Software Engineering - Analysis
Project: E-Scooter Rental Service

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1 Introduction

In this project, we will take the role of founding a start-up company in the E-Scooter rental business. For analyzing this project, our team decided to use the agile SCRUM method.

The purpose of this project is a clear understanding of requirements, developing use case scenarios and UML diagrams for describing the planned software product. Furthermore, the objective is to develop a high-level software architecture and build user interface (UI) prototypes for relevant parts of the functionality. For our project, the artifacts consist of diagrams and documentation for describing the software functionality for outsourcing the development. The quality of these artifacts will be ensured by a proper definition of "Done".

The first step of our project is to collect additional requirements and refine these to build a list of backlog items and estimating the time for producing the artifacts for each backlog item. The purpose of a backlog item is to take a requirement description, in form of a use case description, as input and build an analysis model of our software capability as result.

2 Definition of "Done"

The definition of "Done" (DoD) is part of the SCRUM metrics. All members of the Scrum Team must have a shared understanding of what it means when the work is complete, to ensure transparency. [1] It is a (check-)list of items which need to be validated to consider a backlog item being “Done”. DoD is defined by the development organization to make sure that the results of multiple teams can be integrated into a releasable product. [2]

For our project, the result needs to match the following definition of "Done":

- ☐ Description of the requirement in form of a Use Case
- ☐ Categorization of requirement (functional/non-functional, client/ server)
- ☐ Business value of the corresponding functionality
- ☐ Effort estimation for the implementation of the requirement
- ☐ For UI related functions: UI prototype

- ☐ UML Diagrams
  - Use case diagram
  - Activity diagram
  - Class diagram
  - Sequence diagram
- ☐ Detailed documentation (e.g. table) about who worked on the item and what has been done during the sprint.
- ☐ Overall quality of the documentation meets general industry standards.
- ☐ The results have been reviewed and accepted by another member of the team (tester). It needs to be documented who has performed the review.

3 Backlog Items

Backlog items are part of a product backlog. This is an ordered list of requirements which have to be done for the product.

Below we present our collected backlog items in from of a table.

INSERT BACKLOG ITEMS LIST HERE!

4 Week One

In the first week our team started to collect requirements for the E-Scooter rental service project. We discussed which requirements could fit and saved them in a Google Excel sheet. We also started to talk about the estimation, satisfactions and disatisfactions, the priority, what each requirement should do and when it would fit. Then we thought about how an E-Scooter should work and interact with the customers. In order to understand how the main concept of renting an E-Scooter is, some team members rented an E-Scooter from the company "Lime".

The task for each team member for this week was to collect more requirements for the project. Because finding dates for further meetings turned out to be difficult, we decided to hold our meetings weekly or whenever there occur any problems which needed to be discussed, via discord. Discord is a free voice and text chat that is secure and works desktop and phone. [3]

4.1 Division of work: week one

K. Birringer	N. Cacace	S. Hanzlik	M. Peluso	S. Stojanovic
%	%	%	%	%

5 Week Two

Since we decided to use the agile SCRUM method for analyzing the E-Scooter rental service project, the team members were assigned the following roles:

- Scrum Master: Kendra Birringer

  As Scrum Master she was resonsible for the organisation of the whole team: she organized and moderated the team meetings and wrote the protocols.

  Another task was to check and correct the spelling, grammar and contents of evertything that was written.

- Development Team: Nader Cacace, Steffen Hanzlik, Svetozar Stojanovic

  The Development Team was responsible for modeling all neccessary UML diagrams and sketching UI prototypes.

- Tester: Marco Peluso

  The Tester reviewed and accepted all results.

In the second week the team discussed about each of the collected requirements, and we decided which of them fit and which are not necessary for the software. During this discussion we gathered more requirements.

Then we started to talk about the UML diagrams and built a first use case diagram which was too big and complex and needed some adjustments. So, the task for the Development Team was to simplify the diagram and make it clearer.

Also, we built a main structure for the documentation of the project and started writing the documentation.

5.1 Division of work: week two

K. Birringer	N. Cacace	S. Hanzlik	M. Peluso	S. Stojanovic
%	%	%	%	%

6 Week Three

In week three the Development Team modified the use case diagram which was too big. They also modelled further use case diagrams which we then disussed, if they need further adjustments. At the end of this week, we finished the use case diagrams and finally added the use case documentation to each use case.

Also, after we have thought about where it could be necessary, some activity and sequence diagrams were modelled. Regarding the sequence diagrams there were some problems. For example, the "Check-in" diagram:

We asked ourselves how to calculate the price for a ride. After some discussion we decided to let the wallet calculate the price for the ride information from the Scooter. First, the payment also was included in this diagram. But after reconsidering, we decided taht the payment also needs an own, more detailed diagram. And at the end, both diagrams are very connected.

Considering the acitivity diagrams, we decided to not model a diagram for "Give feedback", because it seemed too simple.

Then we started to think about the class diagram and asked ourself which classes we need and which relations the different classes could have to each other and started modelling the class diagram.

Furthermore, a first UI prototype was built with the sofware design tool "Axure". [4]

6.1 Division of work: week three

K. Birringer	N. Cacace	S. Hanzlik	M. Peluso	S. Stojanovic
%	%	%	%	%

7 Week Four

Week four was a week for adjustment and modification of everything we have done so far. We adjusted the requirements, checked the spelling and grammar, put the requirements in a proper order and checked what was still missing.

On the basis of the backlog items list we finished all UML diagrams and UI prototypes. After we heard the lecture, in which Prof. Dr.-Ing Peter Thoma talked about UML diagrams, we noticed, that all our activity diagrams lack a cancelation mode. Therefore, we had to adjust all these diagrams and add the cancelation mode.

We also finished the documentation so far, that only the appendices need to be added.

The goal of our team was, finish everything until the end of this week, so that in the following week, we can fully concentrate on the presentation of the project.

7.1 Division of work: week four

K. Birringer	N. Cacace	S. Hanzlik	M. Peluso	S. Stojanovic
%	%	%	%	%

8 Week Five

In week five, we again checked and then finished everything. We generated the report from Magic Draw and added it to the documentation. Also, we added all protocols from the team meetings.

Then we thought about a way, how to integrate the UI prototypes. We decided to screenshot each prototype and put them all in one pdf-document. In this way, they could be easily added to the documentation.

Once the documentation was finished, each team member should read it and make any necessary improvements and additions.

Then, finally we started to talk about the presentation and started to build it.

8.1 Division of work: week five

K. Birringer	N. Cacace	S. Hanzlik	M. Peluso	S. Stojanovic
%	%	%	%	%

References

[1] https://www.scrumguides.org/scrum-guide.html#artifact-transparency-done

[2] Prof. Dr.-Ing Peter Thoma *02-3 Software Engineering Analysis (Scrum)*

[3] https://discordapp.com/

[4] https://www.axure.com/

9 Appendix

9.1 Use Case Report

INSERT USE CASE REPORT HERE!

9.2 UI Prototypes

Figure 1: Dummy

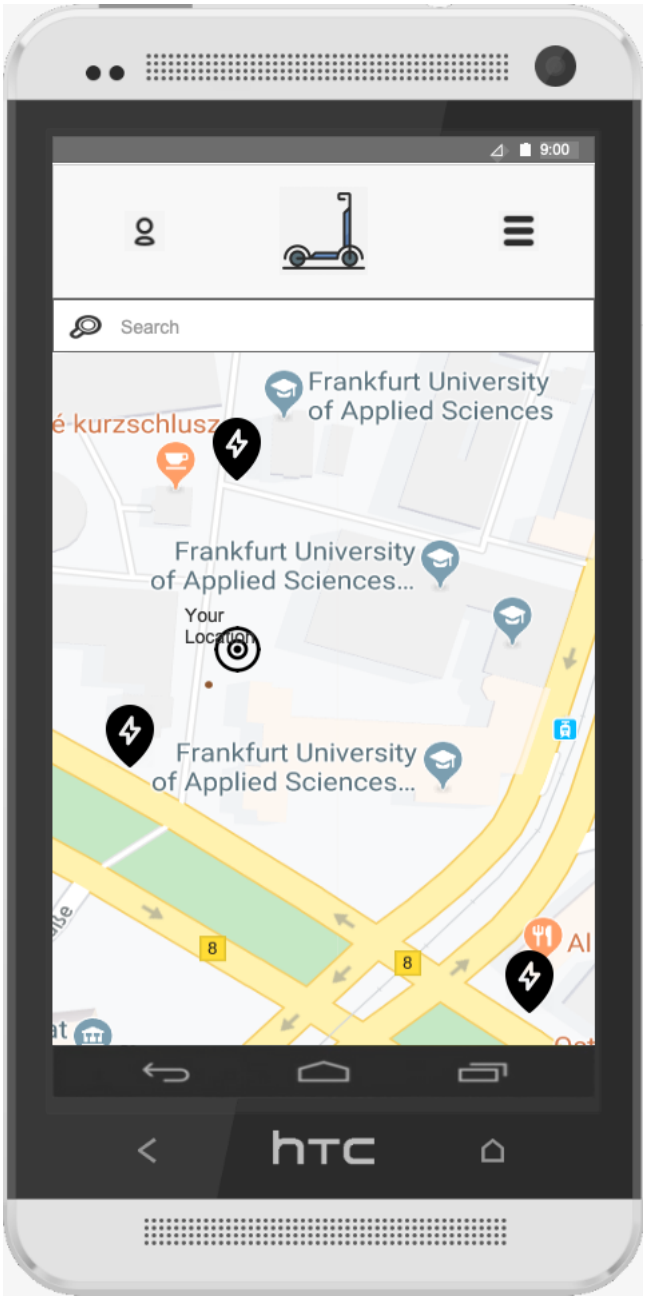

Figure 2: Start Menu

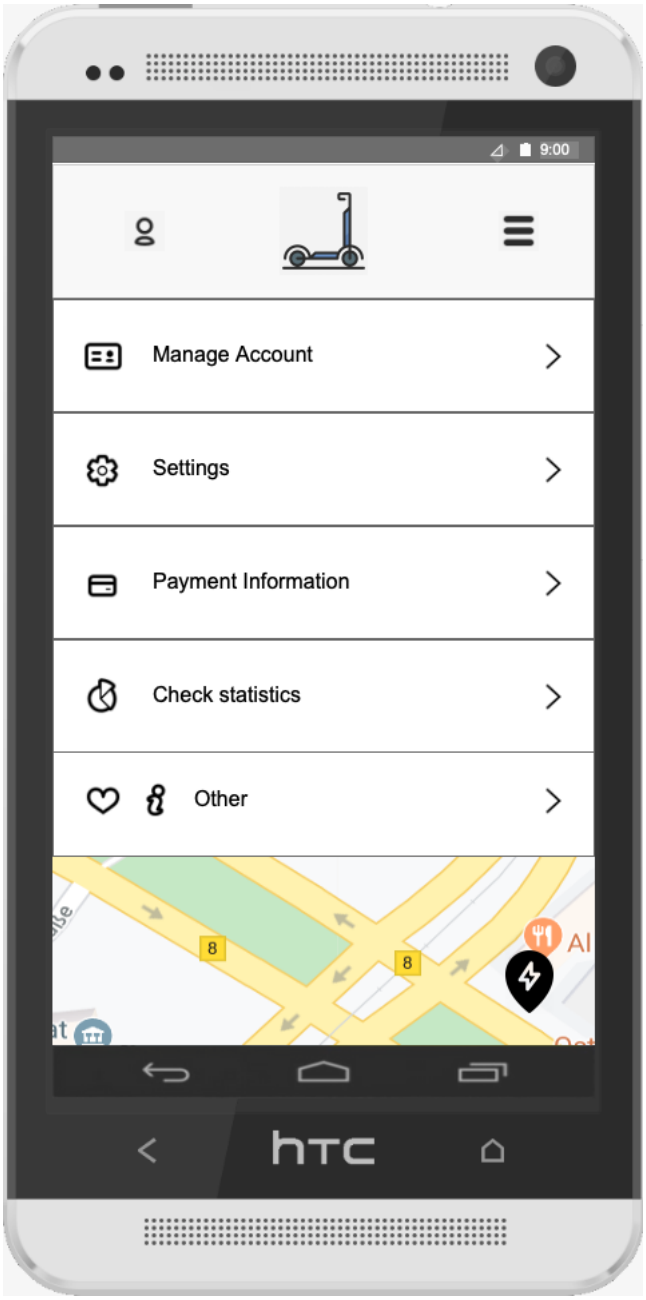

Figure 3: Menu Dropdown

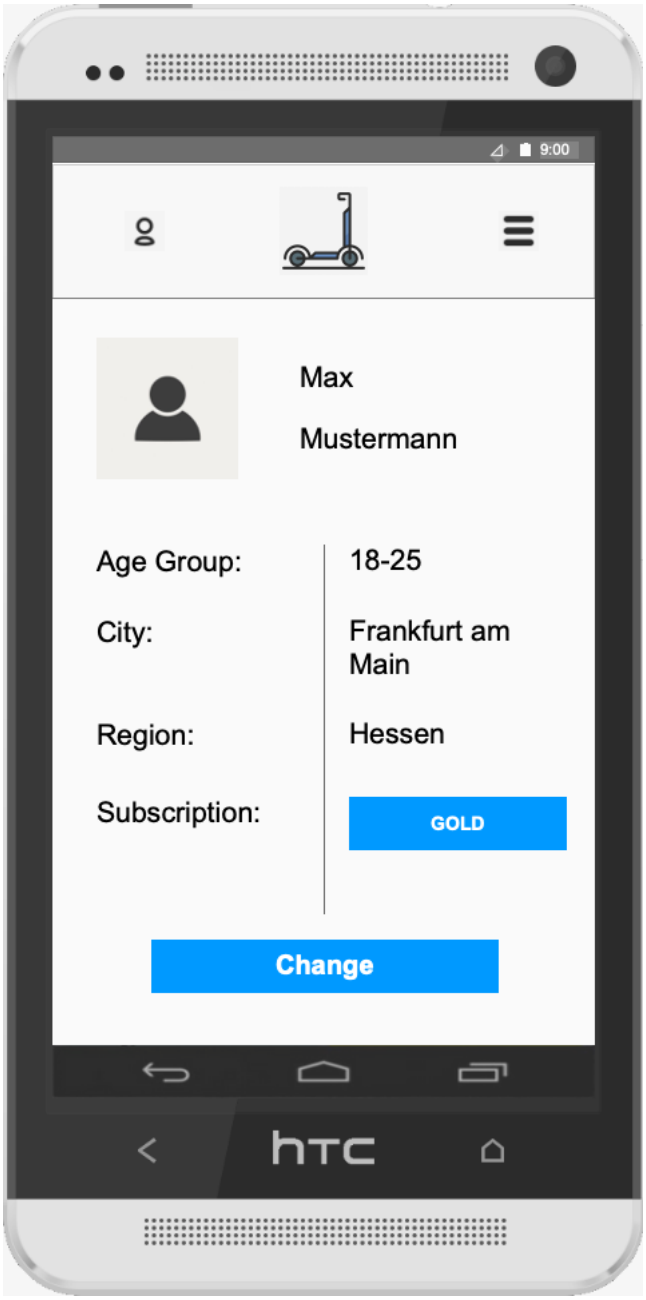

Figure 4: Menu Dropdown → Account Management

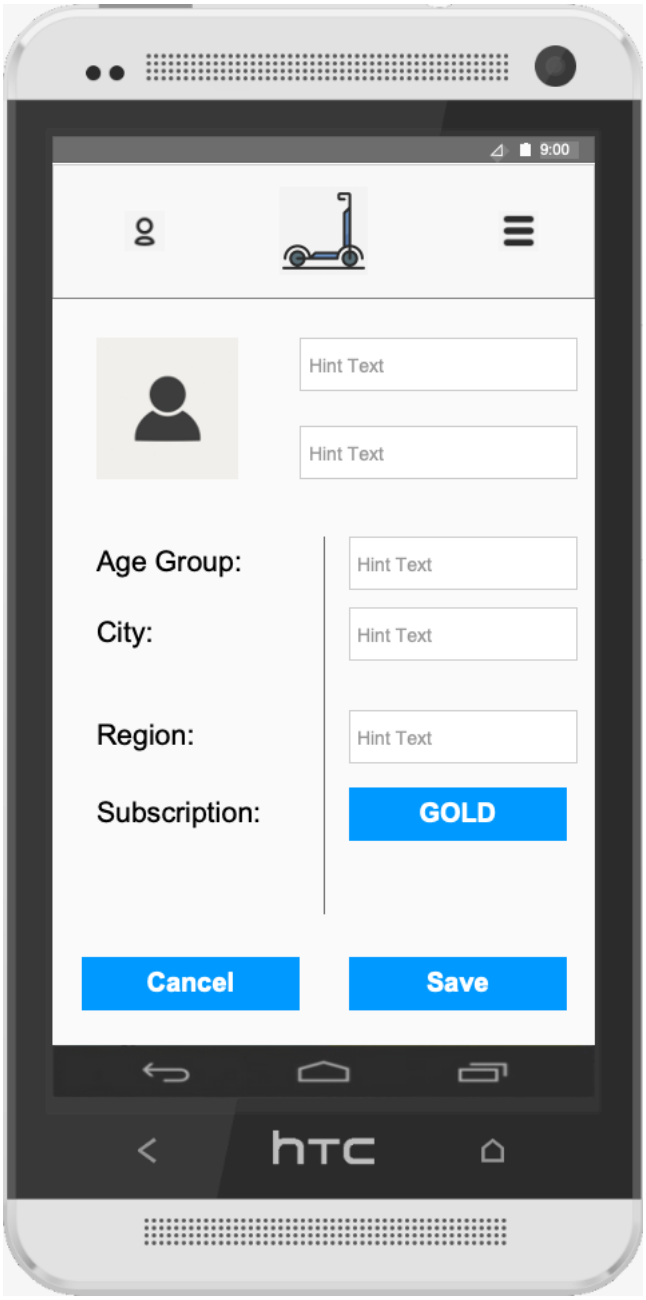

Figure 5: Menu Dropdown → Account Management → Change Account Details

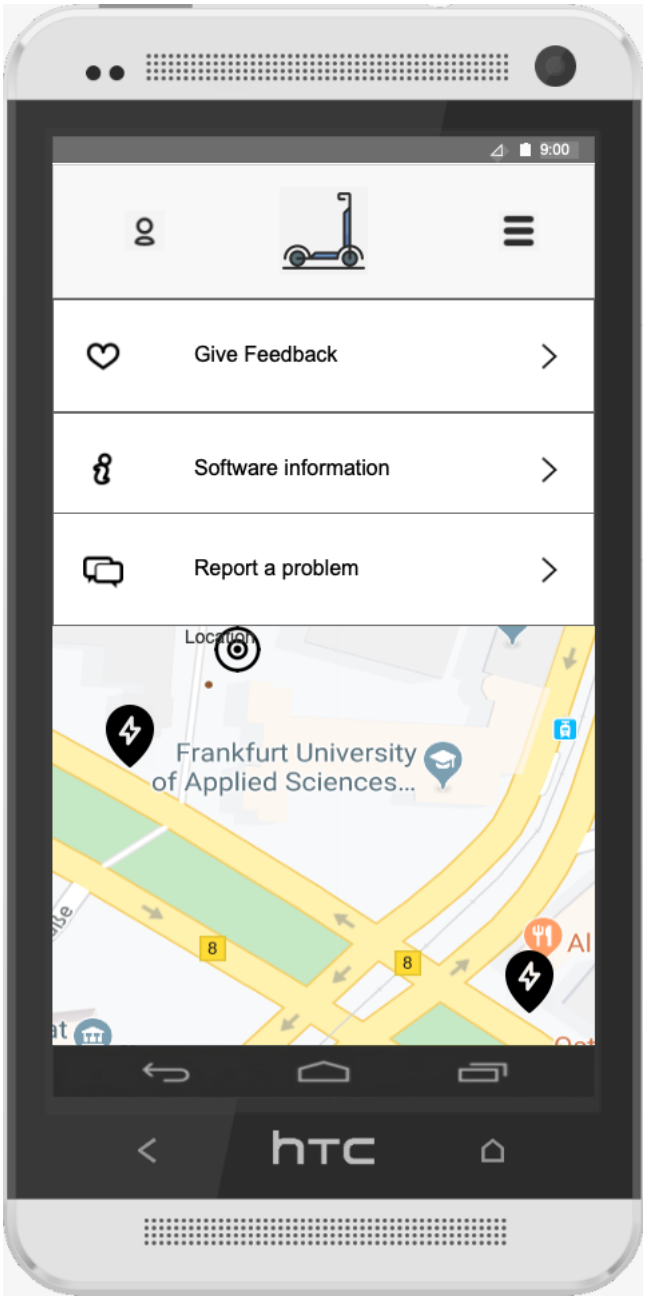

Figure 6: Menu Dropdown → Other

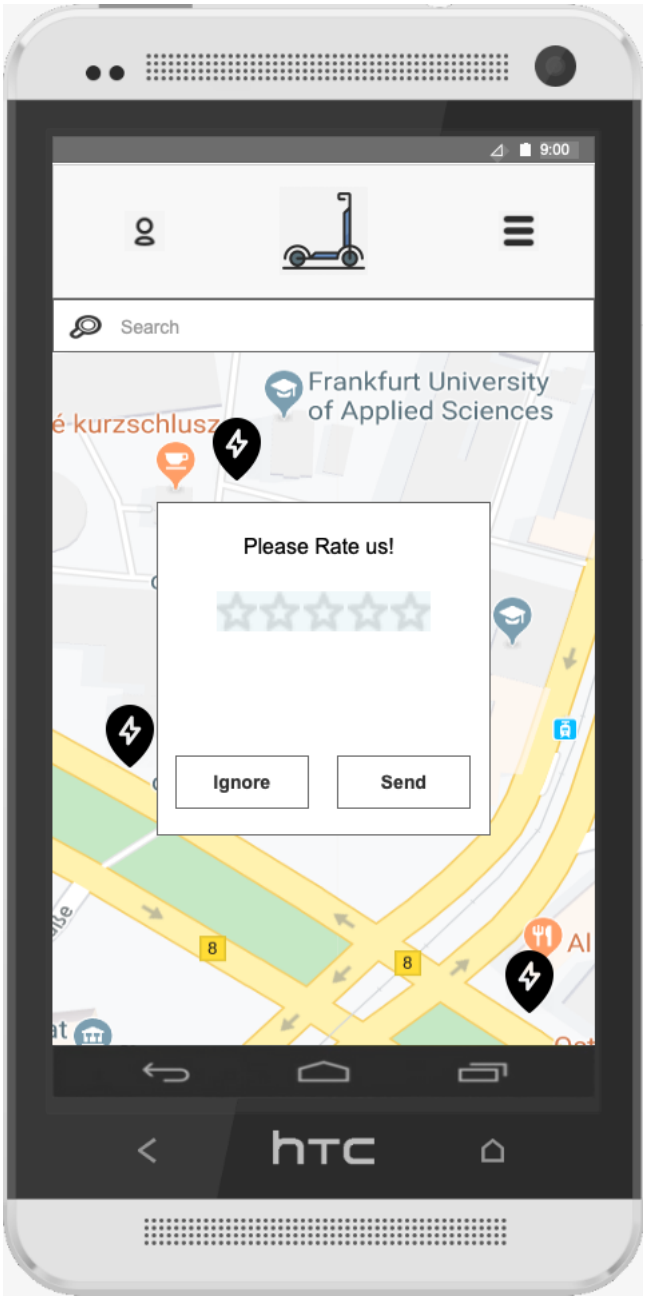

Figure 7: Ask for Feedback

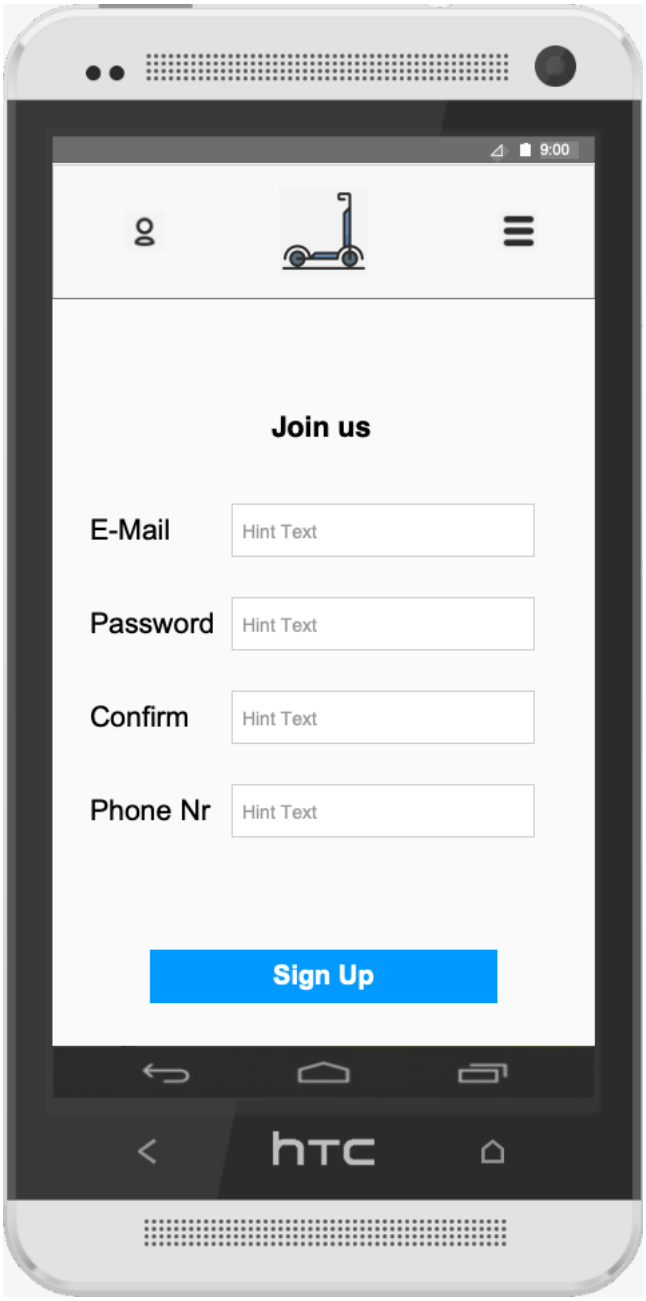

Figure 8: Register/Sign Up

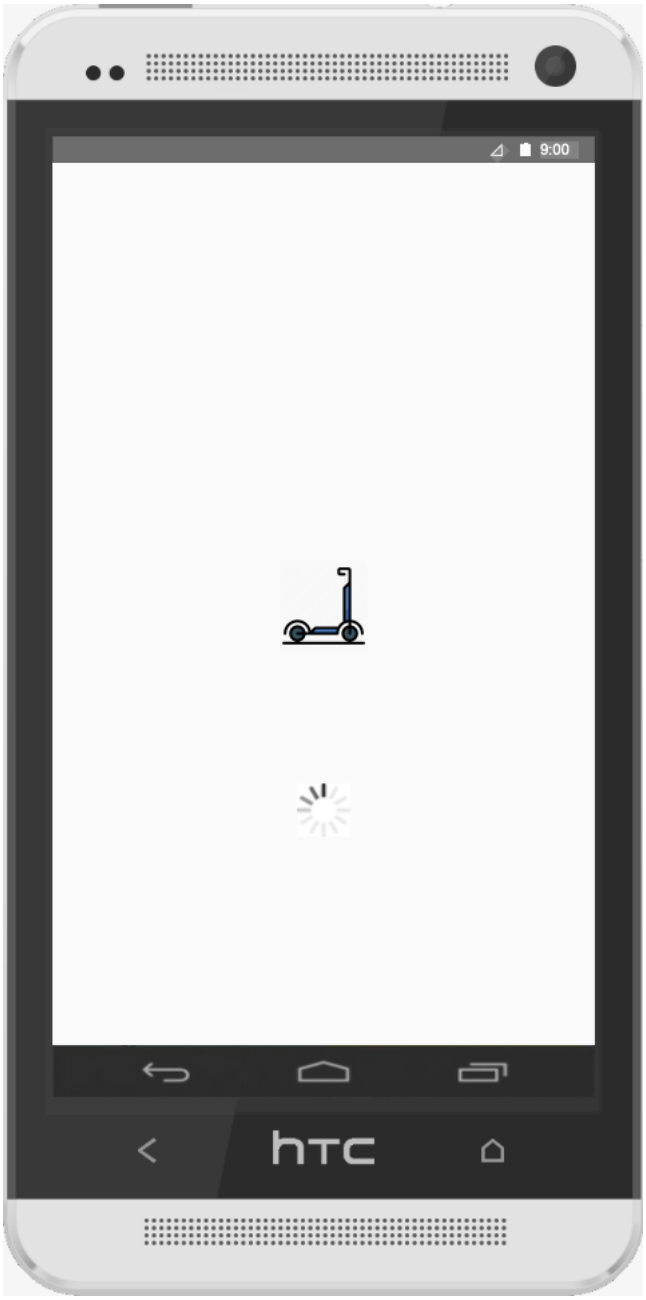

Figure 9: Loading Screen

9.3 Meeting Protocols