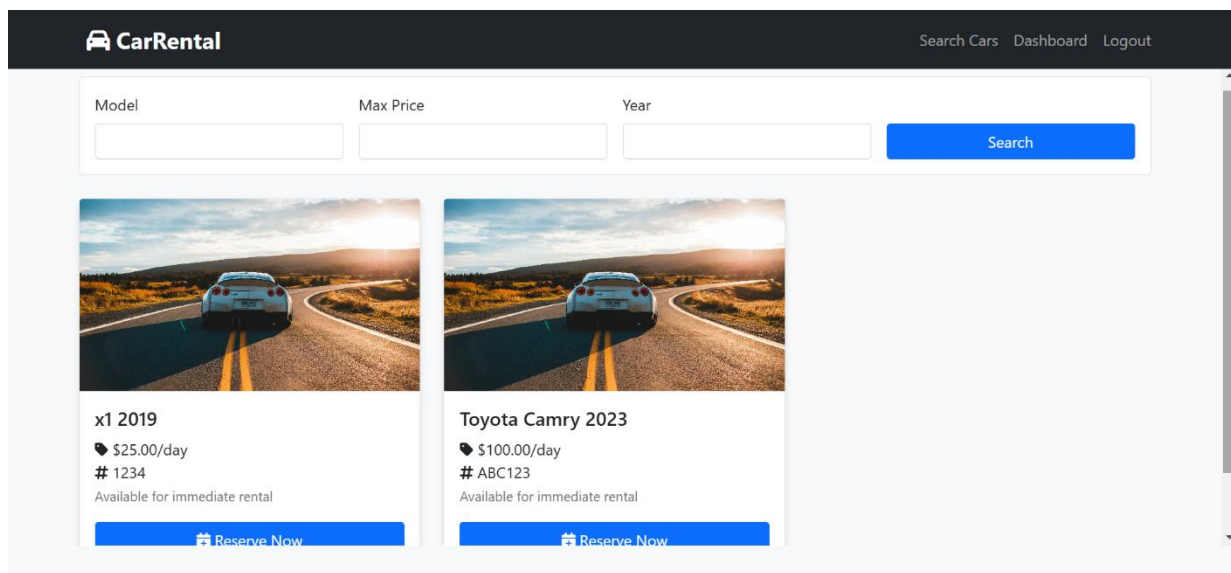
## CUSTOMER DASHBOARD (/CUSTOMER/DASHBOARD)

- Purpose: Central hub for customer activities
- Features:
  - Quick actions menu
  - Active reservations display
  - Car search shortcut
  - Profile management



## CAR SEARCH (/CUSTOMER/SEARCH)

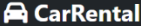
- Purpose: Browse available cars
- Features:
  - Filter by price, model, year
  - Real-time availability check
  - Booking initiation



## ADMIN SCREENS

### ADMIN LOGIN (/ADMIN/LOGIN)

- Purpose: Secure admin authentication
- Features:
  - Enhanced security measures
  - Session management
  - Access control

 CarRental Customer Login Admin Login

### Admin Login

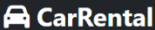
Email

Password


Login


### ADMIN DASHBOARD (/ADMIN/DASHBOARD)


- Purpose: System overview and management
- Features:
  - Car statistics
  - Quick actions
  - System status
  - Navigation to reports

 CarRental Dashboard Logout

## Admin Dashboard

Total Cars  
3

Available Cars  
2

Rented Cars  
1

#### Quick Actions

[+ Add New Car](#)[View Reports](#)[Manage Customers](#)[Settings](#)

#### Recent Reservations

ID	Customer	Car	Status
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#### System Status

Database Status

Connected

REPORTS PAGE (/ADMIN/REPORTS)

- Purpose: Comprehensive system reporting
- Features:
  - Date range filtering
  - Multiple report types:
    - Reservation history
    - Car status
    - Revenue analysis
    - Payment tracking
  - Export capabilities

CarRental

DashboardLogout

System Reports

Start Date

End Date

Car Plate ID (Optional)

Customer SSN (Optional)

12/01/2024

12/30/2024

Generate Reports

All Reservations (1)

ID	Customer	Car Details	Pickup Date	Return Date	Status	Price
5	Mazen Elsayed a@a.com	Daihatsu Materia (2007) ID: 2353	2024-12-30	2024-12-31	active	\$100.00

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DashboardLogout

Car Status on None

Plate ID	Model	Year	Status	Price/Day
1234	x1	2019	active	\$25.00
2353	Daihatsu Materia	2007	rented	\$100.00
ABC123	Toyota Camry	2023	active	\$100.00

Revenue by Car

Car Model	Plate ID	Total Reservations	Total Days Rented	Total Revenue
Daihatsu Materia	2353	1	1	\$100.00

CarRental

Dashboard

Logout

Office Statistics

Office	Total Cars	Total Reservations	Total Revenue
Test Country	3	1	\$100.00
Egypt	0	0	\$0.00

Daily Payments (1)

Date	Number of Payments	Total Amount
2024-12-29	1	\$100.00

ADD CAR (/ADMIN/CARS/ADD)

- Purpose: Vehicle inventory management
- Features:
  - Car details input
  - Office assignment
  - Pricing setup

CarRental

Dashboard

Logout

Add New Car

Plate ID

Model

Year

Office ID

Price per Day

Add Car



## TECHNICAL IMPLEMENTATION

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### SECURITY MEASURES

- Password hashing using bcrypt
  - Input validation and sanitization
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### USER INTERFACE

- Responsive design using Bootstrap
  - Interactive elements with JavaScript
  - Real-time validation
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### FRAMEWORKS AND TECHNOLOGIES USED

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#### BACKEND

- **Python**
  - **Flask:** Web framework
    - Route handling
    - Session management
  - **MySQL Connector:** Database connectivity
  - **bcrypt:** Password hashing and security
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#### FRONTEND

- **Bootstrap 5:** UI framework
    - Responsive design
    - Component styling
    - Grid system
  - **Font Awesome:** For icons
  - **JavaScript:** Client-side validation
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#### DATABASE

- **MySQL:** Relational database
  - Foreign key constraints
  - Transaction management
  - Index optimization

## IMPLEMENTATION APPROACH

### 1. Database Design

- Created ERD diagram
- Implemented database schema
- Set up relationships and constraints

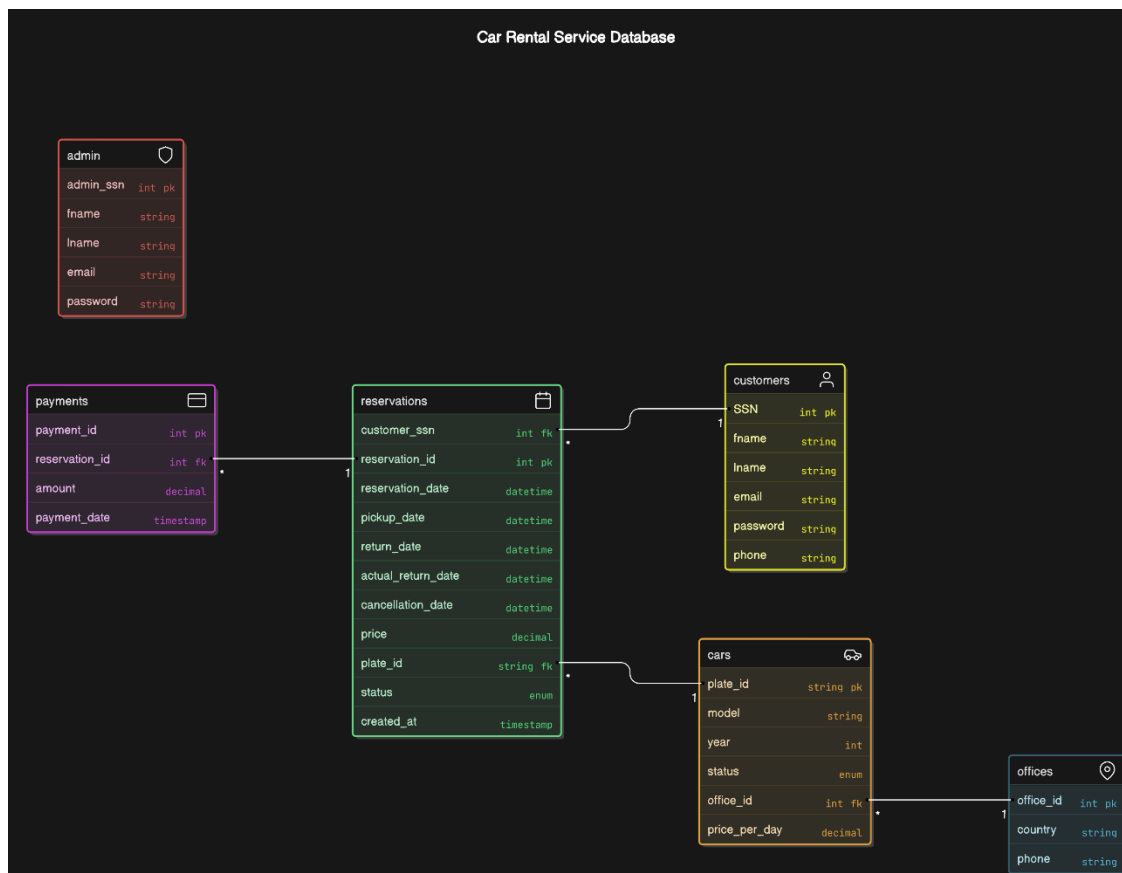
### 2. Backend Architecture

- Used OOP with separate classes for:
  - CarRentalSystem
  - Admin
  - Customer
- Implemented secure authentication
- Created reusable database methods

### 3. Frontend Development

- Template inheritance using base.html
- Responsive design for all devices
- Client-side form validation
- Interactive UI components
- Real-time feedback

## ERD



## DDL

```
schema.sql
1  CREATE DATABASE car_rental;
2
3  USE car_rental;
4
5  CREATE TABLE offices (
6      office_id INT PRIMARY KEY AUTO_INCREMENT,
7      country VARCHAR(255) NOT NULL,
8      phone VARCHAR(20)
9  );
10
11 CREATE TABLE cars (
12     plate_id VARCHAR(10) PRIMARY KEY,
13     model VARCHAR(20) NOT NULL,
14     year INT NOT NULL,
15     status ENUM('active', 'rented', 'out_of_service') DEFAULT 'active',
16     office_id INT NOT NULL,
17     price_per_day DECIMAL(10, 2) NOT NULL,
18     FOREIGN KEY (office_id) REFERENCES offices(office_id) ON DELETE RESTRICT
19 );
20
21 CREATE TABLE customers (
22     SSN INT PRIMARY KEY AUTO_INCREMENT,
23     fname VARCHAR(30) NOT NULL,
24     lname VARCHAR(30) NOT NULL,
25     email VARCHAR(50) UNIQUE NOT NULL,
26     password VARCHAR(20) NOT NULL,
27     phone VARCHAR(20) NOT NULL
28 );
29
```

```
schema.sql
30
31 CREATE TABLE reservations (
32     reservation_id INT PRIMARY KEY AUTO_INCREMENT,
33     customer_ssn INT NOT NULL,
34     plate_id VARCHAR(10) NOT NULL,
35     reservation_date DATETIME NOT NULL,
36     pickup_date DATETIME NOT NULL,
37     return_date DATETIME NOT NULL,
38     actual_return_date DATETIME,
39     cancellation_date DATETIME,
40     price DECIMAL(10, 2) NOT NULL,
41     status ENUM('active', 'picked_up', 'completed', 'cancelled') DEFAULT 'active',
42     created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
43     FOREIGN KEY (customer_ssn) REFERENCES customers(SSN) ON DELETE RESTRICT,
44     FOREIGN KEY (plate_id) REFERENCES cars(plate_id) ON DELETE RESTRICT
45 );
46
47 CREATE TABLE admin (
48     admin_ssn INT PRIMARY KEY AUTO_INCREMENT,
49     fname VARCHAR(30) NOT NULL,
50     lname VARCHAR(30) NOT NULL,
51     email VARCHAR(50) NOT NULL,
52     password VARCHAR(20) NOT NULL
53 );
54
55 CREATE TABLE payments (
56     payment_id INT PRIMARY KEY AUTO_INCREMENT,
57     reservation_id INT NOT NULL,
58     amount DECIMAL(10, 2) NOT NULL,
59     payment_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
60     FOREIGN KEY (reservation_id) REFERENCES reservations(reservation_id) ON DELETE RESTRICT
61 );
62
63 ALTER TABLE customers MODIFY COLUMN password VARCHAR(255);
```