



Título del Proyecto:

Tripescape

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Table of contents

1. Introduction.....	4
1.1 Problem statement	4
1.2 Objectives.....	4
1.3 Personal motivation	4
2. Technologies.....	5
2.1 Google Firebase.....	5
2.2 Design.....	7
2.2 Tests	7
3. Application architecture.....	8
3.1 Persistence Layer.....	9
3.2 Business Model Layer.....	10
3.3 Presentation Layer	11
3.3.1 Login Activity	11
3.3.2 Action Activity	12
3.3.3 MyTrips Activity and TripCode Activity	13
3.3.4 Search Activity.....	14
5. Conclusions.....	17
6. Appendix	17
6.1 GitHub code.....	17
6.2 Firebase link	17
6.3 User Guide.....	18



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Proyecto: Tripescape
Alumno: Emilio Castellano



1. Introduction

1.1 Problem statement

Despite of the advantages of the Internet when planning trips and excursions, there is a vast amount of possibilities, that makes it highly time-consuming and an unpleasant task.

1.2 Objectives

The goal of this thesis is to allow the user to plan excursions and outdoor activities with no restriction of your location in very simple and user-friendly way. Therefore, you can think first what you want to do and then you can check where you can do it.

It could be used on any Android device as long as it fulfils the only requirement: Internet connection.

Trying to keep the user attention throughout the app consumption with very simple and graphical forms, is a must.

The user will be able to register itself on the system in order to plan and latter save some trips within its criteria (Date, Price, Number of persons and Activities). These saved trips will be also displayed on another page on a list form.

1.3 Personal motivation

As passionate traveller, I know how much time and effort I make every single time I want to plan a trip. Therefore, if we could have a mobile app that makes it simple and quick, I would use it every time.

I also love practising sport, and for that reason most of the example activities are sport related, I think we should promote being healthier, more social and enrich ourselves.

2. Technologies

2.1 Google Firebase

Firebase is Google's mobile platform that helps to develop high quality mobile and web apps.

Some functionality from this platform has been included on the app:

- **Firebase Authentication:** this allows our system to rely on the Authentication system from Google and we merely just register and/or request access with some input data. As achievement, the user is able to log in with its email, Google account, Facebook or as Anonymous.

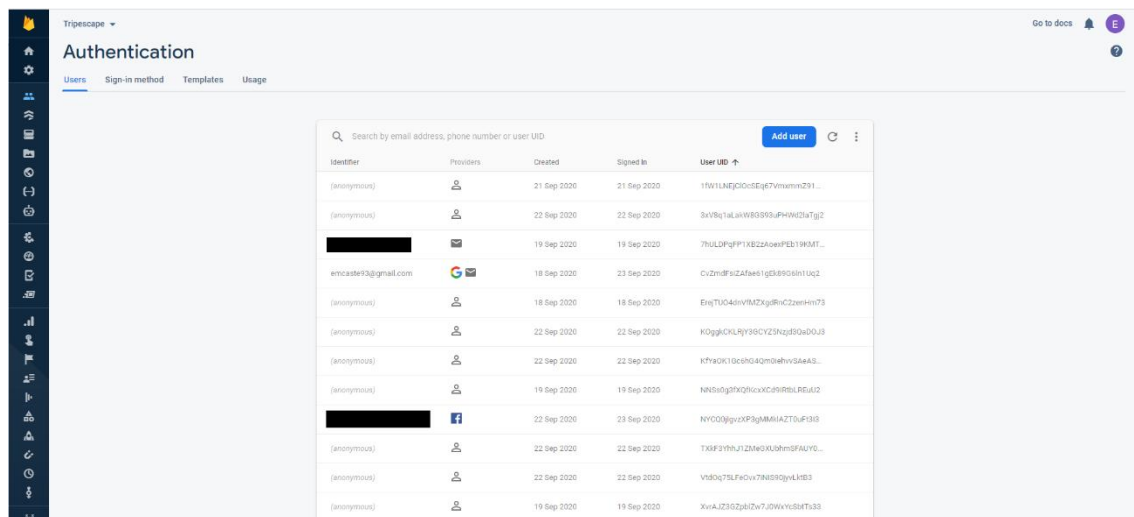


Figure 1: Firebase Authentication

- **Cloud Firestore:** data storage as NoSQL allow us to insert and retrieve large amounts of data in a very rapid way, which will be ideal to support scalability. Some data that is currently saved by the app includes Attractions, Trips and Users.
 - **AttractionsGermany:** data related to attractions in Germany are stored into this collection. A new document is created per attraction, this contains information about the activity (Sightseeing, hiking, skiing ...), userId, location and price (per person).

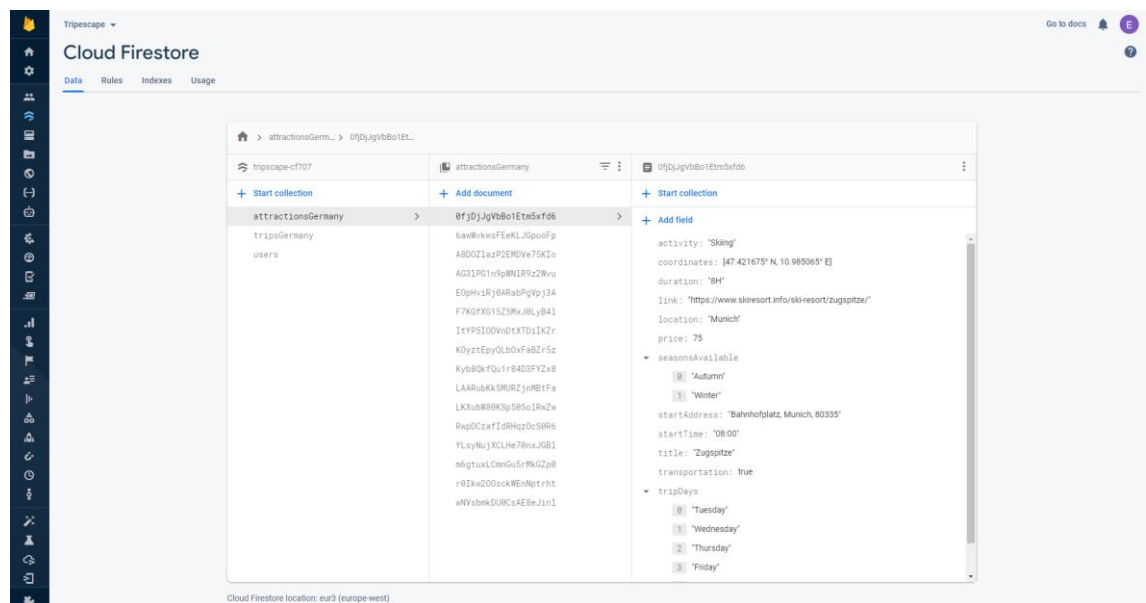


Figure 2: Cloud Firestore – Attractions Germany

- TripsGermany: data related to trips in Germany are stored into this collection. A new document is created per trip, containing information about destination (Munich, Hamburg ...), start date, price, link ...

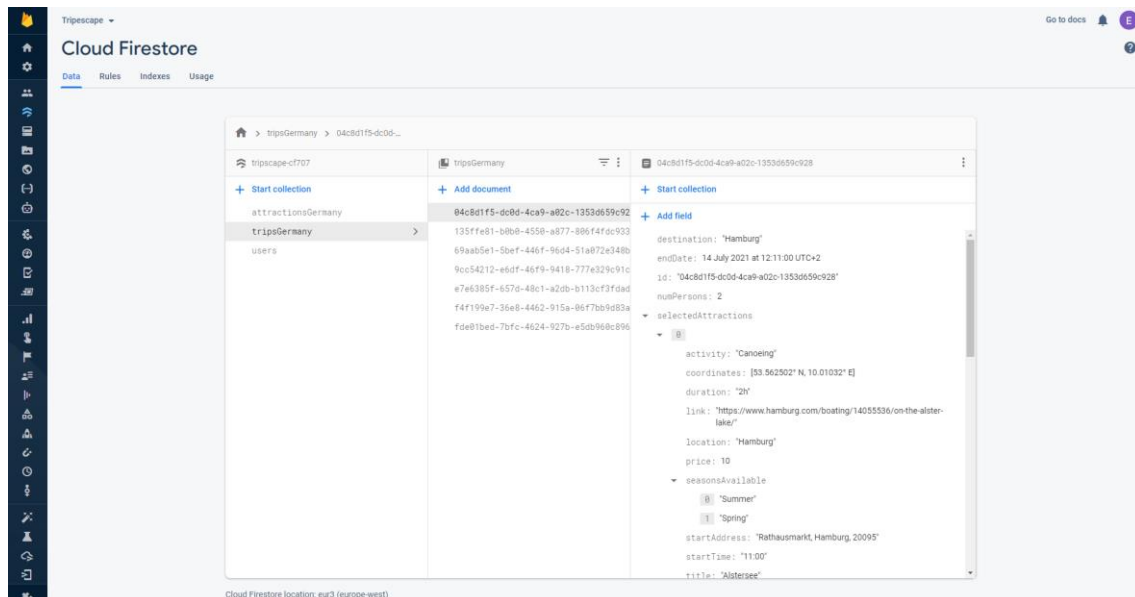


Figure 3: Cloud Firestore – Trips Germany

- Users: this collection has been created in order to store data about the users (Name, email ...) but its functionality is not implemented at this release.



2.2 Design

The design of the App follows as possible the **Material Design** system, in order to apply the correct colours and format in order to improve its accessibility.

Singleton pattern has been applied when a new Trip is being planned and for the adapters of the business model layer. This design pattern has a simple complexity and using a unique and global instance, its use will avoid any possible conflict while editing the trip data.

App resources have been used to the extent possible in order to reach reusability and reliability. For example, the String.xml resource has been used in order to translate the text to Spanish when the device has Spain as preferred language, letting English be the default language.

2.2 Tests

User tests and **GUI tests** have been applied regularly within the development in order to assure the functionality, design on every state.

Unit tests have been developed for complex functions such as date-related for the trip planning itinerary and they should be applied for more functions on further releases to encounter major bugs and avoid future conflicts on future releases.

3. Application architecture

The **multi layered software architecture** has been applied as main pattern for the development of this app, making its complexity moderate but also making it easier for further development and in a more agile manner.

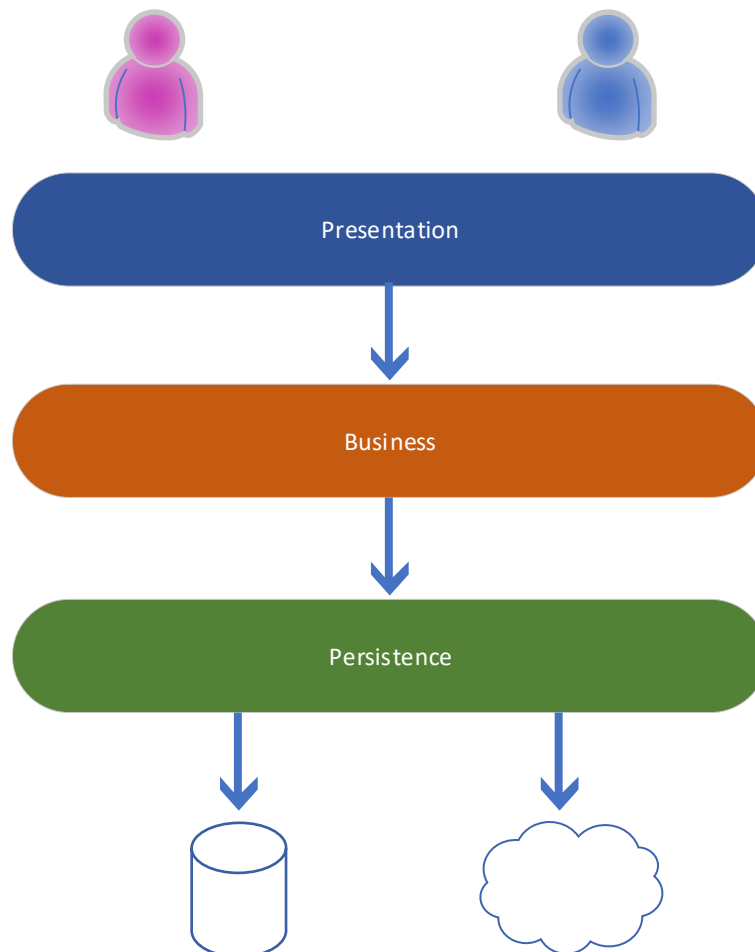


Figure4: Multilayer architecture

This architecture segregates the application into tiers, so it is more flexible and reusable, modifying only one layer when a future change is necessary and not the entire application.

The Presentation layer, used to present data to the application layer in an accurate, well-defined and standardised format. It requests any data to the Business layer, which has the function to act as middleware forwarding and adapting the requests to the Persistence layer. The latter one is the down-layer that has direct contact with the data.



3.1 Persistence Layer

The Persistence layer will be stretchily connected to the Cloud databases.

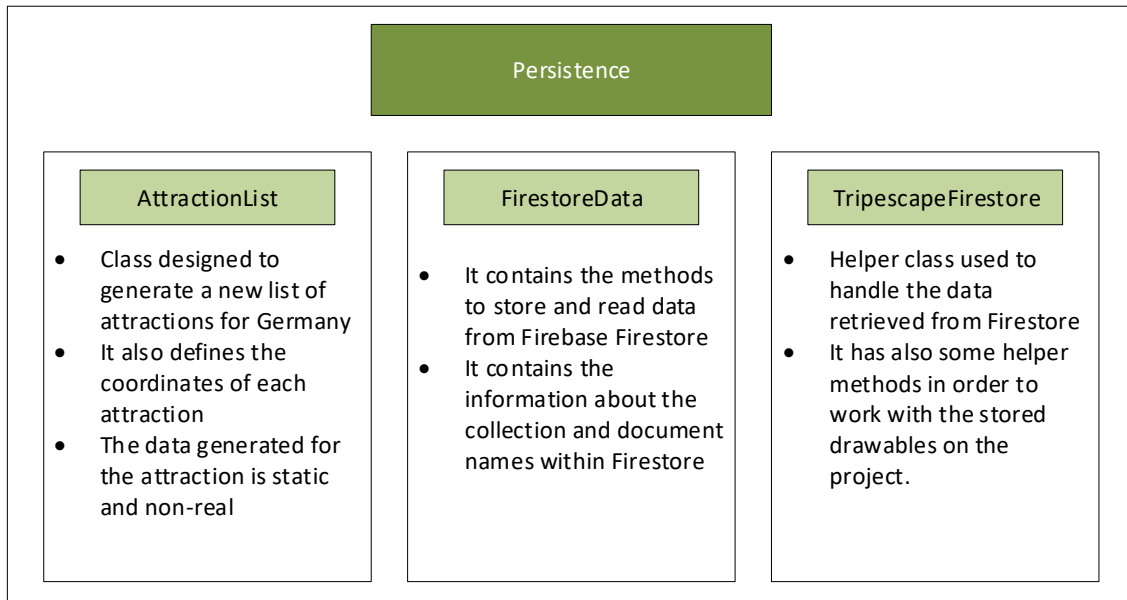


Figure5: Persistence layer



3.2 Business Model Layer

This is the core of the application, where the data types are defined, which will be used on the Persistence layer as well as on the Presentation layer.

The diagram bellow shows how the classes are defined:

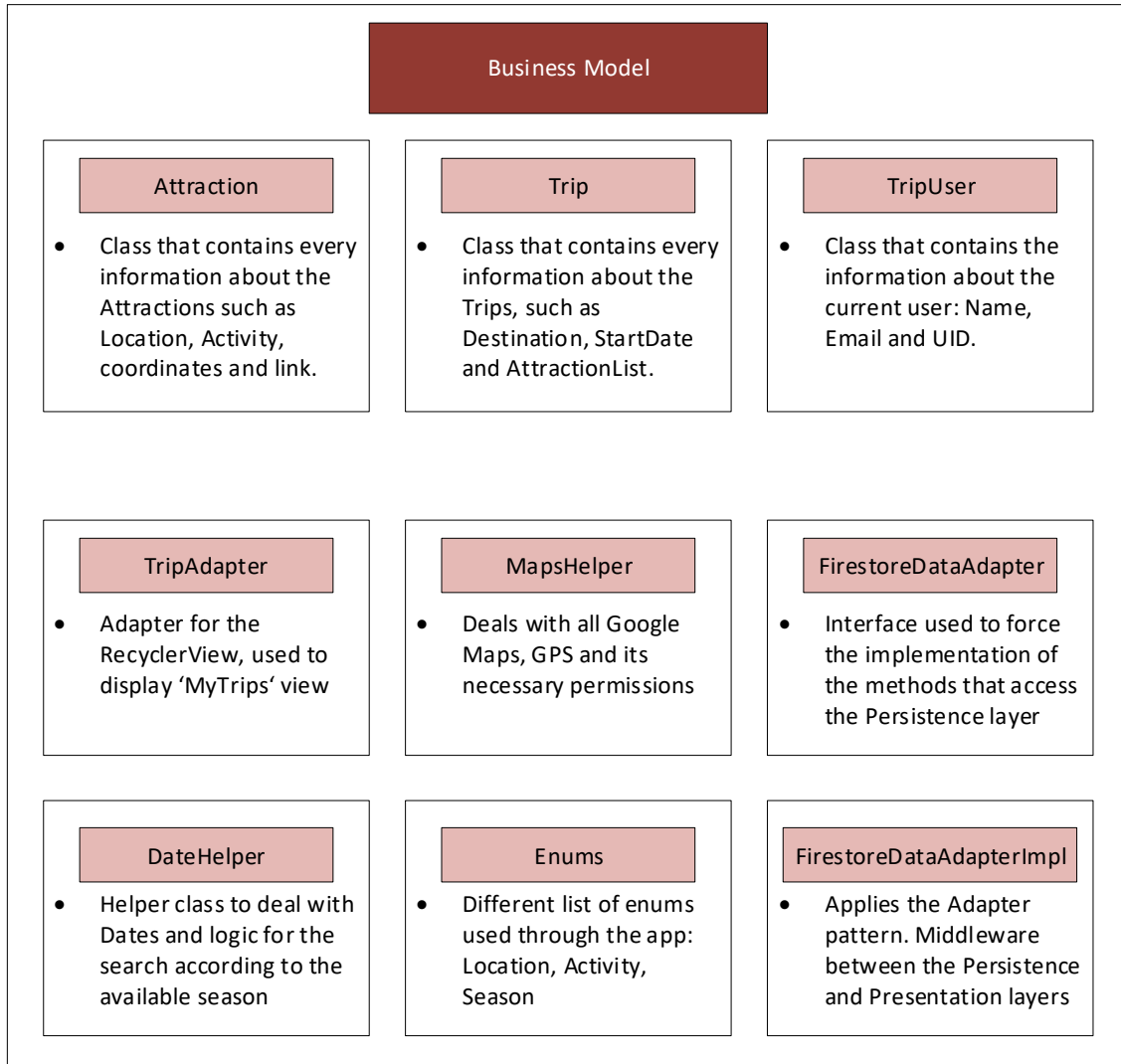


Figure6: Business Model layer

3.3 Presentation Layer

The presentation layer is based on five Activities that handle the logic with the user interaction and are on direct contact with the views.

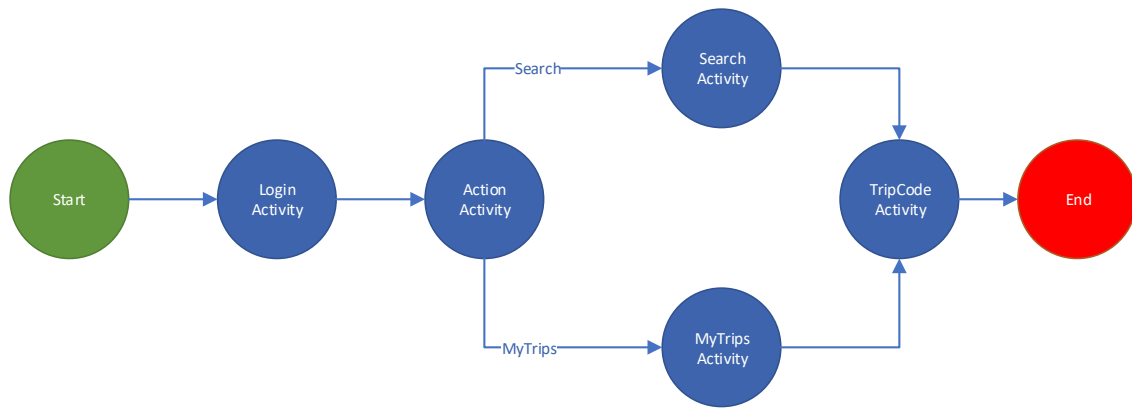
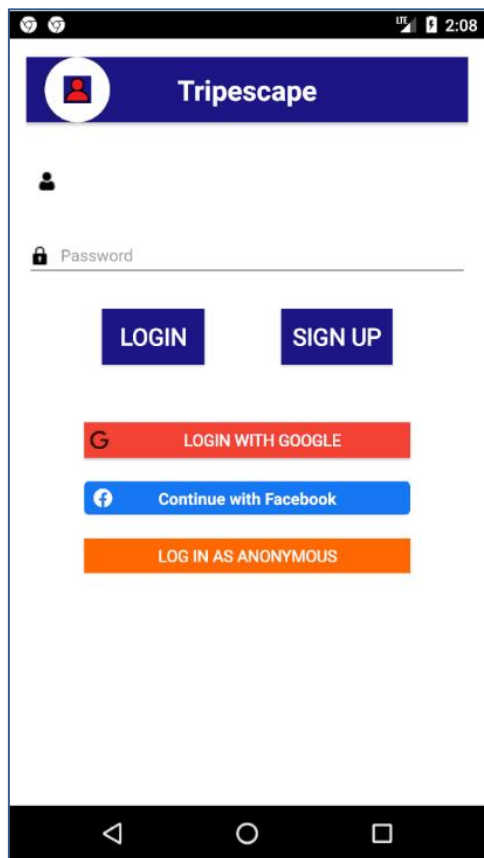


Figure7: Presentation layer

3.3.1 Login Activity



The *Login Activity* is used to allow the user to log in via Email, Google Account, Facebook or as Anonymous.

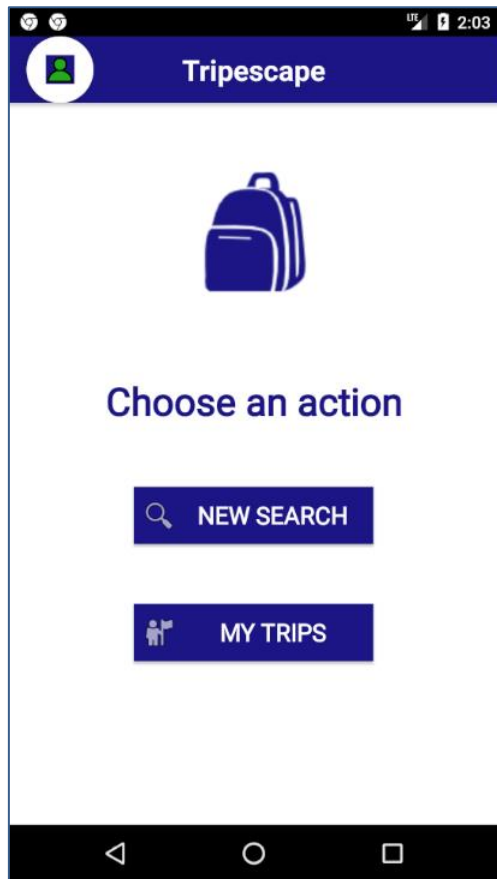
This is the first activity that is triggered when the App is opened.

The red user icon on the left-side of the Toolbar is displayed on every view, it indicates if the user has been logged in successfully-

Figure8: Login Activity



3.3.2 Action Activity



The *Action Activity* is basically a menu where the user can choose if it wants to make a new search (create a new trip) or if it wants to see the list of saved trips.

Figure9: Action Activity

3.3.3 MyTrips Activity and TripCode Activity

MyTrips Activity display a list of all saved trips for the logged user. You have the option to 1) Create a new trip (using the “+” button) , 2) View the details of a trip (clicking on the trip) and 3) Delete a saved trip.

If you choose option 2) View the details of a trip, the *TripCode Activity* will start, which will display a QR-code of the Trip. At the moment the feature of creating a QR code has not implemented, so the purpose image is merely to be visualised.

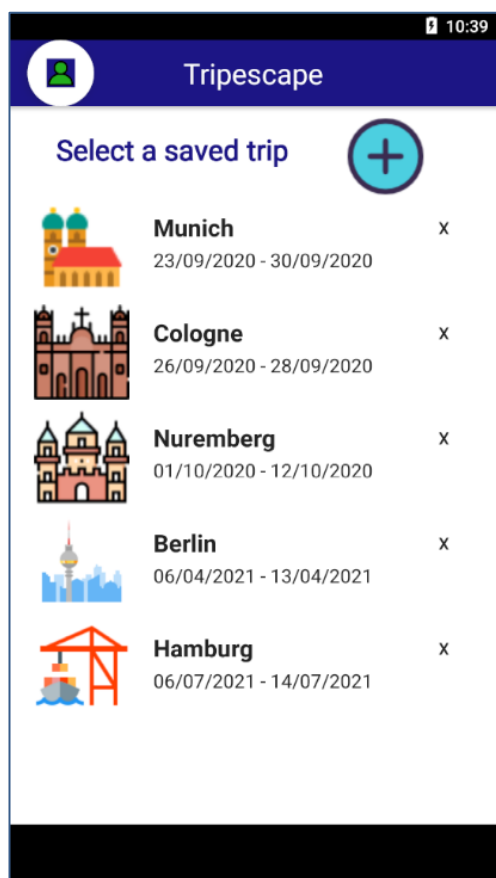


Figure10: MyTrips Activity – List of trips



Figure11: TripCode Activity – Detail view of a trip

3.3.4 Search Activity

This activity handles the creation of a new Trip using a search methodology.

Firstly, the user will be asked to enter some data such as the start date, end date, number of persons, budget and finally select a list of desired activities.

Secondly, the user will choose the destination from the list of matched locations. This information will show the percentage of match and it will be ordered by this. Currently only data for the country Germany has been introduced.

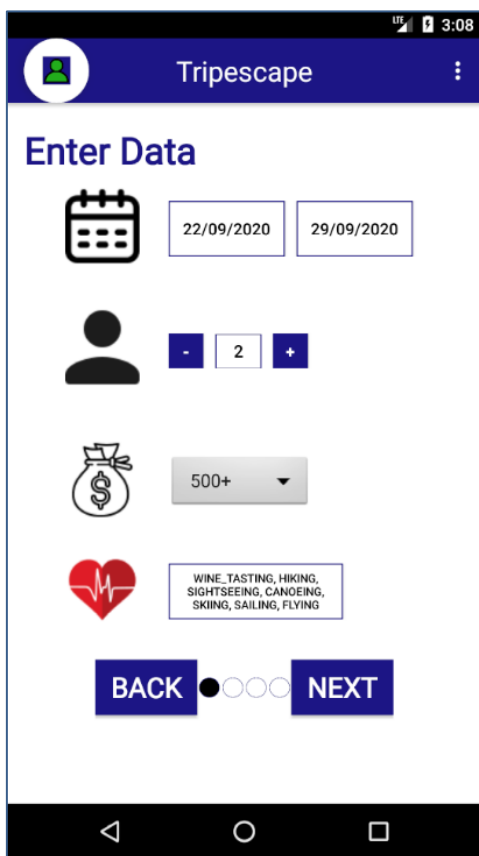


Figure12: Search Activity – Enter Data Fragment

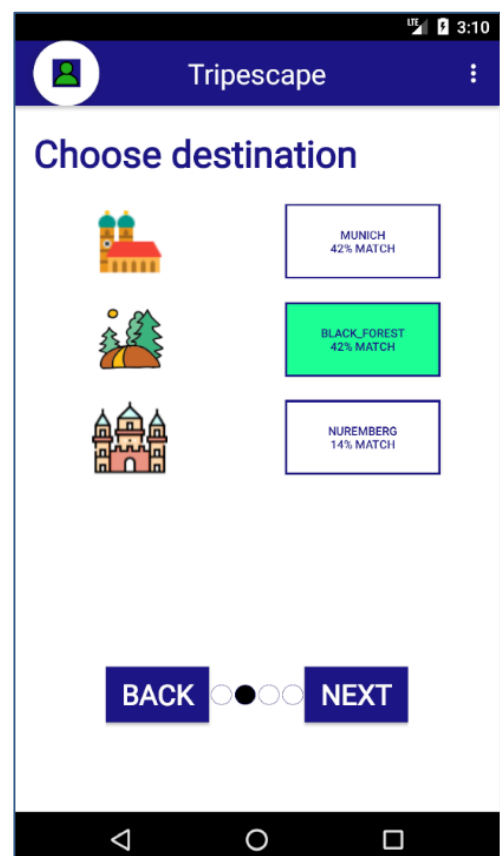


Figure13: Search Activity – Choose destination Fragment

Thirdly you will be able to add or delete attractions from your desired list. Some of them will be added as default according to your interests and the maximum budget. Furthermore, you can click on the price to have a little summary of how the total price is calculated for the number of people you entered on the first page.

And finally, the trip map will be displayed on a Google Maps view and the selected attractions will appear according to their location. To end and save the trip just click on “Next”.



Figure14: Search Activity – Manage your attractions

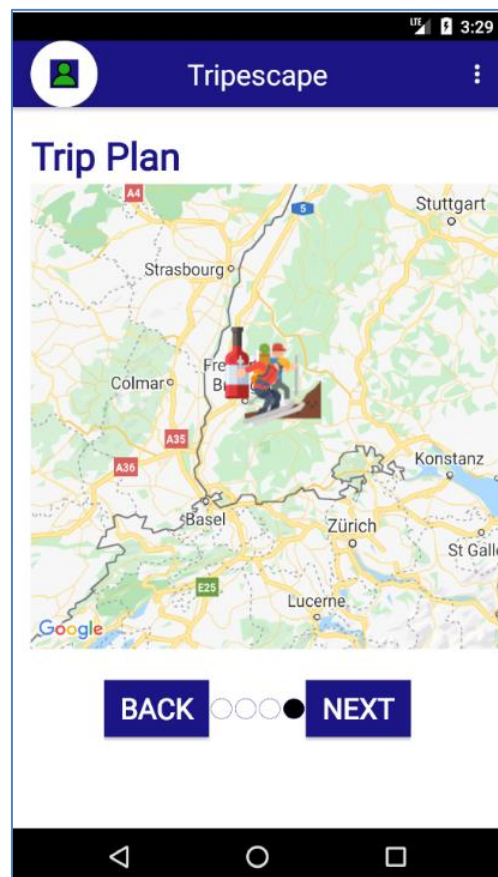


Figure15: Search Activity – Trip plan

Additionally, a right menu has been created that has the option to display the about dialog about the app and also the possibility to share the trip date via Email. Consider, that this functionality of share data can only be used once the trip has been planned and you are on the last step: "Trip Plan"

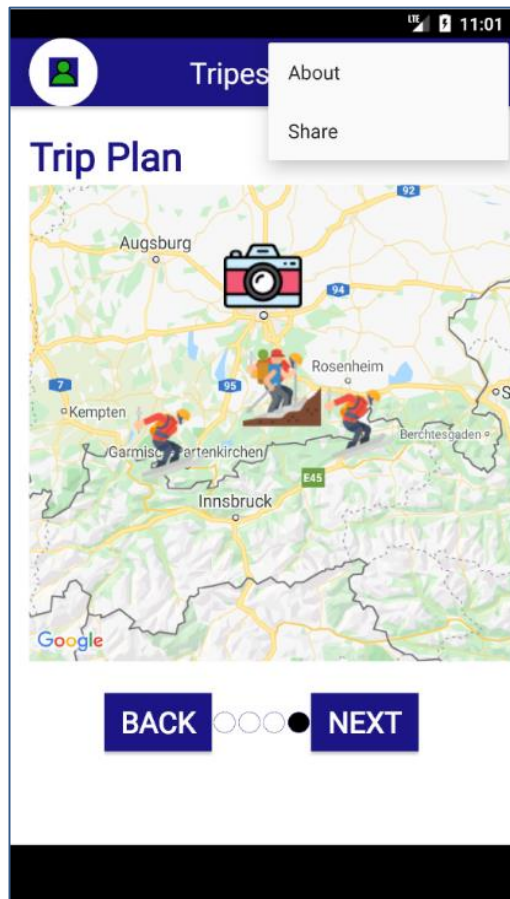


Figure16: Search Activity – Right Menu

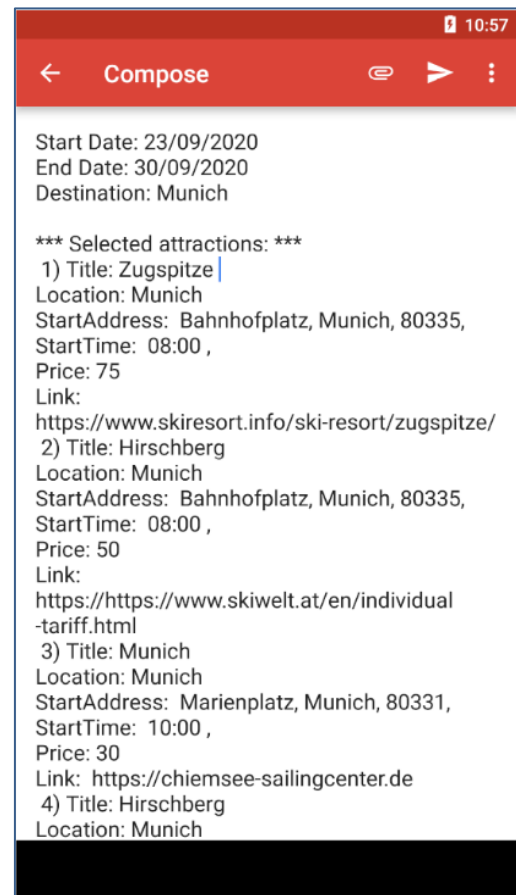


Figure17: Search Activity – Trip Share



5. Conclusions

The main goal of creating an app where the user can plan a trip with a set of attractions stored previously on the Cloud has been achieved. Furthermore, the contents learnt through this year during the Android courses have been applied to the extend possible and frameworks such as Firebase Firestore and Firebase Authentication; libraries such as RecyclerView and Google Maps have been applied.

The generated data is fake and not fully trustful, and the only purpose was to be able to have a sufficient app where the user can manage some data and have the full experience. Herewith, further development is open to have an algorithm which can somehow get and generate this data from real sources such as web pages. Moreover, the current data only contains attractions in Germany and their attractions are some example of passed experiences I had; this, on the future, should have a filter per Country in order to make the search more entertaining.

One of the biggest issues within this app was to create an algorithm which generates a Trip-Plan according to the set of attractions. This issue has been mainly achieved by sorting the trips by season and therefore the start-date has been taken into account in order to filter the available trips. However, in order to have a fully completed version, the app should give you a trip plan with real dates, start location and a fully itinerary of everyday activities.

I am personally very satisfied with this project because it applies most of the contents learnt within this year and a fully working app it is been released as consequence.

6. Appendix

6.1 GitHub code

The documentation and the source of the project can be found on:

<https://github.com/emcaste93/Tripescape>

6.2 Firebase link

The link to Firebase can be found on:

<https://console.firebase.google.com/project/tripscape-cf707/overview>



6.3 User Guide

Go to [Presentation Layer](#) .