Assignment Guidance and Front Sheet

This sheet is to be populated by the Module Tutor, checked by the Programme Team, and uploaded to Moodle for students to fill in their ID and submit with their assessment.

Student ID or IDs for group work	U2136249

Module Title & Code	*WM240, Cyber Context of Software Engineering*
Module Owner	*Hassan Raza*
Module Tutor	*Hassan Raza*
Module Marker	*Hassan Raza*
Assesment type	*Coursework*
Date Set	*cw1 – 27-1-23*
Submission Date (excluding extensions)	*cw1 – 10-3-23*
Marks return date (excluding extensions)	*cw1 - 11-04-2023*
Weighting of mark	*cw1 - 50%*

Assessment Detail	*See individual specifications*
Additional details	*See individual specifications*
Module learning outcomes (numbered)	*1) Apply cyber security good practice to various phases of the software engineering lifecycle* *2) Critically reflect on the development of a software project* *3) Demonstrate the understanding and application of relevant software development frameworks to a given software development scenario*

Learning outcomes assessed in this assessment (numbered)	*1, 2, 3: cw1*
Marking guidelines	*See individual specifications*
Submission guidance	*See individual specifications*
Academic Guidance	*support in timetable lab sessions*
Resubmission details	*A combination of CW1 and CW2 with a new case study i.e., paras 2, 3, 4 in the Introduction will be replaced by a new case study*
Late submission details	If work is submitted late, penalties will be applied at the rate of **5 marks per University working day** after the due date, up to a **maximum of 10 working days** late. After this period the mark for the work will be reduced to 0 (which is the maximum penalty). "Late" means **after the submission deadline time as well as the date** – work submitted after the given time even on the same day is counted as 1 day late.

Global Finance Digital Platform

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Introduction

Global finance automobile is a digital dealership management platform that facilitates clients to purchase or finance new and current automobiles owned by Global Finance. The platform has an intuitive interface design for both agency owners and its customers. It is comprised of three different modules: vehicle listing, inventory and client management.

The objective of digital platform for global finance is to manage and track the loan applications, sales and manage inventory of automobiles, so that the dealership avoids manual work for managing and tracking all of the information which is time-consuming and inefficient for the clients who are trying to get a loan and the agent who is managing the applications. This platform tackles these problems by automating the manual work thus reducing work overload and errors while maintaining efficiency.

Business Requirements & System Features

The first step into building the digital platform for global finance is to outline what are the business requirements and system features that need to be implemented to meet the original expectations. This report divides the requirements into three parts: domain, functional and non-functional requirements.

Domain Requirements

Table 1 showcases the domain requirements. These are high-level goals needed to meet the business needs, listed below:

#	Title	Description	Priority
1.	Vehicle Listing	Allow clients to browse a selection of cars, so they can buy them.	Must Have
2.	Inventory Management	Allow agent to manage current warehouse inventory to display available vehicles. Including sorting by; model, year, colour, and price.	Must Have
3.	Client Management	Enable administration capability for agents to manage customer data, such as contact details, purchase history and finance applications and service records.	Must Have

Table 1 - Domain Requirements for Global Finance Digital Platform

Functional Requirements

Table 2 shows the functional requirements which define what the global financial digital platform must be able to do, what its features and functions should look like:

#	Domain	Requirement	Description	Priority
1.	Vehicle Listing	Display available cars	Display a list of available cars with relevant information.	Must Have
2.	Vehicle Listing	Vehicle detail Page	Create a dedicated page for each car to include detailed information about the vehicle such as multiple photos, features descriptions and financing options.	Must Have
3.	Vehicle Listing	Filter and sorting for available cars	Integrate search filter feature to allow clients to narrow their search, by criteria such as; model, year, milage, price.	Should Have
4.	Client Management	Client portal	Create a custom portal where clients can upload personal information and	Must Have

			documents to facilitate the financing of a vehicle.	
5.	Inventory Management	Internal Administration portal	Create an admin portal where agents can manage vehicle inventory and see current client financing application along with supporting documents.	Must have
6.	Client Management	Login page	Create a login page to enable clients and agents to access their custom portal	Must have
7.	Vehicle Listing	Help and Support	The website should have help and support features, such as FAQs, live chat, or a contact form, to aid users in case they encounter any issues.	Optional

Table 2 - Functional Requirements for Global Finance Digital Platform

Non-Functional Requirements

Table 3 lists all the non-functional requirements. These describe the general properties of the system, listed below:

#.	***Title***	***Category***	***Description***	***Priority***
1.	Interface design	Usability	The platform must have an intuitive user interface, to allow clients to find what they are looking for.	Must have
2.	Navigation and Accessibility	Usability	The platform should have clear and consistent navigation with menus and links easy to understand and use.	Should have
3.	Responsive design	Usability	The platform should be designed with a responsive layout that can adapt to different screen sizes, devices, and users with special needs.	Should Have
4.	Responsive optimisation	Performance	The platform design and code should be optimised to minimise file sizes and reduce server load time using caching mechanisms and performance measurement for monitoring.	Should Have
5.	Secure Protocols for client data	Security	The platform must implement HTTPs and encryption algorithms such as AES to protect client data both in transit and at rest.	Must have
6.	Secure Authentication	Security	The platform must implement authentication mechanisms to ensure only authorised user have access to data, using features such as multi-factor authentication, password policies and database role management.	Must Have
7.	Recovery plan	Security	The platform should implement regular backups and recovery mechanisms to ensure client data is not lost in case of security breach or hardware failure.	Should Have
8.	Traffic Handling	Scalability	The platform should use caching techniques to store frequently accessed data such as images to reduce load on server to handle higher traffic.	Should Have

Table 3 - Non-Functional Requirements for Global Finance Digital Platform

Proposed Application Architecture

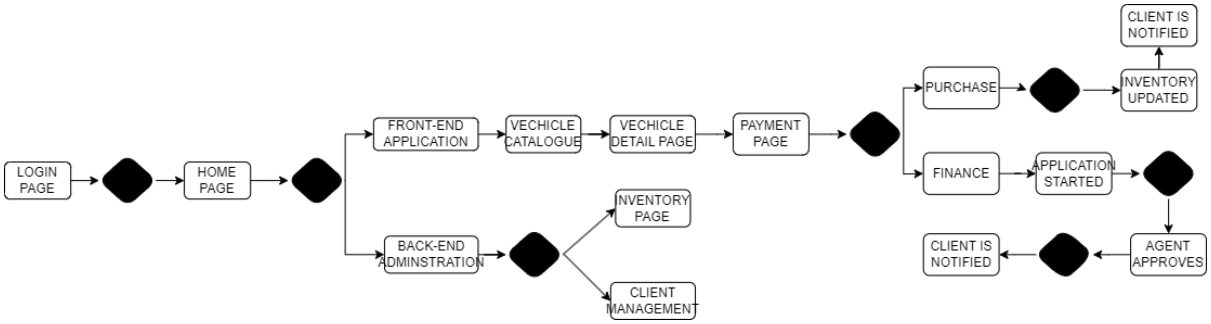


Figure 1 - Global Finance Application Structure

To develop the global finance digital platform, the project was divided into three different modules: vehicle listing, client, and inventory management accordingly. Using the agile software development methodology, these modules were anatomised into three different sprints corresponding to one sprint per module. Each sprint was set a milestone deadline to enable a successful development for each module without overlapping with the development with other modules. Tasks were categorised as To-Do, Doing and Done and placed into a kanban board to keep track of the progress of the development of the platform when implementing features throughout each sprint.

The aim of the software modularisation process is to partition the software system into subsystems to provide an abstract view of the architecture of the web application showcase in Figure 1. This modular approach solution helps in resolving bugs faster and maximises the pace of development since these can be developed and tested separately.

User journey

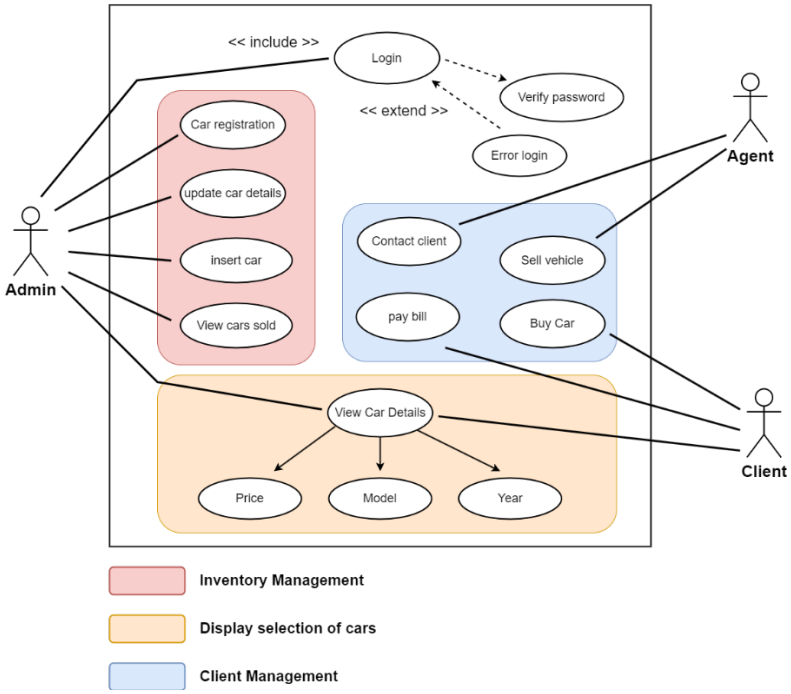


Figure 2 - User Case Diagram

In figure 2, illustrates the user journey of the global finance digital platform. In this system, the customer is able to browse through a catalogue of selected vehicles administrated by the agents.

Customers can search and filter by model, price and make year to find a suitable vehicle according to their needs. To purchase a vehicle the client has two options; pay the vehicle in full or finance it. In the first scenario the client would need to fill up a form with their personal details which is available to them after they click the purchase button display in the detail page of the vehicle they want to buy. In such case, the filled form will be saved in the backend database and sent to the closest available dealer in their area. In the second scenario the client would have to sign up an account with global finance to start a loan application by uploading supporting documents and personal details, once that is done, the system will take those records and notify an agent to review and approve their application.

To manage the backend of the application, this system enables agent administrator to authenticate via a log in page with their given username and password. To increase security multi-factor authentication has been enabled to administer the back-end usability of web application. Admins will receive a one-time code via their registered email to verify the identity of the agent before gaining access to the system. Once logged on the dealer can post new vehicles that need to be sold, manage customer data, such as contact details, purchase history and finance applications and service records.

Development Process

1. Vehicle sales

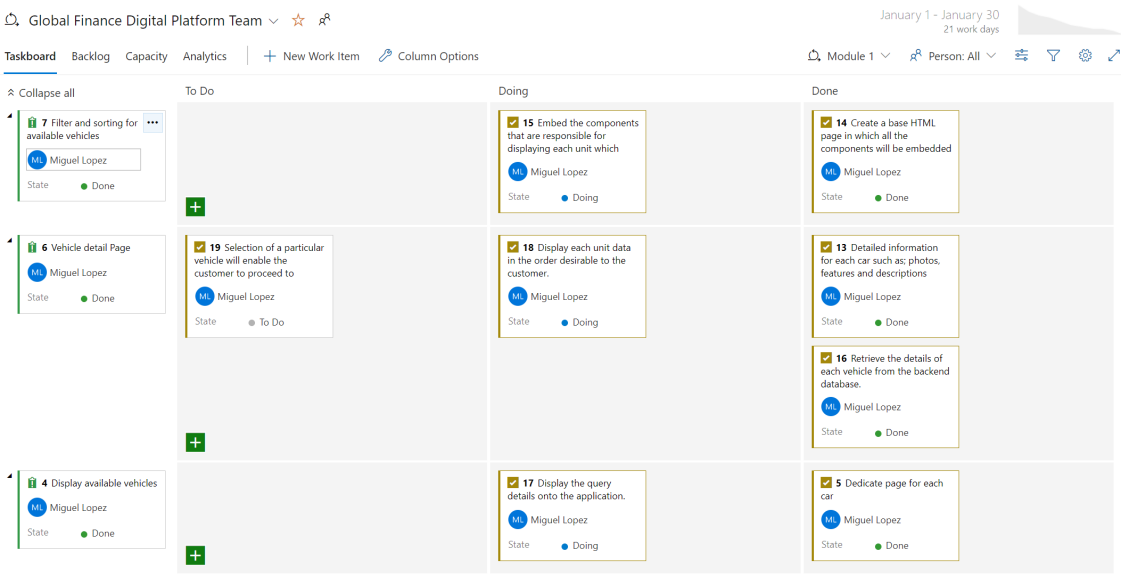


Figure 2 - Vehicle Listing Module - Sprint 1

Figure 2 displays the first sprint of the development process of the web application taken to develop all the features of the module. This module enables the management of vehicle details containing information such as model of car, price and milage that are currently available. The booking feature includes personal details of the client and details of the automobile the customers want to buy. Customers can browse through a catalogue of selected automobiles, once a car is selected the module will redirect the client to the complete specification of the chosen car, listing all of its features and price, this enables the user to search and filter for their needs and can book the vehicle by initiating a purchase or a finance application, that information will then be stored in the back-end database for the agent to review and approve. A confirmation email will be sent to both the client confirming the transaction and to the agent notifying that a client has made a request to buy one of their automobiles.

2. Inventory Management

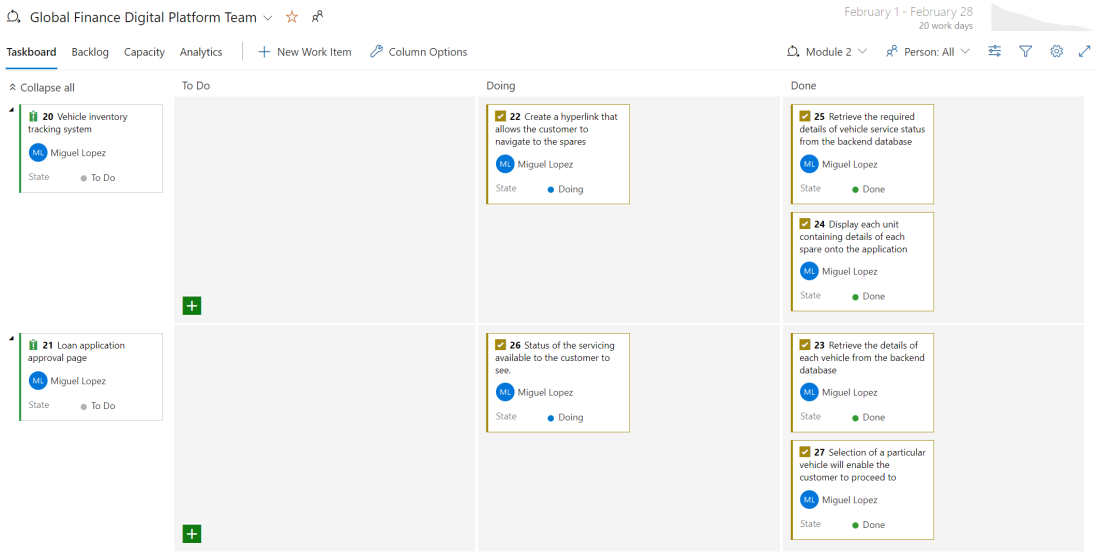


Figure 3 - Inventory Management Module - Sprint 2

Figure 3 shows the second sprint into the development of the web application. The inventory module allows agents to maintain and track information regarding the sales of the vehicles and tracking of their warehouse inventory. Once an agent is logged in into the system they are able to administer automobiles and client information via the admin portal. The customer feature section of the portal allows agents to see and manage client information such as personal information including client's name, email address and personal mobile phone number. Agents can also add or remove existing vehicles listed in the main page, in this section of the portal the agents can add either electric or gas type vehicles, update their promo pictures and features such as milage, price, engine type model year.

3. Client Management

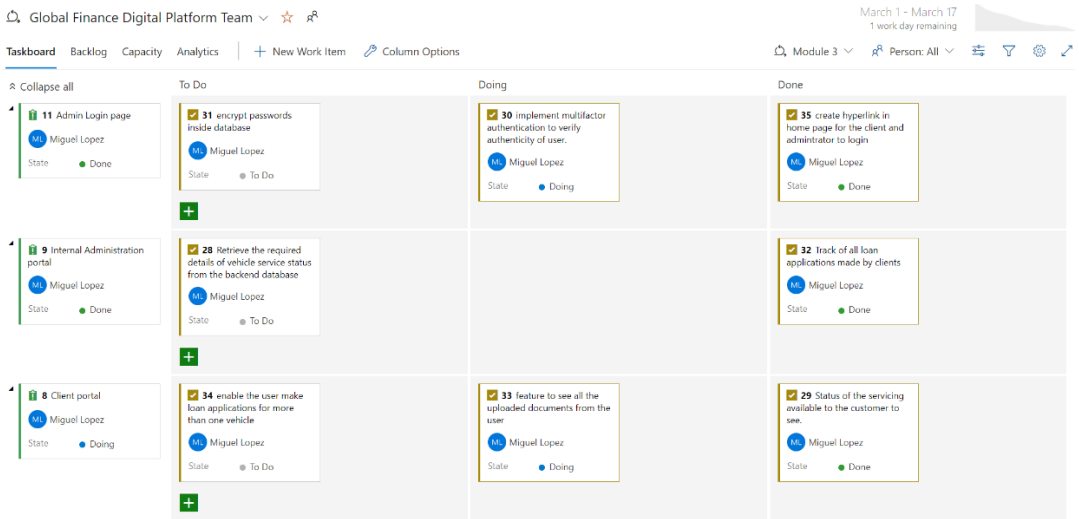


Figure 4 - Client Management Module - Sprint 3

Figure 4, shows the final sprit that of the development of the digital platform. In this module the administrator agent is able to track all loan applications made my clients as well as service records

such as repairs or upgrades requests made by clients. Clients can also access their personalised portal once they are signed up with global finance when starting a new loan application to purchase a vehicle. When a customer submits a new loan application they will be sent an email stating what type of documentation they need to upload to the platform to continue with the process. Once that is done, the closest agent to the client is sent a notification stating that a customer has made a new request to purchase a vehicle with them. Inside the client portal customers can submit these documents as well as update their personal details. The tracking feature inside the client portal allows customers and agents to keep track of the process of the loan application process.

Conclusion

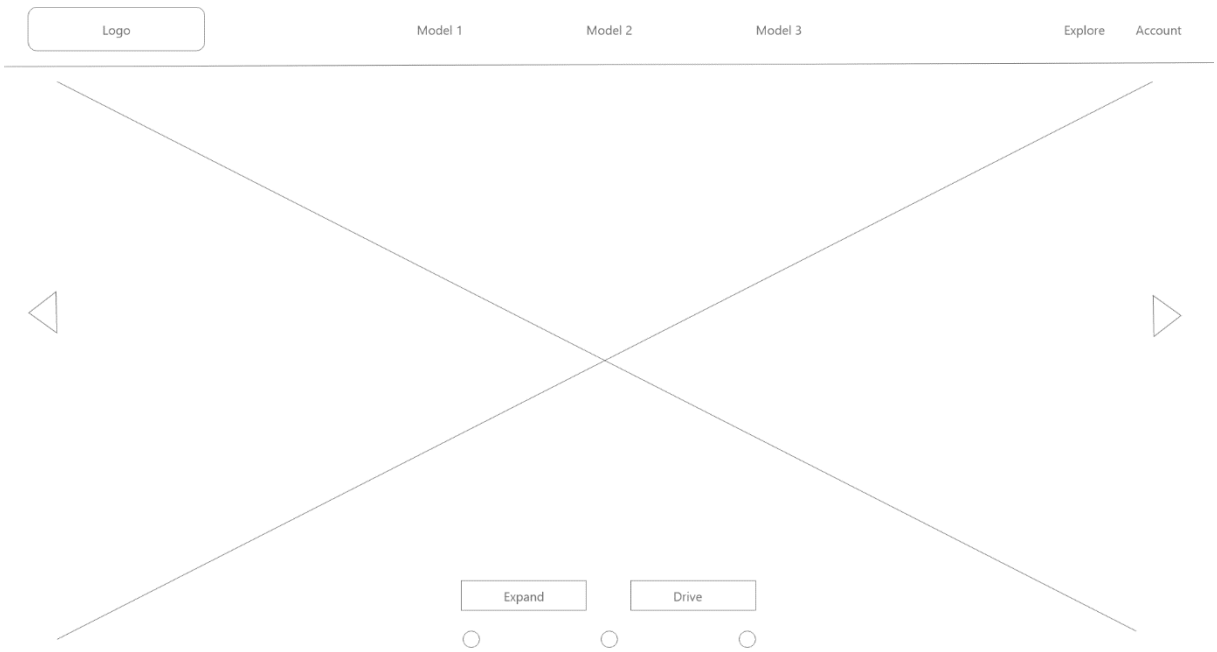
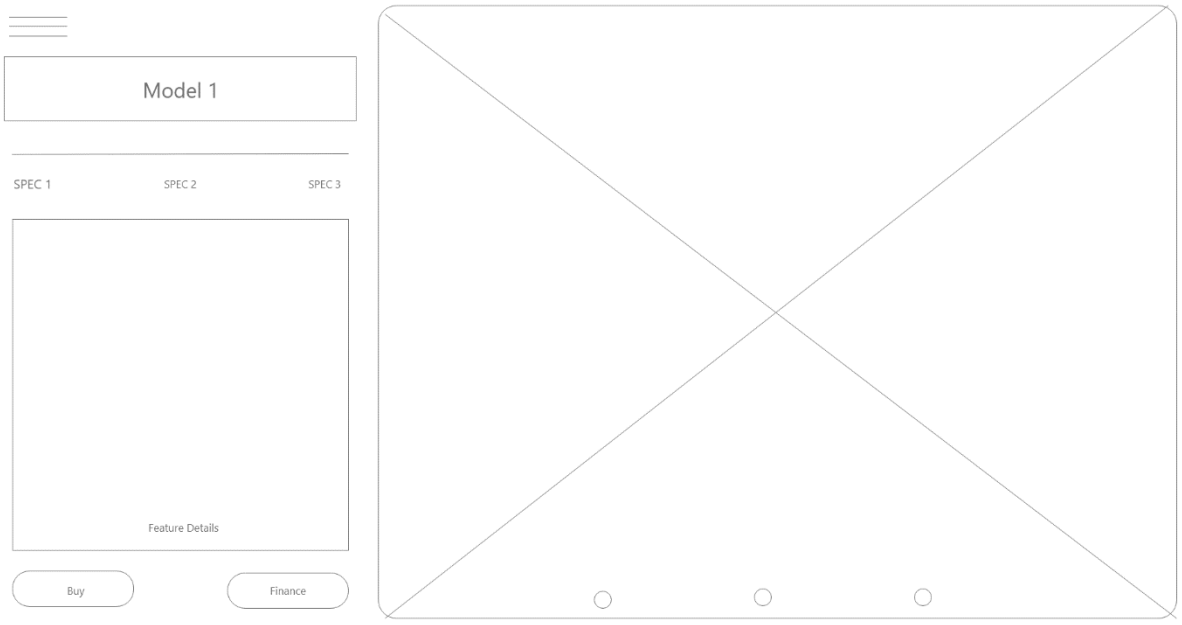
In conclusion, the prototype developed for the Global Finance Digital platform meets the high-level business requirements outlined in the project scope. The system features have been identified, and the software architecture has been designed to provide an intuitive user interface, efficient navigation and responsive design to meet the usability requirements. The system architecture has been structured into three different modules – vehicle listing, client management and inventory management – to provide a modular approach that enhances bug fixing, fasten development and testing capabilities.

The functional requirements of the platform, such as vehicle listing, vehicle detail page, filter and sorting of available cars, client portal and internal administration portal, have been implemented to enable clients to purchase and fiancé new or current automobiles efficiently. The platform also includes help and support features such as FAQs, and a contact form to assist users in case of any issues. Furthermore, the non-functional requirements such as secure protocols for client data, secure authentication, responsive optimisation has been integrated to protect client data, ensuring user access control and minimise server load tome. The platform also uses caching techniques to store frequently accessed data such as images to reduce server load time and enhance scalability.

In conclusion, the prototype provides clients with an efficient way to purchase or finance new or current automobiles while enhancing agent capabilities in managing inventory and client data. The modular approach, intuitive interface, responsive design and security features implemented on the platform demonstrate its potential in enhancing user experience and scalability.

Appendix A

Design Sketching

Description	Mockup
Landing page	
Vehicle page	

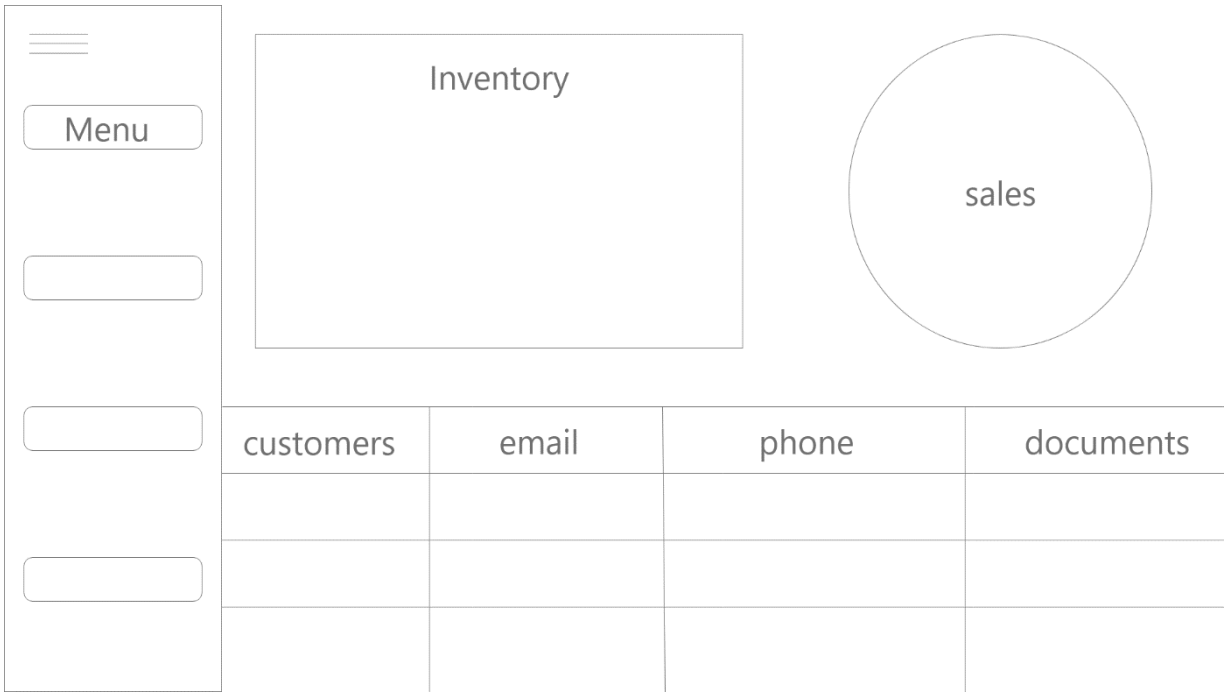
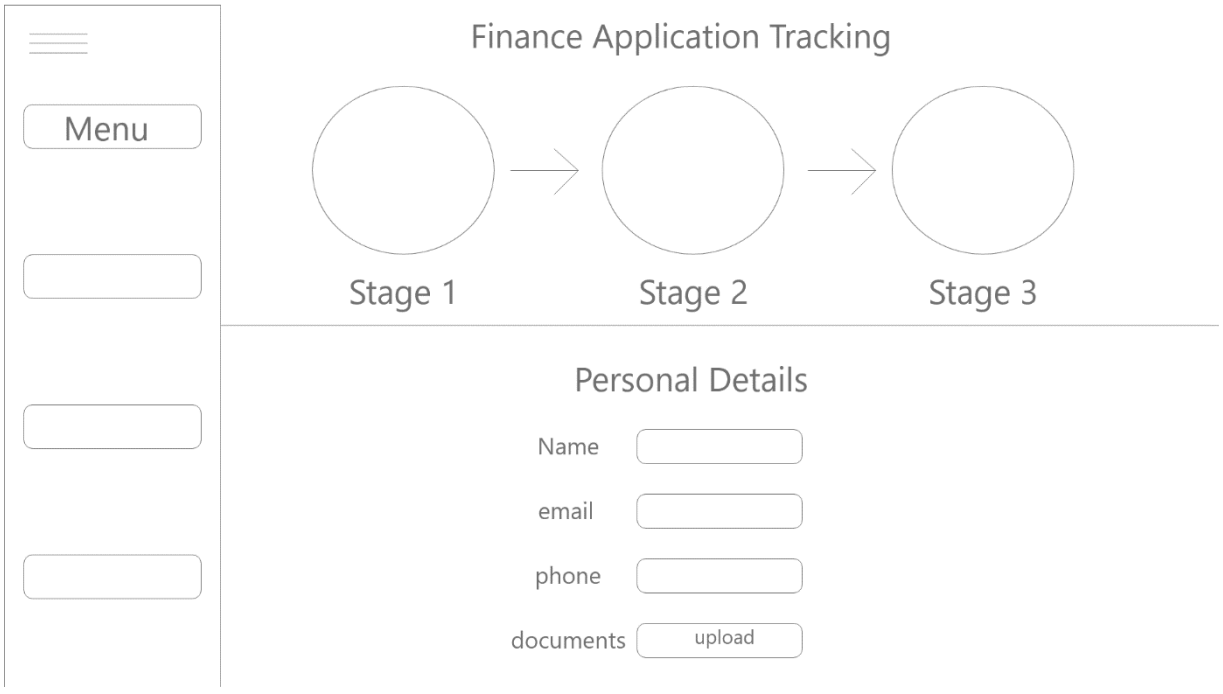
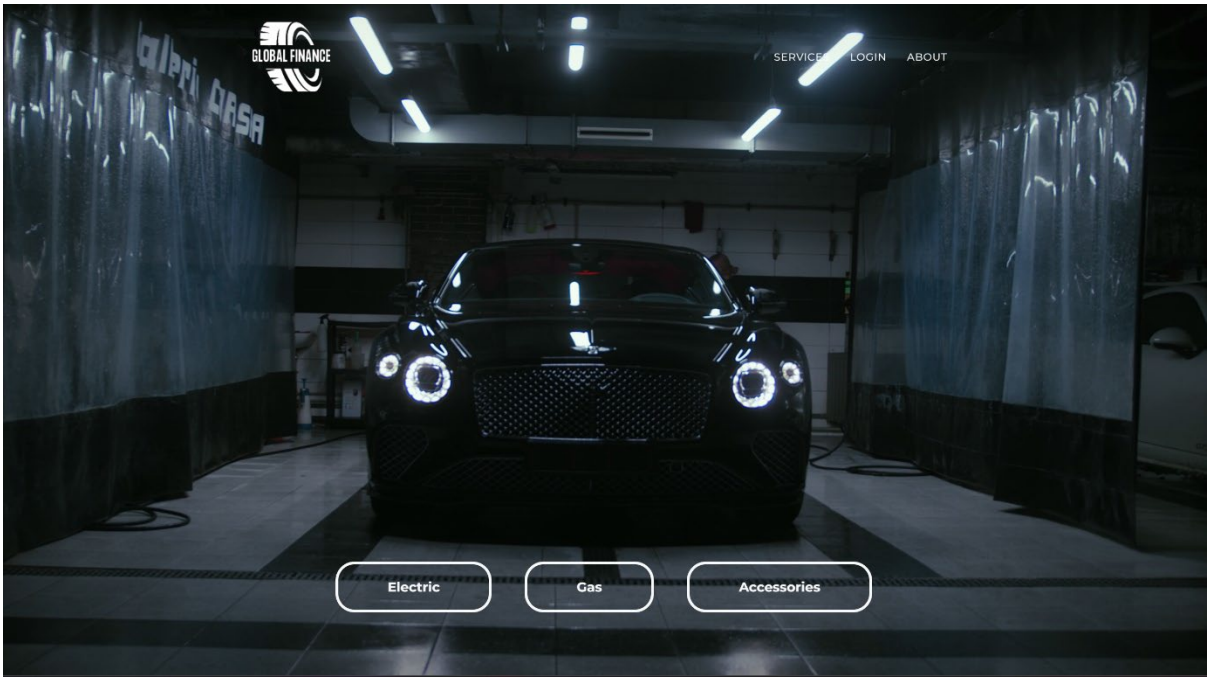
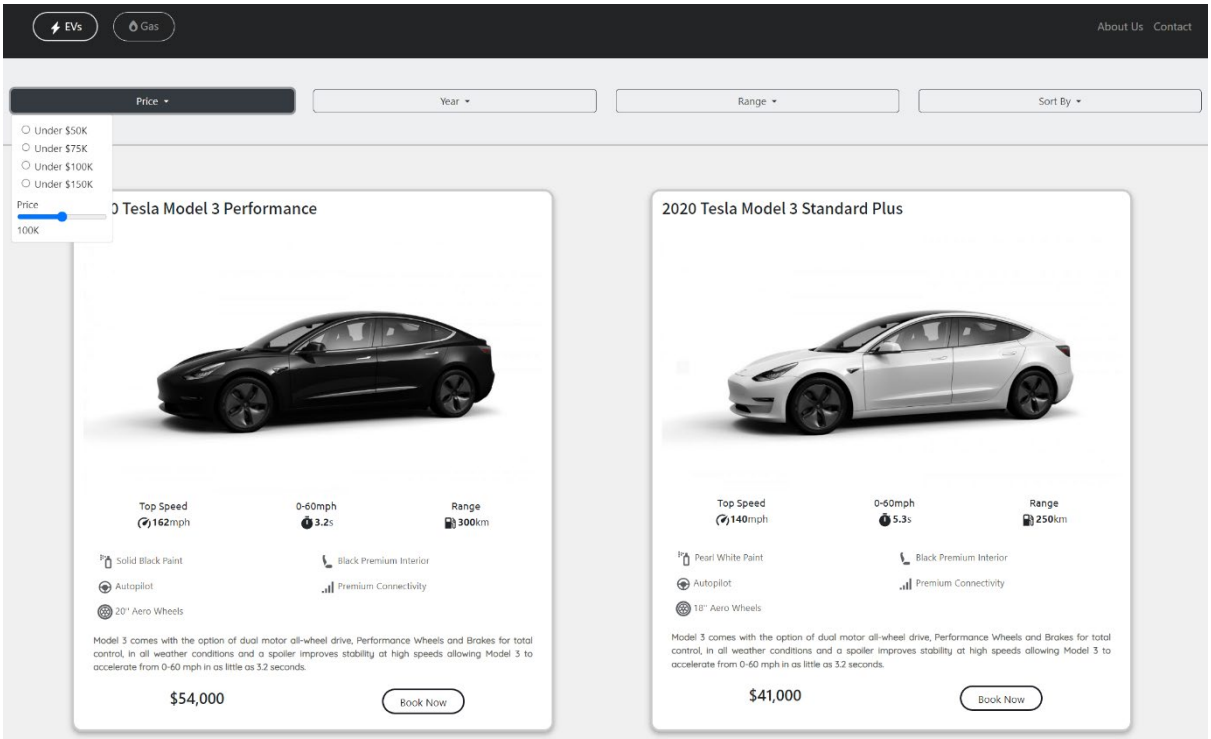
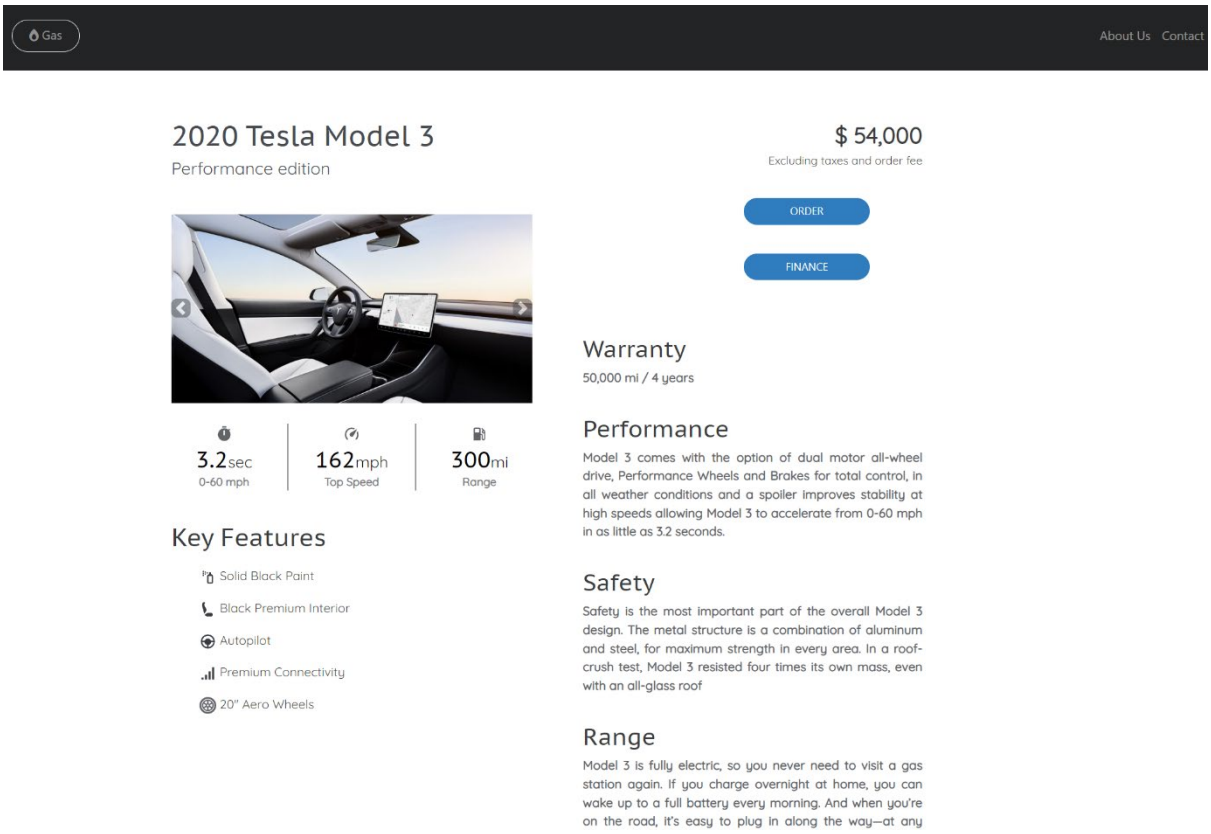
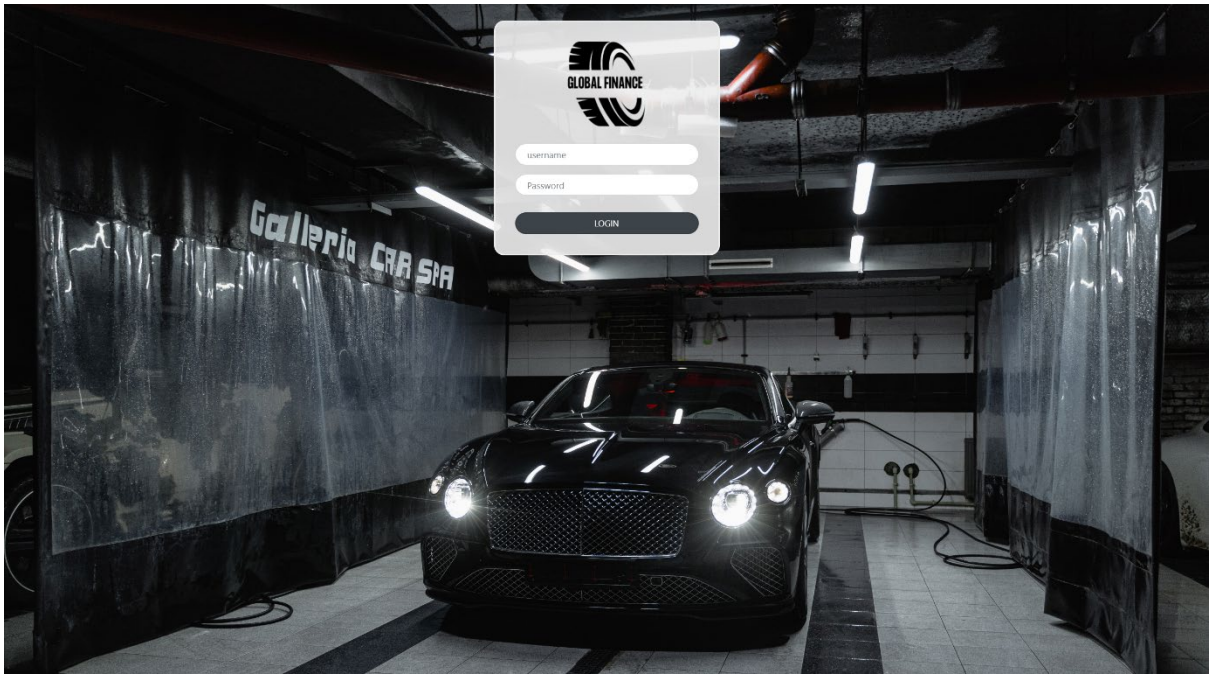
Administration dashboard	
Client portal	

Figure A1 - Design Sketch Solution for Global Finance Digital Platform

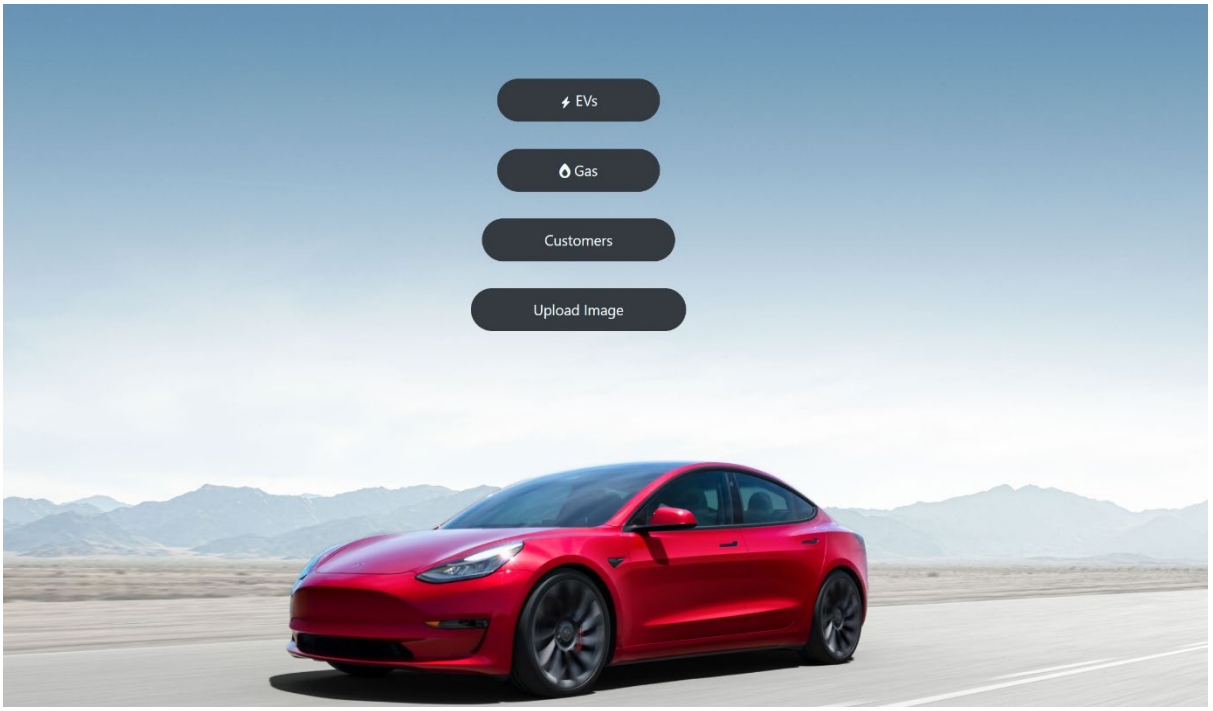
Appendix B

Web Application Product

Description	Product
Landing Page	
Vehicle Listing Page	

Vehicle Detail Page	
Login Page	

Admin Portal



Manage Inventory

Electric Cars

Add Electric | Admin

Img	Title	T1	T2	Year	Price	Price(Text Form)	Top Speed	Time 60	Range	Color	Interior	Wheel	
	Tesla Model 3 Performance	2020 Tesla Model 3	Performance edition	2020	54000	54,000	162	3.2	300	Solid Black Paint	Black Premium Interior	20'' Aero Wheels	Delete
	Tesla Model 3 Standard Plus	2020 Tesla Model 3	Standard Plus Edition	2020	41000	41,000	140	5.3	250	Pearl White Paint	Black Premium Interior	18'' Aero Wheels	Delete
	Tesla Model S Performance	2020 Tesla Model S	Performance Edition	2020	102000	102,000	165	2.4	348	Red Metalic Paint	Black Premium Interior	20'' Silver Alloy Wheels	Delete
	Tesla Model S Long Range	2020 Tesla Model S	Long Range Edition	2020	81000	81,000	155	3.7	391	Matte Grey Paint	Dark Ash Wood Interior	19'' Tempest Wheels	Delete

Manage Clients

Customers requesting Agent contact

Admin

Name	E-mail	Phone	
John	john@gmail.com	7712481811	Delete
Jakob	jokob@gmail.com	8391016415	Delete
Paul	paul@gmail.com	6381946426	Delete
Liam	liam@gmail.com	93899433426	Delete

Figure B1 - Web Application Product for Global Finance Digital Platform