DOKUZ EYLUL UNIVERSITY

ENGINEERING FACULTY

DEPARTMENT OF COMPUTER ENGINEERING

CME3201 DATABASE MANAGEMENT SYSTEMS TERM PROJECT

From The Store To Wherever You Want

FINAL REPORT

by

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02.01.2024

ABSTARCT

This project aims to revolutionize the shopping and transportation experiences in supermarkets, with a specific focus on addressing the unique challenges faced by both individual and corporate customers. The primary concern is the high transportation costs and increased carbon emissions incurred by customers, particularly those without personal vehicles, who rely on taxis or rideshare services for transporting groceries. This issue is exacerbated for bulk purchases, including items like furniture.

Similarly, corporate customers making regular bulk purchases face the dilemma of investing in dedicated vehicles, which often results in underutilized resources and additional expenses. To tackle these challenges, the project proposes the development of a novel website offering an on-demand chauffeured transportation service. This service will utilize vehicles owned by the supermarket and operated by its staff, thereby ensuring affordability and environmental sustainability.

The anticipated outcomes of this initiative include a significant reduction in carbon emissions due to decreased reliance on personal vehicles, a cost-effective alternative to conventional taxi services for individual customers, and the elimination of the need for corporate customers to purchase and maintain dedicated vehicles. Ultimately, this project aims to enhance the overall shopping experience while contributing positively to environmental sustainability and economic efficiency.

PROBLEM SPECIFICATIONS

To effectively address the challenges within the problem domain, specific project specifications and requirements must be identified and considered. These specifications define the key features and functionalities necessary for the successful implementation of the project. The problem specifications are as follows:

Website Development: The project necessitates the creation of a user-friendly and responsive website that allows customers to access the chauffeured transportation service. The website should be accessible via both desktop and mobile devices to cater to a broad user base.

Vehicle Selection: The system must provide customers with the ability to select a vehicle of an appropriate size to accommodate their shopping needs. This feature ensures that customers can choose a vehicle that matches the volume of their purchases, optimizing cost and convenience.

Route Information: Customers should have access to route information, allowing them to plan and visualize the most efficient way to transport their purchased items. This includes real-time traffic updates and route recommendations.

Appointment System: The project requires a robust appointment system that allows users to schedule transportation services at their convenience. This system should include features for both appointment

creation and cancellation, ensuring flexibility.

User Profiles: The system should provide users, whether individuals or corporate customers, with profile pages where they can view their past transfers.

Separate Panels: The project demands separate user interfaces for three distinct user groups: customers, drivers, and the supermarket business. Each panel should offer specific features tailored to the needs and roles of these steakholders.

SOLUTION SYSTEM

The solution system is a user-friendly online platform that provides a chauffeured transportation service. It includes a website accessible on desktop and mobile devices, vehicle selection options, real-time route information, an appointment system, a rating and review system, and user profiles. The system caters to individual and corporate customers, as well as supermarket drivers. It ensures cost-effective, eco-friendly transportation and aims to enhance the overall shopping experience while reducing costs and carbon emissions.

SYSTEM SERVICES

The system offers a range of services tailored to meet the diverse needs of its users:

-Vehicle Selection

-Route Planning

-Appointment Management

-User Profiles

-Business Management

REQUIREMENTS

Functional Requirements

- **User Authentication:** The website must support user registration, login, and authentication for customers and admins.
- **Vehicle Selection Tool**: A feature allowing customers to select vehicles based on size, and other criteria relevant to their shopping needs.
- **Appointment Scheduling System:** A calendar-based interface for customers to book transformation services.
- **User Profile Management**: Capability for users to create and manage profiles, view past transfers, see and change their personal information.
- **Responsive Web Design**: The website should adapt to different screen sizes and devices, providing a consistent user experience across desktops, laptops, tablets, and smartphones.

Non - Functional Requirements

- **Usability:** The website should be user-friendly with an intuitive interface for ease of navigation.
- **Scalability:** The system should be capable of handling an increasing number of users, vehicles, and transactions without performance degradation.
- **Cross-Browser Compatibility:** The website should function correctly across different web browsers.
- **Security:** Robust security measures to protect user data, including secure authentication and data encryption.
- **Maintainability:** The system should be easy to maintain and update, with clear documentation and modular design.

SYSTEM ARCHITECTURE

The application's backend is powered by the .NET MVC framework, interfacing with an MSSQL database. The frontend is crafted using a combination of JavaScript, CSS, and HTML, ensuring a dynamic and responsive user experience.

Backend Architecture

Model-View-Controller Paradigm: Our application leverages the MVC architecture inherent in .NET, promoting separation of concerns. This design pattern divides the application into three interconnected components, enhancing maintainability and scalability.

Model: The model component represents the application's dynamic data structure, independent of the user interface. It directly manages the data, logic, and rules of the application. In our system, models are designed to interact seamlessly with the MSSQL database, handling data retrieval, storage, and manipulation.

View: Views in our application are responsible for presenting data from the model to the user. They are the application's user interface—HTML pages and dynamic UI components. The integration of CSS and JavaScript further enhances these views, providing a rich and interactive user experience.

Controller: Controllers act as an intermediary between models and views. They receive input from users via views, process it (with possible model interaction), and return the output display data to the views. Our controllers are adept at handling various HTTP requests and directing the flow of data in the application.

Backend Architecture

Database Design: Our application utilizes Microsoft SQL Server (MSSQL) for database management. The database schema is carefully designed to optimize data storage, retrieval, and integrity.

Data Access Layer: The integration between .NET MVC and MSSQL is facilitated through a data

access layer, which abstracts the database operations from the business logic. This layer uses Entity Framework, a powerful ORM, for efficient database operations like CRUD (Create, Read, Update, Delete) functionalities.

Frontend Architecture

HTML: We use HTML to structure the content of our web pages. It forms the backbone of the user interface, defining elements like headers, paragraphs, and forms.

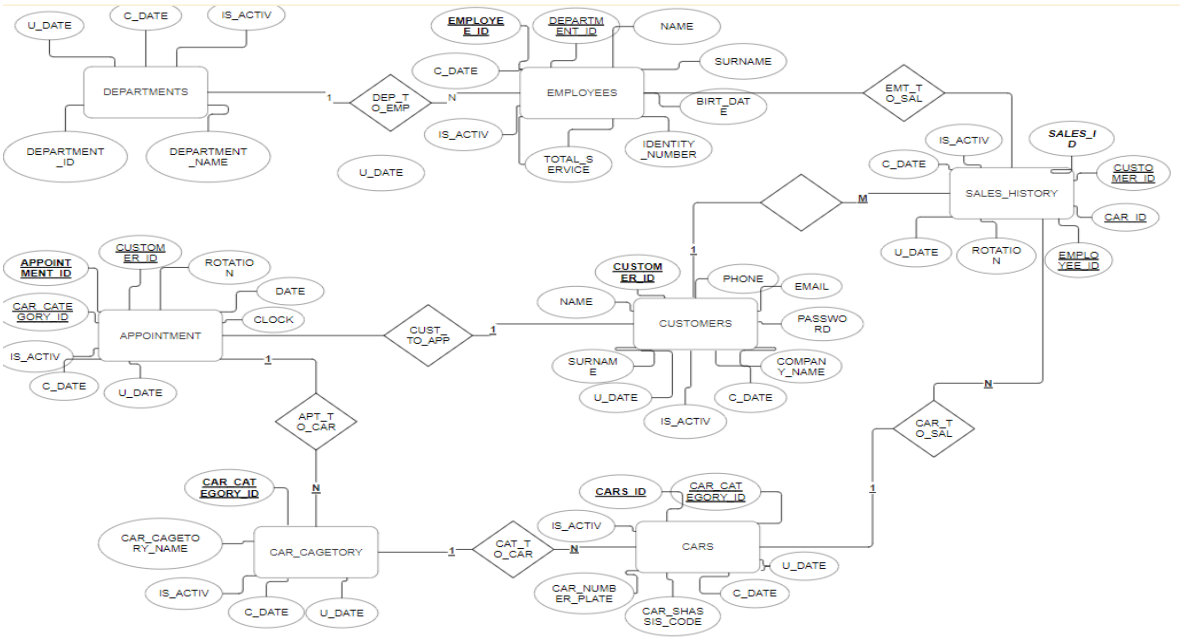
CSS: Cascading Style Sheets (CSS) are employed to style the HTML content. CSS enhances the visual appearance of our application, including layouts, colors, and fonts, contributing to a user-friendly and aesthetically pleasing interface.

JavaScript: JavaScript is utilized for client-side scripting to create interactive web applications. It enables dynamic content updates and improving user experience.

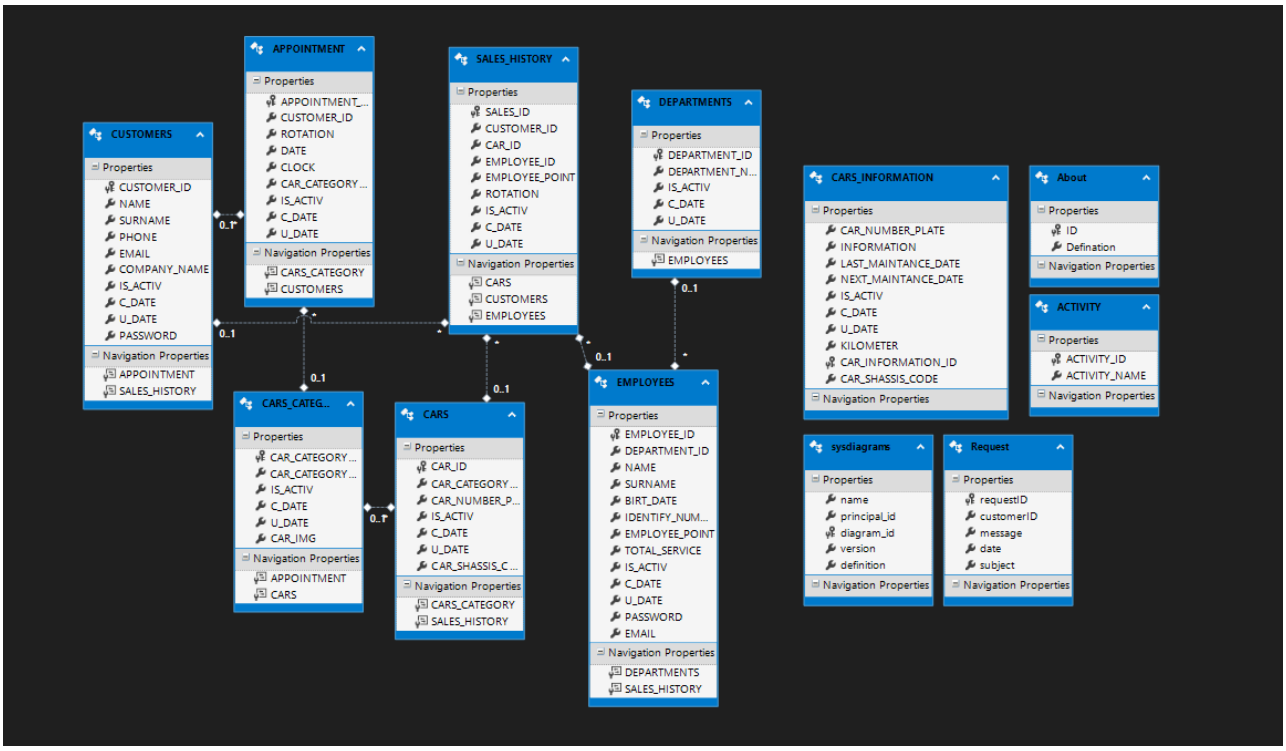
DIAGRAMS

ER Diagram

An Entity-Relationship Diagram (ERD) is a visual representation used in database design to model the structure and relationships of entities within a database. It consists of entities (objects or concepts), attributes (properties of entities), and relationships (associations between entities).

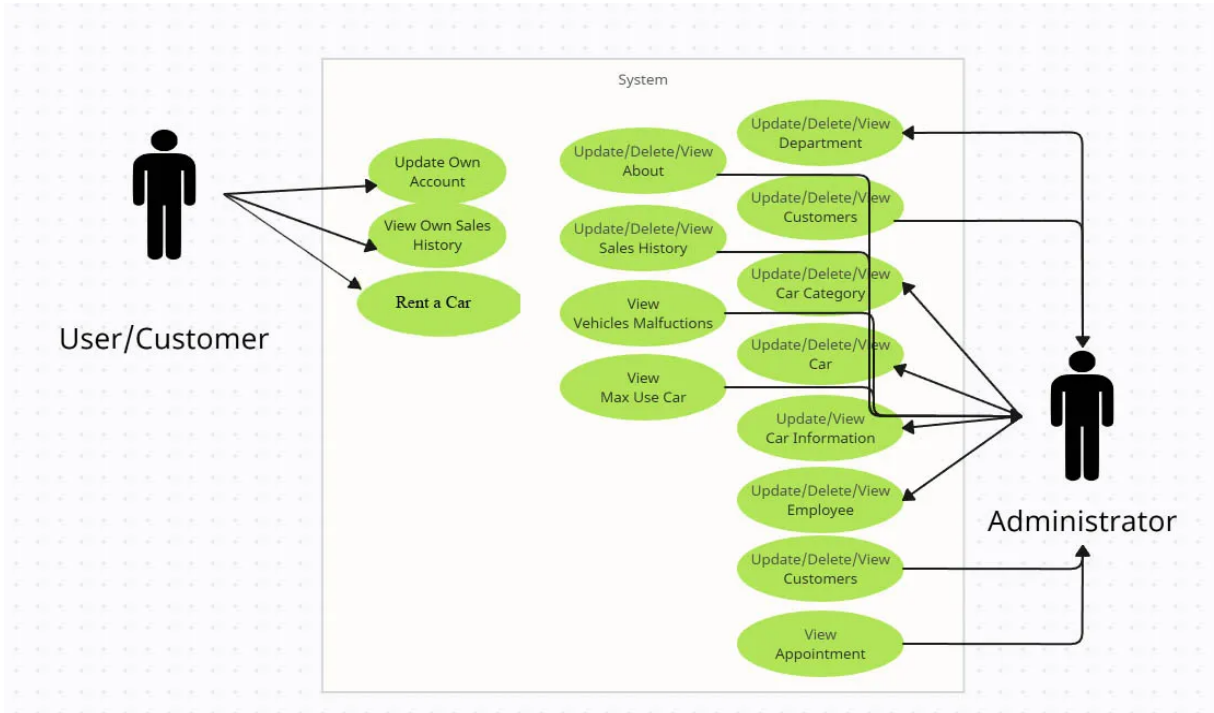


Database Model

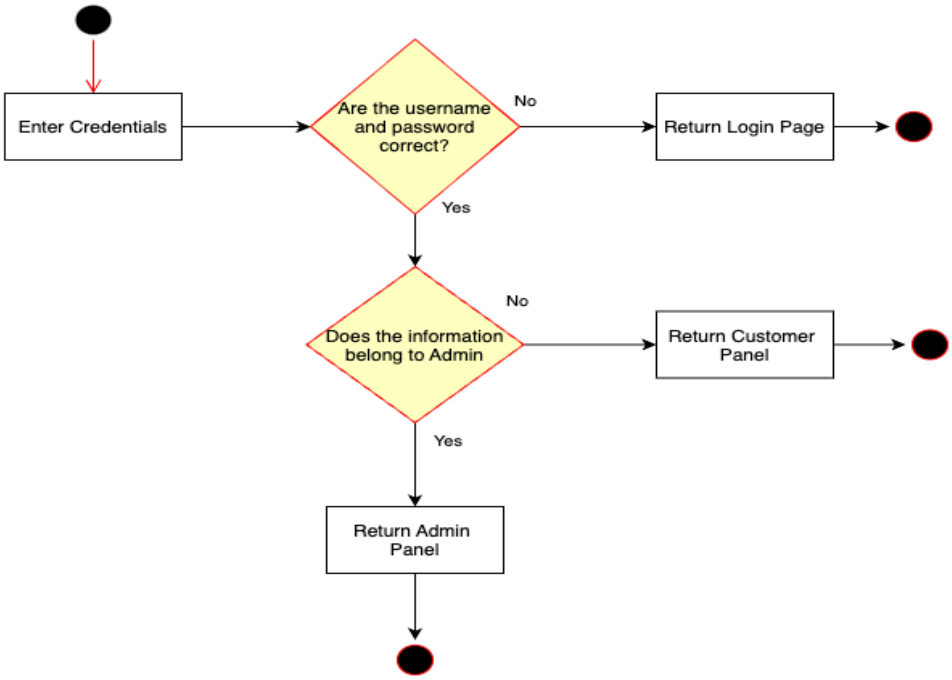


Use Case Diagram

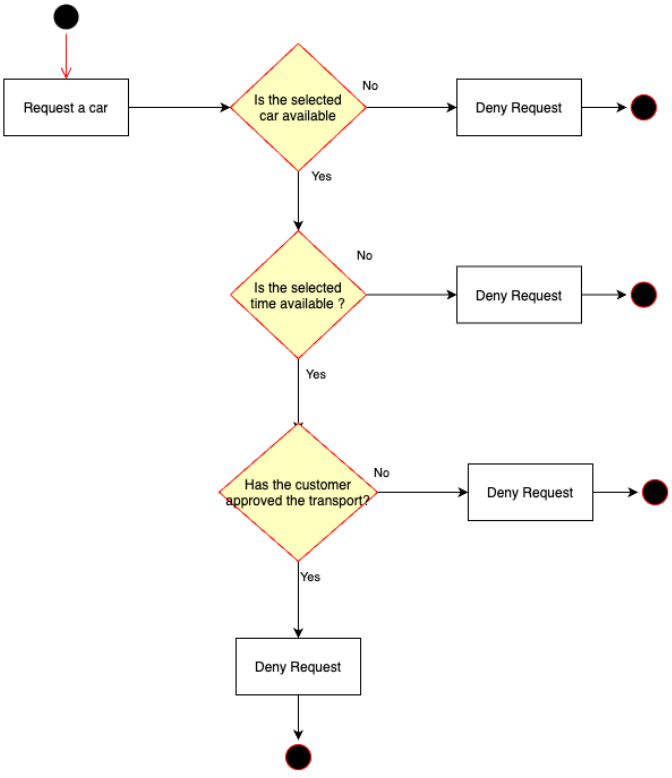
Use case diagrams are a type of visual representation used in software and systems engineering to display the functionality of a system from an end-user perspective.



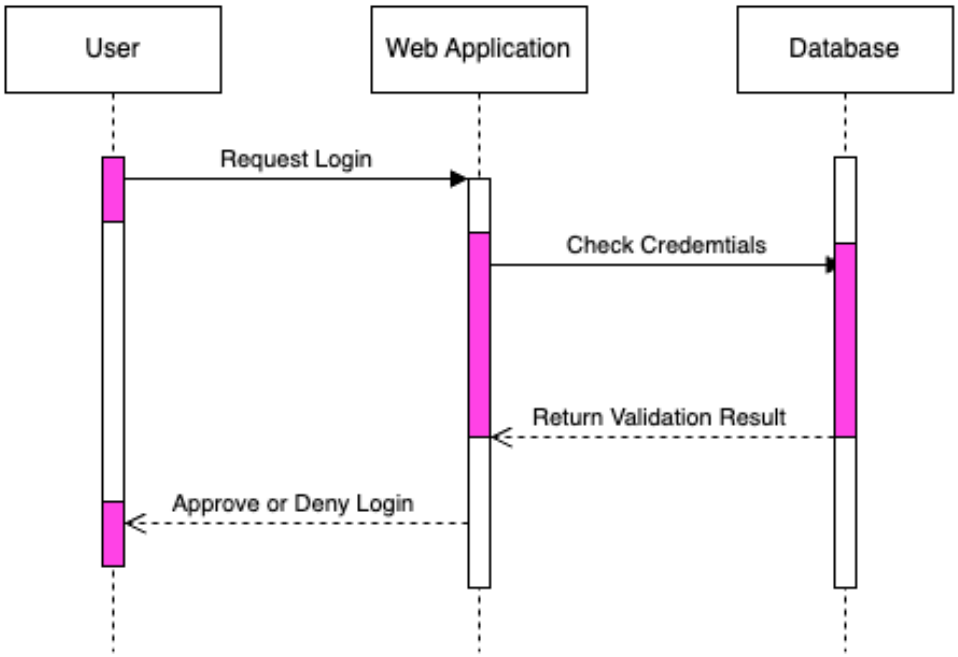
Activity Diagram for Login



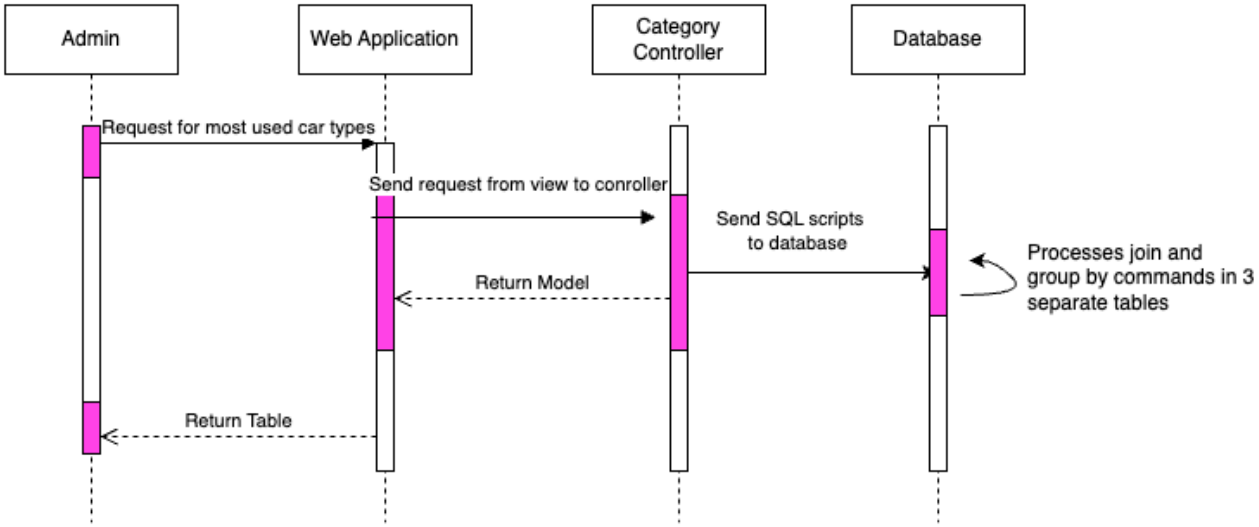
Activity Diagram for Car Request



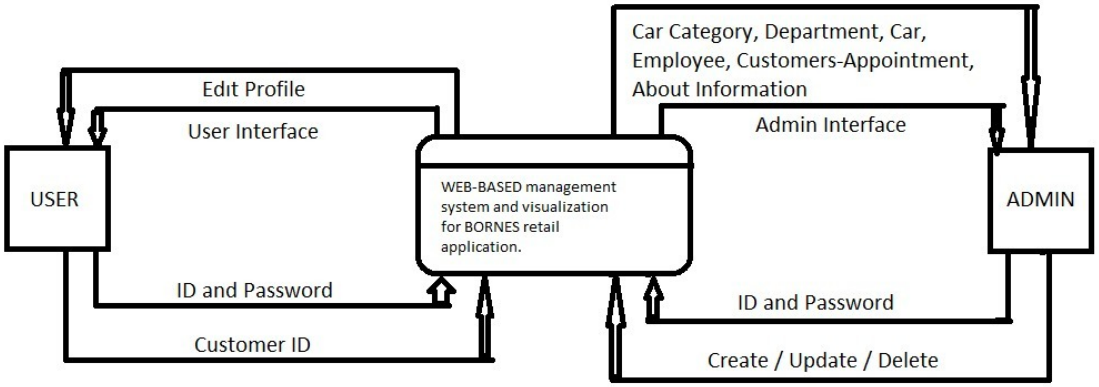
Sequence Diagram for Login



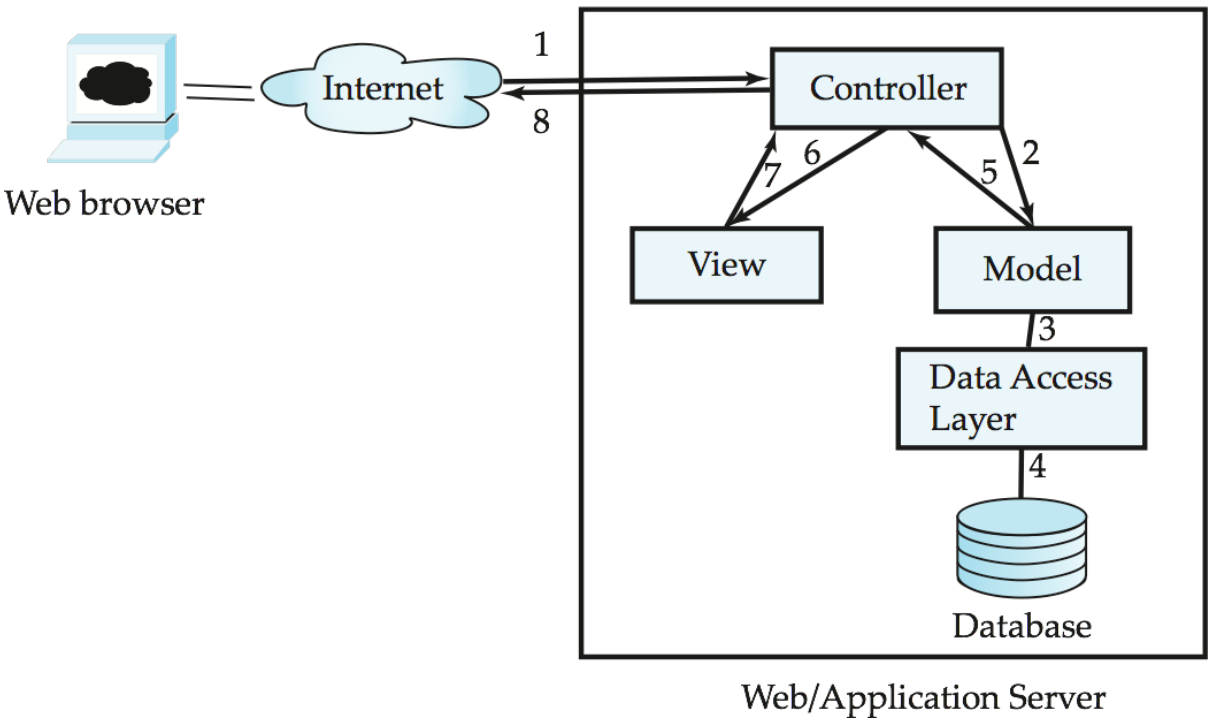
Sequence Diagram for Most Used Car Types



Data Flow Diagram

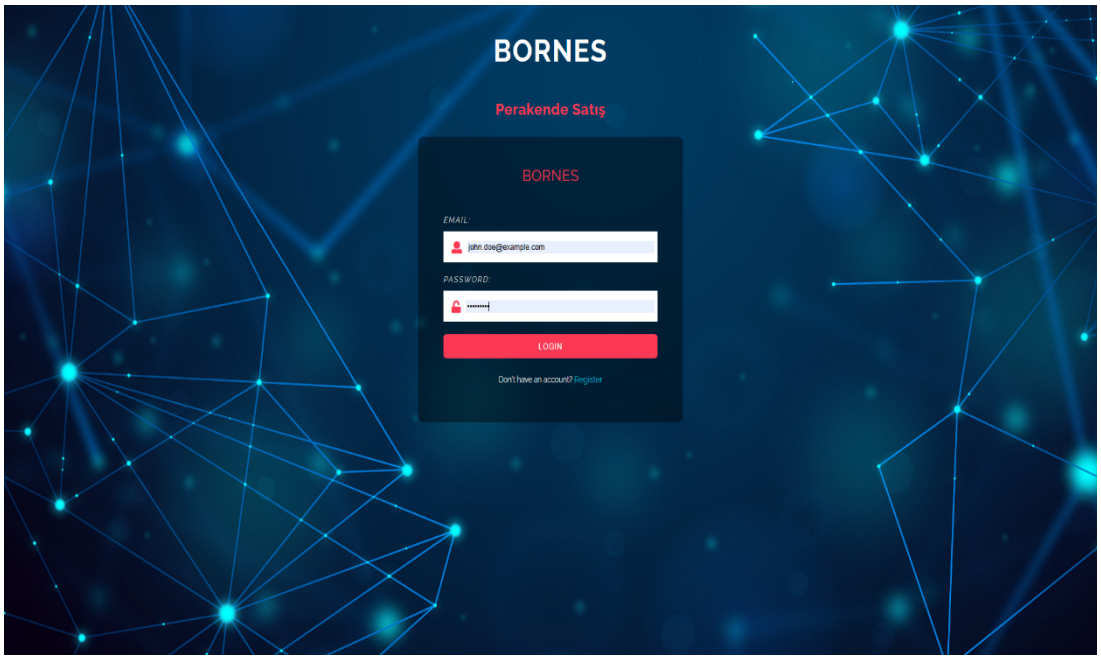


Application Design Diagram

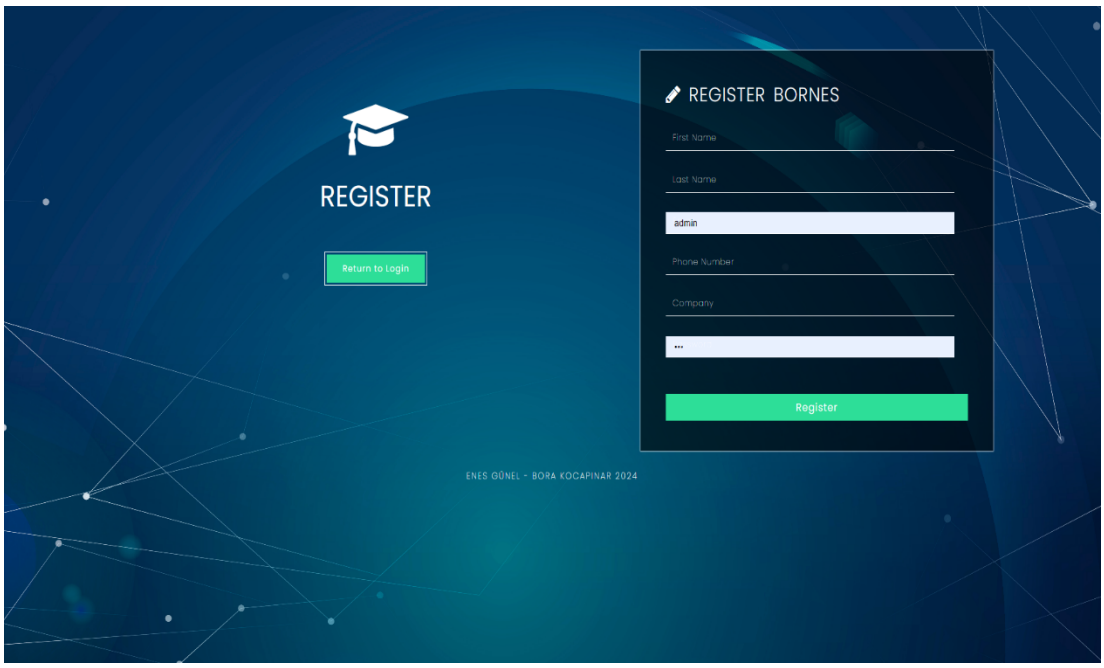


Screenshots

Login Page



Register Page



Sample User Web Pages

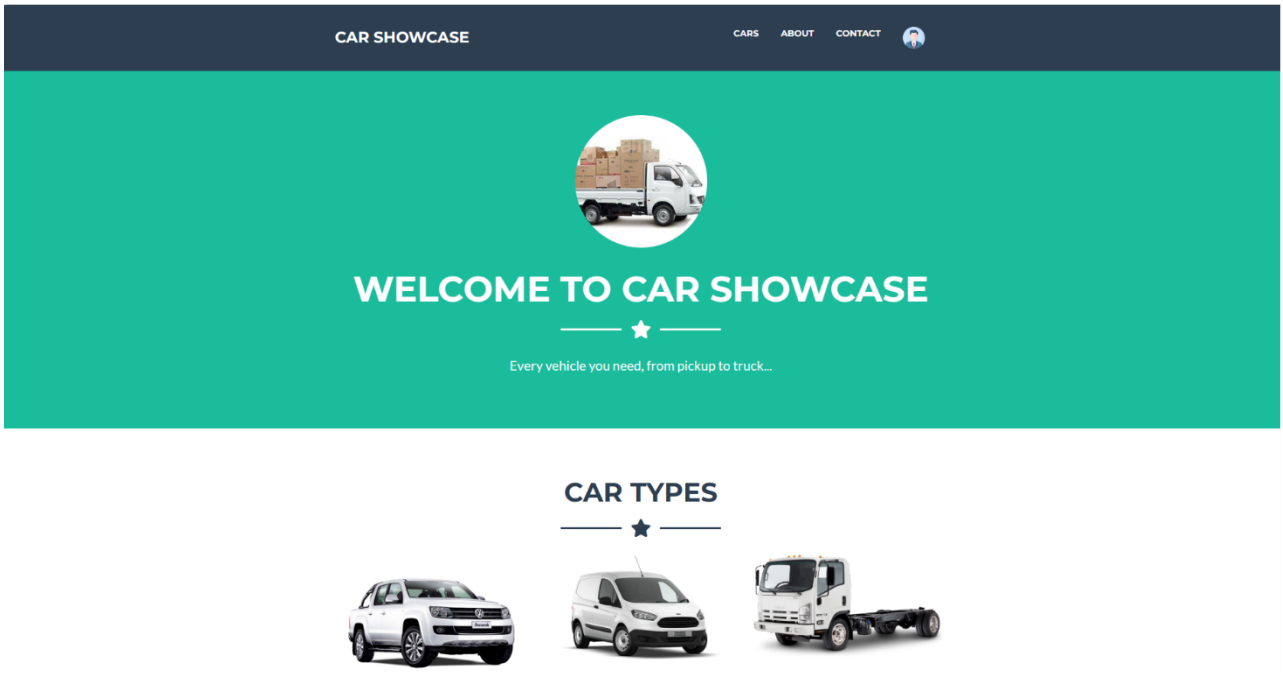


Figure 1: User first panel

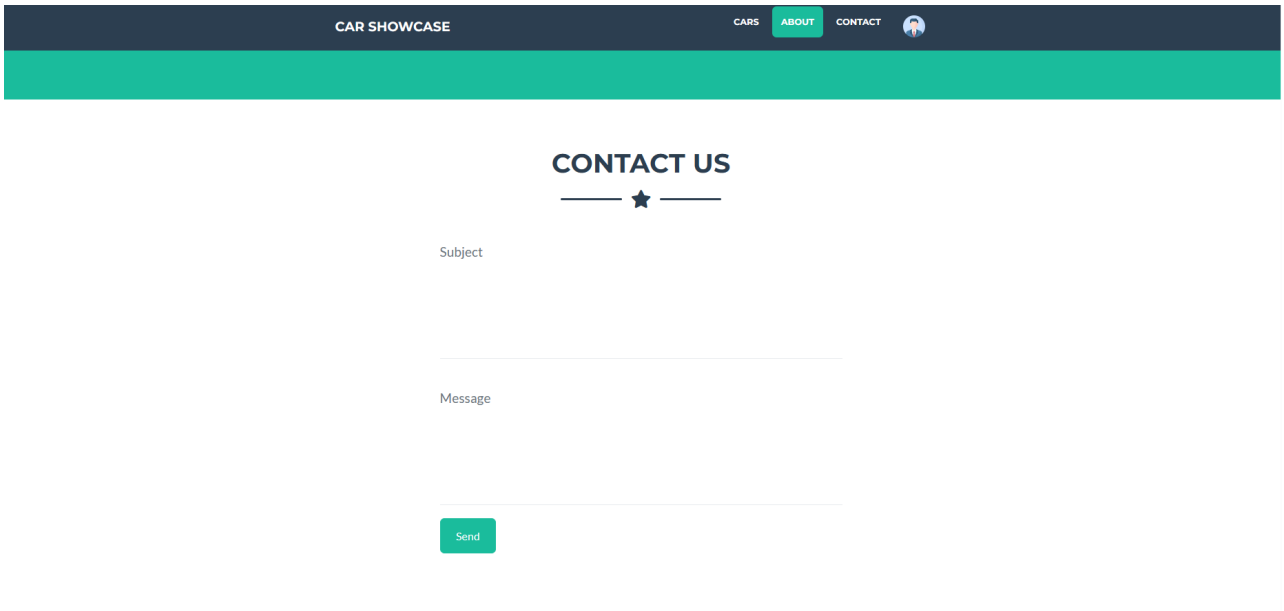


Figure 2: User contact panel

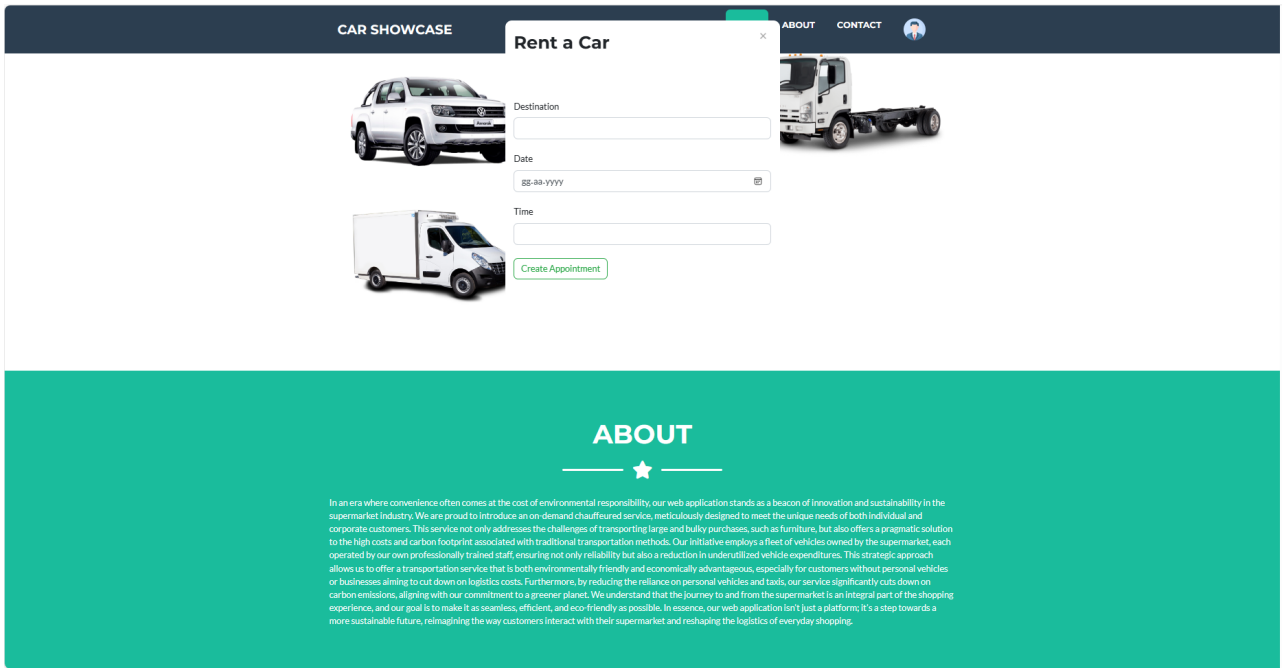


Figure 3: User create an appointment panel

Sample Admin Web Pages

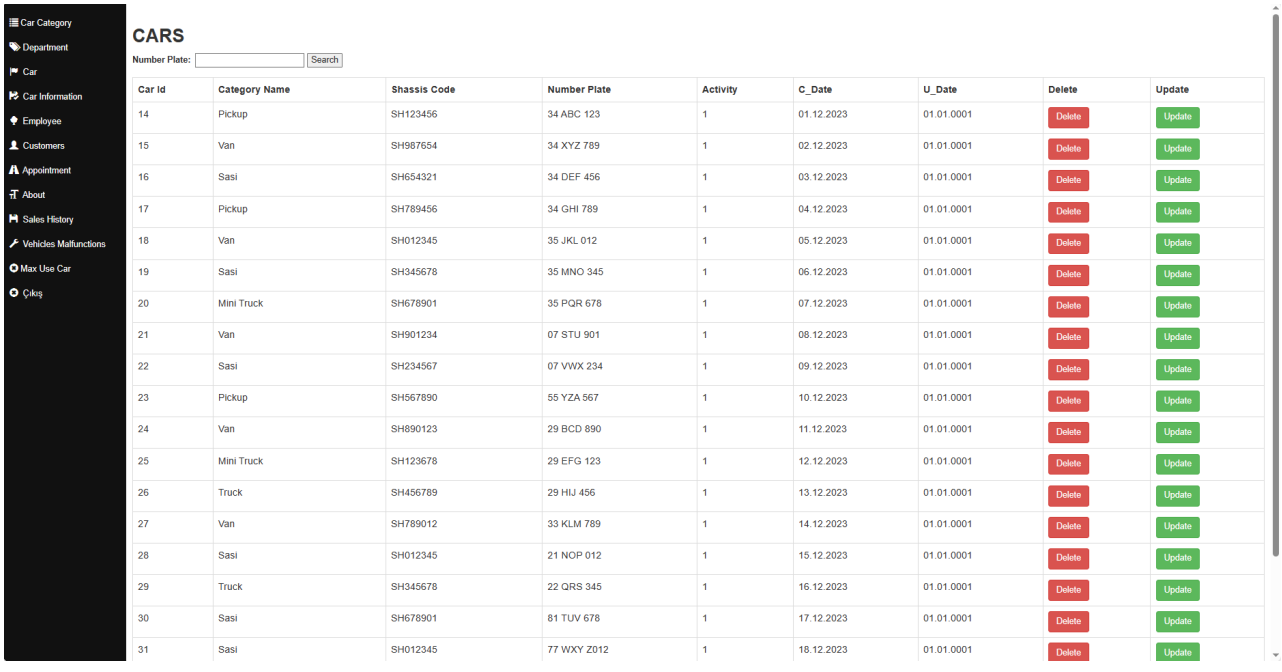


Figure 4: Sample admin search panel

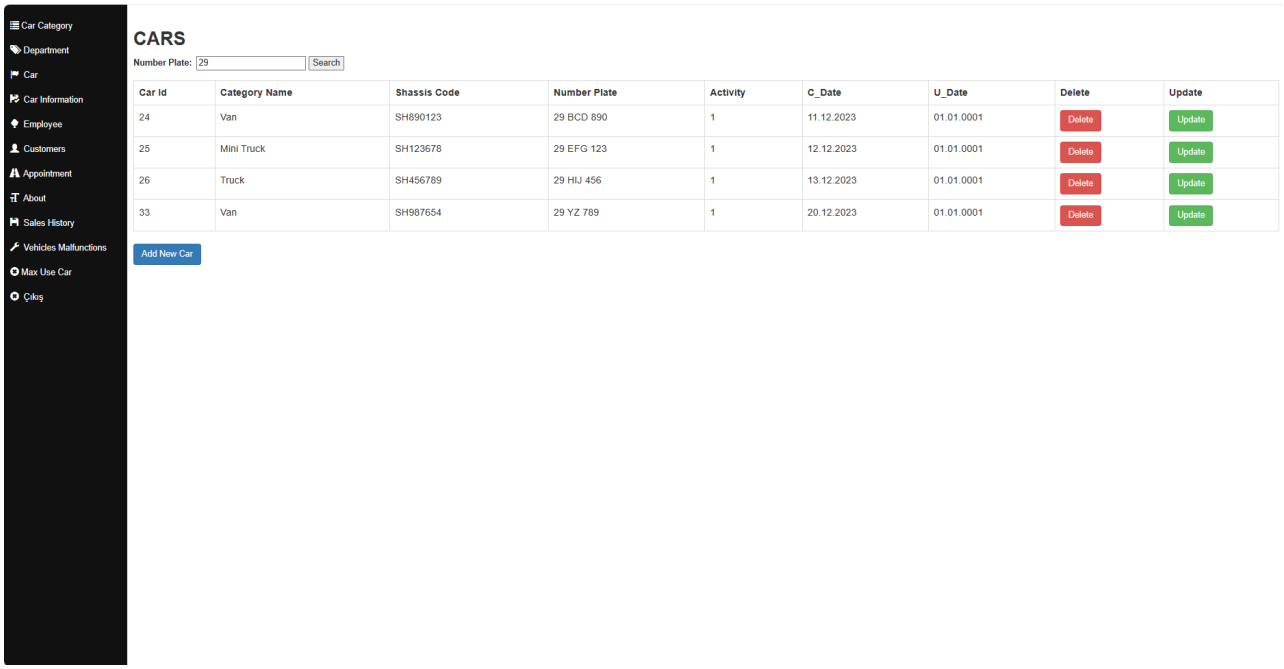


Figure 5: Sample admin search panel

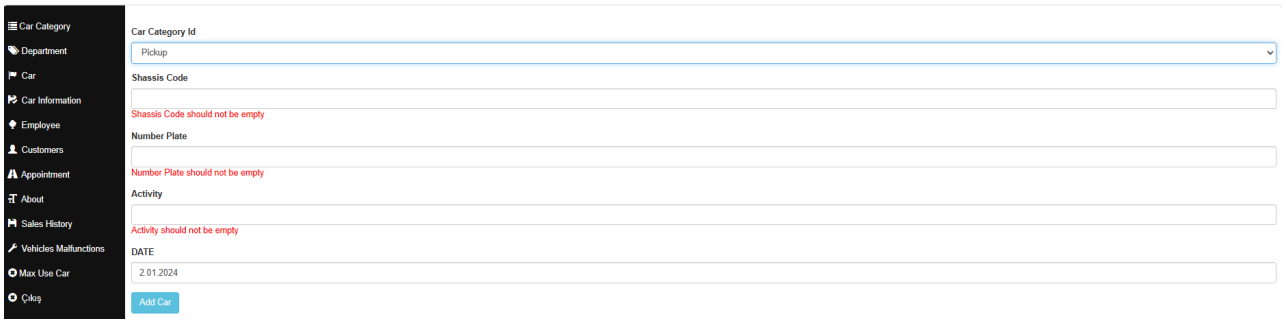


Figure 6: Sample admin create panel

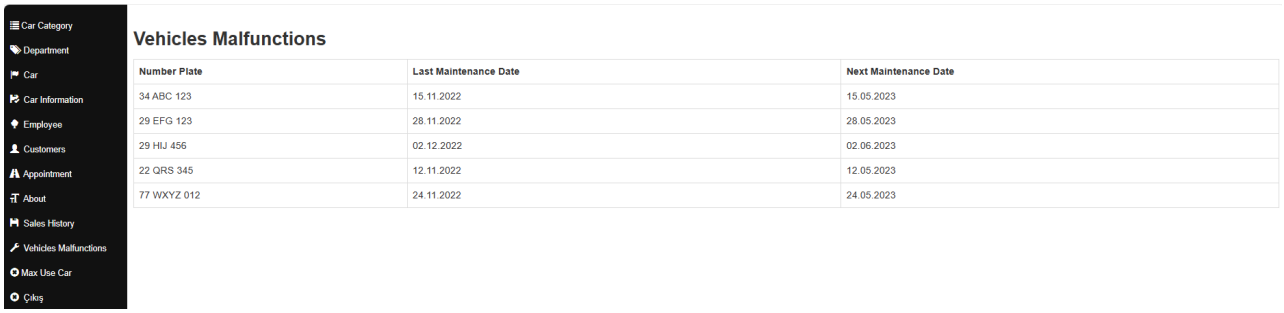


Figure 7: Sample complex query result screen

Conclusion

In conclusion, the project was completed on schedule, achieving all the intended objectives. This outcome highlights the effectiveness of teamwork and strict adherence to the planned framework. As a two-person developer team, we successfully managed various aspects of the project, reflecting the efficiency of coordinated effort. The completion of this project also provided an opportunity for skill enhancement and professional development. Overall, the experience demonstrated the importance of collaboration and structured planning in achieving targeted goals.