

Deliverable 3 - Final Project Documentation

Project Title

- **CarGoNow (Car Rental Management System)**

Project Team:

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1. Project Scope

The CarGoNow project aims to develop a desktop application that simplifies and enhances the management of a car rental business. This system is designed to benefit car rental companies, their administrators, employees, and customers. The project's primary clients could include car rental companies, car fleet management businesses, and individuals looking to streamline their car rental operations.

Below some companies that could use our project in their company:

- Enterprise.
- National.
- Alamo.
- Hertz.
- Avis.
- Budget.
- Dollar.
- Thrifty.

Users and Beneficiaries:

- Administrators (managers): These users have full control over the system and manage user accounts, vehicle inventory, and generate reports.

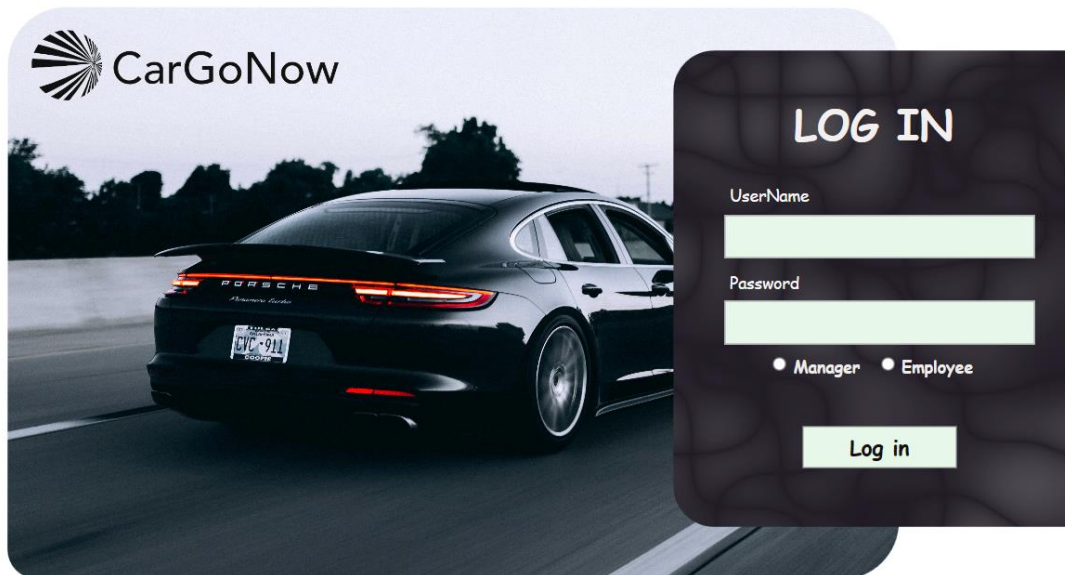
- Employees: Responsible for handling reservations, check-ins, check-outs, and generating bills.

2. Project Functionalities

This section provides a detailed overview of the key functionalities developed for the CarGoNow application.

User Management (Login Screen):

- The application supports both administrator and employee roles with authentication.
- User profiles can be managed, allowing users to update their login credentials.



- Admin Screen:

The admin interface furnishes access to a breadth of data, including employee, car, client, reservation, bill, and settings data. Administrators enjoy elevated permissions within the application.

- Employee Screen:

In contrast, regular employees have less access level compared to administrators.

Both roles have the option to log out of the system.

Employee Management

This user control view is accessible just by admin roles (managers). Within this interface, users can insert a new employee to the system by inserting the required data as the screen shows. In addition to that, users can update, and delete any record from this screen.

Employees

Cars

Clients

Reservations

Bills

Settings

Sign Out

Employee ID:

Role:

Add

First Name:

SIN No.:

Update

Last Name:

Delete

Vehicle Management

- Users (managers) can add, edit, and delete vehicles with details such as make, model, year, etc.
- Employees only can check the available cars in the system.
- Vehicle availability status is tracked to ensure accurate reservation management.
- Maintenance and service scheduling features are implemented for each vehicle.

Employees

Cars

Clients

Reservations

Bills

Settings

Sign Out

Car ID:

Year:

Add

Model:

Color:

Update

Availability:

License Plate:

Delete

Transmission Type:

Maintenance History:

Price Per Day:

Insurance Details:

Client Management

- Users can add and manage customer profiles.

The screenshot shows the 'ManagerProfile' window for CarGoNow. The left sidebar contains navigation icons for Employess, Cars, Clients, Reservations, Bills, Settings, and Sign Out. The main area is titled 'ManagerProfile' and contains a form for adding or updating a customer profile. The form includes fields for Customer ID, Phone No., First Name, Email, Last Name, Driving License, and Expiry Date (with a date picker). Below the form is a table listing existing customers.

cuid	fname	lname	phonenummer	email	drivinglicense	dlexpiry_date	createdat
1	John	Doe	1234567890	john.doe@example.com	987654321	12/31/2024 12:00:00 AM	10/16/2023 9:33:12 AM
2	Alice	Smith	9876543210	alice.smith@example.com	123456789	11/30/2023 12:00:00 AM	10/16/2023 9:33:12 AM
3	Bob	Johnson	5555555555	bob.johnson@example.com	456789123	10/15/2023 12:00:00 AM	10/16/2023 9:33:12 AM
4	Sarah	Brown	4444444444	sarah.brown@example.com	789456123	2/28/2024 12:00:00 AM	10/16/2023 9:33:12 AM
5	David	Wilson	3333333333	david.wilson@example.com	654321987	9/15/2024 12:00:00 AM	10/16/2023 9:33:12 AM
6	Emily	Anderson	2222222222	emily.anderson@example.com	987654321	12/31/2023 12:00:00 AM	10/16/2023 9:33:12 AM
7	Michael	Clark	7777777777	michael.clark@example.com	123987456	11/15/2023 12:00:00 AM	10/16/2023 9:33:12 AM
8	Olivia	Garcia	6666666666	olivia.garcia@example.com	852963741	3/20/2024 12:00:00 AM	10/16/2023 9:33:12 AM
9	Sophia	Jones	9999999999	sophia.jones@example.com	369852147	10/1/2023 12:00:00 AM	10/16/2023 9:33:12 AM
10	Daniel	Lee	8888888856	daniel.lee@example.com	741258963	4/10/2024 12:00:00 AM	10/16/2023 9:33:12 AM

Reservation Management

- Users can make, modify, or cancel reservations.

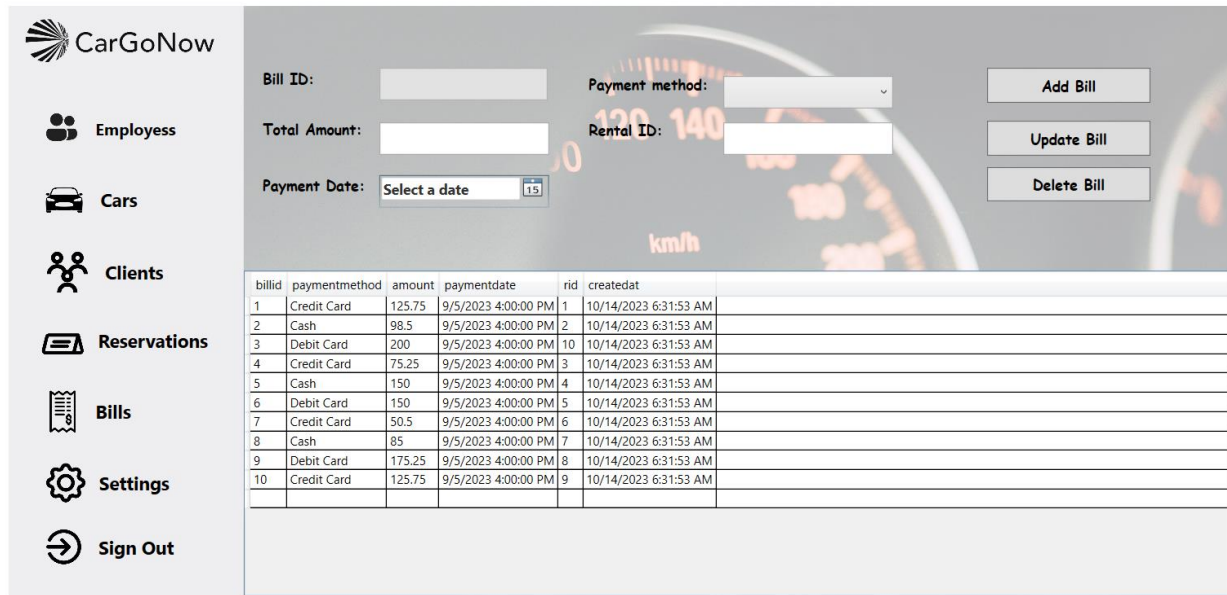
- A calendar view is available for checking vehicle availability.

The screenshot shows the 'CarGoNow' interface for Reservation Management. The left sidebar contains navigation icons for Employess, Cars, Clients, Reservations, Bills, Settings, and Sign Out. The main area contains a form for creating or modifying a reservation. The form includes fields for Rental ID, Check-in (with a date picker), Check-out (with a date picker), Car ID, Employee ID, and Customer ID. Below the form is a table listing existing reservations.

rid	checkin	checkout	carid	cuid	emid	createdat
1	9/1/2023 8:00:00 AM	9/5/2023 4:00:00 PM	1	1	1	10/14/2023 6:31:53 AM
2	9/3/2023 10:00:00 AM	9/7/2023 6:00:00 PM	2	2	2	10/14/2023 6:31:53 AM
3	9/5/2023 12:00:00 PM	9/9/2023 2:00:00 PM	3	3	3	10/14/2023 6:31:53 AM
4	9/2/2023 9:00:00 AM	9/6/2023 5:00:00 PM	4	4	4	10/14/2023 6:31:53 AM
5	9/4/2023 11:00:00 AM	9/8/2023 3:00:00 PM	5	5	5	10/14/2023 6:31:53 AM
6	9/6/2023 1:00:00 PM	9/10/2023 12:00:00 PM	6	6	6	10/14/2023 6:31:53 AM
7	9/7/2023 2:00:00 PM	9/11/2023 11:00:00 AM	7	7	7	10/14/2023 6:31:53 AM
8	9/8/2023 3:00:00 PM	9/12/2023 10:00:00 AM	8	8	8	10/14/2023 6:31:53 AM
9	9/9/2023 4:00:00 PM	9/13/2023 9:00:00 AM	9	9	9	10/14/2023 6:31:53 AM
10	9/10/2023 5:00:00 PM	9/14/2023 8:00:00 AM	10	10	10	10/14/2023 6:31:53 AM
14	9/8/2023 3:00:00 PM	9/20/2023 12:00:00 AM	10	5	8	10/16/2023 11:52:23 AM

Bill Management

- Users (both admins and employees) can generate bills associated with specific reservations. In addition, users can update, and delete any record from this screen.
- Bill calculations are based on the duration of the reservation and the corresponding daily rate for the selected car.



billid	paymentmethod	amount	paymentdate	rid	createdat
1	Credit Card	125.75	9/5/2023 4:00:00 PM	1	10/14/2023 6:31:53 AM
2	Cash	98.5	9/5/2023 4:00:00 PM	2	10/14/2023 6:31:53 AM
3	Debit Card	200	9/5/2023 4:00:00 PM	10	10/14/2023 6:31:53 AM
4	Credit Card	75.25	9/5/2023 4:00:00 PM	3	10/14/2023 6:31:53 AM
5	Cash	150	9/5/2023 4:00:00 PM	4	10/14/2023 6:31:53 AM
6	Debit Card	150	9/5/2023 4:00:00 PM	5	10/14/2023 6:31:53 AM
7	Credit Card	50.5	9/5/2023 4:00:00 PM	6	10/14/2023 6:31:53 AM
8	Cash	85	9/5/2023 4:00:00 PM	7	10/14/2023 6:31:53 AM
9	Debit Card	175.25	9/5/2023 4:00:00 PM	8	10/14/2023 6:31:53 AM
10	Credit Card	125.75	9/5/2023 4:00:00 PM	9	10/14/2023 6:31:53 AM

Rental Transactions

- The application handles check-in (reservation) and check-out (return) of vehicles.
- Rental agreements and invoices are automatically generated based on transaction details.

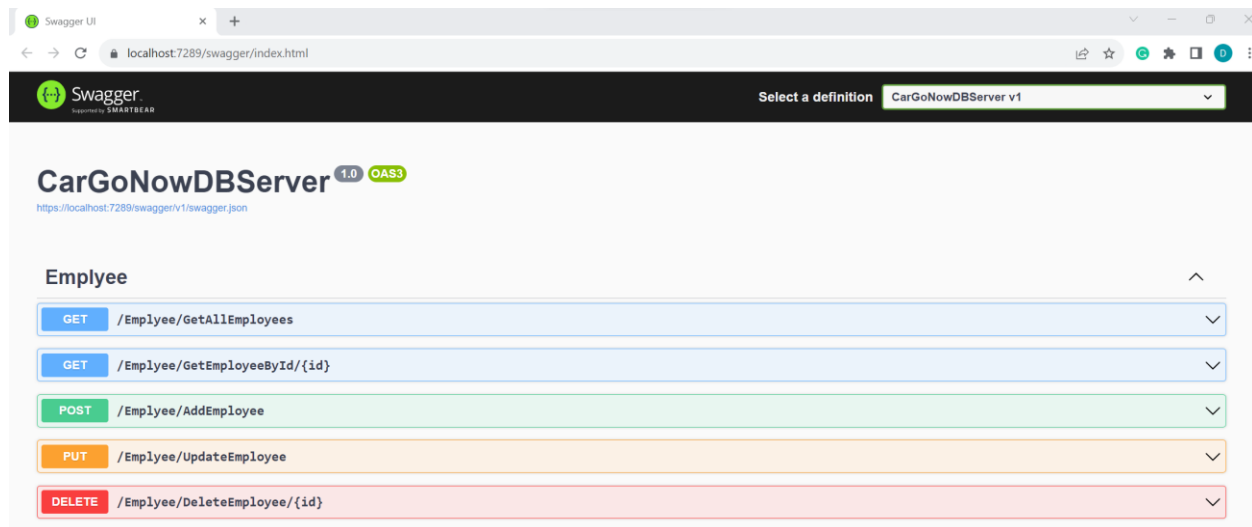
Reporting and Analytics

- The application can generate reports on revenue, reservations, and vehicle usage.
- Visualizations and data insights are provided to help users make informed decisions.

Integration with REST API

The project has planned to integrate the database with a REST API to enable future scalability and remote data access.

We integrated the Employee functionalities with REST API and linked the CarGoNowServer with CarGoNowApp for that class.



Unit Tests:

We added unit tests to ensure that the functionality of our project works as expected. We implemented the unit tests using the NUnit framework for one class (Bill calculation).

Mid-term Project Updates

The project has successfully completed tasks related to database schema design, user interface implementation, and database connectivity before the mid-term presentation. Test validation (CarGoNowApp Test) and REST API (CarGoNowDB Server) have been implemented after that.

3. Project Setup

We employed the following frameworks and tools to develop the CarGoNow application:

- Database: MySQL 8.0.34 for Windows 64-bit.
- Database Management: MySQL Workbench 8.0.34 for Windows 64-bit.
- Framework: .NET Framework 4.7.2.
- User Interface Framework: Windows Presentation Foundation (WPF).
- Programming Language: C#.
- Integrated Development Environment (IDE): Visual Studio Enterprise 2022.
- Rest API: Swagger development tool.

To set up and run the CarGoNow application on the end user's machine, the process involves packaging the application into an installer (e.g., MSI installer). Subsequently, all necessary prerequisite frameworks, such as the .NET Framework, need to be installed. Additionally, the installation process should include setting up the MySQL database on the user's machine, given that the application heavily relies on a local

database for most of its functionalities (REST API for the remote database still needs to be implemented to cover all functionalities, not limited to the employee class alone. This is crucial to eliminate reliance on the local database and enable seamless operation with a remote database.). It is essential to ensure that any required libraries or dependencies (DLLs) are either included with the application installer or already present on the client machine.

One important change we need to make for running and testing the application on the user's machine is to ensure that the application utilizes the correct connection string to connect to the MySQL database. The connection string should encompass the server address, database name, username, and password.

The project's source code is hosted on GitHub for version control, collaboration, and project tracking. Shared storage is managed through a Google Drive folder.

4. Work Progress in Future

In the near future, the project can be expanded and improved by adding the following functionalities:

- Integration with REST API for the others screens such as clients, reservations, etc.
- Implementing additional features for customer feedback and reviews.
- Developing a mobile application for customers to make reservations and check vehicle availability.
- Integration with external systems, such as payment gateways for online payments.
- Expanding reporting capabilities for more in-depth analytics.

The CarGoNow Car Rental Management System aims to provide a comprehensive, efficient, and user-friendly solution for car rental businesses, focusing on user management, vehicle management, reservation management, rental transactions, and robust security measures. The project's integration with end users through user stories ensures that the specific needs of each user category are met. The project delivers a fully functional application, user documentation, source code, and a support plan for long-term sustainability.