



For

Dr. Irfan Ahmad

SWE 205 - Introduction to Software Engineering

Fall Semester 2020 (201)

Software Design Document

For Car Rental Company System

Team #04

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3. Introduction:

a. Introduction and scope of the product

The purpose of a car rental system is to provide an easier way to manage the products in the company while giving the user a remote access to book their reservations. The system allows users to create an account within it and have features such as choosing the type of car they need and the time they need it in while giving them the option to either pay online or on site. Furthermore, the manager in the company has certain access to features like managing, arranging, cancelling reservations and viewing all transactions also the ability to create and edit accounts for users and employees when in need. The rental management and rental reservation teams have access to most of the features that the manager has access to, yet they cannot create accounts and view transactions. The system also provides direct communication between customers and the support team in case any issue arises.

b. Purpose of this document

The purpose of this document is to design Software Architecture, User interfaces and components. In addition, to give a clear view of the design by showing architecture block diagrams, class diagrams and user interfaces for the major functionalities and attributes.

c. Overview of the remainder of the document

1. Software Architecture:

The software architecture is concerned with the organization and design of the system, it describes the main components of the software and the relationships between them.

Repository Architecture: The data is stored in a central repository that can be accessed by all components of the system, and all communication happens through the central repository.

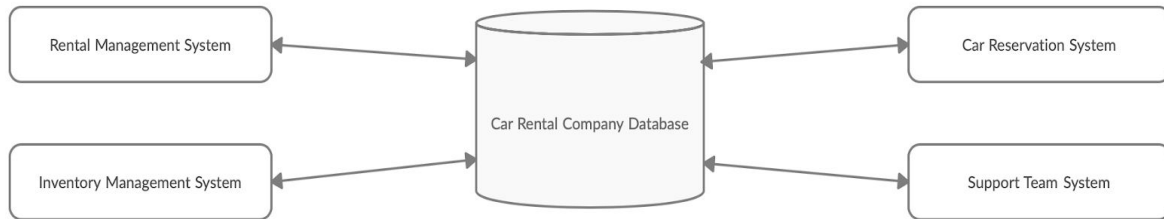
2. User Interface Design:

The user interface design focuses mainly on the visuals of a software, the goal is to enhance the experience of the user of said software while giving them maximum functionality and keeping the design simple and easy to use.

3. Component Design:

In component design, the classes and main components of the system are identified and organized in the way they will be implemented.

4. Software Architecture



The architecture choice

Repository Architecture

According to the software description, we preferred a repository architecture because we need a database as a Central Repository that holds all information. Furthermore, we noticed that there is no direct contact between the sub-system, the connection is between the sub-system and the central repository only. The system also needs to have a backup consistently.

Sub-Systems

Rental Management System

It has full access to reservations, and includes features such as modifying or cancelling a reservation. Furthermore, the customer and the company can access the system.

Car Reservation System

it is the most system that has operations within it, Both the company faculty member and customer can have access to this system. It includes operations like reserve a car and the payment and modifying or removing cars.

Inventory Management System

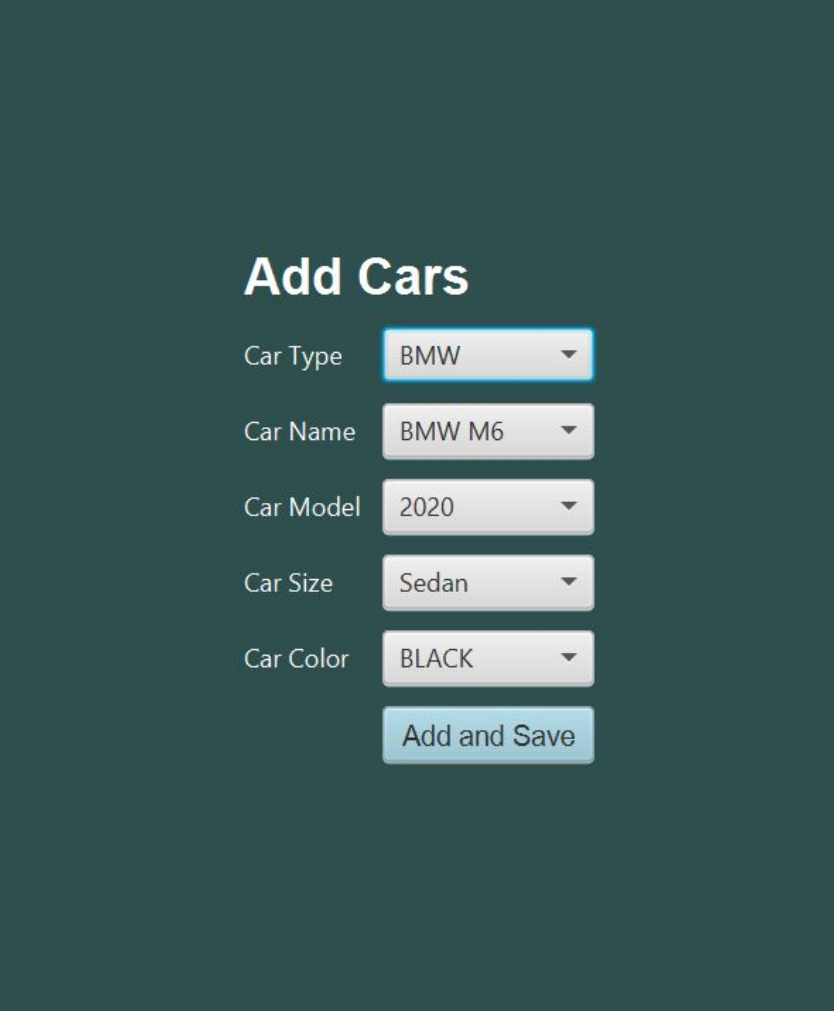
It has access to cars inventory only, and a company faculty member only can access this system.

Support Team System

Support System is responsible to receive and solve issues. Furthermore, the company has full access to it while customers have limited access such as reporting an issue.

5. User Interface Design

1.Add cars

A user interface form titled "Add Cars" on a dark teal background. The form contains five dropdown menus for "Car Type", "Car Name", "Car Model", "Car Size", and "Car Color", each with a light gray border and a downward arrow. The selected values are "BMW", "BMW M6", "2020", "Sedan", and "BLACK" respectively. Below the dropdowns is a light blue button with the text "Add and Save".

Add Cars

Car Type

Car Name

Car Model

Car Size

Car Color

2.Rent A Car

Rent A Car

Car Type

TOYOTA

Car Name

CAMRY

Car Model

2020

Car Size

Sedan

Rent

3.Modify Price

Modify Price

Reservation Number

Enter the number

Old Price

Type...

New Price

Type...

Save and Submit

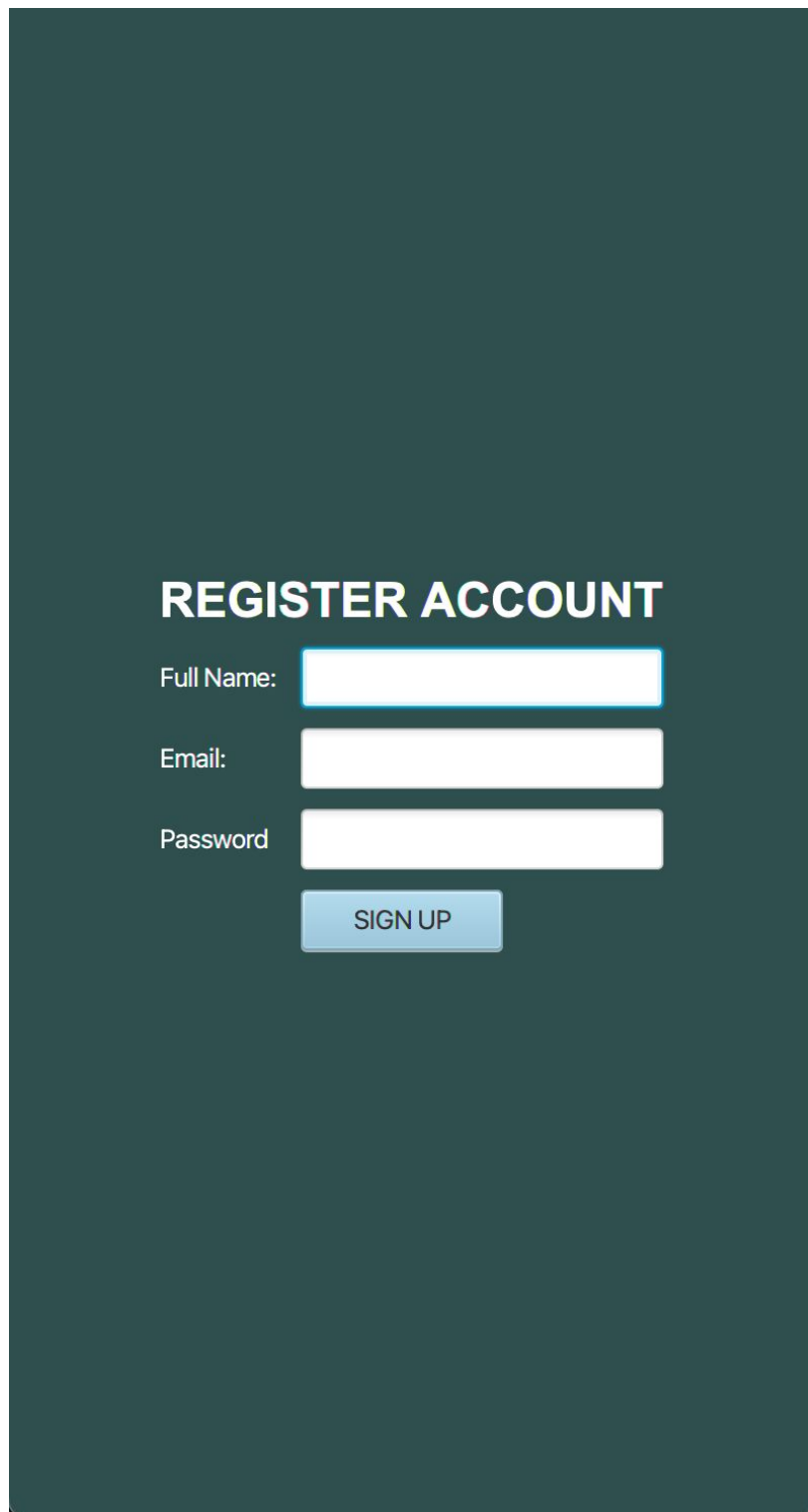
4.Cancel Reservation

Cancel Reservation

Reservation Number

Cancel Reservation

5. Create a user account



REGISTER ACCOUNT

Full Name:

Email:

Password:

6. Online/On site payment

CHOOSE PAYMENT METHOD

☒ On Site

☐ Online

Card Number

Name on Card

Expire Date

CVV

7. View all transactions

TRANSACTIONS

View Transactions

From:

To:

8. Cancel a reservation

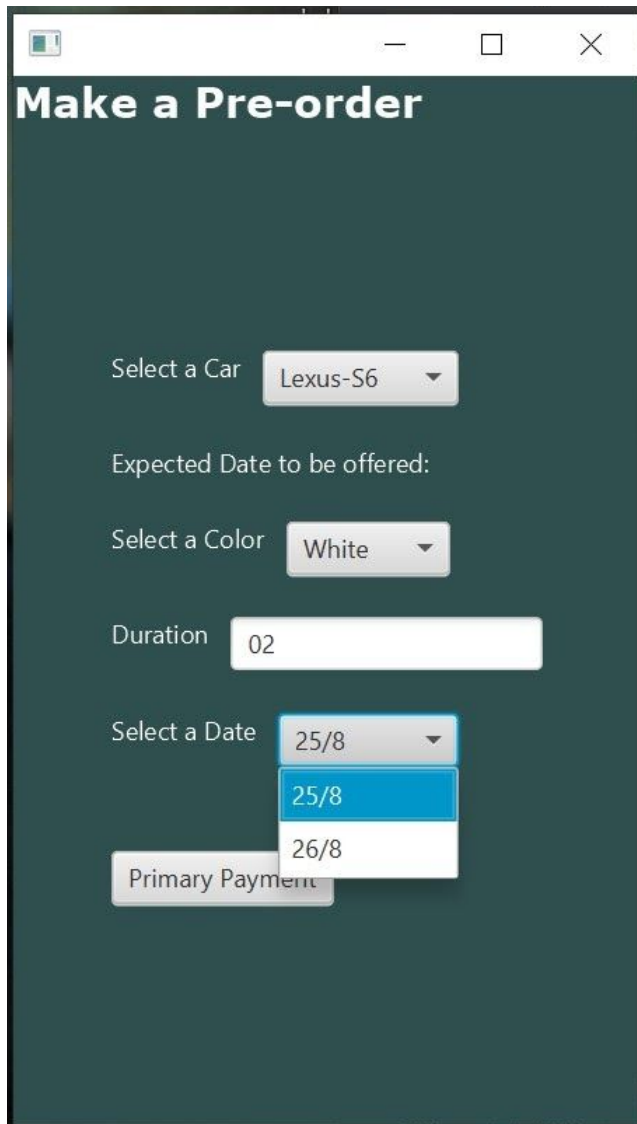
CURRENT RESERVATIONS

BMW 530i	<input checked="" type="checkbox"/>
BMW 530i	<input type="checkbox"/>
BMW 530i	<input type="checkbox"/>
BMW 530i	<input type="checkbox"/>

Enter reservation number:

Or cancel checked reservations:

9.make a pre-order



Make a Pre-order

Select a Car

Expected Date to be offered:

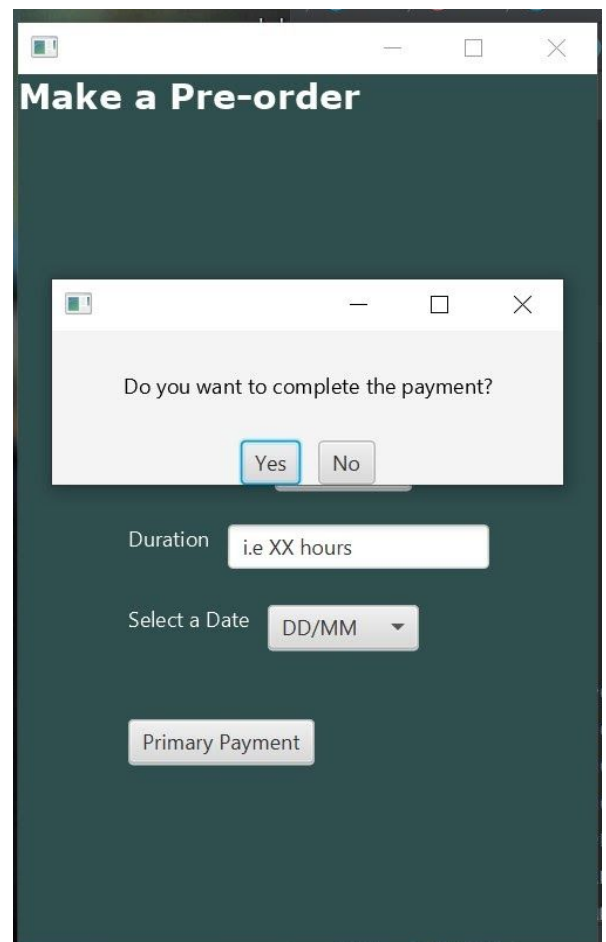
Select a Color

Duration

Select a Date

The dropdown menu for 'Select a Date' is open, showing the following options:

- 25/8
- 25/8
- 26/8



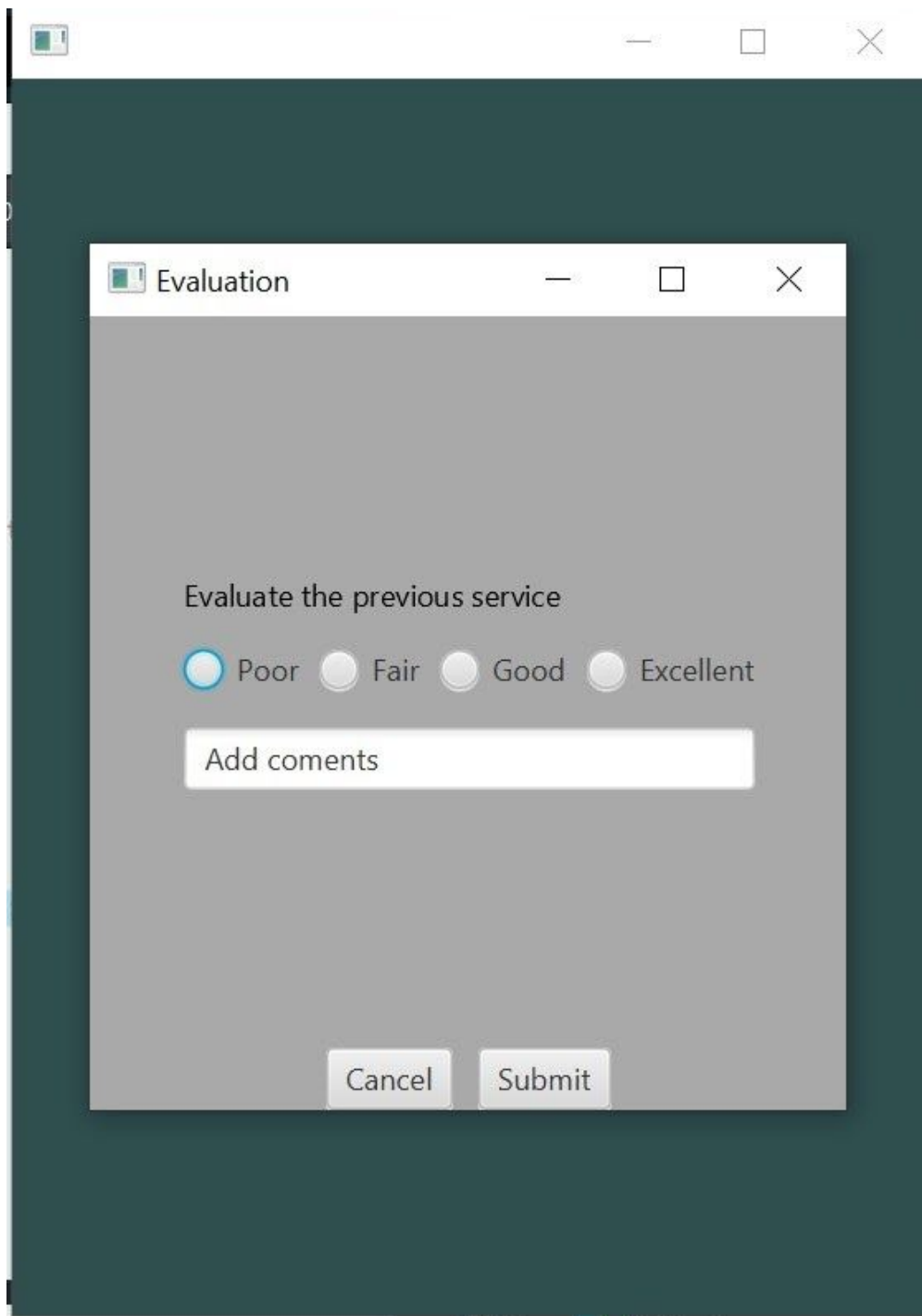
Make a Pre-order

Do you want to complete the payment?

Duration

Select a Date

10. Evaluate the service



The image shows a screenshot of a web application with a dark teal background. A modal dialog box titled "Evaluation" is centered on the screen. The dialog has a light gray background and a white title bar with standard window controls. Inside the dialog, the text "Evaluate the previous service" is displayed. Below this text are four radio buttons labeled "Poor", "Fair", "Good", and "Excellent". The "Poor" radio button is selected, indicated by a blue highlight. Below the radio buttons is a text input field with the placeholder text "Add coments". At the bottom of the dialog are two buttons: "Cancel" and "Submit".

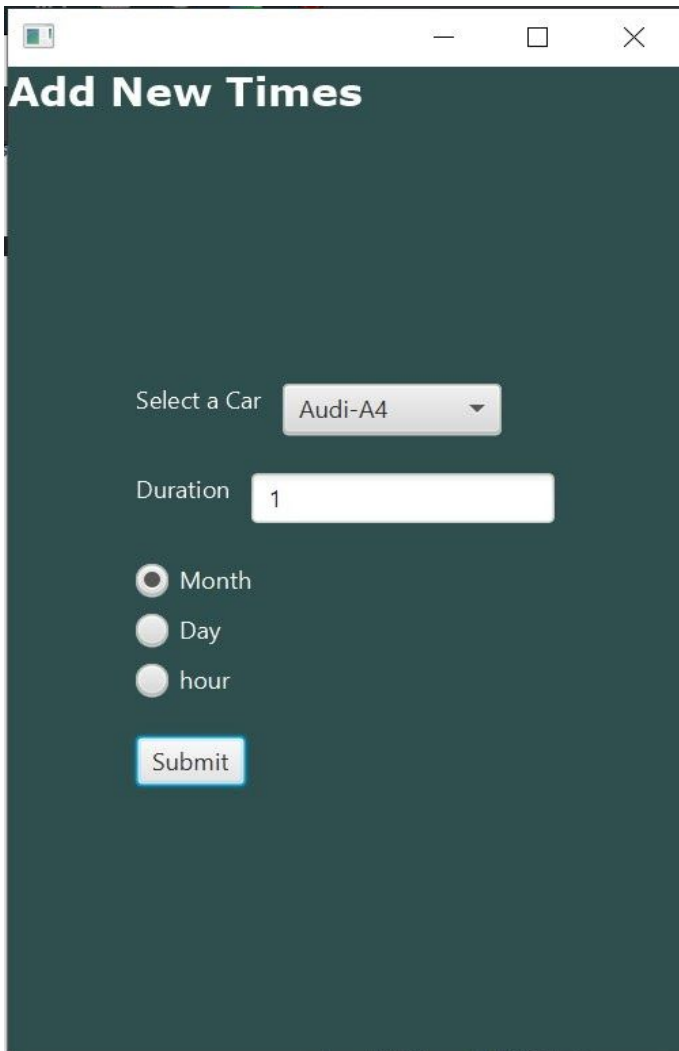
Evaluate the previous service

☒ Poor ☐ Fair ☐ Good ☐ Excellent

Add coments

Cancel Submit

11. Add new reservations times



A screenshot of a web application window titled "Add New Times". The window has a dark teal background. At the top, there is a title bar with standard window controls. Below the title, the text "Add New Times" is displayed in a large, bold, white font. The form contains the following elements: a label "Select a Car" followed by a dropdown menu showing "Audi-A4"; a label "Duration" followed by a text input field containing the number "1"; three radio buttons labeled "Month", "Day", and "hour", with "Month" selected; and a blue "Submit" button at the bottom.

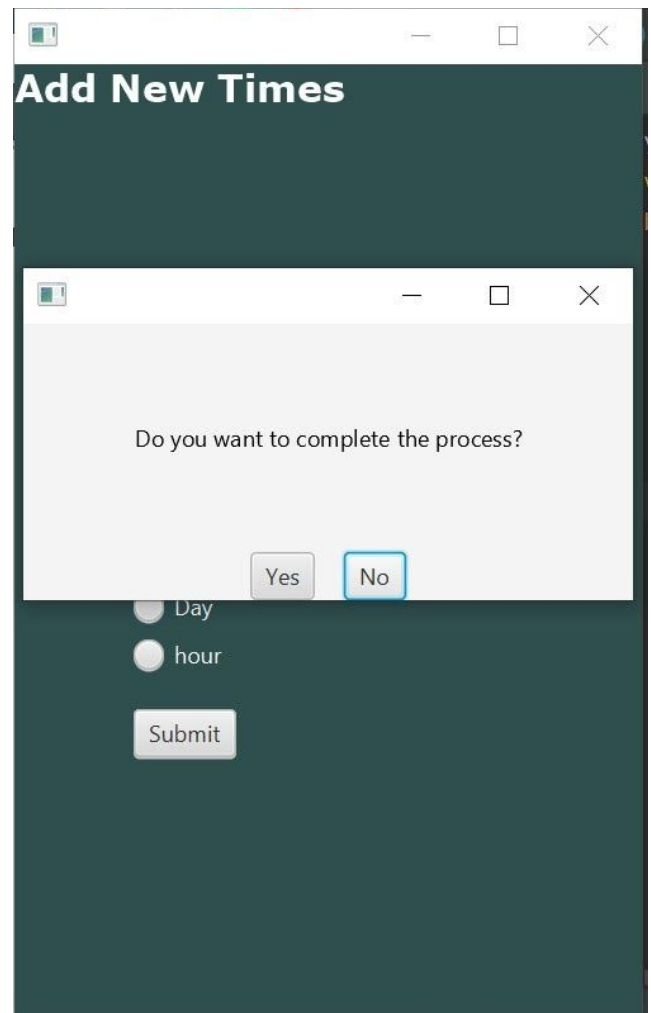
Add New Times

Select a Car Audi-A4

Duration 1

☒ Month
☐ Day
☐ hour

Submit



A screenshot of the same "Add New Times" web application window, but with a confirmation dialog box open in the foreground. The dialog box is light gray and contains the text "Do you want to complete the process?". It has two buttons: "Yes" and "No", with the "No" button highlighted with a blue border. The background form is partially visible through the dialog box, showing the "Day" and "hour" radio buttons and the "Submit" button.

Add New Times

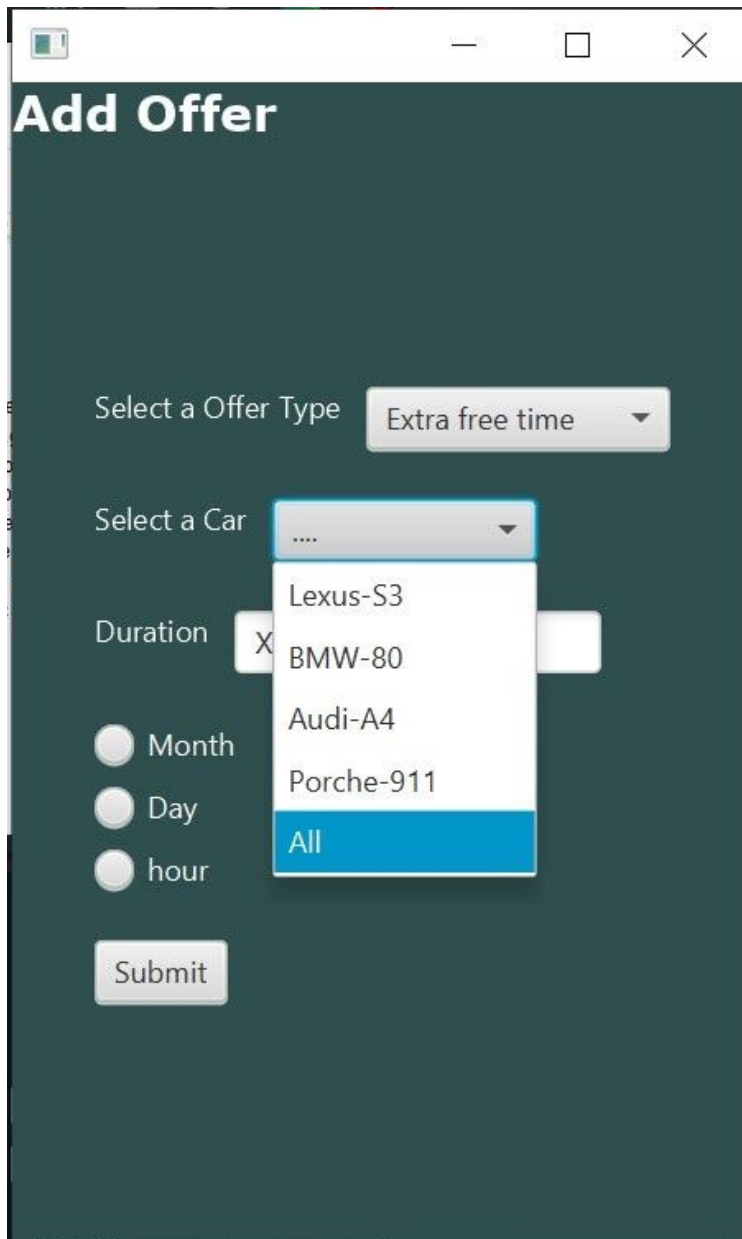
Do you want to complete the process?

Yes No

Day
hour

Submit

12. Add offers



The screenshot shows a web application window titled "Add Offer". The form has a dark teal background. At the top, there's a title "Add Offer". Below it, there are three main sections: "Select a Offer Type" with a dropdown menu showing "Extra free time", "Select a Car" with a dropdown menu showing a list of car models (Lexus-S3, BMW-80, Audi-A4, Porche-911, and All), and "Duration" with three radio buttons labeled "Month", "Day", and "hour". A "Submit" button is located at the bottom left of the form.

Select a Offer Type: Extra free time

Select a Car:

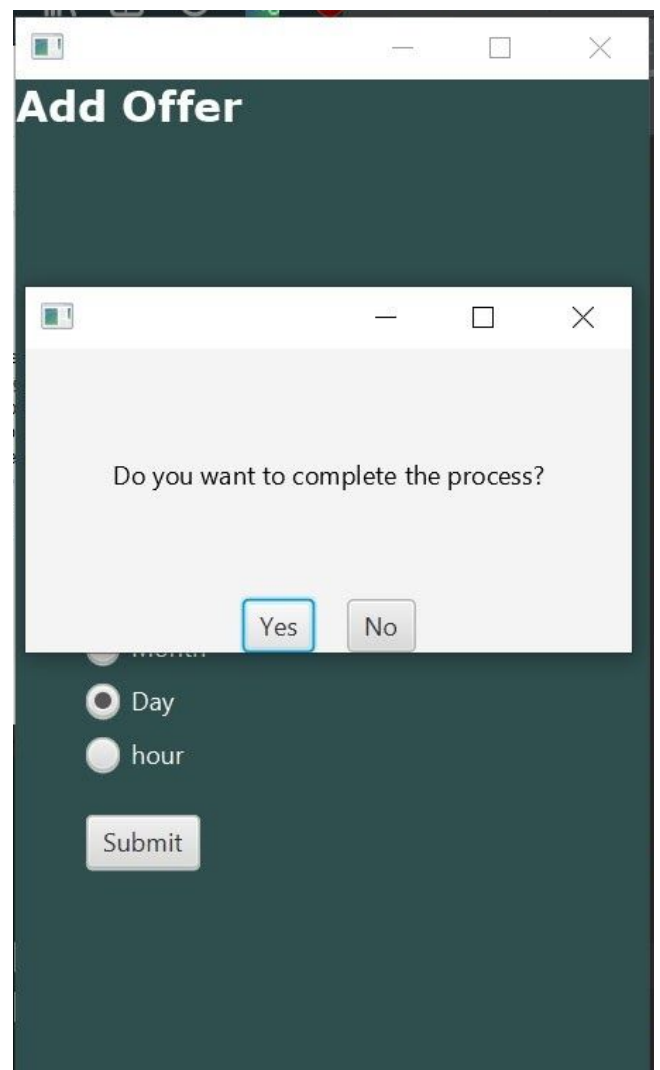
Duration: X

Month

Day

hour

Submit



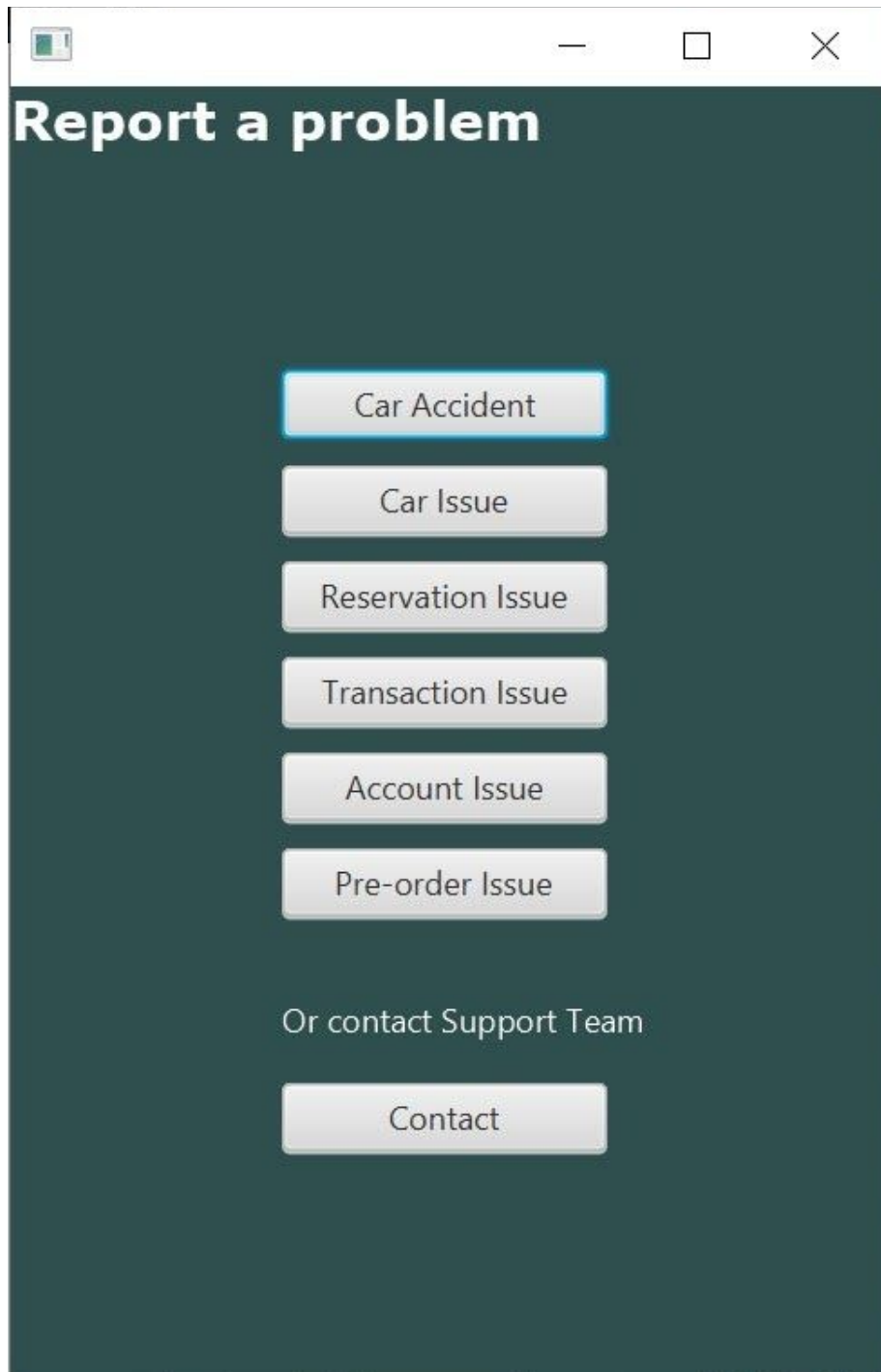
The screenshot shows the same "Add Offer" form, but with a confirmation dialog box overlay. The dialog box is white with a light gray border and contains the text "Do you want to complete the process?". At the bottom of the dialog box, there are two buttons: "Yes" and "No". The "Add Offer" form is visible in the background, showing the "Duration" section with the "Day" radio button selected and the "Submit" button.

Do you want to complete the process?

Yes No

Submit

13. Report a problem



The image shows a screenshot of a web application window titled "Report a problem". The window has a dark teal background and a white title bar with standard window controls (minimize, maximize, close). The title "Report a problem" is in a large, bold, white font. Below the title, there is a vertical stack of six light gray buttons with rounded corners, each containing a problem category in black text. The first button, "Car Accident", is highlighted with a blue border. Below these buttons, the text "Or contact Support Team" is displayed in a smaller white font. At the bottom, there is a single light gray button with the text "Contact" in black.

Report a problem

Car Accident

Car Issue

Reservation Issue

Transaction Issue

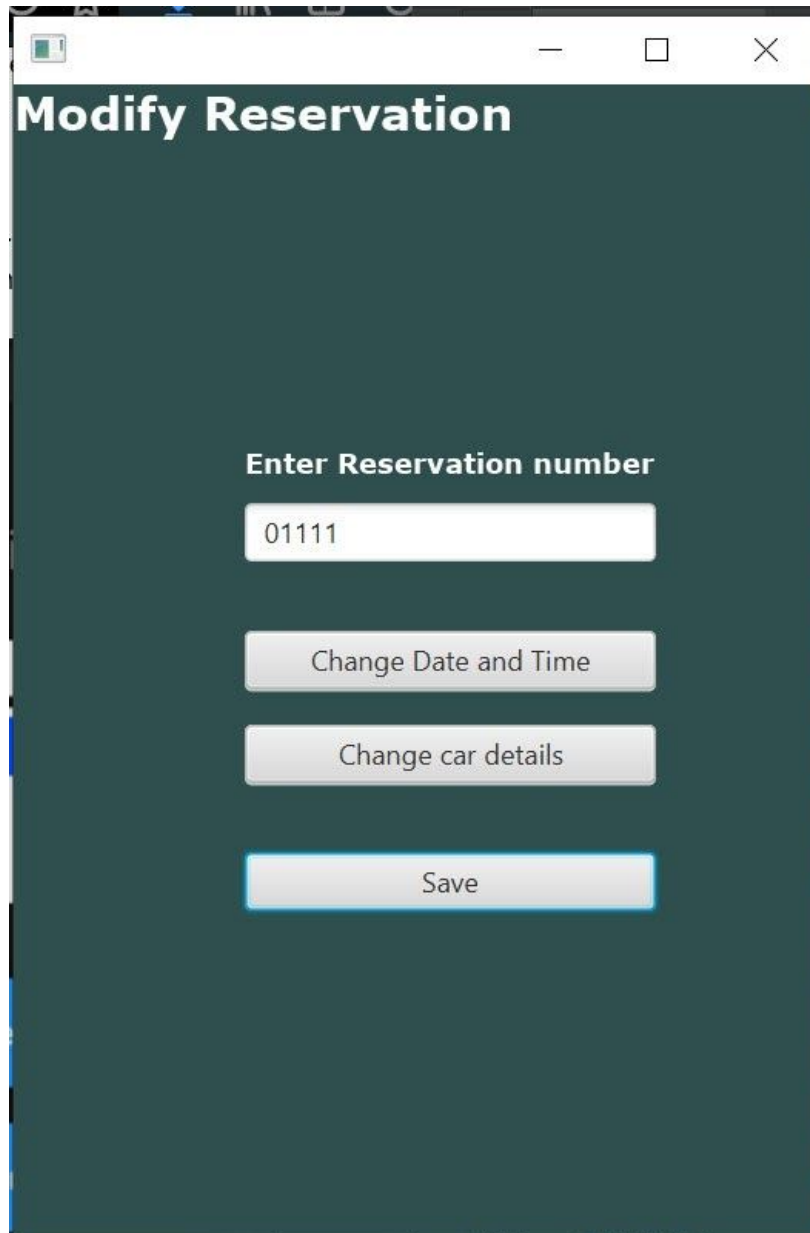
Account Issue

Pre-order Issue

Or contact Support Team

Contact

14. Modify reservation



A screenshot of a web application window titled "Modify Reservation". The window has a dark teal background. At the top, there is a white header bar with the title "Modify Reservation" in bold white text. Below the header, the main content area is dark teal. In the center, there is a white text input field with the placeholder text "Enter Reservation number". Below the input field, there are three buttons: "Change Date and Time", "Change car details", and "Save". The "Save" button is highlighted with a blue border. The window also has a standard Windows-style title bar with minimize, maximize, and close buttons.

Modify Reservation

Enter Reservation number

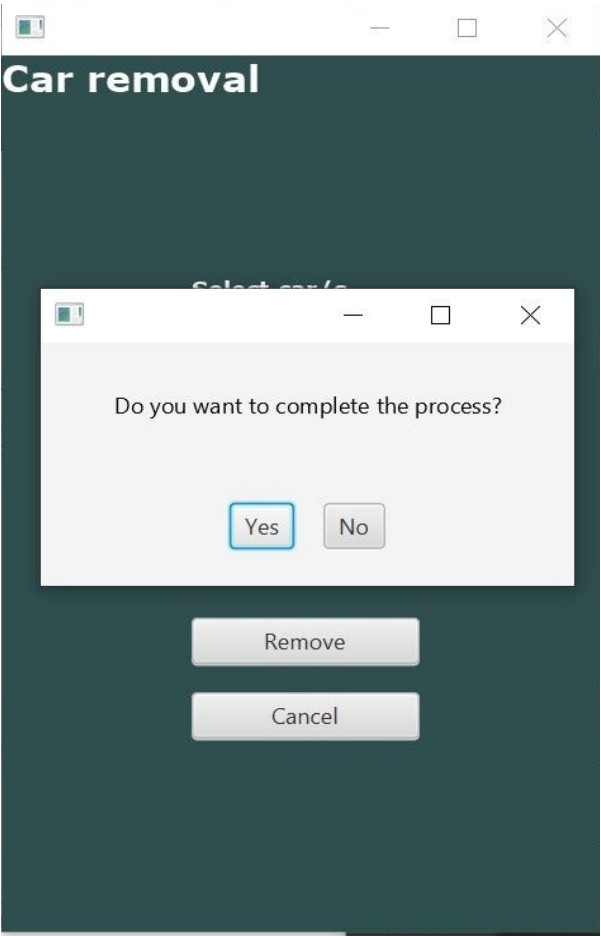
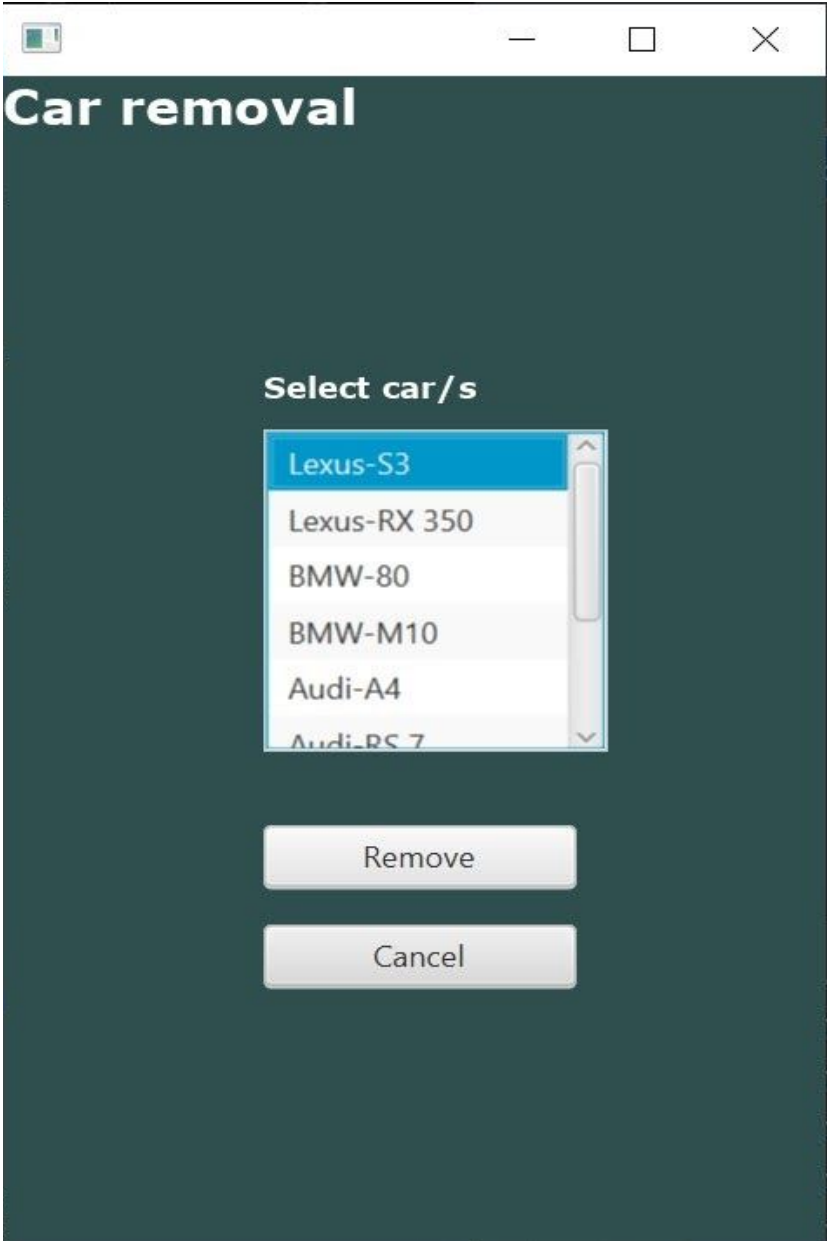
01111

Change Date and Time

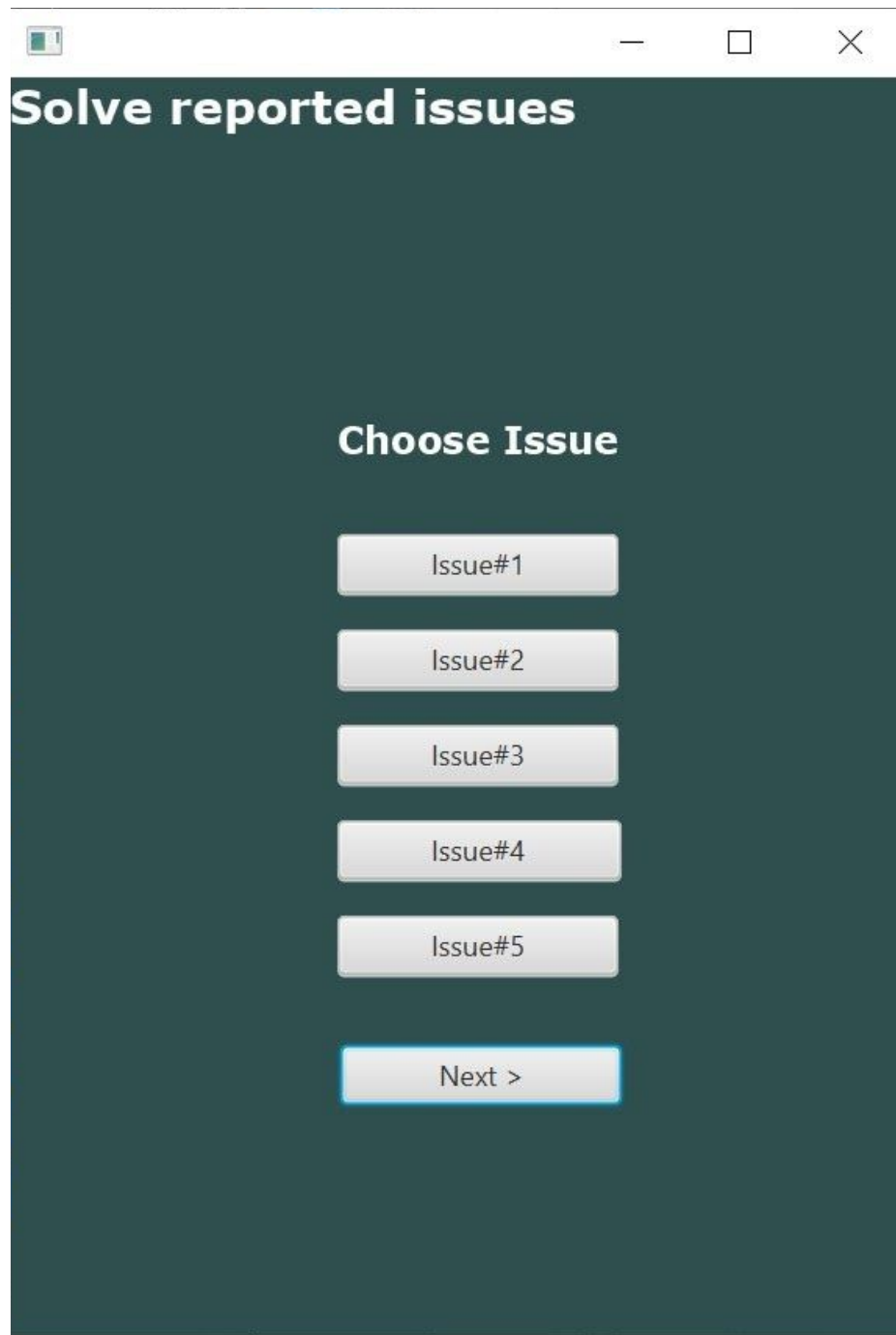
Change car details

Save

15. Remove car



16. Solve reported issues



The screenshot shows a web application window with a dark teal background. At the top, the title "Solve reported issues" is displayed in white. Below the title, the heading "Choose Issue" is centered in white. Underneath this heading, there are five light gray buttons with rounded corners, each containing the text "Issue#1", "Issue#2", "Issue#3", "Issue#4", and "Issue#5" respectively. At the bottom of this list is a light gray button with a blue border and rounded corners, containing the text "Next >". The window has a standard title bar with a minimize button, a maximize button, and a close button.

Solve reported issues

Choose Issue

Issue#1

Issue#2

Issue#3

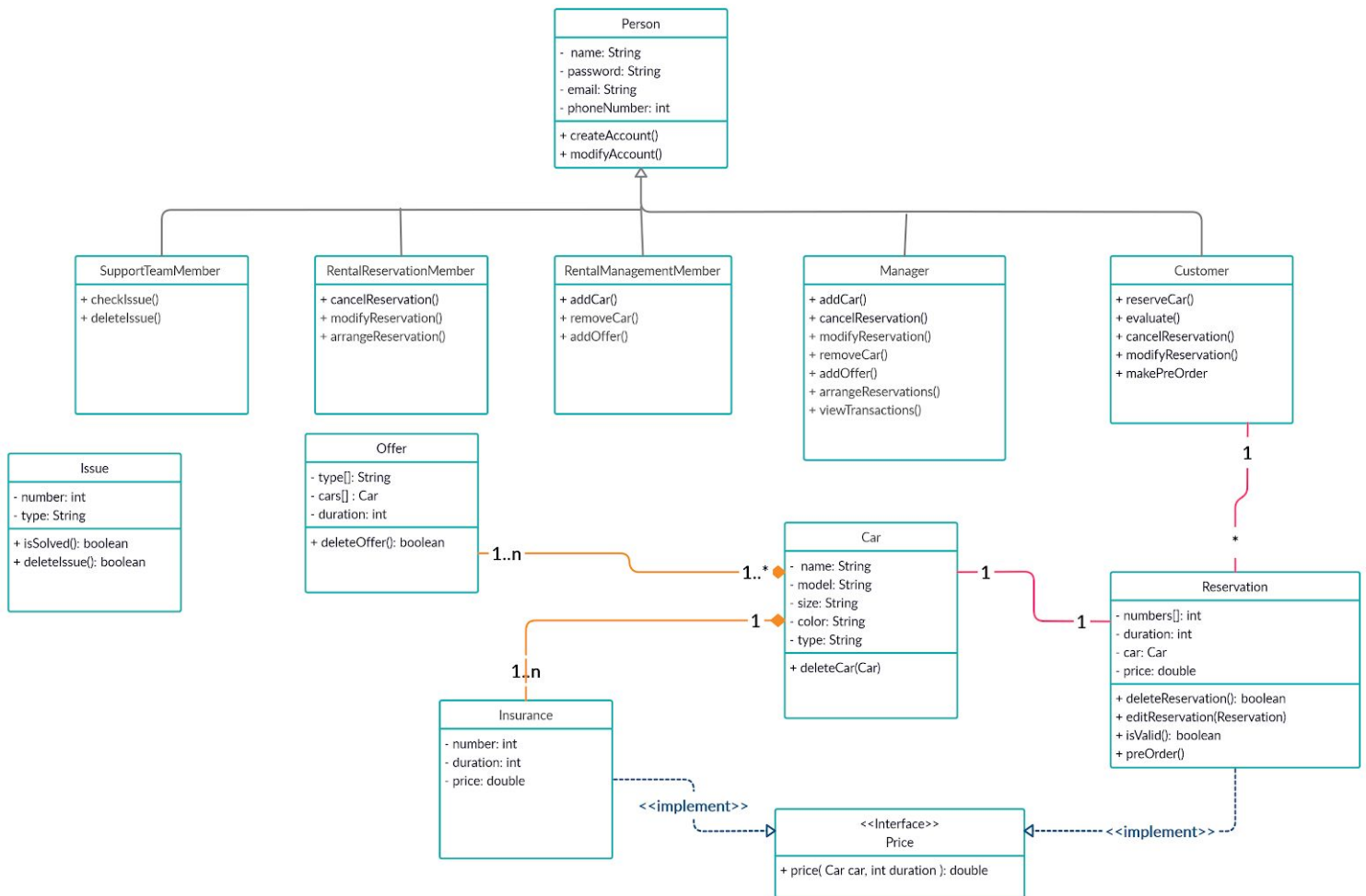
Issue#4

Issue#5

Next >

6. Component design

a. Class diagrams



b. Class description

Person

A user of the rental systems that could be one of the following:

- Customer
- Manager
- Rental Management Member
- Rental Reservation Member
- Support Team Member

Attributes: name, email and phone number.

Methods: Create Account and modify account.

Customer

A person who can reserve/pre-order cars and evaluate their experience. Customer has no attributes. Customer has the following methods: reserve cars, modify reservations, cancel reservations, make pre-orders and evaluate experience.

Manager

A person who can control reservations, add/remove cars, make offers and view transactions. Manager has no attributes. Manager has the following methods: Add car, remove car, cancel Reservation, modify Reservation, arrange Reservation, add offer and view transactions.

Rental Management Member

A person who can add/remove cars and make offers. Rental Management Member has no attributes. Rental Management Member has the following methods: Add car, remove car And add offer.

Rental Reservation Member

A person who can control reservations. Rental Reservation Member has no attributes. Rental Reservation Member has the following methods: cancel Reservation, modify Reservation and arrange Reservation.

Support Team Member

A person who can solve reported issues. Support Team Member has no attributes. Support Team Member has the following methods: check issue and delete issue.

Reservation

An important part of the rental system where users who can access it would make, modify, arrange or remove reservations. Reservation in the rental system has the following attributes: numbers, duration, car and price. And it has the following methods: delete reservations, edit reservations and pre-order.

Car

Is the backbone of the rental system. it has the following attributes: name, model, size, color and type. And it has one method: delete car.

Offer

A way for manager to give customers benefits. offer has the following attributes: type, cars, duration. and it has one method: delete offer.

Insurance

It is an important part of the rental system to protect customers and cars. It has the following attributes: number, duration and price. It has no methods.

Issue

Issue is a part of the user experience to help users and to make the system better by solving those issues. It has the following attributes: number and type. And it has the following method: delete issue.

Interface price

It is responsible for calculating the price by allowing other classes to implement its method (price).

7. Conclusion:

- Meeting Schedule:

	Achievements	Period	Date
First Meeting	<ul style="list-style-type: none">- Viewing design document- Planning	08:00 PM - 08:30 PM	13/11/2020
Second Meeting	<ul style="list-style-type: none">- Brainstorming- Software Architecture- User Interface Design	07:00 PM - 09:00 PM	22/11/2020
Third Meeting	<ul style="list-style-type: none">- Cover Page.- Introduction.- Component design.- Conclusion.- Document polishing.	06:00 PM - 10:30 PM	30/11/2020

- **Performance of the members:**

Adhm Al Mansour	Turki Almalki	Tareq S. Al Qarawi	Yasser Abdo Ali
BrainStorming (25%)	BrainStorming (25%)	BrainStorming (25%)	BrainStorming (25%)
Introduction (10%)	Introduction (30%)	Introduction (30%)	Introduction (30%)
Software Architecture (25%)	Software Architecture (25%)	Software Architecture (25%)	Software Architecture (25%)
User Interface Design (25%)	User Interface Design (25%)	User Interface Design (15%)	User Interface Design (35%)
Component design (15%)	Component design (15%)	Component design (30%)	Component design (40%)
Cover Page (20%)	Cover Page (50%)	Cover Page (20%)	Cover Page (10%)
Conclusion. (40%)	Conclusion. (10%)	Conclusion. (40%)	Conclusion. (10%)

8. References

- SWE 205 Textbook: Somerville, Ian. Software Engineering, 7th Edition, Addison-Wesley, 2004.
- Creatly <https://create.ly.com/>