

Software Engineering 2: PowerEnJoy

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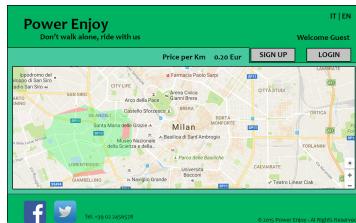
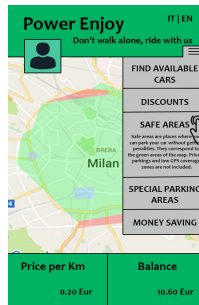
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- 1 Requirement Analysis and Specification Document
- 2 Design Document

Requirement Analysis and Specification Document

High level functionality for the overall implementation. That includes:

- Defining and differentiating between requirements, domain properties and goals.
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- World and the Machine diagram.
- Identifying various scenarios.
- UML-Use case diagram derived from scenarios identified.
- Dynamic modeling: through sequence diagram, class diagram, activity diagram.
- Alloy modeling for the world and the machine.



Goals and Domain Properties

Goals:

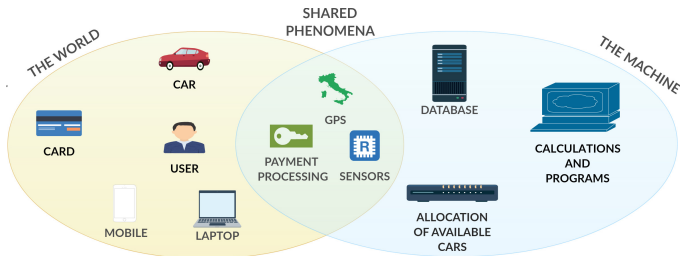
- [G1] Registration of a user to the system
- [G2] Finding the locations of the available cars
- [G3] Reservation of a car
- [G4] Expiration of reservation and penalization
- [G5] Entry of registered user into the car
- [G6] Start charging and notifying the registered user
- [G7] Stop charging the registered user and lock the car
- [G8] Safe areas for parking the reserved cars
- [G9] Detection of extra passengers and applying discount
- [G10] Detection of the battery status and applying discount
- [G11] Detection of special parking areas and applying discount
- [G12] Checking parking and battery constraints and penalization

Domain properties:

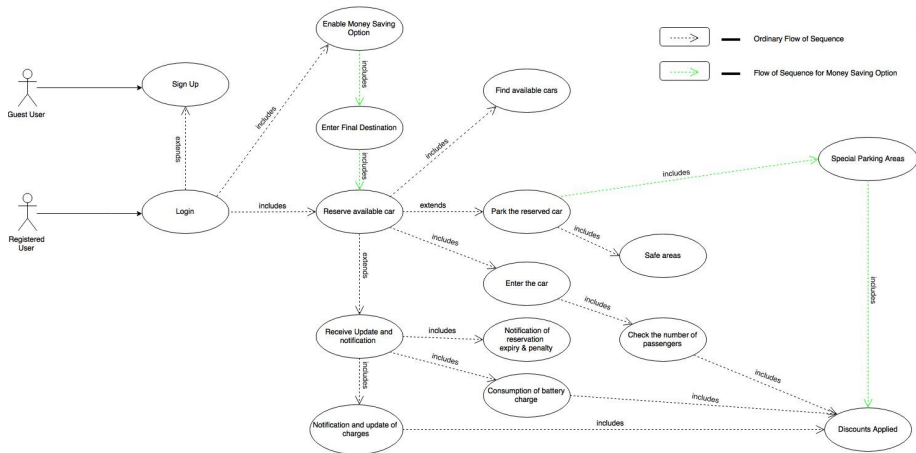
- User's data are always valid.
- Location reported by the GPS is always accurate.
- Every user can reserve just a car per time.
- The service is only available to validated users.
- The service has employees to move the cars if their distribution in the map is unbalanced.
- The license office provides the online service to let the system instantly check the user's documents during the registration.
- If the user's driver license expires, he gets unvalidated until he renew it.
- A call center is provided by the service to handle difficult situations.

Requirements

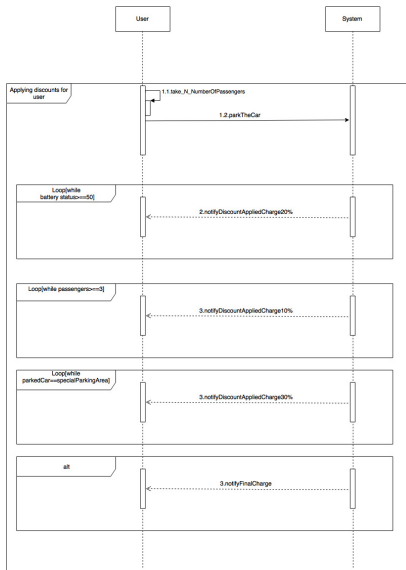
- The system needs to provide mandatory sign up and payment options or the guest users who wants to register to use the car sharing service.
- Once the payment is successful and the guest user is registered, the registered user receives a password that can be used to access (login into) the system.
- The system needs to provide the exact location of the cars that are available within a certain distance either from the current location of the registered users or from a specified address given(entered) by the registered users.
- The system provides provision such that the registered users must be able to reserve only a single car among the available cars in a certain geographical region for up to one hour before they pick it up.
- The system checks if a reserved car is picked-up within one hour. If not, the system tags the car as available again and the reservation expires.
- The system penalizes the registered user who made the reservation and did not pick the reserved car within an hour, by making him to pay a fee of 1EUR.



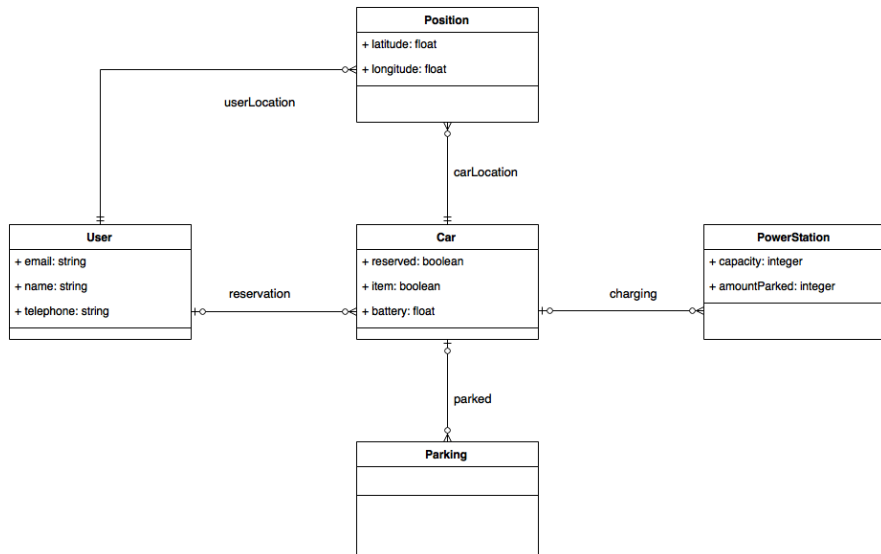
UML Model - Use Case Diagram



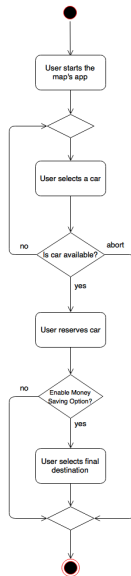
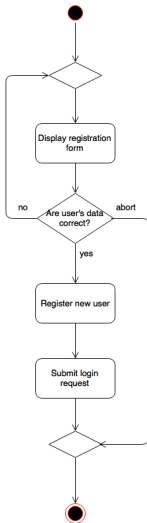
UML Model - Sequence Diagram for Applying Discount



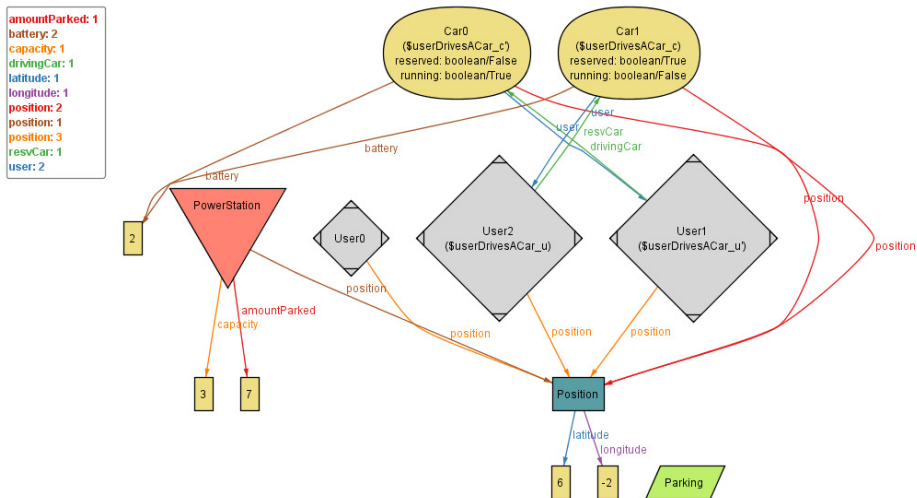
UML Model - Class Diagram



UML Model - Activity Diagrams

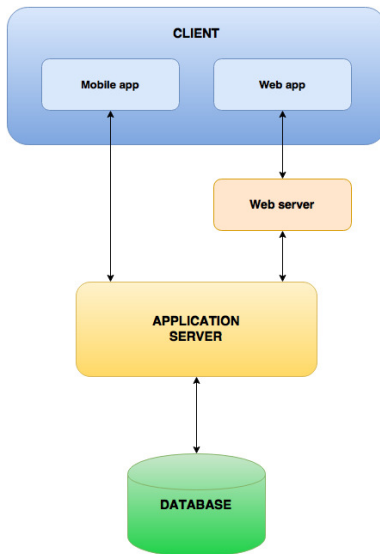


Alloy Model and World Generated

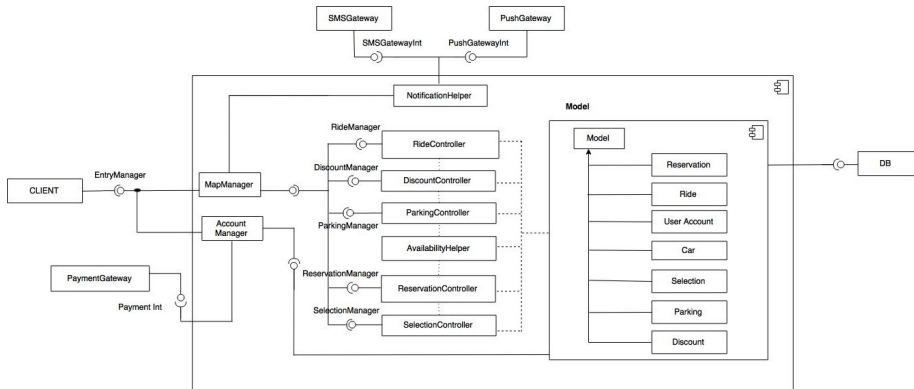


Design Document

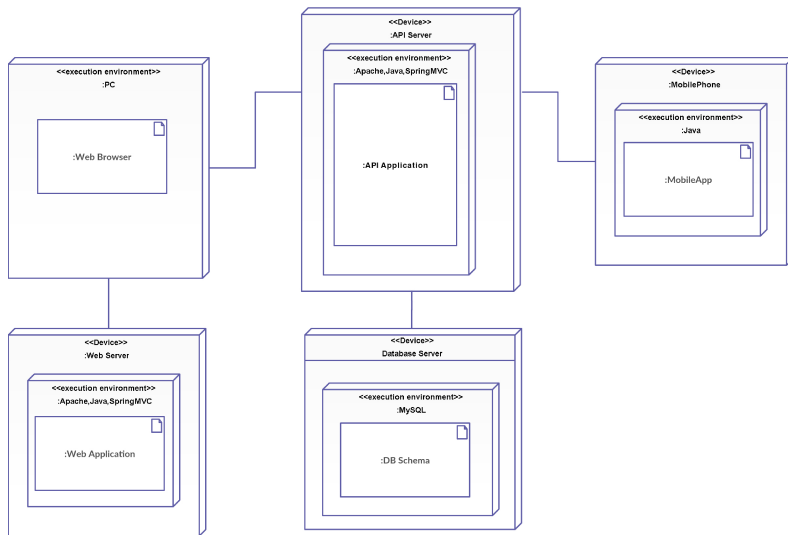
Three-tier Architecture



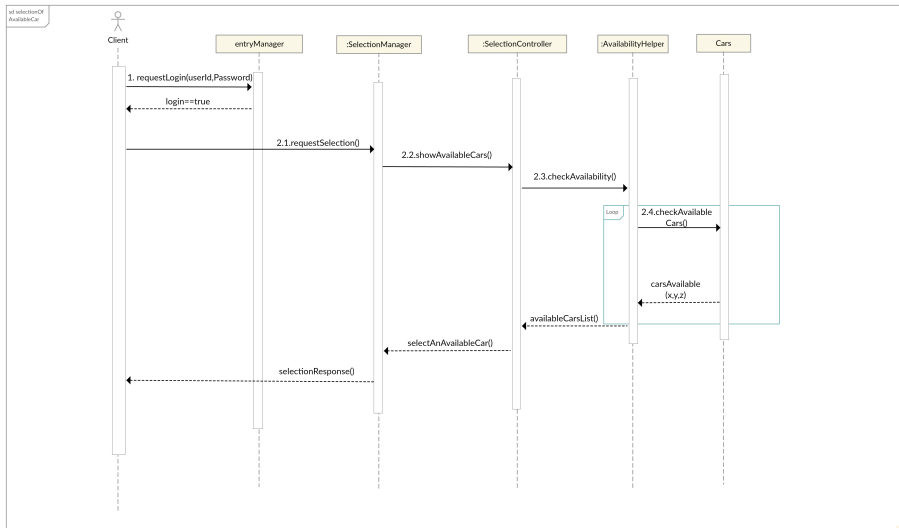
Component View



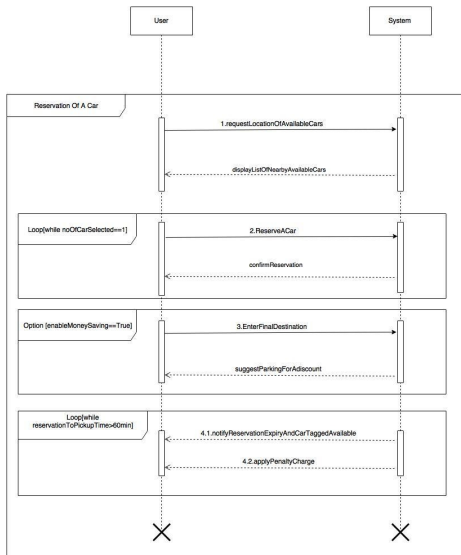
Deployment View



Selection of Available Car



Reservation of Selected Car



UX Diagrams

