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Sur le thème

Conception et Développement d'un système de Covoiturage inter-urbain sous Android et Web

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Abstract

This project is about developing an interurban carpooling system (between the wilayas) under Android and Web platforms. Customers are of two types: car drivers and travellers. The Android application will be used by both types of customers for registration and reservation of seats for a given trip. The web part will allow the system manager to have a dashboard of all the activities recorded in the Android application.

Keywords: intercity carpooling, Web management of reservation system, Android application for carpooling.

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Introduction

As is the trend worldwide, Algeria is undergoing rapid urbanization. This means that more people than ever before will be living and working in cities and that more people and more goods will be making more and longer trips in urban areas. The costs of increasing dependence on cars are resulting in expensive road building and maintenance, high levels of energy consumption along with its economic and environmental costs, worsening air and noise pollution, traffic accidents, and social inequities that arise when the poor find transportation services increasingly unaffordable. Thanks to increasing vehicular traffic, overcrowded public transport, congested roads, the lack of public transportations (train, buses, and metros), and the growth in the population there is inadequate transportation through the car, transportation in Algeria has become an everyday challenge, especially for students and people with low incomes.

In the following Figure we present the number of land transport vehicles registered from 2008 to 2019 in Algeria:

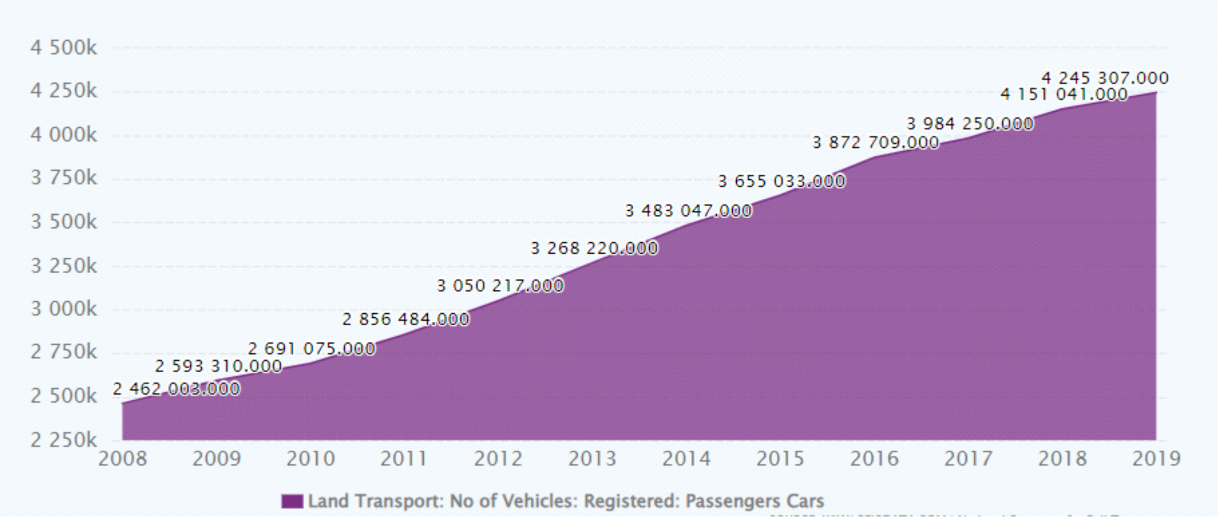


Figure 1. Algeria's land Transport Registration (1)

Problematic: In today's world, there are lots of people commuting from place to place. Example: employees going home, students going home from university, etc. In addition, many times, people will be commuting via car when there is a place to take a fellow people along with them to give a ride. But the problem is there is no easy way to know how many people a person can take and co-ordination is a huge issue that there is no effort by people to help each other by giving a lift and this saves the environment in fuel usage, reduces traffic with fewer vehicles, etc. Finally, to the best of our knowledge, there is no system in Algeria to allow people to carpool.

Proposed Solution: We propose to develop an Android application called **"***UrbanMobile*" that will provide advanced searching techniques and provide the most relevant results for carpooling through the country, where people can book a carpool ride, or share their ride with others and cut the cost of fuel. With just a tap of a finger, you will be able to create an account, book a ride, and be ready to go at the specified time and price. Every ride will start and end at *UrbanMobile* agencies in every state in Algeria to ensure the safety of the passengers.

This carpooling system merges multiple new people in a car, which leads to meeting new people in a car, reduces air pollution and noise pollution, save the economy of every people as they share their rides costs with the other member in the car. It will stop endless Spending money on travel. *UrbanMobile* is an emerging alternative transportation mode that is eco-friendly and sustainable, it has clear benefits for both your organization and your staff and/or students, and may also benefit the wider community (2).

Organizational Benefits	Individual Benefits	Community/Societal Benefits
• Reduce costs and car parking problems • Frees up land for other uses • Increase productivity and retention • Promote internal social networks • Improve organizational image	• Reduce travel costs (if shared) • May save time (reduced traffic congestion) • Reduce stress (burden of driving shared) • Reduce need for a second car • Provide alternative travel options • Reinforce social networks	• Reduces traffic volumes and congestion • Reduces vehicle emissions • Contributes to a cleaner environment • Helps reach emission reduction targets

Table 1 Carpooling Benefits

Chapter 1: The Android Universe

1. Introduction

The Android operating system is a mobile operating system that was developed by Google be primarily used for touchscreen devices, cell phones, and tablets. Its design lets users manipulate the mobile devices intuitively, with finger movements that mirror common motions, such as pinching, swiping, and tapping. Google also employs Android software in televisions, cars, and wristwatches—each of which is fitted with a unique user interface.

Android is an open-source and Linux-based mobile operating system that has been around for nearly 15 years. Known as the base operating system of phones and tablets around the world. Additionally, other operating systems natively support Android applications, including Chrome OS and Windows 11.

It was initially developed by Google and later the OHA (Open Handset Alliance). Java language is mainly used to write the android code even though other languages can be used.

2. Why Android?

The emergence of Android created a new rivalry between smartphone manufacturers, with Apple serving as Google's chief competitor. To some, this competitive dynamic mirrors that of the “cola wars” between Coca-Cola (KO) and Pepsi (PEP) over the past 30 years, where no clear winner or loser has emerged.

Android provides a rich application framework that allows us to build innovative apps and games for mobile devices in a Java and other language environments with powerful features as shown in the following Figure:

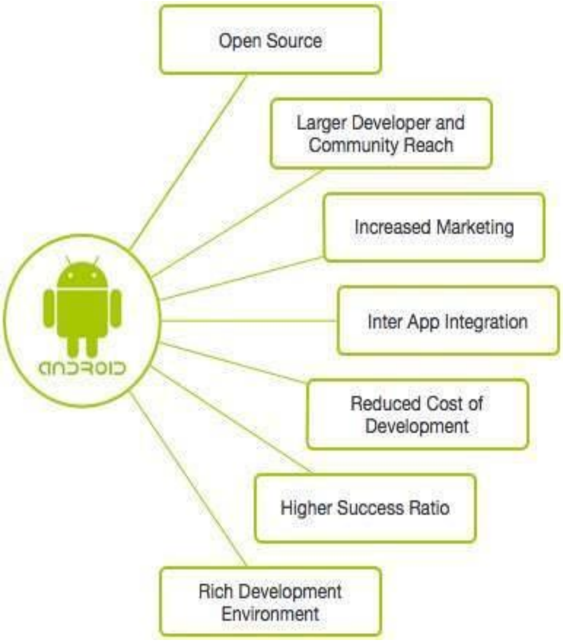

android
Open Source
Larger Developer and Community Reach
Increased Marketing
Inter App Integration
Reduced Cost of Development
Higher Success Ratio
Rich Development Environment

Figure 2. Android Features (3)

In the market, there is a wide range of hardware devices powered by the Android OS, including many different phones and tablets. Even development of android mobile apps can occur on Windows, Mac OS, or Linux, without forgetting that Android is the most used operating system on phones in virtually all countries, with some countries, such as Algeria, having over 96% market share as demonstrated in the following Figure:

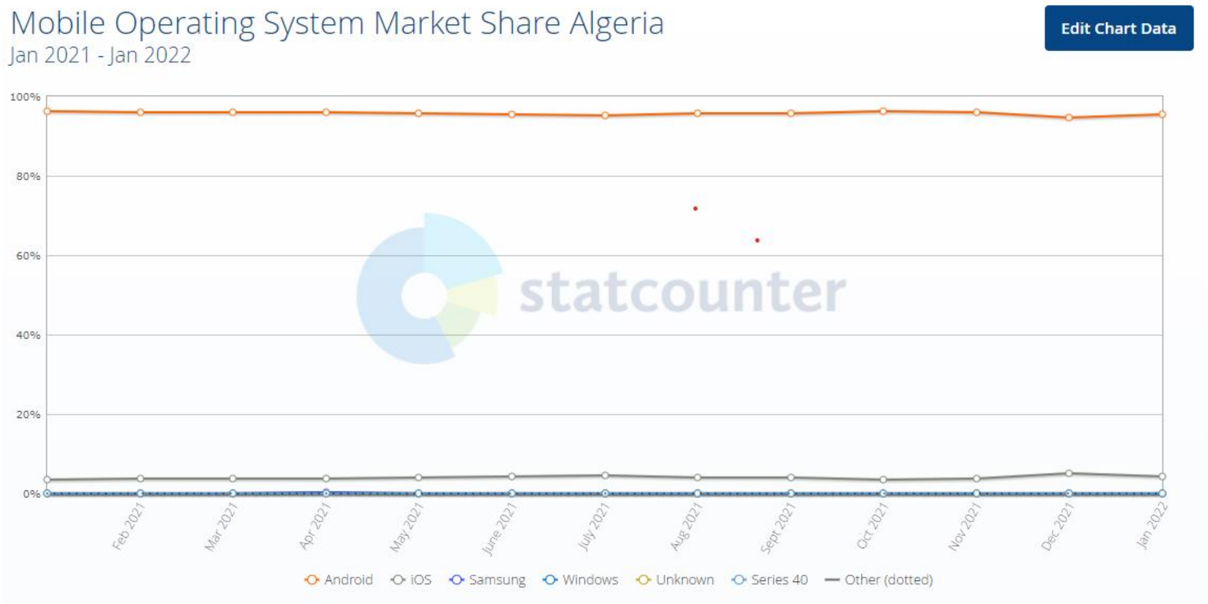


Figure 3. Mobile Operation System Market Share in Algerie 2021 (4)

3. Advantages of Android Apps

Simple and User-Friendly Interface: Android OS basic screen provides a beautiful and intuitive user interface.

Fast Loading Speed: One of the prime reasons why most mobile applications fail to create an impact in the market is because of their slow loading speed. The users prefer applications proving quick response

Supporting the Multiple Languages: Another striking feature that will give your Android app the upper hand in the tough race is integrating the support for multiple languages.

Flexibility: There are three main mobile operating systems – iOS, Android, and Windows and to achieve the best out of your app, it needs to be available on all of these. Android apps are easy to upload to the PlayStore, but iOS needs to be tried and tested by Apple before they are allowed on the App Store.

Other Technical features/characteristics of the android operating system include the following: Near Field Communication (NFC) - Alternate Keyboards - IR Transmission - No-Touch Control - Automation - Wireless App Downloads - Storage & Battery Swap - Custom Home Screen - Widgets - Custom ROMs - Headset layout - Connectivity: GSM/EDGE, IDEN, CDMA, Bluetooth, WI-FI, EDGE,3G,NFC, LTE,GPS. - Messaging: SMS, MMS, C2DM (could to device messaging), GCM (Google could messaging) - Multilanguage support - Multi-touch - Video calling - Screen capture - External storage - Streaming media support - Optimized graphics (5).

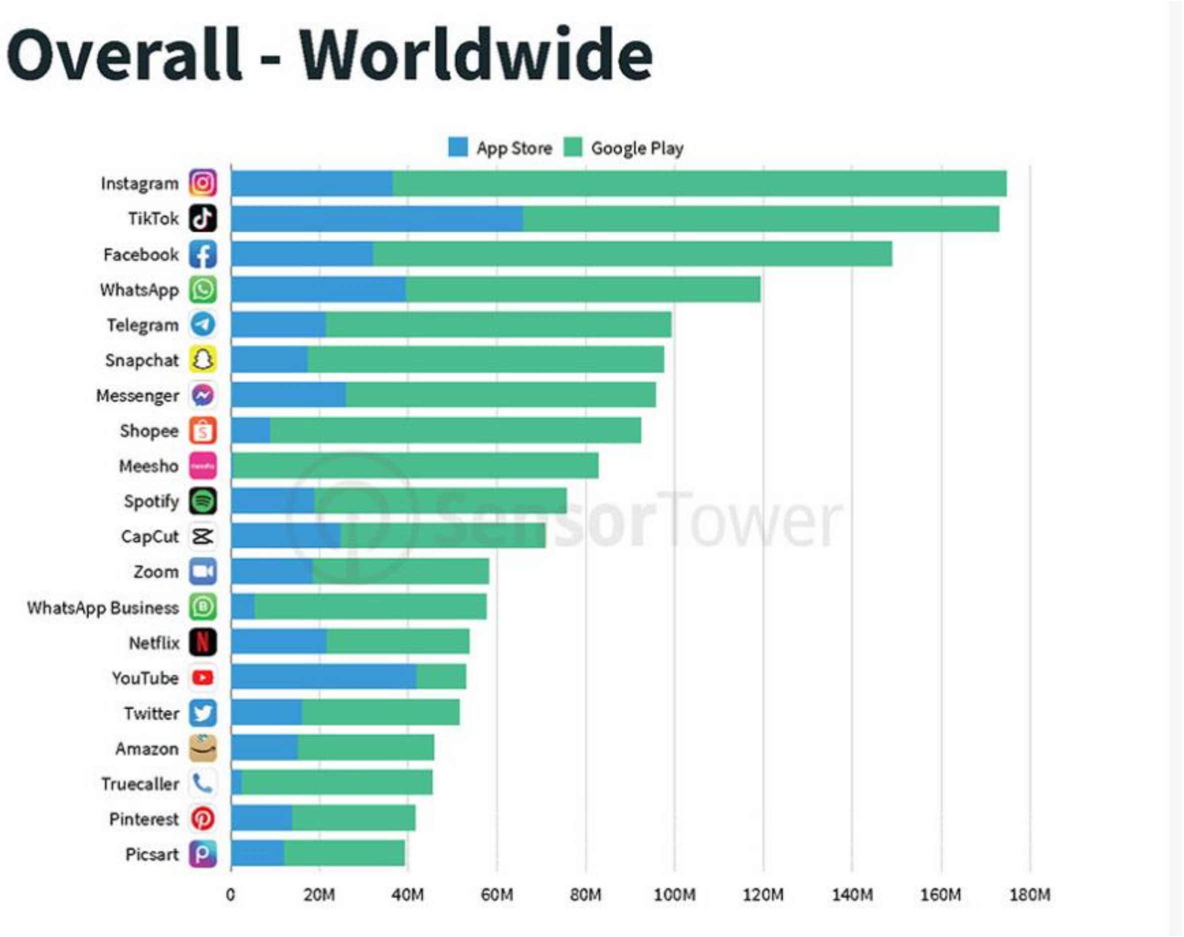


Figure 4. Appstore vs Playstore Apps downloads (6)

4. Android management applications

in the following we present some of the most popular service-based management applications in the market:

a. Online Shopping (eBay Amazon, BestBuy)

Online shopping is becoming increasingly popular for a variety of reasons. There are certainly outside factors such as increasing gas prices, difficulty in getting to traditional stores, and hassles often associated with shopping malls and other traditional stores to contribute to the increased interest in online shopping. Consumers can get full information about the product with its reviews being passed by the existing users. If someone wants to buy a product he/she is no longer limited to asking friends and families because there are many products reviews on the app that gives opinions of the existing users of the product.

b. Doctor Appointment Apps (HealthPlix SPOT, MFine, Practo)

A doctor appointment app is a software application that is especially meant to help patients manage and schedule appointments with the doctors or plan a video call or opt for a real-time chat.

c. Dating Apps (Tinder, Bumble, Hinge)

Dating apps are search tools. They use algorithms to make match recommendations using your data, which includes personal info (location and age ...etc.) as well as preferences you set and your app activity.

5. E-service in the Android era

The Electronic service represents an application accessible via the web, providing a set of functionalities to companies or individuals, it must be open, developed for inter-organizational, and easily composable.

E-service has many forms and can be found in all sectors, for example, E-Business in the public sector or E-Government in the private sector and it can be both sectors like

E-Health and E-Learning (7).

E-service has numerous advantages for example:

- Access to more customers and expansion.

- Offer an alternative channel of communication with customers.

- Increase in services provided to customers.

- Transparency and openness of public services.

a. E-service in Algeria: advantages and limitations

When it comes to quality E-services, Algeria already has some big E-service companies especially in e-commerce like Ouedkniss, however, Algeria is considered a virgin market with many opportunities. With the Huge government investment in Startups and the greatly improved internet infrastructure, we can say that the future is looking bright for E-services in all domains.

However, the lack of a national electronic banking system and the limited online and mobile banking services are the biggest challenge ahead of E-services in Algeria. The use of digital financial services is low: 16% of adults use digital payments (8) adding to that the lack of trust and awareness about technologies and e-services.

b. Carpooling systems in Algeria

Algeria has many active transportation applications, the three most popular ones are the following:

- **TemTem:** Since launching in 2017, Algeria's temtem app service has traversed the world of online services almost effortlessly, having entered the market as a ride-hailing service. Since then, the startup has teamed up with various partners to expand and evolve its services, even at one point collaborating with Jumia Food on food delivery services**.**

- **YASSIR**: It is the application that brings you a new vision of transport, provides you with a private driver in one click, and allows you to move from one point to another with ease, comfort, and at unbeatable prices. You can now choose to travel according to your budget and type of travel.
- **Heetch**: It is a friendly and professional ride-hailing app. It offers VTC, LVC, taxi, or moto-taxi services in several countries. Heetch drivers are available around the clock when public transit lets you down. This app service displays price estimates before a client orders and give him the option to choose his favourite payment method!

There are about 5 transportation apps in Algeria (YASSIR, Heetch, HARBIN, inDriver, Coursa), yet none of them are known for carpooling, or even long-distance ridesharing, which leaves the carpooling market undefiled and untouched.

Chapter 2: Android Development

1. Introduction

Android Development is the process of creating an application that is supported by the Android Operating system using the android software development kit (SDK). These applications support any device, which is built in android OS and written In Java or other android languages. These run on Java Virtual Machines (JVM).

The android architecture contains a different number of components to support any android device needs. Android software contains an open-source Linux Kernel having a collection of several C/C++ libraries, which are exposed through application framework services.

Among all the components Linux Kernel provides the main functionality of operating system functions to smartphones and Dalvik Virtual Machine (DVM) provides a platform for running an android application.

The main components of the android architecture are the following:

- **Linux Kernel**

The android uses the powerful Linux kernel and it supports a wide range of hardware drivers. The kernel is the heart of the operating system that manages input and output requests from the software. This provides basic system functionalities like process management, memory management, device management like camera, keypad, display, etc. the kernel handles all the things.

Linux is good at networking and it is not necessary to interface it to the peripheral hardware. The kernel itself does not interact directly with the user but rather interacts with the shell and other programs as well as with the hardware devices on the system.

- **Libraries**

On top of a Linux kernel, there is a set of libraries including open-source web browsers such as WebKit, and library libc. These libraries are used to play and record audio and video. SQLite is a database that is useful for the storage and sharing of application data. The SSL libraries are responsible for internet security, etc.

- **Android Runtime**

The android runtime provides a key component called Dalvik Virtual Machine which is a kind of java virtual machine. It is specially designed and optimized for android. The Dalvik VM is the process virtual machine in the android operating system. It is a software that runs apps on android devices.

The Dalvik VM makes use of Linux core features like memory management and multithreading, which is in java language. The Dalvik VM enables every Android application to run its process. The Dalvik VM executes the files in the ".dex" format.

- **Application Framework**

The application framework layer provides many higher-level services to applications such as windows manager, view system, package manager, resource manager, etc. The application developers are allowed to make use of these services in their applications.

- **Applications**

You will find all the android applications at the top layer and you will write your application and install it on this layer. Examples of such applications are contacts, books, browsers, services, etc. Each application performs a different role in the overall applications.

- **Android Emulator**

The Emulator is a new application in the Android operating system. The emulator is a new prototype that is used to develop and test android applications without using any physical device.

The android emulator has all of the hardware and software features like mobile devices except phone calls. It provides a variety of navigation and control keys. It also provides a screen to display your application. The emulators utilize the android virtual device configurations. Once your application is running on it, it can use services of the android platform to help other applications, access the network, play audio, video, store, and retrieve the data.

The following figure briefly represents the android architecture:

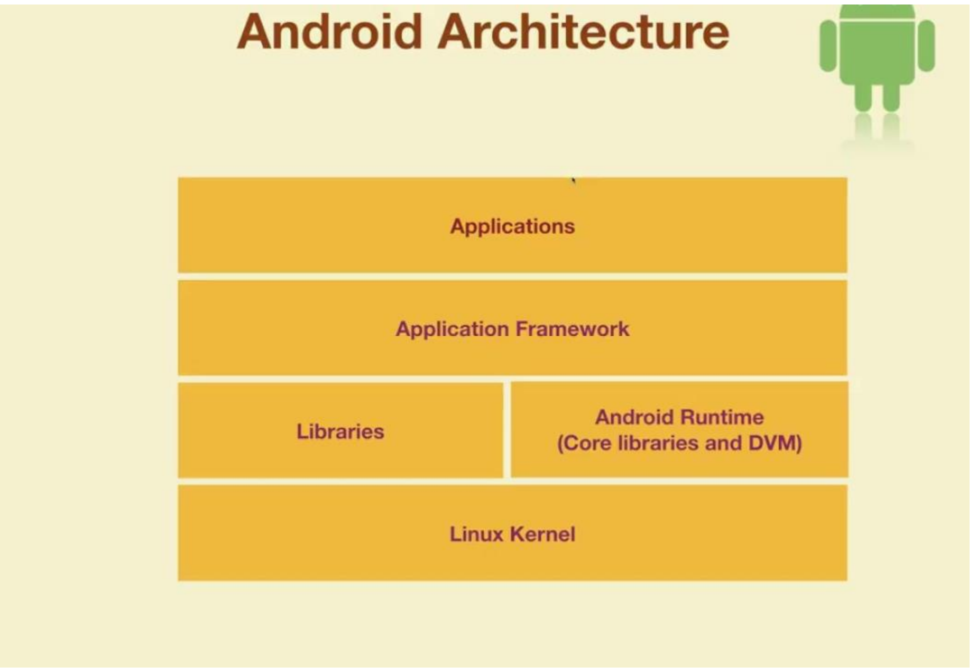


Figure 5. Android Architecture

An Android app is made up of two parts, the front end and the back end:

2. Front-end pane

The front end of the mobile application is the part the user interacts with directly. It is usually referred to as the application's "client-side" The front consists of everything that the user sees when interacting with the app.

The basic unit of the android application is the activity. A UI is defined in an XML file. During compilation, each element in the XML is compiled into an equivalent Android GUI class with attributes represented by methods.

A user interface is built as a hierarchy of layouts and widgets. The layouts are ViewGroup objects, containers that control how their child views are positioned on the screen. Widgets are View objects, UI components such as buttons and text boxes.

3. Back-end pane

The backend is a necessary part of a mobile app that stores, secures, and processes the data. backend apps are hosted on remote servers. It is in opposition to the frontend, which typically runs on devices owned by their users. The servers on which the backend is set up can be physical machines, virtual cloud servers, or any kind of platform able to execute the remote tasks. Developing a backend app is very flexible as many tools and languages can be used, choosing the right tech stack should be in harmony with the main needs of the project.

The basic technologies required for Developing a backend app include a programming language, an architecture, and infrastructure (for instance, the platform you want to run your backend from), a database (e.g., SQL, NoSQL DB, or a mix of ones), and the necessary type of API (e.g., XML, Rest API, JSON API, etc.).

4. Android & Databases

The database installed locally on Android is SQLite, which is a lighter version of the popular MySQL database, SQLite is an embedded app database that permits developers to provide mobile phone users the local data storage. It combines a clean SQL interface with a very small memory footprint and decent speed. For Android, SQLite is “baked into” the Android runtime, so every Android application can create its SQLite databases. However most apps stores data remotely (Cloud Database), for that, it is possible to use almost any database as long as it is compatible with the backend frameworks.

Cloud-based database apps perform in the cloud. Such apps are a great innovation as they come with a large amount of space to house data. Cloud is the technology over the internet that functions as a centralized database as they are always available, and one can access it from anywhere.

5. Google's suggestions

5.1. Android Studio

As the official integrated development environment for all Android applications, Android Studio always seems to top the list of preferred tools for developers.

Google created Android Studio back in 2013. It replaced – or should we say it eclipsed? – Eclipse Android Development Tools (ADT) as the primary IDE for native Android app development.

Android Studio provides code editing, debugging, and testing tools all within an easy-to-use drag-and-drop interface. It is free to download and is supported not only by Google but also by a large and actively engaged community of Android developers.

5.2. Firebase

Firebase is a development platform known originally for its real-time database that's still at its core a multi-node, key-value database optimized for synchronizing data, often between user machines or smartphones, and centralized storage in the cloud. It's designed to make life easier for developers by handling much of the pushing and pulling of data. That relieves app developers of the programming burdens associated with managing versions or locations. They can write the new bits to Firebase and the data will be consistent throughout the system.

5.3. Google Maps

Google Maps is a Web-based service that provides detailed information about geographical regions and sites around the world. In addition to conventional road maps, Google Maps offers aerial and satellite views of many places. In some cities, Google Maps offers street views comprising photographs taken from vehicles.

5.4. Google Cloud APIs

Google Cloud APIs are programmatic interfaces to Google Cloud Platform services. They are a key part of the Google Cloud Platform, allowing you to easily add the power of everything from computing to networking to storage to machine-learning-based data analysis to your applications.

6. Argument of preferences

Today, there are only two major mobile operating systems left: iOS and Android. iOS has kept a more or less stable market share over the last ten years. But Android skyrocketed in 2009, outgrew iOS, what makes starting development with Android operating system a wise decision.

Chapter 3: Requirements Specification and Analysis

1. Introduction:

In this chapter, we deal with the analysis and specification of the needs. We start by defining the functional and non-functional needs of the application. Next, a class diagram and *use case diagram*s are drawn up to give a view overall functional behavior of the solution.

2. Preliminary study:

The preliminary study is the very first step in our development process. It consists of first extracting the functional and operational needs, mainly using text or very simple diagrams. In this step, we must define the external entities and their interactions with the system.

3. Identification of actors:

Our system supports four main actors:

A) **The visitor**: the application must also provide services to unregistered and unauthenticated users, which is why the presence of an actor who represents this type of user is essential. We have called this actor a “Visitor”.

B) **The passenger**: represents a passenger who uses our tool to consult available routes and to book seats.

C) **The driver**: represents a car driver who uses our tool to share seats with passengers

D) **The administrator**: is the employee of the agency who is responsible for the application management.

4. Functional Requirements :

First of all, when the user opens the application, if he is a driver he must authenticate, if he is new, he must register, and if he is a passenger he can consult all the journeys according to the place of departure and destination, after he authenticates himself, in case he is new he must register.

a. The passenger can do the following tasks:

- Type the place of departure and destination and consult all the available routes according to the places of departure and destination.

-Reservation of places for him or his friends.

-See all the routes (current or old) on which he has reserved places.

-Cancellation of the reservation of seats on a journey.

- View ratings, reviews, and the driver’s phone number.

- Leave a note and a comment on the profile of the driver after having travelled with him.

- Manage his account (modify the name, first name, telephone number, and password pass).

- Password reset after entering the code that the system gave it sent.

- Contact the administration.

b. The driver is capable of the following tasks:

- Creating a route.

- See all his journeys.

- Cancellation of a trip.

- Modification of a route.

- Manage his account (modify the name, first name, telephone number, his car, and the password).

- Password reset after entering the code that the system gave it sent.

- See all the ratings and reviews on his profile.

- Announced that the trip has arrived at the destination.

- Contact the administration.

c. The administrator is responsible of:

- Pricing management.

- User management.

- Trips management.

- Messaging management.

5. Non-functional requirements :

A non-functional need is a restriction or constraint that weighs on a service of the system, such as constraints related to the environment and implementation and performance requirements, system dependencies in the project, ease of maintenance, expandability, and reliability.

In the case of this work, the application will need to meet these needs:

- **Performance and Reliability**: Requirements that should be considered when developing any system. The application or system should be able to respond quickly when the user interacts with the application. The application should be developed in such a way that it should be scalable enough to accept new features when we want to expand the application complexity. In addition, the tolerance rate of the application should be at a higher level in case of network issues, connectivity issues, and when the application crashes or stops.

- **Availability**: The application must be available for use by any android phone user.

- **Security of access to critical information**: We must consider the privacy of customer data, especially when it comes to authentication. For this, we must restrict access to these information to the administrator only.

-**Minimum data storage on the device**: Application data storage should be minimized to satisfy users with very limited storage space.

- **The user-friendliness of the graphical interface**: The application must provide a user-friendly and simple interface for any type of user because it presents the first contact of the user with the application and through it, we will discover its features.

6. The used Modelling Language:

In this project, we used UML (Unified Modeling Language) as a modeling language. UML is a graphic modeling language; it appeared in the world of software engineering as part of "object-oriented design". It has several advantages to mention:

🕐 UML is based on the mechanisms of abstraction, hierarchy, and decomposition.

🕐 UML is a high-performance communication medium : thanks to its graphical representation, it visually expresses an object solution, to facilitate solution comparison and evolution

🕐 UML is a formal and standardized language, it provides access to information accurately and ensures stability.

🕐 UML facilitates the understanding of complex abstract representations.

UML is based on the establishment of diagrams representing the views, static and dynamic, in the development of a computer application. To better design our application, we need to use a diagram of use cases that makes it possible to specify the functionalities of our system and their interactions with the user.

7. Context Diagram

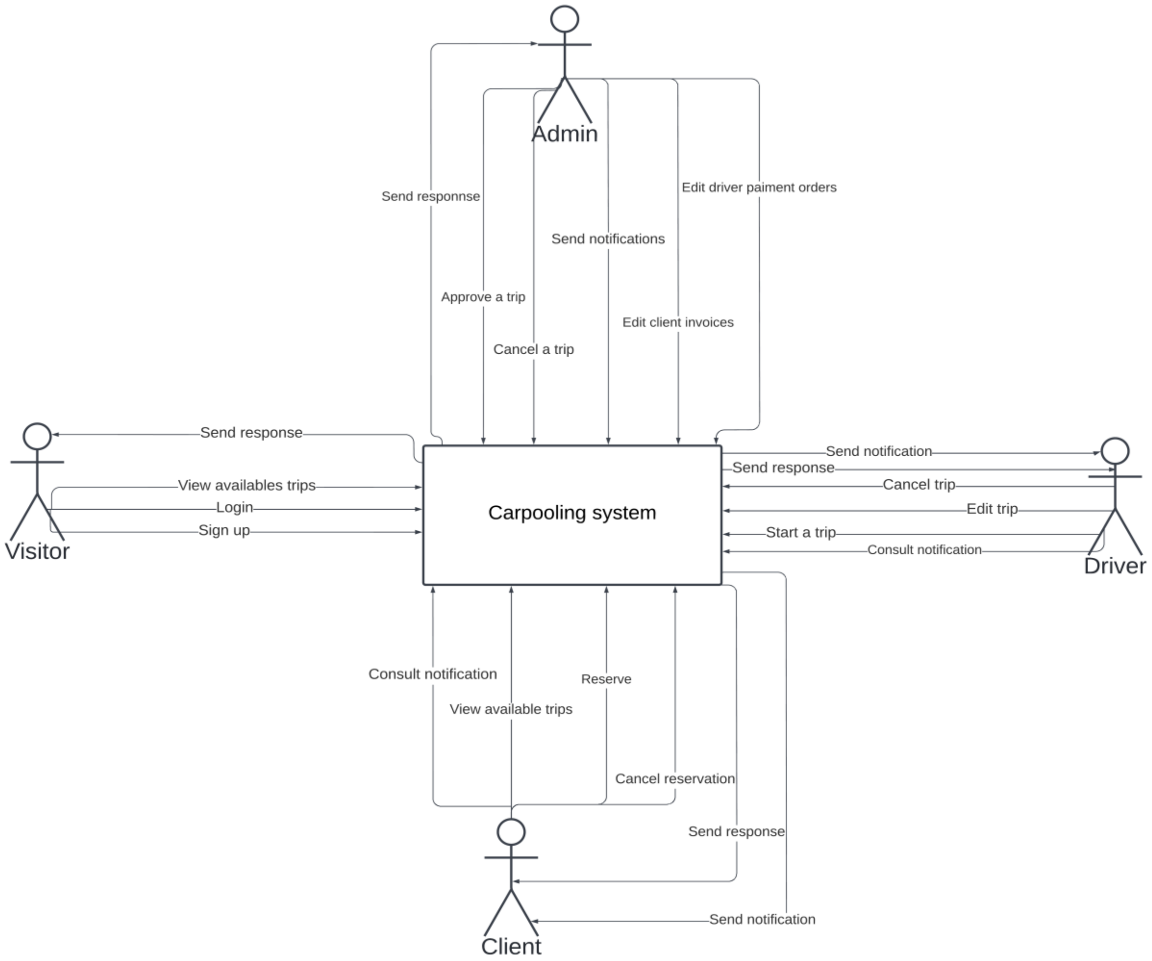


Figure 6. Context diagram

8. Use case diagrams:

8.1. Visitor use case diagram:

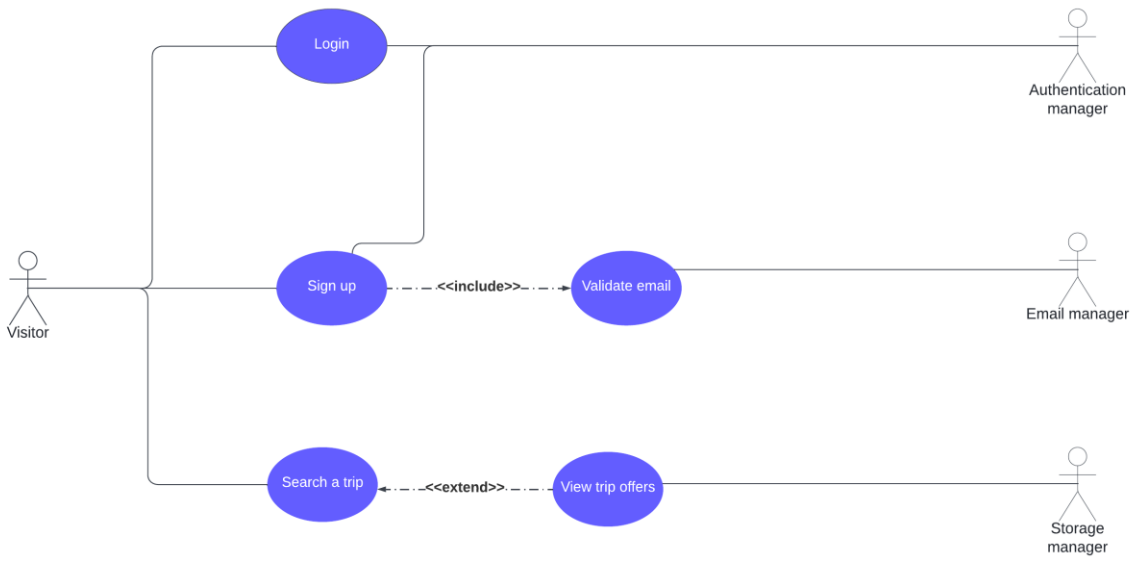


Figure 7. Visitor use case diagram

8.2. Driver use case diagram :

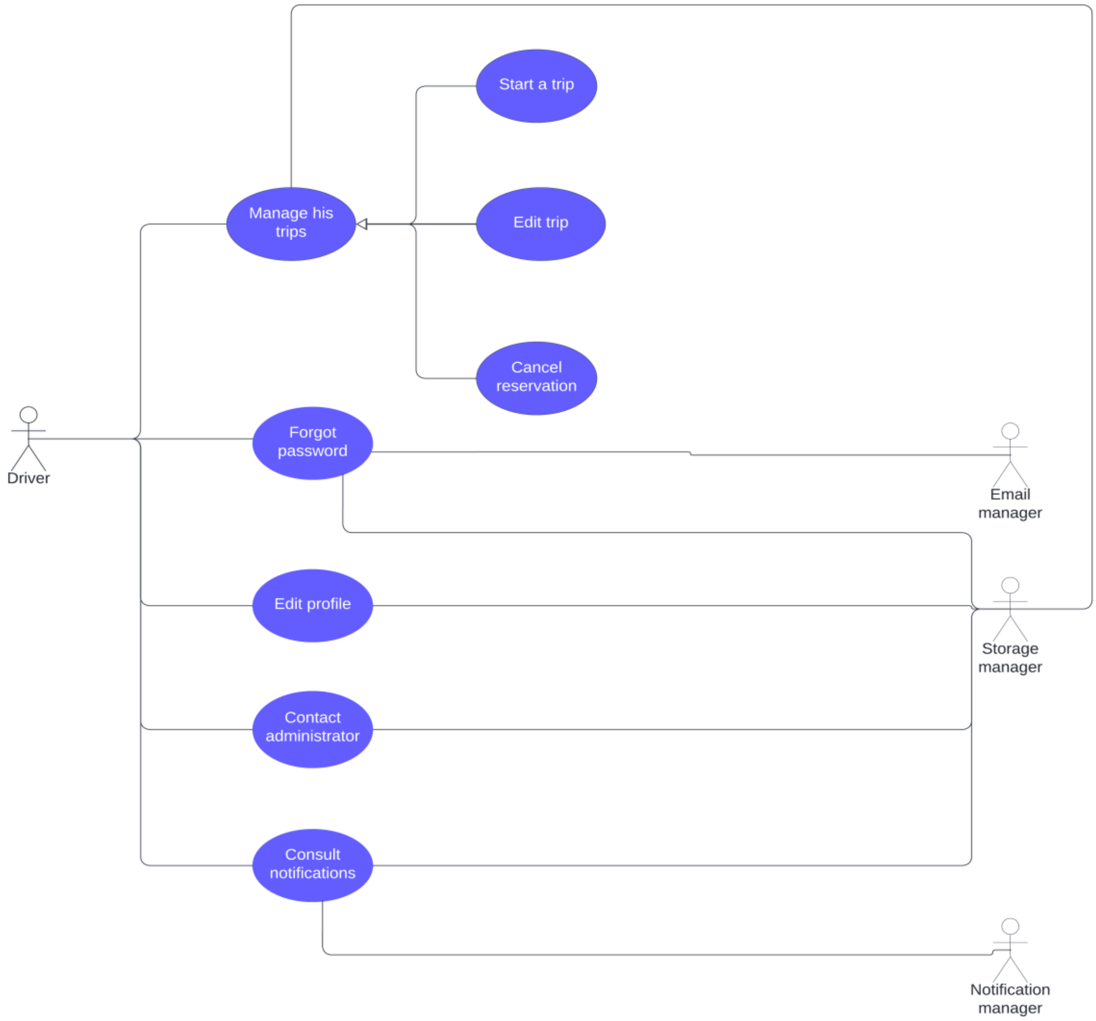


Figure 8. Driver use case diagram

8.3. Client use case diagrams:

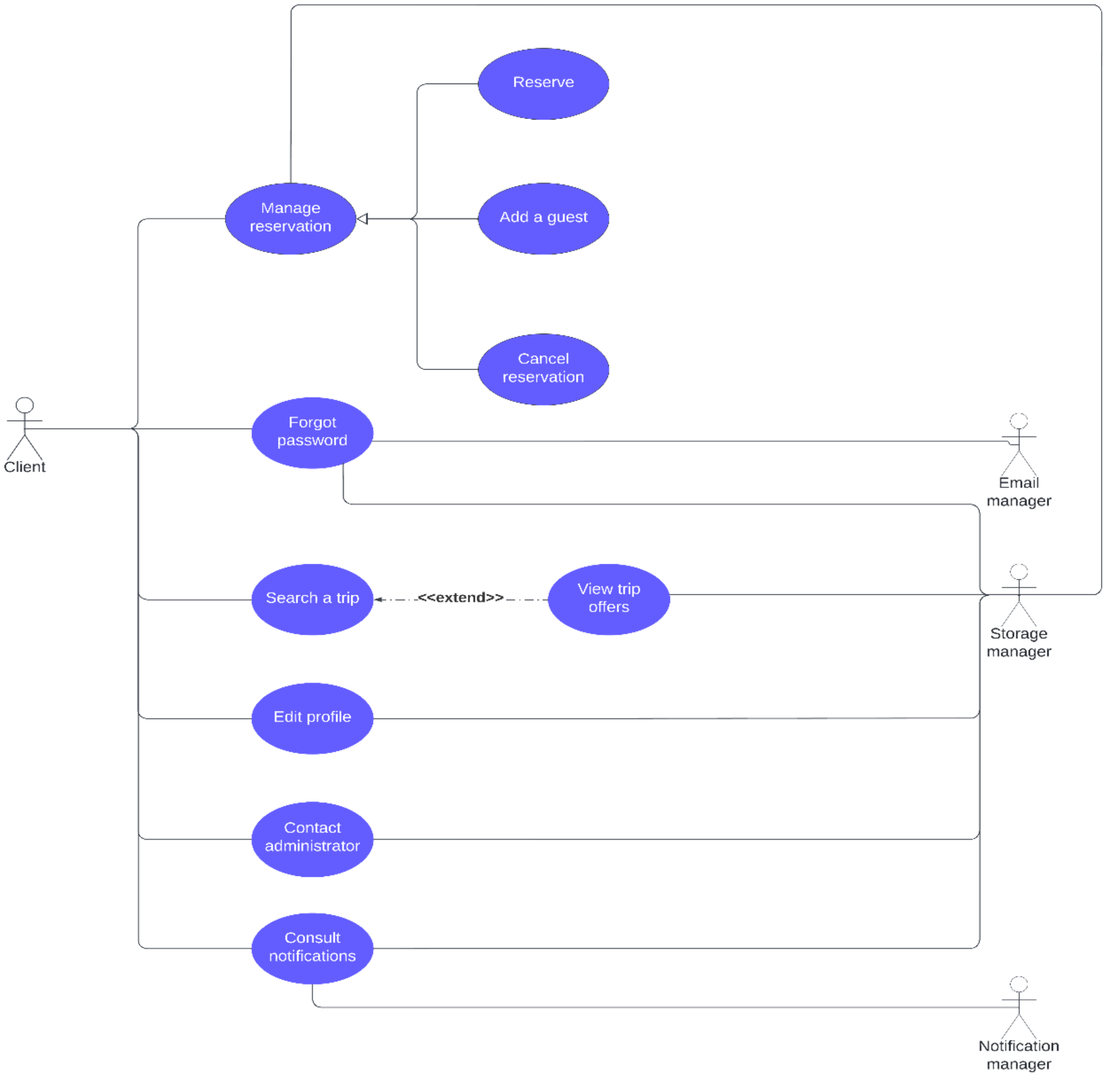


Figure 9. Client use case diagrams

8.4. Administrator use case diagram:

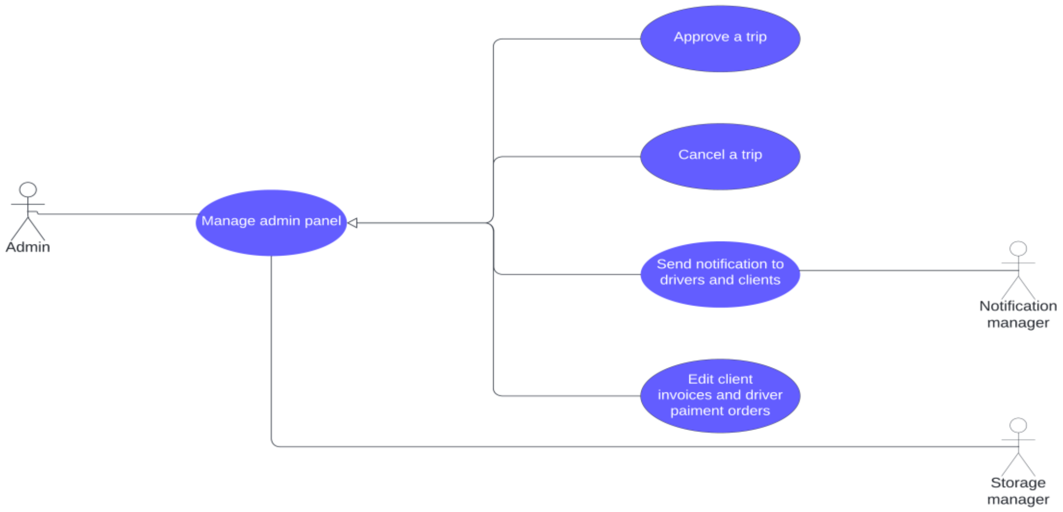

Approve a trip
Cancel a trip
Admin
Manage admin panel
Send notification to drivers and clients
Notification manager
Edit client invoices and driver paiment orders
Storage manager

Figure 10. Administrator use case diagram

9. Text description:

Use case	« Login»
Actor	Visitor
Precondition	The actor must exist in the database.
Post-condition	The actor has authenticated.
Script	-reach the login page. -Enter credentials (email, password). -The system verifies the data entered by the actor. -Display of the main page that suits him
Exception	- Incorrect data. -The user does not exist in the database.

Use case	« Start a trip»
Actor	Driver
Precondition	Authenticated driver.
Post-condition	The trip is created.
Script	- Fill in the form for creating a trip and validate. -The system checks the validity of the fields entered by the driver. -The system saves the data in the database and shows a creation success message
Exception	- Incorrect data. -No service at the starting place.

Use case	**« Edit a trip»**
Actor	Driver
Precondition	-Authenticated driver. -Existing trip.
Post-condition	The trip has been modified .
Script	- The system displays trip data in a form such as number of available seats, departure date, and departure time. -.The driver modifies the data and validates. -The system saves the modification in the database and shows a modification success message
Exception	- Incorrect data.

Use case	« Cancel a trip»
Actor	Driver
Precondition	- Authenticated driver. -Existing trip.
Post-condition	The trip has been canceled .
Script	- The system shows a confirmation message. -.The driver confirms the cancellation. -The system cancels the trip and shows a cancellation success message
Exception	

Use case	« Look for a trip»
Actor	Client, Visitor
Precondition	Existing trip
Post-condition	The system shows the result of all offered trips .
Script	- Reach the available trips' page. - Communicate the city of departure and the city of destination -The system searches the result in the database -The system shows the search result
Exception	-No offer available for this trip -No service at the starting place

Use case	« Reserve a seat for a trip»
Actor	Client
Precondition	-Authenticated client. -Existing trip. -Available seats in the trip
Post-condition	The client has reserved for the trip.
Script	- The system shows a reservation success message.
Exception	-No available seats for the concerned trip

Use case	« Cancel a reservation»
Actor	Client
Precondition	- Authenticated client. - Existing trip. - The client has already reserved a place for the trip
Post-condition	-The client has canceled the reservation for the trip.
Script	- The system shows a confirmation message -The client confirms the cancellation - The system cancels the reservation and shows a cancel reservation success message.
Exception	

Use case	« Consult a car driver profile»
Actor	Client
Precondition	- Authenticated client.
Post-condition	-The system displays the driver profile.
Script	-The client communicate the car driver name to the system -The system shows the driver's name, phone number and all the comments that correspond to him
Exception	

Use case	« Edit profile»
Actor	Client, driver
Precondition	- Authenticated actor.
Post-condition	-The profile has been edited.
Script	-The system displays a form filled with his data -The actor modify his data and validate - The system checks the data validation -The system saves the modifications and shows a modification success message.
Exception	-Incorrect data -Incorrect password

10. Class Diagram :

The construction of the internal structure of a software is a task that consumes a great effort and which requires a thorough study as of the phase of specification of the requirements, which returns to the confusion that one can often have between the potential classes and the classes candidates that must be implemented as well as the definition of the relationships between them. The refinement at the level of the structure of our software was the dominant load of this stage. At this level, we will also present the general structure of our system via a class diagram represented in the following figure:

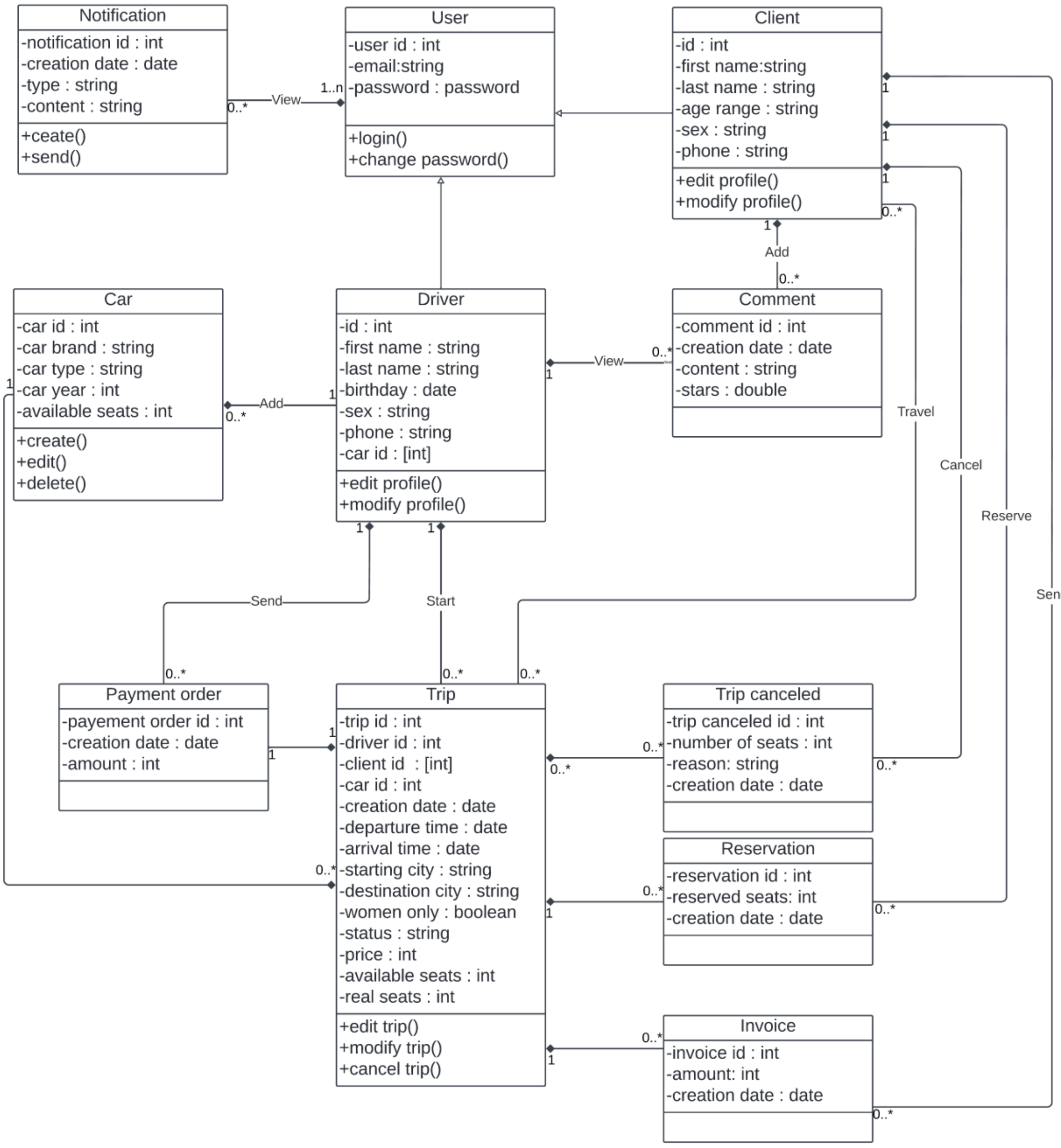


Figure 11. Class diagram

10.1. Class Diagram Description:

The following table highlights a subset of the classes in our design:

Class Name	Semantic Description
Client	The main customer is referred to as the passenger
Admin	The operator who manages and surveys the operations in one of the agencies
Trip	A collection of data that represent the details of a trip and its status
Notification	A structure that manages notifications for users
Comment	A review left by a client to describe his experience attempting a trip
Reservation	A collection of data that represent a client and the trip he reserved in
Trip canceled	A collection of data that represent a client and the trip in which the reservation was cancelled
Invoice	A collection of data that represent the trip invoice that the client must pay
Payement order	A collection of data that represent to the driver the amount he benefits from to travel

Table 2 class diagram description

Chapter 4: Software Design and Implementation

1. Introduction

The design phase of software development deals with transforming our requirements as described in the requirements into a form of implementable programme using a programming language.

The software design process can be divided into the following three levels of design's phases:

2. Software Design

2.1. Description of the UrbanMobile app

This section represents the description of the results obtained following the execution of our application, but first and before going to this level, we will present the structure of the system via a simple plan represented in the following Figure:

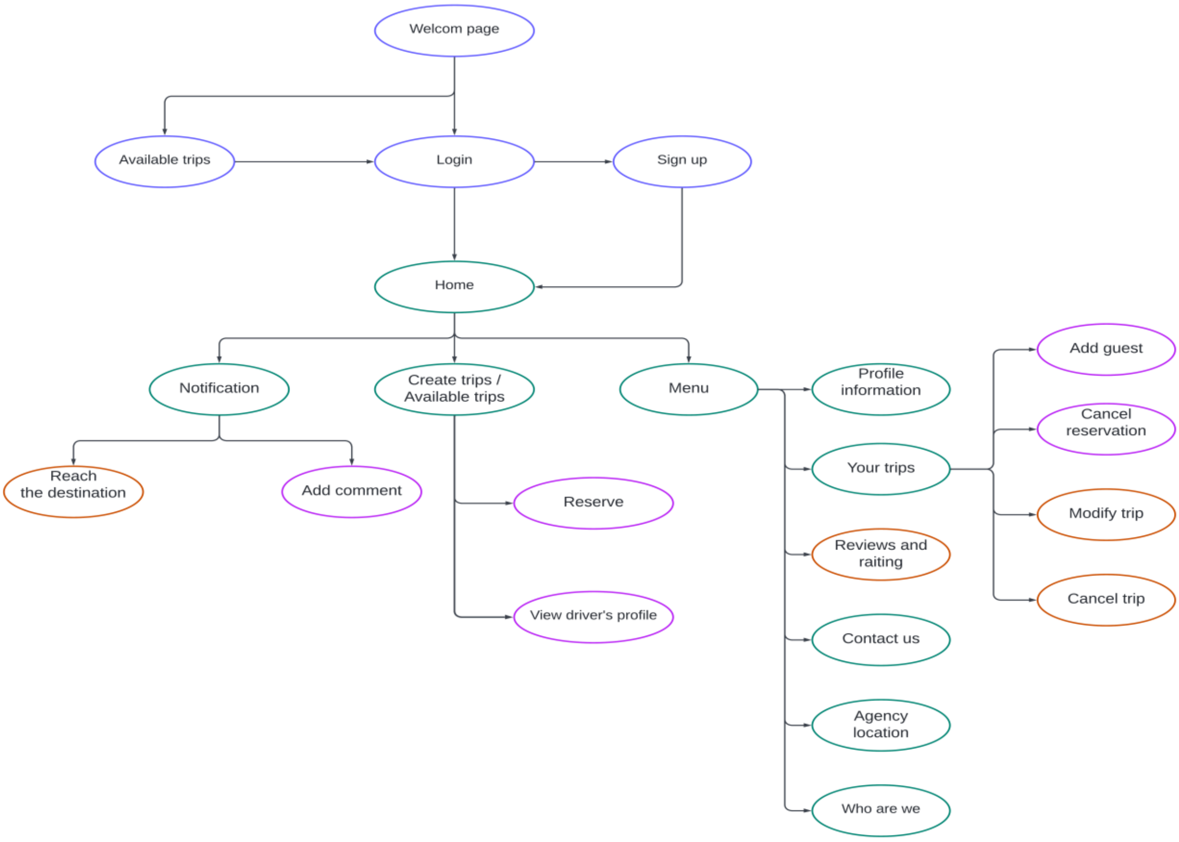


Figure 12. UrbanMobile structure

2.2. Interface Design

After determining the constraints and non-functional requirements, we built a prototype to validate the requirements analysis. The following figure shows a subset of the graphic design developed for prototyping using **Figma** (described later in the manuscript).

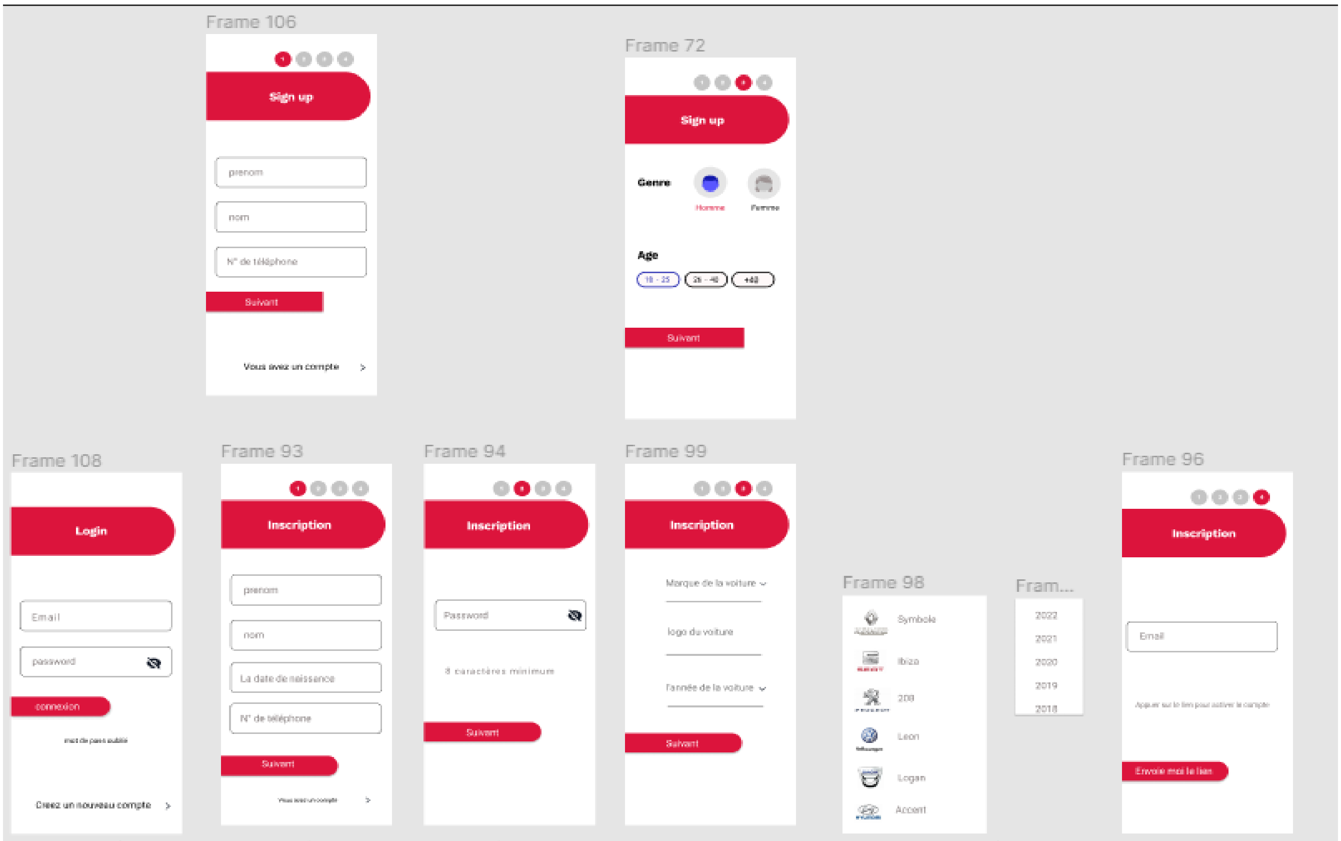


Figure 13. App Interface design by Figma

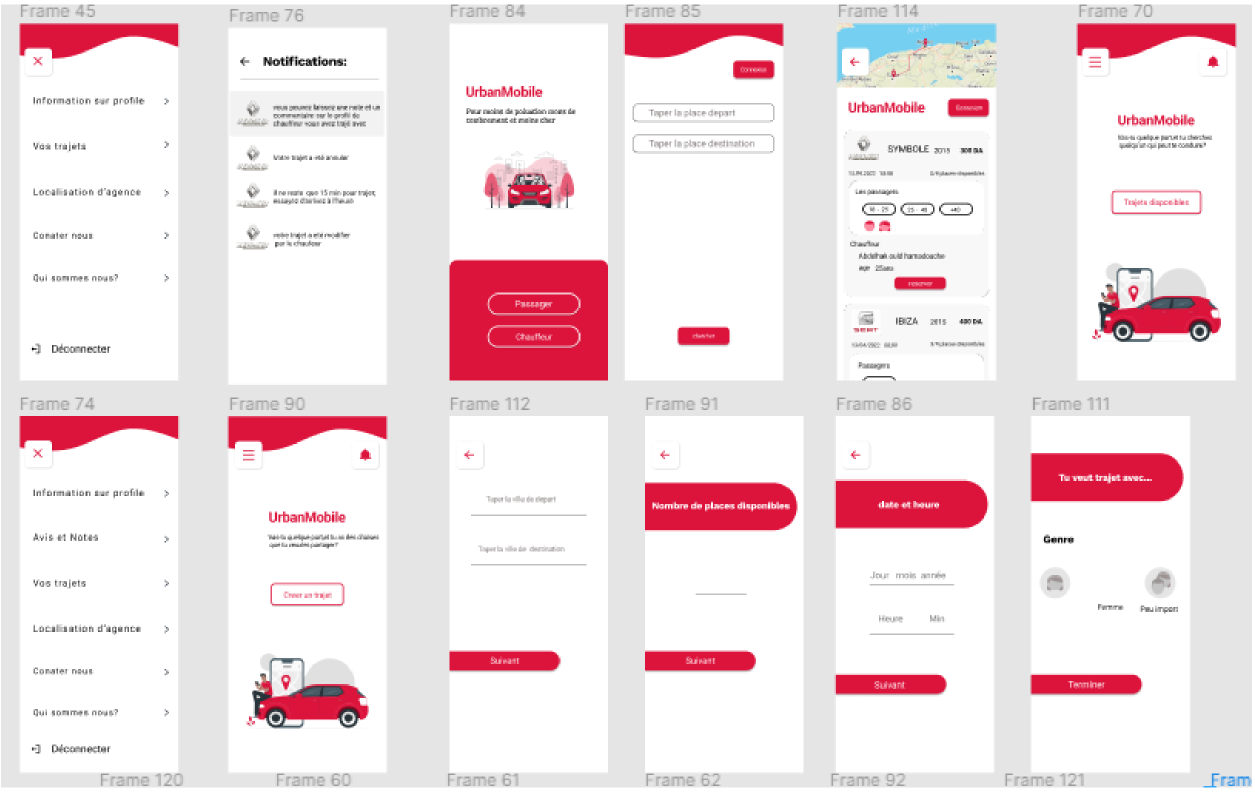


Figure 14. App Interface design by Figma

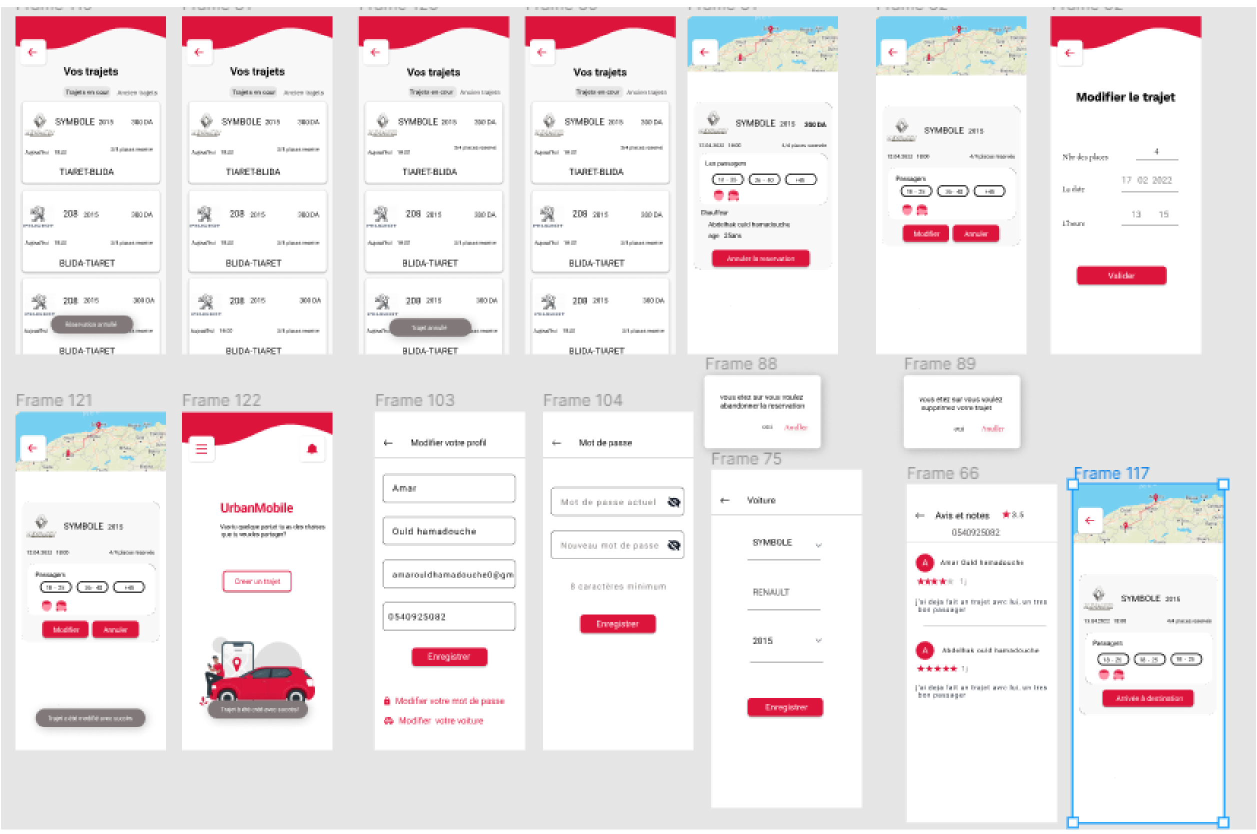
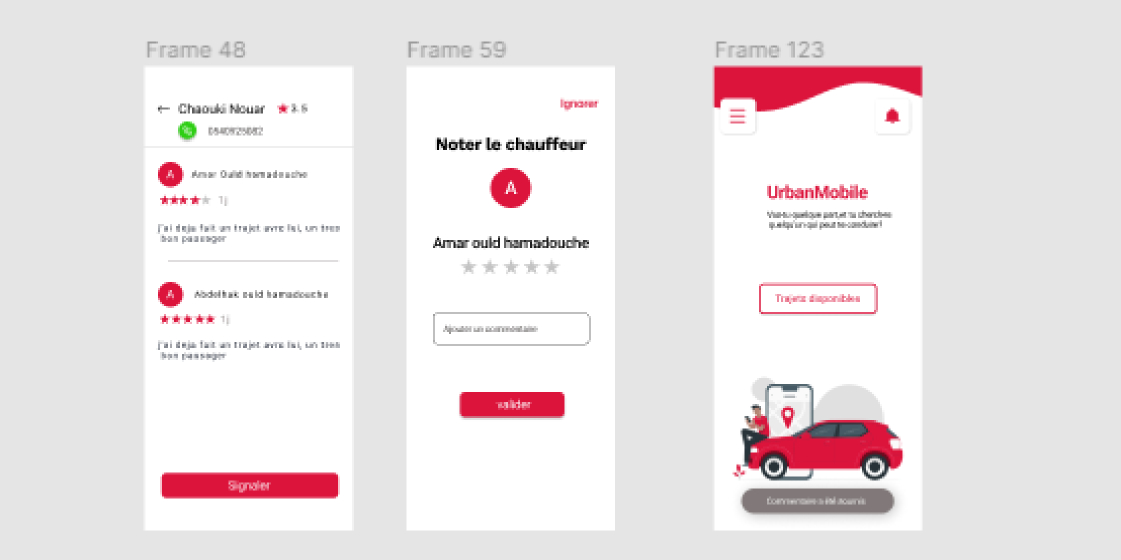


Figure 15. App Interface design by Figma



Frame 48

← Chaouki Nouar ★3.5

0540925082

A Amar Ould hamadouche

★★★★☆ 1j

j'ai deja fait un trajet avec lui, un tres bon passager

A Abdelhak ould hamadouche

★★★★★ 1j

j'ai deja fait un trajet avec lui, un tres bon passager

Signaler

Frame 59

Ignorer

Noter le chauffeur

A

Amar ould hamadouche

☆☆☆☆☆

Ajouter un commentaire

valider

Frame 123

UrbanMobile

Vas-tu quelque part,et tu cherches quelqu'un qui peut te conduire!

Trajets disponibles

Commentaire a été ajouté

Figure 16. App Interface design by Figma

2.3. Architectural Design

The design of software evolves through a partitioning process that defines and specifies elements of the software solution (i.e., software modules or software components) related to parts of the practical application problems defined during requirements analysis. The design is complete when each part of the specification is solved or carried out by one or more software elements. This process represents a transition between software requirements analysis and software design. Our conceptual architecture proposal allowed us to satisfy all the requirements and constraints of our system with a bearable development cost.

The architectural design of our system is shown in the following figure:

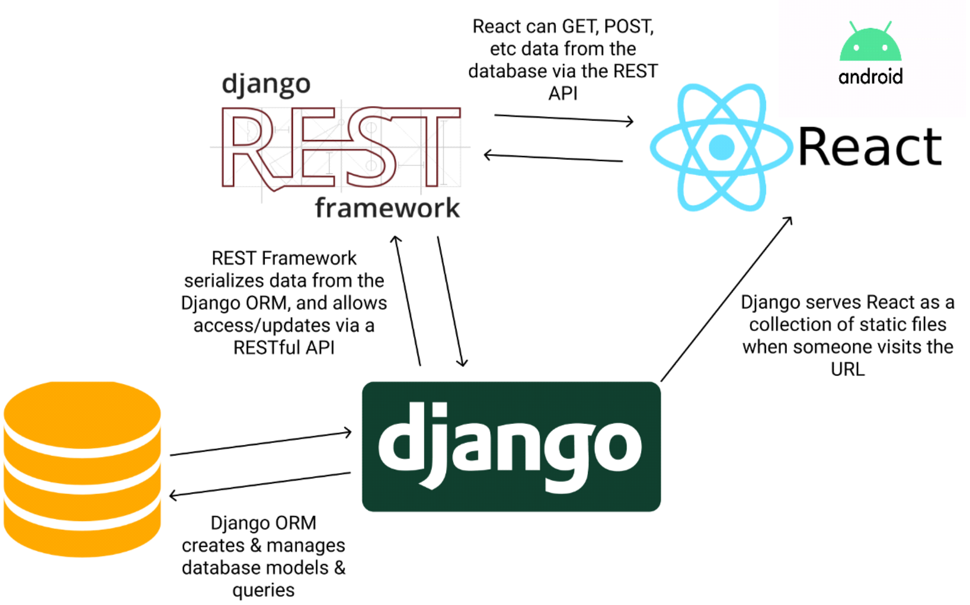

React can GET, POST, etc data from the database via the REST API
django REST framework
android
React
REST Framework serializes data from the Django ORM, and allows access/updates via a RESTful API
Django serves React as a collection of static files when someone visits the URL
django
Django ORM creates & manages database models & queries

Figure 17. General Architecture of our system

3. Implementation

3.1. Development Environment

When developing a software, the choice of technologies is very important insofar as the most suitable technologies to our needs must be used.

In this section, we will describe the development environment used in the realization of this project and the collection of processes and tools that are used to develop the source code for the software product. This involves the entire environment that supports the process end to end, including development, staging, and production servers. The development environment automates or facilitates the routines involved in creating, testing, debugging, patching, updating, and maintaining software.

3.2. Material Environment

Properties	PC Desktop	PC Laptop	Mobile1	Mobile2
Brand	/	Asus	Realme	Huawei
Processor	Ryzen 5-3400g	i3-4100	Snapdragon 850	Qualcomm MSM8940
RAM	8 Go	4 Go	6 Go	2 Go
Screen	21"	13"	6,4"	5,5"
ROM	500 Go SSD	320 Go HDD	128 Go	32 Go

3.3. Software Environment

To ensure the different functionalities of our application, we have used the following software and technologies:

3.3.1. Figma

Figma is a cloud-based design and prototyping tool for digital projects. It’s made so that users can collaborate on projects and work pretty much anywhere. Figma gives you all the tools you need for the design phase of the project. Because Figma is browser-based, teams can collaborate as they would in Google Docs. As a result, many designers prefer Figma for creating prototypes, wireframes, and production-ready designs.

3.3.2. Django REST Framework

Django REST framework is a powerful and flexible toolkit for building Web APIs. It is an open-source, mature, and well-supported Python/Django library that aims at building sophisticated web APIs. It is a flexible and fully-featured toolkit with modular and customizable architecture that makes the development of both simple possible, turn-key API endpoints and complicated REST constructs.

3.3.3. Postman

Postman is one of the most popular software testing tools which is used for API testing. With the help of this tool, developers can easily create, test, share, and document APIs.

Over 5 million developers use it every month to make their API development easy and simple. It can make various types of HTTP requests (GET, POST, PUT, PATCH), save environments for later use, and convert the API to code for various languages (like JavaScript, and Python).

3.3.4. ReactNative

React Native (RN) is a mobile app development framework that enables the development of multi-platform Android and iOS apps using native UI elements. It is based on the JavaScriptCore runtime and Babel transformers. With this setup, RN supports new JavaScript (ES6+) features, e.g. arrow functions, async/await, etc.

React components wrap existing native code and interact with native APIs via React's declarative UI paradigm and JavaScript. As shown in Figure … he enables native app development for whole new teams of developers and can let existing native teams work much faster.

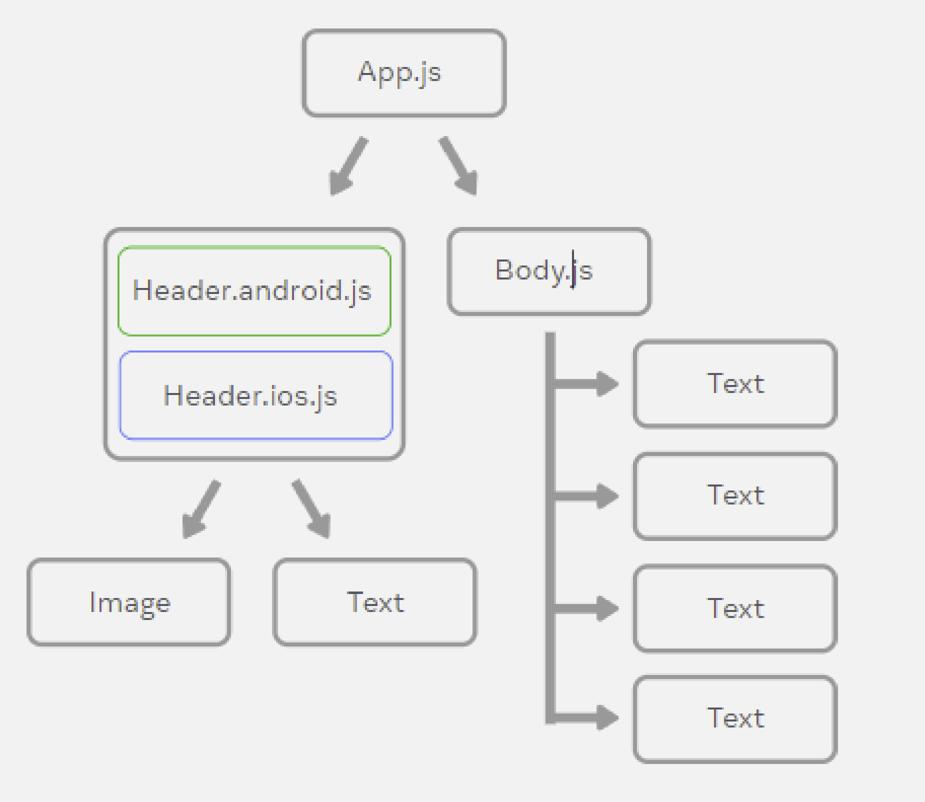


Figure 18. React Native Cross-Platform architecture(10)

3.3.5. Heroku

Heroku is a widely relied-upon platform as a service offering that enables developers to carry out hassle-free application deployment, scaling, and management. This platform offers support for a wide range of programming languages such as Java, Ruby, PHP, Node.js, Python, Scala, and Clojure. Heroku runs applications through virtual containers known as Dynos.

3.3.6. Atom IDE

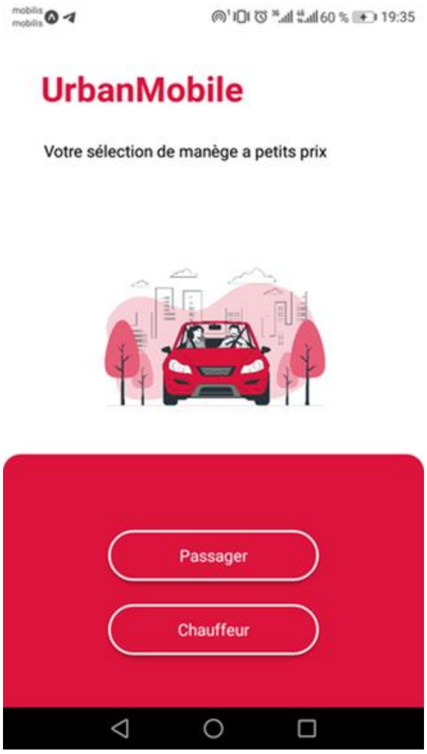
Atom is a text editor that we use to quickly create applications that we build for voice first. We have to build PHP, react native, JavaScript, and other web-based languages using an Atom text editor.

Atom is a text editor, which is open source and provided by GitHub, which is owned Now by Microsoft. it’s a developer alternative to using more basic text editors like notepad or notepad++.

3.4. Description of the "UrbanMobile" app

3.4.1. The first screen

The first screen is displayed directly after loading the application, it allows users to choose their type (passenger or driver), the "passager" button takes them to the available trips, and the "chauffeur" button takes them to the login screen as depicted in figure 19.



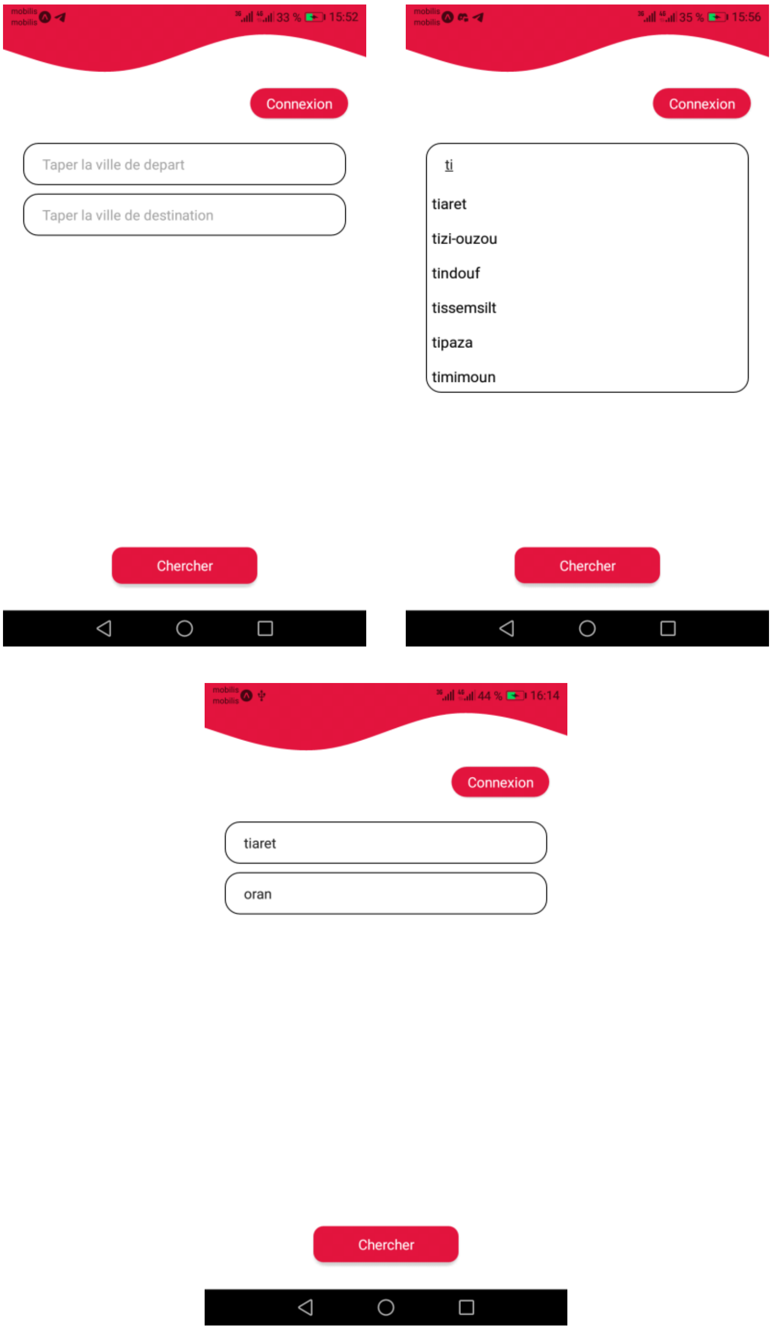
UrbanMobile

Votre sélection de manège a petits prix

Figure 19. UrbanMobile Main Screen

3.4.2. The available routes

It allows passengers to type their trip data (the starting and the destination city) and see all the offers for that trip even if the visitor hasn’t an account yet (if there is no offer for their desired trip, why should he creates an account). The button "Chercher" displays the available offers and the "connexion" button displays the login screen, see figure 20.



tiaret

oran

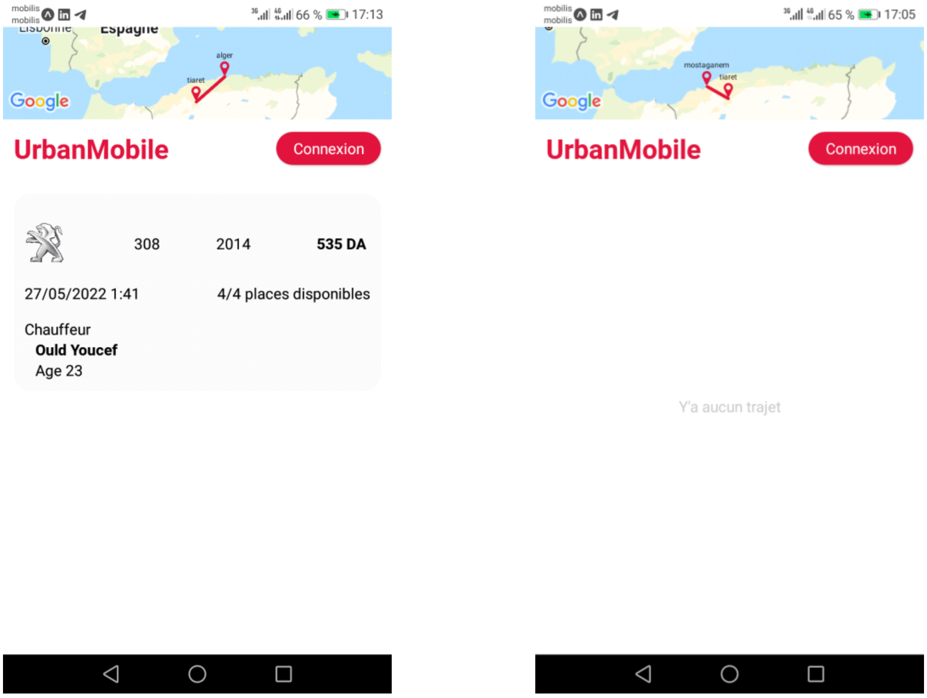
Figure 20. UrbanMobile routes searching Page

3.4.3. The available offers

On the top, it will show a polyline between the starting and the destination city on a google map. It shows all the offers for a specific trip on the rest of the screen, if there is no offer it will show the text "Il n'y a aucun trajet"

3.4.4. When the passenger doesn’t login to his account or doesn’t register yet

The "connexion" button navigates to the login screen, each offer shows only the trip information as shown in figure 21 (car information, price, the date of the trip, number of available seats, passenger ages, and genders if there are passengers who are already reserved in this trip, and driver name and age, the user can only see those offers and cannot interact with the trip .



UrbanMobile

Connexion

308 2014 535 DA

27/05/2022 1:41 4/4 places disponibles

Chauffeur
Ould Youcef
Age 23

UrbanMobile

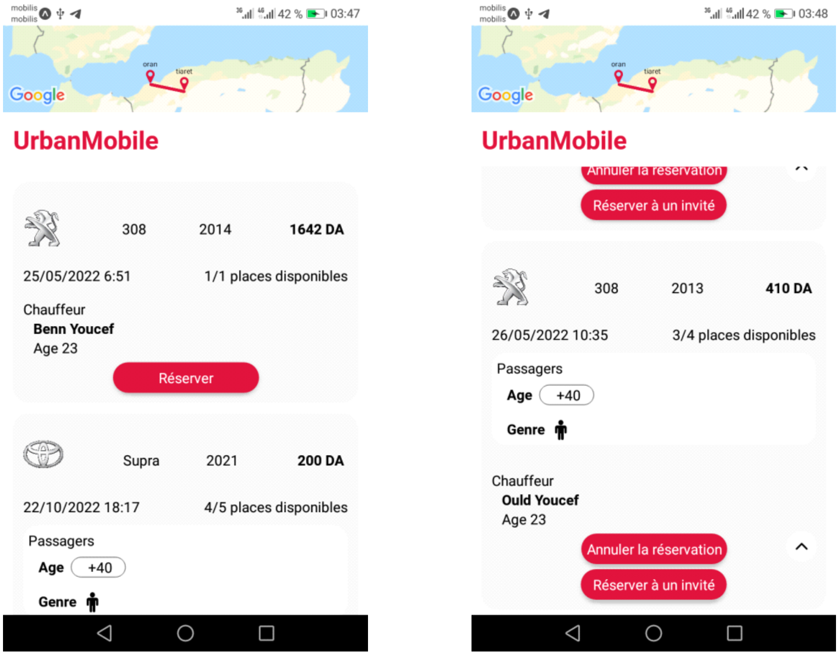
Connexion

Y'a aucun trajet

Figure 21.UrbanMobile Trips List Page

3.4.5. When the passenger logged to his account

The passenger can reserve a seat on the trip by pressing the "reserve" button as depicted in figure 22, if there is no seat available, the application will respond with a toast "ya aucune place disposable", if the passenger is already reserved on that trip he can cancel the reservation by pressing on the "annuler la reservation" button and he can also add a guest to that trip if there are still available seats by pressing on the "réserver pour un invite" button then it will take him to the add guest screen, and he can see the driver profile by pressing on his name.



UrbanMobile

308 2014 1642 DA

25/05/2022 6:51 1/1 places disponibles

Chauffeur
Benn Youcef
Age 23

Supra 2021 200 DA

22/10/2022 18:17 4/5 places disponibles

Passagers
Age +40
Genre

UrbanMobile

308 2013 410 DA

26/05/2022 10:35 3/4 places disponibles

Passagers
Age +40
Genre

Chauffeur
Ould Youcef
Age 23

Figure 22. UrbanMobile Passanger Home Page

3.4.6. Login

The figure 23 shows the login screenshot for the passengers and the drivers who are already registered in the application.

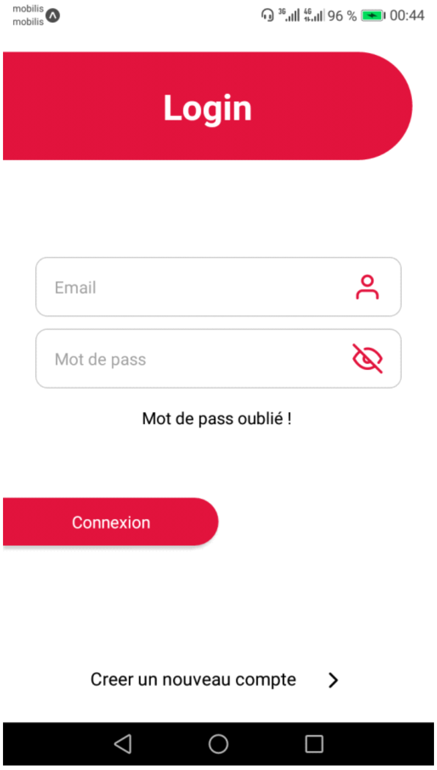


Figure 23. UrbanMobile Login Page

3.4.7. Registration

If the user is not yet registered, he must fill in the fields as shown in figures 24 and 25 to be able to connect to the application.

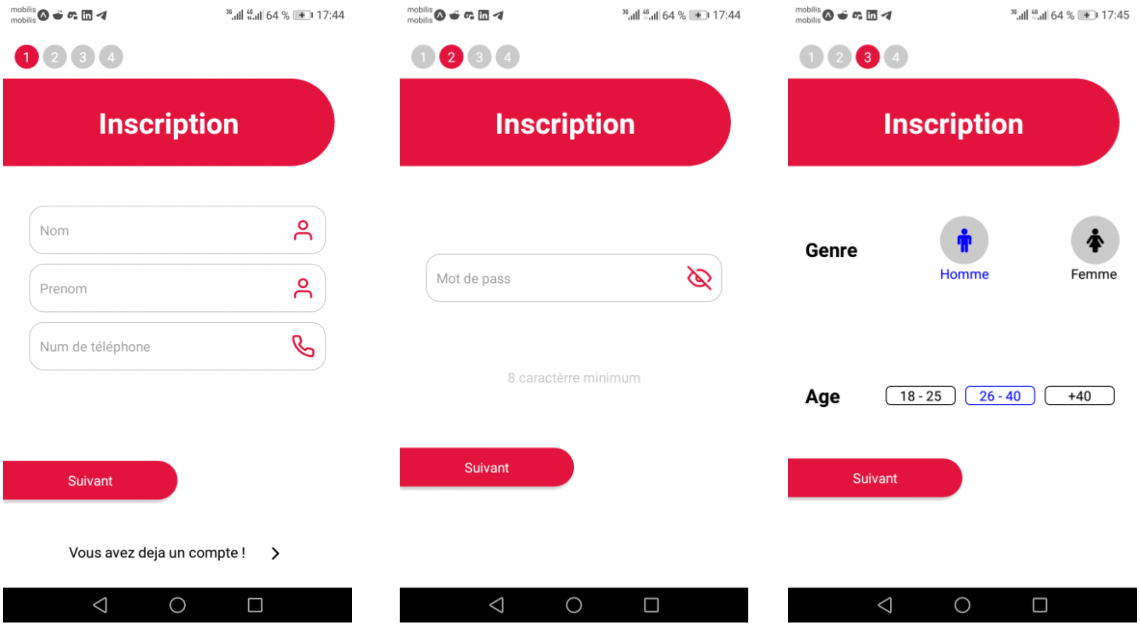


Figure 24. UrbanMobile Passanger Registration Page

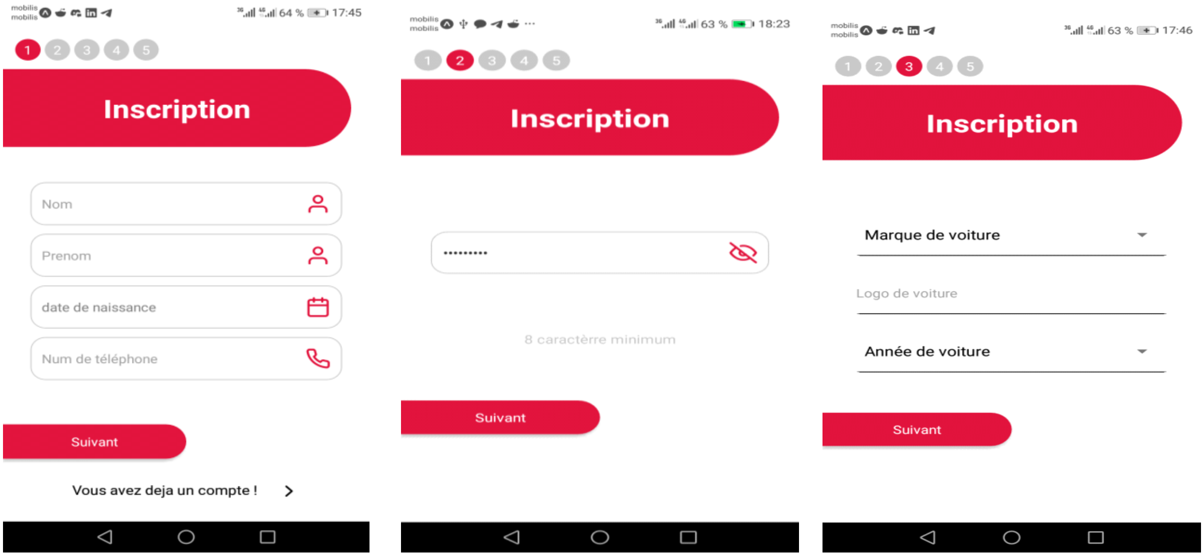


Figure 25. UrbanMobile Driver Registration Page

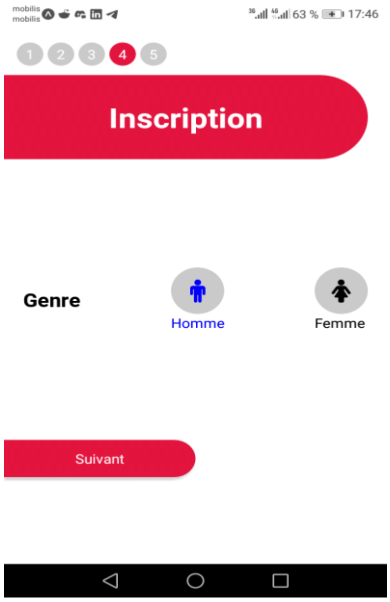
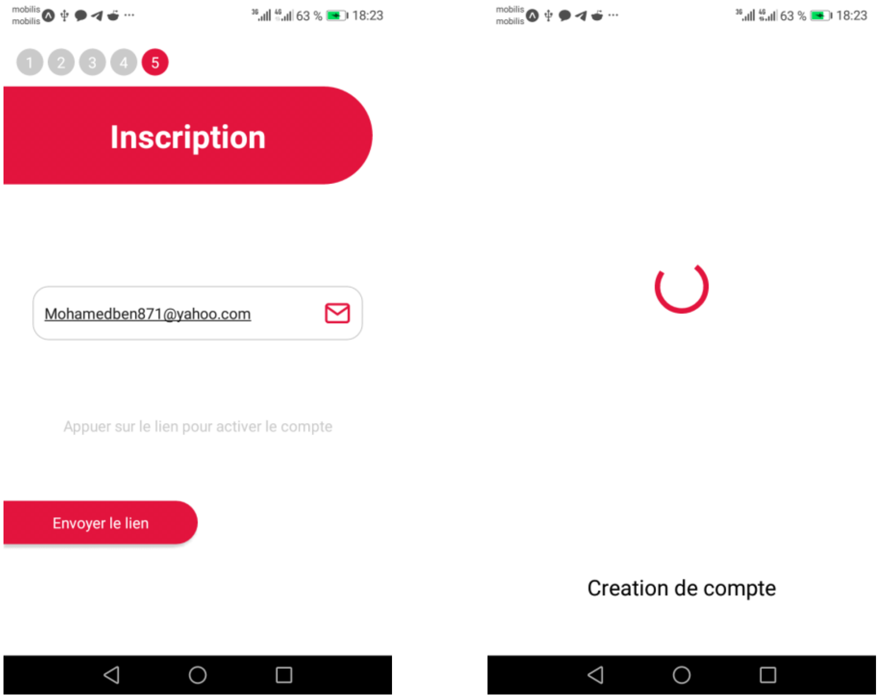


Figure 25 (suite)

3.4.8. Email verification

To avoid spam, it is about entering the email and then sending the validation link, it is necessary to click on the link and validate the email to continue the registration. Figure 26 shows the procedure of Email sending.



Mohamedben871@yahoo.com

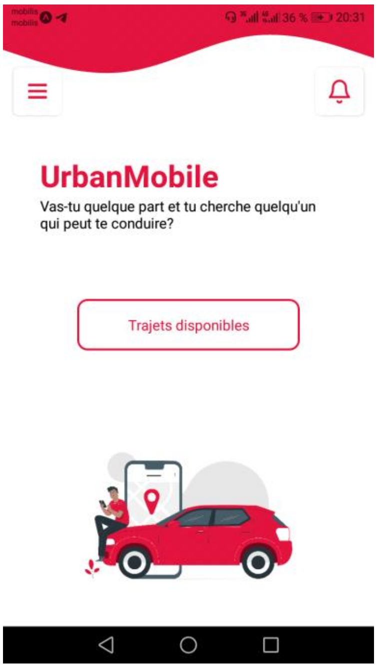
Appuer sur le lien pour activer le compte

Creation de compte

Figure 26. UrbanMobile Email Verification Page

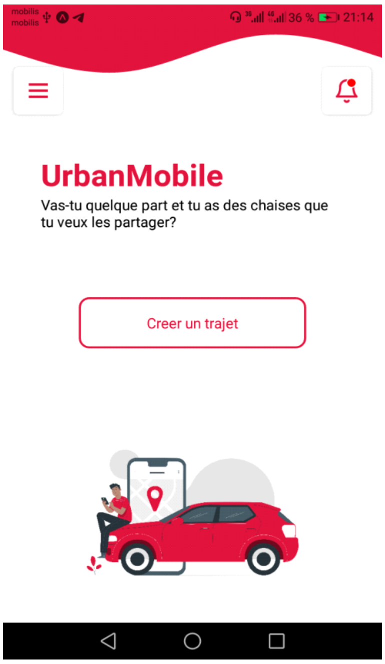
3.4.9. Home

Contains 3 buttons dedicated to the passenger, a "Menu button", a "Notification button", "Trajets disponibles button", and one button "Créer un trajet button" for the car driver as depicted in figures 27 and 28.



Vas-tu quelque part et tu cherche quelqu'un qui peut te conduire?

Figure 27. UrbanMobile Driver Home Page

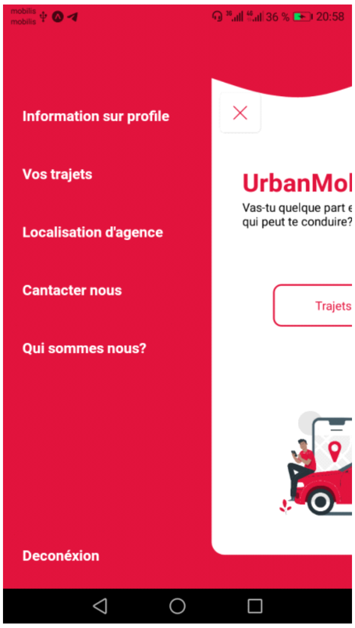


Vas-tu quelque part et tu as des chaises que tu veux les partager?

Figure 28. UrbanMobile Passenger Home Page

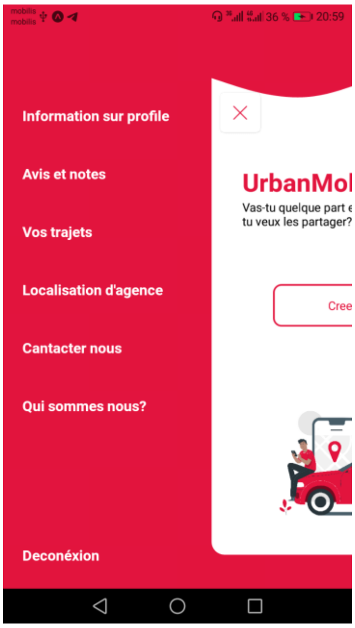
3.4.10. Menu

Contains the principal Menu of the app as shown in figures 29 and 30



Vas-tu quelque part e
qui peut te conduire?

Figure 29. UrbanMobile Driver Menu Page



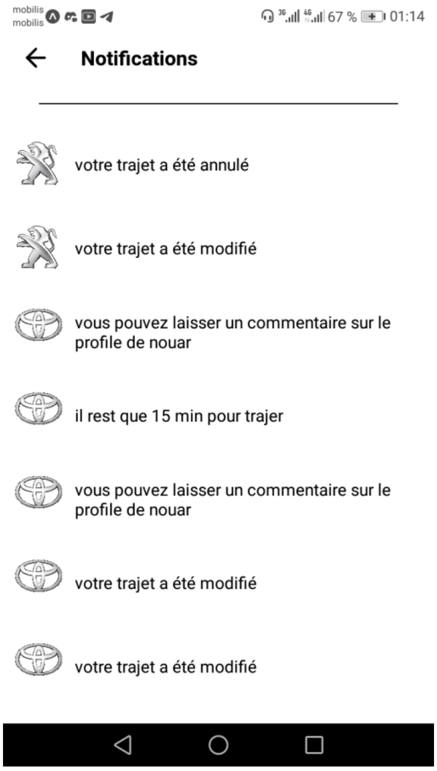
Vas-tu quelque part e
tu veux les partager?

Figure 30. UrbanMobile Passenger Menu Page

3.4.11. Notifications

The notification screen contains 4 types of notification for the passenger as depicted in figure 31 :

- The first type of notification is sent a quarter of an hour before the trip starts to remind the passenger about it.
- The second type of notification is sent when the driver updates the trip.
- The third type of notification is sent when the car driver cancels his trip.
- The fourth type of notification is sent when the driver announces that they have reached the destination.



Notifications

votre trajet a été annulé

votre trajet a été modifié

vous pouvez laisser un commentaire sur le profile de nouar

il rest que 15 min pour trajer

vous pouvez laisser un commentaire sur le profile de nouar

votre trajet a été modifié

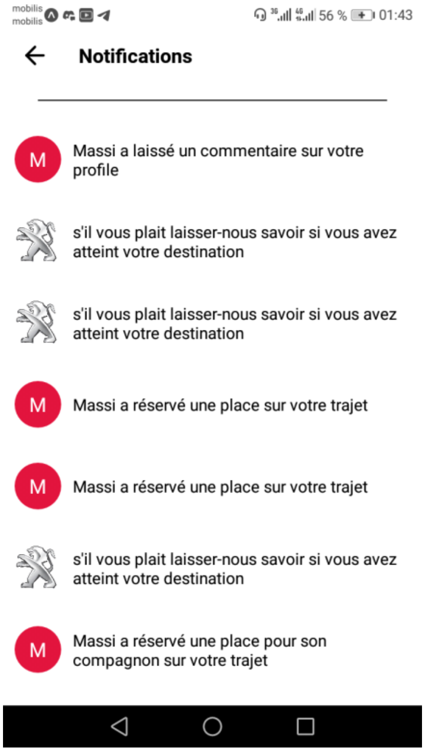
votre trajet a été modifié

Figure 31. UrbanMobile Passenger Nitification Page

There also 6 types of notification for the driver like mentioned in figure 32 :

- The first type of notification is sent when a passenger reserved a seat on his trip.
- The second type of notification is sent when a passenger reserved a seat for a friend.
- The third type of notification is sent when a passenger cancel the reservation in his trip.
- The fourth type of notification is sent a quarter of an hour before the trip starts to remind the driver about it.
- The fifth type of notification is sent when the trip has begun and the driver doesn’t announce that they have reached their destination yet, this type of notification is sent after the expected trip period to remind the driver to announce that they have reached their destination.

- The sixth type of notification is sent when a passenger has commented on the car driver's profile



Notifications

Massi a laissé un commentaire sur votre profile

s'il vous plait laisser-nous savoir si vous avez atteint votre destination

s'il vous plait laisser-nous savoir si vous avez atteint votre destination

Massi a réservé une place sur votre trajet

Massi a réservé une place sur votre trajet

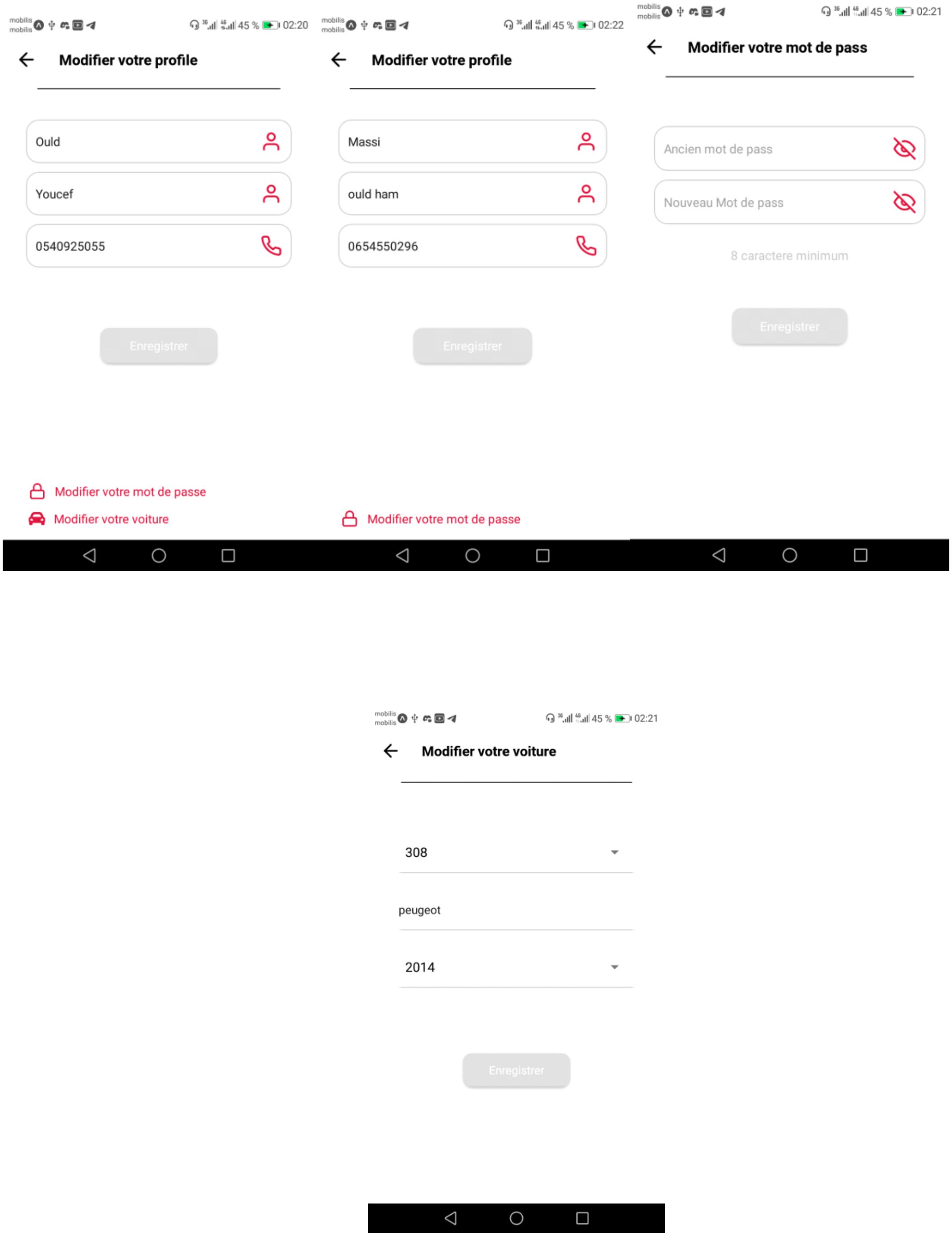
s'il vous plait laisser-nous savoir si vous avez atteint votre destination

Massi a réservé une place pour son compagnon sur votre trajet

Figure 32. UrbanMobile Driver Nitification Page

3.4.12. Profile

The user can update his profile and save the changes by pressing on the "Enregistrer" button as shown in figure 33, he can update his password by pressing the "Modifier Votre mot de passe" button, it will take him to the update password screen, the user must enter his old password then he enters the new password, if the old password was not correct then the application will respond by a toast like "le mot de passe Vous avez saisie est incorrect" and for the driver he can also update his car by pressing on "Modifier Votre Voiture" button, it will take him to the update car screen.



Modifier votre profile

Ould

Youcef

0540925055

Modifier votre profile

Massi

ould ham

0654550296

Modifier votre mot de pass

Ancien mot de pass

Nouveau Mot de pass

8 caractere minimum

Modifier votre voiture

308

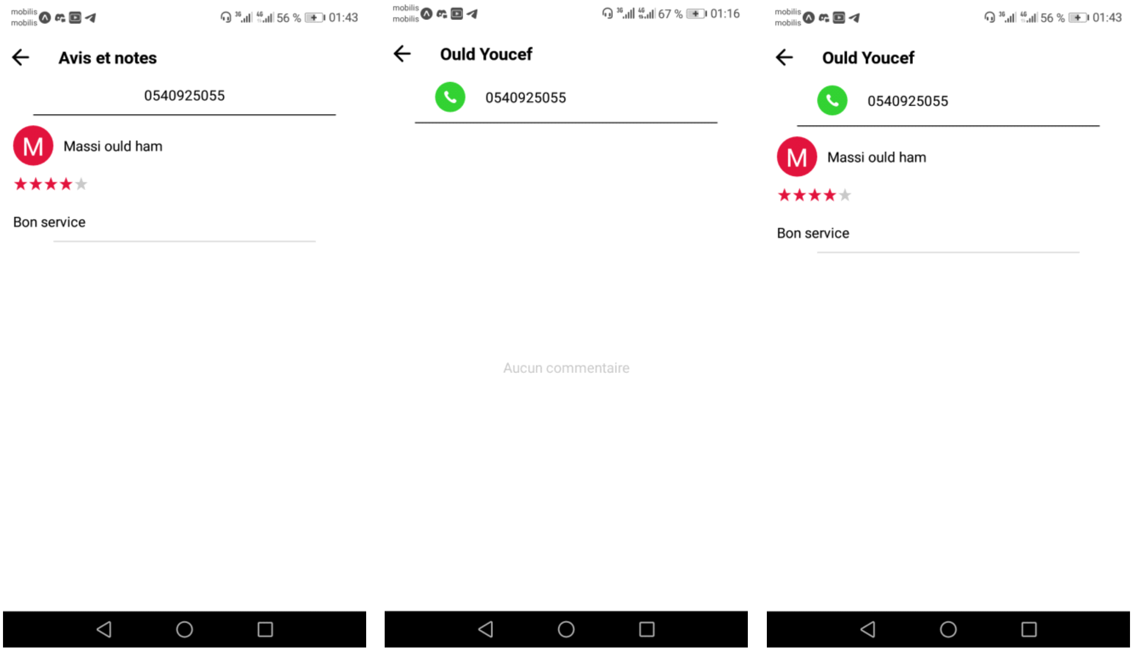
peugeot

2014

Figure 33. UrbanMobile Profil Page

3.4.13. Opinions and Notes

For the driver, he can only see the passenger’s opinions and notes of him by pressing the "Avis et notes" button in the menu, while for the passenger, he can see all the opinions and notes of a specific driver by specifying his name on trip information. The passenger can also make a phone call to the driver by pressing on his phone number or by pressing the phone icon, and can add a comment and a note only if he has travelled with him. Figure 34 depicts the opinions and Notes screenshots.



Avis et notes

0540925055

M Massi ould ham

★★★★☆

Bon service

Ould Youcef

☎ 0540925055

Aucun commentaire

Ould Youcef

☎ 0540925055

M Massi ould ham

★★★★☆

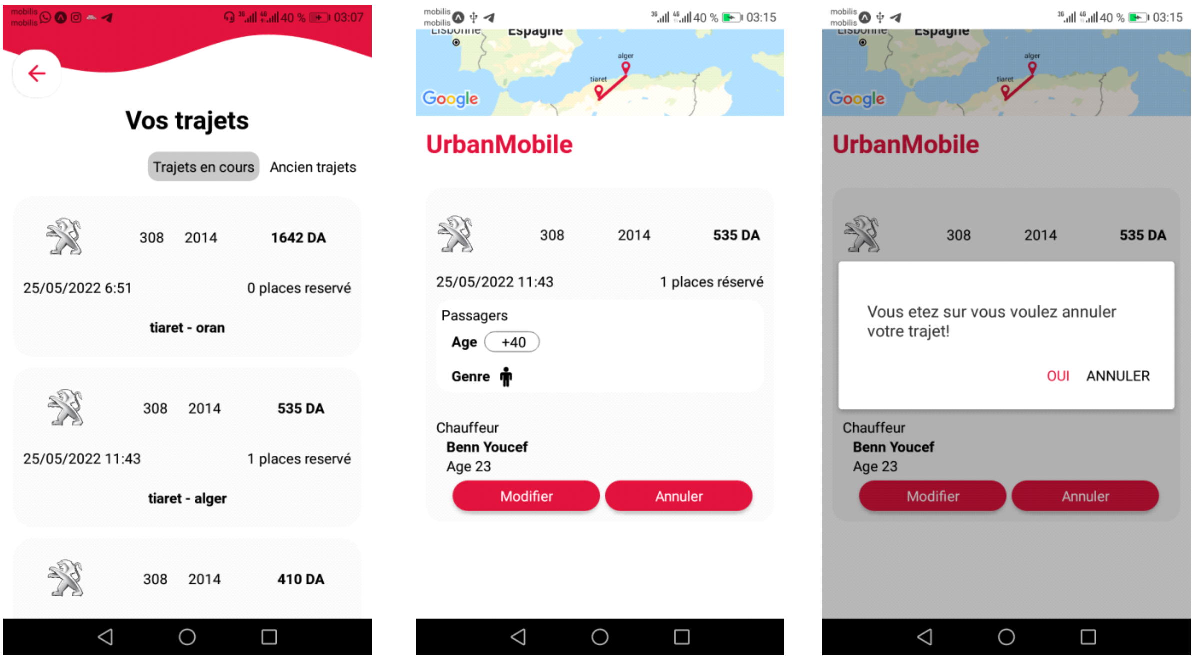
Bon service

Figure 34. UrbanMobile Comments Page

3.4.14. **Trips consultation**

The driver can see all the trips that he has created and has not started yet, he can see more details about the trip by pressing it, and he can cancel it by pressing on the "Annuler" button, and update it by pressing on the "Modifier" button. The figure 35 shows the trips consultation.

For the passenger he can also see all the trip he reserved a seat in it and not started yet, see more details by pressing on it and cancel the reservation by pressing on the "Annuler la reservation" button or add a guest if there are still seats available on it by pressing on the "reserver pour un invite" button, if there are no seats available the application will respond with a toast like "Il n'y a aucune place disposable".



Vos trajets

Trajets en cours | Ancien trajets

308 2014 1642 DA
25/05/2022 6:51 0 places reservé
tiaret - oran

308 2014 535 DA
25/05/2022 11:43 1 places reservé
tiaret - alger

308 2014 410 DA

UrbanMobile

308 2014 535 DA
25/05/2022 11:43 1 places réservé
Passagers
Age +40
Genre
Chauffeur
Benn Youcef
Age 23

UrbanMobile

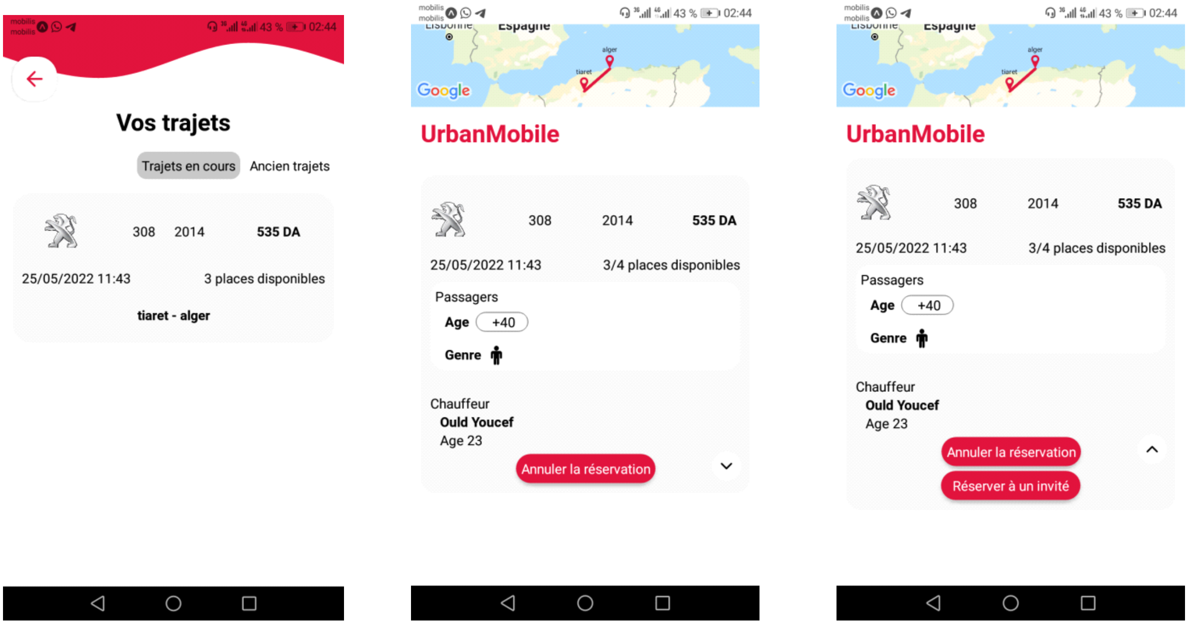
308 2014 535 DA

Vous etez sur vous voulez annuler votre trajet!

OUI ANNULER

Chauffeur
Benn Youcef
Age 23

Figure 35. UrbanMobile Driver Trips Page



Vos trajets

Trajets en cours | Ancien trajets

308 2014 535 DA
25/05/2022 11:43 3 places disponibles
tiaret - alger

UrbanMobile

308 2014 535 DA
25/05/2022 11:43 3/4 places disponibles
Passagers
Age +40
Genre
Chauffeur
Ould Youcef
Age 23

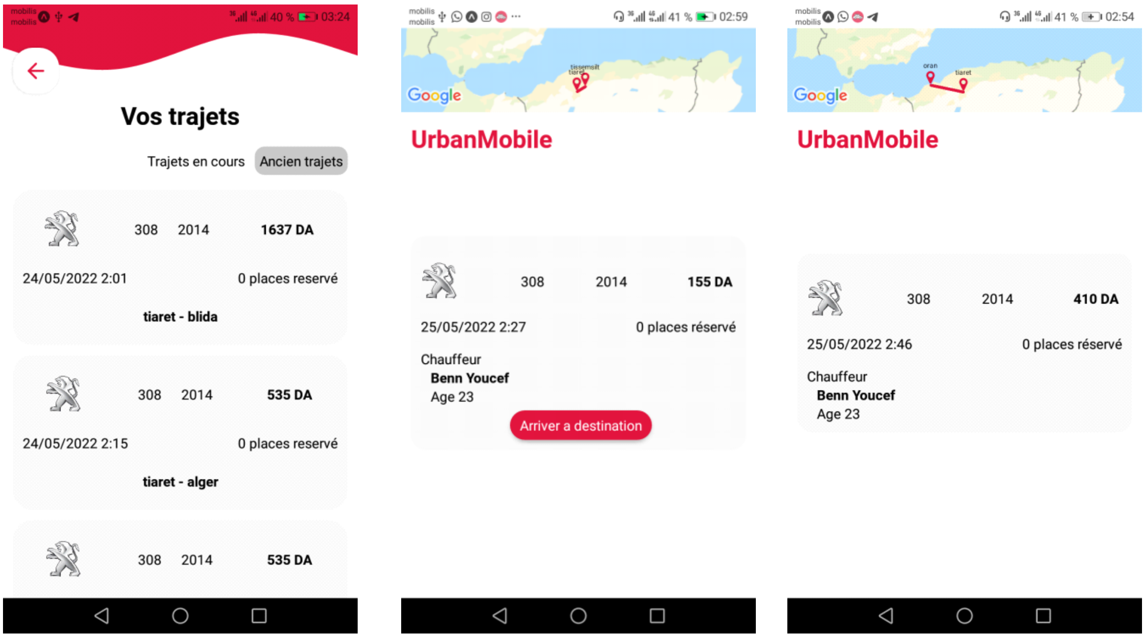
UrbanMobile

308 2014 535 DA
25/05/2022 11:43 3/4 places disponibles
Passagers
Age +40
Genre
Chauffeur
Ould Youcef
Age 23

Figure 36 UrbanMobile Passenger Trips Page

3.4.15. Old trips

The driver can additionally see all the past trips that he created, he can show more details by pressing on it, and announce that they have reached their destination if he didn't announce it yet (See figure 37). For the passenger, he can only see the past trips and show more details by pressing on it and cannot interact with it anymore (see figure 38)



Vos trajets

Trajets en cours | Ancien trajets

308	2014	1637 DA
24/05/2022 2:01		0 places reservé
tiaret - blida		

308	2014	535 DA
24/05/2022 2:15		0 places reservé
tiaret - alger		

308	2014	535 DA

308 2014 155 DA

25/05/2022 2:27 0 places réservé

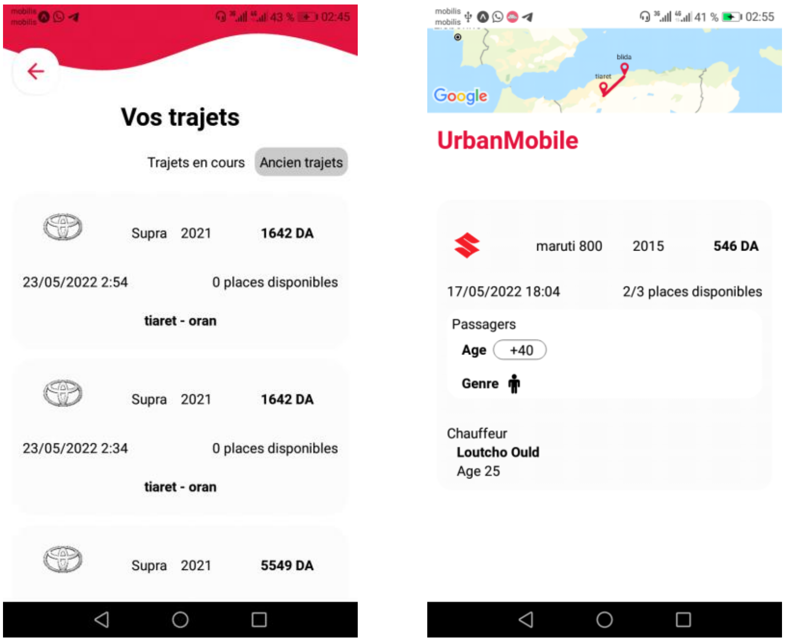
Chauffeur
Benn Youcef
Age 23

308 2014 410 DA

25/05/2022 2:46 0 places réservé

Chauffeur
Benn Youcef
Age 23

Figure 37. UrbanMobile Passenger Trips History Page



Vos trajets

Trajets en cours | Ancien trajets

Supra	2021	1642 DA
23/05/2022 2:54		0 places disponibles
tiaret - oran		

Supra	2021	1642 DA
23/05/2022 2:34		0 places disponibles
tiaret - oran		

Supra	2021	5549 DA

maruti 800 2015 546 DA

17/05/2022 18:04 2/3 places disponibles

Passagers
Age +40
Genre

Chauffeur
Loutcho Ould
Age 25

Figure 38. UrbanMobile Driver Trips History Page

3.4.16. Contact us screen

The user can reach the screen by clicking on the "contactez nous" button on the menu. Figure xxx shows the screenshot of the mentioned screen.

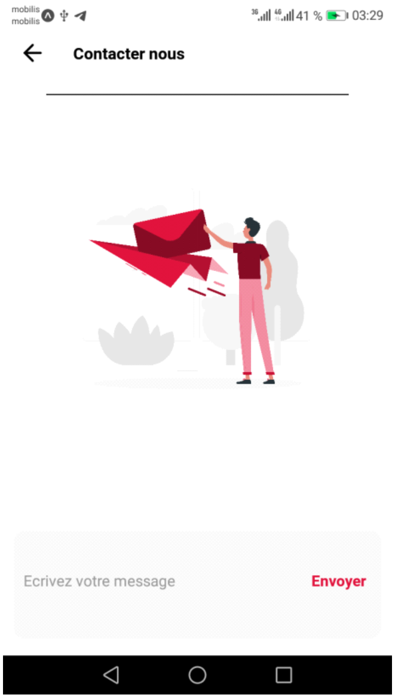
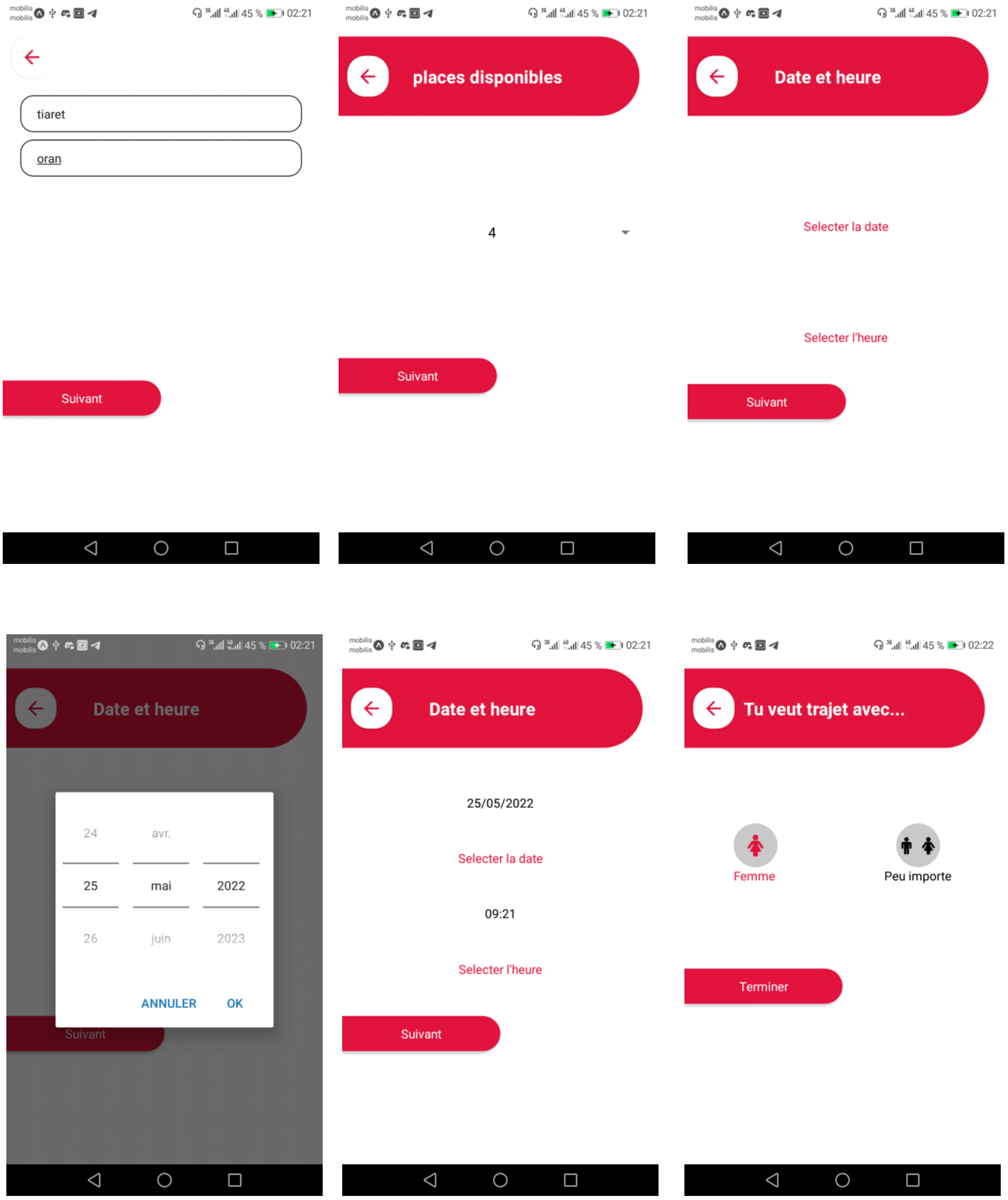


Figure 39. UrbanMobile Contact Page

3.4.17. Trip creation

The driver must fill in all the trip information, the starting and destination city (if there are no services for the starting city the application will respond with a toast like "Nous n'avons pas de services à «starting city» en ce moment". Then he selects the available seats, and enter the date and the hour of the trip. If the driver is a female then she can specify if the trip is only for women or not. See figure 40.



tiaret

oran

4

25 mai 2022

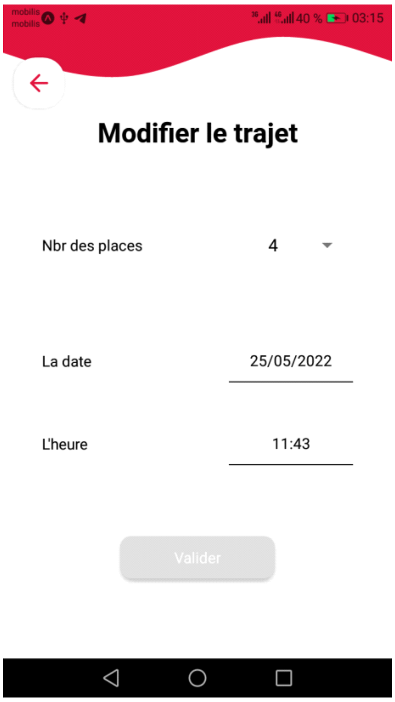
25/05/2022

09:21

Figure 40. UrbanMobile Create Trip Page

3.4.18. Trip updating

The driver can update the available seats on the trip, the date, and the time of the trip. For the available seats he cannot update less than the reserved seats (See figure 41).



Modifier le trajet

Nbr des places 4

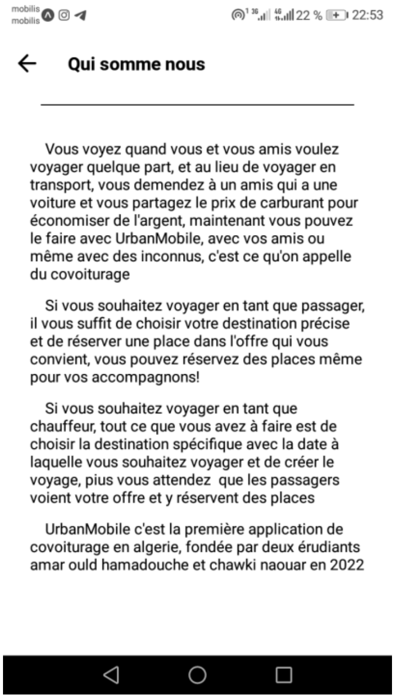
La date 25/05/2022

L'heure 11:43

Figure 41. UrbanMobile Update Trip Page

3.4.19. About us

The user can reach the screen by pressing the "Qui Somme nous" button on the menu to see who we are, and how and why he should use our application like showed in figure 42



Qui somme nous

Vous voyez quand vous et vous amis voulez voyager quelque part, et au lieu de voyager en transport, vous demendez à un amis qui a une voiture et vous partagez le prix de carburant pour économiser de l'argent, maintenant vous pouvez le faire avec UrbanMobile, avec vos amis ou même avec des inconnus, c'est ce qu'on appelle du covoiturage

Si vous souhaitez voyager en tant que passager, il vous suffit de choisir votre destination précise et de réserver une place dans l'offre qui vous convient, vous pouvez réservez des places même pour vos accompagnons!

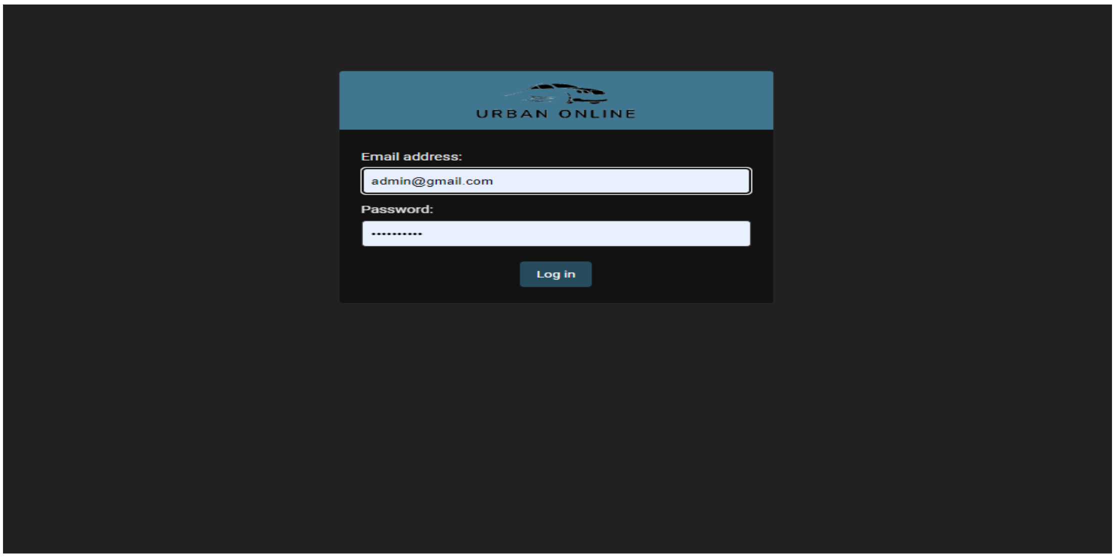
Si vous souhaitez voyager en tant que chauffeur, tout ce que vous avez à faire est de choisir la destination spécifique avec la date à laquelle vous souhaitez voyager et de créer le voyage, pius vous attendez que les passagers voient votre offre et y réservent des places

UrbanMobile c'est la première application de covoiturage en algerie, fondée par deux érudiants amar ould hamadouche et chawki naouar en 2022

Figure 42. UrbanMobile About Us Page

3.5. Description of the website administration

The first thing the admin will see when accessing the website is the authentication page, where he provides his email and password like showed in figure 43.



URBAN ONLINE

Email address:

admin@gmail.com

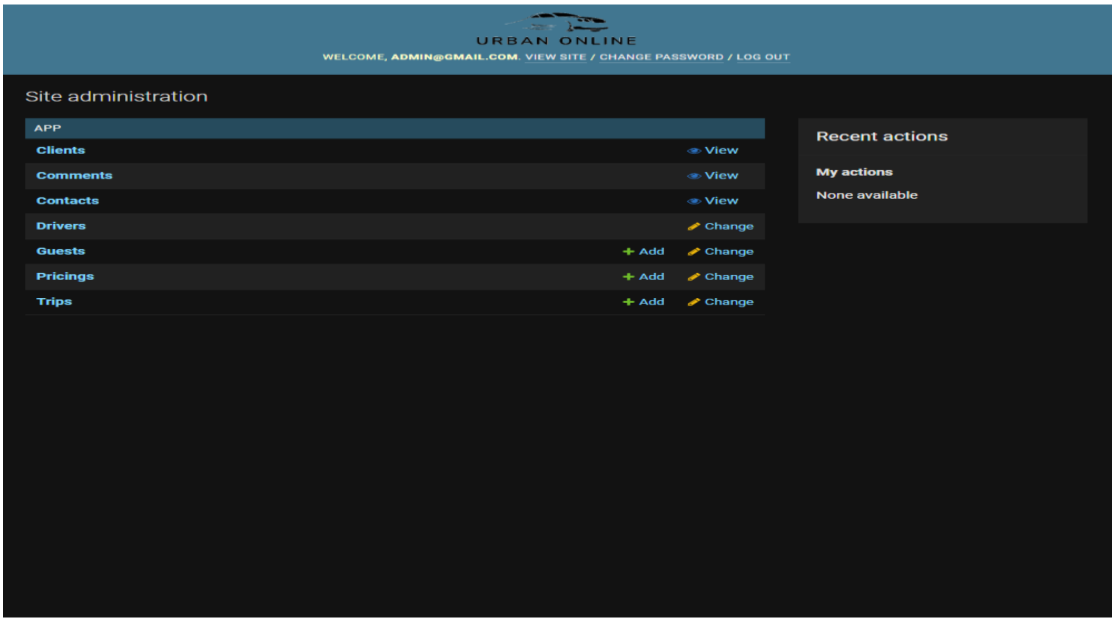
Password:

••••••••••

Log in

Figure 43. UrbanOnline Login Page

After authenticating, the admin can now see a list of subjects that he can choose from, some of them are editable like Guests, Pricings, and Trips and the rest is not editable (See the figure below)



URBAN ONLINE

WELCOME, ADMIN@GMAIL.COM. VIEW SITE / CHANGE PASSWORD / LOG OUT

Site administration

APP		
Clients		View
Comments		View
Contacts		View
Drivers		Change
Guests	+ Add	Change
Pricings	+ Add	Change
Trips	+ Add	Change

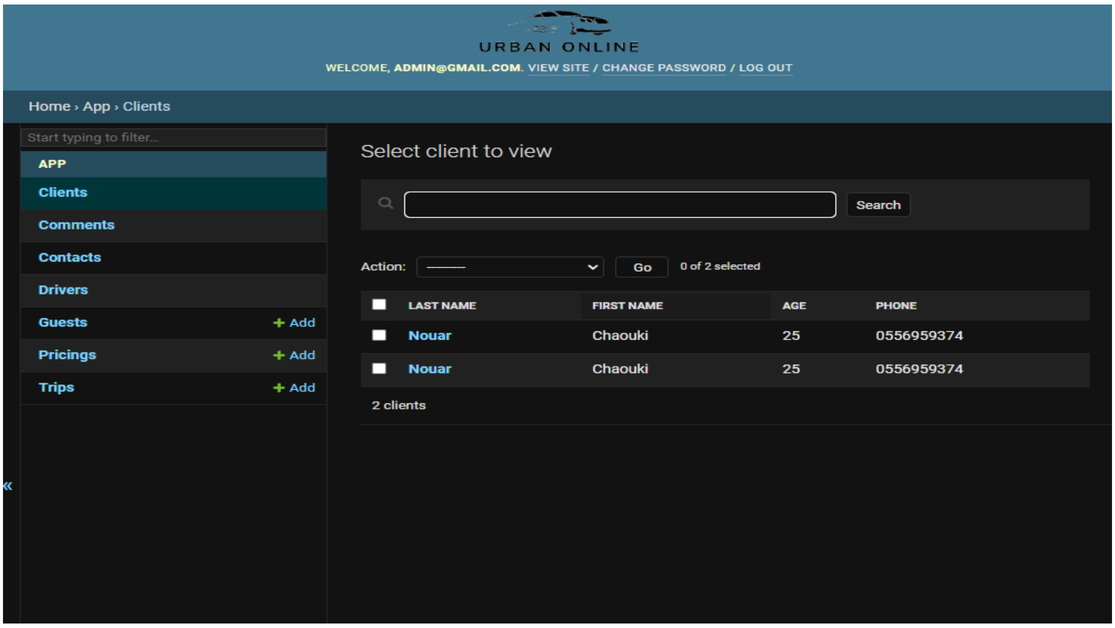
Recent actions

My actions

None available

Figure 44. UrbanOnline Menu Page

When the administrator click on one of the subjects, he can see a table of details, he can also search for a specific object like a client using a search bar or a filter as shown in figure 45 and figure 46.



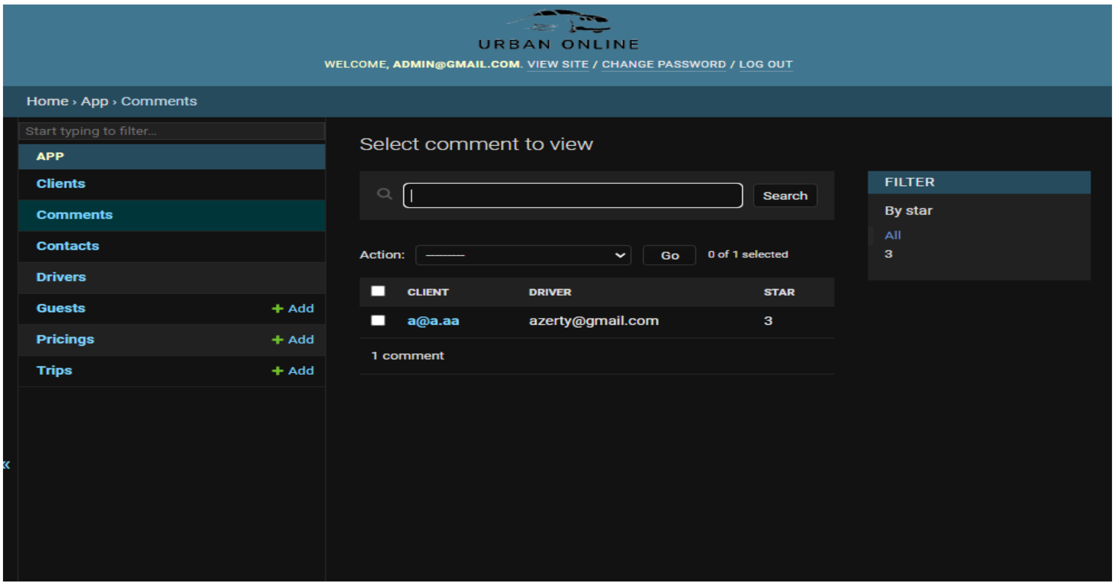
Select client to view

0 of 2 selected

	LAST NAME	FIRST NAME	AGE	PHONE
□	Nouar	Chaouki	25	0556959374
□	Nouar	Chaouki	25	0556959374

2 clients

Figure 45. UrbanOnline Clients List Page



Select comment to view

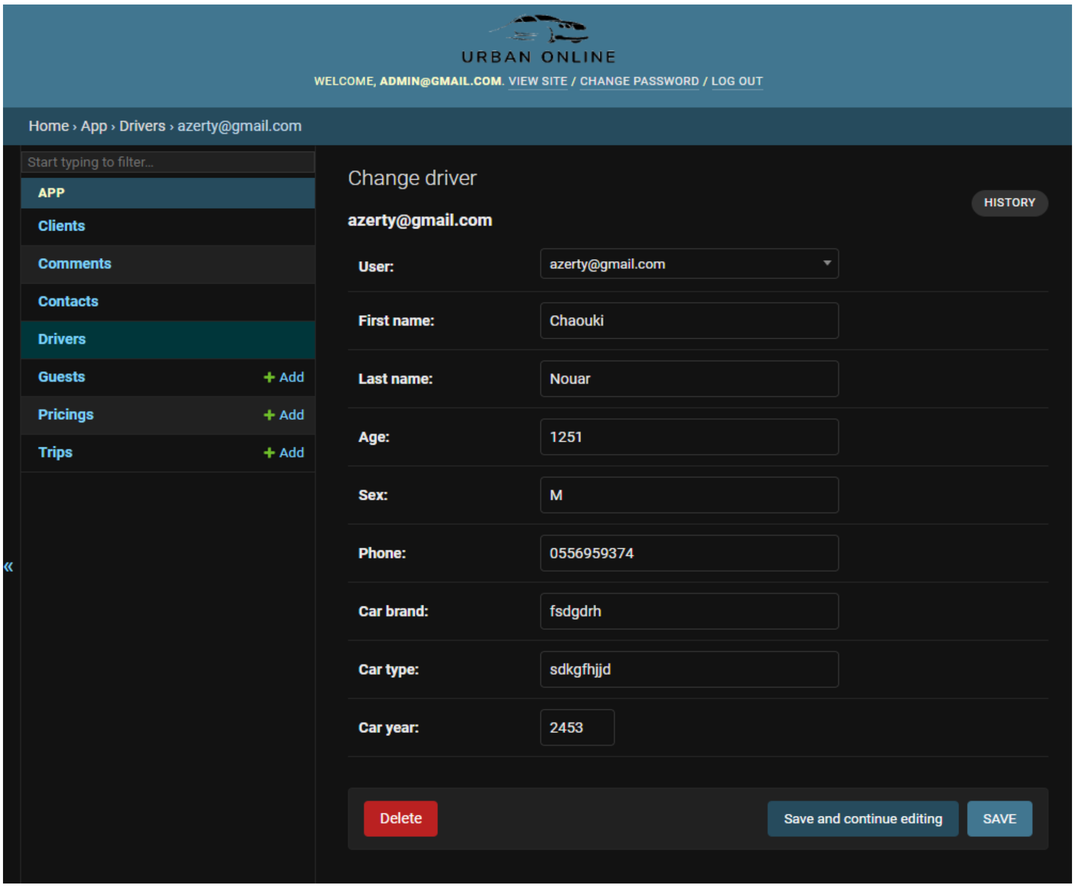
0 of 1 selected

	CLIENT	DRIVER	STAR
□	a@a.aa	azerty@gmail.com	3

1 comment

Figure 46. UrbanOnline Comments List Page

When clicking on one of the objects, the administrator can see the full details and do some operations like editing or deleting or adding another object, as showed in the figure 47.


URBAN ONLINE
WELCOME, ADMIN@GMAIL.COM. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › App › Drivers › azerty@gmail.com
Start typing to filter...
APP
Clients
Comments
Contacts
Drivers
Guests + Add
Pricings + Add
Trips + Add
«
HISTORY
Delete
Save and continue editing
SAVE

Change driver

azerty@gmail.com

User: azerty@gmail.com

First name: Chaouki

Last name: Nouar

Age: 1251

Sex: M

Phone: 0556959374

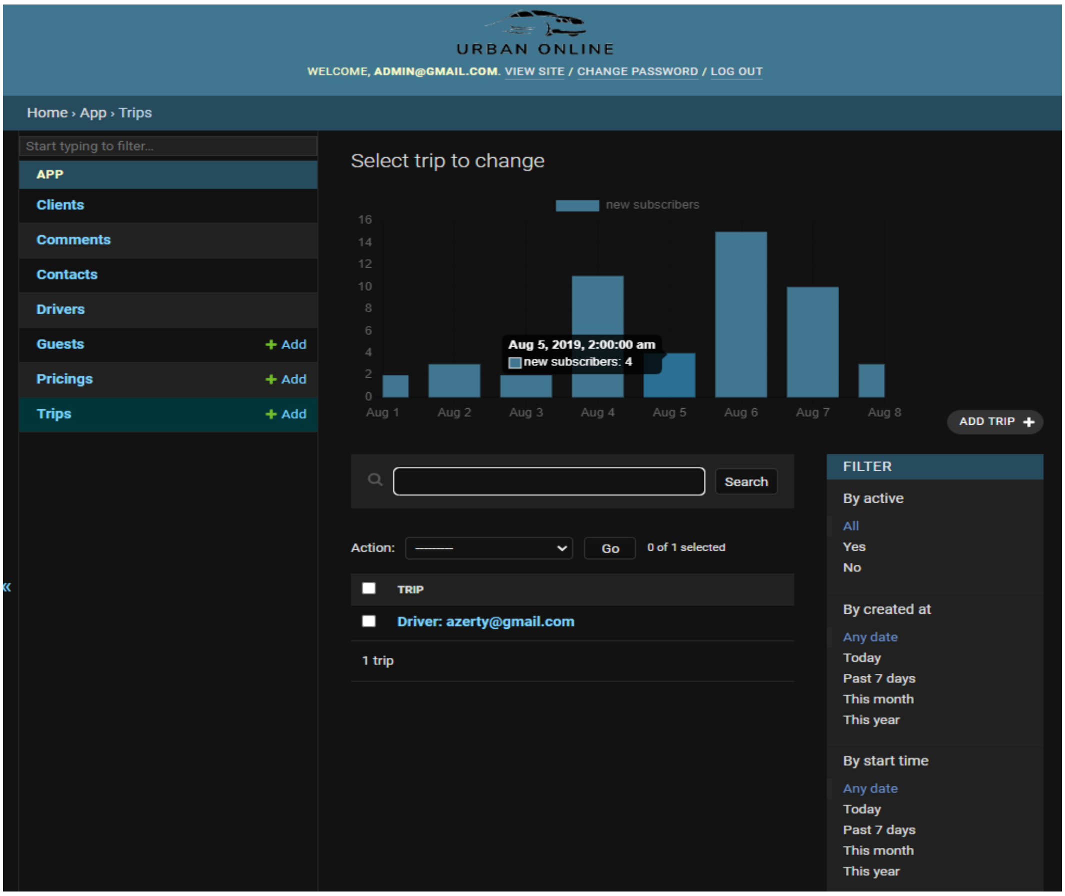
Car brand: fsdgdrh

Car type: sdkgfhjjd

Car year: 2453

Figure 47. UrbanOnline Driver Details Page

One of the most important subjects is Trips. Here, the administrator can search for any trip and have full control of them, at the same time, the administrator can look at some statistics that indicate how many trips are active and can consult the income in the last few days as depicted in figure 48.



Select trip to change

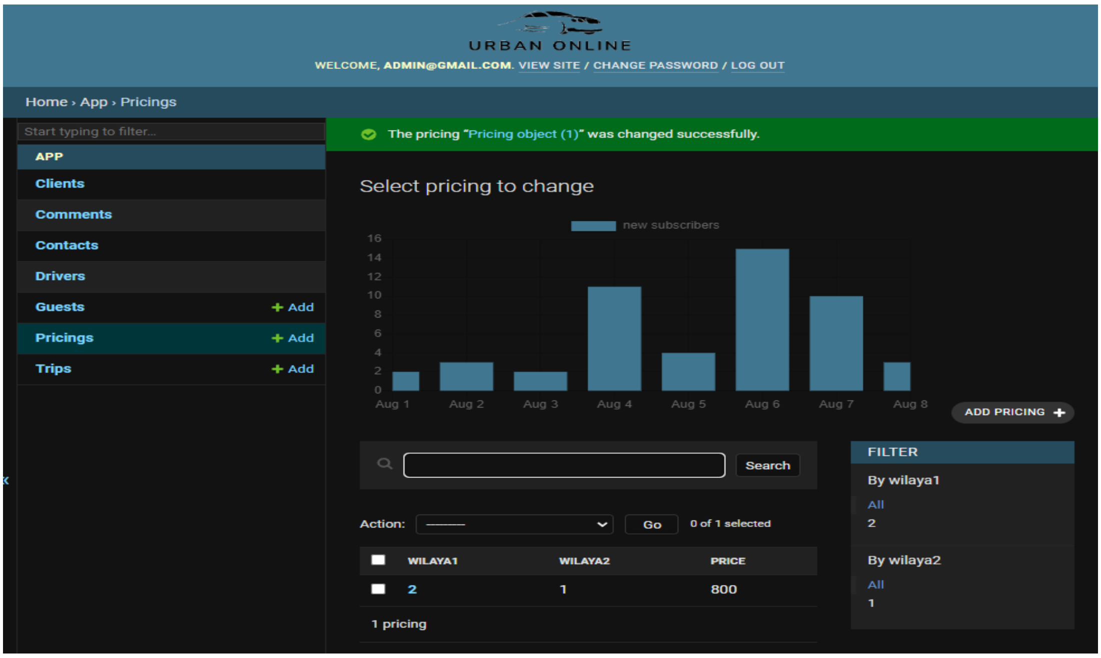
0 of 1 selected

☐	TRIP
☐	Driver: azerty@gmail.com

1 trip

Figure 48. UrbanOnline Trips List Page

Pricing is very critical in this project, therefore we provided a very easy way to control it and look for the most popular destinations of clients. Figure 49 shows the pricing management.



The pricing "Pricing object (1)" was changed successfully.

Select pricing to change

0 of 1 selected

☐	WILAYA1	WILAYA2	PRICE
☐	2	1	800

1 pricing

Figure 49. UrbanOnline Pricings List Page

Conclusion and Perspectives

In this dissertation, we approached a practical transportation problem with the aim of helping the community, especially the disadvantaged individual. After deeply analysing the functional needs and the Algerian market and stating its advantages and disadvantages, we came up with a solution in a form of an e-service mobile application with the name of "***UrbanMobile***" to solve this real-world problem, which comes helpful for most of the users and can be used in most of the cities in Algeria.

For the implementation of the application, we chose the android platform for its ease and accessibility to the general public, and the studies and analysis of the Algerian market with its advantages and disadvantages which helped us to define the functional requirements and non-functional requirements of our system and how it should perform.

UrbanMobile is used for efficient communication between the car owner and ride seekers. It leads to the establishment of a well-organized transport method that provides a low-cost alternative for people without cars and a good solution to save money for people with cars. Besides this application aid in reducing fuel consumption and carbon emission. Thus, it is an environment-friendly application.

During the development, we focused on the main functionalities of the project, we came up with ideas that could further improve the app by conducting more user studies and by adding more functionalities to it. The future implementations may include:

I. Enhanced User Interface:

Personalized enhancements like storing users' previous source and destination searches, adding favorite routes, and enhancing user experience. This will also increase the application's performance.

II. IOS platform:

Keeping in mind the huge number of Android users in Algeria compared to IOS, the mobile application is built for the Android platform. As part of future needs, an IOS version will have to be configured.

III. Data Analytics:

The application's data can provide a perfect platform to study the habits of customers, understand and respond to geographical demands and make the pricing based on the results of the analytics.

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