<Smart Shopping>

Analysis and Design Document

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Revision History

Date	Version	Description	Author
<18.03.2020>	<1.0>	<initial specifications>	<Andrei Rusu>

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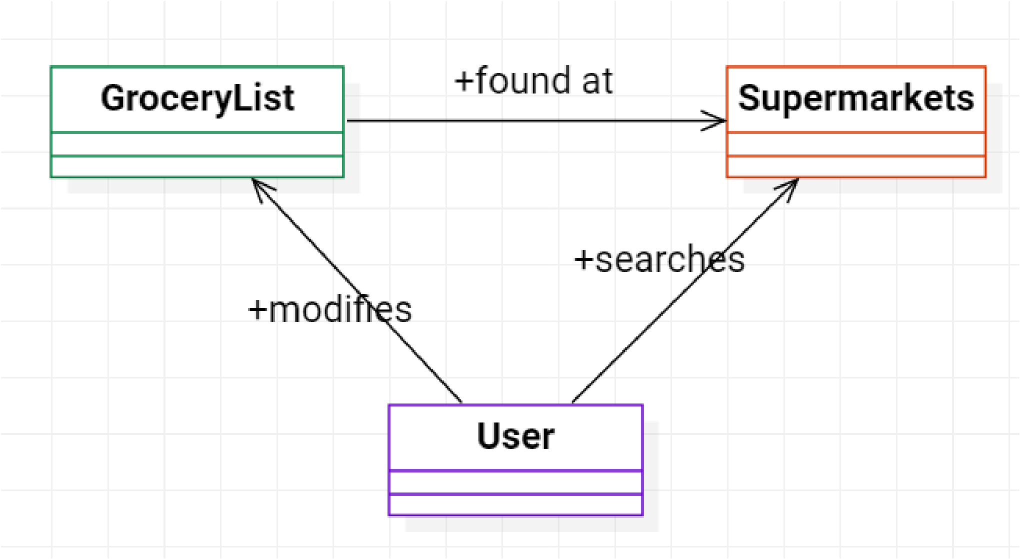
I. Project Specification

The project is a system designed to run on Android devices, together with a backend for loading and storing data, implemented in Firebase.

II. Elaboration – Iteration 1.1

1. Domain Model

The domain of the application covers a few distinct aspects. First, the user should be able to input a shopping list, save it to the cloud, and access it later for editing. Then, the user should search for a supermarket in their vecinity using the Google Maps API integrated into the application. After finding a suitable supermarket, the app should guide the user through the shop according to their grocery list, showing them in which part of the store their items are found.



2. Architectural Design

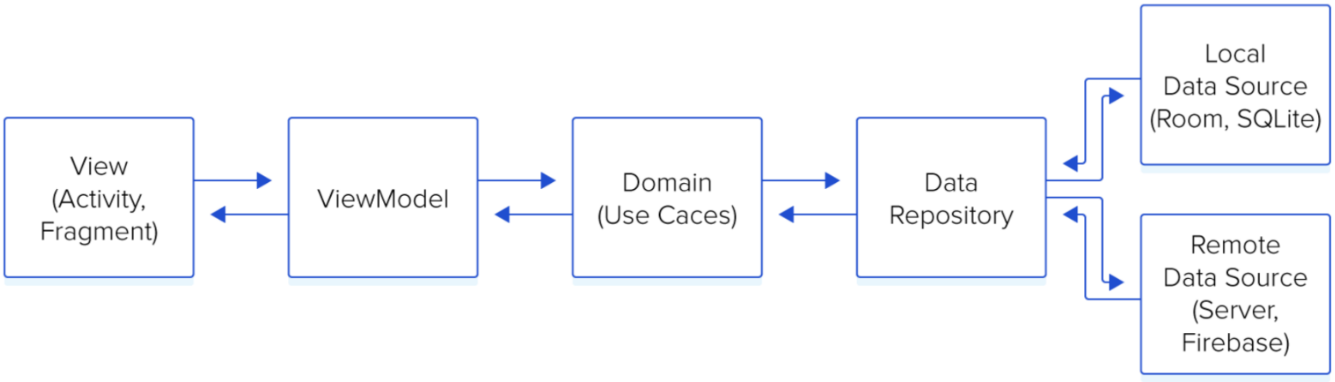
2.1 Conceptual Architecture

The system will be implemented using the Model-View-ViewModel (**MVVM**) architecture, using LiveData for real-time data update, Android data binding and various other Android Jetpack features.

The Model of the application will be made up of data classes, such as grocery list items, supermarkets and shop maps.
The View of the application is made up of what the user sees, aka the fragments and activities of the app, and the items in them, such as lists, maps and so on.
The ViewModel represents the domain and business logic of the applciation, it is what processes requests and connects the other components together. Also, the business logic of the application is decoupled from the UI.

Inside the application, the FactoryMethod pattern is used for Fragment instantiation, the Builder pattern for dialogs and also other patterns used in smaller areas, part of the recommended programming practices of Android and the MVVM pattern.

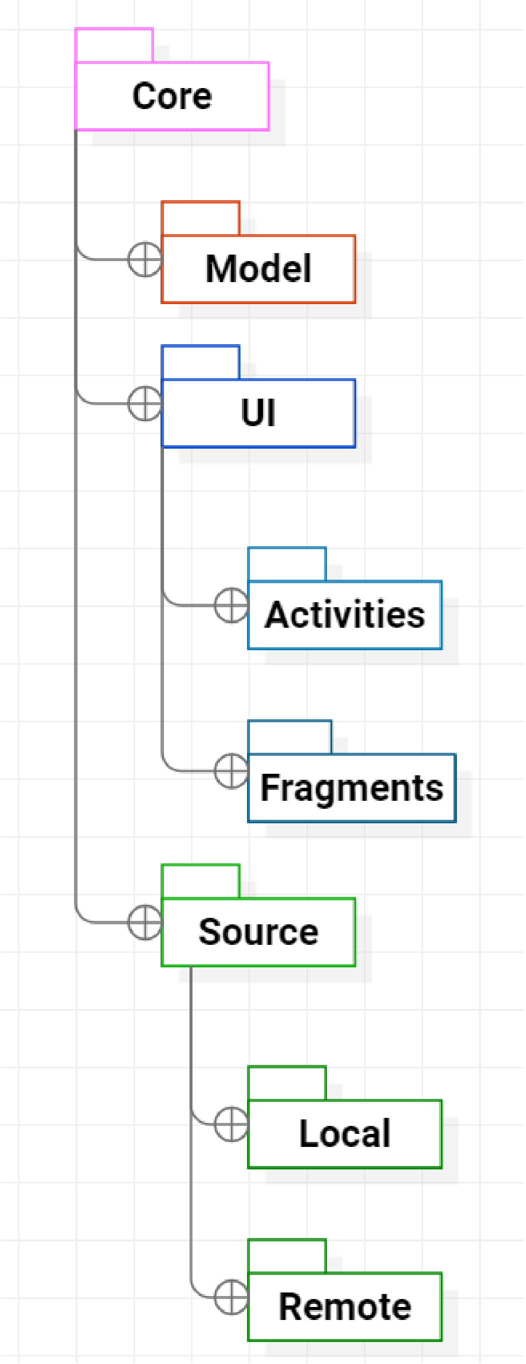
There will be a local and remote data source. The local data source will be implemented with Room of Firebase Offline DB, and the remote one will use Firebase Realtime DB as data storage. This type of layer separation is great for building modular and scalable apps that can easily be modified and upgraded later.



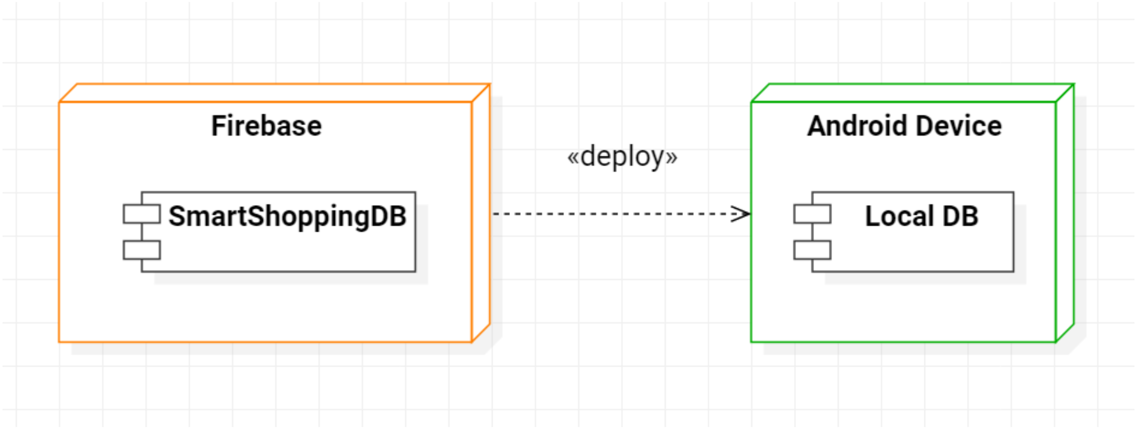
View (Activity, Fragment)
ViewModel
Domain (Use Caces)
Data Repository
Local Data Source (Room, SQLite)
Remote Data Source (Server, Firebase)

2.2 Package Design

The preliminary package diagram is shown below, depicting the main packages of the MVVM pattern:



2.3 Component and Deployment Diagrams



III. Elaboration – Iteration 1.2

1. Design Model

1.1 Dynamic Behavior

[Create the interaction diagrams (1 sequence, 1 communication diagrams) for 2 relevant scenarios]

1.2 Class Design

[Create the UML class diagram; apply GoF patterns and motivate your choice]

2. Data Model

[Create the data model for the system.]

3. Unit Testing

[Present the used testing methods and the associated test case scenarios.]

IV. Elaboration – Iteration 2

1. Architectural Design Refinement

[Refine the architectural design: conceptual architecture, package design (consider package design principles), component and deployment diagrams. Motivate the changes that have been made.]

2. Design Model Refinement

[Refine the UML class diagram by applying class design principles and GRASP; motivate your choices. Deliver the updated class diagrams.]

V. Construction and Transition

1. System Testing

[Describe how you applied integration testing and present the associated test case scenarios.]

2. Future improvements

[Present future improvements for the system]

VI. Bibliography