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Theme

**Marketplace for selling and
buying vehicles**

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DEDICATION

we dedicate this modest work

to Our advisor

Our families

Our teachers

And Our colleagues



Résumé :

Malgré un commerce électronique en croissance dans le monde entier, l'Algérie manque encore de retard, en particulier sur le marché des véhicules. Cette thèse porte sur la création d'un site Web pour la vente et l'achat de véhicules neufs et d'occasion.

Mots clés:

E-commerce, boutique en ligne, site internet, vente, achat, échange, véhicules neufs, véhicules d'occasion.

Summary:

Despite an growing Ecommerce worldwide, Algeria still lacks behind especially in vehicles market. This thesis is about building a website for selling and buying used and new vehicles.

Key words:

E-commerce, online store, website, sale, purchase, trade, new vehicles, used vehicles.

ملخص المذكرة :

في السنين الاخيرة زاد الاقبال على المواقع الالكترونية بشكل كبير مما اعطى للتجارة الالكترونية موقعا مهما في دور التجارة بصفة عامة ، وبشكل جزئي سيكون هذا موضوع هاته المذكرة بحيث سنخصصها في جانب المركبات.

على الرغم من التجارة الإلكترونية المتنامية في جميع أنحاء العالم ، لا تزال الجزائر تفتقر إلى الخلف خاصة في سوق السيارات. تدور هذه الأطروحة حول إنشاء موقع على شبكة الإنترنت لبيع وشراء السيارات المستعملة والجديدة.

يتلخص هذا المشروع في إنشاء موقع الكتروني لتسهيل التجارة أو كما يطلق عليه في الوقت الحاضر المتجر الإلكتروني ، وبشكل خاص سيحتوي هذا المتجر الالكتروني على السيارات المستعملة او جديدة بحيث يسهل على المستخدم عمليتي البيع و الشراء.

كلمات مفتاحية :

التجارة الإلكترونية، متجر الكتروني ، موقع الكتروني، بيع ، شراء ، تجارة ، المركبات الجديد ، المركبات المستعملة.

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General introduction:

Since the dawn of the web, Ecommerce has been increasing in size and is penetrating new markets every year. It keeps increasing in size and services. Various related aspects like shipping, logistics and information security keep coming.

Despite this international phenomenon, The Algerian Ecommerce scene still lacks behind. The Ecommerce solutions entail a lot of problems ranging from bad user experience to weak security and site moderation.

The process of selling and buying a vehicle in Algeria is still done in the traditional way with all its pitfalls like the lack of price transparency.

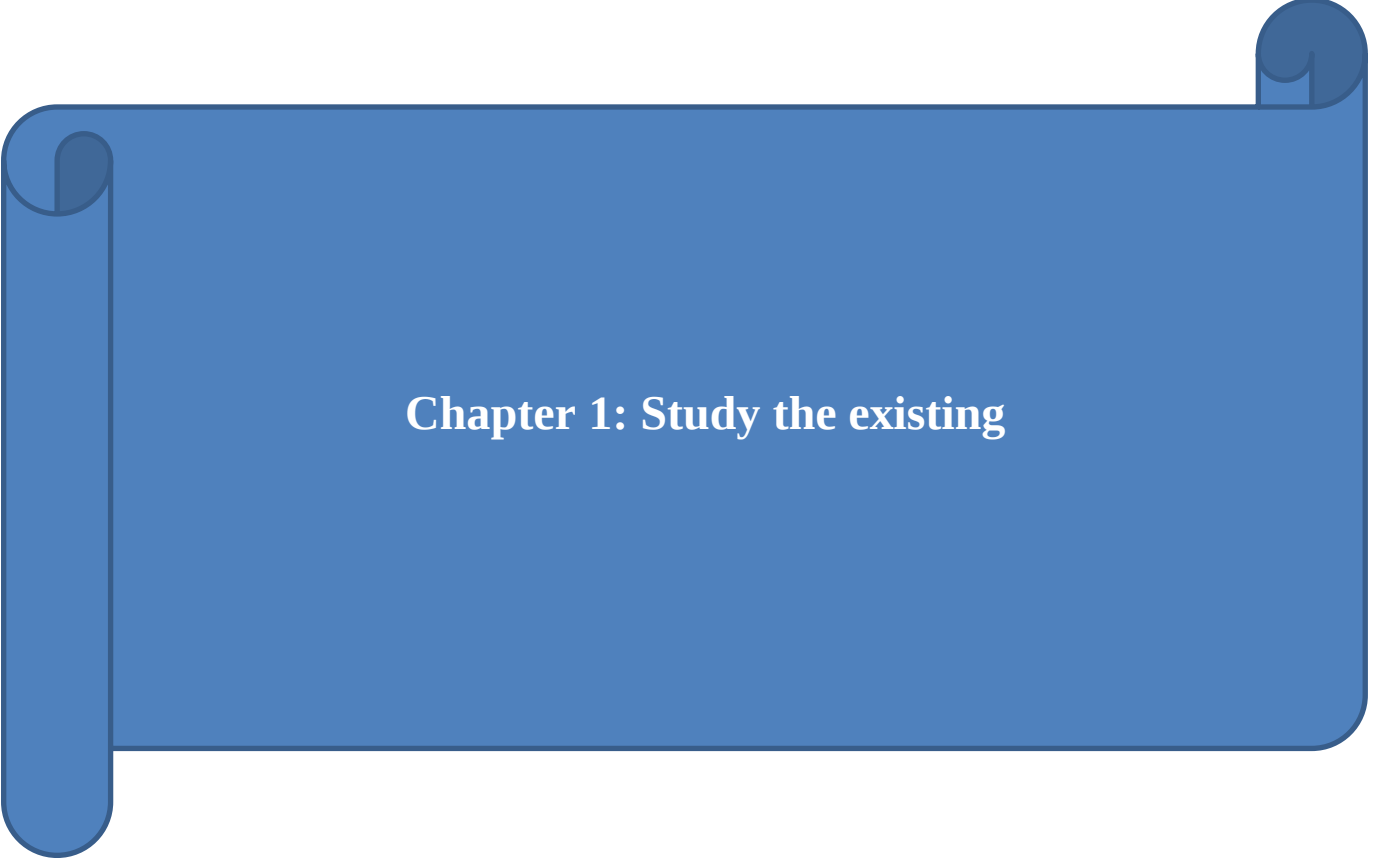
The previous two issues motivated us to create a new solution that inspires ideas from the international market but designed specifically for the Algerian market.

We propose creating a new marketplace for the vehicles market. We attempt solving the previously mentioned problems through the use of modern technologies and a better software design process.

Our project is broken into 3 parts:

- We start by introducing the different concepts related to Ecommerce, detailed problems of existing solutions and our proposed solution.
- Second, we present our software design process; start collecting user needs and end by a detailed software and database design.
- Third, we describe our choice of tools and technologies, the motivations behind it and present our user interfaces.

We finish our thesis by a general conclusion.



Chapter 1: Study the existing

1 Introduction :

The goal of this thesis is building a website for selling and buying used vehicles initially in Algeria.

This chapter studies the relevance of this idea and tries to recognize the problems we could face during the project.

2 E-Commerce :

E-commerce (electronic commerce) is the activity of electronically buying or selling products using online services or over the Internet.

Ecommerce started with websites in 1990. Since then, it kept improving until it took the look that we see today. You can buy almost any product with one click. Ecommerce has lots of advantages and disadvantages for the seller and the buyer.

For the buer:

- **Convenience:**

Convenience is the biggest perk. There is sometimes you can't move of your place or you are not in good time to go out to buy something or you just too lazy to go out , but the shopping through internet gave you the best solution for that , you can buy anytime from anywhere and almost anything , with one click and that's the big attractive thing in the shopping through the internet

- **Better prices:**

Cheap deals and better prices are available online, because products come to you direct from the manufacturer or seller without involving middlemen. Plus, it's easier to compare prices and find a better deal. Many online sites offer discount coupons and rebates, as well. Not only are prices better, but you can save on tax as well, since online shops are only required to collect a sales tax if they have a physical location in your state. Factor in the saved expense of gas and parking and you have saved yourself a lot of money!

- **More control:**

Many times, when we opt for conventional shopping, we tend to spend a lot more than planned and end up buying items that aren't exactly what we wanted

(but we can't find anything better in the store). Online, you don't have to let the store's inventory dictate what you buy, and you can get exactly what you want and need.

And for the seller:

- ✓ Much faster transactions available 24/7.
- ✓ Products and services are easy to find.
- ✓ Easier time managing a business.
- ✓ Doesn't require much (if at all) physical space.
- ✓ No geographical limitations translate as a bigger customer reach.
- ✓ Higher quality of services and lower operational costs.

But it has many disadvantages like:

- ✓ No guarantee of product quality.
- ✓ Customer loyalty becomes a bigger issue as there is a minimal direct customer-company interaction.
- ✓ Inability to experience products beforehand leads to more checkout dropouts.
- ✓ Anyone can start an online business, which sometimes leads to scam and phishing sites.
- ✓ Hackers target web shops more often than you think.
- ✓ Mechanical failures can get quite more punishing.

But through the years, companies tried to find solutions for these disadvantages: Amazon for example, checks the merchandise of sellers before letting them display it online.

3 States of the vehicles e-commerce in the world :

For the stats we can't find general things because it's hard to collect all the deals through the world, but we can find some numbers in particular websites like "moutory" which it is an Saudi website for selling and buying vehicles for people so we can take some numbers from that website:

- More than 1.200.000 Visitor Per month.
- Every potential buyer views around 7 vehicles on average every session.
- More than 70.000 calls and inquiries get generated via Motory per month.

4 Presentation of the Algerian vehicles market :

“According to the National Statistical Office (ONS), Algeria's motor fleet reached 6 418 212 vehicles in 2018, an increase of 4.15% compared to 2017, that is the equivalent of 255 538 new vehicles.”[1]

One of the challenging aspects in the Algerian vehicles market is the untrustworthiness of the buying and selling procedure. Therefore a modern digital solution is needed.

5 Presentation of the Algerian Ecommerce vehicles market:

Buying and selling vehicles online is done using websites like OuedKniss or Facebook groups. These solutions have a lot of shortcomings:

- It lacks in usability
- It is not designed specifically for Vehicles
- It lacks in moderation: most do not have dedicated moderation team.

6 Potential problems with website creation :

Many problems could encounter us during the design and implementation of the marketplace:

- Designing accessible user interfaces for better client experience.
- Providing powerful administration tools for the moderation team.

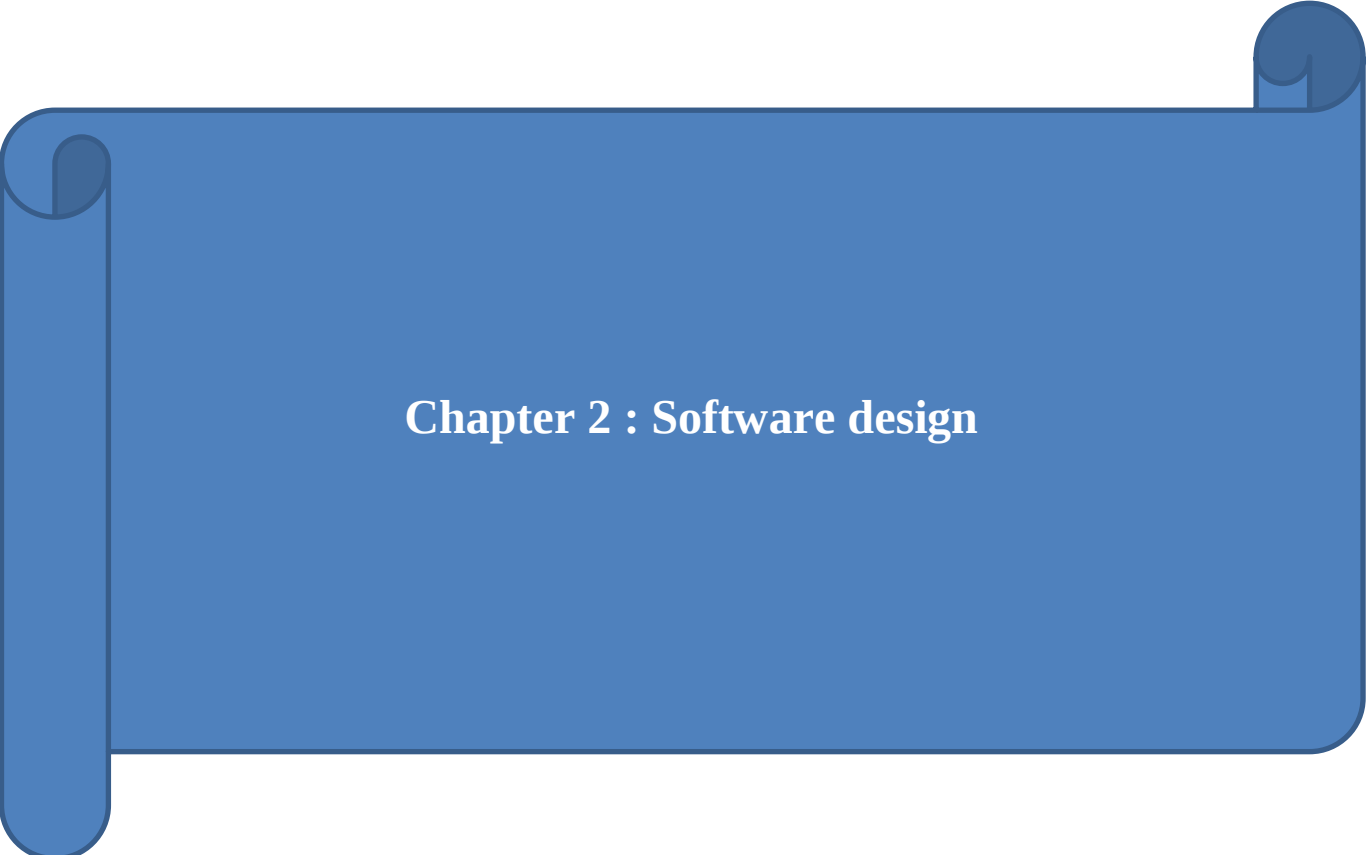
7 Our special addition:

- Much better moderation through an administration panel that will provide a safe environment for commercial transactions.
- Removing sold vehicles from the website.
- Possibility of giving a price for specific vehicle models by utilizing Data entered by users.

8 Conclusion:

In this chapter, we introduced ecommerce in the vehicles market, Worldwide and in the Algerian market, with an analysis of the existing solutions and our proposed idea.

The next step will be presenting the methods and approaches used to designing the project.



Chapter 2 : Software design

1 Introduction:

Development method it's one of the most important steps during working on projects which considering the diagrams of the project with the way of process that it take.

We going to use on this project The Unified Modeling Language (UML) Diagrams which it's perfect for this kind of projects beside the Two Track Unified process (2TUP) for software development.

2 Two Track Unified Process (2TUP):

2.1 The Unified Process definition:

The unified process is a software development process: it groups together the activities to be carried out to transform a user's needs into a software system. [3]

2.2 The main properties of Unified process:

- the unified process is based on components
- the unified process use the UML language
- the unifie process is guided by the use cases
- Focused on architecture.
- Iterative and incremental. [3]

2.3 2TUP Definition :

2TUP or Tow Unified Process it is a software development process which implement the Unified Process [4]

2.4 Methodology of Track Unified Process:

2TUP propse a « Y » development cycle, which separates the technical aspects from the functional aspects. It begins with a preliminary study which essentially consist in identifying the actors who will interact with the system to be bult, the messages that the acotrs and the system exchange , in producing the system exchange, in producing the specifications and in modeling the context .[4]

The process then revolves around three essential phases:

2.4.1 A technical branch:

Capitalize on technical know-how and / or technical constraints. The techniques developed for the system are independent of the functions to be performed.

2.4.2 A functional branch:

Capitalize on knowledge of the company's business. This branch collection the functional needs, which produces a model focused on the “business” of end users.

2.4.3 A Realization phase:

Consists in union the two branches together, which making it possible to carry out an application design and finally the delivery of a solution adapted to the needs which. The figure number II 1 explains the Y development process.

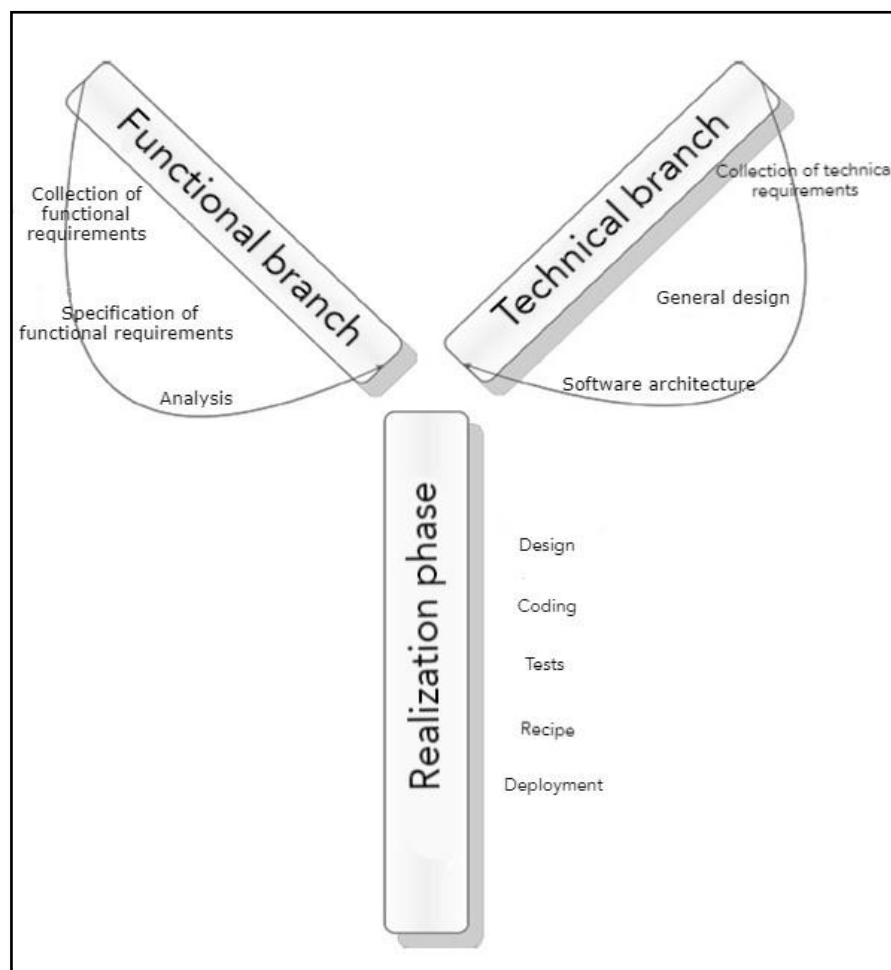


Figure II 1- The Y development process

3 Software design:

3.1 Introduction:

This step of the 2TUP process involves a primary collection of functional and technical needs using different types of diagrams. It prepares for the later steps of the software design.

3.2 Description of the system:

The systems consist of two parts: a marketplace for clients and an admin panel for the moderation team.

3.3 Identification of actors:

The actors likely to be involved in the system:

- Visitor : person who doesn't belong to the system and he have no privilege because he doesn't have membership, so he only can browse the website
- Client: is a member in the website he have ability to add cars to sell or commenting on other cars , plus he have a profile and information
- Supervisor: he's a member whom have privilege on clients and their profiles and products like banning them deleting comments and products.. that's for Keeping safety on the site so if there any fake products or profiles he's the responsible of deleting them or punishing them
- Admin: the manager of the website he have all the privilege with option to give them to anyone so he can divide roles.

3.4 Context modeling: The figure number II 2 presents Dynamic context diagram

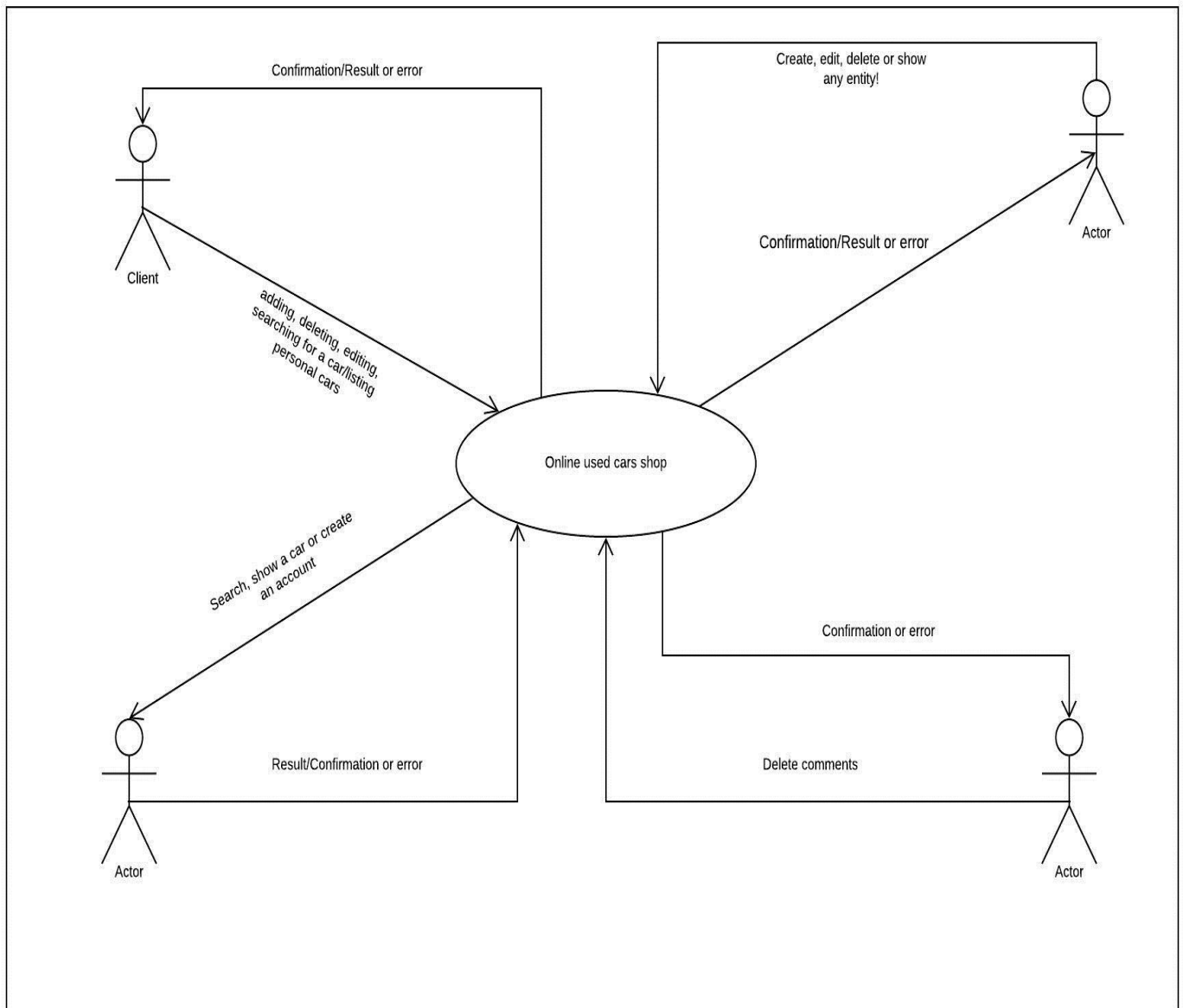


Figure II 2- Dynamics contexte diagram

4 Collection of functional requirements :

4.1 Identification of use cases:

The following table presents List of use cases

Table II 1 : List of use cases

Use Cases	Actors
Accounts Management	Admin
vehicles Management	Client
Comments Management	Client
Browsing vehicles List	Visitor

The figure number II 3 presents general use case diagram.

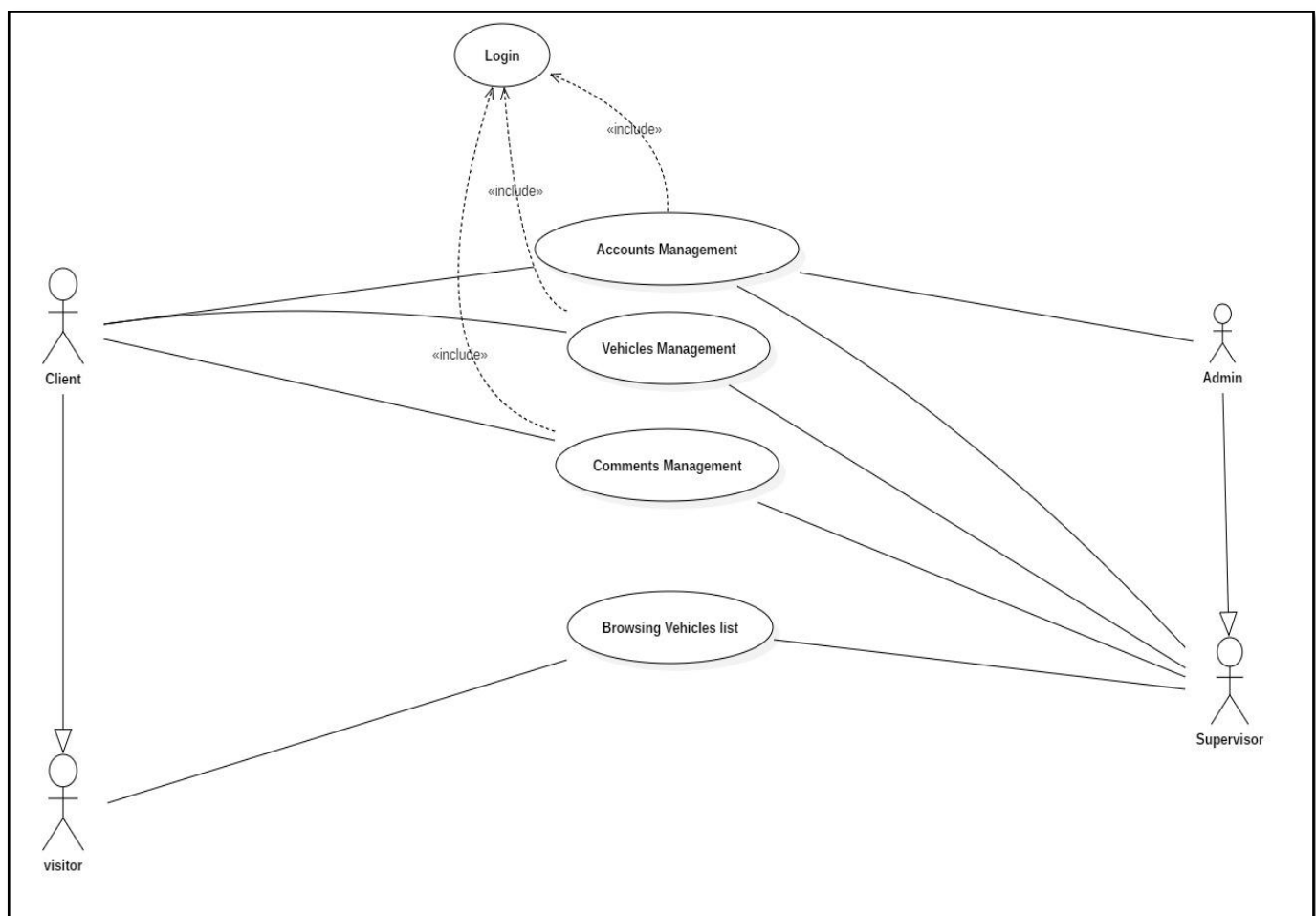


Figure II 3- User Case Diagram

- “Accounts Management” Use Case :
- Intention : anything relate to accounts exclude Admin account
 - Action : update , delete and add profile user information for user and admin
- a. User case diagram : The figure number II 4 presents Accounts management Use Case

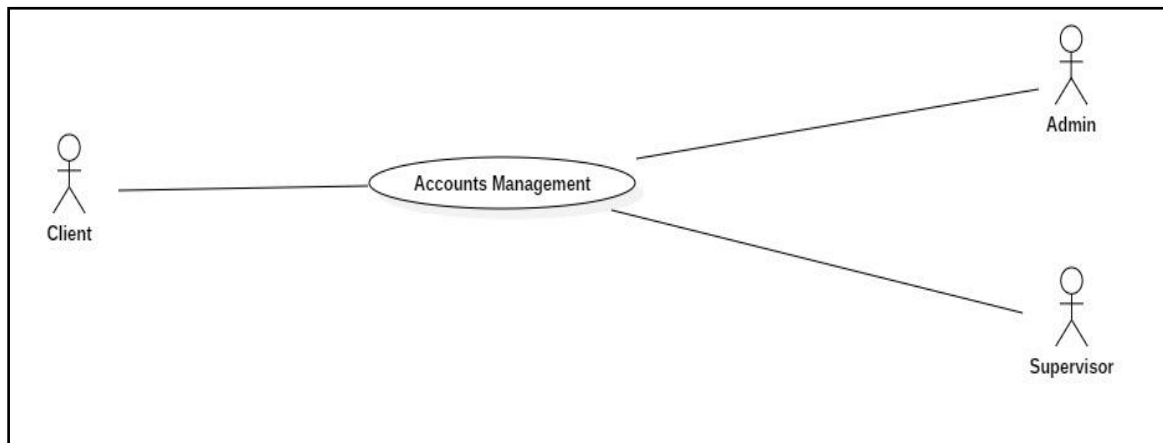


Figure II 4- Accounts management Use Case

- b. Activity diagram : The figure number II 5 Accounts management activity diagram



Figure II 5 - Accounts management activity diagram

- c. Sequence diagram: The figure number II 6 and figure II 7 presents accounts management sequence diagram for the user and the Supervisor(Including the admin).

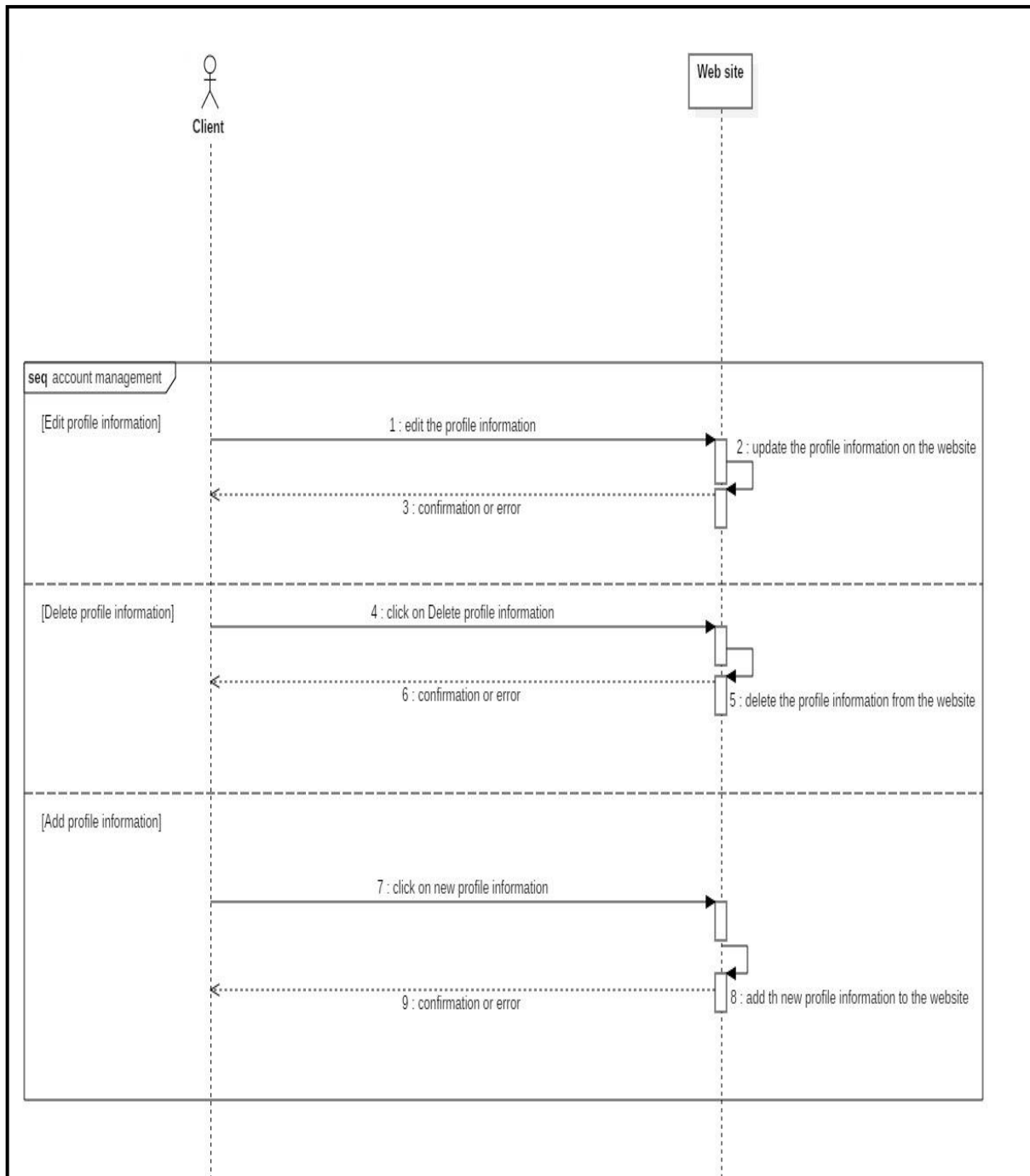


Figure II 6 - User account management sequence diagram

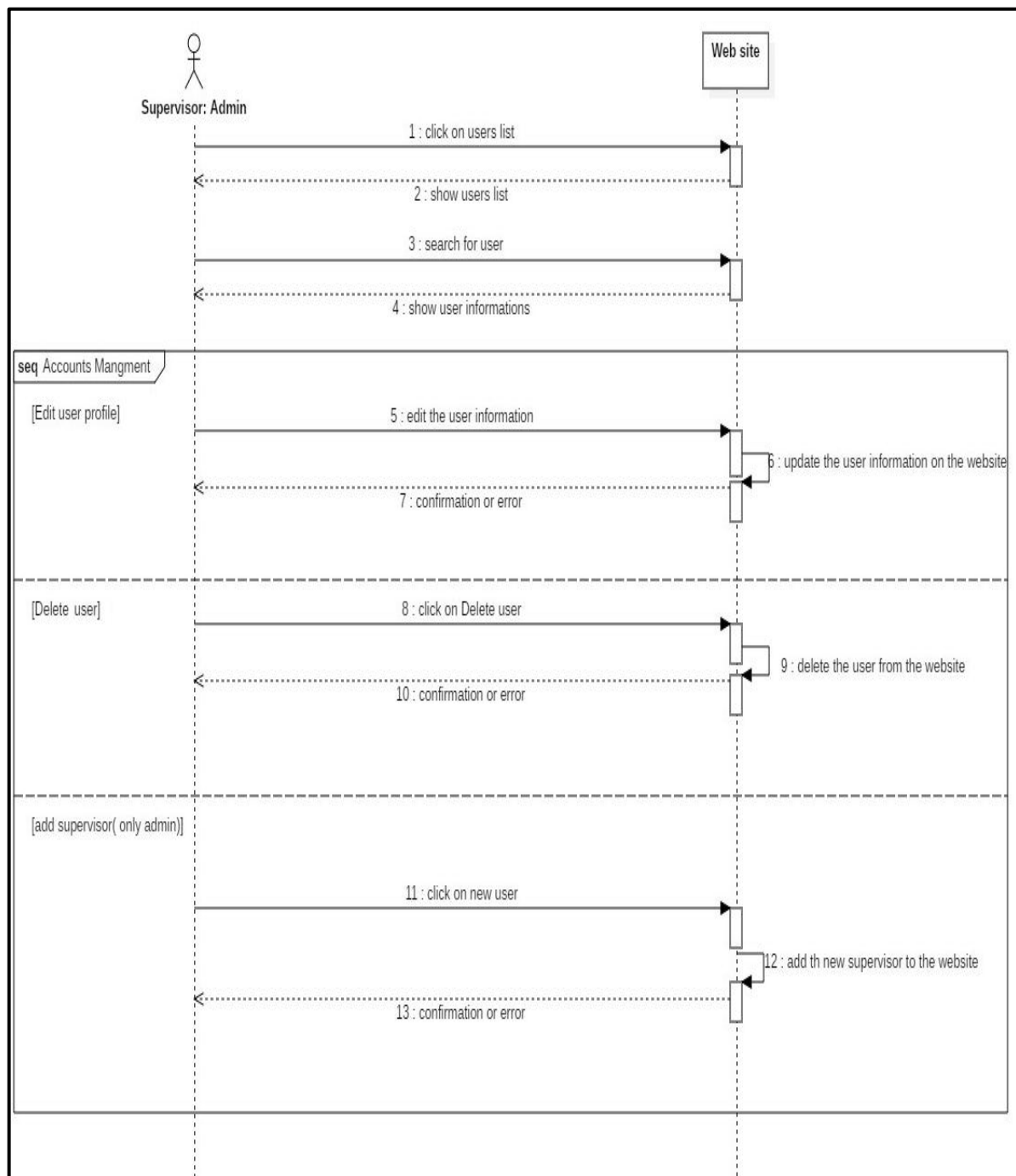


Figure II 7 Supervisor and Admin accounts management



➤ “Vehicles Management” Use Case :

- Intention : anything relate to products (vehicles)
- Action : if there is no problem and the information as require it will confirm

a. User case diagram : The figure number II 8 presents Vehicles Management Use Case

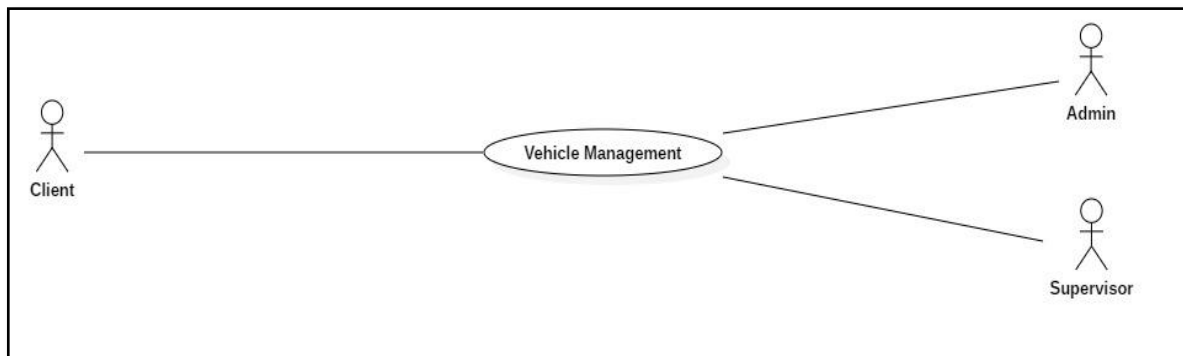


Figure II 8 - Vehicles Management Use Case

b. Activity diagram : The figure number II 9 presents Vehicles Management activity diagram

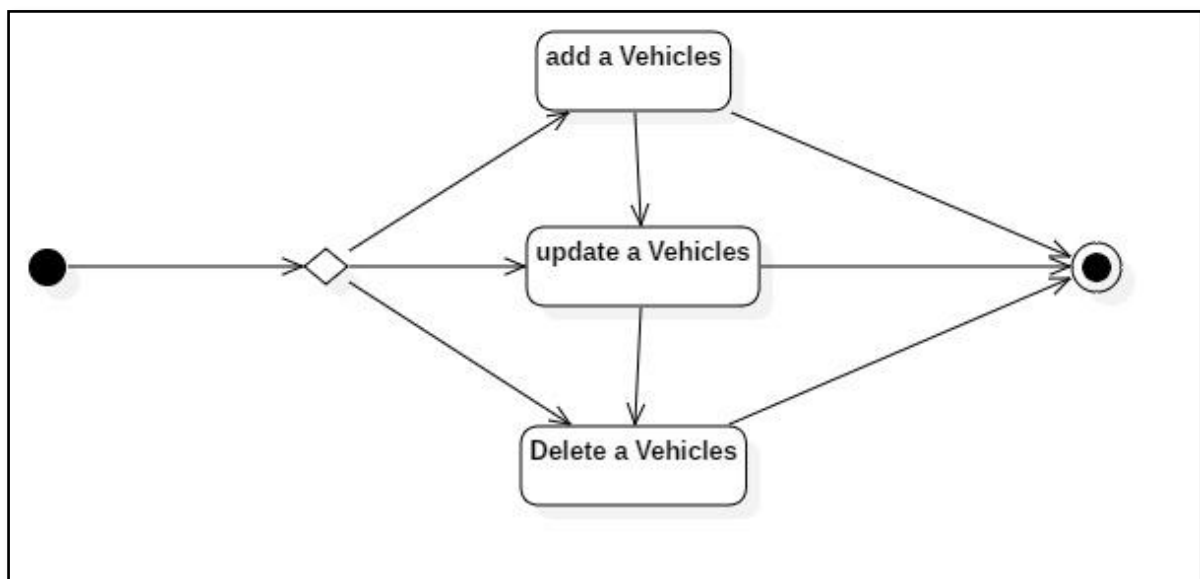


Figure II 9 - Vehicles Management activity diagram

- c. Sequence diagram : The figure II 10 and figure II 11 presents vehicles management sequence diagram for the clients and supervisor (include admin)

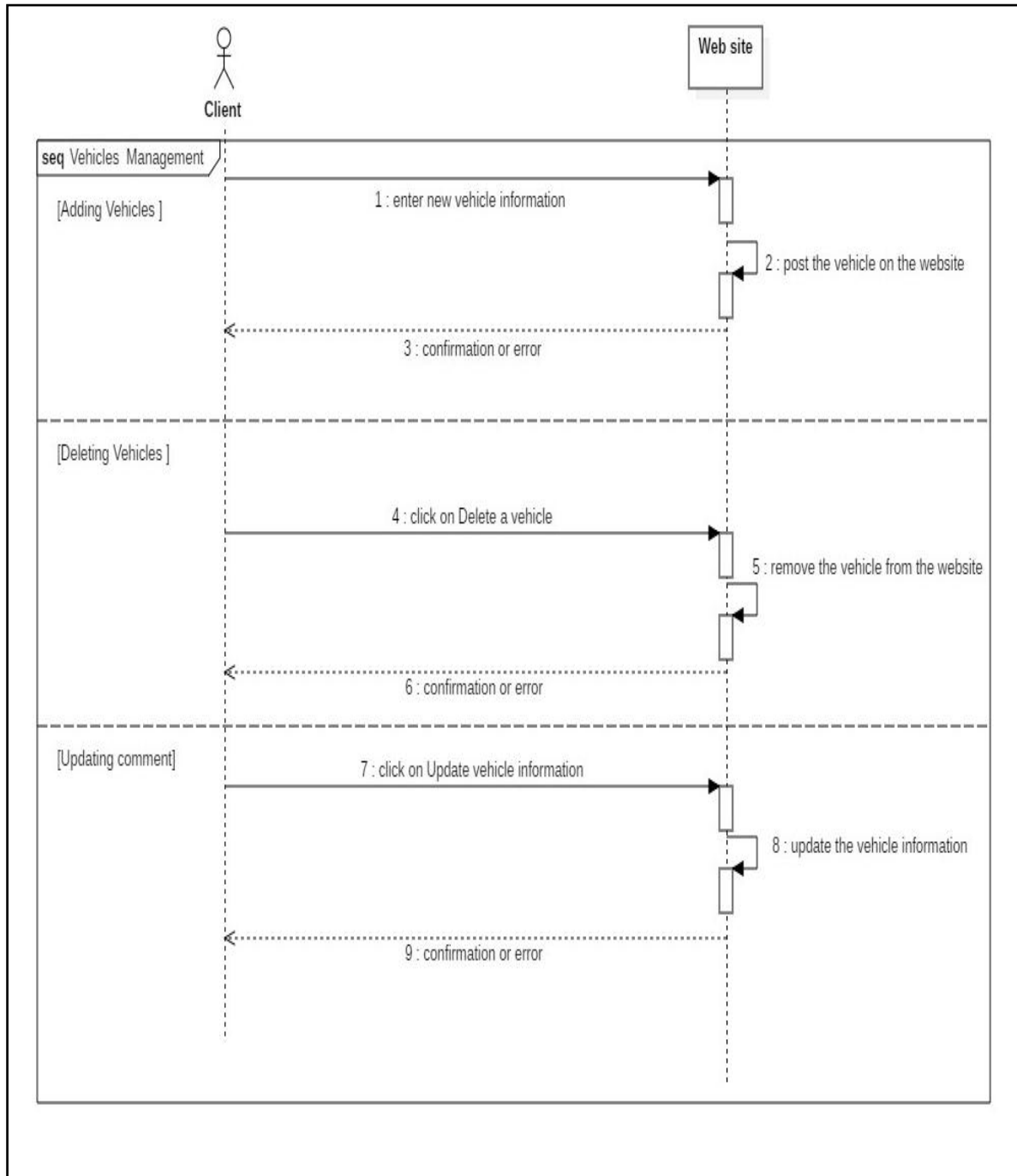


Figure II 10 - User Vehicles Management Sequence diagram

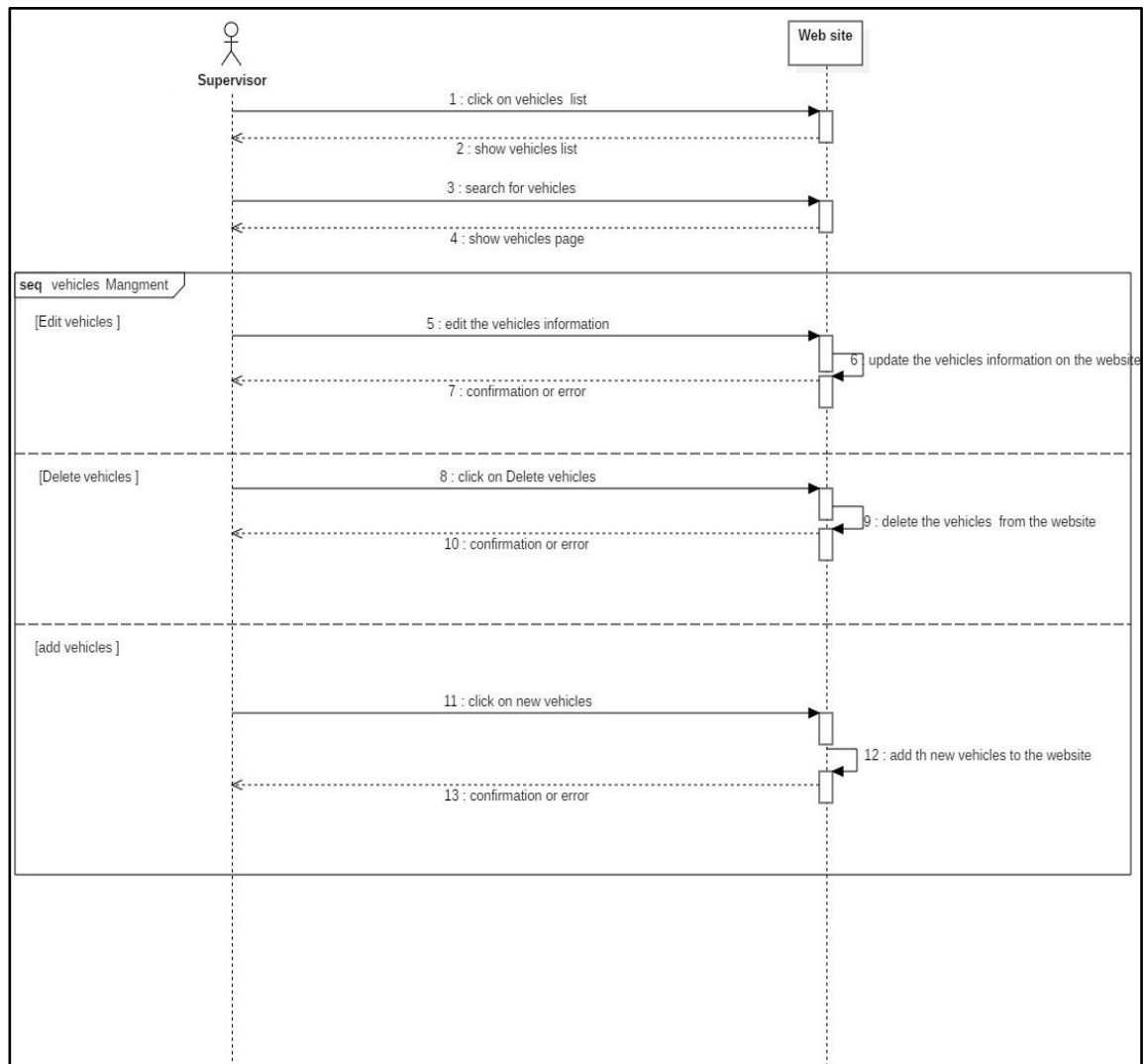


Figure II 11 - Supervisor and Admin Vehicle Management Sequence diagram

➤ “Comments Management” Use Case Intention :

- Intention : anything relate to comments
- Action :
 - Add comment
 - Delete comment
 - Update comment

a. User case diagram : The figure number II 12 presents comments management for user and supervisor (including admin)

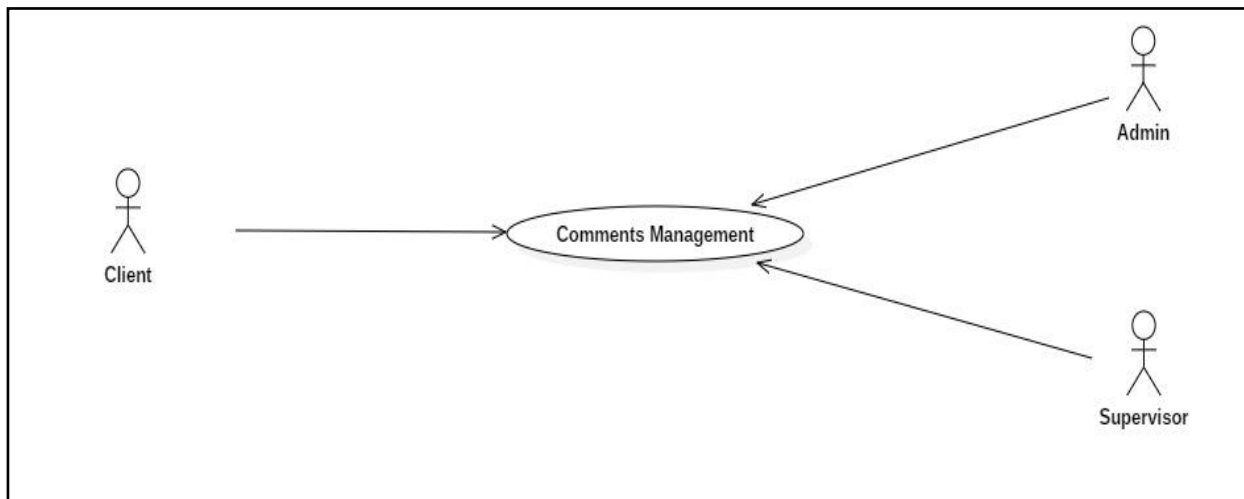


Figure II 12 - Comments Management User case

b. Activity diagram : The figure number II 13 comments management activity diagram

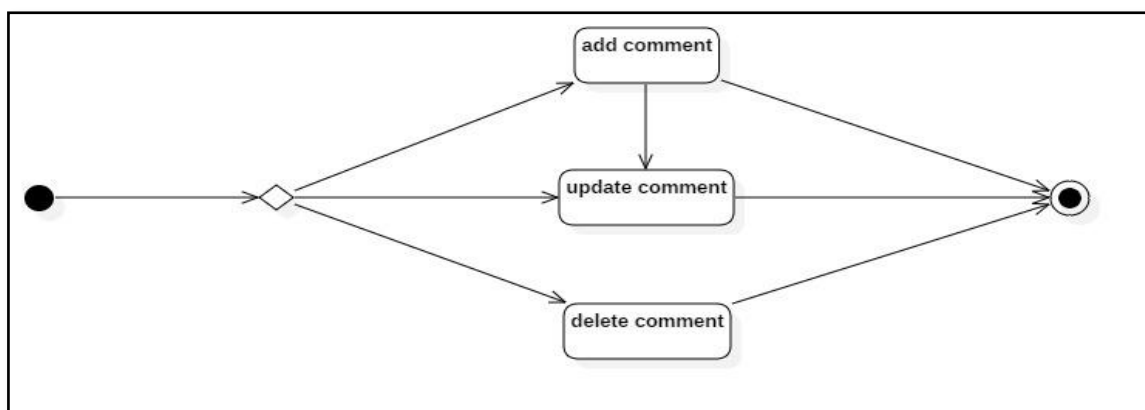


Figure II 13 - Comments Management Activity diagram

- a. Sequence diagram: The figure II 14 and figure II 15 presents comments management sequence diagram for the user and the Supervisor(Including the admin).

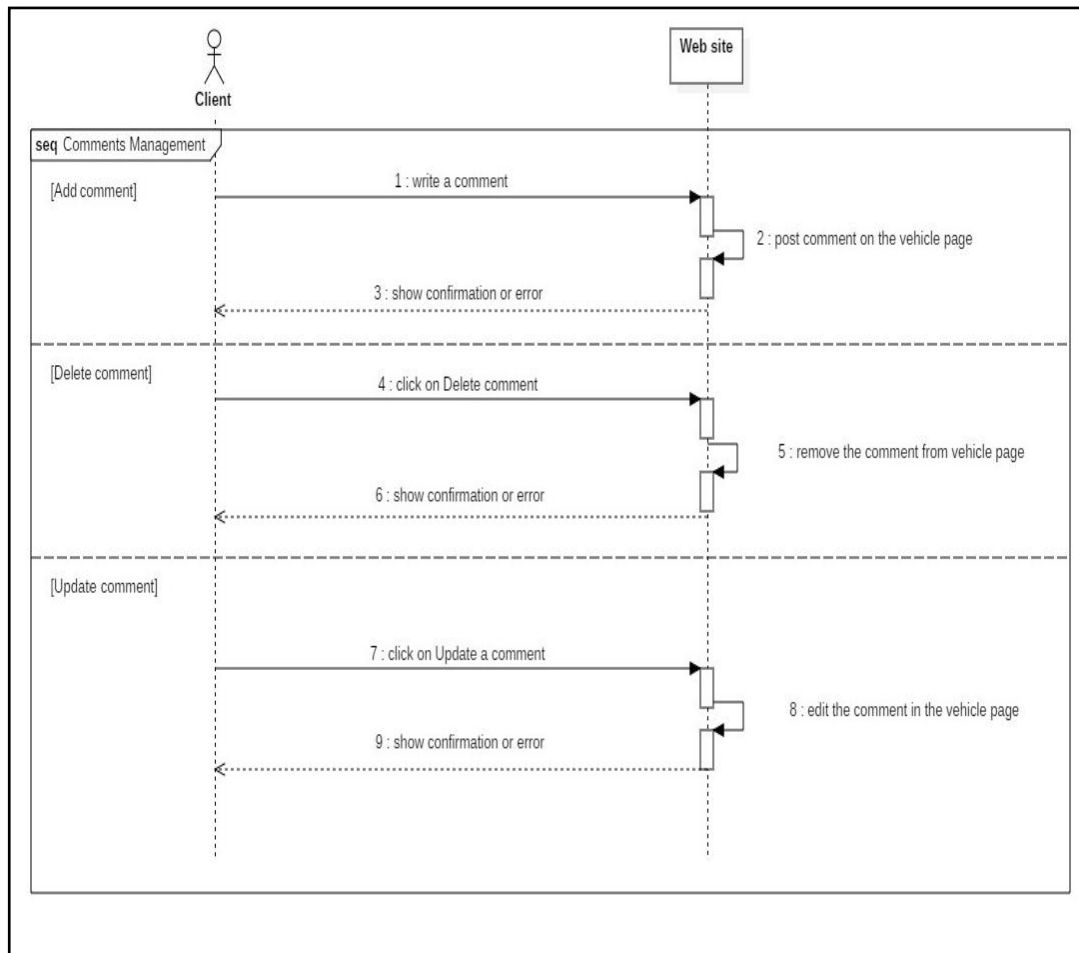


Figure II 14 – User comments Management Sequence diagram

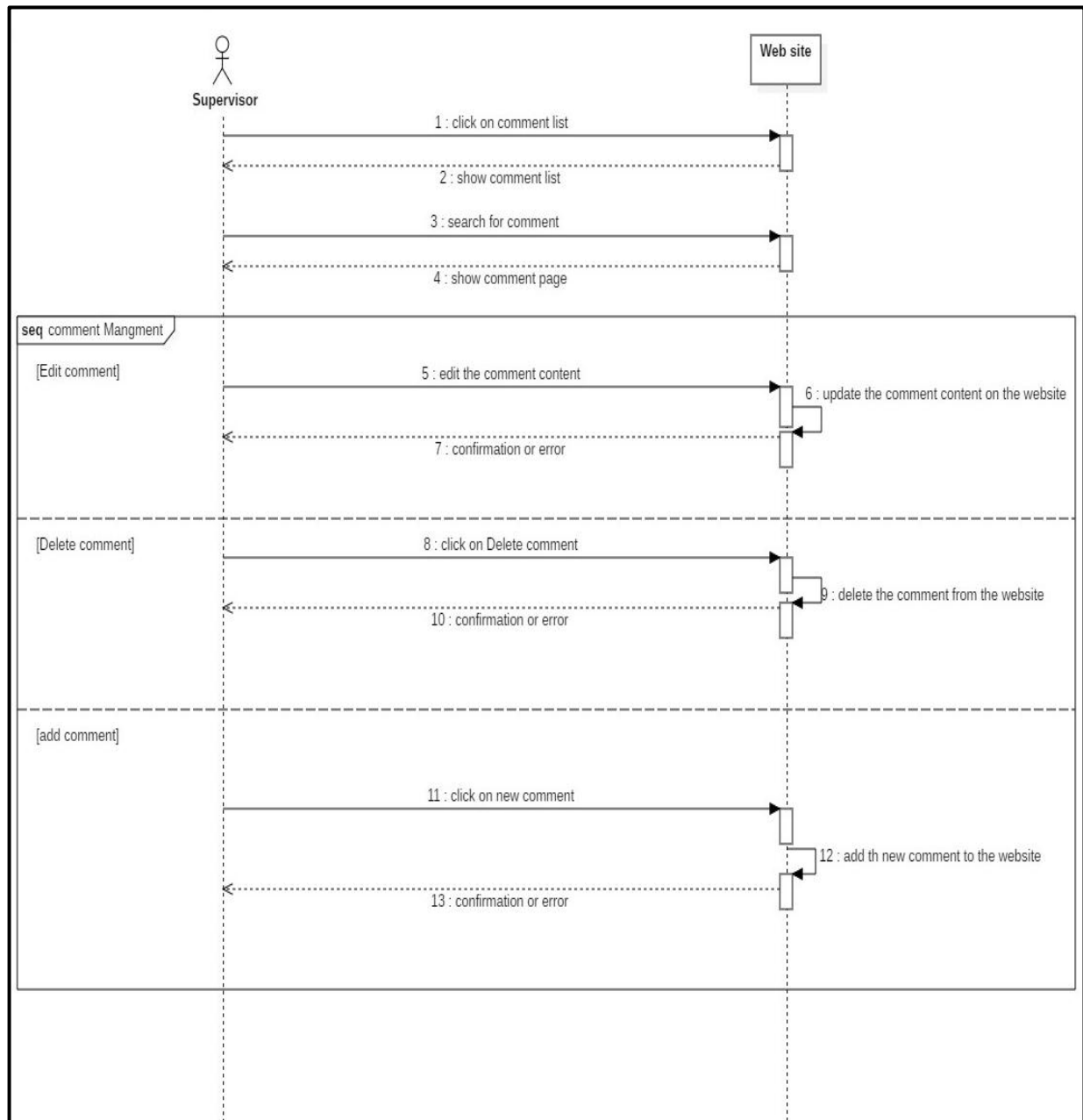


Figure II 15 - Supervisor and Admin comments Management Sequence diagram

- “Browsing Management” Use Case :
 - Intention: Browsing the products list
 - Action : Only browsing

a. User case diagram : The figure number II 16 presents browsing use case diagram

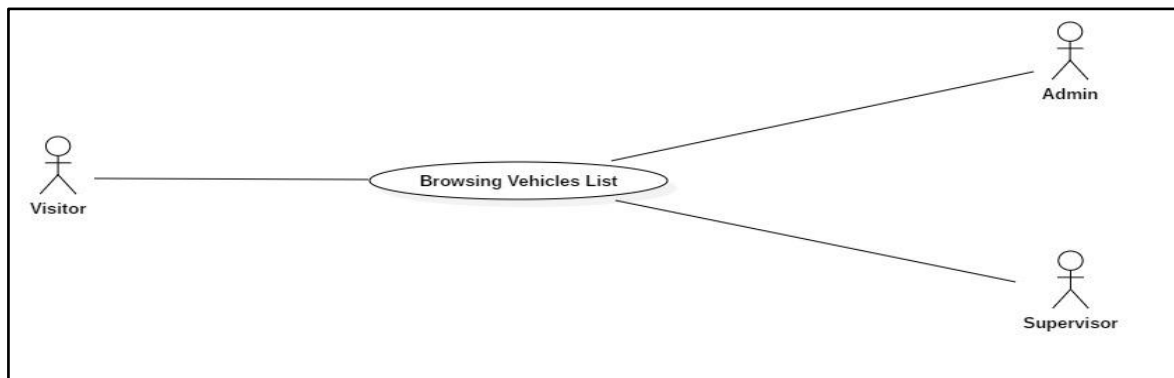


Figure II 16 - Browsing Use Case diagram

c. Activity diagram : The figure number II 17 Browsing activity diagram

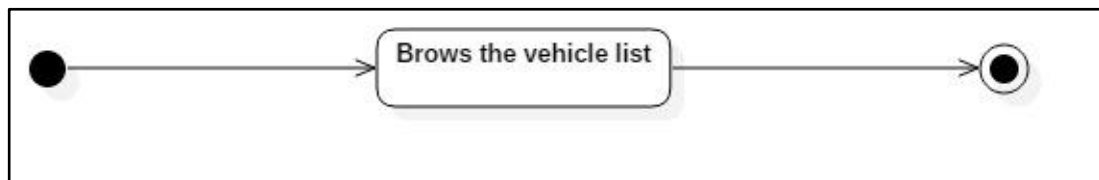


Figure II 17 - Browsing Activity diagram

- b. Sequence diagram : The figure number II 18 presents Browsing sequence diagram for the visitor

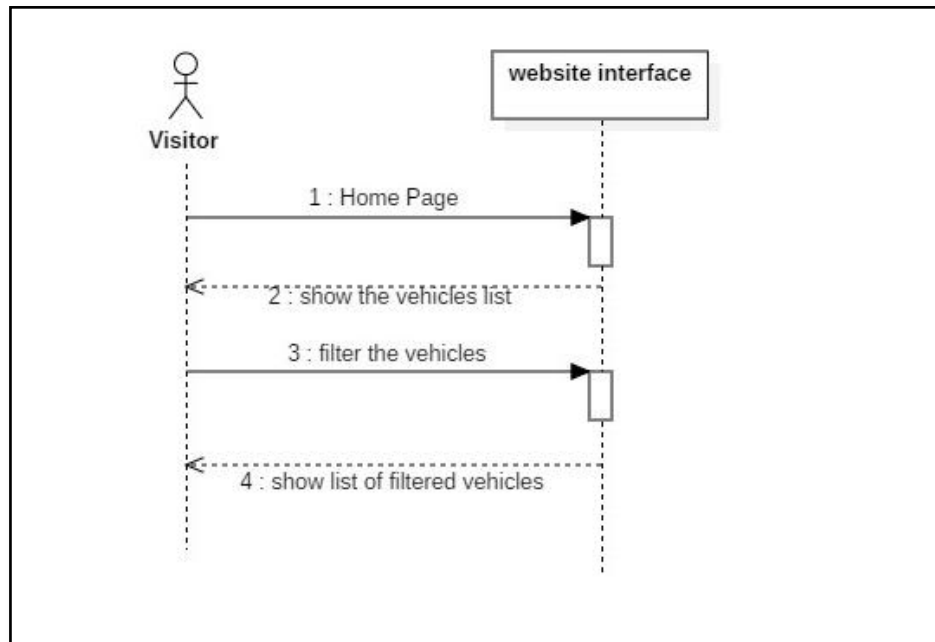


Figure II 18 - Browsing sequence diagram

4.2 List of candidate classes:

The table below shows the different classes resulting from the use cases analyzed previously and you found it on The table II 2 explains

Table II 2- The candidate classes

Use case	Candidate Classes	Attributes
Accounts Management	client	clientID
		firstName
		familyName
		email
		phoneNumber
		address
Vehicles Management	vehicle	vehicleId
		series
		distance
		price
		description
		photo
	model	modelId
		modelName
	brand	brandId
		brandName
	type	typeId
		typeName
Comments management	comments	commentId
		content
	add comments	date

5 Collection of technical requirements:

5.1 Identification of technical use cases:

- Visitor(User): it's an user whom have no membership in website so his privilege limited to browsing only
- Client(User): user who have a membership and profile in the website he can put products and comment on other products
- Supervisor(User): sit security guard
- Admin(User): the website manager
- Accounts Management: an use case describe all the operation we can do on profiles information according to the actor privilege
- Vehicles Management: an use case describe all the operation we can do on vehicles information according to the actor privilege
- Comments Management: an use case describe all the operation we can do on comments information according to the actor privilege
- Browsing Vehicles List: taking a look on the products that the website display

The technical use constraints give rise to the software specification model represented by the figure II 19 use case diagram:

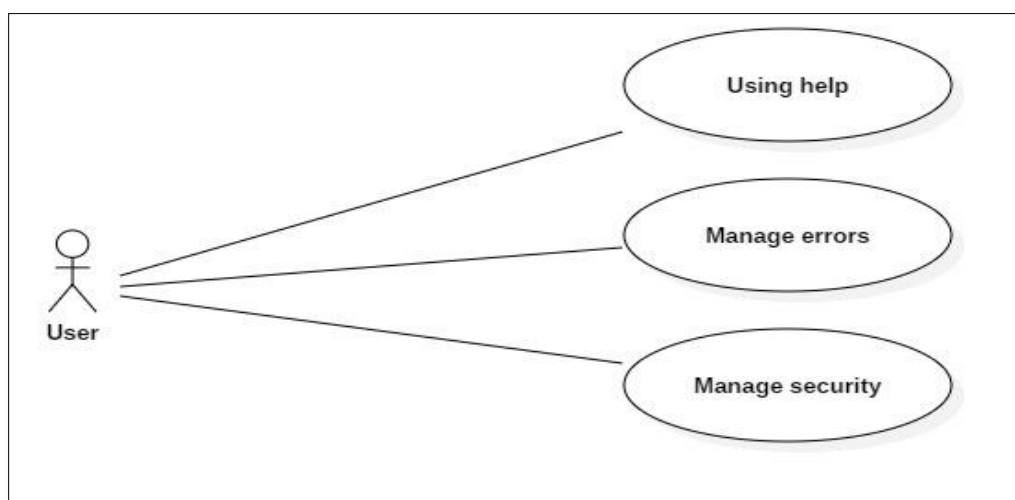


Figure II 19- Technical user case diagram

6 Development of the static model:

This step will allow us to illustrate the main constructions of the class diagram. These class diagrams, summarily developed in the functional needs analysis step, will be detailed, completed and optimized.

6.1 Class diagram :

The figure number II 20 presents class diagram

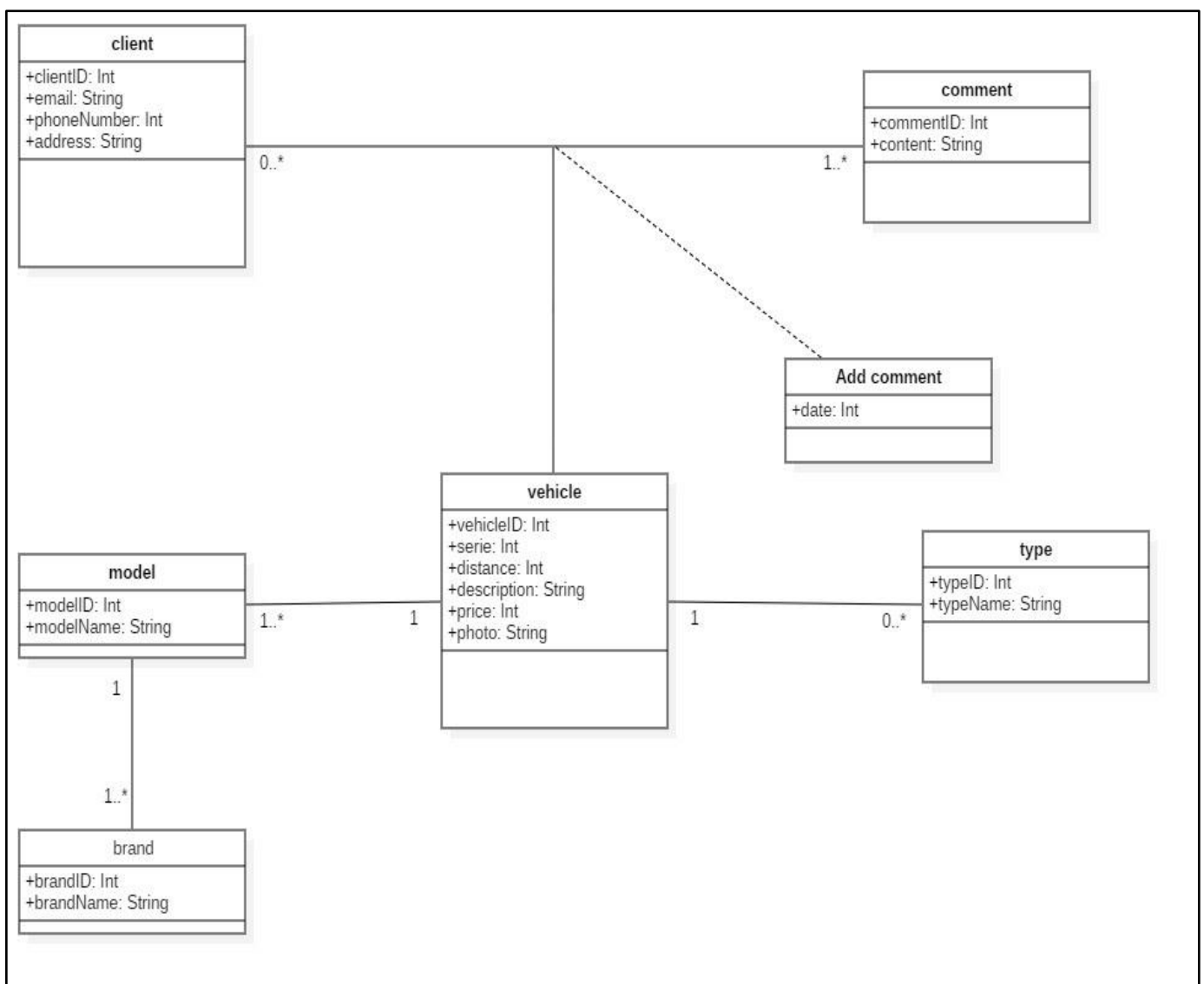
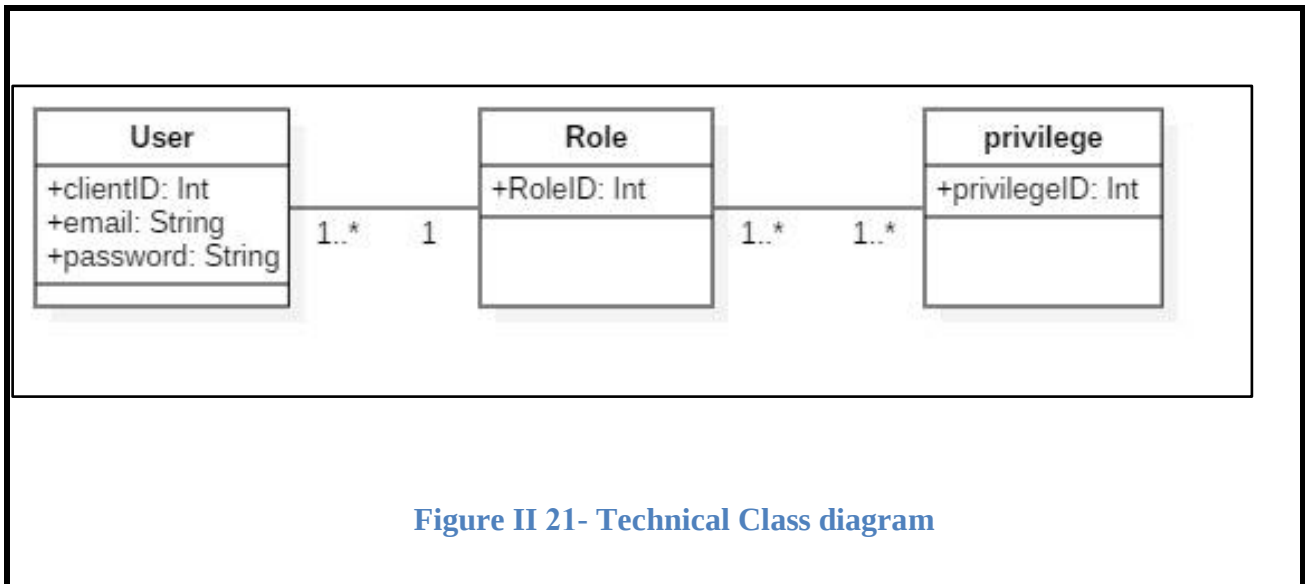


Figure II 20- Class diagram

6.2 Technical Class diagram:

The figure number II 21 presents the technical class diagram



7 Detailed design:

Detailed design is the final phase of modeling which consists of constructing and precisely documenting the classes, tables and methods that constitute the coding of the solution.

7.1 Description of the class model:

The table II 3 presents the class model with description.

Table II 3- Description of class model

Classes	Attributes	Description	Type [length]
client	clientID	Client identification number	Int[3]
	firstName	Client First Name	String[20]
	familyName	Client Family Name	String[20]
	phoneNumbre	Client phone number	String[10]
	Address	Client address	String[20]
vehicle	vehicleID	Vehicle identification number	Int[3]
	serie	Production Date	Int[10]
	description	Vehicle description	String[800]
	distance	The distance that vehicle has traveled since it was produced	Int[10]
	price	Vehicle price	Int[12]
	photo	Vehicle photos and pictures	String[50]
model	modelID	Model Identification number	Int[3]
	modelName	Model name	String[20]
brand	brandID	Brand Identification number	Int[3]
	brandName	Brand name	String[20]
type	typeID	Type Identification number	Int[3]
	typeName	type name	String[20]
comments	commentID	Comment Identification number	Int[3]
	content	content of the comment	String[500]
add comments	date	Comment date	Date[]
user	clientID	Client Identification number	Int[3]
	email	Client email address	String[30]
	password	Pass word of user	String[20]

7.2 Switching to the relational model:

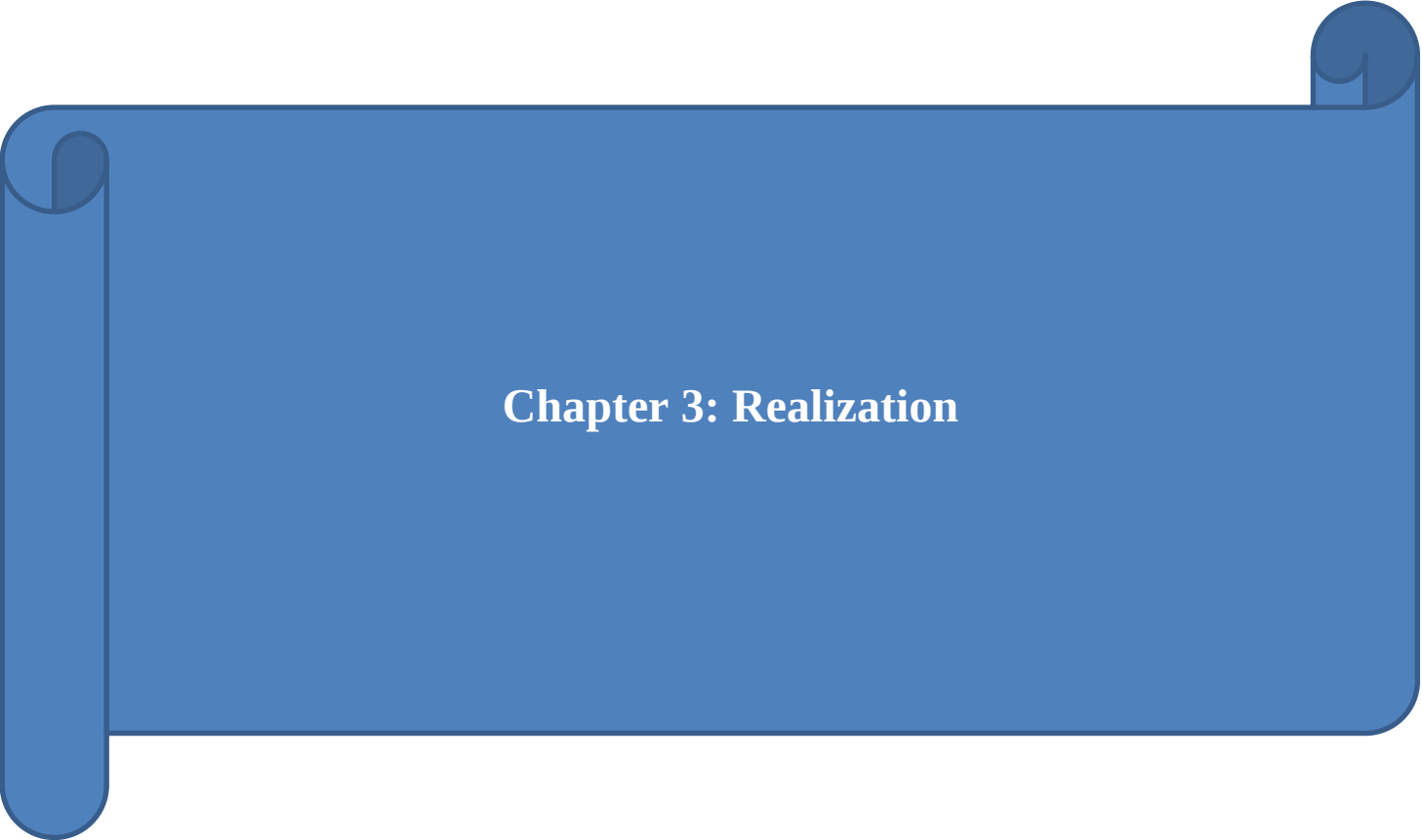
To use DBMS we need to move one from object model to relational model which we already done the table II 4:

Table II 4- List of tables in the data base

Table	Primary key	Attributes
client	clientID	<u>clientID</u> , firstName, familyName, email, phoneNumbre, address
vehicle	vehicleID	<u>vehicleID</u> , <u>ClientID</u> , <u>modelID</u> , <u>typeID</u> , serie, description, distance, price, photo
model	modelID	<u>modelID</u> , <u>brandID</u> , modelName
brand	brand ID	<u>brandID</u> , brandName
type	typeID	<u>typeID</u> , typeName
comments	commentID	<u>commentID</u> , Content
addcomment	clientID vehicleID commentID	date, <u>clientID</u> , <u>vehicleID</u> , <u>commentID</u>
user	clientID	<u>clientID</u> , email, password

8 Conclusion:

With the aim of creating this website life, in this chapter, we presented a collection of the digraphs used during the modeling followed a development process. The results of this chapter will be enriched by details of implementation in the next chapter to realize our system



Chapter 3: Realization

1 Introduction:

In the last chapter we presented our methodology and software design, in this chapter we are going to introduce the technology stack used , the implementation of our project and its user interfaces.

2 Development Environment

2.1 Programming Language (JavaScript)

JavaScript is one the most used programming languages on the web. With its rich set of libraries, it helped us implement both and frontend and the backend of our marketplace.

Advantages:

- ✓ No compilation needed: JavaScript is JIT-compiled and doesn't need a separate compilation phase.
- ✓ Platform independent: JavaScript can run on any operating system and in the browser.
- ✓ Simplicity: JavaScript has an intuitive syntax and semantics making it extremely accessible to new programmers.

2.2 Editor (VSCode):

VSCode is the most popular JavaScript editor. It is created and maintained by Microsoft Corporation. It has a rich set of plugins and extensions to speed up development.

2.3 Database (MYSQL):

"MySQL" is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founders Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language"[5]

2.4 Architecture:

We used the "Three-tier architecture" for better maintainability. "Three-tier architecture is a client-server software architecture pattern in which the user interface (presentation), functional process logic ("business rules"), computer data storage and data access are developed and maintained as independent modules, most often on separate platforms."[6]

3 Project presentation:

3.1 “Home” user interface:

The “Home” user interface shown in figure III 1 is the starting page of the website, It enables the user to search and explore enlisted vehicles

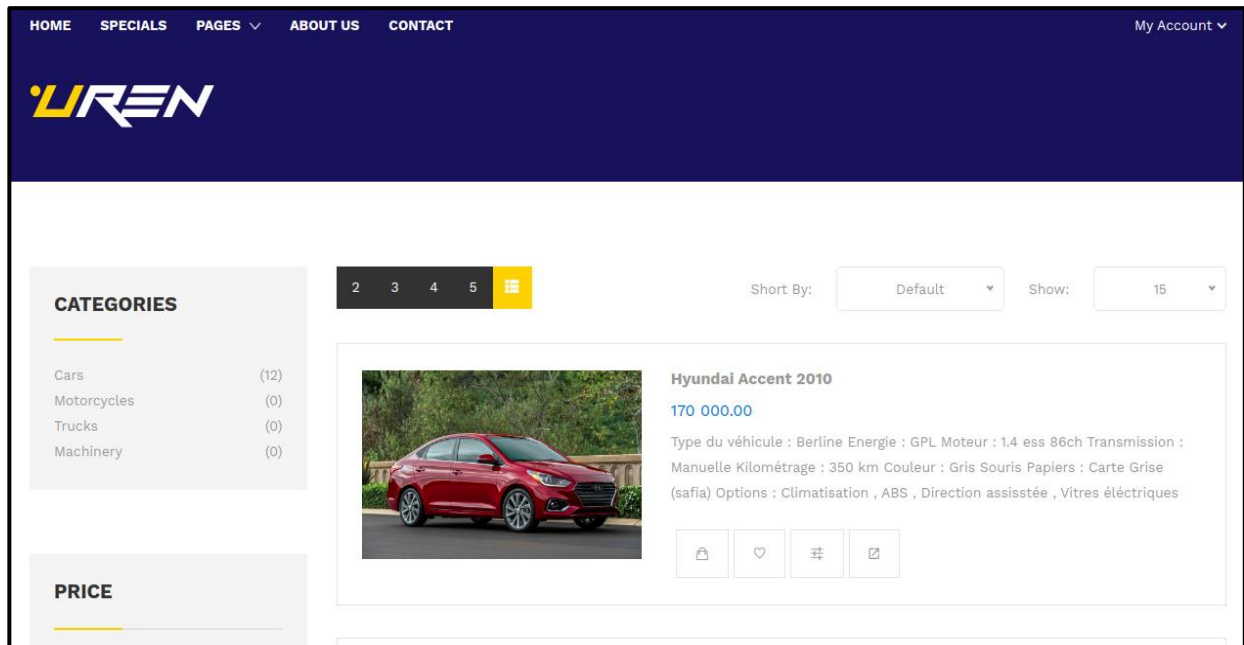
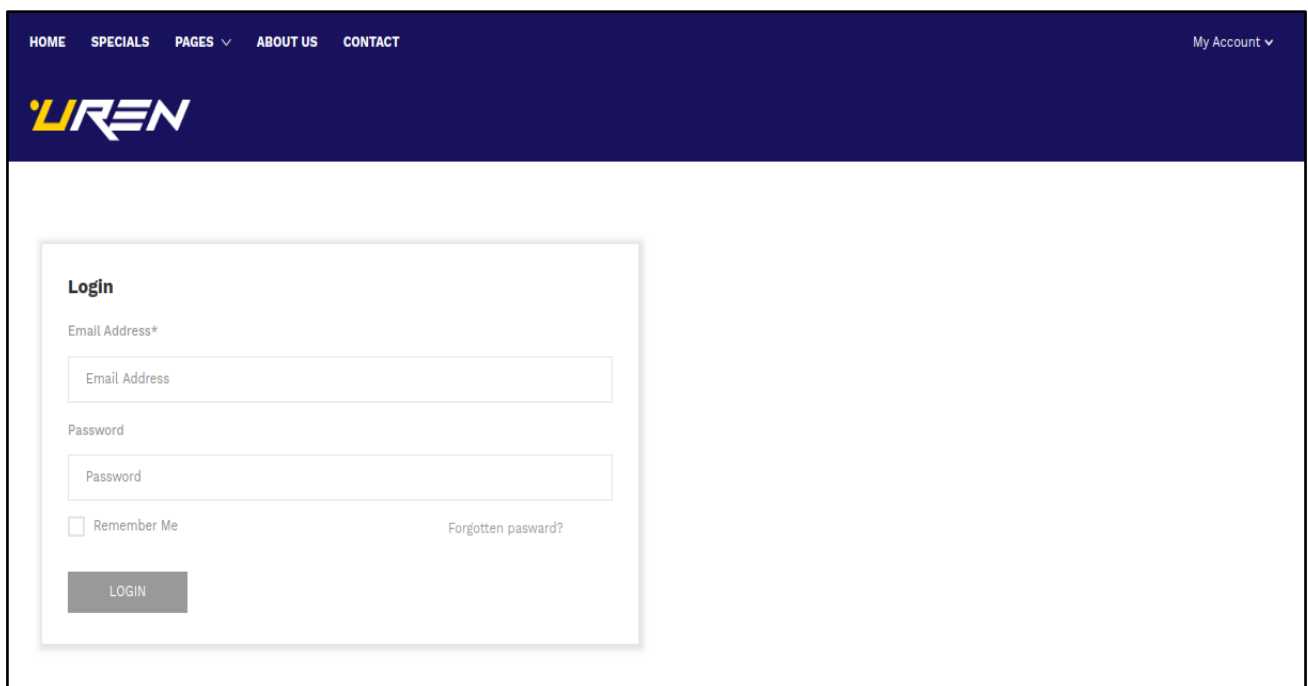


Figure III 1- Home user interface

3.2 "Login" user interface:

The "Login" user interface show in figure III 2- is page web used by clients to access their accounts on the marketplace.

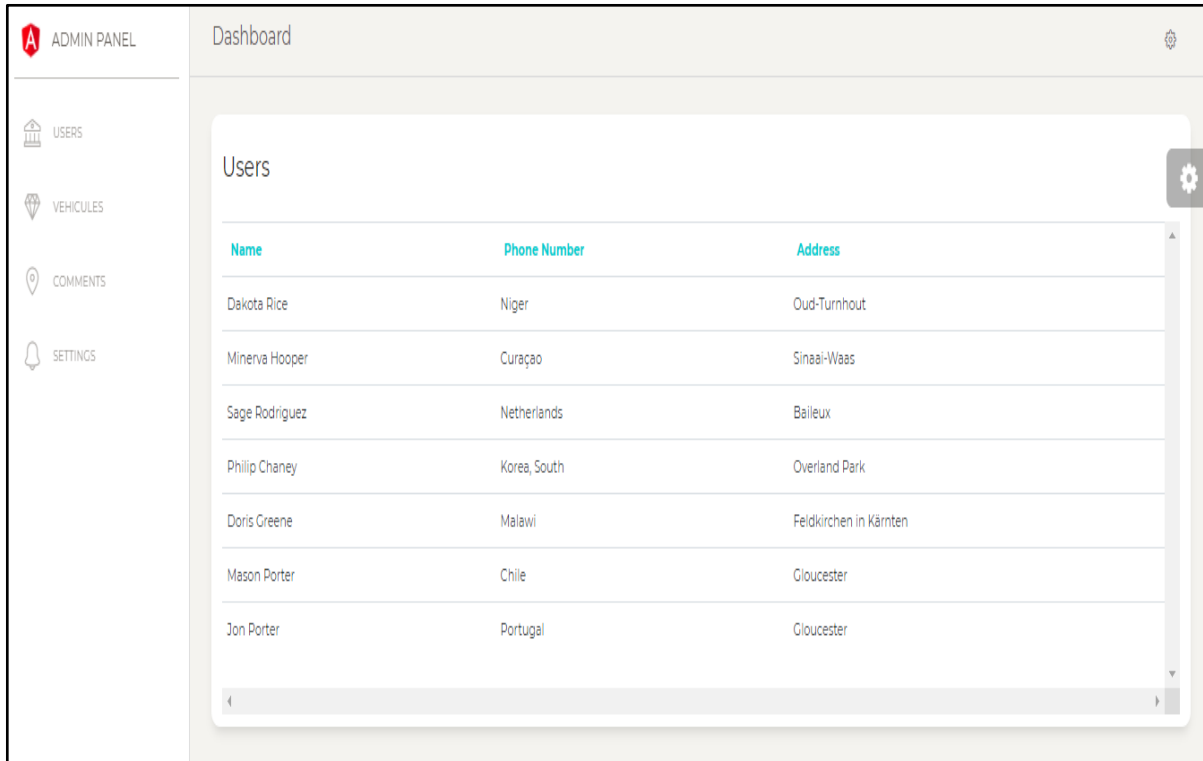


The screenshot displays the login page of the UREN website. The header is dark blue with navigation links: HOME, SPECIALS, PAGES (with a dropdown arrow), ABOUT US, and CONTACT. On the right side of the header is a link for My Account (with a dropdown arrow). The UREN logo is positioned on the left side of the header. The main content area is white and features a login form. The form is titled "Login" and includes an "Email Address*" label above a text input field. Below this is a "Password" label above another text input field. Under the password field, there is a checkbox labeled "Remember Me" and a link labeled "Forgotten pasward?". At the bottom of the form is a grey button labeled "LOGIN".

Figure III 2- login user interface

3.3 "Administration Panel" user interface:

The "Administration Panel" user interface show in figure III 3 is used by the moderation team (the admin and the supervisors) to manage many aspects of the marketplace.



The screenshot displays the 'ADMIN PANEL' interface. On the left is a sidebar with navigation links: USERS, VEHICLES, COMMENTS, and SETTINGS. The main content area is titled 'Dashboard' and contains a 'Users' section. This section features a table with the following data:

Name	Phone Number	Address
Dakota Rice	Niger	Oud-Turnhout
Minerva Hooper	Curaçao	Sinaai-Waas
Sage Rodriguez	Netherlands	Baileux
Philip Chaney	Korea, South	Overland Park
Doris Greene	Malawi	Feldkirchen in Kärnten
Mason Porter	Chile	Gloucester
Jon Porter	Portugal	Gloucester

Figure III 3- Adminstration Panel

4 Conclusion:

In this chapter we have presented and explained the implementation of our website and its different features that enable Algerian internet users to sell and buy vehicle with more transparency.

General Conclusion :

Our goal in this thesis was to design and implement a new Ecommerce solution for the Algerian vehicles market.

We started our work by introducing Ecommerce, the problems with the existing solutions and our proposed new solution. In the second chapter, We moved to the software design phase by trying to collection user needs and finished by a detailed design of our software. The third chapter involved the implementation details and the presentation of the important user interfaces.

This work benefited us immensely by putting our theoretical training into practice and by sharpening our web development skills.

Perspectives:

Our projects could be improved in various ways:

- Mining data collected by the website to understand market trends and consumer behavior.
- Increasing security and confidence in the website.
- Adding monetization the website.

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- [2] <https://ksa.motory.com/ar/>: real website for selling and buying Vehicles
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