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# **PedalaMi Requirements Definition Document**

**Version 1.1**

PedalaMi	Version: 1.2
Requirements Definition Document	Date: 2021-12-31

## Revision History

Date	Version	Description	Author
2021-11-05	1.0	First Version	Giancarlo Sorrentino Vincenzo Riccio Panagiotis Bampilis Gezim Blliku
2021-12-10	1.1	Revised Version following the provided feedback. New requirement given from customers.	Vincenzo Riccio
2021-12-31	1.2	Correcting some typos	Vincenzo Riccio

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## Initial Product Backlog

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### 1. Introduction

#### 1.1 Purpose of this document

The purpose of this document is to define all the requirements of the PedalaMi project. Therefore, User Stories intend to present the needs for the requirements to be fulfilled. The Requirement Definition document is to correctly orient team members throughout the project development process fulfilling all listed requirements.

#### 1.2 Document organization

The document is organized as follows:

- Section 1, *Introduction*, describes contents of this guide, used documentation during the development process etc.
- Section 2, *Project Background*, describes motivation for the project.
- Section 3, *Requirements*, defines all project requirements.
- Section 4, *Epics, Features* describes in detail epics, features and user stories.
- Section 5, *User Stories and Use Case diagram* describe in more detail the requirements.
- Section 6, *Initial Backlog*, project's initial product backlog.

#### 1.3 Intended Audience

The intended audience is:

- **Team members**, the development team should have full access to this document, to create the Design Document and develop the required solution.
- **Supervisors**, the professors from POLIMI and MDH should have full access to this document, to evaluate and grade the progress of the development as well as to advise the team where it is needed.
- **Customer**, Deloitte Digital, to whom deliver the final product. They should have full access to this document, to revise the development progress with the compliance of the Product Owner.

#### 1.4 Scope

This document addresses all requirements defined at the beginning of the project. Every requirement is being additionally described through User Stories. Main idea and functionality of PedalaMi system can be devised based on requirements described in this document. This document does not address project plan, design, architecture or any implementation specifications of PedalaMi system.

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## 1.5 Definitions and acronyms

### 1.5.1 Definitions

Keyword	Definitions
<b>Ride data</b>	Term indicating the group of path, time, burned calories and average speed of a ride.
<b>Record a ride</b>	Collect ride data
<b>User profile</b>	Term indicating all the information linked to a user, such as its username, its profile picture, its teams and its personal statistics
<b>Badge</b>	Special rewards that can be unlocked after completing specific tasks. They are visible in the user profile.
<b>Individual public event</b>	Event proposed by the system admins that every user can join individually.
<b>Exclusive Event</b>	Individual public event whose access is limited to users who hold one or more specific badges, selected by the event creator.
<b>Team private event</b>	Event proposed by team admins, in which only two teams can participate.
<b>Team public event</b>	Event created by system admins that could have been proposed by team admins, in which an unlimited number of teams can participate.

### 1.5.2 Acronyms and abbreviations

Acronym or abbreviation	Definitions
<b>NTR</b>	Nothing to Report. There is no information on a specific topic available or necessary
<b>UI</b>	User Interface
<b>UX</b>	User Experience
<b>App</b>	Application
<b>User</b>	Synonym for <i>registered user</i>
<b>Individual event</b>	Synonym for <i>individual public event</i>
<b>Public event</b>	Synonym for both <i>individual public events</i> and <i>team public events</i>
<b>Private event</b>	Synonym for <i>team private events</i>

## 1.6 References

- Documentation Guidelines:  
[https://www.fer.unizg.hr/\\_download/repository/DSD\\_DocumentationGuidelines\\_2017\\_publiched\\_1.pdf](https://www.fer.unizg.hr/_download/repository/DSD_DocumentationGuidelines_2017_publiched_1.pdf)
- Project vision and plan document:  
<https://www.fer.unizg.hr/rasip/dsd/projects/pedalami/documents>

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## 2. Project background

### 2.1 Background

PedalaMi is an application created for promoting the use of bikes as a green and sustainable alternative to the non-zero-emissions means of transport, which still represent the most preferred choice in the field.

This objective is pursued by providing the users with an interactive system that encourages cycling thanks to a funny reward and challenge-based system, in order to enrich the standard riding experience to make it more appealing to casual bikers.

The customers of the project are Guido Perrucchini and Giuseppe Valerio Gramazio, who are employed by Deloitte Digital as developer consultants.

The project team consists of six people from POLIMI and four from MDH, with one supervisor from each university.

### 2.2 Project goals

The goal set by the customer for this project is to create a product that encourages the use of bikes: in this way it is possible to have a better and healthier life and, at the same time, reduce urban traffic and pollution.

The main idea on PedalaMi is based on nudge and gamification techniques: a user, riding a bike, can obtain badges and collect points to redeem rewards. He can also join teams and participate in private or public events.

For more detailed information about the project PedalaMi see the Project vision and plan document.

### 2.3 Actors

The actors of the system are:

- **Non-registered user**, who is a person that is not logged in to the application;
- **Registered user**, that is a user who has successfully completed the registration and the login process. He can be a member of one or more teams;
- **Team admin**, who is a *registered user* that created a team and is a member of it;
- **System admin**, who is the administrator of PedalaMi and can create public events.

## 3. Requirements

The requirements gathering process was performed by analyzing the initial project proposal and obtaining some high-level requirements in it. The project team discussed them further with the customer to specify their priorities.

### 3.1 Functional Requirements

The specified functional requirements are listed in the table below.

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ID	Description	Source	Motivation
R1	The application must have authentication, allowing users to login	Project group	Users should be authenticated to track and share their progress
R2	The application must allow users to record bike rides	Customer	It is the main functionality of the application
R2.1	The app should allow users to see the rides they made	Customer	This is to let the user look at previous rides
R3	The application must collect users' rides statistics and display them	Customer	Doing so, users can track their progress
R4	The application must allow users to edit their username and their profile picture	Project group	Users want to keep their personal information up to date
R5	The application must allow users to earn points from their rides	Customer	This in order to encourage the users to use the bicycle
R6	The application must assign badges to the users as a reward, based on their rides' statistics	Customer	This in order to make the riding experience more funny and challenging
R7	The app should allow users to redeem rewards	Customer	This in order to reward the users for their efforts in cycling
R8	The app should display information about the redeemed rewards	Project group	This in order to allow users to keep track of their rewards
R9	The application should allow users to create teams and become team admins	Customer	This in order to team up with other users and propose team events
R10	The application should allow users to search for teams and join them	Project group	This in order to let users compete and earn more points
R11	The application should allow team admins to create private team events	Project group	This in order to compete with another team and earn more points
R12	The application should allow system admins to create individual public events	Project group	This to incentivize users to make rides in order to win bonus points
R13	The application should allow system admins to create exclusive public events	Project group	This in order to incentivize users to unlock badges
R14	The application should allow a Team	Project	This in order to compete with

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	admin to propose a public team event that has to be approved by a System Admin	group	other teams and earn more points
R15	The application should display to the user the available events and allow users to enrol for them	Project group	This to allow users to compete and earn more points
R16	The application could allow team admins to invite other teams to join private events	Project group	This to give team admins the possibility to challenge other teams
R17	The app should give extra points to the user if they bike in adverse weather	Customer	This to incentivize the usage of bicycles even in adverse weather condition
R18	The web-app should display all the user's statistics	Customer	Doing so, users can check their progress without the need of the mobile app
R19	The app could alert the user when the air quality is low	Customer	This is to warn consumers that cycling in such conditions may be dangerous to health.

### 3.2 Non-Functional Requirements

ID	Description	Source	Motivation
NR1	Do not ask for or store user's personal information like name, surname, age, phone number and address. Only the email is required, in order to let the user login. All the stored data should not be used for purposes different from the ones of the application and should not be shared with any third party company.	Customer	Users should feel comfortable by not sharing their sensitive data with third party companies.
NR2	Prevent battery drain while using the application, having no more than a 25% battery discharge per hour.	Customer	Having a power-consuming app leads users to uninstall it
NR3	Localization permission must only be requested and used during the ride tracking phase. Any other functionality of the application must be available also without these permissions granted.	Customer	Users should be able to do all the basic operations with the application without the need of granting permission when not needed.

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### 3.3 Requirements validation

Functional Requirement validation is carried out by determining whether or not the requirements are met at the end of each prototype.

Some non-functional requirements influence the design phase and their validation is the result of the design of the product. The other non-functional requirements that are not design-related will be validated through appropriate testing.

### 3.4 Constraints

In order to have a large audience, the mobile application should be cross-platform.

## 4. Epics

The following table shows the epics of PedalaMi, according to the SCRUM methodology.

ID	Name	Description
E1	Alpha prototype	Implementation and testing of a first prototype of the product, which allows users to interact with the basic functionalities of the system. It includes the user login and the tracking of the bike ride.
E2	Beta prototype	Implementation and testing of the second prototype of the product, which, in addition to the alfa prototype, allows users to earn points from rides and to join teams and competitions. It also includes refinements of the UI.
E3	Final product	Implementation and testing of the final product, which must satisfy all the given requirements. It includes the development of the web dashboard and refinements of the UI.



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## 5. Features

Features are linked to each epic that were stated earlier and each feature has been mapped with one or more of the functional requirements accordingly.

### 5.1 E1 features

ID	Name	Description	Requirements Involved
F1.1	Profile Creation	Allows users to create, retrieve and modify their personal profile, and authenticate to the system	R1, R4
F1.2	Ride Tracking	Implementation of the ride tracker, which collects, analyses and displays data retrieved by the smartphone	R2, R3, R2.1

### 5.2 E2 features

ID	Name	Description	Requirements Involved
F2.1	Reward System	Assign users points and/or badges after each ride	R5, R6, R7, R8
F2.2	Team Creation	Allow users to create and join teams in order to participate to competitions	R9, R10
F2.3	Competitions	Allow the creation of individual and team events. Also allow the team admin to propose an event to the system admins.	R11, R12, R13, R14, R15, R16

### 5.3 E3 features

ID	Name	Description	Requirements Involved
F3.1	Web Dashboard	Display user's profile page in a web dashboard accessible by any device	R18
F3.2	Weather-based extra points	Assign points to the user's rides based on the weather conditions of each ride	R17
F3.3	Air quality alert	Alert users when the air quality is low when they start a new ride	R19

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## 6. User Stories

### Feature 1.1 User Stories

ID	Name	Description
<b>Non-Registered User</b>		
US1	Account creation	<b>As a Non-registered User I want to</b> create an account <b>so that</b> I can have access to Registered User's features.
<b>Registered User</b>		
US2	User authentication	<b>As a Registered User I want to</b> log into the system <b>so that</b> I can use the application.
US3	Profile editing	<b>As a Registered User I want to</b> edit my profile <b>so that</b> it is always up to date.

### Feature 1.2 User Stories

ID	Name	Description
<b>Registered User</b>		
US4	Record a ride	<b>As a Registered User I want to</b> be able to record my bike ride <b>so that</b> I can earn points for it and I can check the ride data.
US4.1	Provide ride history	<b>As a Registered User I want to</b> be able to see my past rides <b>so that</b> I can see the routes I have already rode
US14	Check user statistics	<b>As a Registered User I want to</b> know the statistics about my rides <b>so that</b> I have an overview of my performances.

### Feature 2.1 User Stories

ID	Name	Description
<b>Registered User</b>		
US5	Points collection	<b>As a Registered User I want to</b> collect points for every ride <b>so that</b> I can redeem rewards
US6	Badge unlocking	<b>As a Registered User I want to</b> unlock badges <b>so that</b> I can participate to Exclusive events
US7	View Reward	<b>As a Registered User I want to</b> see details of the rewards I have earned <b>so that</b> I know what the rewards include.
US8	Redeem a Reward	<b>As a Registered User I want to</b> be able to redeem a reward <b>so that</b> I am more motivated to use the system.

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#### Feature 2.2 User Stories

ID	Name	Description
<b>Registered User</b>		
US9	Team Creation	<b>As a Registered User I want to</b> create teams and become team admin, <b>so that</b> I can accept or deny join requests.
US10	Team Search & Participation	<b>As a Registered User I want to</b> have the ability to search for teams, <b>so that</b> I have the option to join in after the team's admin acceptance.

#### Feature 2.3 User Stories

ID	Name	Description
<b>Registered User</b>		
US11	Events Overview	<b>As a Registered User I want to</b> have the possibility to know all the available public events and all the available events my teams are enrolled in <b>so that</b> I can choose which to participate in.
US12	Events Enrolling	<b>As a Registered User I want to</b> participate in events <b>so that</b> I can earn more points.
<b>Team Admin</b>		
US17	Private Team Events Creation	<b>As a Team Admin I want to</b> create private events <b>so that</b> I can invite and challenge another team.
US18	Public Team Events Proposal	<b>As a Team Admin I want to</b> propose public events to the System Admin <b>so that</b> they can be joined from every other team.
<b>System Admin</b>		
US19	Public Individual Events Creation	<b>As a System Admin I want to</b> create public individual events <b>so that</b> every user can join that event.
US20	Public Team Events Approval	<b>As a System Admin I want to</b> approve public team events <b>so that</b> teams can join and enjoy bigger competitions
US21	Exclusive Events proposal	<b>As a System admin I want to</b> create Exclusive events <b>so that</b> only people who unlocked a specific badge can join.

#### Feature 3.1 User Stories

ID	Name	Description
<b>Registered User</b>		
US15	Retrieve user information on the web app	<b>As a Registered User I want to</b> use a web app <b>so that</b> I am able to retrieve my information and statistics without the need of the app

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### Feature 3.2 User Stories

ID	Name	Description
<b>Registered User</b>		
US13	Bonus for Adverse Weather	<b>As a Registered User I want to</b> earn more points with adverse weather <b>so that</b> I will be more motivated to use the bicycle anyway.

### Feature 3.3 User Stories

ID	Name	Description
<b>Registered User</b>		
US16	Air quality alert	<b>As a Registered User I want to</b> receive notifications about the air quality <b>so that</b> I am informed about it when I want to start a new ride

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## 7. Traceability matrix

	R1	R2	R 2.1	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19
US 1	F 1.1																			
US 2	F 1.1																			
US 3					F 1.1															
US 4		F 1.2																		
US 4.1			F 1.2																	
US 5						F 2.1														
US 6							F 2.1													
US 7									F 2.1											
US 8								F 2.1												
US 9										F 2.2										
US 10											F 2.2									
US 11																F 2.3				
US 12																F 2.3				
US 13																		F 3.2		
US 14				F 1.2																
US 15																			F 3.1	
US 16																				F 3.3
US 17												F 2.3					F 2.3			

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US 18															F 2.3					
US 19													F 2.3							
US 20															F 2.3					
US 21														F 2.3						

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## 8. Main use cases

Record a ride	
User story	US11
Actor	Registered User
Pre conditions	<ul style="list-style-type: none"> <li>The user has installed the mobile application and is already logged in.</li> </ul>
Event flows	<ol style="list-style-type: none"> <li>The user presses the start ride button.</li> <li>The app shows detailed information about the current bike trip.</li> <li>The user can end the ride.</li> <li>At the end of the ride, the app shows the ride data and sends them to the server.</li> </ol>
Exceptions	<ul style="list-style-type: none"> <li>A communication error occurs.</li> </ul>

Check user statistics	
User story	US14
Actor	Registered User
Pre conditions	<ul style="list-style-type: none"> <li>The user has installed the mobile application and is already logged in.</li> </ul>
Event flows	<ol style="list-style-type: none"> <li>The user navigates to the dashboard</li> <li>The user is presented with the statistics about his rides</li> </ol>
Exceptions	A communication error occurs.

View Reward	
User story	US7
Actor	Registered User
Pre conditions	<ul style="list-style-type: none"> <li>The user has installed the mobile application and is already logged in.</li> <li>The user has received a reward.</li> </ul>
Event flows	<ol style="list-style-type: none"> <li>The user navigates to the reward section of the app.</li> <li>The user sees the received rewards.</li> <li>The app presents detailed information about the reward.</li> </ol>
Exceptions	A communication error occurs.

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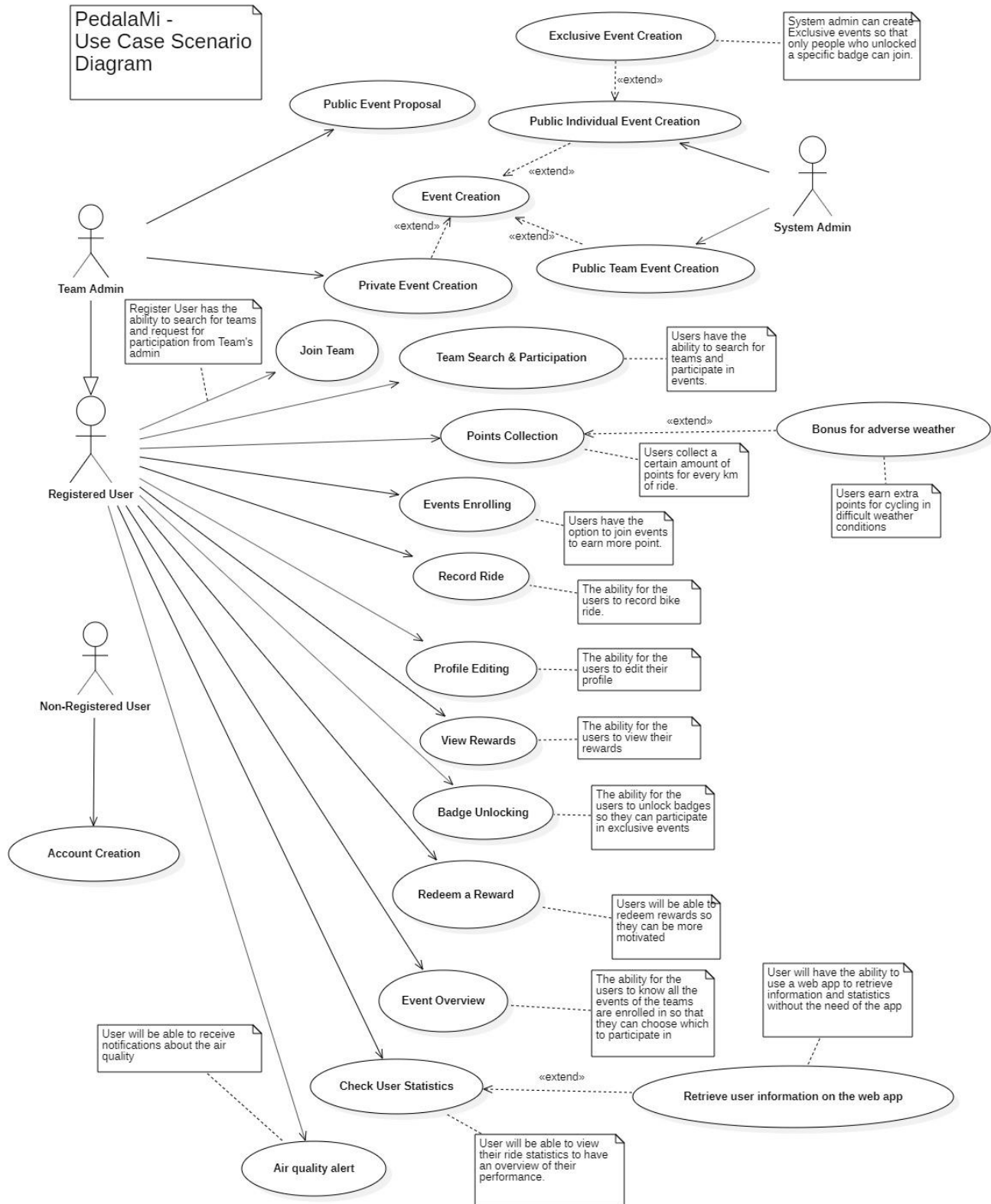
Redeem a Reward	
User story	US8
Actor	Registered User
Pre conditions	<ul style="list-style-type: none"> <li>• The user has installed the mobile application and is already logged in.</li> <li>• The user has received a reward.</li> <li>• The user is viewing a reward.</li> </ul>
Event flows	<ol style="list-style-type: none"> <li>1. The user presses the 'redeem' button.</li> <li>2. The system verifies if the user can redeem the reward.</li> <li>3. If yes, the system provides the user with the reward.</li> </ol>
Exceptions	<ul style="list-style-type: none"> <li>• The reward could not be redeemed.</li> <li>• A communication error occurs.</li> </ul>

Event Joining	
User story	US12
Actor	Registered User
Pre conditions	<ul style="list-style-type: none"> <li>• The user has installed the mobile application and is already logged in.</li> </ul>
Event flows	<ol style="list-style-type: none"> <li>1. The user navigates to the event section of the app.</li> <li>2. The app shows the list of individual events and of the events his teams have enrolled in.</li> <li>3. The user selects an event.</li> <li>4. The app shows the information about the event.</li> <li>5. The user selects the option to join the event.</li> </ol>
Exceptions	<ul style="list-style-type: none"> <li>• A communication error occurs.</li> </ul>



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## 8.1 Use Case Diagram



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## 9. Initial Product Backlog

Priority **5-4** is a *must have*, **3-2** is *nice to have*, **1** optional.

Maximum of estimated effort in points is **15** for each user story.

Name	Priority	Estimated effort (points)	Sprint
<b>Non registered users</b>			
Account creation	5	10	1
<b>Registered User</b>			
User authentication	5	8	1
Profile Editing	3	14	1
Record a Ride	5	15	
Points Collection	5	7	
Badge Unlocking	5	8	
View Reward	3	9	
Redeem a Reward	5	6	
Team Creation	5	15	
Team Search & Participation	4	12	
Events Overview	3	9	
Events Enrolling	3	10	
Bonus for Adverse Weather	2	9	
Check user statistics	5	14	
Retrieve user information on the web app	4	15	
Air quality alert	2	8	
<b>Team admin</b>			
Private Team Events Creation	3	13	
Public Team Events Proposal	1	7	
<b>System admin</b>			
Public Individual Events Creation	3	8	
Public Team Events Approval	1	4	
Exclusive Events Proposal	1	4	
Document writing	5	40	1 (10 points)