

# Male' Auto Services GUI Application

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**Course**

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**Module**

OO Systems Development II UFCFB6-30-2

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# Introduction

For our final submission for OO Systems development II, we were given a case study for an application which would be used at a vehicle service centre. The application includes multiple users with various roles that start from the point where a customer arrives at the garage to the point where they receive a bill at the end of the service. The system has a GUI and is written with JavaFX since it is a lot easier to use and is intended to replace the older Swing library. This documentation highlights all the test cases that were included in the UML use case diagram, designed before the implementation of this system. Test cases enable us to determine whether our system is free of bugs and works as intended. I will be following the sequence that I had written in my UML use case diagram and including it in the appendix for reference.

There are four main actors in the system and they each have a permission level from 1 to 4 which determines what job they have to perform using the system.

1. Data Entry Staff: In charge of managing customers
2. Service Advisor: In charge of creating Job Sheets and Job Items
3. Mechanic: In charge of updating Spare and Labour items
4. System Administrator: In charge of uploading the users for the system and conducting market review using the Twitter API integrated into the system

The different actors have different dashboards depending on the work that they are assigned but we mainly have six parts in the system

1. Customer and vehicle registration, view, edit and delete
2. Job Sheet + Job Item(s) view, add, edit and delete
3. Mechanic log + Spare Item(s) + Labour Item(s) add, edit and delete
4. Generate bill + simulated printing based on databases
5. System Staff view, add, edit and delete
6. Twitter Connect for searching terms and displaying feed

# Staff Login

Male' Auto Service

Log In

Staff ID

MAS0001

Password

Submit

Staff members are pre-assigned login credentials. Each member has a unique user ID and a password which they must use to log in to the system.

#	Test Case	Expected Result	Actual Result	Status
1	Login with correct username and password	Change window to indicate login was successful	Window changes	Works as intended
2	Login with incorrect username and password	Error message should display: username or password is incorrect	Error message displays: username or password is incorrect	Works as intended
3	Login with blank username	Error message should display: enter your staff ID	Error message displays: enter your staff ID	Works as intended
4	Login with blank password	Error message should display: enter your password	Error message displays: enter your password	Works as intended
5	Login with blank username and password	Error message should display: enter your login credentials	Error message displays: enter your login credentials	Works as intended

# Register Customer & Vehicle

« New Customer Registration

Owner Details

Customer Type ☐ Corporate ☒ Private

Customer Name

Customer Contact

ID Card Number

Customer Identifier **P0002**

Vehicle Details

Model

Registration Number

Chassis Number

Registration Date

Register Customer

Log Out

Customers are registered as either private or corporate customers and the fields that are displayed changes upon the customer type selected.

#	Test Case	Expected Result	Actual Result	Status
6	Choose either private or corporate customers	Corporate customers should have an identifier starting with C and private should have a P	Identifier changes	Works as intended
7	Register customer without customer type selected	Error message should display: make sure a customer type is selected	Error message displays: make sure a customer type is selected	Works as intended
8	Register customer with all fields filled	Customer gets registered and a success message is displayed	Customer got registered and a success message was displayed	Works as intended

9	Register customer with some fields filled	Error message should display: make sure all fields are filled	Error message displays: make sure all fields are filled	Works as intended
10	Register customer with no fields filled	Error message should display: make sure all fields are filled	Error message displays: make sure all fields are filled	Works as intended
11	Log out	User should be logged out and taken to login screen	User is logged out and taken to login screen	Works as intended

## Log Vehicle Inspection

Includes: record inspection date status & remarks

Corporate customers should additionally have the Inspection date, status and remarks fields.

#	Test Case	Expected Result	Actual Result	Status
12	Choose corporate customer to log vehicle inspection	Corporate customers should have the Inspection date, status and remarks fields.	The Inspection date, status and remarks fields appear so that this information can be logged.	Works as intended

# Generate Job Sheet

Includes: unique service order number

« Job Sheet

Service Order Number: SO/2020/0003

Job Items

Customer Number

Service Notes

No content in table

New Job Item

Add Job Item Delete Job Item Save Job Sheet

The service advisor is able to generate a Job Sheet on which they can add job items and the mechanic can add labour and spare items.

#	Test Case	Expected Result	Actual Result	Status
13	Save job sheet with customer number and service order fields filled	Job sheet should save and a success message should display	Job sheet saves and a success message is displayed	Works as intended
14	Save job sheet with some fields filled	Job sheet should not save and a error message should display: make sure all fields are filled	Job sheet does not save and a error message displays: make sure all fields are filled	Works as intended
15	Save job sheet with none of the fields filled	Job sheet should not save and a error message should display: make sure all fields are filled	Job sheet does not save and a error message displays: make sure all fields are filled	Works as intended

16	Adding a new job sheet with a unique service order number	Each job sheet should have a uniquely generated service order number	Each job sheet has a uniquely generated service order number	Works as intended
17	Adding a second job sheet to see if the service order number changes	After saving, the next service order number should be incremented by one	After saving, a new service order number is incremented by one	Works as intended
18	Press back	User should be taken to the job sheet database window	User is taken to the job sheet database window	Works as intended

« Job Sheet Database

Add New Job Sheet Save Edited Job Sheet Delete Selected Job Sheet Print Selected Job Sheet

Service Order No.	Customer ID	Service Notes	Job Items
SO/2020/0001	P0001	Might need to change engine oil	Service Vehicle
SO/2020/0002	C0002	Customer wants to pick the car up today	Wash & Wax
SO/2020/0003	C0003	Waiting for customer to confirm service	No job items recorded

Log Out Generate Bill

A database of all saved Job Sheets can be viewed, edited or deleted by the service advisor.

#	Test Case	Expected Result	Actual Result	Status
19	Click add new job sheet	User should be taken to the add job screen	User is taken to the add job screen	Works as intended



20	Change a service order number, customer ID, service note or job item	The content in the cell should change	The content in the cell changes	Works as intended
21	Click save edited job sheet	Current data on the table should save into the job sheet database	Current data on the table saves into the job sheet database	Works as intended
22	Log out	User should be logged out and taken to login screen	User is logged out and taken to login screen	Works as intended

## Record Job Items

The screenshot displays a web application interface for a 'Job Sheet'. At the top left is a back arrow icon. The title 'Job Sheet' is centered at the top. Below the title, the 'Service Order Number: SO/2020/0004' is displayed. The interface is divided into two main sections. On the left, there is a table titled 'Job Items' with a dark header. The table contains three rows of job items: 'Wash & Wax', 'Change Engine Oil', and 'Replace Spark Plug'. Below the table is a 'New Job Item' input field. On the right, there is a 'Customer Number' field with the value 'P0003'. Below that is a 'Service Notes' text area containing the text 'Please put on two coatings of wax'. At the bottom right, there are three buttons: 'Add Job Item', 'Delete Job Item', and 'Save Job Sheet'.

The Service Advisor can add 0..\* number of Job Items to a Job Sheet. Job Items let a mechanic know what needs to be done.

#	Test Case	Expected Result	Actual Result	Status
23	Save job sheet with all fields filled and at least one job item	Job sheet should save with a success message. Database should have the filled fields and job item	Job sheet saves with a success message. Database has the filled fields and job item	Works as intended
24	Save job sheet with all fields filled and multiple job items	Job sheet should save with a success message. Database should have the filled fields and job items	Job sheet saves with a success message. Database has the filled fields and job items	Works as intended
25	Save job sheet with all fields filled and no job items	Job sheet should save with a success message. Database should have the filled fields and job items should say no job items recorded	Job sheet saves with a success message. Database has the filled fields and job items say no job items recorded	Works as intended
26	Save job sheet with one or more job items but without filling customer or service note field	Job sheet should not save and a error message should display: make sure all fields are filled	Job sheet does not save and a error message displays: make sure all fields are filled	Works as intended
27	Edit a saved job item	The text in the selected job item should be editable and reflected upon saving a the sheet	The text in the selected job item changes and these changes are saved to the database	Works as intended
28	Delete a saved job item	Selected job item should delete	Selected job item is removed	Works as intended

# Print Job Sheet

[illegible]

Since the project is a prototype, I have not implemented an actual print function. However, the print button will simulate a print.

#	Test Case	Expected Result	Actual Result	Status
29	Pressing print selected job sheet	Pressing print selected job sheet should simulate a print by displaying a success message	Pressing print selected job sheet displays a success message	Works as intended

## View Job Sheet & Job Items

[illegible]

Mechanics are able to view the Job Sheets and Job Items on the database view. They don't have the same rights as a service advisor so they can only view and then log a mechanic log for one the job sheets on the table.

#	Test Case	Expected Result	Actual Result	Status
30	Sign in as a mechanic	User should be able to view the current list of job sheets along with customer ID, service notes and all job items	User is able to view the current list of job sheets along with customer ID, service notes and all job items	Works as intended
31	Press log mechanic for job sheet	User should be taken to a new screen to log mechanic details, spares and labour items	User is taken to a new screen to log mechanic details, spares and labour items	Works as intended
32	Press log out	User should be logged out and taken to login screen	User is logged out and taken to login screen	Works as intended

# Update Job Items

Includes: recording mechanic details

Extends: recording spares and recording labour

«

Mechanic Log

Service Order No.

SO/2020/0000

Mechanic ID

Staff ID

Mechanic Name

Full Name

Charge Rate

MVR

Quantity	Spare Number	Spare Name	Price	Discount %
No content in table				

Quantity

Spare Number

Spare Name

Price

Discount%

Log Spare

Delete Spare

Work Logged	Time Logged (mins)
No content in table	

Labour

Time

Log Work

Delete Work

Save Log

Mechanic is able to reference a service order and then log his personal details into the service order and if required he can also include spare and labour.

#	Test Case	Expected Result	Actual Result	Status
33	Save mechanic log with the service order, mechanic name, mechanic ID and charge rate fields filled and no spare or labour items	Mechanic log should save even with no spares or labour items logged	Mechanic log saves even with no spares or labour items logged	Works as intended
34	Save mechanic log with some of the mechanic details filled and no spare or labour items	Mechanic log should not save without all the mechanic details and an error message should be displayed	Mechanic log does not save without all the mechanic details and an error message displays	Works as intended

35	Save mechanic log with none of the fields filled and no spare or labour items	Mechanic log should not save without all the mechanic details and an error message should be displayed	Mechanic log does not save without all the mechanic details and an error message displays	Works as intended
36	Save mechanic log with all the mechanic detail fields filled and one spare item	Mechanic log should save even with one spare and no labour items logged	Mechanic log saves even with one spare and no labour items logged	Works as intended
37	Save mechanic log with all the mechanic detail fields filled and one labour item	Mechanic log should save even with no spare items and one labour item logged	Mechanic log saves even with no spare items and one labour item logged	Works as intended
38	Save mechanic log with all the mechanic detail fields filled and multiple spare items	Mechanic log should save with multiple spare items	Mechanic log saves with multiple spare items	Works as intended
39	Save mechanic log with all the mechanic detail fields filled and multiple labour items	Mechanic log should save with multiple labour items	Mechanic log saves with multiple labour items	Works as intended
40	Log spare with alpha characters in quantity, price or discount	Quantity, price and discount should only take in numeric characters so this should trigger an error	Quantity, price and discount only takes in numeric characters so an error message displays	Works as intended
41	Log spare with numeric characters in quantity, price and discount	Spare should log successfully since these fields only take in numeric values	Spare logged successfully since these fields only take in numeric values	Works as intended
42	Log labour with alpha characters in time	Time should only take in numeric characters so this should trigger an error	Time only takes in numeric characters so an error message displayed	Works as intended

43	Log labour with numeric characters in time	Labour should log successfully since this field only takes in a numeric value	Spare logs successfully since these fields only take in numeric values	Works as intended
44	Edit logged spare	Spare should be editable from the GUI and the changes should reflect in the final database when the log is saved	Spare is editable from the GUI and the changes are reflected in the final database when the log is saved	Works as intended
45	Edit logged labour	Labour should be editable from the GUI and the changes should reflect in the final database when the log is saved	Labour is editable from the GUI and the changes are reflected in the final database when the log is saved	Works as intended
46	Delete logged spare	Selected spare should be removed from the table and database	Selected spare is removed from the table and database	Works as intended
47	Delete logged labour	Selected labour should be removed from the table and database	Selected labour is removed from the table and database	Works as intended
48	Save log	All the mechanic details, logged spares and logged labour should save in the database	All the mechanic details, logged spares and logged labour is saved in the database	Works as intended
49	Press back	User should be taken to the job sheet database window	User is taken to the job sheet database window	Works as intended
50	Log a new mechanic log	No values from the previous log should appear on the spare or labour table and all text fields should be clear	No values from the previous log appear on the spare or labour table and all text fields are clear	Works as intended

## Print Bill

«

Billing

Bill Number	INV/2020/0006	Service Order No.	SO/2020/001	Vehicle Model	Batmobile
Bill Date	05-08-2020	Mechanic Name	Ahmed Mohamed	Registration No.	P6447
Customer ID	P0001	Mechanic ID	M0003	Registration Date	01/01/2001
Customer Name	Batman	Hourly Rate	300.00 MVR	Chassis	123456789
Customer Contact	777-2866	Time Logged	44 Minutes	Service Notes	Patch tyre if possible
				Job Item(s)	Replace punctured tyre

Labour	Minutes Logged	Hourly Rate	#	Details	Price
Replaced Tyre	44	300.00 MVR	1	Total Labour Cost	220.00 MVR
	Labour Cost	220.00 MVR	2	Total Spare Cost	490.00 MVR
				<b>Subtotal</b>	<b>710.00 MVR</b>
				<b>GST 6%</b>	<b>42.60 MVR</b>
				<b>Total</b>	<b>752.60 MVR</b>

Qty	Spare Number	Spare Name	Price	Discount
1	SGDHN	Tyre	500.00 MVR	2%
			Spare Cost	490.00 MVR

Printed successfully

Print Bill

Once a job is completed, the service advisor can print a bill for a job sheet. However since this is a prototype, the service advisor isn't picking a particular job sheet to print the bill for. However, the bill printer is taking the actual data passed into the mechanic log database and customer database, albeit it being only the first line on the database that the system is able to scan and generate a bill for. Future improvements would include the ability to choose the job sheet.

#	Test Case	Expected Result	Actual Result	Status
51	Pressing generate bill to create a new bill	It should trigger a new bill being created by taking data from the first line of mechanic and customer database and it should display the current date	new bill is created by taking the data from the first line of mechanic and customer database and it displays the current date	Works as intended
52	Press print bill	Pressing print bill should simulate a print by displaying a success message	Pressing print bill displays a success message	Works as intended



53	Press back	User should be taken to the job sheet database window	User is taken to the job sheet database window	Works as intended
54	Re-click generate bill	New bill should've been generated with the bill number incremented by 1	New bill is generated with the bill number incremented by 1	Works as intended

## Upload Data

«

### Staff Database

Permission Level	User ID	Password
001	MAS0001	password1
002	MAS0002	password2
003	MAS0003	password3
004	MAS0004	password4

The system administrator is able to populate the initial users that are able to log in to the system. He can also add, edit and delete these users.

#	Test Case	Expected Result	Actual Result	Status
55	Click edit user data from the system administrator dashboard	User should be taken to the screen where they see the current system users	User is taken to the screen where they see the current system users	Works as intended

56	Add new staff with all fields filled	Staff should be added into the staff database	Staff is added into the staff database	Works as intended
57	Add new staff with some fields filled	Staff should not be added into the staff database and an error message should display: fill all fields	Staff is not added into the staff database and an error message displays: fill all fields	Works as intended
58	Add new staff with none of the fields filled	Staff should not be added into the staff database and an error message should display: fill all fields	Staff is not added into the staff database and an error message displays: fill all fields	Works as intended
59	Add new staff with random permission	Staff should not be added into the staff database and an error message should display: permission should be 001, 002, 003 or 004	Staff is not added into the staff database and an error message displays: permission should be 001, 002, 003 or 004	Works as intended
60	Add new staff with correct permission	Staff should be added into the staff database with the specified permission	Staff is added into the staff database with the specified permission	Works as intended
61	Delete single-selected staff	Staff should be removed from the staff database	Staff is removed from the staff database	Works as intended
62	Delete multiple-selected staff	All selected staff should be removed from the staff database	All selected staff is removed from the staff database	Works as intended

63	Edit staff	Staff should be editable from the GUI and all changed must reflect in the database after save is pressed	Staff is editable from the GUI and all changes are reflected in the database after save is pressed	Works as intended
64	Click save	Any changes should be reflected in the database after save is pressed	All changes are reflected in the database after save is pressed	Works as intended
65	Press back	User should be taken to the system administrator dashboard	User is taken to the system administrator dashboard	Works as intended

## Conduct Market Review

Includes: Twitter API

The system administrator is able to conduct market research directly from the system using the twitter connect feature.

#	Test Case	Expected Result	Actual Result	Status
66	Pressing check twitter from dashboard	User should be taken to the twitter connect screen	User is taken to the twitter connect screen	Works as intended
67	Press search after typing a term	The view port should display results for the term that was searched for	The view port displays results for the term that was searched for	Works as intended
68	Press search without a search term	The view port should not display results and an error message should display: type a query before you press search	The view port does not display results and an error message displays: type a query before you press search	Works as intended
69	Press display feed	View port should display the current twitter feed of the twitter account connected through the API to the system	View port displays the current twitter feed of the twitter account connected through the API to the system	Works as intended
70	Press back	User should be taken to the system administrator dashboard	User is taken to the system administrator dashboard	Works as intended

## Viewing Customers

[illegible]

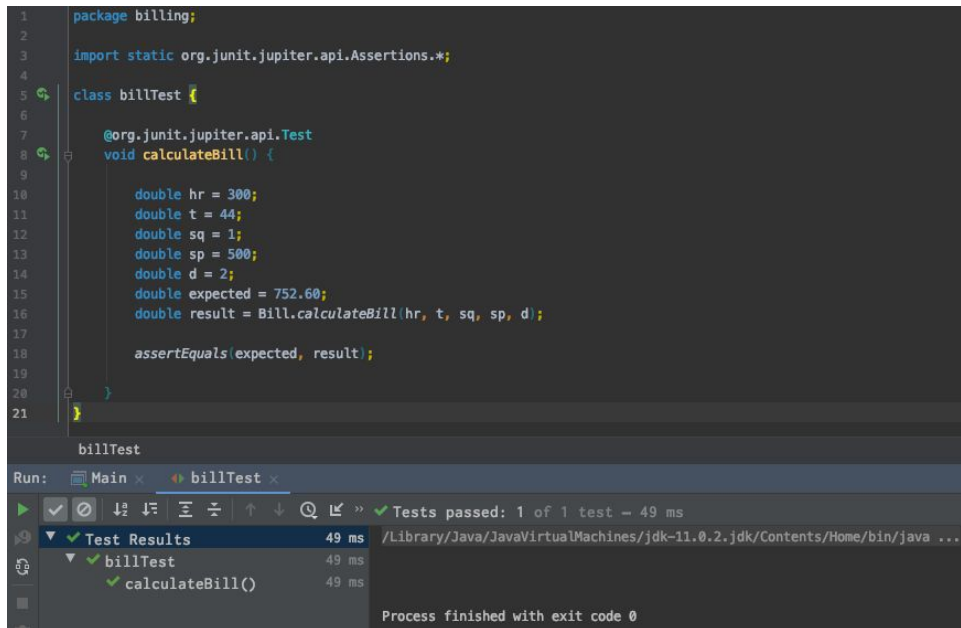
Data entry staff & service advisors are able to view the database of private and corporate customers. The information collected for both customer types vary.

#	Test Case	Expected Result	Actual Result	Status
71	Click view private customers from either data entry or service advisor dashboard	Data entry staff should see the buttons add, save, delete and log out apart from the database. Service advisors should only see logout and the database	Data entry staff can see the buttons add, save, delete and log out apart from the database. Service advisors only see logout and the database	Works as intended
72	Click view private customers from either data entry or service advisor dashboard	Data entry staff should see the buttons add, save, delete and log out apart from the database. Service advisors should only see logout and the database	Data entry staff can see the buttons add, save, delete and log out apart from the database. Service advisors only see logout and the database	Works as intended
73	While signed in as data entry user, click add new customer	User should be taken to the add customer screen	User is taken to the add customer screen	Works as intended

74	Change a detail on the private customer database using the GUI	The content in the cell should change	The content in the cell changes	Works as intended
75	Change a detail on the corporate customer database using the GUI	The content in the cell should change	The content in the cell changes	Works as intended
76	Click save edited customer on the private customer database	Current data on the table should save into the private customer database	Current data on the table saves into the private customer database	Works as intended
77	Click save edited customer on the corporate customer database	Current data on the table should save into the corporate customer database	Current data on the table saves into the corporate customer database	Works as intended
78	Press back from the private customer database	User should be taken to the relevant dashboard depending on whether they are data entry staff or a service advisor staff	User is taken to the relevant dashboard depending on whether they are data entry staff or a service advisor staff	Works as intended
79	Press back from the corporate customer database	User should be taken to the relevant dashboard depending on whether they are data entry staff or a service advisor staff	User is taken to the relevant dashboard depending on whether they are data entry staff or a service advisor staff	Works as intended
80	Log out from the private customer database	User should be logged out and taken to login screen	User is logged out and taken to login screen	Works as intended
81	Log out from the corporate customer database	User should be logged out and taken to login screen	User is logged out and taken to login screen	Works as intended

# JUnit Testing

Part of the assignment included running a JUnit test on a function. I have chosen billing as the function for me to run my test on.



```
1 package billing;
2
3 import static org.junit.jupiter.api.Assertions.*;
4
5 class billTest {
6
7     @org.junit.jupiter.api.Test
8     void calculateBill() {
9
10         double hr = 300;
11         double t = 44;
12         double sq = 1;
13         double sp = 500;
14         double d = 2;
15         double expected = 752.60;
16         double result = Bill.calculateBill(hr, t, sq, sp, d);
17
18         assertEquals(expected, result);
19     }
20 }
21
```

billTest

Run: Main x billTest x

Tests passed: 1 of 1 test - 49 ms

Test Results	49 ms	/Library/Java/JavaVirtualMachines/jdk-11.0.2.jdk/Contents/Home/bin/java ...
billTest	49 ms	
calculateBill()	49 ms	

Process finished with exit code 0

The billing function which takes in the hourly rate (hr), time in minutes (t), spare quantity (sq), spare price (sp) and discount percentage (d) passes the test.

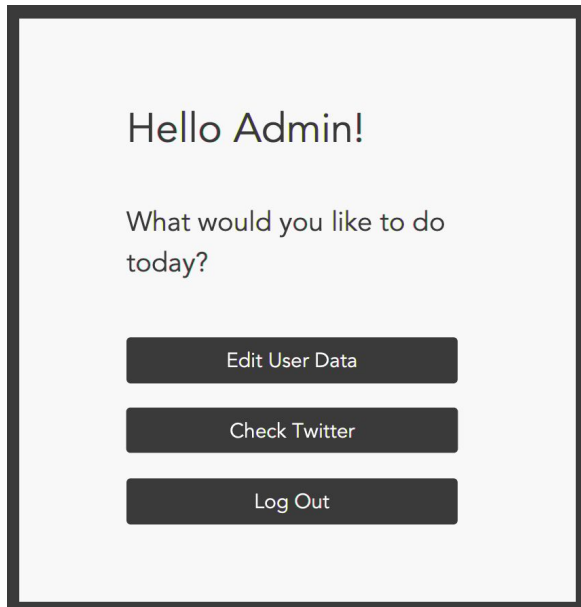
```
public static double calculateBill(double hr, double t, double sq, double sp, double d) {  
    labourCost = (hr / 60) * t;  
    spare = sq * sp;  
    discountedSpare = (spare - (spare * d * 0.01));  
    subtotal = labourCost + discountedSpare;  
    gst = subtotal * 0.06;  
    return subtotal + gst;  
}
```

The function calculateBill() scans a database for the required values in order to process the information and determine the bill total.

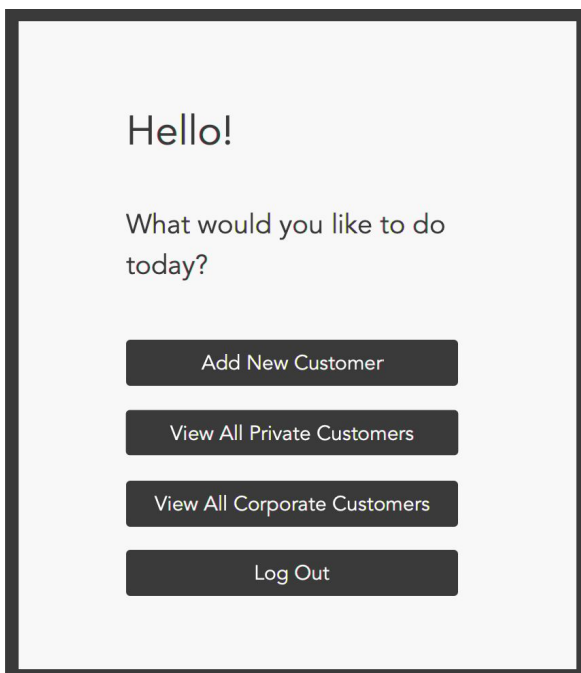
# Appendix

## Dashboards

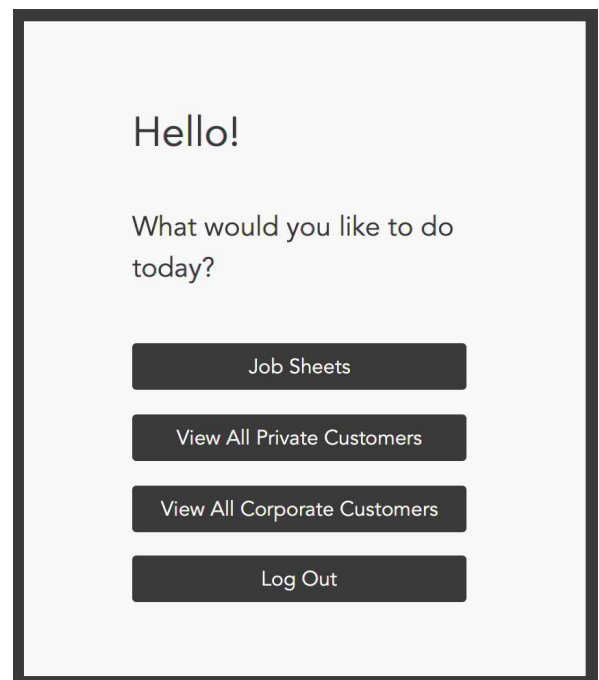
Mechanic's are the only users that do not have a specialised dashboard since the Job Sheet view suffices as an initial dashboard for them.



System Administrator



Data Entry Staff



Service Advisor



# Use Case Diagram

