Design your future car

(DFC)

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1- Introduction.

Purchasing a car in this day and age can be an arduous process, with plenty of pitfalls along the way. From choosing your perfect set of wheels to taking into account shipping costs and timescales, it's all too easy for buyers to become discombobulated or intimidated by the sheer complexity of the task at hand. Finding the right make and model to suit your needs is no mean feat either; nowadays there are so many options available that prospective purchasers often find themselves floundering in a sea of confusion. Additionally, receiving financing from banks or dealerships may seem like a Herculean undertaking, as there are myriad restrictions and criteria which must be met before obtaining approval. All these factors contribute to why buying a car can prove difficult in the current climate.

2- Description.

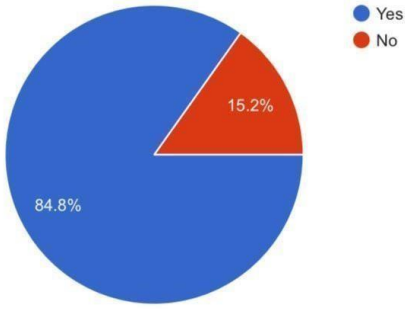
For this reason, we decided to design an application that helps the customer with the process of buying a car related to the cars specifications such as selecting the trim line of the vehicle, interior modification, exterior color preference. Also providing a simple test drive scheduling system that allows the user to book a test drive in just a few clicks, most importantly you can also choose the method of claiming the car that suits you either by shipping/delivery or pick up from selected showrooms and agencies nearest to you. All your needs made simple in one place.

3- Information gathering.

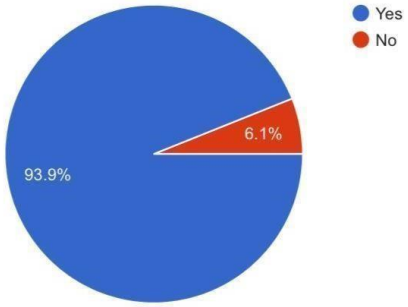
3.1 Questionnaire.

We made a questionnaire for students aged 19-21, we received 33 answers.

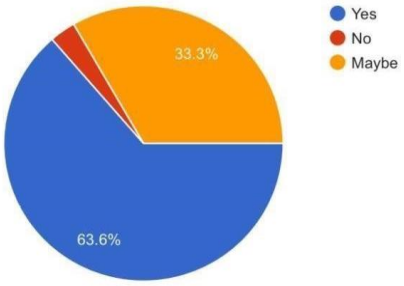
Do you have a car?



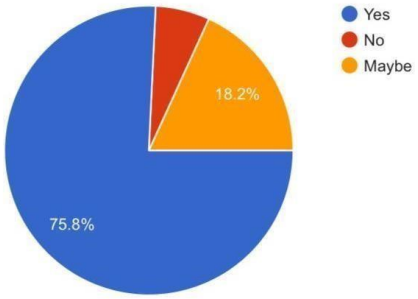
Do you find it difficult for someone at your age to buy a car?



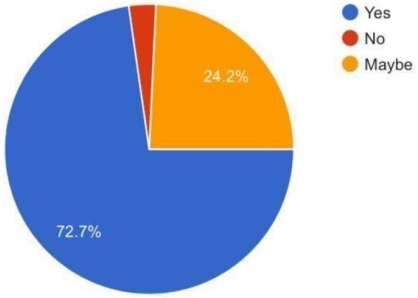
Do you want to buy a car in the future?



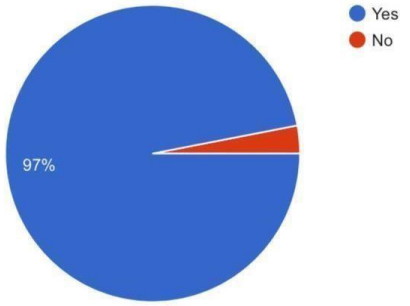
What if we told you that we are going to design an application that helps you create your own car by your own preference would you use it?



Do you think that this application will help you in your life?



Would you recommend this app and share it with your friends and family?



3.2 Analyst Comments.

1- As we noticed from the first question that 85% of the students own cars and 15% do not, which means that the vast majority of students have experienced purchasing a car.

2- In the second question, 94% of the students find purchasing a car difficult, which results in our theory to be correct, purchasing a car is in fact hard and something needs to be fixed.

3- Third question results 64% of the students plan to buy a future car, and 33% may plan to buy it, and what is preventing them from buying one? the difficulty of purchasing it? Maybe a program that makes that easier will change their minds.

4- And in the fourth question, we noticed that 76 percent of the students want to use our application, and 18 percent may use it, meaning 94 percent of the students want to design their cars with their own preferences.

5- 97% of the students think that it will help them in their lives and that they can buy their future car through the application, so efforts must be made to make it effective in the community.

6- At last 97% of the students will recommend the application to their family and friends, and this indicates the wide spread that we will find.

4- Planning Phase

4.1 The purpose of the project:

Purpose and goal:

We are creating the DFC application to make buying a car easier and more tailored to your individual needs. With this app, you can now choose exactly what features and colors you want for your car, as well as being able to design it in any way that suits you. The app allows you to have your vehicle delivered directly to you or picked up at a car showroom of your choice. By using our unique algorithm, we are able to collect data from all available options so you can compare prices and get the best deal possible. So if you're looking for convenience and customization when it comes to buying a car.

Motivation:

The world is developing and growing day by day, and we want to keep up with this development and this modern revolution of technology by making this application that serves you to choose the car you love at any time, which in turn will save you time and effort. Just lay down in your house and the car will be delivered to your doorstep

Considerations:

A lot of people waste their time and money while they are looking for a car that matches their taste, our main goal in this project is helping you to save time and money, and makes you think clearly to design your own car by your own terms and conditions.

4.2 Preliminary report:

The problem:

The car design and implementation process is time-consuming, the guarantees in the system are not robust, and there is no direct link between dealerships - these are all problems within our system. An effective connection between dealerships would help streamline processes for everyone involved. To top it off, more reliable guarantees should be put into place so that customers can feel confident about their purchases. All in all, these issues need to be addressed with creativity, insight, and precision - otherwise, we won't make any real progress.

The finding:

- Implementation time
- Indirect connection with the dealerships
- Guarantee

Recommendation or proposed solution:

Hiring a team to design the cars and implement orders in a short period of time. To make the process simpler, we are creating direct connections between customers and dealerships which will ensure easy access and additional guarantees for each vehicle.

Project Estimated Costs

Resources	Estimated cost
web design cost	3500$
Routine site maintenance	7500 $
Vehicle Transport	30000$
Re-designing according to the customer's request	15000$
Regular maintenance of cars	50000$
website security	4000$

Cost and schedule estimate:

Depending on the services offered, the projected total cost of the application might be around 110,000 US dollars, and the time needed to complete it could be between one and two years.

Project Estimated Schedule:

Tasks	Estimated duration	Start date	End date
User experience design	Two weeks	26/12/2022	15/1/2023
Program design	Three months	16/1/2023	16/4/2023
Application quality test	Four days	16/4/2023	20/4/2023
Hiring logistical support	One month	22/4/2023	22/5/2023
Expansion and contracting with well-known car companies	Two months	25/5/2023	25/7/2023
Government actions	Two weeks	28/7/2023	12/8/2023
Marketing and publishing	Three weeks	15/8/2023	6/9/2023
Make updates to app development	Three days per three months	10/9/2023	1/1/2024

5- Planning Phase 2

5.1 Feasibility study:

A comprehensive **feasibility study** of an app that helps you purchase a car through your phone is necessary to determine if the concept is **viable**. While the potential cost and time-savings may be appealing, there are several elements that must be evaluated in order to assess the long-term success of such an endeavor.

We need to understand **how feasible** it would be for users to design their own cars on the app. For this purpose, the user interface needs to be carefully designed so that customers can easily create their desired vehicle specifications without much difficulty. Additionally, ensuring the availability of quality parts should also be taken into consideration as they will form the basis of these custom designs.

An important aspect is **shipping** arrangements. Customers should not have to worry about arranging transportation or paying any extra charges as part of the service offered by the app. Therefore, developing a reliable logistics network with efficient delivery timescales should be established in advance. Moreover, measures should be taken to ensure that vehicles remain secure throughout the entire process until delivered safely to the customer.

The associated **costs of operating** such an app must also be considered. This includes staff salaries, maintenance fees, insurance premiums and other fixed expenses. A budgeting model should be developed based on revenue from sales and other possible sources of income. This could include ads and referral programs where customers can get discounts for recommending others to use the app.

All in all, a **thorough analysis** of each component involved in this project is essential before proceeding with its implementation. With careful planning and execution, an app which provides a convenient way for people to buy cars can certainly become successful and achieve long-term success.

5.2 Report writing:

Problem definition:

The key issue we are confronting is designing and implementing a car that is both secure, reliable, and efficient but takes considerable time and money to accomplish. Additionally, the existing guarantee system within our system is inadequate, and there is no direct connection with dealerships which might confuse some users. All in all, this situation necessitates expertise and experience on our part to create an effective solution that meets all of these requirements.

Scope objectives of "new system":

"Design Your Future Car" is the name of our system, which tries to design the car from every angle.
The system will also design the car from the inside and out to suit the wants of the customer. The buyer will present specifications for the vehicle, including those for the dashboard, cameras, sensors, and glass tinting. We will thus begin the design and execution phase to create an automobile that satisfies the customer's needs. We stand out because we offer a guarantee, affordable ongoing maintenance, and good customer relations.

Alternative solutions:

- Involving more developers, software engineers and application security engineers.
- Adding more tools and equipment to save time..
- Having multiple factories and companies participate in our application.
- Estimating and gathering all the resources.
- Tracking and managing the resources.

Cost and benefits of alternatives:

Alternatives	Cost	Benefits	Drawbacks
Our DFC application	200,000	The application would simplify the procedure for users to create their own cars.	The application has quite a high cost and is complicated to make highly efficient in all ways.
selling vehicles designed by us to another company	100,000	The price is lower and the level of efficiency will be higher	unable to meet all of the company's needs through manufacturing

Software impacts:

Our app could benefit from a few future additions to make it even better, we could include a car wash option that would provide users with convenient access to quick and thorough cleaning services. We also plan to offer a yearly or every 100,000km car modification service, allowing clients to customize their vehicles if they ever get bored or change their mind. Moreover, security of customers' information will be further enhanced by our specialized software system. To top off these features, we'll also try to include a service that allows users to modify cars originally designed by other companies, but they will not be covered by our warranty and maintenance service. By incorporating these unique offerings into our application, we believe the user experience will be significantly improved.

Potential changes in the organization:

• Giving a chance to clients to design their own cars depending on preferences, and what makes them comfortable.

• Become easier to use in the future.

• Annual improvement to the application

• Become the common way to buy cars nowadays.

• Decreasing the time to buy a car.

Recommended alternative of the course of action:

• Building a strong and creative team for the project.

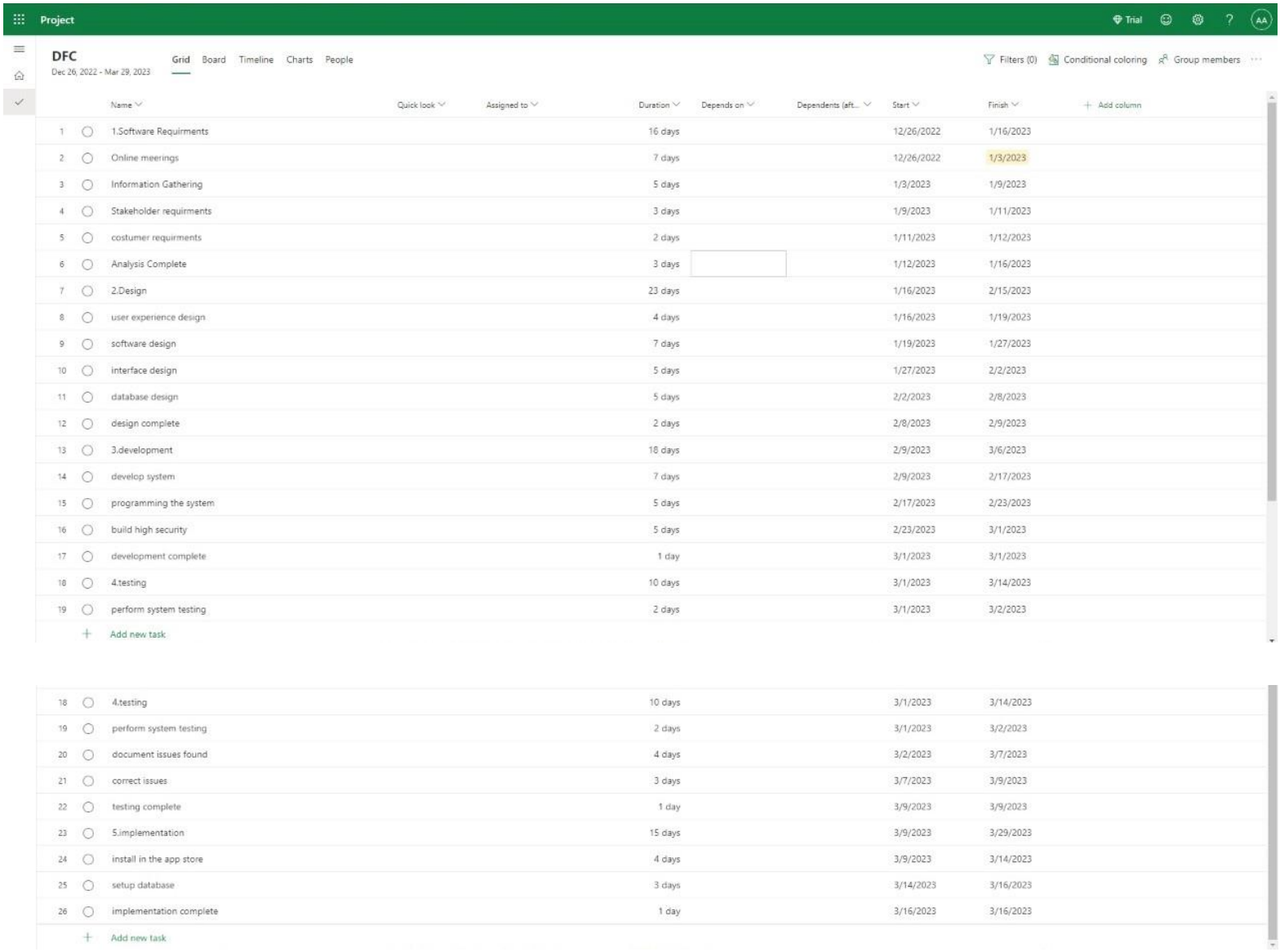
• Properly testing the system.

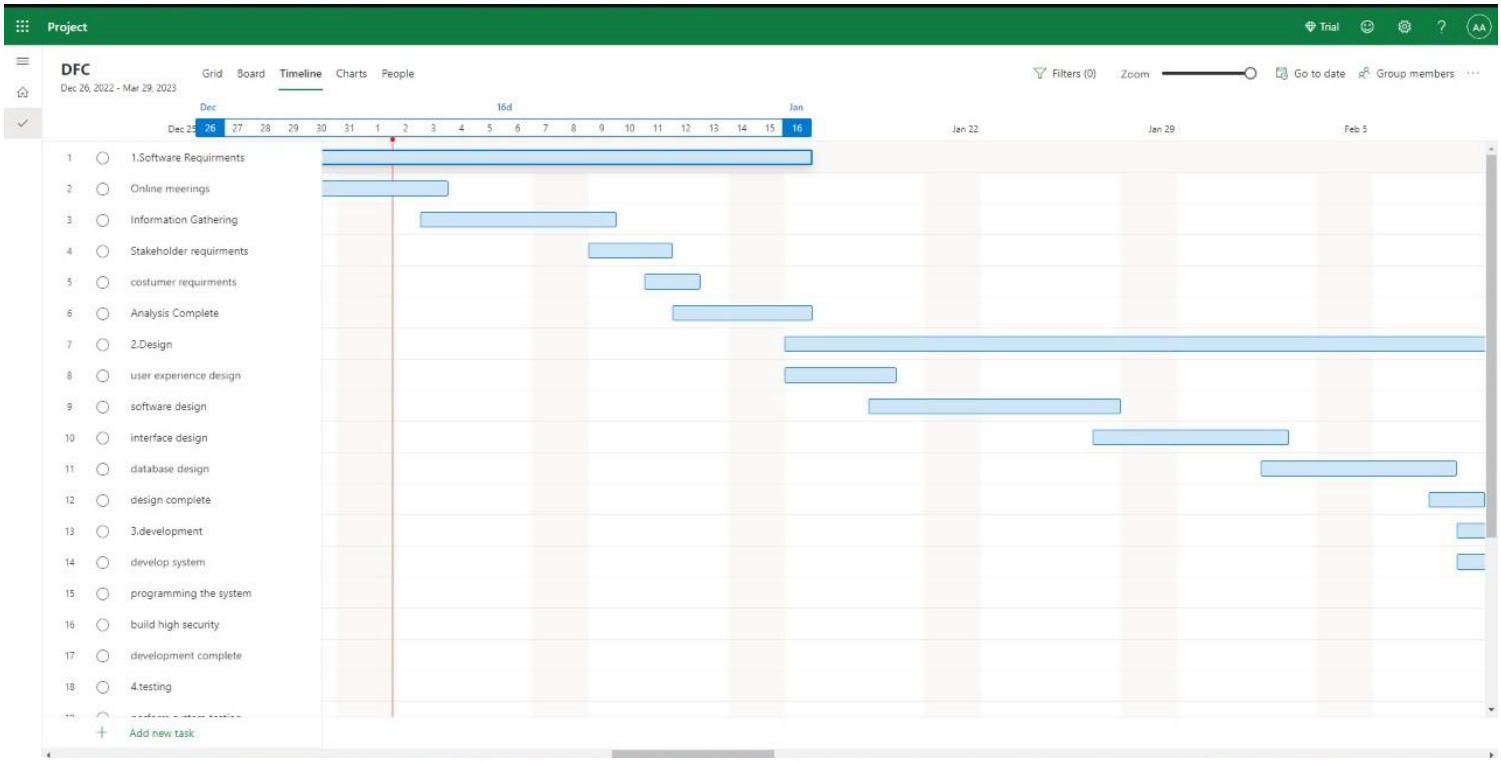
• Managing possible risks.

• Frequent update to the application to prevent any future risks.

• Implementing a second authorization method to protect client data.

5.3 Project plan: ***Please zoom in for a better view :)***

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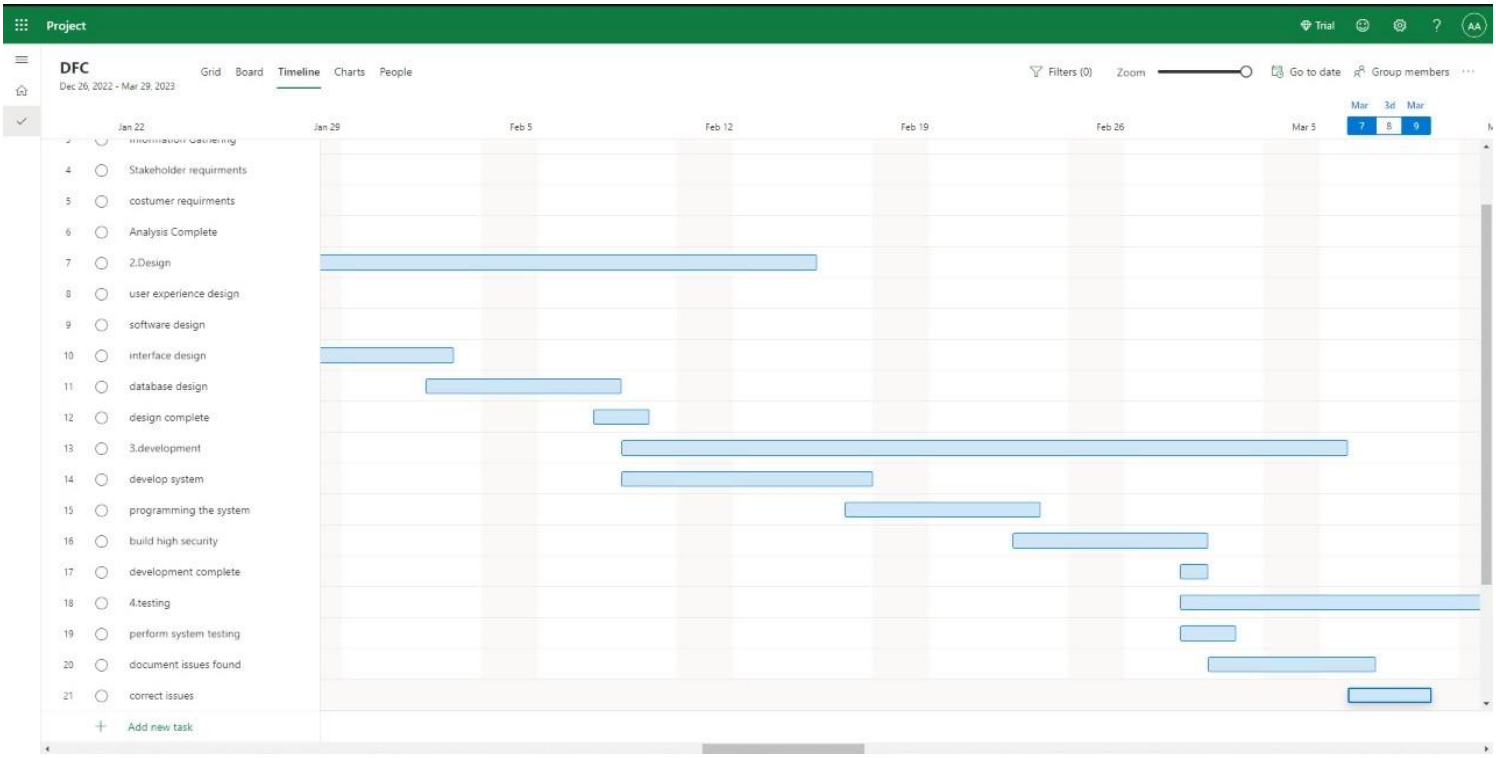
2 Online meerings
3 Information Gathering
4 Stakeholder requirments
5 costumer requirments
6 Analysis Complete
7 2.Design
8 user experience design
9 software design
10 interface design
11 database design
12 design complete
13 3.development
14 develop system
15 programming the system
16 build high security
17 development complete
18 4.testing
Add new task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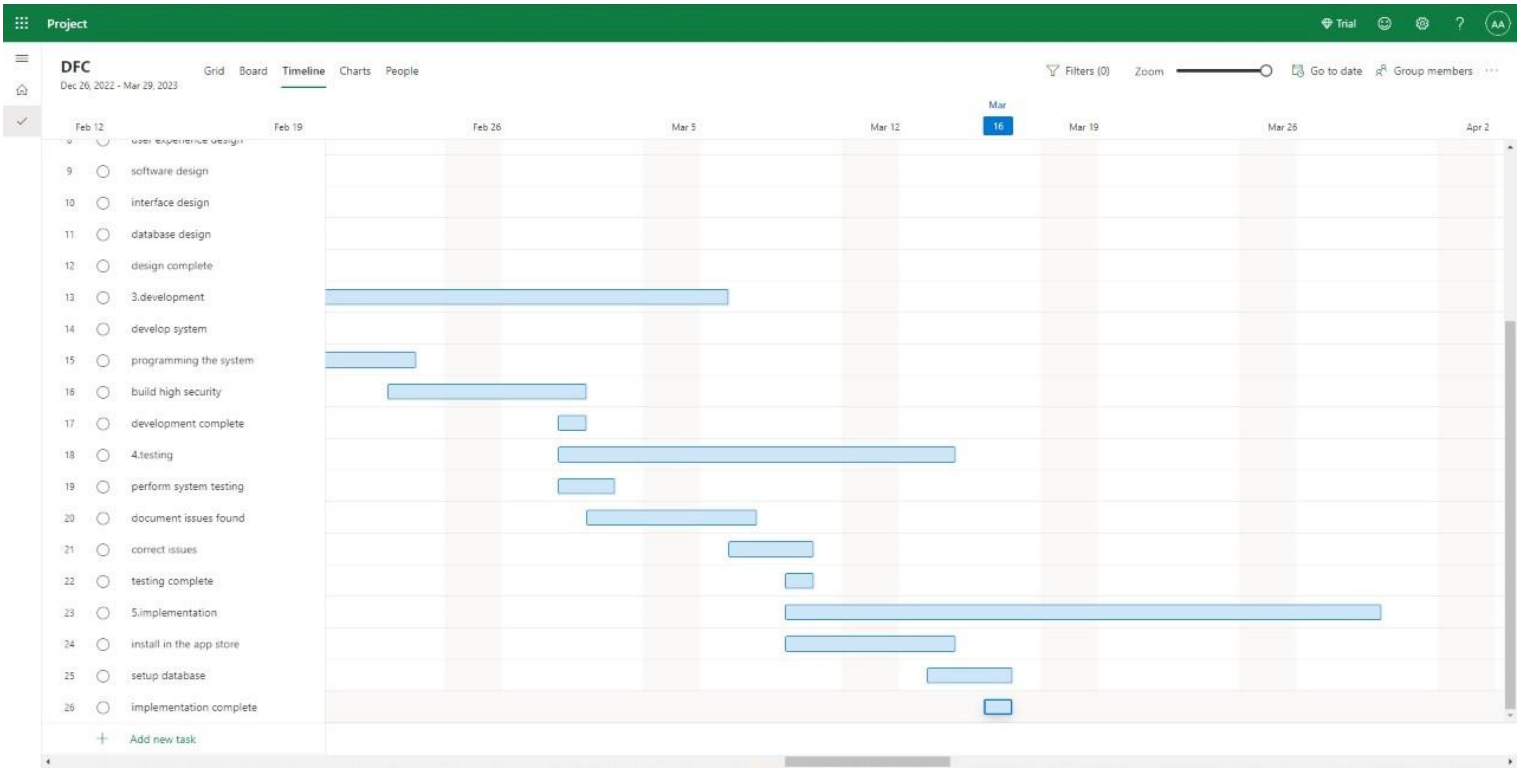
17 development complete
18 4.testing
19 perform system testing
20 document issues found
21 correct issues
Add new task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Mar 26
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9 software design
10 interface design
11 database design
12 design complete
13 3.development
14 develop system
15 programming the system
16 build high security
17 development complete
18 4.testing
19 perform system testing
20 document issues found
21 correct issues
22 testing complete
23 5.implementation
24 install in the app store
25 setup database
26 implementation complete
Add new task

6- Analysis Phase 1

6.1 Stockholder definition:

A) The Client:

-Car manufacturing companies.

-Vehicle designers.

-Car dealers/agents.

-Mechanical engineers.

B) The Customer:

-Every customer with driver a license.

-Students looking for a new car.

-Customers looking for an upgrade.

C) Other Stakeholders:

-Owner: someone who makes decisions about how the company should run and what benefits it should produce.

-Employees: individuals who have been recruited by the company to do duties that lead to the delivery of goods or services to users or clients.

-Partner: Business partners who share same ideologies that focus on improving the company.

-Investors: Firm believers who buy stock with the hope that the company will generate a high rate of income in the future.

-Suppliers: Organizations that provide goods and services, among other things.

Scope of Work:

A) Current situation:

Content:

Buying a car in today's age can be a harrowing experience, rife with endless obstacles. From having to bargain and haggle with the salesperson to carefully choosing from the plethora of new models and features available, it can prove quite difficult to find an automobile that best suits your budget, lifestyle and needs. Then there are all the hidden costs associated with buying a car - not only do you have to think about insurance premiums, but also gas prices, taxes and maintenance fees that add up over time. Moreover, certain dealers may take advantage of potential buyers by using shady tactics such as artificially inflating prices or misinforming them about various details of the vehicle they're looking for. This added complexity makes purchasing a car no small feat, thus calling for detailed research beforehand and intense vigilance during the process itself.

Motivation:

Ultimately, we hope that these changes will lead to more satisfied customers who feel empowered in their decisions. With the right combination of technology, processes, and human interaction, the car buying system can become easier, faster, and less stressful.

B) Context of the Work:

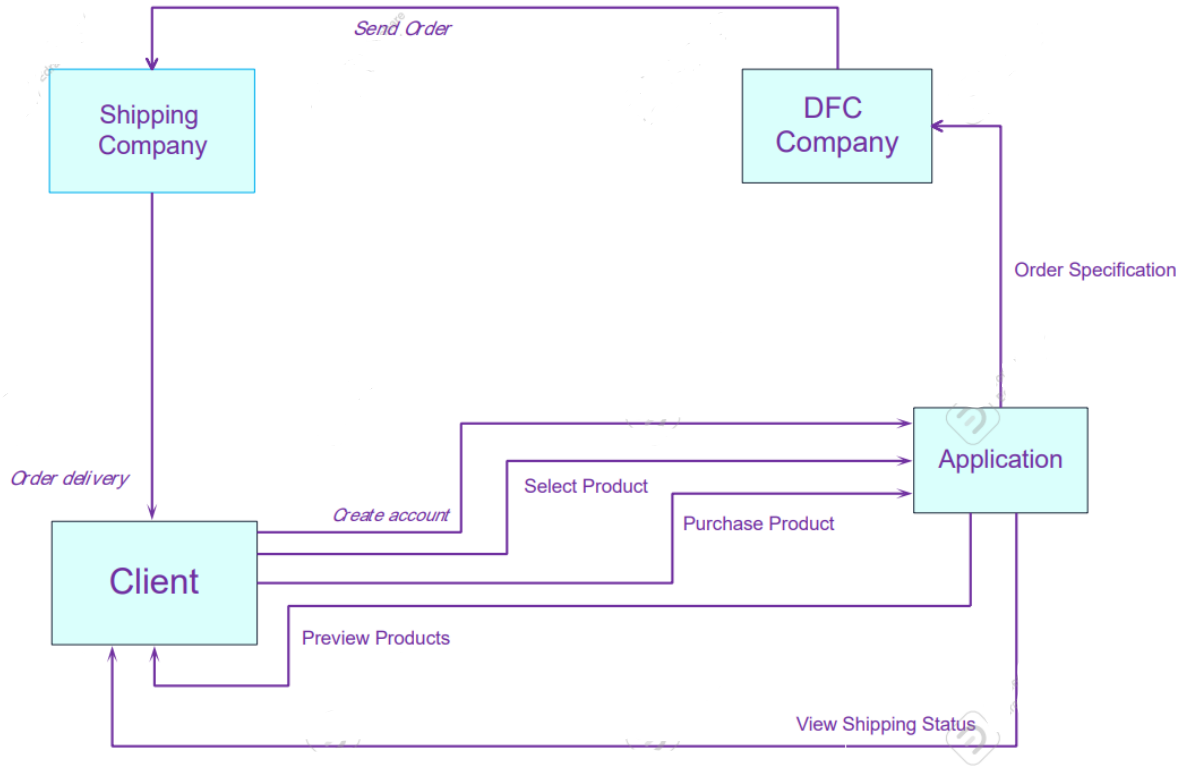
Content:

First, customers have to create a new account and select the product, which they want to buy. All this information has to be logged in the DFC app and then the customer has to select the specification of the order in our company and the customer with a quote for our services.

Motivation:

The main goal of this application is to make the process of buying a car much easier for our customer according to customers taste and preference.

6.2 Context diagram:



6.3 Event table:

Event Name	*Input and Output*	*Summary*
1- Register an account	Create account (in)	Register a personal account in the application
2- Client's selection	Select Product (in)	Clients choose a design from the app
3- Payment	Purchase product (in)	Client purchase's product from the app
4- Show clients product	Preview product (out)	The app will show the product
5- Shipping status	View shipping status (out)	Report of shipping status
6- Order specification	Order Specification (in)	Order specs will be sent to the company
7- Receiving order	Send order (out)	Sends order to shipping company
8- Receiving product	Order delivery (in)	Clients receive the product

7- Analysis Phase 2:

7.1 Functional requirements:

FR1: Sign up

FR1.1: Users must be able to register through the mobile app, user must provide username, password and phone number.

FR2: Design vehicle

FR2.1: The use must be able to design the vehicle.

FR3: view owner

FR3.1: The system must allow the employee to see the vehicle owner.

FR4: Order

FR4.1: The system must allow the customer or sales agent to place an order.

FR5: Payment method

FR5.1: The system must allow the user to choose different types of payment.

FR6: View shipment status

FR6.1: User must be able to see the Shipment status.

FR7: make maintenance request

FR7.1: The system must allow the user to perform maintenance requests.

FR8: Sort search

FR8.1: The user must be able to sort search results by price, cat type and car make.

FR9: contact owner

FR9.1: The system must allow the user to contact the owner.

FR10: View vehicle info

FR10.1: The system must allow the dealer to access automotive information.

FR11: Book appointment

FR11.1: The user must be able to make an appointment to test drive the car.

FR12: Edit

FR12.1: The system must allow the user to edit information about their vehicle.

7.2 Non-functional requirements:

2.1 Performance

P1: The system must be able to support more than 10,000 concurrent users.

P2: The application must be able to finish saving the data within 2 minutes of any changes

P3: The system must allow the user to start and display the application within 4 seconds

P4: Average system recovery time after a system crash must be less than 5 minutes

P5: All notifications must be displayed within 10 seconds of the event

2.2 Usability

U6: Error rate of users submitting their payment details on checkout page cannot exceed 5%

U7: System will display all user options/specs on the vehicle they want

U8: contract completed and notarized no more than 3 minutes

U9: User is ready to view/buy the vehicle and be able to locate and view all stores that carry it in 6 minutes.

2.3 Availability

A10: App must support Apple and Android devices

A11: App must be available 98% of the time

A12: System must be able to store all user/dealer/car information and data

2.4 Security

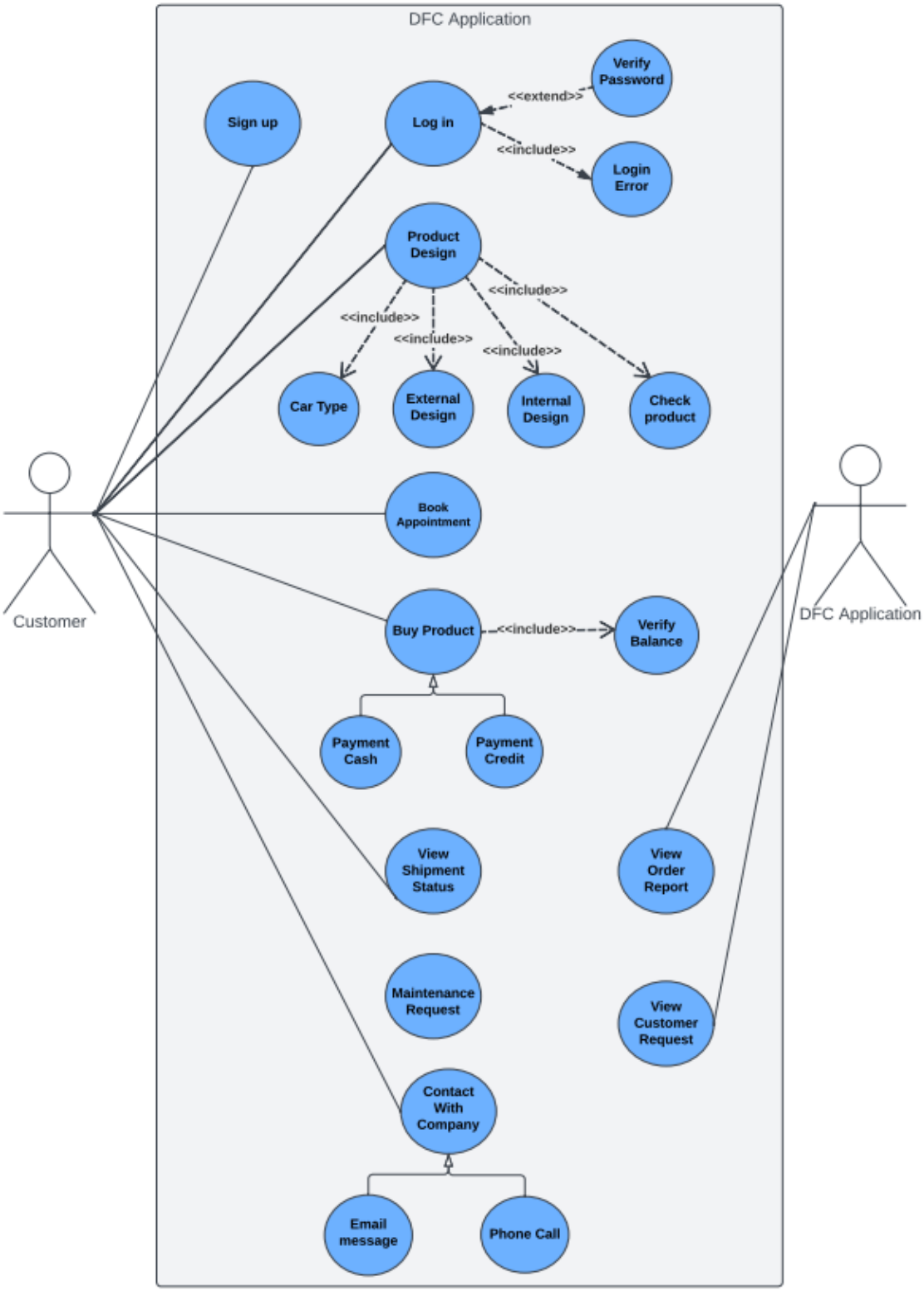
SE13: System must provide password protected access to the application

SE14: Data must be encrypted for privacy and security

SE15: All payment transactions processed and cardholder data must be encrypted

8- Design Phase 1

8.1 Use case diagram:



8.2 Use case description:

Name	*Sign up*
ID	*UCI*
Actors	*Registered Customer*
Precondition	*Open the application*
Scenario	*1. press on create new account* *2. enter his email and password* *3. enter his personal data* *4 . press on create*

Name	*Log in*
Id	*UC2*
Actors	*Registered Customer*
Precondition	*Open the application*
Scenario	*1. press on log in* *2. enter his email and password* *3. if the password is not correct it will display error message and ask customer to enter it again*

Name	*Product Design*
Id	*UC3*
Actors	*Registered Customer*
Precondition	*Open the application and have an account*
Scenario	*1. choose car type* *2. designing the car from the inside* *3. designing the car from the outside* *4. add order to cart*

Name	*Book Appointment*
Id	UC4
Actors	*Registered Customer*
Precondition	Open the application and have account
Scenario	*1. choose the car type he wants to test* *2. choose the date and time* *3 . press on reserve*

Name	*Buy product*
Id	*UC5*
Actors	*Registered Customer*
Precondition	*Open the application, have account, designed a car or chose a car*
Scenario	*1. choose payment method (credit or PayPal)* *2. application will verify funds if the payment was failed it will ask him to pay again* *3. order will be sent to the company*

Name	*View order report*
Id	*UC6*
Actors	*DFC Company.*
Precondition	*Open the application, order came from customer*
Scenario	*1. view order report* *2. press on order has been confirmed*

Name	*View shipment statue*
Id	*UC7*
Actors	*Registered Customer*
Precondition	*Open the application, have an account, have an order*
Scenario	*1. press on view shipment status* *2. all details of the shipment will appear*

Name	*Maintenance request*
Id	*UC8*
Actors	*Registered Customer*
Precondition	*Open the application, the car from DFC application*
Scenario	*1. choose the car he wants to maintain* *2. send pictures for the damage if it exists* *3. choose the date and time* *4. send the location* *5. the application will send the request to the company*

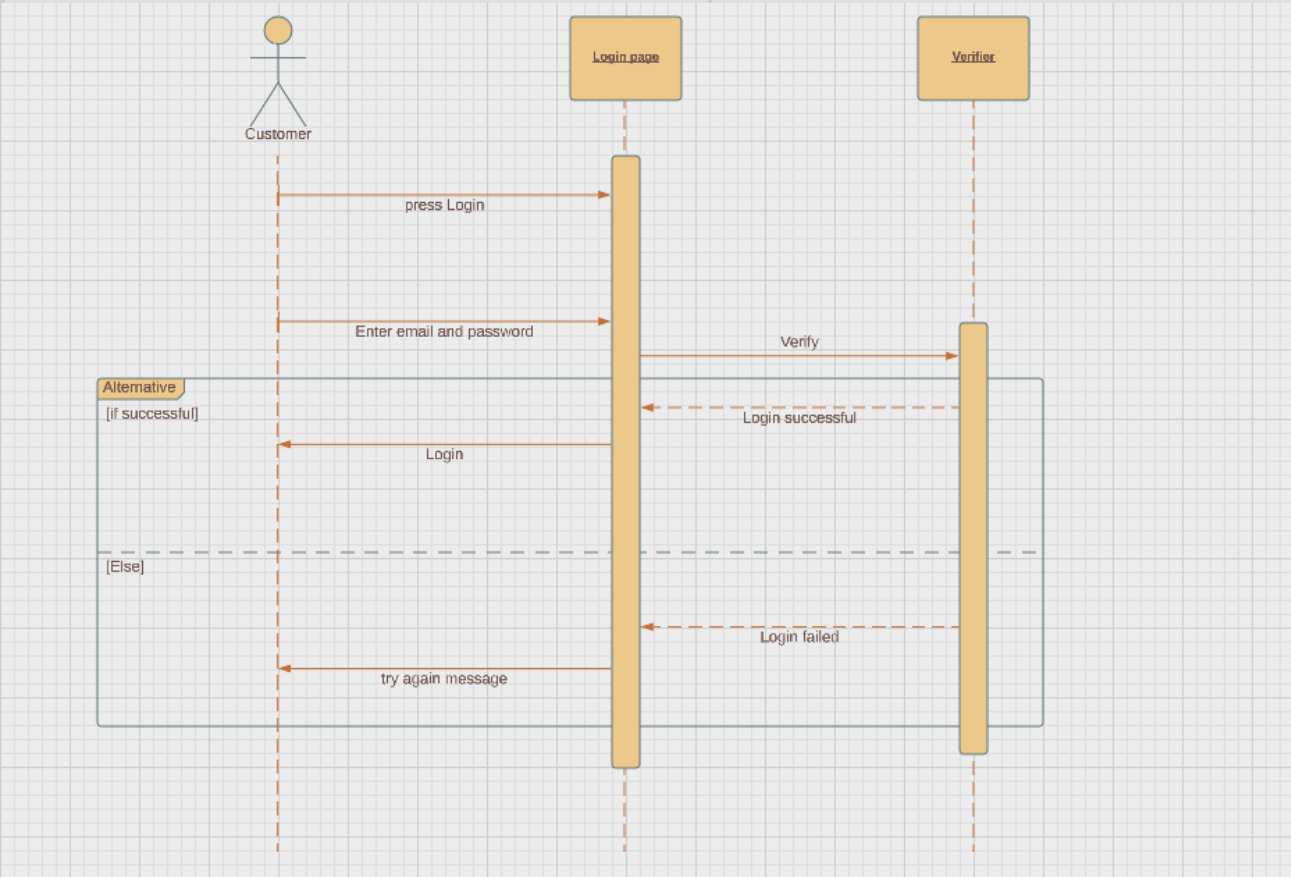
Name	*View customer request*
Id	*UC9*
Actors	*DFC Company.*
Precondition	*Open the application*
Scenario	*1. view customer request* *2. press on request has been confirmed*

Name	*Contact with the company*
Id	*UC10*
Actors	*Registered Customer*
Precondition	*Open the application*
Scenario	*1. press on contact with the company* *2. choose the way to contact (phone call or send email)*

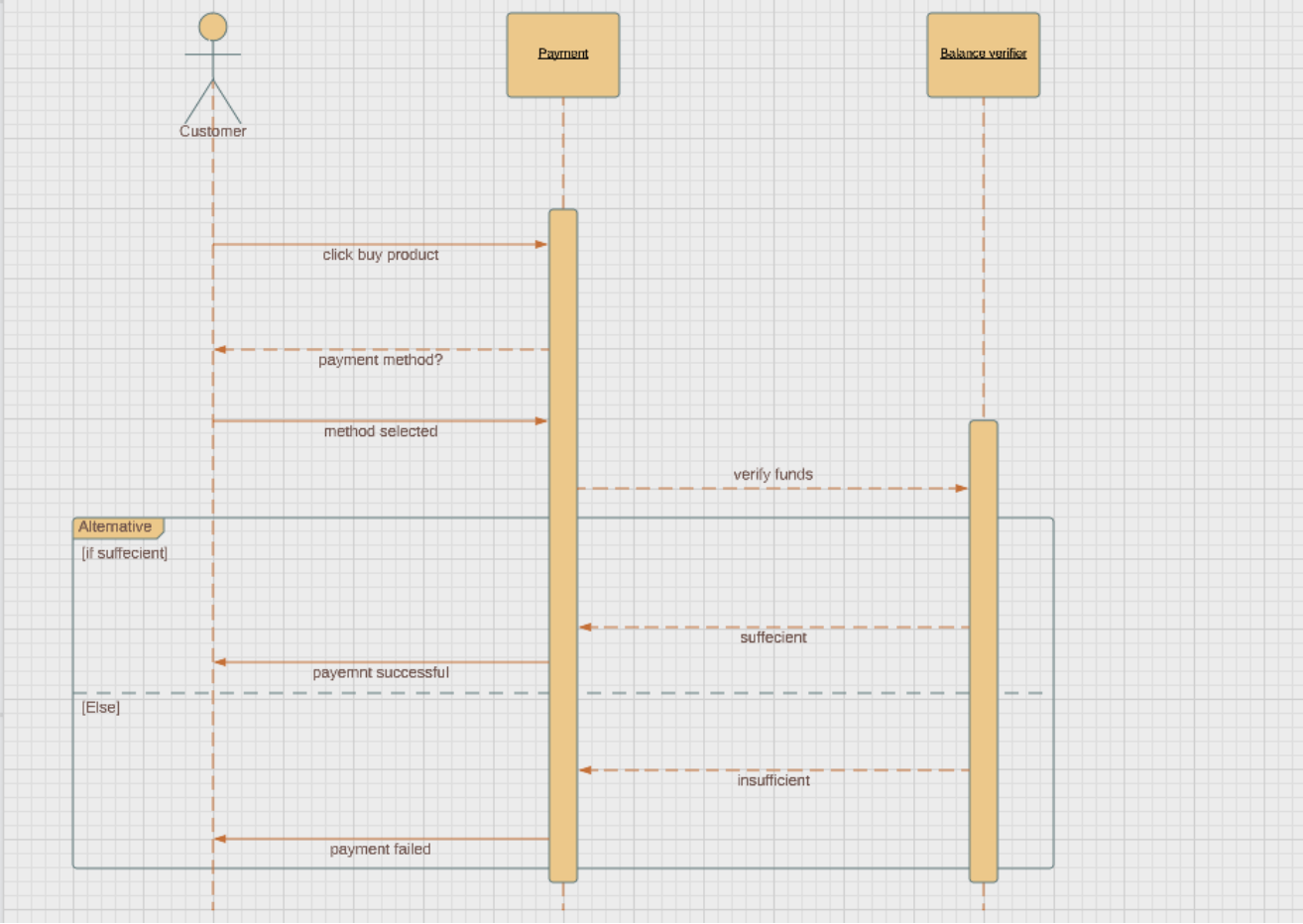
9- Design Phase 2

9.1 System sequence diagrams:

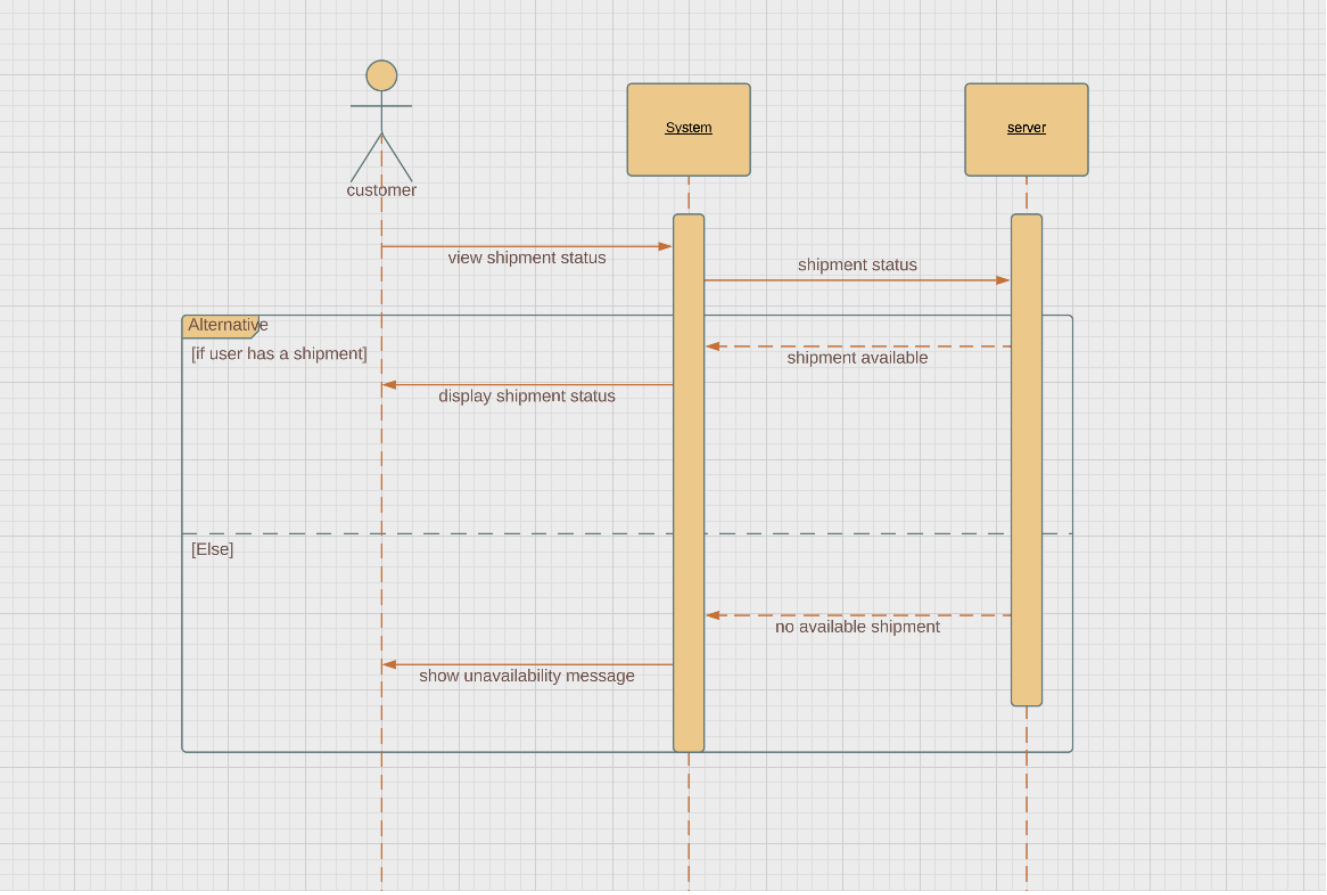
Login sequence diagram:



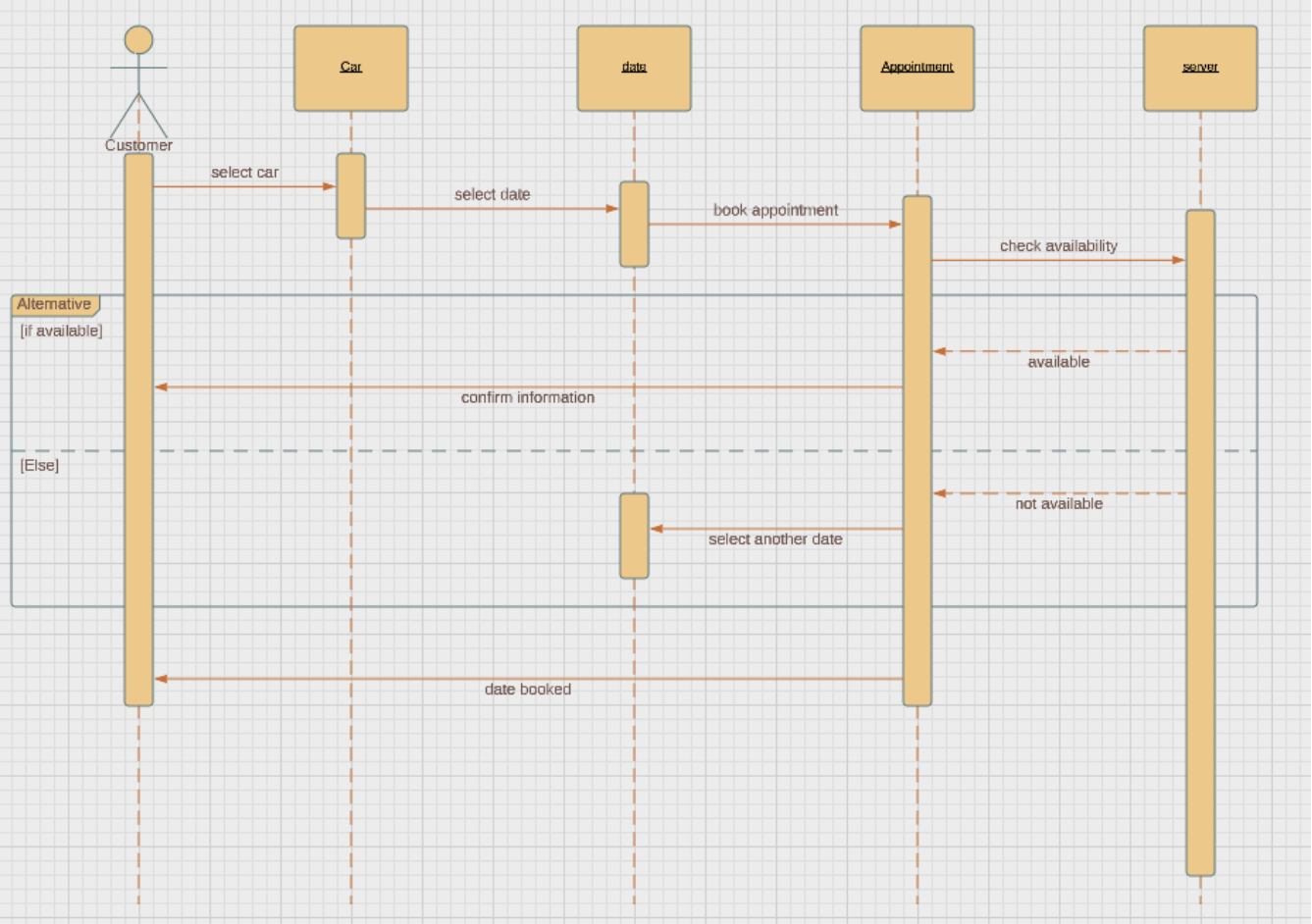
Purchase product sequence diagram:



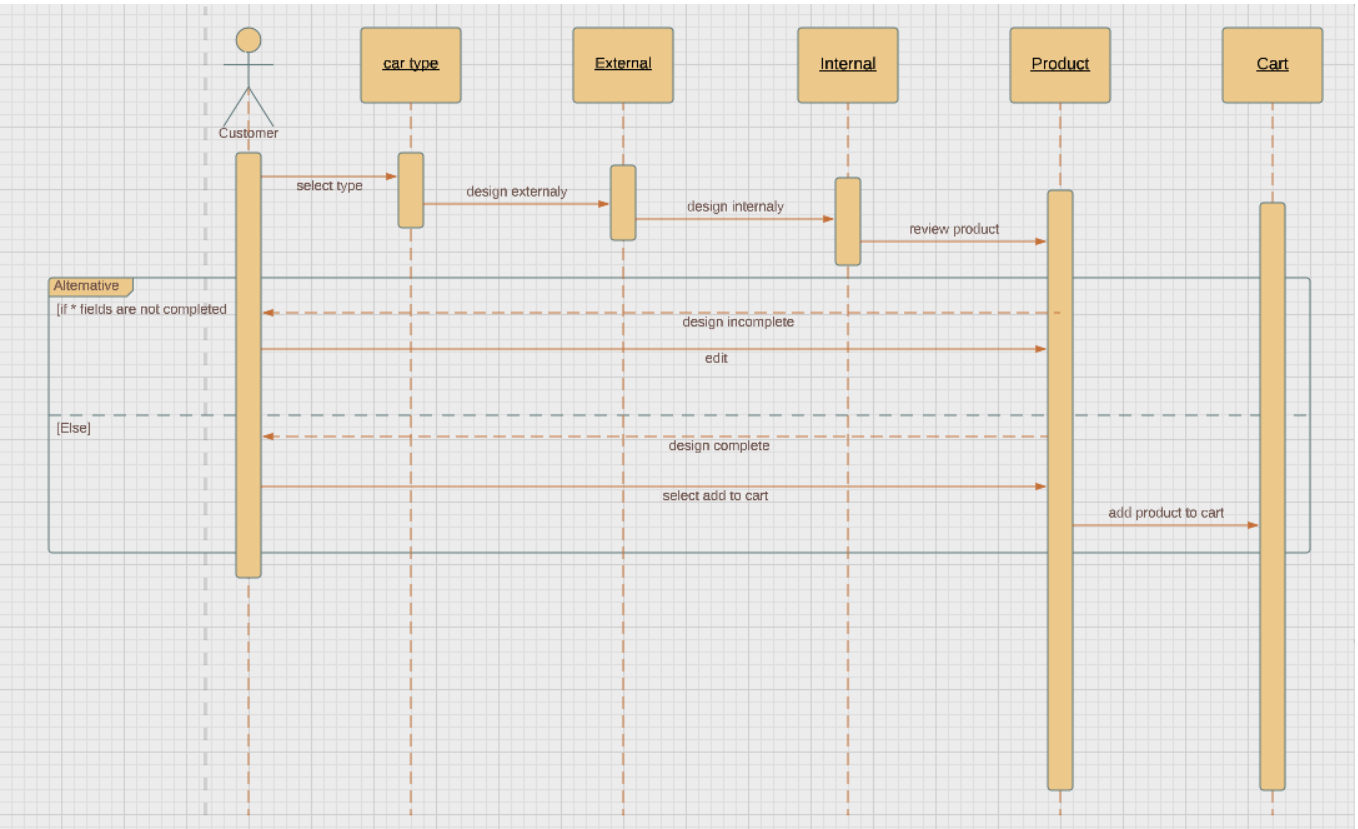
Shipment status sequence diagram:



Appointment booking sequence diagram:

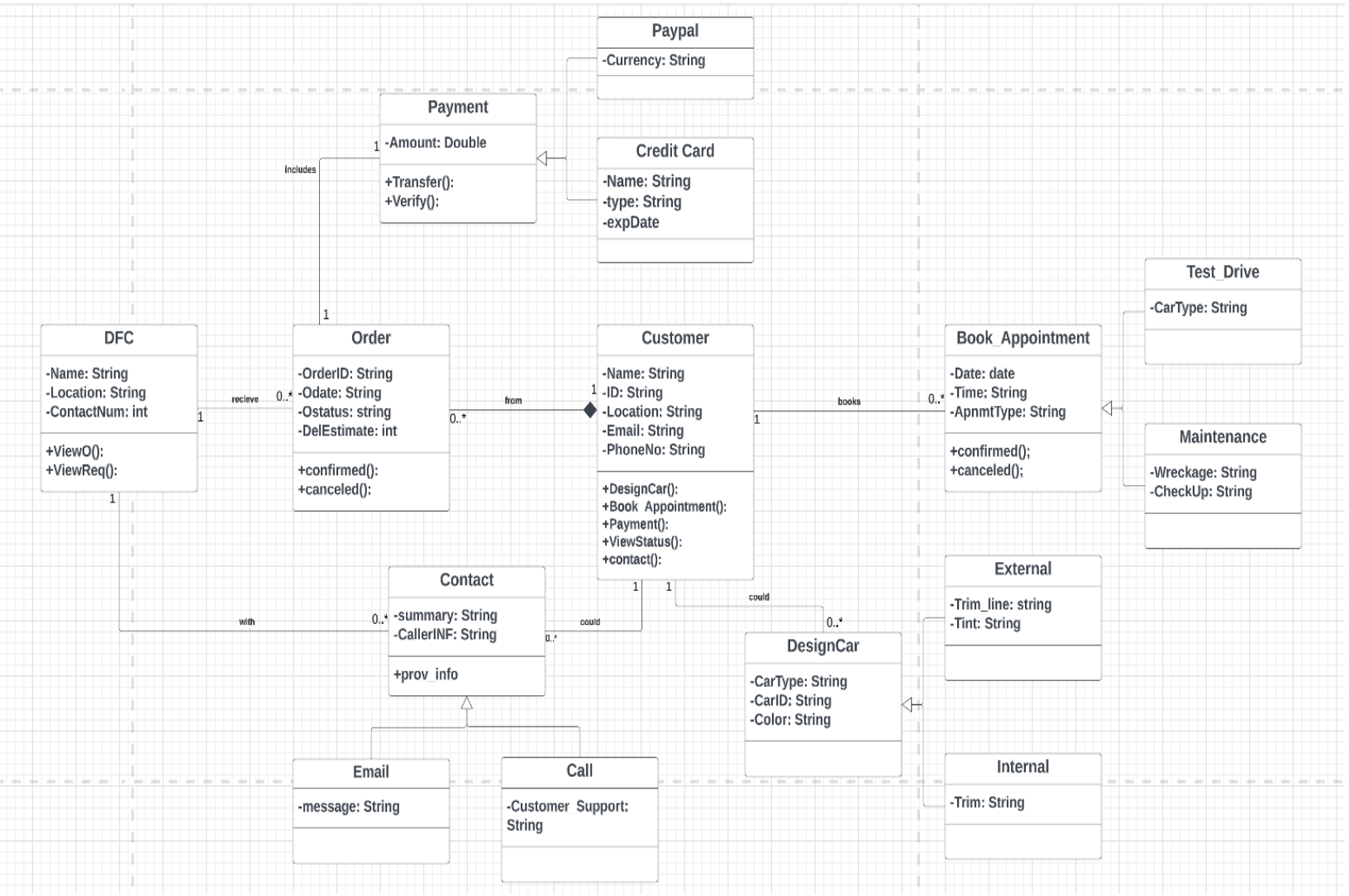


Product designing sequence diagram:



10- Design Phase 3

10.1 Class diagram:



10.2 Class analysis:

System: We are interested in creating a more straightforward car design system with two different user groups: customers and the DFC Company.

-Customer can: Design a car, Book appointments, Make payments, View order status, Contact the company

-Company can: View orders, View customers' requests

- Each customer can have many orders

-Each customer has Id, name, location, email, phone number

-Each order contains Id, date, status and delivery estimate

-Each order has more than one payment method

-Payment methods are Credit Cards and PayPal both of them require transfer and verifying.

-credit card has name, type and expiry date

-PayPal has currency type

-The company receive many orders from the customers

-The company has name, location and contact number

-Customer has option to contact the company either by call or email, both of them include summary and caller info.

-You can send a message through email or contact customer support via a call

-Each customer can design their car.

-Design includes interior and exterior design both of them contain car type, car Id and color

-Interior design includes trim modification

-Exterior design includes trim line modification and tint selection

-The Customer can book an appointment for a test drive or maintenance both can be confirmed or canceled.

-Maintenance includes wreckage maintenance or a check up.

-Test drive allows you to select car type you wish to test.

What is Class analysis ?:

represents an abstraction of a single, multiple, or all of the system's classes and/or subsystems. Characteristics. Put your attention on managing functional requirements (conceptual) Instead of operations, define behavior as responsibility. Define conceptual qualities based on the issue at hand.

Types of Analysis classes:

Entity classes:

model data that lasts a long time and is frequently persistent Information on a phenomena or concept's associated behavior and its model (e.g. individual, real-life object, real-life event)Display a logical data structure and help the reader understand what data the system depends on.

Control classes:

Model the system's dynamics, including coordination, sequencing, transactions, and object control. encapsulate the control for a use case. Represent sophisticated calculations, derivations, and business logic

Task Table

Lab	Task	Name
Lab 1	-Description	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 2	-Information gathering	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 3	-The purpose of the project. -Preliminary report	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 4	-Feasibility study. -Report writing. -Project plan	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 5	-Stockholder definition -Context diagram -Event table	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq

Lab 6	1- Functional requirements 2- Non-Functional requirements	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 7	1- Use Case diagram 2- Use case description	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 8	Sequence diagram model	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq
Lab 9	Class diagram model Class analysis document	Audai Al-Sulimany Abdullah Al-Jadani Abdulrahman Quraish Khalid Al-Thumaly Sultan Fairaq