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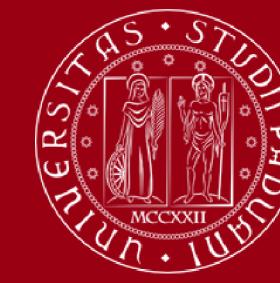
Car Rental System

Car Rent Group

Web Application
University of Padova
Academic Year 2023/2024

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Introduction



Introduction

Project Overview:

Our Car Rental Web Application is designed to streamline car rental operations, enhance customer experience, and optimize the management of rental activities.

The project incorporates a robust backend developed using Java and an interactive frontend utilizing HTML, CSS, JavaScript, jQuery, AJAX, and Bootstrap.

Technology Used:

Backend

- Java
- Servlets and RESTful APIs

Frontend

- HTML/CSS /Bootstrap
- JavaScript/jQuery
- AJAX

Objectives and System Architecture



Objectives and System Architecture

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Project Objectives:

- Design and implement a robust web application
- Enhance customer experience
- Optimize car rental processes
- Provide valuable insights

System Architecture:

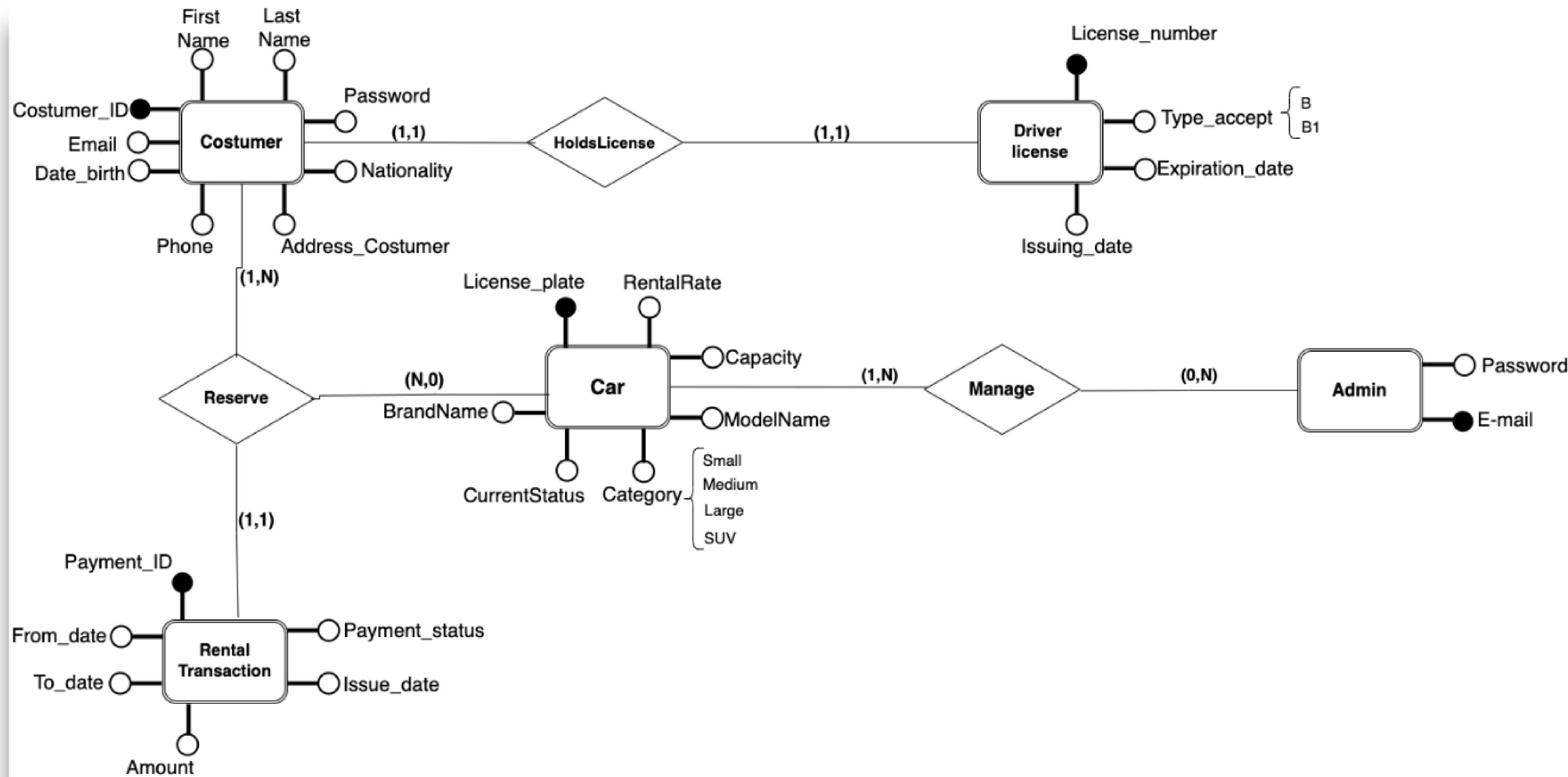
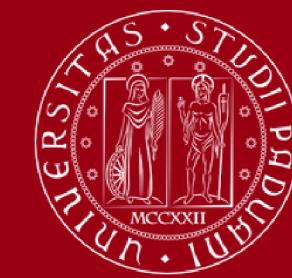
Client-Server Model

- Frontend
- Backend

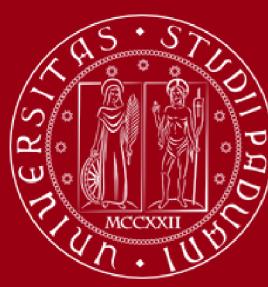
Architecture Components

- **Frontend:** HTML, CSS, JavaScript, jQuery, AJAX, Bootstrap.
- **Backend:** Java-based servlets and REST APIs.
- **Database:** Manages data persistence and retrieval.

ER Schema



Class Diagram



Backend

Data Access Objects (DAO) Layer



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Key DAO Classes:

- AddRentalTransactionDAO.java: Handles adding new rental transactions to the database.
- AdminLoginDAO.java: Manages admin login operations and authentication.
- CreateCarDAO.java: Facilitates the creation of new car entries in the database.
- ListCarDAO.java: Retrieves a list of cars available for rental.
- LoginDAO.java: Handles user login operations.
- RegisterUserDAO.java: Manages user registration and adds new users to the database.
- UpdateCarDAO.java: Handles updates to car details in the database.
- UpdateUserDAO.java: Manages updates to user information.



Key Service Classes:

- Admin.java: Manages administrative tasks, including user and car management.
- Car.java: Handles operations related to car information and availability.
- User.java: Manages user-related functionalities, including registration and profile updates.
- RentalTransaction.java: Oversees rental transactions, including reservations, modifications, and cancellations.
- Reserve.java: Handles car reservation logic, ensuring availability and processing bookings.

Key Servlet Classes:

- AddRentalTransactionServlet.java: Processes requests to add new rental transactions.
- AdminLoginServlet.java: Handles admin login functionality.
- CreateCarServlet.java: Manages requests to add new cars to the system.
- LoginServlet.java: Processes user login requests.
- RegistrationServlet.java: Manages user registration requests.
- SearchServlet.java: Handles search functionality for available cars.
- UpdateCarServlet.java: Processes requests to update car information.
- UpdateCustomerServlet.java: Manages requests to update customer information.

REST API



| URI | Method | Description | Filter |
|--------------------------|--------|--------------------------------|---------------------------------|
| /rest/car | GET | get the list of cars | no |
| /rest/car | POST | make a new car record | no |
| /rest/car/{licenseplate} | GET | get a car by its license plate | filters cars by license plate |
| /create-car | POST | make a new car record | no |
| /update-car | POST | update a car record | no |
| /search-car | GET | get the list of cars | can filter with cars parameters |
| /create-customer | POST | Registering a new customer | no |
| /edit-customer | POST | Registering a new customer | no |
| /login | POST | Login a customer | no |
| /create-licence | POST | Creating a new Licence | no |
| /edit-licence | POST | update a car record | no |
| /add-transaction | POST | create a payment transaction | no |
| /remove-transaction | POST | remove a payment transaction | no |
| /update-transaction | POST | remove a payment transaction | no |

Payment API Integration (Stripe)



- Why third party payment handler?
 - from security perspective it is better not to store or handle the payments info in our database because it will need a lot of work and security knowledge.
 - payments are a very repetitive part of all commerce websites and a well-known company like Stripe made it super easy to integrate with all languages and tech stacks.
 - Stripe will provide a very effective dashboard to manage the billings and payments history.

Stripe Dashboard



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← → ⌛ dashboard.stripe.com/test/payments

New folder PHP Practice Challe... PlayHT Online LaTeX Editor... Chatgot Photopea | Online P... Practical Data Science (AGT1E2) [Game Th... selcuk ozyurt - YouT... All Bookmarks

Test mode You're using test data. To accept payments, complete your business profile. Complete profile ↗

New Business Search Developers Test mode ⓘ 🔔⚙️ +

Home Payments All payments Disputes All transactions

+ Create payment

All Succeeded Refunded Uncaptured Failed

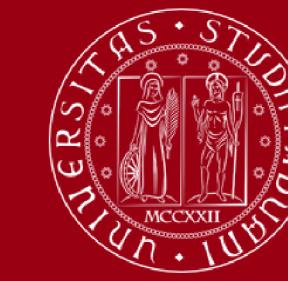
46 25 0 0 0

Date and time Amount Currency Status Payment method More filters Export Edit columns

| Amount | Payment method | Description | Date | Decline reason |
|--------------------------|----------------|-----------------------------|-----------------|----------------|
| €150.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PP99LRxoQCZUBaj0oqFrc28 | Jun 7, 10:12 PM | — |
| €100.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PP8utRxoQCZUBaj0s51CK00 | Jun 7, 9:57 PM | — |
| €150.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PP8dwRxoQCZUBaj0CEgwEtc | Jun 7, 9:40 PM | — |
| €150.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PP8UkRxoQCZUBaj0pf0wERp | Jun 7, 9:30 PM | — |
| €150.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PP8P5RxoQCZUBaj07Uo1kwu | Jun 7, 9:24 PM | — |
| €150.00 EUR Incomplete ⓘ | — | pi_3PP8OJRxoQCZUBaj0eMwMLfQ | Jun 7, 9:23 PM | — |
| €150.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PKgHqRxoQCZUBaj1lwtnSKK | May 26, 2:34 PM | — |
| €150.00 EUR Succeeded ✓ | VISA **** 4242 | pi_3PKgG1RxoQCZUBaj0J6fc3JG | May 26, 2:33 PM | — |

Viewing 1–20 of 46 results Previous Next

Payment API Integration (Stripe)



- Steps and workflow of payments:
 - on reserve page with cdn of <https://js.stripe.com/v3/> we initialized an object of stripe in JavaScript with Stripe Public Key
 - this object will make a call with post method to /create-payment-intent, fetching a payment intent(an object containing all payment data(amount from session not frontend, payment_id created with Stripe Java library).
 - on submit of payment form stripe js object will establish an ssl secured connection to Stripe to handle the payment. if the card was real and payment succeed we persist the reservation in database and redirect user to success page. in case of error we render the error returned on payment form.

Front - End



Front-End Technologies

Purpose:

- The frontend of our Car Rental Web Application provides a user-friendly interface for customers and admins to interact with the system. It handles user input, displays data, and ensures a seamless user experience.

Technologies Used:

- HTML: Structures the web pages.
- CSS: Styles the web pages for a visually appealing look.
- JavaScript: Adds interactivity and dynamic behavior to the web pages.
- jQuery: Simplifies DOM manipulation and AJAX requests.
- AJAX: Enables asynchronous data loading, improving user experience by avoiding full page reloads.
- Bootstrap: Ensures a responsive design that works across various devices and screen sizes.

Home / Displaying All cars



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Rent Car

Home Search Dashboard Logout

Brand Name: All Current Status: Available Category: All

Model Name:

Min Rental Rate: Max Rental Rate: Min Capacity: Max Capacity:

Filter

Toyota Corolla
HR23791B
Capacity: 5
Category: medium
Rate: 50
[Reserve](#)

Honda Civic
T6237FX5
Capacity: 4
Category: small
Rate: 70
[Reserve](#)

Ford Explorer
BF82HYH6
Capacity: 7
Category: SUV
Rate: 100
[Reserve](#)

Volkswagen Golf

BMW X5

Toyota Camry

Registration Page



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Rent Car

[Home](#) [Search](#) [Login](#) [Register](#)

Registration

Email:

First Name:

Last Name:

Date of Birth:

 mm/dd/yyyy

Address:

Phone:

Nationality:

Password:

License Number:

[Register me](#)

[Reset the form](#)

Login Page



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Rent Car

 [Home](#) [Search](#) [Login](#) [Register](#)

Login

Email:

Password:

[Login](#)

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[Site Map](#):

[Home](#)[Search](#)[Login](#)[Register](#)

Ahmad Sadin, Elnaz Dolati, Francesco Chemello, Gabriella Ingridy De Souza Farias, Luca Pellegrini, Seyedreza Safavi



Rent Car

[Home](#)[Search](#)[Dashboard](#)[Logout](#)[Personal Information](#)[License Information](#)

Personal Information

Email: seyedreza.safavi@studenti.unipd.it

First Name: SeyedReza

Last Name: Safavi

Date of Birth: 2010-02-09

Address: 123 Main St

Phone: 234234234

Nationality: USA

License Number: DL876793

[Edit your Information](#)



Reservation / First Stage



Rent Car

[Home](#)[Search](#)[Dashboard](#)[Logout](#)

Edit Customer Form

Licence Plate:

HR23791B

From:

mm/dd/yyyy

June 2024 ▾

↑ ↓

Su Mo Tu We Th Fr Sa

26 27 28 29 30 31 1

2 3 4 5 6 7 8

9 10 11 12 13 14 15

16 17 18 19 20 21 22

23 24 25 26 27 28 29

30 1 2 3 4 5 6

Clear

Today

set the Form

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Site Map:



Reservation / Second Stage



Rent Car

[Home](#)[Search](#)[Dashboard](#)[Logout](#)

Dear SeyedReza Safavi,

Please check the car details and the dates, then proceed with the payment to secure your reservation.

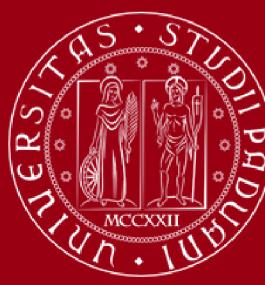
| | |
|---------------|------------|
| License Plate | HR23791B |
| Capacity | 5 |
| Model Name | Corolla |
| Category | medium |
| Brand Name | Toyota |
| Start Date | 2024-06-11 |
| End Date | 2024-09-11 |

Total Amount
4650.0 Euros

Card number MM / YY CVC

Pay

Reservation / Second Stage



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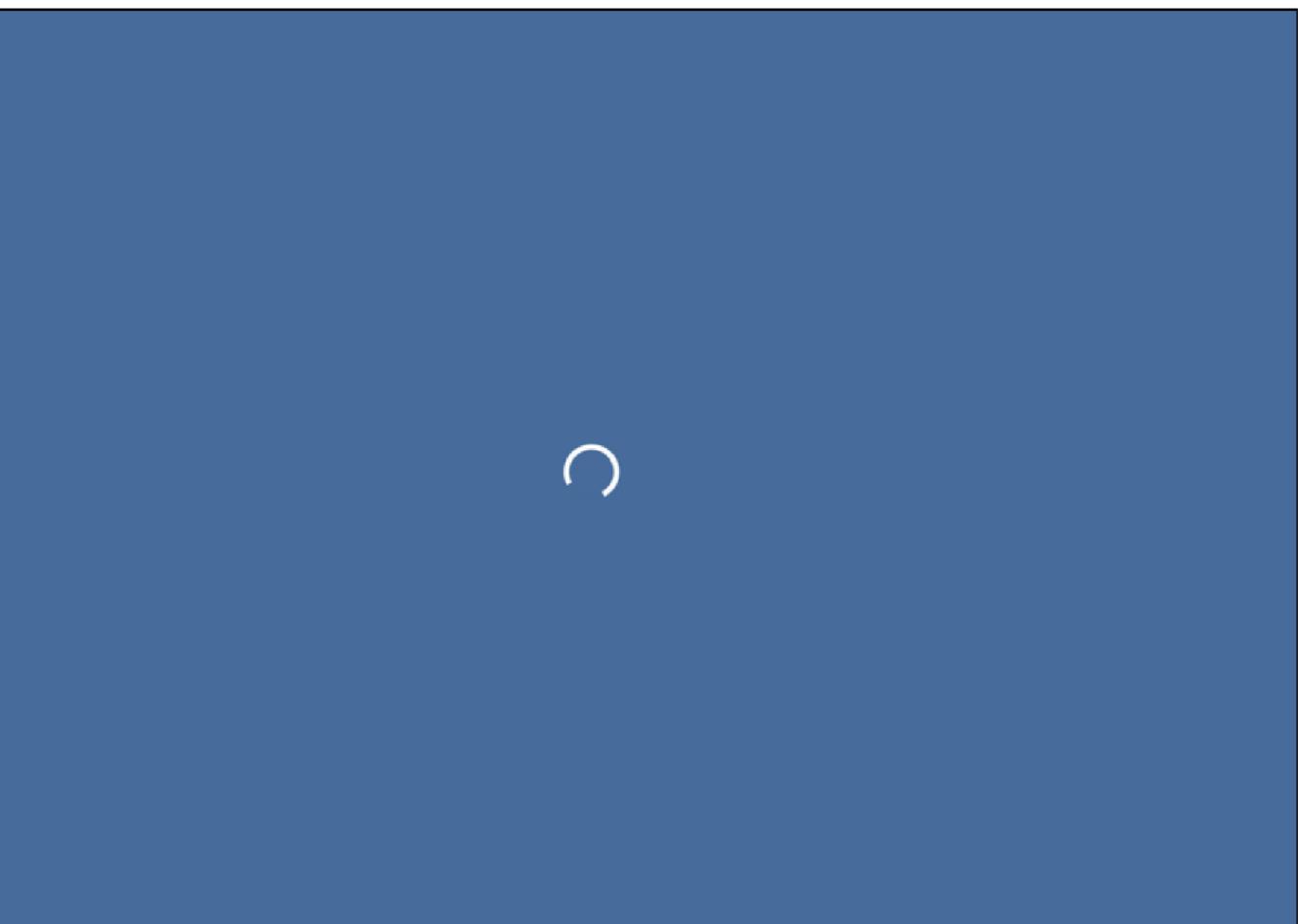
Total Amount
150.0 Euros

4242 02 / 28 555 99999

Pay

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Site Map:

Pay →





Reservation / Third Stage



Rent Car

[Home](#)

[Search](#)

[Dashboard](#)

[Logout](#)

Payment Successful! you can find your reservation in dashboard.

Conclusion / Future Works



Conclusion

Summary

- Streamlined car rental operations and enhanced customer experience.
- Integrated robust backend services with an interactive frontend.

Achievements

- Implemented core functionalities with data integrity and security.
- Developed a responsive and intuitive user interface.



Enhancements

- Advanced search capabilities, availability calendars, and personalized recommendations.
- Review and rating system for feedback and service improvement.
- Expanded administrative functionalities for user management and reporting.

Technological Advancements:

- Adoption of machine learning and AI for pricing optimization and demand prediction.
- Continuous refinement of frontend technologies for improved user experience.

Community Engagement:

- Collaboration with industry experts for feedback and feature prioritization.
- Participation in events to stay updated on industry trends and foster innovation.

Thank You!

ANY QUESTIONS?