

Analysis and specification

OutSports

An application to facilitate the safe practice of sports in a group.

Software engineering 2020-2021

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# Introduction

## Purpose of the document

This document is written to provide detailed information regarding the OutSports app we will go in-depth analysing, in particular, the purpose, operation and services that the app can offer to the user.

In this document, we’ll evaluate the functional and non-functional requirements that the application must comply with and go into detail about those requirements.

## Description of the document

This document consists of the following items:

* **Glossary**: This is a detailed list of technical terms used in the document.
* **System models**:: Description of the various use cases represented by UML diagrams
* which uses “actors”, “actions” and “dependencies” to describe the relationship between them.
* **Definition of functional requirements**: Description of the services that the system will have to provide upon release.
* **Definition of non-functional requirements**: Description of the constraints that determine the properties of system behaviour in terms of reliability, response and storage times among others.
* **Evolution of the system**: Possible upgrade of our App in the future.
* **Specification of requirements**: Detailed explanation of the functional requirements discussed in the section “Definition of non-functional requirements”.

## The functionality of the project

OutSports consists is an android app designed to help monitor and record the practice of outdoor sports recommended for running/walking with a group or alone, with features geared towards the achievement of that goal in a safe and efficient manner. We aim to provide these features by the end of the semester:

In OutSports the user can create a private account that contains the data of all their activities.

If the client wants to perform a group activity, there are features that allows them to make a group with other OutSports users, this comes with features to improve the overall experience and sense of security of working out outside in a group:

* Know the location of all team members in real-time on a map.
* Click on a user in their team and view information.
* Whenever someone is stopped for more than x minutes a notification will be sent to every team member (toggle function).
* If someone from the team gets separated the last known coordinates will be sent to every person in the group (toggle function).

# Glossary

**Android:** is an operating system for mobile devices developed by Google.

**Android Studio:** Android Studio is an integrated development environment(IDE) for development for the Android platform

**IDE:** Integrated development environment that helps programmers in

development of the source code of the programs.

**API (Application Programming Interface):** An API is a set of programming code that enables data transmission between one software product and another. Their usefulness is especially to reuse code already implemented by the company that created the platform itself.

**Bug**: error in writing the source code that leads to anomalous behaviour of the software;

**Alpha:** the version of the software under development whose functionality has not yet been fully implemented, often these versions are affected by bugs.

**Beta:** the non-definitive version of a software, still being tested.

**UML:** The Unified Modeling Language (UML) is a general-purpose, developmental, modelling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system.

**App**: Short for application, or software program intended for an end-user. The term is usually used with reference to mobile terminals.

**Java**: High-level object-oriented programming language.

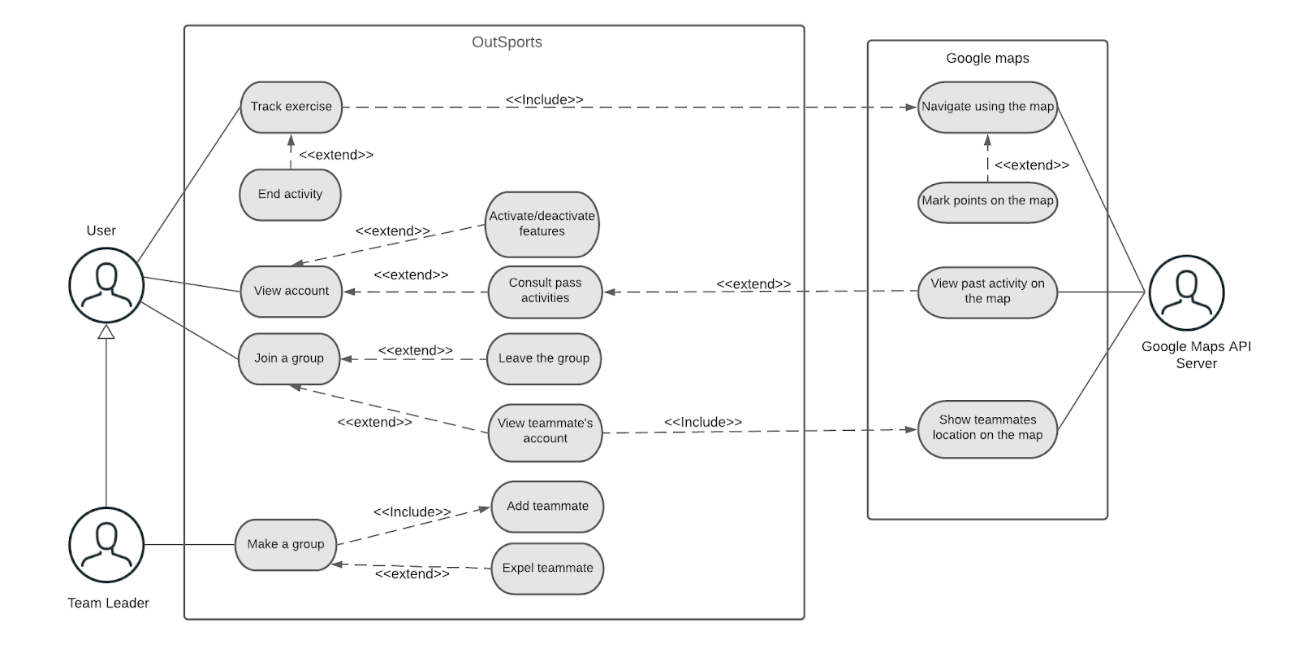
# System models

The point “System models ” consists of a description of the main use cases will be done through a  UML diagram which will express each action in an abstract way. Subsequently, there is a table to describe in detail how each use case works.

Template of the table that details each use case :

|  |  |
| --- | --- |
| Code | Use case code |
| First name | Use case name |
| Target | Purpose of the use case |
| Addictions | Use cases required to run |
| Actors | Indicates who interacted with the application |
| Preconditions | Conditions required for this use case |
| Trigger | The event that triggers the use case |
| Description | List of activities leading to the conclusion of the use case |
| Alternatives | Alternative situations to the success of the use case in question |
| Postconditions | Conditions met at the end of the use case |

## UML diagram



## Detailed tables

|  |  |
| --- | --- |
| Code | UC-01 |
| First name | Track exercise |
| Target | To track the exercise that is starting |
| Addictions | None |
| Actors | User |
| Preconditions | Allow the system to have access to the GPS localization |
| Trigger | Click on the bottom to start tracking the exercise |
| Description | The system starts tracking the exercise and showing the map with the current speed in Km/H, the travelled distance and the average speed. |
| Alternatives | None |
| Postconditions | The exercise starts to be recorded |

|  |  |
| --- | --- |
| Code | UC-02 |
| First name | View account |
| Target | To view the user account and access past activities |
| Addictions | None |
| Actors | User |
| Preconditions | None |
| Trigger | Clicking on their profile tab |
| Description | If a user wants to view past activities, they can tap on the profile tab to access that information |
| Alternatives | None |
| Postconditions | The user learns how to access account information |

|  |  |
| --- | --- |
| Code | UC-03 |
| First name | Make a group |
| Target | Do an activity in a group |
| Addictions | None |
| Actors | Team Leader |
| Preconditions | User needs to accept these permissions:  [ACCESS\_FINE\_LOCATION](https://developer.android.com/reference/android/Manifest.permission#ACCESS_FINE_LOCATION)  [CHANGE\_WIFI\_STATE](https://developer.android.com/reference/android/Manifest.permission#CHANGE_WIFI_STATE)  [ACCESS\_WIFI\_STATE](https://developer.android.com/reference/android/Manifest.permission#ACCESS_WIFI_STATE)  [INTERNET](https://developer.android.com/reference/android/Manifest.permission#INTERNET) |
| Trigger | The user selects the make group option |
| Description | The user can select the option to make a group and take advantage of its features |
| Alternatives | None |
| Postconditions | User can now add users in close proximity to his group |

|  |  |
| --- | --- |
| Code | UC-04 |
| First name | Join a group |
| Target | Join a group to make an exercise |
| Addictions | UC-03 |
| Actors | User |
| Preconditions | The group must be already created |
| Trigger | Click on the Join a group button |
| Description | The user can join a group to participate in the activity |
| Alternatives | None |
| Postconditions | User is now part of a group |

|  |  |
| --- | --- |
| Code | UC-06 |
| First name | Activate/ Deactivate features |
| Target | The user being able to activate/deactivate features |
| Addictions | None |
| Actors | User |
| Preconditions | None |
| Trigger | Tapping in the toggle button in order to activate/deactivate the feature |
| Description | The user is able to define the unit of distance, height, weight and preferred language. |
| Alternatives | None |
| Postconditions | Features activated/deactivated will be implemented |

|  |  |
| --- | --- |
| Code | UC-07 |
| First name | Consult past activities |
| Target | The user can consult their past activities |
| Addictions | None |
| Actors | User |
| Preconditions | The user has past activities to consult |
| Trigger | Choose one of the past activities to consult the details |
| Description | The user will be able to see the number of kilometres done as well as the average speed of that activity. He will also be able to see the route taken. |
| Alternatives | None |
| Postconditions | The user checked the past activities he wanted to consult |

|  |  |
| --- | --- |
| Code | UC-08 |
| First name | Add teammate |
| Target | To add a user to the team |
| Addictions | UC-03 |
| Actors | Team Leader |
| Preconditions | The group has to exist already |
| Trigger | Tapping the add teammate option |
| Description | The team leader makes the group in order to add members to be able to do a group activity |
| Alternatives | None |
| Postconditions | The group is created and available to add teammates |

|  |  |
| --- | --- |
| Code | UC-09 |
| First name | View teammate’s account |
| Target | To view one of the teammate’s information |
| Addictions | UC-03 or UC-04 |
| Actors | User |
| Preconditions | The user needs to be in group either one he has joined or one he has formed |
| Trigger | Tapping on a teammates profile picture in the map |
| Description | The user in a group can tap on a profile of a teammate and view the distance between the user and the teammate selected. |
| Alternatives | None |
| Postconditions | The user is able to see the distance to his teammate |

|  |  |
| --- | --- |
| Code | UC-10 |
| First name | Navigate using the map |
| Target | Show the exercise on the map |
| Addictions | UC-01 |
| Actors | Google Maps API Server, User |
| Preconditions | Allow the system to have access to the GPS localization |
| Trigger | When the exercise starts being tracked |
| Description | The user is able to see his exact location as well as the route that he has done, represented by a line in the map. It also shows the travelled distance, the average speed, calories burned and time passed on the activity . |
| Alternatives | None |
| Postconditions | The exercise ended and is saved on the user account |

|  |  |
| --- | --- |
| Code | UC-11 |
| First name | Mark points on the map |
| Target | To facilitate navigation and allow the user to make points of interest in the map |
| Addictions | UC-10 |
| Actors | Google Maps API Server |
| Preconditions | The user need have started an exercise (which requires access to their GPS location) |
| Trigger | The user taps on a point in the map |
| Description | The user can tap the map to make custom points of interest in the map |
| Alternatives | None |
| Postconditions | A pin appears in the map |

|  |  |
| --- | --- |
| Code | UC-12 |
| First name | View past activity on the map |
| Target | To view recorded activities on the map |
| Addictions | UC-07 |
| Actors | Google Maps API Server |
| Preconditions | The users need to have done at least one pass activity |
| Trigger | Tapping on one of the last activities in the profile’s user |
| Description | By going to his profile and tapping on a past activity the user can see on the map the trail made in the selected activity |
| Alternatives | None |
| Postconditions | The user will be able to see past courses made in the map |

|  |  |
| --- | --- |
| Code | UC-13 |
| First name | Show teammates location on the map |
| Target | To show the members of the group on the map |
| Addictions | UC-09 |
| Actors | Google Maps API Server |
| Preconditions | The user is doing a group activity |
| Trigger | N/A |
| Description | The user is able to see the teammates location on the map represented my different colours to facilitate the identification of each group member while doing the exercise |
| Alternatives | None |
| Postconditions | User can see teammate’s location |

|  |  |
| --- | --- |
| Code | UC-14 |
| First name | Expel Teammate |
| Target | To remove one of the users from the group |
| Addictions | UC-03 |
| Actors | Team Leader |
| Preconditions | The user needs to be a team leader |
| Trigger | Once a team leader taps on a teammates profile it will have an extra option to kick the teammate from the group |
| Description | The team leader can choose to remove a team member from the group |
| Alternatives | None |
| Postconditions | The group will have one less member |

|  |  |
| --- | --- |
| Code | UC-15 |
| First name | End activity |
| Target | To end a started activity |
| Addictions | UC-01 |
| Actors | User |
| Preconditions | The user needs to have started an activity |
| Trigger | Tapping the option to stop an activity |
| Description | Once a user starts an activity it can finish it so that the progress can be saved to his account |
| Alternatives | None |
| Postconditions | Progress done in the activity will be saved in the users account |

|  |  |
| --- | --- |
| Code | UC-16 |
| First name | Leave group |
| Target | To be in a group |
| Addictions | UC-04 |
| Actors | User |
| Preconditions | The user needs to be in a group |
| Trigger | Tapping the option to leave the group |
| Description | If a user wants to leave a group that he is not the leader, he can tap on the option to do so. |
| Alternatives | None |
| Postconditions | Progress done in the group will be saved to the user’s account and he will no longer be in the group |

# Definition of functional requirements

## Activity features

|  |  |
| --- | --- |
| Code | FR-01 |
| Description | Initiate an activity |
| Reason | User wants to start recording an activity |
| Influence | None |
| Specific | RS-01 |
| Actor | User |
| Priority | High |

|  |  |
| --- | --- |
| Code | FR-02 |
| Description | End activity |
| Reason | The user wants to end a started activity and record what he did on it |
| Influence | FR-01 |
| Specific | RS-02 |
| Actor | User |
| Priority | High |

## Group features (being group leader)

|  |  |
| --- | --- |
| Code | FR-06 |
| Description | Join a group |
| Reason | The user wants to join a group already formed |
| Influence | None |
| Specific | RS-06 |
| Actor | User |
| Priority | High |

|  |  |
| --- | --- |
| Code | FR-07 |
| Description | Leave a group |
| Reason | the user wants to leave the group in the middle of an activity |
| Influence | FR-06 |
| Specific | RS-07 |
| Actor | User |
| Priority | High |

## Information features

|  |  |
| --- | --- |
| Code | FR-08 |
| Description | View account |
| Reason | The user wants to see his account information |
| Influence | None |
| Specific | RS-08 |
| Actor | User |
| Priority | Medium |

# Definition of non-functional requirements (NFR)

## Product Requirements

* The app must be fluid, with a response time of under 1 second.
* The part of the app that shows the map must respond to the touch of the screen to move around the map and to click on the team member’s icon.
* The app must be user-friendly so that the user does not need more than a couple of minutes to understand how everything works.

## Process Requirements

* The app will be developed in Java orientated to Android applications.
* The app can be installed in every Android smartphone with the version 6.0 and above.
* The smartphone needs to have a GPS sensor, an accelerometer.

## External Requirements

* The app saves the information on the smartphone and doesn't share it with any other services other than google maps for the purpose of locating the user on the map.

# System evolution

In future updates we plan to improve current features, UI, fix any bugs reported by clients and extend compatibility with iOS.

In addition to the there are some new feature we would like to implement such as:

* Allow the use of the camera and to capture points of interest found during an activity.
* Implement a system of points and levels as rewards for a recurrent recording of the activities made
* Finally, we intend to change the type of storage from local to a server so that the user can switch phones without losing his progress and achievements.

# Specification of requirements

It is a precise and detailed description of the system's functionality. Each requirement specification will come described through a table structured as follows:

|  |  |
| --- | --- |
| ID | Requirement specification code |
| Input | Accepted or expected input parameters |
| Output | Parameters returned |
| Precondition | Conditions necessary for the activation of the requirement |
| Post-condition | Conditions fulfilled upon completion |

|  |  |
| --- | --- |
| ID | RS-01 (Initiate an activity) |
| Input | GPS Location |
| Output | Show the current location on the map |
| Precondition | Have the necessary permissions activate  GPS active  Current location found  Internet connection |
| Post-condition | Start the activity when the preconditions are all successful |

|  |  |
| --- | --- |
| ID | RS-02 (End activity) |
| Input | Activity data |
| Output | Update activity statistics |
| Precondition | Have an activity started |
| Post-condition | Show a screen with the summary of the completed activity |

|  |  |
| --- | --- |
| ID | RS-03 (Form a group) |
| Input | Group data |
| Output | - |
| Precondition | Have Wi-Fi Direct enabled |
| Post-condition | Show a screen where it is possible to add new members, as well as see members who are already part of the group |

|  |  |
| --- | --- |
| ID | RS-04 (Kick team member) |
| Input | Kick member |
| Output | List of updated members |
| Precondition | Being a group manager |
| Post-condition | Show a screen to team member as you were kicked out of the group  And the list of team members still on the team for the group manager |

|  |  |
| --- | --- |
| ID | RS-05 (Add teammate) |
| Input | User id to add |
| Output | Success or error messages |
| Precondition | Have the necessary permissions active |
| Post-condition | Show screen with members that already belong to the group |

|  |  |
| --- | --- |
| ID | RS-06 (Join a group) |
| Input | Group you want to join |
| Output | Success or error messages |
| Precondition | Have Wi-Fi Direct enabled  Do not currently belong to a group |
| Post-condition | Show screen with all the members of the group you are on now |

|  |  |
| --- | --- |
| ID | RS-07 (Leave a group) |
| Input | User Id |
| Output | Updated list of group members |
| Precondition | Belong to a group |
| Post-condition | Notify the remaining team members who left the group |

|  |  |
| --- | --- |
| ID | RS-08 (View account) |
| Input | User Id |
| Output | User data (activity statistics, latest activities, personal data) |
| Precondition | Have an account in the device |
| Post-condition | Show a screen with user data |

|  |  |
| --- | --- |
| ID | RS-09 (View teammates account) |
| Input | Teammate you want to view |
| Output | Teammate data (current location, distance) |
| Precondition | Belong to a group |
| Post-condition | Show a screen with the chosen teammate's data |

# Appendices

## Device requirements

* Android operating system version 6.0 corresponding to API 17 or a higher android version.
* Google Play services
* Internet connection
* Wifi direct
* Gps Location