POLITECNICO
MILANO 1863

Requirement Analysis and Specifications Document

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v0.9

Contents

Revision History

Revision	Date	Author(s)	Description
0.1	31.10.16	N and J	First draft of the introduction
0.2	1.11.16	N and J	Adding the Domain Properties
0.3	31.10.16	N and J	Definition of Goals and Constraints
0.4	1.11.16	N and J	Conclusion of the overall section
0.5	3.11.16	N and J	Introduction to the third section
0.6	4.11.16	N and J	Adding the mockup examples of the UI
0.7	5.11.16	N and J	Adding the Functional requirements
0.8	6.11.16	N and J	Adding more details about non functional req
0.9	7.11.16	N and J	Describing the scenarios

1 Introduction

1.1 Description of the problem

PowerEnjoy is a car sharing service that exclusively employs electric cars. The company is in need of a system that allows users to find the locations of available cars located in the geographical areas they choose to explore. Then, they may complete the reservation of a car among those found with the research tool. After that, if the user who made the reservation launches the car doors unlock command and PowerEnjoy detects he is nearby, then the car doors are actually unlocked.
During the ride, the driver is notified of the current bill in real-time through the screen. At the of the ride expenses are automatically charged on the driver's count. Since all the vehicles are electric, it is fundamental to keep them properly charged, so the users will be incentivized in being virtuous through discounts and penalty fees. A saving option will be provided in order to help users make the right choices both to save money and to help the PowerEnjoy maintain its high quality service.

1.2 Goals

PowerEnJoy must provide the following main features:

- **[G1]** Let users drive a car for a fare when needed.
- **[G2]** When a user wants to use a car, nobody else can use that car at the same time.
- **[G3]** Let users find and reach cars.
- **[G4]** Let drivers find and reach safe parking areas and locations.
- **[G5]** Encourage the sharing of a single car.
- **[G6]** Most of the time cars have battery level such that they can be used.
- **[G7]** Cars are always well distributed on the territory.
- **[G8]** Make sure that most of the cars are ready to use and in a good condition.
- **[G9]** Identify who is the driver for security purposes.

1.3 Domain properties

We suppose these assertions to be true in the analyzed world:

- **[D1]** Personal information provided in the sign up phase are true.
- **[D2]** Cars are always connected to PowerEnjoy VPN (Virtual Private Network).
- **[D3]** Cars' GPS is never neither switched off nor damaged.
- **[D4]** Cars' locations are known by GPS.

- [**D5**] Users who have an open reservation are properly located by GPS through their mobile devices.
- [**D6**] Payments management is delegated to a third party company.
- [**D7**] All sensors report correct information and they are neither switched off nor damaged.
- [**D8**] Every possible technical issue is detected by the sensors.
- [**D9**] Each power plug can be linked to at most one car at the same time.
- [**D10**] Power grid stations always dispense electricity.
- [**D11**] Cars' screens are never switched off nor damaged.
- [**D12**] The number of available slots in a special parking area is always known by PowerEnJoy though his VPN.
- [**D13**] The user who inserts his password on the screen is the same who actually drives the car.

1.4 Glossary

In this paragraph, we go through some recurrent terms that deserve a complete definition to avoid misunderstandings along the discussion:

- **Budget:** maximum amount of money acquirable from a payment method.
- **Car:** one of the electric vehicles owned by PowerEnJoy.
- **Discount:**
  - **A:** PowerEnJoy detects the user took at least two other passengers onto the car. A 10% discount is applied on the last ride's bill.
  - **B:** the car is left no more than 50% of the battery empty. A 20% discount is applied on the last ride's bill.
  - **C:** the car is left in a special parking area and it is plugged to a power grid station before ending the ride. A 30% discount is applied on the last ride's bill.
- **Driver:** a user who already ignited the engine of the car he rented.
- **Fee:**
  - **A:** a user makes a reservation but he does not unlock the car doors within one hour from the reservation. A 1 EURO fee is applied.
  - **B:** a car is left more than 3 kms away from the nearest power grid station or with more than 80% of empty battery. A 30% fee is applied on the last ride's bill.
  - **C:** the car is left in a special parking area and it is plugged to a power grid station before ending the ride. A 1 EURO per minute fee is applied until the user ignites the engine.

- **Guest:** an unlogged visitor of the application. Guests are only allowed to browse the map, but they can not make reservations.
- **Minor issue:** an issue not detectable by sensors, such as dirt into the car cabin or damages to the car seats. This kind of issues can be reported by users through the apposite functionality.
- **Operator:** an employee of PowerEnJoy who is in charge of resolving all kinds of issue in the service.
- **Passenger:** every person who boards a car, excepted the driver.
- **Payment information:**
  - Payment method name
  - Surname and name of the owner
  - Card number
  - Expiration date
  - CVV
- **Personal information:**
  - Surname and name
  - Nationality
  - Date of birth
  - City of birth
  - Username
  - Phone number
  - E-mail address
  - Driving license
- **Power grid station:** the energy turrets where users can leave cars to refill batteries.
- **Power plug:** there is one and only one power plug per power grid station.
- **Reservation:** functionality provided to the users to reserve a single car at one time.
- **Ride:** time gap between the ignition of the engine and the locking of the car doors.
- **Safe parking area:** a parking area included in a list of legal geographical areas to leave a car. Safe parking areas are the only places where a car can be left to put an end to a ride.
- **Screen:** system terminal embedded on every car and connected to the central server. The screen is used to directly interact with the user during a ride.
- **Special parking area:** a subset of safe parking areas where a fixated number of power grid stations is present.

- **Technical issue:** an issue that can be detected by the car's sensors, such as mechanical and electrical problems, battery levell and eventual collisions.
- **User:** a guest who provided personal and payment information which have been verified. Users have access to the full set oof PowerEnJoy features.

1.5 Assumptions

In this section we analyze all the properties of the application domain of the system in order to describe the environment in which it operates.

- A guest can only register, surf the list of available cars on the map and consult the service's rules.
- The A discount can be applied if and only if the number of passengers is greater or equal to three, both at the beginning and at the end of the ride.
- Each special parking area is composed of a fixated number of parking slots.
- Each parking slot in a special parking area is associated to exactly one power grid station.
- Each power grid station has exactly one power plug.
- Insurance renewal is a task of the company administration.
- Road fines are discussed between traffic corps and the company's legal department.
- The validity of the driving license number associated with the user's profile will have to be verified by the driver licensing authority.
- The validity of the payment information associated with the user's profile will have to be verified by the payment company.
- Once a request is made, the user may cancel it.
- Payments are charged at the end of each ride.
- Despite the possibility of encouraging users to behave well, periodically an operator will take care about cars' repositioning.
- A driver cannot temporary park his car and exit from it . This assumption is made to prevent drivers from leaving cars in parking areas not included in the set of safe parking areas. In a future perfective development this assumption will be erased.
- A discount regarding power grid stations is applied if and only if the car is in a special parking area and the car is actually charging.
- The set of special parking areas is pre-defined in PowerEnJoy.
- Car batteries are considered almost empty when they reach 20%.
- A user who unlocks the car and does not ignites the engine within 5 minute has to pay the C fee. For all the time the driver does not ignite the engine, he is encouraged to do so or leave the car through the screen.

- Power grid stations are located only in special parking areas.
- A safety lock is present on each power plug.
- Locking and unlocking car doors means that also the power plug on the car is either locked or unlocked.
- Cars' windows close automatically whenever a ride ends.
- Sensors capable of detecting whether a person is sitting or not on the car seats are present on every car.
- Discounts and fees are calculated all together at the end of each ride. Discounts are calculated first in the order A-B-C, then the eventual fee B is considered.
- The map navigation, tow trucks and mechanics services are managed by external affiliated companies.
- Assurances and other necessary documentations are renewed by external affiliated companies.

1.6 Proposed system

The best solution to carry on the project is to develop a web platform, both in the form of a website and of a mobile application. The requisite of portability is fundamental, since one of the wanted features is the that cars should be found opened and ready to serve when they are near enough. A plugin for wearable devices could also serve to this functionality.
The mobile application to be developed interacts with previously installed sensors. The system will retrieve data periodically from the cars' sensors to find technical issues in real time. The website will be available in all the most common browsers (Mozilla Firefox, Google Chrome, Microsoft Edge) and the mobile app will work in Android, OSX, Windows Phone.

1.7 Actors identifying

The actors involved in PowerEnJoy are:

- Guest: a person who can access a limited number of the PowerEnJoy's features, e.g. the research tool. They can neither make reservations nor access to any features that requires the possibility of online payments.
- User: a person who has registered and therefore has provided his personal and payment information.
- Driver: a user who has made a reservation for a car and now is driving it.***
- Operator: a person who takes care of cars' maintainability both for technical and legal issues.

1.8 Stakeholders

The one and only stakeholder for this project is represented by the professor who defined the assignment. The deadline for the submission of the complete document is the end of the current semester. The final submission should provide a clear and complete documentation for the development of the system, along with use cases analysis and tests.

The completeness of the document will be compromised by the need of focusing on the major features of the system. Nonetheless we'll try to maintain a high level of consistency all along the dissertation and to develop as many aspects as possible.

Concerning the target of the application, we can think of the standard user as a stable user: the aim of PowerEnJoy should be to convince the customers to use it more than just once.

1.9 Other considerations concerning the system

Some considerations based on the last sentence in the previous paragraph can be made. If the aim of PowerEnJoy is to be used daily, a great effort must be spent on the user experience, in particular we require the following characteristics:

- **Usability:** since the set of functionalities usable by the user is quite limited it should not be difficult to make them so intuitive that no documentation will be necessary to fully understand them at a first glance.
- **Security:** the manipulation of sensible data like payment methods requires a strong focus on security matters and the customers must be aware that they are placing their money in good hands.
- **Stability:** it's a major characteristic since the service must be available h24 7/7dd.
- **Look & feel:** an essential design is necessary to catch the customers' attention and bound them to the service.

2 Requirements

2.1 Functional requirements

In the following paragraph we describe the main use cases in detail. The list of use cases presented in the following pages does not cover all the possible events that can occurr in the analyzed domain, but it is sufficient to explore all the features of the system, both in normal and exceptional situations. When we talk about pages and buttons it is only to help the reader figuring the ongoing flow of events: pages' structure will be examined in depth in the Design Document.

1. **[G1] Whenever a user needs to rent a car, he can do it for a fixated price**

   R1 Sign up functionality.

   R2 Verification of driving license and payment information.

   R3 Log in functionality.

   R4 Prevention of car doors unlocking unless the user is into a 10m range.

   R5 Start charging expenses for a given amount of money per minute as soon as the engine is ignited.

   R6 Chargement of expenses on the user's account after the end of each ride.

   R7 Consult last rides' invoices.

2. **[G2] Whenever a user wants to use a car, nobody else can use that car at the same time.**

   R1 Make reservations valid for a single car at the same time.

   R2 Reservations expires after one hour and the A fee is charged on the user's payment method, then the car is available again.

   R3 Reserved cars are marked as unavailable.

   R4 Lock car doors after each ride.

   R5 Stop counting expenses and generate an invoice whenever a ride terminates.

   R6 Restore cars' availability after each ride.

3. **[G3] Let users find and reach cars.**

   R1 Find cars located nearby or by specifying an address.

   R2 Provide navigation tips to to reach a reserved car.

4. **[G4] Let drivers find and reach safe parking areas and locations.**

   R1 Guide each driver to the chosen destination area.

   R2 If the money saving option is enabled, guide the driver to a special parking area according to his final destination.

5. **[G5] Encourage the sharing of a single car.**

   R1 Apply the A discount.

6. **[G6] Keep cars battery at a level such that they can be used for the greatest possible amount of time.**

   R1 Show special parking areas.

   R2 Apply the B discount.

   R3 Apply the C discount.

   R4 Periodically, if there is a car with almost empty battery, send a notification to operators who will intervene.

R5 Restore cars' availability once at least 20% battery level is reached.

R6 Apply the B fee.

R7 Provide the money saving option.

7. **[G7] Keep cars always well distributed on the territory.**

   R1 Apply the B fee.

   R2 Periodically, if there is a non-uniform cars' distribution, send a notification to operators who will intervene.

   R3 View special parking areas.

   R4 Enable money saving option.

G8 **Make sure that most of the cars are ready to use and in a good condition.**

   R1 When a technical issue is detected, a notification is sent to operators who will intervene and the car is switched to unavailable.

   R2 Make a report whenever a minor issue is reported by a user.

   R3 Periodically, an operator takes care of managing reported minor issues.

G9 **Identify who the driver is for security purposes.**

   R1 The user who unlocks the car doors must enter his personal password once in the car in order to be recognized.

   R2 Every time the user wants to ignite the engine, he must be recognized.

   R3 Every time the driver exits the car, the engine goes off after 15 seconds.

   R4 An operator can watch all drivers driving a certain car in every moment and, in case of necessity, he can send this information to recognized external authorities (like police and or medical services). **** add scenario per questo

   R5 The user can ask for a new password.

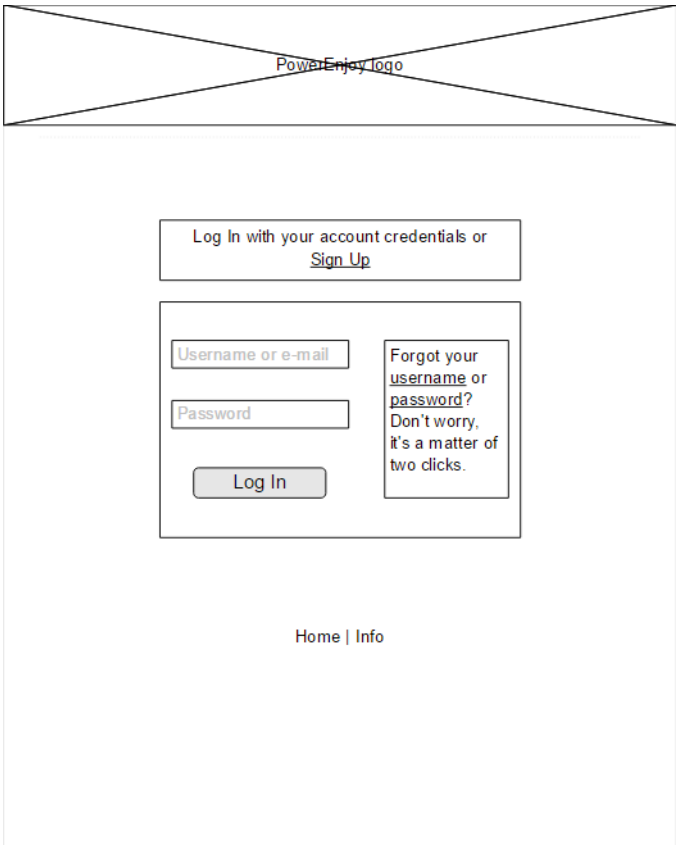
   R6 A ride can last for at most eight hours. After that, the public safety service is informed about a potential robbery.

2.2 Non-functional requirements

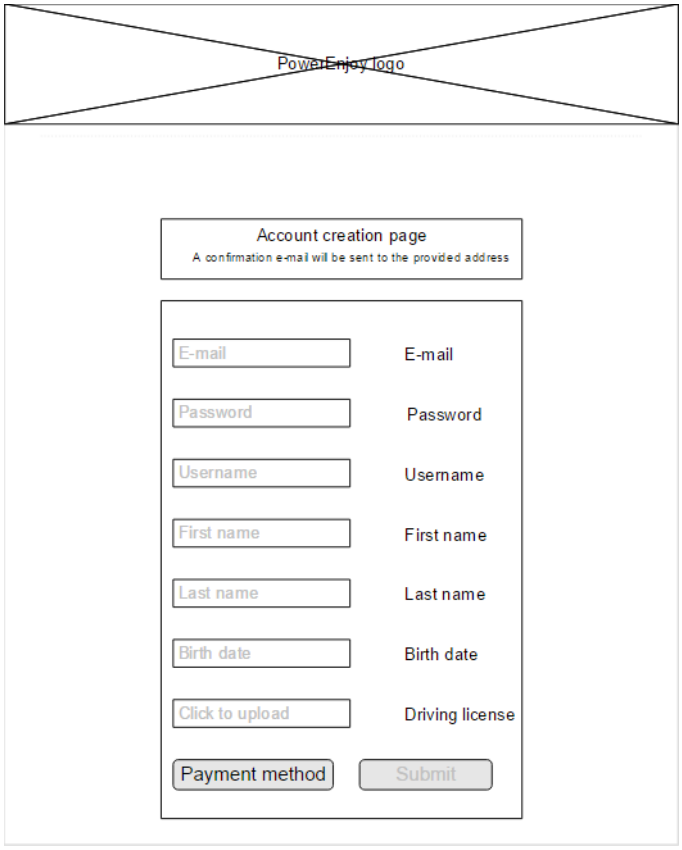
2.2.1 User Interface

In this paragraph, we go through the main features of the user interface. In particular, we concentrate on the app's most important pages and on the car screen, leaving the operator interface for a further development.

Login Page The login page should be intuitive, without any functionality but to sign in or create a new account. A "home" button is provided to get to the main page and surf the available cars (without login).

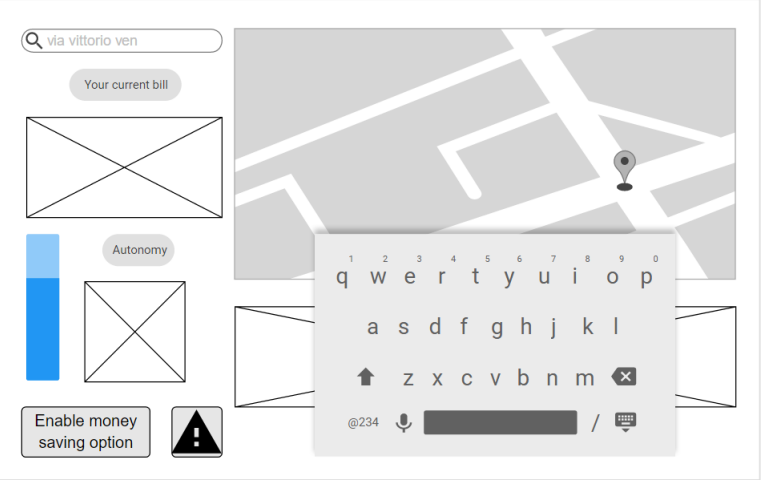

PowerEnjoy logo
Log In with your account credentials or
Sign Up
Username or e-mail
Password
Log In
Forgot your
username or
password?
Don't worry,
it's a matter of
two clicks.
Home | Info

Account creation page A scrollable page where new users can provide all the personal information necessary to create an account, comprehensive of a copy of the driving license. We must notice that in the following mockup not all the required information is represented (for example, a telephonic number is required). This was made only to make the representation clearer.



Main page The main page of the application. Through this page it is possible to search all the available cars in the selected zones and, once a car is selected, to make a reservation for that car and start the navigation tool (powered by Google). The car doors unlock button is also in the main page, so that a user who gets to the car using the navigation tool can unlock the doors from the same page. Unlogged users can get to the main page, but all the buttons below the map will be unavailable.

Car screen The following picture represents the car screen after it has been unlocked through the personal password. The navigation system is powered by Google Maps, so we will not go through its complete functionality. The car screen provides the driver with real-time information regarding the car's battery level and current money charge (excepted the application of fees and discounts).



2.2.2 Documentation

Here we report the list of the complete documentation that will be available ate the end of the deployment of the proposed system:

- **RASD**, Requirement Analysis and Specification Document, the present document, containing the description of goals and requirements along with a high level description of the proposed system. Technical properties are described through use case diagrams, UML diagrams and scenarios. The whole document.
- **DD**, Design Document, containing the functional description of the system.
- **Installation manual**, containing the instructions necessary for the deployment of the system.
- **User manual**, a complete description of the system from the point of view of the users.
- **Testing report**, the description of the tests used to confirm the system's reliability.
- **Project report**, the result of analysis conducted during the development of the system.

2.2.3 Considerations upon reliability and availability of the proposed system

The objective is to develop a system that ensures its service available H24 7/7. Since this goal is not obtainable in the real world, we plan to conduct all the necessary maintenance services during the night, when PowerEnJoy should be less requested, and with a large forewarning for customers. We plan to keep the maintenance services limited at 3 hours every two weeks, but these numbers will be revised in the precise analysis brought on in the Design Document. Reliability is a fundamental characteristic of the system to be developed. The application in write-intensive. Every reservation is critical, since it requires access and blocking of resources that are normally accessible by everyone. A recise reliability rate (reliability rate = mean time between failures) will be evaluated in the Design Document.

3 Scenario identifying

3.1 Scenario 1

Juan has planned a day trip to a museum with three friends of him. Since the museum is in the same city as them, Juan wants to get to the museum using PowerEnJoy, so he signs up and searches for a car. After some minutes, he receives an e-mail containing his new password, which he finds too difficult to remember, so he asks for a new one through the app functionality. To be well prepared for the event, he also searches for the nearest special parking area through the app functionality. Half an hour before the meeting, Juan reserves a car and uses the "navigate to the car" functionality to get to the right location

along with his friends. When everybody is there, he uses the "unlock doors" button to open the car doors, then they board together. Juan is asked to insert the password that was provided by the system at the moment of the registration, then he ignites the engine and searches for the destination through the car's screen. Juan presses the "money saving option" button on the screen to be informed of the upcoming discounts, then he starts driving to the selected location. When Juan arrives at the selected location he parks into a safe parking area, all the passengers get off the car and the doors lock. Ten minutes later, Juan is notified of the new invoice and he consults the final expenses for the ride.

3.2 Scenario 2

After Christmas holidays there are several cars that are located in areas that are very far from safe parking areas. A notification is sent to one of the operators of PowerEnJoy requesting his intervention to bring one of the vehicles back to the nearest special parking area. After the operator has completed the task another notification arrives claiming that a car was left unplugged with 5% battery, so he heads to the location of the vehicle and recharges it with the emergency kit he's provided with, then he boards on the car and brings it back to nearest safe parking area and makes sure the battery is at least 10% recharged.

3.3 Scenario 3

Julia has a reservation for a car but when she arrives at the vehicle's location she finds out the cabin is dirty. She presses the "report an issue" button on the car screen and retires the reservation through the app. After a short time, an operator pushes the "show reported issues" button and takes the issue in charge. After he has opened a new paperwork, he uses the "find rides by plate number" to check who used the car the last time, then he heads at the car's location and resolves the issue requesting aid from the central. Being the problem not that grave, no notification is sent to the responsible, but the operator still produces a report for the issue using the "create a report" functionality.

3.4 Scenario 4

One day a vandal breaks the glasses of a parked PowerEnJoy car. The system detects the issue and a notification is sent to an operator, who takes the problem in charge and immediately heads to the car's location. After he has checked the car's conditions he brings it to the affiliate mechanic to repair the damage.

3.5 Scenario 5

Anthon has boarded a car with his girlfriend to go to the cinema. They rush out the car to arrive in time for the show, but doing so Anthon parks in a safe parking area leaving the engine ignited. To make things worse, the car's battery is at 7% when Anthon and his girlfriend get off and the nearest power grid is 5km away from the car's location. In the interval, Anthon checks the invoice that was generated for the ride and he discovers not only that he has no right to any discount, but that he also must pay fee C.

3.6 Scenario 6

At three o'clock p.m. a notification for a technical issue (a pneumatic brake) appears on the page of an operator. He starts the procedure by marking the car as unavailable but, doing so, he finds out that the car was reserved in the meanwhile. The operator waits for the ride to end, then the car is finally marked as unavailable and he heads to its location. When the operator arrives, he discovers that the car's insides are not as clean as they should, so he resolves both the issues and writes down in the report the actions he performed.

4 Use case description

Actor	Guest
Goal	[G1] [R1] [R2]
Precondition	-
Event Flow	1. A guest on the home page presses the "sign up" button to start the registration process. 2. The guest fills the form with personal, payment and driving license information. 3. The guest verifies and confirms information entered. 4. PowerEnJoy forwards driving license information to the driver licensing authority which will validate them. 5. PowerEnJoy forwards payment information to the payment company which will validate them.
Post-Condition	The guest receives a password generated by PowerEnJoy to log in via e-mail. The guest can now log in PowerEnJoy. All the guest's information is stored.
Exception	a. A guest fills the form with information regarding another user. b. The driving license information has not been validated. c. The payment information has not been validated.
Exception Handling	(a), (b), (c) The signing up process is aborted and the guest is notified via e-mail.

Actor	Guest
Goal	[G1][R3]
Precondition	-
Event Flow	1. A guest on the home page presses the "log in" button to use PowerEnJoy's features. 2. The guest fills basic personal information and the password given by PowerEnJoy
Post-Condition	The guest is logged in PowerEnJoy. The guest has become a user.
Exception	a. Either basic personal information or password is wrong.
Exception Handling	(a) Ask the user to refill both basic personal information and the password.

Actor	User
Goal	[G1] [R4] [R5] [G9] [R1] [R2]
Precondition	The user has an active reservation for a car.
Event Flow	1. The user launches the car doors unlock command. 2. PowerEnJoy detects the user's position using the GPS. 3. PowerEnJoy unlocks car doors. 4. The user enters his password through the car's screen. 5. PowerEnJoy recognizes the user. 6. The user ignites the engine for the first time.
Post-Condition	The ride starts. The user becomes a driver. Start counting expenses for a given amount of money per minute. The driver can drive the car.
Exception	a. The user is too far from the car. b. The wrong password is inserted for five times. c. The car is linked to a power turret.
Exception Handling	(a) Prevent car doors unlock. (b) PowerEnJoy prevents further password insertion and the user has the possibility to exit the car within five minutes from the car doors unlock otherwise he starts paying the C fee. Then, the car doors lock, the reservation expires, the car status is switched to available and an invoice reporting expenses is generated. (c) Once the car doors are unlocked, the user has also to unplug the car from the power turret, otherwise the engine does not ignite.

Actor	User
Goal	[G2] [R1] [R2] [R3]
Precondition	The user has found an available car.
Event Flow	1. The user presses the “make a reservation” button. 2. Reservation expiring timer starts. 3. The car is marked as unavailable.
Post-Condition	The user has reserved a car.
Exception	a. Another user makes a reservation for the same car in the very short moment before so the car is actually unavailable. b. The user does not start the ride within one hour.
Exception Handling	(a) The user may find another available car. (b) The user has to pay the A fee and the reservation for the car expires.

Actor	Driver
Goal	[G2] [R4] [R5] [R6]
Precondition	-
Event Flow	1. The driver parks into a safe parking area. 2. The driver turns off the engine definitively. 3. Every passenger gets off the car. 4. All doors are closed.
Post-Condition	PowerEnJoy locks car doors within one minute. The ride ends. The driver returns to be considered a user. PowerEnJoy stops charging expenses. PowerEnJoy generates the invoice corresponding to the ride. The car is marked as available.
Exception	a. The driver parks in a non-safe parking area. b. One or more passengers do not get off the car. c. Not all doors are closed. d. The driver does not turn off the engine. e. The car has almost empty battery. f. The car is parked in a special parking area.
Exception Handling	(a), (b), (c) The car doors does not unlock and the ride does not terminate. (d) The engine will be automatically switched off within 20 seconds as the driver exit. (e) Car doors get locked, the ride ends but the car is marked as unavailable. PowerEnJoy charges the B fee unless it is parked in a special parking area. (f) As the event flow below. In addition, the driver has to plug the car to the power turret otherwise the ride will not end. Then, all post-conditions above occur.

Actor	Guest / User
Goal	[G3] [R1]
Precondition	-
Event Flow	1. A guest or a user on the home page presses the "look for a car" button to find a car. 2. The guest or the user fills the search filter searching for places of interest, address or actual position. 3. The guest or the user may consult cars' status.
Post-Condition	PowerEnJoy finds out all the cars which match the search filter. Cars' status is available to be consulted.
Exception	-
Exception Handling	-

Actor	User
Goal	[G3] [R2]
Precondition	The user has an active reservation for a car.
Event Flow	1. The user presses the "navigate to the car" button to reach the car. 2. The user selects a path according to his necessity.
Post-Condition	PowerEnJoy provides navigation tips to the user in order to reach the reserved car.
Exception	-
Exception Handling	-

Actor	Driver / Operator
Goal	[G4] [R1]
Precondition	-
Event Flow	1. A driver/operator presses the "look for a destination" text area in order to navigate to a safe parking area near to a specific location. 2. The driver/operator fills the search filter according to places of interest or a specific address. 3. The driver selects a path according to his necessity.
Post-Condition	PowerEnJoy provides navigation tips to reach the target location.
Exception	-
Exception Handling	-

Actor	Driver
Goal	[G4] [R2]
Precondition	-
Event Flow	1. A driver, on the screen presses the "money saving option" button. 2. The driver fills the search filter according to places of interest or a specific address. 3. The driver selects a special parking area among the ones near to the target location. 4. The driver selects a path according to his necessity.
Post-Condition	PowerEnJoy provides navigation tips to the driver in order to reach the nearest special parking area from the target location.
Exception	a. While reaching the special parking area, it may happen that the target special parking area becomes full.
Exception Handling	(a) PowerEnJoy notifies the driver that the selected special parking area is not available anymore. Then, it evaluates another special parking area target.

Actor	Operator
Goal	[G6] [R4] [R5]
Precondition	PowerEnJoy detects an almost empty battery level car among those which are not charging and it notifies the operator.
Event Flow	1. The operator accepts the notification. 2. The operator opens a new paperwork to manage the issue. 3. PowerEnJoy shows cars with low battery level. 4. The operator picks the car through a by-pass. 5. The operator moves the car to a special parking area. 6. The operator plugs the car to a power grid station. 7. PowerEnJoy will restore car's availability when 20% level of battery is reached. 8. The operator closes the paperwork.
Post-Condition	A car is placed in a special parking area and it is charging.
Exception	a. The car has a very low battery level and the operator can not move it to a special parking area. b. In addition, the car has either a technical issue or a minor issue.
Exception Handling	(a) The operator reaches the car bringing with him a supply battery and plugs it. After an enough battery charge, the operator takes care of moving the car to a special parking area, to plug it and to restore the car's availability. (b) The operator will also take care of other problems according to the related routine procedure.

Actor	Guest / User / Driver / Operator
Goal	[G6] [R4] [R5]
Precondition	-
Event Flow	1. An actor on the home page clicks on the "show special parking area" button.
Post-Condition PowerEnJoy provides a list of all special parking areas.	
Exception	-
Exception Handling	-

Actor	Operator
Goal	[G8] [R1]
Precondition	PowerEnJoy detects a technical issue and it sends a notification to an operator.
Event Flow	1. PowerEnJoy marks the car as unavailable. 2. The operator accepts the notification. 3. The operator opens a new paperwork to manage the issue. 4. The operator evaluates the issue relevance. 5. The operator picks the car through a by-pass. 6. The operator, once in the car, may either launch the external tow truck service or move the car to the affiliate mechanical workshop according to the issue relevance. 7. After having fixed the issue, the operator brings the car to a safe parking area. 8. The operator restores car availability. 9. The operator closes the paperwork.
Post-Condition	The car is ready to serve.
Exception	a. The technical issue is detected while a user has reserved the car. b. A user makes a reservation before the operator has marked the car as unavailable. c. In addition, the car has either a low battery level or a minor issue.
Exception Handling	(a), (b) PowerEnJoy notifies the user/driver about it and it exhorts to cancel the reservation or end the ride. When the ride ends, the car is marked as unavailable. Then, the operator can proceed as explained in the event flow shown below. (c) The operator will also take care of other problems according to the related routine procedure.

Actor	Driver
Goal	[G8] [R2]
Precondition	-
Event Flow	1. The driver pushes the “report an issue” button through the car screen. 2. The driver fills relevant fields regarding the observed issue.
Post-Condition	The report is saved.
Exception	-
Exception Handling	-

Actor	Operator
Goal	[G8] [R3]
Precondition	The car is not reserved.
Event Flow	1. The operator pushes the "show reported issues" button. 2. The operator selects all minor issues regarding a single car. 3. The operator opens a new paperwork to manage the car minor issues. 4. The operator switches the car as unavailable. 5. The operator picks the car through a by-pass. 6. The operator takes care of solving the minor issue. 7. The operator brings the car to a safe parking area. 8. The operator restores car availability. 9. The operator closes the paperwork.
Post-Condition	The car is clean and in a good condition.
Exception	a) In addition, the car has either a low battery level or a technical issue.
Exception Handling	(a) The operator will also take care of other problems according to the related routine procedure.

Actor	Operator
Goal	[G9] [R4]
Precondition	-
Event Flow	1. The operator pushes the “show ride information by number plate” button. 2. The operator selects details about a ride. 3. The operator selects the “create a report” button in order to create a summary document about that ride.
Post-Condition	A report of the ride is created.
Exception	-
Exception Handling	-

Actor	User
Goal	[G9] [R5]
Precondition	-
Event Flow	1. The user pushes the “generate a new password” button on his profile settings.
Post-Condition	PowerEnJoy sends a new personal password associated to the user via e-mail.
Exception	-
Exception Handling	-