

System Design for Sayyara

Team 3, Tiny Coders

Arkin Modi

Joy Xiao

Leon So

Timothy Choy

April 5, 2023

1 Revision History

Table 1: Revision History

Date	Developer(s)	Change
December 28, 2022	Arkin Modi	Revision History & Mark Not Applicable Sections
January 7, 2023	Joy Xiao	Introduction & Purpose
January 11, 2023	Leon So	Undesired Event Handling
January 12, 2023	Leon So	Normal Behaviour & Introduction
January 13, 2023	Timothy Choy	Connection Between Requirements & Design
January 13, 2023	Timothy Choy	Scope
January 16, 2023	Joy Xiao	Component Diagram
January 17, 2023	Arkin Modi	Create Timeline
January 17, 2023	Arkin Modi	Add Work Order Mockups
January 17, 2023	Joy Xiao	Add Shop Appointments, Services, Customer Landing Page Mockups
January 17, 2023	Leon So	Add Login & Sign Up, Shop Owner/Employee Landing Page, Shop Profile, Employee Management Mockups
January 17, 2023	Timothy Choy	Add Customer Appointments, Quotes, Shop Lookup Mockups
January 18, 2023	Leon So	Add team reflection
March 25, 2023	Joy Xiao	Add Component Diagram Description
April 4, 2023	Arkin Modi	Add description for Work Orders Mockups
April 4, 2023	Joy Xiao	Add Descriptions to mock ups

2 Reference Material

This section records information for easy reference.

2.1 Abbreviations and Acronyms

symbol	description
Sayyara	Explanation of program name
MIS	Module Interface Specifications
MG	Module Guide
PWA	Progressive Web Application
SRS	Software Requirements Specification

Contents

1	Revision History	i
2	Reference Material	ii
2.1	Abbreviations and Acronyms	ii
3	Introduction	1
4	Purpose	1
5	Scope	1
5.1	Context Diagram	1
6	Project Overview	2
6.1	Normal Behaviour	2
6.2	Undesired Event Handling	2
6.3	Component Diagram	3
6.4	Connection Between Requirements and Design	3
7	System Variables	4
7.1	Monitored Variables	4
7.2	Controlled Variables	4
7.3	Constants Variables	4
8	User Interfaces	4
8.1	Home Page	4
8.2	Manage Shop Employees	5
8.3	Manage Shop Details	7
8.4	Shop Profile	9
8.5	Add Service to Shop	11
8.6	Shop Owner/Employee Registration	13
8.7	Vehicle Owner Registration	21
8.8	Vehicle Owner/Shop Owner/Employee Login	25
8.9	Vehicle Owner Dashboard	27
8.9.1	Services	27
8.9.2	Quotes	29
8.10	Vehicle Owner Create Appointment	31
8.11	Shop Owner/Employee Dashboard	31
8.11.1	Quotes Requests	31
8.11.2	Service Requests — Requested	32
8.11.3	Service Requests — Scheduled	33
8.11.4	Service Requests — In Progress	35
8.11.5	Service Requests — Work Orders	36
8.11.6	Service Requests — Completed	38
9	Design of Hardware	40
10	Design of Electrical Components	40

11 Design of Communication Protocols	40
12 Timeline	41
12.1 Module Development	41
12.2 Module Testing	41
13 Appendix	43
13.1 Reflection	43

List of Tables

1	Revision History	i
2	Connection Between Requirements and Design	4
3	Module Development Timeline	41
4	Module Testing Timeline	42

List of Figures

1	Context Diagram	2
2	Component Diagram	3
3	Home Page — Logged In (Desktop)	5
4	Home Page — Logged In (Mobile)	5
5	Manage Shop — Employees (Desktop)	6
6	Manage Shop — Employees (Mobile)	7
7	Manage Shop — Details (Desktop)	8
8	Manage Shop — Details (Mobile)	9
9	Shop Profile — Shop Owner (Desktop)	10
10	Shop Profile — Vehicle Owner (Desktop)	10
11	Shop Profile (Mobile)	11
12	Add Service to Shop (Desktop)	12
13	Add Service to Shop (Mobile)	13
14	Shop Owner/Employee Registration — Part 1 (Desktop)	14
15	Shop Owner/Employee Registration — Part 1 (Mobile)	15
16	Shop Owner/Employee Registration — Part 2 (Desktop)	16
17	Shop Owner/Employee Registration — Part 2 (Mobile)	17
18	Shop Owner Registration — Part 3 (Desktop)	18
19	Shop Owner Registration — Part 3 (Mobile)	19
20	Employee Registration — Part 3 (Desktop)	20
21	Employee Registration — Part 3 (Mobile)	21
22	Vehicle Owner Registration — Part 1 (Desktop)	22
23	Vehicle Owner Registration — Part 1 (Mobile)	23
24	Vehicle Owner Registration — Part 2 (Desktop)	24
25	Vehicle Owner Registration — Part 2 (Mobile)	25
26	Vehicle Owner/Shop Owner/Employee Login (Desktop)	26
27	Vehicle Owner/Shop Owner/Employee Login (Mobile)	27
28	Vehicle Owner Dashboard — Service Requests (Desktop)	28
29	Vehicle Owner Dashboard — Service Requests (Mobile)	29
30	Vehicle Owner Dashboard — Quotes (Desktop)	30
31	Vehicle Owner Dashboard — Quotes (Mobile)	30
32	Vehicle Owner Create Appointment (Desktop)	31
33	Shop Owner/Employee Dashboard — Quotes Requests (Desktop)	31
34	Shop Owner/Employee Dashboard — Quotes Requests — Invitation (Desktop)	32
35	Shop Owner/Employee Dashboard — Service — Requested (Desktop)	32
36	Shop Owner/Employee Dashboard — Service — Requested (Mobile)	33
37	Shop Owner/Employee Dashboard — Service — Scheduled (Desktop)	34
38	Shop Owner/Employee Dashboard — Service — Scheduled (Mobile)	35

39	Shop Owner/Employee Dashboard — Service — In Progress (Desktop) .	36
40	Shop Owner/Employee Dashboard — Service — In Progress (Mobile) . .	36
41	Shop Owner/Employee Dashboard — Service Requests — Work Orders (Desktop)	37
42	Shop Owner/Employee Dashboard — Service Requests — Work Orders (Mobile)	38
43	Shop Owner/Employee Dashboard — Service — Completed (Desktop) .	39
44	Shop Owner/Employee Dashboard — Service — Completed (Mobile) . .	40

3 Introduction

The following document details the System Design for project Sayyara. Sayyara is a progressive web application (PWA) which will act as a single platform for independent auto repair shops and vehicle owners. This platform will allow independent auto repair shops and vehicle owners to interact in a more efficient and effective manner.

Complementary documents include the Module Interface Specifications and Module Guide. The full documentation and implementation can be found at <https://github.com/arkinmodi/project-sayyara/>.

4 Purpose

The purpose of this document is to display the component decomposition of the system and provide the user interface designs of the software being built. The implementation of the software will be based off of the designs within this document. The MIS <https://github.com/arkinmodi/project-sayyara/blob/main/docs/Design/SoftDetailedDes/MIS.pdf> and MG <https://github.com/arkinmodi/project-sayyara/blob/main/docs/Design/SoftArchitecture/MG.pdf> are also created to give details to the software architecture and detailed component breakdowns for the project.

5 Scope

The system is designed to connect vehicle owners and independent shop owners, providing users with the ability to communicate with one another, and respectively view and manage the interactions and processes involved in a typical auto repair and maintenance service experience. All functionality of the system has been defined in the SRS <https://github.com/arkinmodi/project-sayyara/blob/main/docs/SRS/SRS.pdf> and everything not included in the SRS is not part of the scope.

The system includes a PWA and the relevant database to store information relevant to the application.

5.1 Context Diagram

Below is a context diagram detailing the boundary between the system and the environment around it.

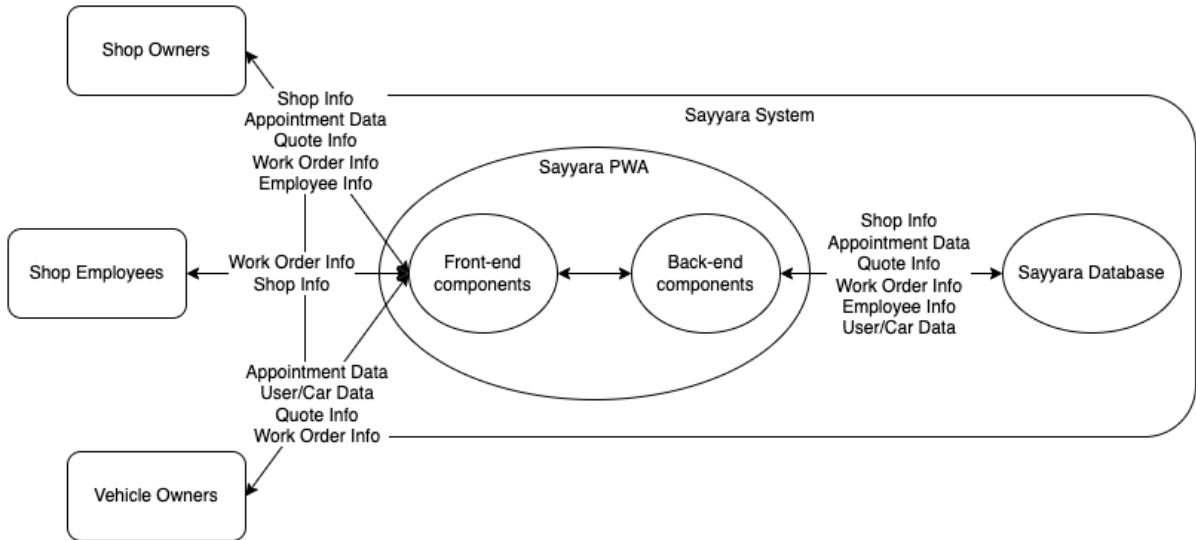


Figure 1: Context Diagram

6 Project Overview

6.1 Normal Behaviour

Sayyara is an event-driven application which handles inputs from the intended users including: vehicle owners, and independent auto repair shop owners and employees. The application will accept various inputs through a variety of input forms and controls. Under normal behaviour where valid inputs are entered and valid events are triggered, the application will: update the appropriate local and global application states, trigger the corresponding side-effects, and/or update the database accordingly.

Vehicle owners can search for auto repair shops and services; request quotes for service; book, view, and manage service appointments and work orders. On the application, auto repair shop owners will be able to manage a list of employees; manage a list of service types and corresponding service appointment availabilities; manage store information such as location, hours of operation, and contact information. Auto repair shop owners and employees will be able to view and manage quotes, service appointments, and work orders.

6.2 Undesired Event Handling

Undesired events will be handled both client-side and server-side.

On the client-side, if an unexpected event arises or the application enters a bad state, the application will reset to a safe state. For example, if a user attempts to access a route that they are not authorized to access, they will be either redirected to an appropriate route, prompted to login, or an error page will be displayed with instructions to return to the home page. Input forms will also include input validation to ensure only properly formed data is handled. If the user attempts to input invalid data, the form field will reset and form submission will be blocked. The user will be prompted to enter a valid input value in the form field. Similarly, various user actions and inputs that may pose

cause that the application to enter an undesirable state will be validated before updating the application state.

On the server-side, each API will return a response with the appropriate error status code and message. Subsequently, the client will have logic to gracefully handle unsuccessful responses and status codes, preventing the system from entering an undesirable state. Inputs will also be validated on the server-side by parsing the input data using defined schemas. This will ensure data integrity and prevents the undesirable data from entering the workflows or database.

6.3 Component Diagram

The Authentication Module is responsible for ensuring users have the appropriate permissions to access resources and modules to perform specific actions. The Authentication Module is responsible for handling authentication for requests between the client and server, and providing mechanisms for authorizing access to requests resources. The Authentication Module will ensure that any actions and interactions between modules are authorized based on the user and their permissions. The Shop Module is responsible for handling requests associated with any shop entity, including handling requests for shop creation, update, and look up. The Quotes Module is responsible for handling requests and interactions for quotes, including the live chat module. The Appointments Module is responsible for handling any appointment creations, appointment status updates, appointment cancellations, and appointment edits. The Work Orders Module is responsible for handling requests regarding the work order of a service, including creating the work order and updating the work order. The Users Module is responsible for handling user account related requests such as retrieving user data and user account creation for the shop owner, employee, and customer. The Employee Management Module is responsible for handling employee requests such as getting all employees in a shop and updating the employee account status to suspend employees. The Services Module is responsible for handling requests to create, update, delete services and parts used for each service. The Database Driver Module is responsible for providing a standard interface for communication between the application and the database management system (DBMS).

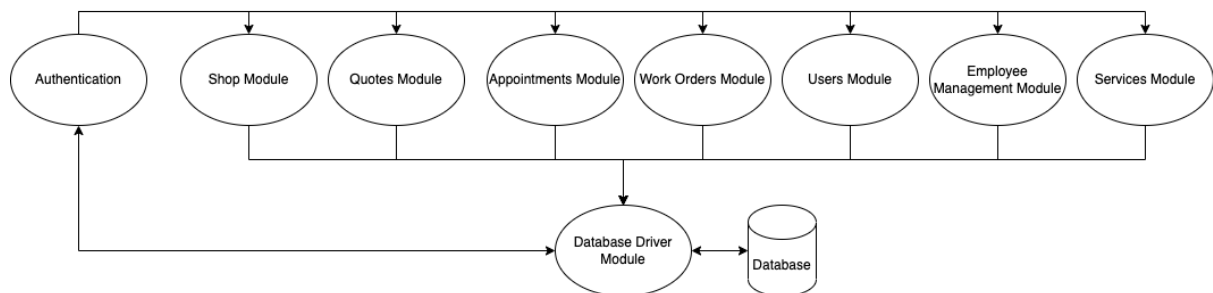


Figure 2: Component Diagram

6.4 Connection Between Requirements and Design

The following table shows the connections between the requirements stated in the SRS <https://github.com/arkinmodi/project-sayyara/blob/main/docs/SRS/SRS.pdf> and our

design decisions to implement the requirements. The requirements in the table will refer to the requirement number as stated in the SRS.

Table 2: Connection Between Requirements and Design

Requirement	Design Decision
BE4	A calendar dropdown is used to allow the user to view appointment dates
BE8, BE20	The quotes, appointments are in a tab view for easy visibility
BE25	Employees are listed in a list view
BE32	Shops are listed in a list view, with tags showing information relevant to the filters (such as services provided and parts used)
LF1	Each screen has a desktop and mobile view so that it can adjust cleanly based on the user's screen size
SR1, SR2	Separate views are created for each type of user, so that they have access to only information that the specific user needs. Each account is created with a unique user type, so that they can only access the correct view
LR1	Images and assets used are either created by the team or provided by the stakeholder

7 System Variables

7.1 Monitored Variables

N/A

7.2 Controlled Variables

N/A

7.3 Constants Variables

N/A

8 User Interfaces

8.1 Home Page

The Home Page features all the auto repair shops that match the search criteria. Users can search by shop name or service name. By default, when no search criteria is entered, the Home Page will show all shops in a paginated list view. There are also filters for OEM parts or aftermarket parts, new parts or used parts, and also a location filter. Users can view the shop profile by clicking one of the search entries.

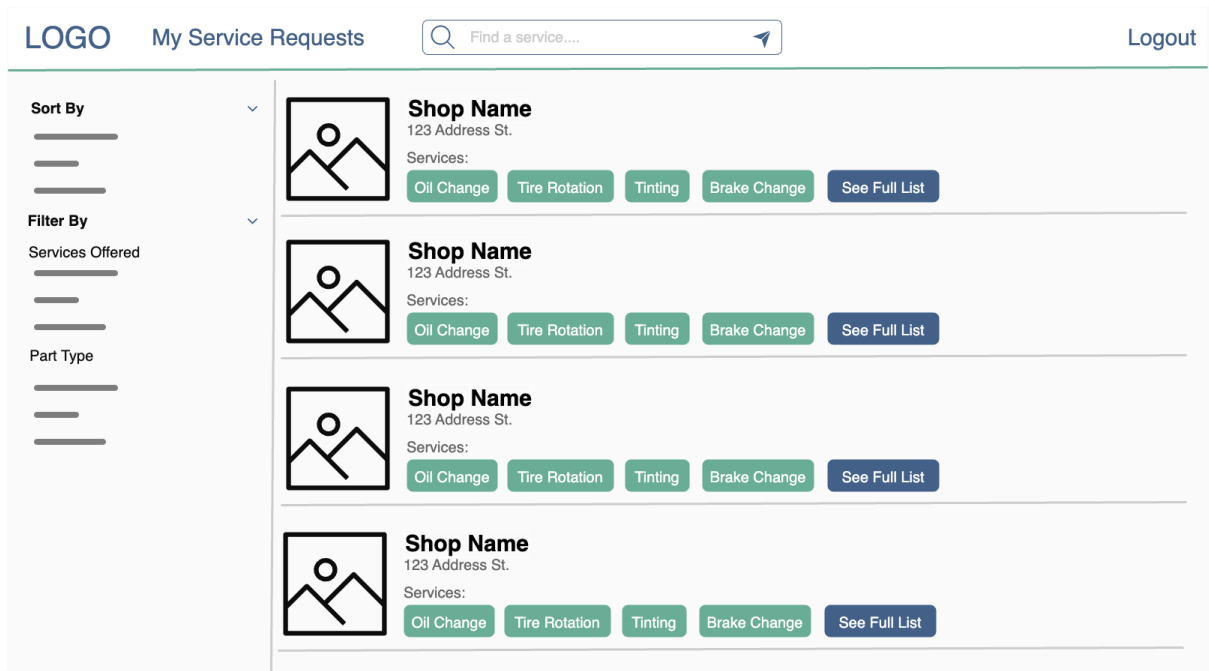


Figure 3: Home Page — Logged In (Desktop)

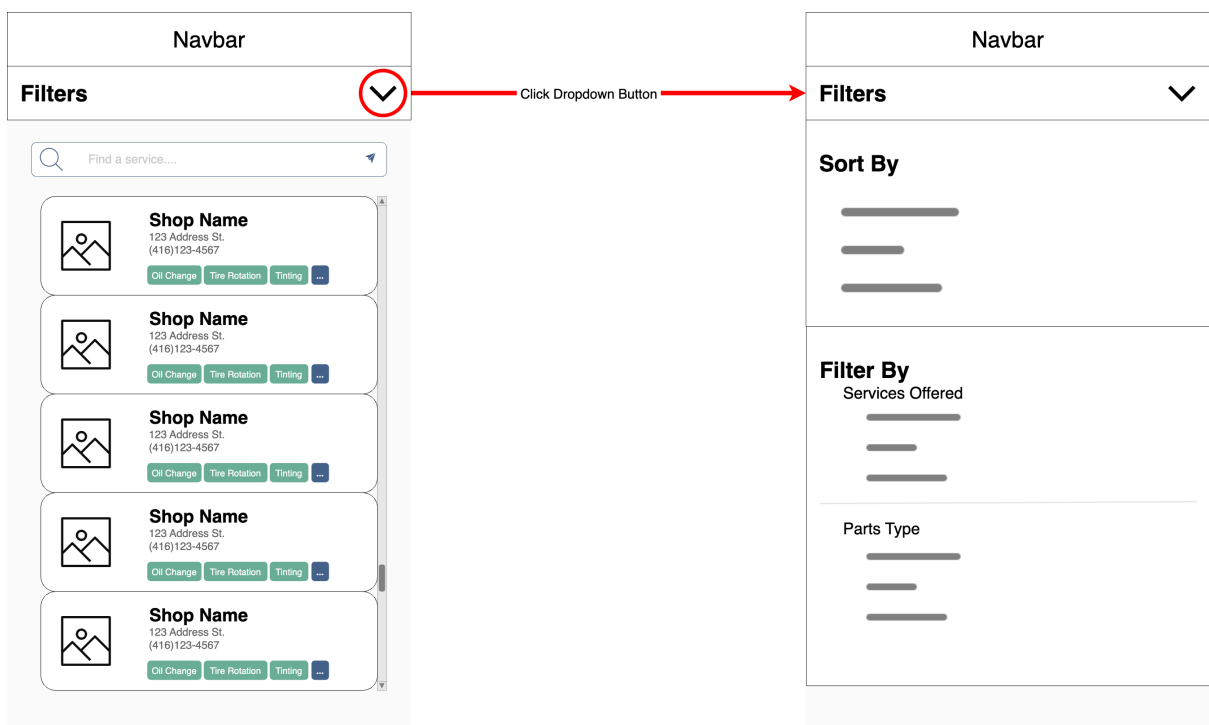


Figure 4: Home Page — Logged In (Mobile)

8.2 Manage Shop Employees

The Manage Shop Employees page is where shop owners and employee can view a tabular view of all shop employees. Shop owners can manage their employees by searching for their employee, suspend employees, and view employee details such as name, phone number, email, etc.

LOGO

Service RequestsManage Shop

ProfileLogout

Services

Employees

Search employees

ID	Name ↕	Email	Phone Number	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	
<id>	<employee name>	<employee email>	<employee phone #>	

Figure 5: Manage Shop — Employees (Desktop)

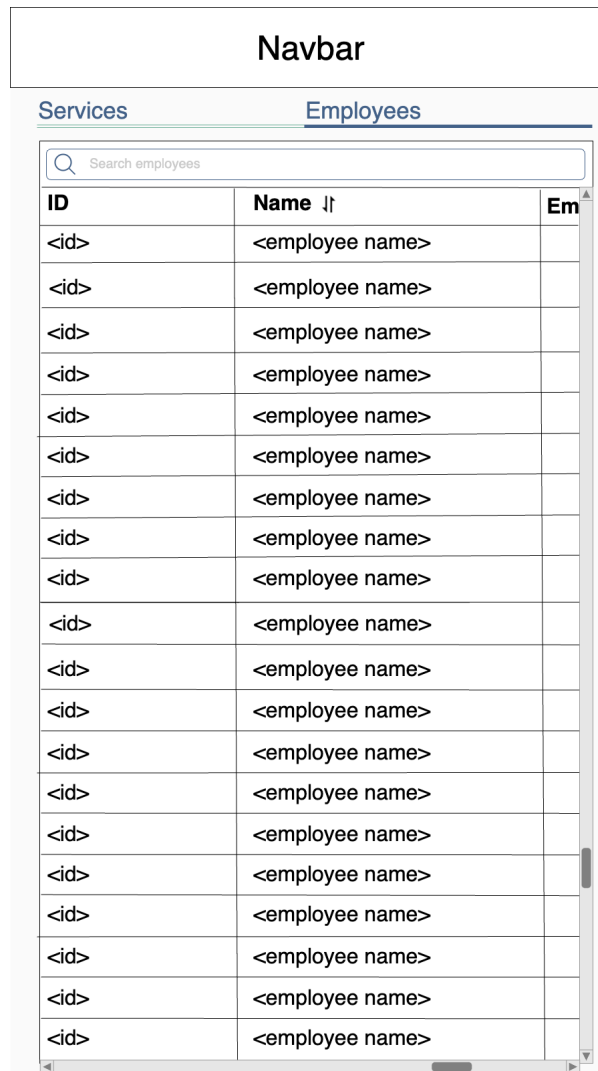


Figure 6: Manage Shop — Employees (Mobile)

8.3 Manage Shop Details

The Manage Shop Details page is where shop owners can manage their shop services. Shop owners can manage their basic services, custom services, and add any information about the parts being used for the service.

LOGO

Service Requests

Manage Shop

Profile

Logout

Services

Employees

Shop ID: <shop id>

Basic Services

Add Basic Service

Search Service

Service Type	Description	Part Type	Part Condition	Duration (H)	Estimated Cost		

Custom Services

Add Custom Service

Search Service

Service Type	Description	Part Type	Part Condition		

Figure 7: Manage Shop — Details (Desktop)

Navbar

[Services](#)
[Employees](#)

Shop ID: <shop id>

Basic Services [Add Basic Service](#)

Service Type	Description		

Custom Services [Add Custom Service](#)

Service Type	Description		

Figure 8: Manage Shop — Details (Mobile)

8.4 Shop Profile

The Shop Profile page contains information about a shop such as location, contact information, hours of operation, and services offered. Vehicle owners, employees, and shop owners can view, however, only the shop employee has edit permission to edit the hours of operation.

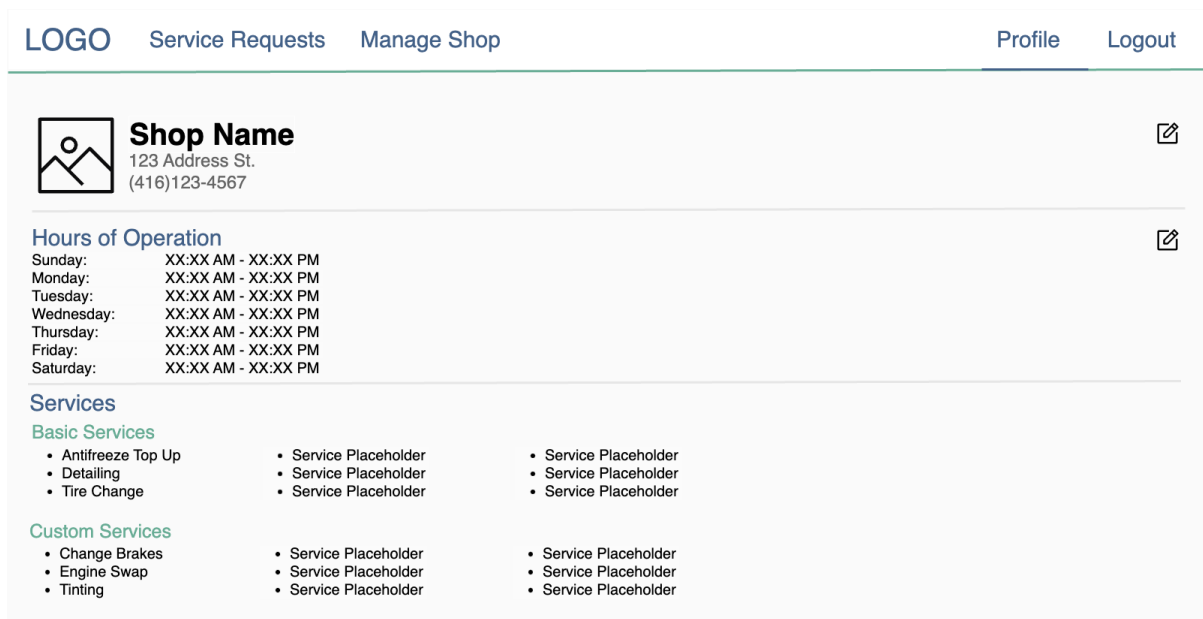


Figure 9: Shop Profile — Shop Owner (Desktop)

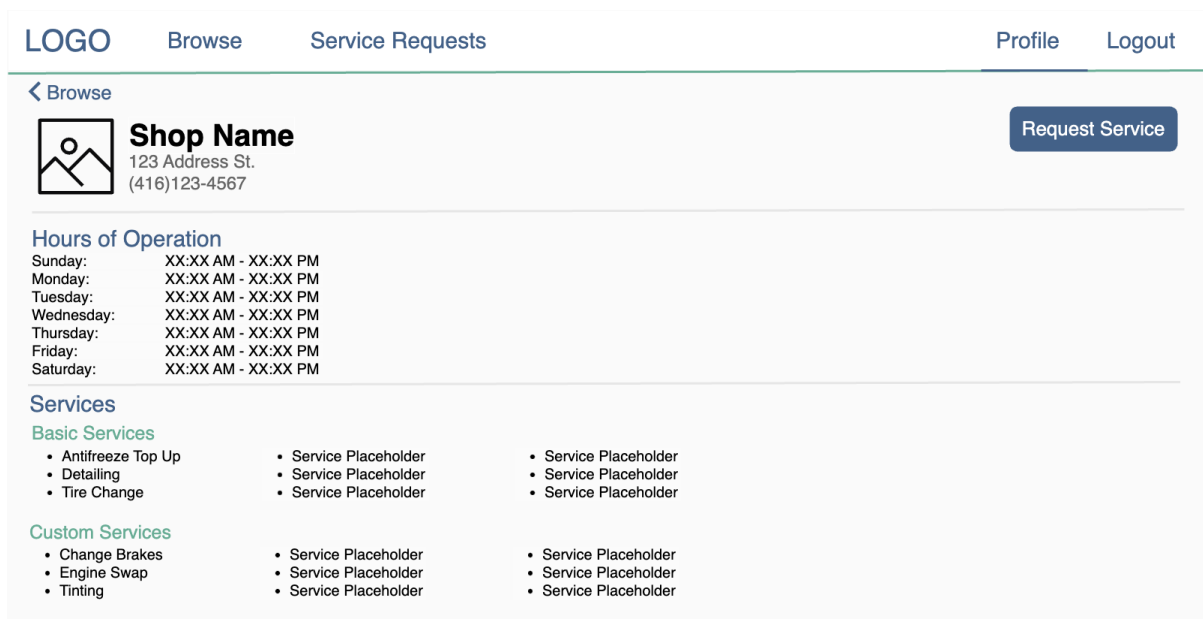



Figure 10: Shop Profile — Vehicle Owner (Desktop)

Navbar

[< Browse](#)



Shop Name
 123 Address St.
 (416)123-4567

Hours of Operation

Sunday:	XX:XX AM - XX:XX PM
Monday:	XX:XX AM - XX:XX PM
Tuesday:	XX:XX AM - XX:XX PM
Wednesday:	XX:XX AM - XX:XX PM
Thursday:	XX:XX AM - XX:XX PM
Friday:	XX:XX AM - XX:XX PM
Saturday:	XX:XX AM - XX:XX PM

Services

Basic Services

• Antifreeze Top Up	• Service Placeholder
• Detailing	• Service Placeholder
• Tire Change	• Service Placeholder
• Service Placeholder	• Service Placeholder
• Service Placeholder	• Service Placeholder

Custom Services

• Change Brakes	• Service Placeholder
• Engine Swap	• Service Placeholder
• Tinting	• Service Placeholder
• Service Placeholder	• Service Placeholder
• Service Placeholder	• Service Placeholder

Request Service

Figure 11: Shop Profile (Mobile)

8.5 Add Service to Shop

These popups show the form that shop owners need to complete to add a service to the shop. After the form is submitted, the service will be shown in the table on the manage shop details page.

LOGO

Service Requests

Manage Shop

Profile

Logout

Services

Employees

Shop ID: <shop id>

Basic Services

Add Basic Service

Service Type

Description

Part Condition

Part Type

Save Custom Service

Arch Service

ation (H)

Estimated Cost

Custom Services

Add Custom Service

Search Service

Service Type

Description

Part Type

Part Condition

LOGO

Service Requests

Manage Shop

Profile

Logout

Services

Employees

Shop ID: <shop id>

Basic Services

Add Basic Service

Service Type

Description

Part Condition

Part Type

Duration (in hours)

Estimated Cost

Save Basic Service

Arch Service

ation (H)

Estimated Cost

Custom Services

Add C

Search Service

Service Type

Description

Part Type

Part Condition

Figure 12: Add Service to Shop (Desktop)

Navbar

Shop Settings
Employees

Shop ID: <shop id>
Basic Services
Add Basic Service

Se

Add Basic Service

Service Type

Description

Part Condition
New

Part Type
Aftermarket

Duration (in hours)

Estimated Cost

Save Basic Service

Navbar

Shop Settings
Employees

Shop ID: <shop id>
Basic Services
Add Basic Service

Se

Add Custom Service

Service Type

Description

Part Condition
New

Part Type
Aftermarket

Save Custom Service

Custom Services
Add Custom Service

Search services

Service Type	Description	

Figure 13: Add Service to Shop (Mobile)

8.6 Shop Owner/Employee Registration

These popups show the sign up form for shop owners and employees. The sign up has multiple steps which the user can access once completing the previous steps. When all fields are entered and validated, the user can successfully sign up. Depending on if the user is signing up as an employee or shop owner, they will be directed to different steps containing relevant fields required for registration of that specific role.

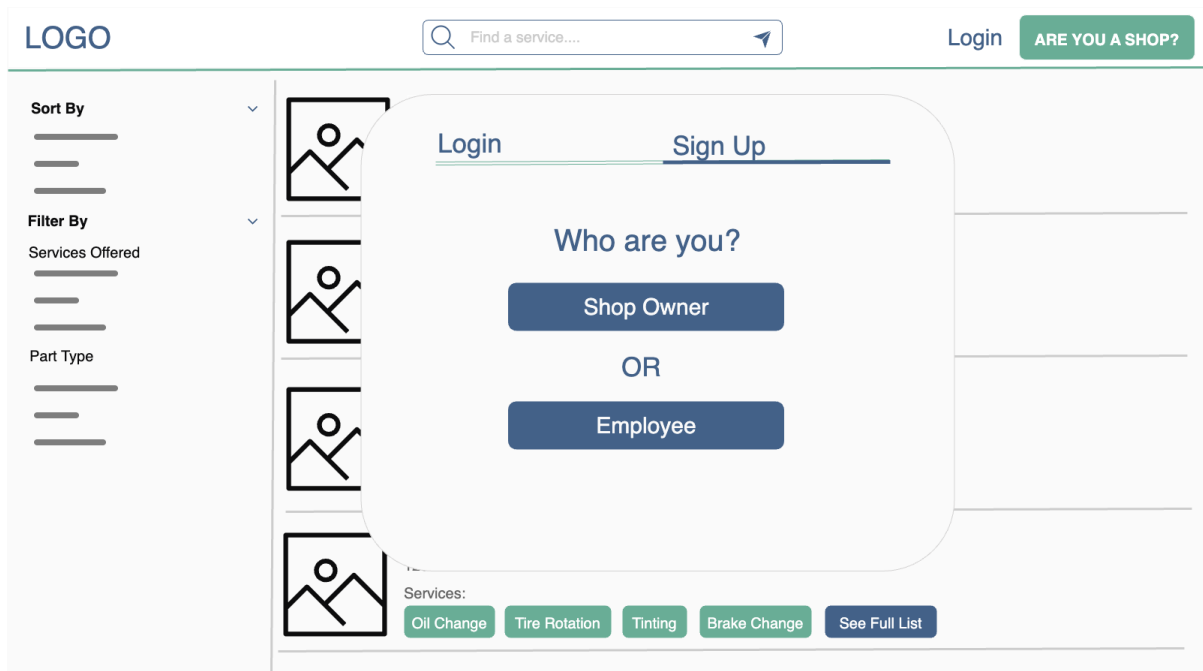


Figure 14: Shop Owner/Employee Registration — Part 1 (Desktop)

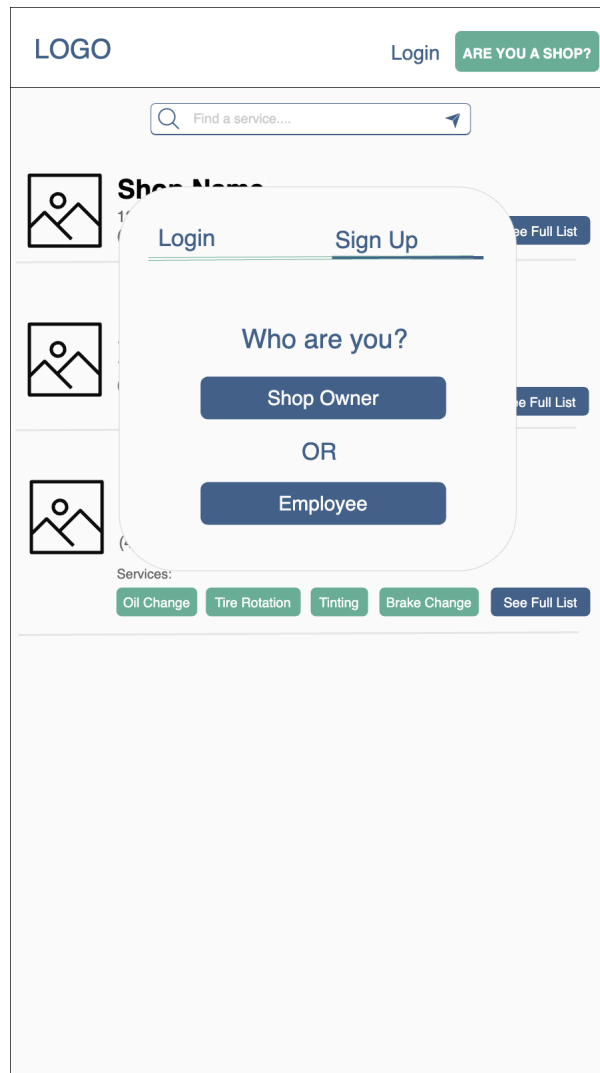


Figure 15: Shop Owner/Employee Registration — Part 1 (Mobile)

LOGO

Find a service....

Login

ARE YOU A SHOP?

Sort By

Filter By

Services Offered

Part Type

Login

Sign Up

First Name

John

Last Name

Doe

Email

example@email.com

Phone

(416) 123 - 4567

Password

Back

Next

Services:

Oil Change

Tire Rotation

Tinting

Brake Change

See Full List

Figure 16: Shop Owner/Employee Registration — Part 2 (Desktop)

LOGO

Find a service...

Login

ARE YOU A SHOP?

Sort By

Filter By

Services Offered

Part Type

Login

Sign Up

Shop Name

ABC Auto Repair

Shop Address

123 Address St.

City

Toronto

Postal Code

A1B 2C3

Province

Shop Phone Number

(416) 123 - 4567

Back

Sign Up

Services:

Oil Change

Tire Rotation

Tinting

Brake Change

See Full List

Figure 18: Shop Owner Registration — Part 3 (Desktop)

LOGO

Login

ARE YOU A SHOP?

Find a service.....

Shop Name

123

Shop Address

123

City

Toronto

Postal Code

A1B 2C3

Province

Shop Phone Number

(416) 123 - 4567

Login

Sign Up

Back

Sign Up

See Full List

See Full List

See Full List

Figure 19: Shop Owner Registration — Part 3 (Mobile)

LOGO

Find a service....

Login

ARE YOU A SHOP?

Sort By

Filter By

Services Offered

Part Type

Login

Sign Up

Shop ID

ABCDEFG12345

Back

Sign Up

Services:

Oil Change

Tire Rotation

Tinting

Brake Change

See Full List

Figure 20: Employee Registration — Part 3 (Desktop)

The image shows a mobile application interface. At the top, there is a header with a 'LOGO' on the left, a 'Login' link in the center, and a green button labeled 'ARE YOU A SHOP?' on the right. Below the header is a search bar with the placeholder text 'Find a service....' and a magnifying glass icon on the left and a right arrow icon on the right. The main content area displays a list of shops. Each shop entry includes a placeholder icon (a square with a mountain and a person), a shop name (e.g., 'Shop Name'), a shop ID (e.g., 'ABCDEFGH12345'), an address (e.g., '123 Address St.'), a phone number (e.g., '(416)123-4567'), and a list of services (e.g., 'Oil Change', 'Tire Rotation', 'Tinting', 'Brake Change'). A 'See Full List' button is located to the right of each shop entry. A modal dialog is open in the center of the screen, featuring a 'Login' tab and a 'Sign Up' tab. The 'Sign Up' tab is selected. The modal contains a 'Shop ID' input field with the text 'ABCDEFGH12345', a 'Back' button, and a 'Sign Up' button.

Figure 21: Employee Registration — Part 3 (Mobile)

8.7 Vehicle Owner Registration

This shows the sign up process for vehicle owners. The form includes information about the vehicle owner's vehicle which will be used when booking appointments.

LOGO

Find a service...

Login

ARE YOU A SHOP?

Sort By

Filter By

Services Offered

Part Type

Login

Sign Up

First Name

John

Last Name

Doe

Email

example@email.com

Phone

(416) 123 - 4567

Password

Next

Services:

Oil Change

Tire Rotation

Tinting

Brake Change

See Full List

Figure 22: Vehicle Owner Registration — Part 1 (Desktop)

LOGO

Login

ARE YOU A SHOP?

Find a service.....

Shop Name

15

Shop Name

15

Shop Name

15

See Full List

See Full List

See Full List

Login

Sign Up

First Name

John

Last Name

Doe

Email

example@email.com

Phone

(416) 123 - 4567

Password

Next

Figure 23: Vehicle Owner Registration — Part 1 (Mobile)

LOGO

Find a service...

Login

ARE YOU A SHOP?

Sort By

Filter By

Services Offered

Part Type

Login

Sign Up

Vehicle Make

Toyota

Vehicle Model

Corolla

Manufacture Year

2022

VIN

VIN

License Plate

#####

Back

Sign Up

Services:

Oil Change

Tire Rotation

Tinting

Brake Change

See Full List

Figure 24: Vehicle Owner Registration — Part 2 (Desktop)

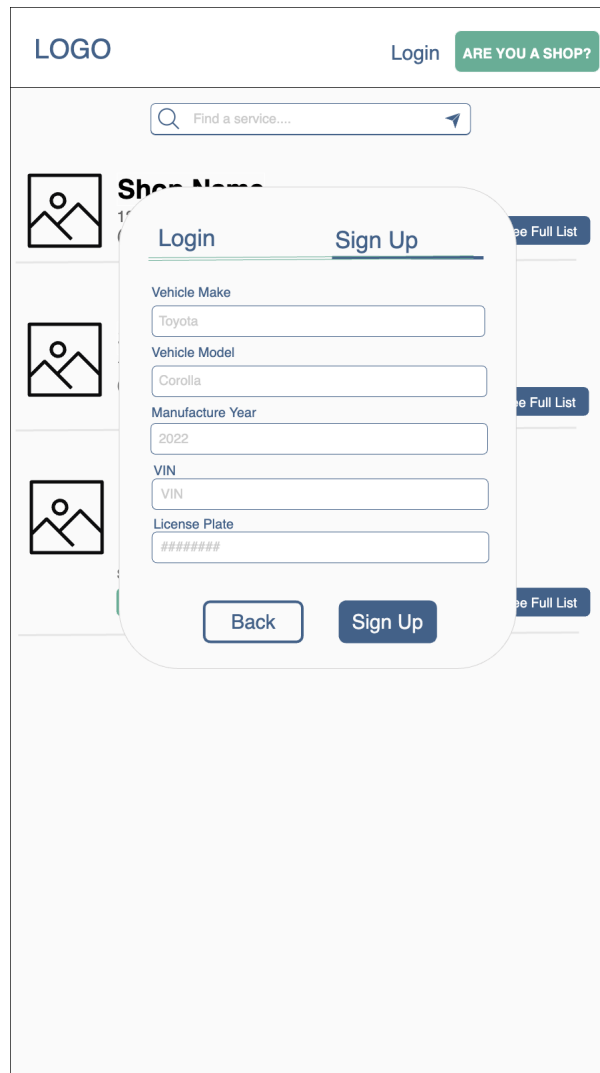


Figure 25: Vehicle Owner Registration — Part 2 (Mobile)

8.8 Vehicle Owner/Shop Owner/Employee Login

These popups show the login form for the application. Vehicle owners, shop owners, and employees use the same login flow.

LOGO

Find a service...

Login

ARE YOU A SHOP?

Sort By

Filter By

Services Offered

Part Type

Login

Sign Up

Email

example@email.com

Password

Login

Services:

Oil Change

Tire Rotation

Tinting

Brake Change

See Full List

Figure 26: Vehicle Owner/Shop Owner/Employee Login (Desktop)

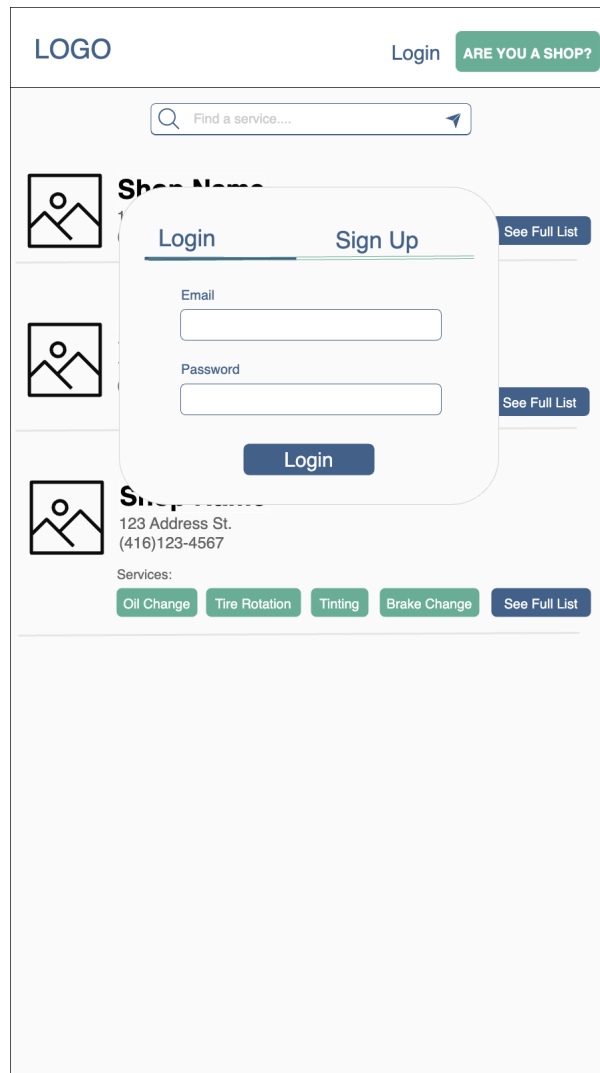


Figure 27: Vehicle Owner/Shop Owner/Employee Login (Mobile)

8.9 Vehicle Owner Dashboard

8.9.1 Services

The Service page shows the all user's services. The services are split into the categories Requested, Scheduled, In-Progress, Completed and Cancelled/Rejected.

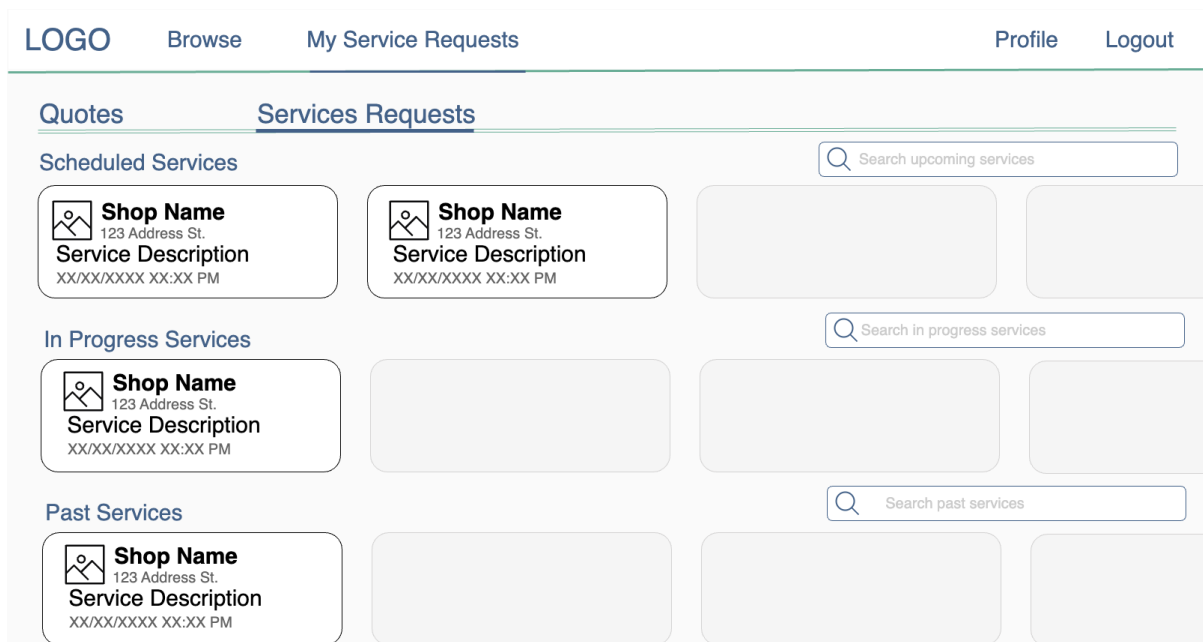


Figure 28: Vehicle Owner Dashboard — Service Requests (Desktop)

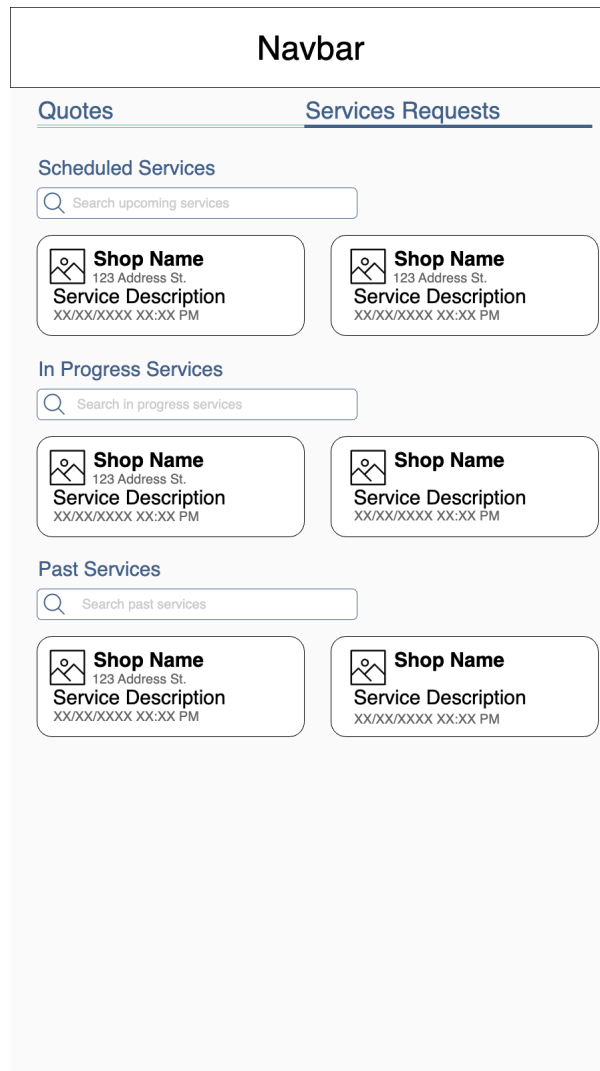


Figure 29: Vehicle Owner Dashboard — Service Requests (Mobile)

8.9.2 Quotes

The Quotes page displays any chats the vehicle owner has had with shop owners to receive a quote. Vehicle owners can send chat messages to shops using this page. Users can also query and search for a specific chat using the search bar.

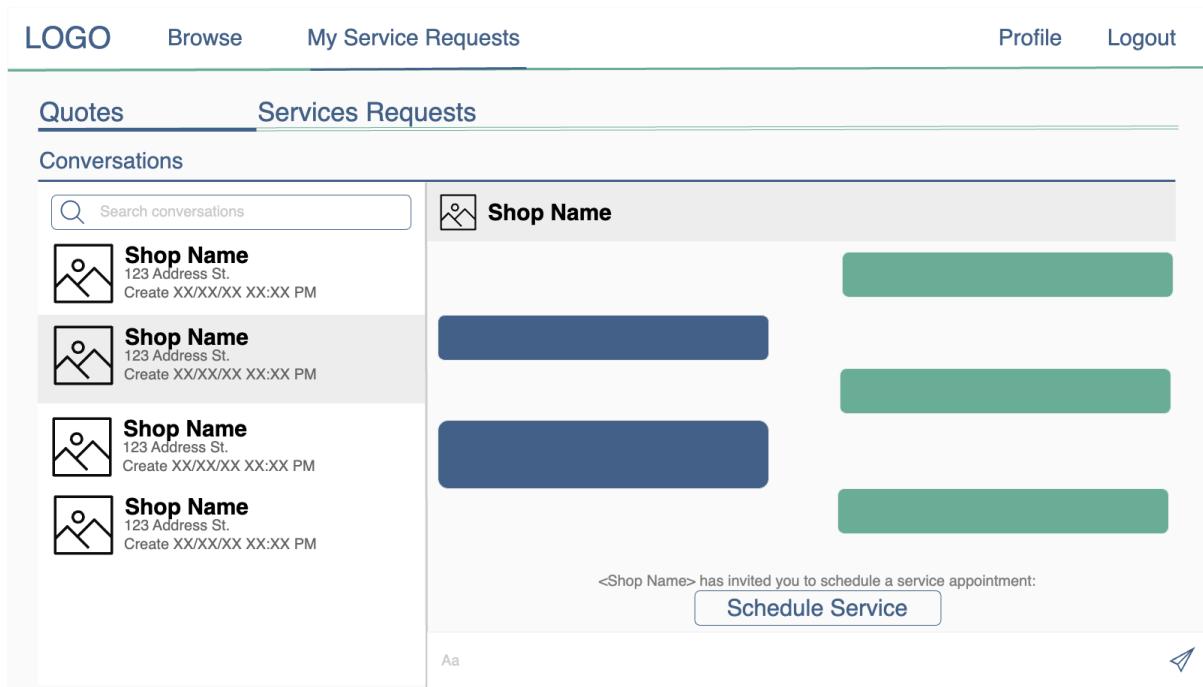


Figure 30: Vehicle Owner Dashboard — Quotes (Desktop)

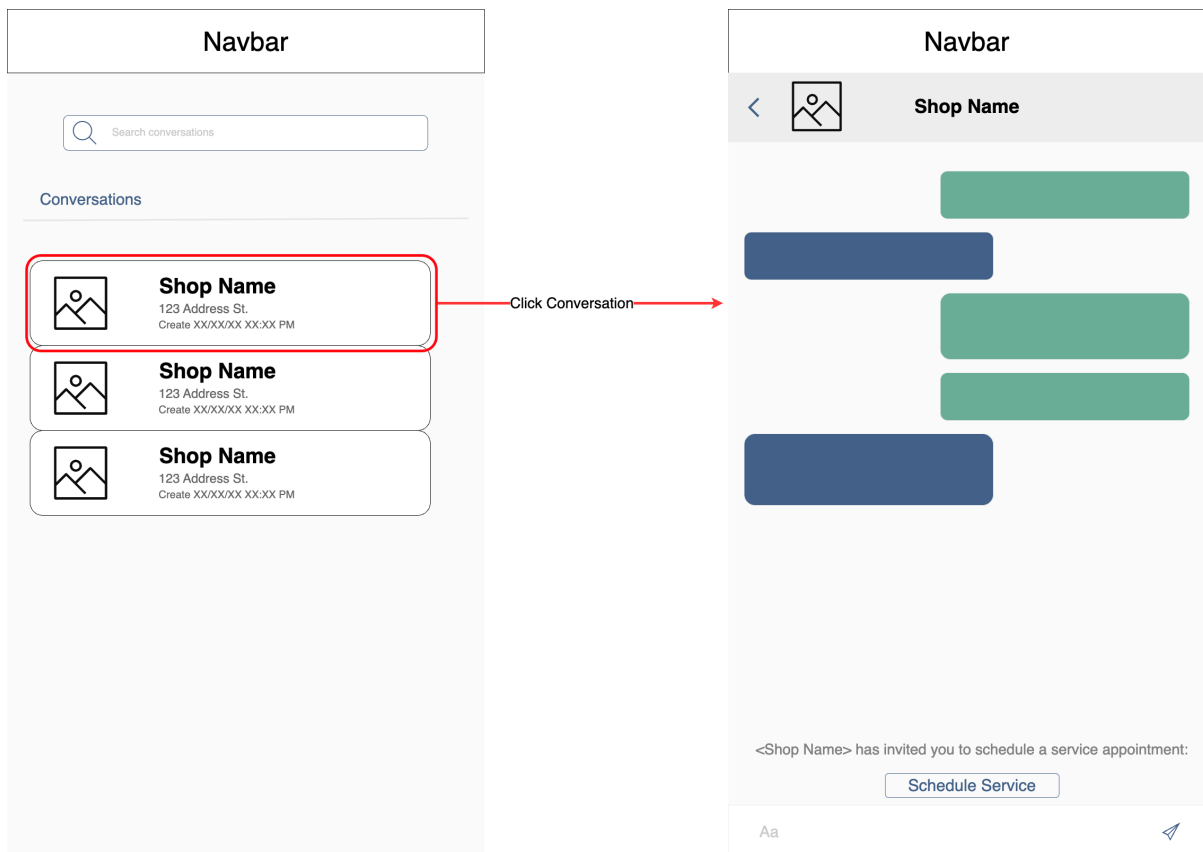


Figure 31: Vehicle Owner Dashboard — Quotes (Mobile)

8.10 Vehicle Owner Create Appointment

The popup to create an appointment contains various steps. The grey fields represent pre-filled fields that are read-only. These fields are populated using vehicle metadata associated with the user and service metadata associated with the service. The shop availabilities will be displayed according to their hours of operations and any hours that currently do not have a service requested, scheduled, or in-progress.

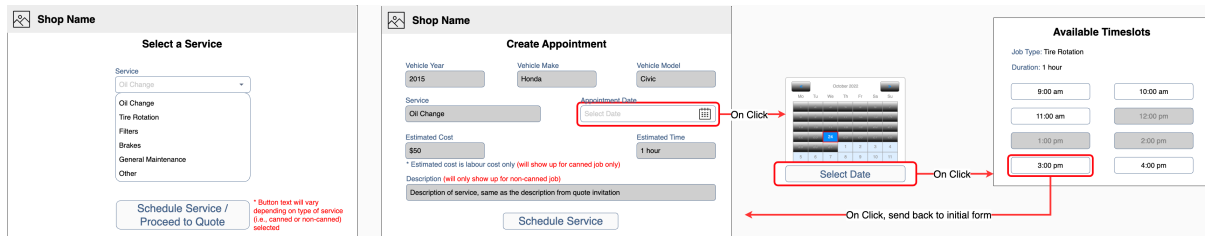


Figure 32: Vehicle Owner Create Appointment (Desktop)

8.11 Shop Owner/Employee Dashboard

8.11.1 Quotes Requests

The Quotes page displays any chats that have been initiated by vehicle owners. Shop owners and employees can send chat messages to vehicle owners on this page. Users can also query and search for a specific chat using the search bar. Shop owners can invite an employee to schedule an appointment once they are ready.

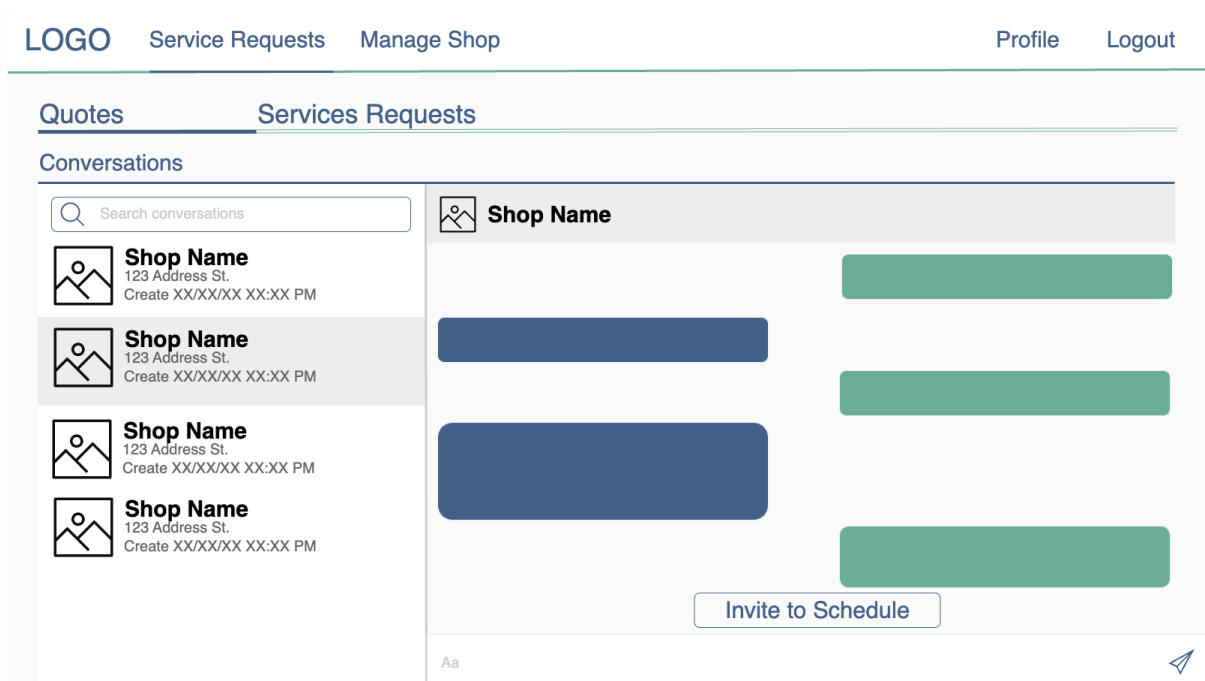


Figure 33: Shop Owner/Employee Dashboard — Quotes Requests (Desktop)

LOGO

Service Requests

Manage Shop

Profile

Logout

Quotes

Services Requests

Conversations

Search conversations

Customer Name

Service Name

Create XX/XX/XX XX:XX PM

Customer Name

Service Name

Create XX/XX/XX XX:XX PM

Customer Name

Service Name

Create XX/XX/XX XX:XX PM

Customer Name

Service Name

Create XX/XX/XX XX:XX PM

Customer Name

Create Invitation

Vehicle Year

2015

Vehicle Make

Honda

Vehicle Model

Civic

Price Estimate

\$ Labour rate + Parts Cost

Duration

1 hour

30 minutes

1 hour

1.5 hours

2 hours

2.5 hours

3 hours

Description

Description of service/job

Invite to Schedule

Figure 34: Shop Owner/Employee Dashboard — Quotes Requests — Invitation (Desktop)

8.11.2 Service Requests — Requested

The Requested Services are shown on this page. By clicking on an appointment, the work order for the appointment will be displayed. Requested Services can be rejected or accepted. Accepting an appointment will automatically reject all conflicting appointments.

LOGO

Service Requests

Manage Shop

Profile

Logout

Quotes

Services Requests

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Dec 30, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Reject

Accept

Estimate: \$XXX.XX

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Reject

Accept

Estimate: \$XXX.XX

Dec 31, 2022

Service Type

Customer Name:

View Quote

Reject

Accept

Figure 35: Shop Owner/Employee Dashboard — Service — Requested (Desktop)

LOGO

Quotes

Services Requests

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Dec 30, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Reject

Accept

Estimate: \$XXX.XX

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Reject

Accept

Estimate: \$XXX.XX

Dec 31, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Reject

Accept

Estimate: \$XXX.XX

Figure 36: Shop Owner/Employee Dashboard — Service — Requested (Mobile)

8.11.3 Service Requests — Scheduled

The Scheduled Services are shown on this page. By clicking on an appointment, the work order for the appointment will be displayed.

LOGO

Service Requests

Manage Shop

Profile

Logout

Quotes

Services Requests

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Dec 29, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Cancel

Estimate: \$XXX.XX

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Cancel

Estimate: \$XXX.XX

Dec 30, 2022

Service Type

Customer Name:

View Quote

Figure 37: Shop Owner/Employee Dashboard — Service — Scheduled (Desktop)

LOGO

Quotes

Services Requests

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Dec 29, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Cancel

Estimate: \$XXX.XX

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Cancel

Estimate: \$XXX.XX

Dec 30, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

View Quote

Cancel

Estimate: \$XXX.XX

Figure 38: Shop Owner/Employee Dashboard — Service — Scheduled (Mobile)

8.11.4 Service Requests — In Progress

The In Progress Services are shown on this page. By clicking on an appointment, the work order for the appointment will be displayed.

LOGO

[Service Requests](#)
[Manage Shop](#)

[Profile](#)
[Logout](#)

[Quotes](#)
[Services Requests](#)

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Dec 29, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

Work Order

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

Work Order

Figure 39: Shop Owner/Employee Dashboard — Service — In Progress (Desktop)

LOGO

[Quotes](#)
[Services Requests](#)

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Dec 29, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

Work Order

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

Work Order

Figure 40: Shop Owner/Employee Dashboard — Service — In Progress (Mobile)

8.11.5 Service Requests — Work Orders

The Work Orders page features a list of information about the appointment and a rich text editor for any notes the shop would like to share with the customer. The appointment information can be edited from the Work Orders page by clicking the “Edit Metadata” button. The “Save” button can be used to save any changes. The “Back” button will take the user back to the Service Requests page. Customers will be presented a read-only version of this page, while Employees and Shop Owners will be able to make changes.

LOGO

Service RequestsManage Shop

ProfileLogout

Quotes

Services Requests

Requested (#)

Scheduled (#)

In Progress (#)

Completed

< Back

Tire Rotation

Last Updated: XX/XX/XX XX:XX PM

Status: In Progress

Assigned to: <Employee Name>

Customer: Todd Howard <todd@example.com>

Vehicle: 2017 Ford F150

Customer Email: todd@example.com

Vehicle VIN: 1FTFW1RG0HFA66295

Customer Phone Number: (905) 525-9140

Edit Metadata

B

/

U

<Work Order Details>
(Rich Text Editor)

Save

Last Saved: XXXXXXXX XXXXX PM

Figure 41: Shop Owner/Employee Dashboard — Service Requests — Work Orders (Desktop)

Back to "In Progress"
Service Requests

Navbar

Tire Rotation

Last Updated: XX/XX/XX XX:XX PM
Assigned to: <Employee Name>
Customer: Todd Howard <todd@example.com>
Customer Email: todd@example.com
Customer Phone Number: (905) 525-9140
Vehicle: 2017 Ford F150
Vehicle VIN: 1FTFW1RG0HFA66295

B

/

U

<Work Order Details>
(Rich Text Editor)

Save

Last Saved: XX/XX/XX XX:XX PM

Figure 42: Shop Owner/Employee Dashboard — Service Requests — Work Orders (Mobile)

8.11.6 Service Requests — Completed

The Completed Services are shown on this page. By clicking on an appointment, the work order for the appointment will be displayed.

LOGO

Service RequestsManage Shop

ProfileLogout

Quotes

Services Requests

Requested (#)

Scheduled (#)

In Progress (#)

Completed

Nov 29, 2022

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

Work Order

Service Type

Customer Name:

Start Time:

End Time:

Vehicle Make:

Vehicle Model:

Manufacture Year:

Work Order

Nov 30, 2022

Service Type

Customer Name:

Figure 43: Shop Owner/Employee Dashboard — Service — Completed (Desktop)

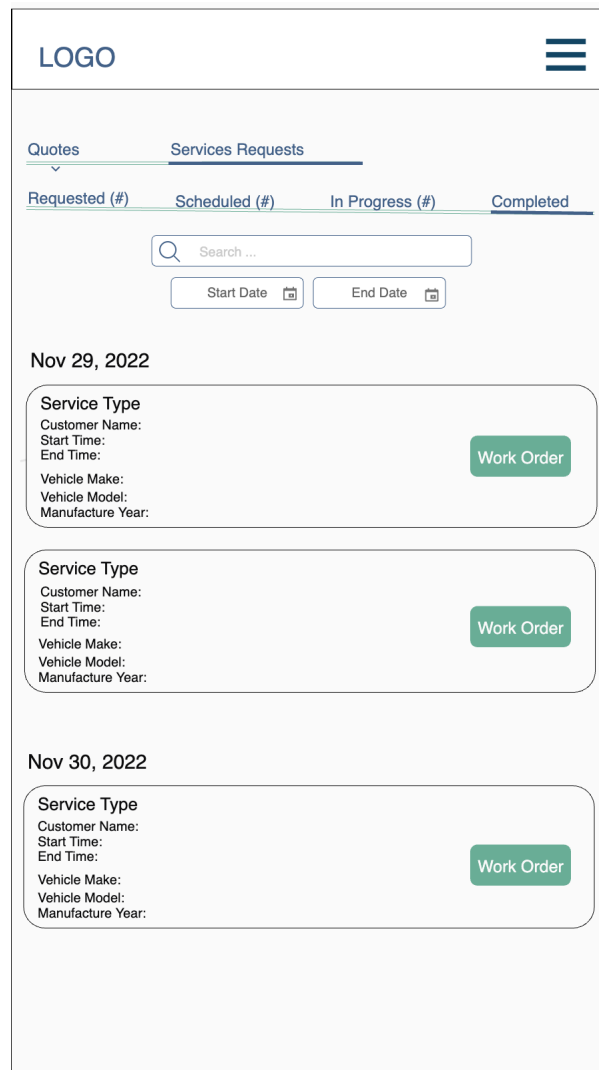


Figure 44: Shop Owner/Employee Dashboard — Service — Completed (Mobile)

9 Design of Hardware

N/A

10 Design of Electrical Components

N/A

11 Design of Communication Protocols

N/A

12 Timeline

12.1 Module Development

The development of the modules shall take place over the months of December 2022 and January 2023. Specific dates, and responsibilities are described in Table 3.

Table 3: Module Development Timeline

Module Name	Development Timeline	Developer(s)
Database Driver Module	Dec. 1, 2022 — Jan. 31, 2023	Arkin Modi, Joy Xiao, Leon So, Timothy Choy
Users Module	Dec. 1, 2022 — Dec. 15, 2022	Arkin Modi, Leon So
Employee Management Module	Dec. 15, 2022 — Dec. 22, 2022	Joy Xiao, Leon So
Shop Module	Dec. 15, 2022 — Dec. 22, 2022	Leon So, Timothy Choy
Quotes Module	Jan. 1, 2023 — Jan. 8, 2023	Arkin Modi, Timothy Choy
Services Module	Jan. 1, 2023 — Jan. 8, 2023	Arkin Modi, Joy Xiao
Appointments Module	Jan. 15, 2023 — Jan. 22, 2023	Arkin Modi, Joy Xiao, Timothy Choy
Work Orders Module	Jan. 15, 2023 — Jan. 24, 2023	Arkin Modi

12.2 Module Testing

The testing of the modules shall take place over the months of December 2022 and January 2023. The tests conducted shall primarily consist of manual testing and have the primary goal of certifying confidence for the Revision 0 Demonstration. This testing will not include everything described in the System Verification and Validation Plan. Generally, testing will take place for the week after development is scheduled to finish. Specific dates, and responsibilities are described in Table 4.

Table 4: Module Testing Timeline

Module Name	Testing Timeline	Developer(s)
Database Driver Module	Dec. 1, 2022 — Jan. 31, 2023	Arkin Modi, Joy Xiao, Leon So, Timothy Choy
Users Module	Dec. 15, 2022 — Dec. 22, 2022	Arkin Modi, Leon So
Employee Management Module	Dec. 22, 2022 — Dec. 29, 2022	Joy Xiao, Leon So
Shop Module	Dec. 22, 2022 — Dec. 29, 2022	Leon So, Timothy Choy
Quotes Module	Jan. 8, 2023 — Jan. 15, 2023	Arkin Modi, Timothy Choy
Services Module	Jan. 8, 2023 — Jan. 15, 2023	Arkin Modi, Joy Xiao
Appointments Module	Jan. 22, 2023 — Jan. 29, 2023	Arkin Modi, Joy Xiao, Timothy Choy
Work Orders Module	Jan. 24, 2023 — Jan. 31, 2023	Arkin Modi

13 Appendix

13.1 Reflection

The information in this section will be used to evaluate the team members on the graduate attribute of Problem Analysis and Design. Please answer the following questions:

1. What are the limitations of your solution? Put another way, given unlimited resources, what could you do to make the project better? (LO_ProbSolutions)

One of the main limitations on the resources available is the time allotted for this project. This has limited the number of features which we could support for this project.

To improve the project, we would propose adding the following features:

- Supporting multiple vehicles per customer
- Ability to specify employee skill sets and assign employees to service appointment bookings accordingly
- Adding email notification functionality
- Adding a profile page for employees and customers
- Add analytics dashboards for shop employees and owners
- Ability to delete and remove accounts
- Ability to sign up for employees to sign up to multiple shops
- Ability for shops to view and manage existing customers
- Add a parts entity and inventory management system
- Add a vehicle inspect checklist

In addition, there are some financial constraints on resources made available for the project. If we had unlimited financial resources, we would make the following improvements:

- Add a long-lived server to support and manage features that can benefit from being stateful
- Add an email server to support email communication and notifications

2. Give a brief overview of other design solutions you considered. What are the benefits and tradeoffs of those other designs compared with the chosen design? From all the potential options, why did you select documented design? (LO_Explores)

Our supervisor provided us with existing mockups for a UI, however, our team took initiative to completely refactor and redesign the application to be more user-friendly. With this, we simplified workflows for the user, to make the user experience more efficient and tailored to fulfill the desired functionality. We also gathered feedback from the project supervisor, and incorporated such feedback into the designs.

For the navigation bar, we considered two alternatives for the positioning of the navigation bar. We considered a top and bottom navigation bar for mobile devices.

We decided on a top navigation bar, as many of the pages show lots of information and often require scrolling. A top navigation bar is less intrusive when it comes to interfering with scrolling on mobile devices. A top navigation is also more visible and noticeable as the user interacts with the application on their phone.