

Deliverable 2 Report

Project Title

- CarGoNow (Car Rental Management System).

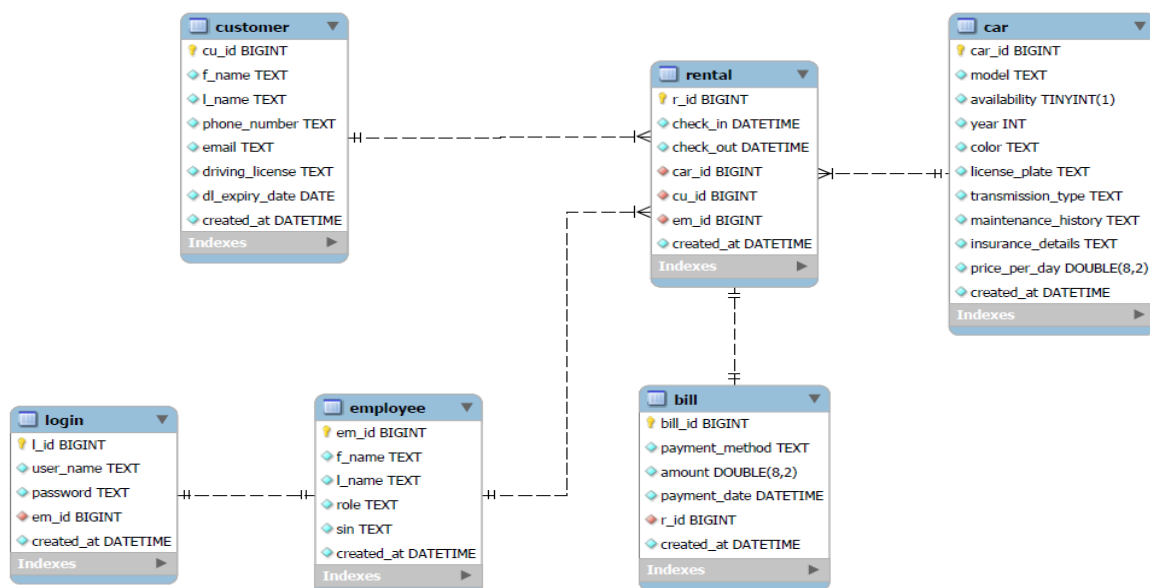
Project Team:

- Diana Majolli Andre #2328346
- Belal Mohsen #2395009
- Work in Progress

As Deliverable 2 is due, we have accomplished significant progress, having completed over 70% of our project (we are still working on the last two tasks: REST API and Test Units). This achievement encompasses the creation of the requisite database and the development of all necessary screens, as shown below.

Database:

Our choice for the database management system is MySQL. This selection was driven by our commitment to expanding our database proficiency beyond our existing familiarity with PostgreSQL. The ER diagram of our database provides a comprehensive overview of our tables, attributes, and their interrelationships.



We want to emphasize that we've shared the commands for creating tables and adding sample data to the database on our GitHub Repository(cargonowDB folder). Below, we present a specific example demonstrating the process of populating the Customer/Clients table with some random data.

```
-- Insert random data into the `Customer` table (10 records)
INSERT INTO `Customer` (`f_name`, `l_name`, `phone_number`, `email`, `driving_license`, `dl_expiry_date`)
VALUES
  ('John', 'Doe', '1234567890', 'john.doe@example.com', '987654321', '2024-12-31'),
  ('Alice', 'Smith', '9876543210', 'alice.smith@example.com', '123456789', '2023-11-30'),
  ('Bob', 'Johnson', '5555555555', 'bob.johnson@example.com', '456789123', '2023-10-15'),
  ('Sarah', 'Brown', '4444444444', 'sarah.brown@example.com', '789456123', '2024-02-28'),
  ('David', 'Wilson', '3333333333', 'david.wilson@example.com', '654321987', '2024-09-15'),
  ('Emily', 'Anderson', '2222222222', 'emily.anderson@example.com', '987654321', '2023-12-31'),
  ('Michael', 'Clark', '7777777777', 'michael.clark@example.com', '123987456', '2023-11-15'),
  ('Olivia', 'Garcia', '6666666666', 'olivia.garcia@example.com', '852963741', '2024-03-20'),
  ('Sophia', 'Jones', '9999999999', 'sophia.jones@example.com', '369852147', '2023-10-01'),
  ('Daniel', 'Lee', '8888888888', 'daniel.lee@example.com', '741258963', '2024-04-10');
```

Moreover, the screenshots below display all the database entries for the sample data we inserted into the tables.

WPF Application:

Before delving into the specifics of our WPF screens, we wish to highlight several noteworthy features:

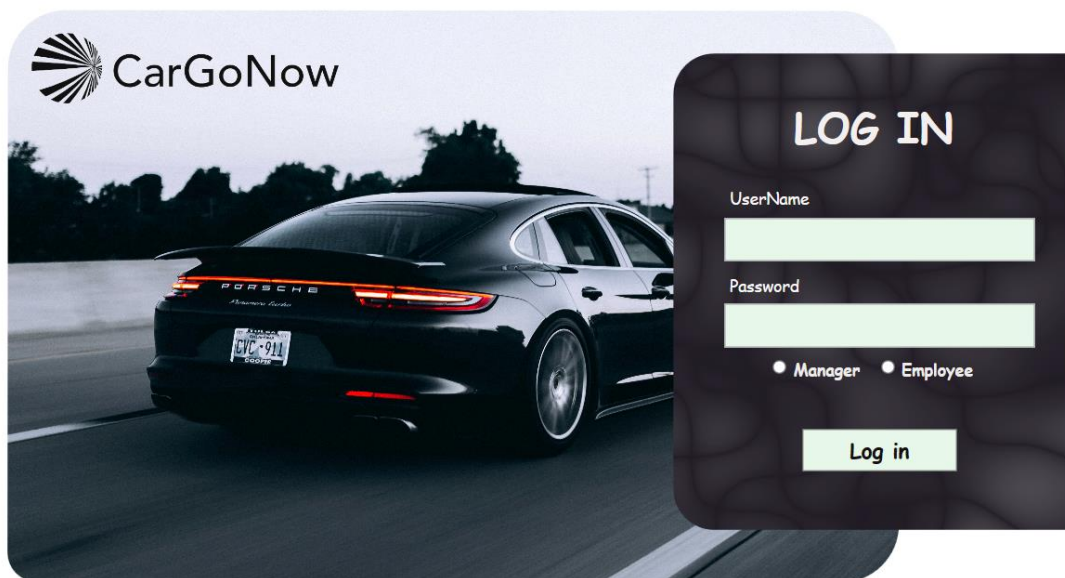
- In Addition to the login screen, our application has two primary windows, catering to distinct user roles: one for administrators (managers) and another for employees.
- We have implemented **user control views** within WPF, facilitating seamless navigation between various views within the same screen, obviating the need to load additional screens. This design choice contributes to enhanced application performance and ease of maintenance.
- We store a special variable when someone logs in. We use this variable to know who made a reservation. It also helps the admin keep track of reservations. We also use this variable to get user info in the settings screen.

- A **dedicated data layer** is employed to establish a connection between our database and our application. This architecture offers flexibility in the event of future database changes or modifications to the connection mechanism.
- The data grid within the application updates automatically when the screen loads or when the corresponding database table undergoes modifications, such as record additions, updates, or deletions.
- Users can readily delete or update records within the database table by simply selecting the desired record within the data grid. This action populates the corresponding text boxes with the associated data, empowering users to manipulate data without the need for manual searches.

Primary Screens:

- **Login Screen:**

On the login screen, users are required to input their username, password, and role. The application subsequently directs users to distinct interfaces (admin or employee) based on their specified role.



- **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, which will be elucidated further.

- **Employee Screen:**

In contrast, regular employees have less access level compared to administrators, as will be expounded upon subsequently.

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

User Control Views:

- **Employees User Control View:**

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.

The screenshot displays the 'ManagerProfile' window for 'CarGoNow'. The left sidebar contains navigation icons and labels: Employees, Cars, Clients, Reservations, Bills, Settings, and Sign Out. The main content area is titled 'Employees' and features a form for managing employee records. The form includes fields for 'Employee ID', 'First Name', 'Last Name', 'Role', and 'SIN No.', along with 'Add', 'Update', and 'Delete' buttons. Below the form is a table listing 10 employees with columns for 'emid', 'fname', 'lname', 'role', 'sin', and 'createdat'.

emid	fname	lname	role	sin	createdat
1	Emily	Anderson	Manager	789456123	10/16/2023 9:33:12 AM
2	Michael	Brown	Employee	654789321	10/16/2023 9:33:12 AM
3	Sophia	Clark	Employee	321654987	10/16/2023 9:33:12 AM
4	James	Smith	Manager	456123789	10/16/2023 9:33:12 AM
5	Emma	Johnson	Employee	987321654	10/16/2023 9:33:12 AM
6	William	Wilson	Employee	654987321	10/16/2023 9:33:12 AM
7	Olivia	Garcia	Manager	123789456	10/16/2023 9:33:12 AM
8	Liam	Davis	Employee	789654123	10/16/2023 9:33:12 AM
9	Ava	Brown	Employee	456123987	10/16/2023 9:33:12 AM
10	Noah	Martinez	Employee	321987654	10/16/2023 9:33:12 AM

- Employees
- Cars
- Clients
- Reservations
- Bills
- Settings
- Sign Out

Employee ID:
Role:
Add

First Name:
SIN No.:
Update

Last Name:
Delete

	emid	fname	lname	role	sin	createdat
1	Emily	Anderson	Manager	789456123	10/16/2023 9:33:12 AM	
2	Michael	Brown	Employee	654789321	10/16/2023 9:33:12 AM	
3	Sophia	Clark	Employee	321654987	10/16/2023 9:33:12 AM	
4	James	Smith	Manager	456123789	10/16/2023 9:33:12 AM	
5	Emma	Johnson	Employee	987321654	10/16/2023 9:33:12 AM	
6	William	Wilson	Employee	654987321	10/16/2023 9:33:12 AM	
7	Olivia	Garcia	Manager	123789456	10/16/2023 9:33:12 AM	
8	Liam	Davis	Employee	789654123	10/16/2023 9:33:12 AM	
9	Ava	Brown	Employee	456123987	10/16/2023 9:33:12 AM	
10	Noah	Martinez	Employee	321987654	10/16/2023 9:33:12 AM	
14	Emmanuel	Smith	Manager	369852147	10/16/2023 8:36:49 PM	

- **Car User Control View:**

This user control view is accessible by both admin roles (managers) and employee roles but with different permissions. Within this interface, Admins can insert a new car 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. While employees only can check the available cars in the system.

- 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:

	carid	model	availability	year	color	licenseplate	transmissiontype	maintenancehistory	insuredetails	priceper_day	createdat
1	Toyota Camry	<input checked="" type="checkbox"/>	2022	Blue	ABC123	Automatic	Regular maintenance	Comprehensive insurance	55	10/16/2023 9:33:12 AM	
2	Honda Civic	<input checked="" type="checkbox"/>	2021	Red	XYZ456	Automatic	Recent servicing	Basic insurance	60	10/16/2023 9:33:12 AM	
3	Ford Mustang	<input type="checkbox"/>	2020	Yellow	DEF789	Manual	Full service history	Premium insurance	80	10/16/2023 9:33:12 AM	
4	Chevrolet Malibu	<input checked="" type="checkbox"/>	2022	Silver	GHI789	Automatic	Regular maintenance	Basic insurance	58	10/16/2023 9:33:12 AM	
5	Jeep Wrangler	<input checked="" type="checkbox"/>	2021	Green	JKL123	Manual	Full service history	Comprehensive insurance	75	10/16/2023 9:33:12 AM	
6	Nissan Altima	<input checked="" type="checkbox"/>	2023	Black	MNO456	Automatic	Recent servicing	Basic insurance	65	10/16/2023 9:33:12 AM	
7	Subaru Outback	<input checked="" type="checkbox"/>	2022	White	PQR789	Automatic	Regular maintenance	Comprehensive insurance	70	10/16/2023 9:33:12 AM	
8	BMW 3 Series	<input checked="" type="checkbox"/>	2021	Silver	STU123	Automatic	Full service history	Premium insurance	85	10/16/2023 9:33:12 AM	
9	Kia Sportage	<input checked="" type="checkbox"/>	2023	Red	VWX456	Automatic	Recent servicing	Basic insurance	62	10/16/2023 9:33:12 AM	
10	Hyundai XXXG	<input type="checkbox"/>	2020	Red	YZA789	Automatic	Regular maintenance	Comprehensive insurance	57	10/16/2023 9:33:12 AM	

- **Client User Control View:**

Within this interface, users (both admins and employees) can add a new client 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.

- Employess
- Cars
- Clients**
- Reservations
- Bills
- Settings
- Sign Out

Customer ID:
Phone No.:
Add

First Name:
Email:
Update

Last Name:
Driving License:
Delete

Expiry Date:

	cuid	fname	lname	phonenumber	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	

- Employess
- Cars
- Clients**
- Reservations
- Bills
- Settings
- Sign Out

Customer ID:
Phone No.:
Add

First Name:
Email:
Update

Last Name:
Driving License:
Delete

Expiry Date:

	cuid	fname	lname	phonenumber	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	
12	John	Clarke	5823145789	john.clarke@example.com	2547896132	11/25/2023 12:00:00 AM	10/16/2023 8:19:44 PM	

- **Reservation User Control View:**

This screen permits users (both admins and employees) to create reservations by entering the car ID, customer ID, check-in, and check-out details. The employee ID responsible for the reservation is automatically determined based on the user's login information. In addition to that, users can update, and delete any record from this screen.

- Employess
- Cars
- Clients
- Reservations**
- Bills
- Settings
- Sign Out

Rental ID:
Check-in:
Car ID:
Customer ID:

Check-out:
Employee ID:

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

- Employess
- Cars
- Clients
- Reservations**
- Bills
- Settings
- Sign Out

Rental ID:
Check-in:
Car ID:
Customer ID:

Check-out:
Employee ID:

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 User Control View:**

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

- Employess
- Cars
- Clients
- Reservations
- Bills
- Settings
- Sign Out

Bill ID:
Payment method:
Add Bill

Total Amount:
Rental ID:
Update Bill

Payment Date:
Delete Bill

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

- Employess
- Cars
- Clients
- Reservations
- Bills
- Settings
- Sign Out

Bill ID:
Payment method:
Add Bill

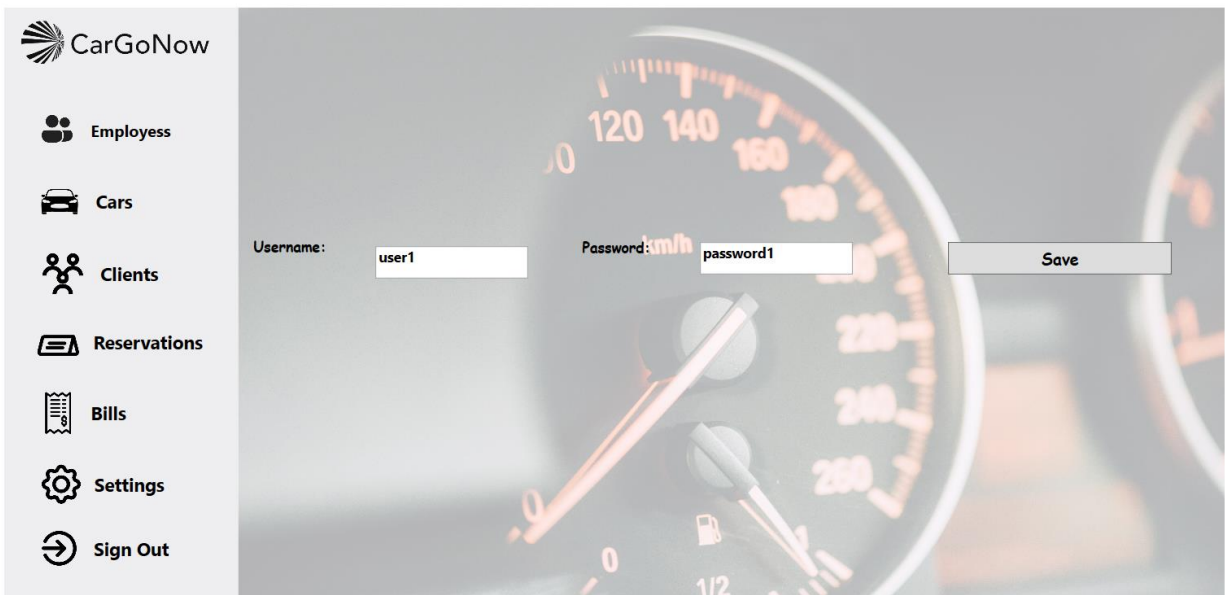
Total Amount:
Rental ID:
Update Bill

Payment Date:
Delete Bill

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

- **Setting User Control View:**

A straightforward screen is provided to empower users to update their login credentials.



- **Tools used in this project:**

- **Database management system:** MySQL 8.0.34 for Windows 64-bit.
- **Official user interface for MySQL:** MySQL Workbench 8.0.34 for Windows 64-bit.
- **Framework:** .NET Framework 4.7.2
- **UI framework:** WPF (XAML)
- **Programming language:** C#
- **IDE:** Visual Studio Enterprise 2022

- **Plan**

- **Week8 (Oct 15 – Oct 21):**
 - Implement Database Connectivity: **(Belal, Diana)**

- Continuing the integration process between the database and the other modules. **(Belal, Diana)**
- Data Validation and Error Handling:
 - Implement data validation to ensure data integrity in the database. **(Belal, Diana)**
 - Handle errors gracefully by providing meaningful error messages to the users. **(Belal, Diana)**
- **Week9 (Oct 22 – Oct 28):**
 - Migrate the database to REST API. **(Diana)**
 - Prepare the final report and the final project presentation. **(Diana)**
- **Week10 (Oct 29 – Nov 4):**
 - Test Unites, Testing and debugging:
 - Write the test units for our app. **(Belal)**
 - Identify and fix any remaining bugs or issues. **(Belal)**
 - Deployment
 - Prepare the application for deployment, including packaging it for installation on users' computers. **(Belal, Diana)**

Self-declaration information

While implementing and building our project, we primarily collaborated synchronously. We scheduled meetings on Teams to work together on complementary tasks. However, we also assigned some work to be completed individually. For example, we designated Diana to handle tasks related to employee, client, and car tables and screens, while Belal was responsible for reservation, bill, login, settings, and logout. Debugging, error correction, and preparing the deliverable report were handled as a group effort. It's worth noting that the workload distribution across the entire project was evenly split, with each team member contributing 50%.