**Requirements Analysis and Specifications Document**

**Introduction**

**Description of the system**

The project that we implement named Car-Sharing Service, Users can reserve and use a car through the platform .Besides the service based on both mobile application and web applications.

**The functions for user**

Users can use their credentials and payment information to register an account in this system,then they will receive their personal password to access the system.

When users need a car, they need to locate their current location, then they can see the information about available cars nearby.After selecting a car ,user can follow the route provide by system to approach the car.

when a user reaches the car who reserved , system will unlocks the car.As soon as the engine ignites,users can see current charge through the screen on the car.After user get out of the car,system stop charging and locks the car.

System in order to restrain the behaviour of users , and to encourage virtuous behaviours of users, will carry out some reward and punishment measures.

The main purpose of this system is to help people who doesn’t has a car and need to use one, bring convenience to their life.The system also implements the efficient, convenient and affordable way off renting a car.In addition,it simplifies the artificial mechanism of renting a car.

**Actual system**

This Car-sharing company is able to has a systems, according to the user's location provide them with near the available car’s information and location.After selecting a car by user, the system will provide a route that users can approach to the position of the car.

when a user reaches the reserved car, tell the system she already arrive, then system unlocks the car for user.System also has automatic charging function, the charge of per minute will appear on the screen in the car.When users leave the car,system stop charging and locks the car.

System accord to the finally parking location of the user, as well as rest of electricity of the car,there are discounts or fines would be given to users .

This system stores information both of users and cars into a Mysql database.

**Goals:**

**1)** User can access the system from smartphone, using app

*Reqs:*

- App must be compatible with IOS, Android mobile operating systems.

- System must provide registration of a user. Or sign up procedure.

- While registering system must ask for user’s credentials and payment information, username and password#1 to access the system

- After signing up and car reservation, system must ask user to guess 4-number password#2

- password#2 must be entered in the app every time user picks up the phone after unlocking the screenlock (in terms of security)

- system must ask user to guess the recovery question with correct answer (in case of user’s bad memory and in terms of security as well), e.g. “what is your mother’s maiden name?”. Recovery question can be guessed once while registering.

*Da:*

- user’s smartphone has either IOS or Android operating system

**2)** Registered users can locate all unoccupied electric cars parked nearby or on the specific zone.（Can the system provides users with a route by GPS to the chosen car?)

*Reqs:*

- The system must acquire information about location of all unoccupied cars within the certain area

- The system must notify user to turn on the GPS on smartphone while using the app

*Da:*

- user already has credentials and payment (it is obvious)

- all electric cars have GPS navigators

**3)** Registered users can see the information about battery capacity of each unoccupied electrical car

*Reqs:*

- The system must acquire information about car’s battery capacity

*Da:*

- all electric cars have battery capacity sensors

**4)** User can reserve 1 chosen unoccupied electric car for up to 1 hour

*Reqs:*

- when 1 hour after reservation is up, system must state that the car is now unoccupied

- when 1 hour after reservation is up, system charges user for 1 euro

- the system states that the car is occupied when user starts engine (not correct, as user can start engine from any point by using the app)

*Scenario:*

*John reserved the car from the app and is up to be late for “occupying” the car and willing to avoid being charged and lose the reservation. He presses the “start/kill engine” button being far from car, thus occupies it.*

*Solution:*

*App buttons can be used only when the user is nearby the car. Engine starts not from app, but on the console in the car, using the same password, that user uses in the app. Not good. Explained in the goal 6)*

- buttons can only be used, when user’s GPS location states that he is near the car (problem of car theft is reduced, watch scenario 2)

- engine must be started from app by pressing special button.

- app buttons can be used only when

**5)** User can park the car for later usage without missing the “occupied” status

*Reqs:*

- the system must charge user less, when the engine is turned off

- user must have an opportunity to “tell” the system that he quitted using the car

*Da:*

- cars have detectors that states whether the engine is working or not

**6)** User can access the car locks and car engine via app (not reasonable to use systems inside the car, as user have to have access into the car from outside)

*Reqs:*

*-* system locks/unlocks the car ⇔ user presses the button “lock/unlock car” in the app

- system starts/kills car’s engine ⇔ user presses the “start/kill the engine” button in the app

*Da:*

- user has a stable and continuous internet connection, e.g. 3G or 4G

- car has to provide emergency unlock system, if something goes wrong with the system, a user’s smartphone or internet connection

**7)** User is notified about driving charges on the screen in the car

*Reqs:*

-System must display charging information on the screen in the car

*Da:*

-Car has a screen that is driven by inner OS

**8)** User has a 10% discount when he picks at least 2 more passenger onto the car

*Reqs:*

- User should to tell the system there are two passengers will get on the cars.(cuz users may put some luggages or bags on other seats to add the weight),then system will start discount timer for this period ride.when the other two passenger get off car,user ought to also tell system.(Does here has any discount when here is just one passenger?How much is the capacity of the car?)

- system must acquire information from sensors to detect the number of persons inside

- system must provide 10% discount when it gets information that there are 2 more passengers in the car (What if e.g. user uses the car the whole day, but he drove 2 passenger only for 2h? The discount affects only on the period of charging when the car was sensing these 2 passengers.)

*Da:*

- car has detectors of persons inside it (what kind of sensor??? Maybe pressure sensors embedded into the seats. Not good, user can have a discount if he carries luggage on the back seats. Maybe car has cameras and system can recognize persons inside the car)

**9)** User has a 20% discount on the ride if he left the car with no more than 50% battery empty

*Reqs:*

-System must provide 20(20 right? Right :) )% discount ⇔ user states that the car is no more needed + battery’s capacity is not less that 50% full

*Da:*

**10)** User has a 30% discount on the ride if he left the car on the special parking area with the power grid station and plugged car to it.

*Reqs:*

-System must provide 30% discount ⇔ user states that the car is no more needed + the car is on the special area + car’s battery is charging

- System must acquire information about battery’s charging state

*Da:*

- Car can state whether the battery is charging or not( -There is a sensor that help the system of the car distinguish whether the car be recharged)

**11)**Users would be charged 30% more,if a car is left at more than 3 KM from the nearest power grid station or with more than 80% of the battery empty, to compensate for the cost required to re-charge the car on-site.

Reqs:

-System charge 30% more as compensation⇔user states that the car is no more needed+The car is left at more than 3 KM from the nearest power grid station or battery’s capacity is not less than 50% full

Da:

-System can detect the distance between car and the nearest power grid when user press “kill the engine” button.(how the system can sensor user already don’t use it any more ?)

-System can obtain the information about the battery

-System can analyze that once one of the situation as below two happend,user have to pay for compensation.

**“Global” domain assumption:**

* **Car has an inner OS, that process information from sensors(cameras, engine state, battery fulness), starts/kills engine, locks/unlocks doors, display information on the screen**

**“Global” requirement:**

* **System must be able to communicate with car’s inner OS to acquire processed information from car’s sensors, send signals to start/kill engine, lock/unlock door, to display information on the screen**

Fairytale 1: Distance occupy cheating

Melanie has

Fairytale 2: Car theft reduce

Winter. John parked the electric car near his working place. After the the end of the day, before walking off in the street, he decides to warm the car and starts the engine via app. When John go outside, he unlocks the car, being in 15 meters from it. Suddenly some person ran into the car and drived it away. Due to the fact that John has a remote access to the car control system, he kills the engine, locks doors and calls the police. ( car is more than 15 meters when it is driven away! John can’t access the car no more to kill the engine and lock the car! Add an emergency button. When pressed it kills the engine and locks the car from any distance. Must be done with confirmation question to avoid accidental touch. OR with confirmation with password enter(better))

Fairytail 3: Why it is important to use have an opportunity to leave the car without “missing” it.

Jeremy lives outside the city. At the end of the working day his car has broken and he gave it for a repair. The only way to get to the city to his working place is to use the car. Jeremy found available electric car and reserved it. He parked it near his house. The next day he uses this car to get to job. At the end of the working day he drives to the repair station, parks the electric car and picks his one. (Company wastes money if the user suspends the car for a long time and after that states that the car is no more needed. Must be some kind of punishment in terms of charging, e.g. if such situation occurs, system must charge user proportionally to the time the car was suspended)



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**Scope or Application Domain :**

**Identifies the product :**

**car-sharing** is a model of [car rental](https://en.wikipedia.org/wiki/Car_rental) where people rent cars for short periods of time, often by the hour. They are attractive to customers who make only occasional use of a vehicle, as well as others who would like occasional access to a vehicle of a different type than they use day-to-day.

* Car-sharing is defined by its environmental and social purpose, rather than business and financial objectives.
* Car-sharing is designed for local users in support of community transit and environmental goals. It’s mission, vision and values lead to actions aimed at decreasing personal car ownership, reducing vehicle distance travelled, improving urban land use and development, providing affordable access to vehicles for all constituencies, as well as motivating residents to walk, cycle and take buses and trains, and decreasing dependence on fossil fuels while reducing the emission of greenhouse gases.
* Car-sharing is a membership based service available to all qualified drivers in a community. No separate written agreement is required each time a member reserves and uses a vehicle. All CSOs offer members access to a dispersed network of shared vehicles 24-hours, 7 days a week at unattended self-service locations.

Car-sharing is primarily designed for shorter time and shorter distance trips as an extension of the transportation network, providing a public service designed to enhance mobility options. Longer trips may be available to further discourage car ownership. it help members save money over the cost of individual car ownership by encouraging members to drive less often, plan trips more, use other modes of transportation more, and share fuel efficient vehicles when a car is needed.

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12.Users are able to alternatively take plugging the car into the power grid .

**Lucia**

**26/10, 2h**

**27/10, 2h**

**28/10, 1h**

**29/10, 1h**

**30/10, 2h**

**Artemiy**

**26/10, 1h**

**28/10, 2.5h**

**29/10, 3h**

**31/10, 2h**

**2/11,**