SofaBoda Test Challenge

22th December 2018

REQUIREMENTS

Intro: Create an Android app that get list of airline schedules and display their origin and destination airports on a map.

Task: Implement an Android app with the following features.

- Give option to the user to select the origin and destination airport
- Fetch list of airline schedules based on the selections above
- Display them on a list
- Show the origin and destination of the flight on a map upon selection of a schedule
- And connect them with a polyline

GETTING STARTED

These instructions will get you a copy of the project up and running on your local machine:

1. Clone the project repository from Github.

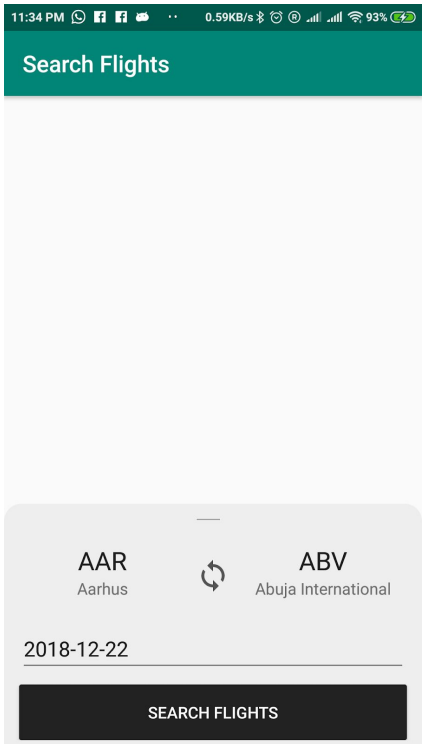
   ```
   git clone https://github.com/mfathy/AirlinesBook.git
   ```

2. Open **Android studio**, Select File | Open... and point to the the project, wait until the project syncs and builds successfully.

3. Run the project using Android studio.

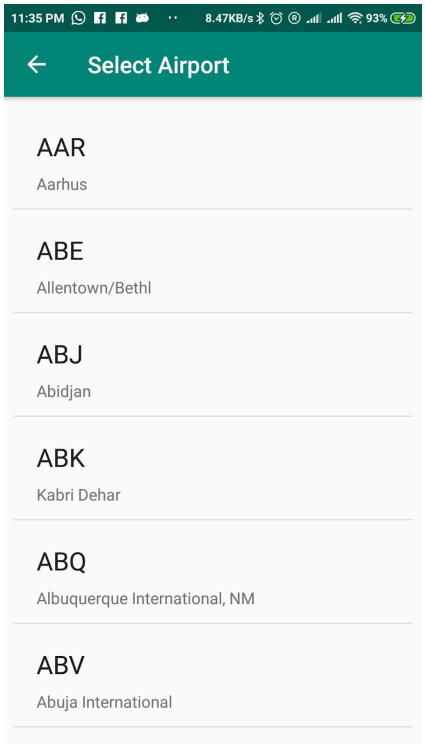
DISCUSSION

User interface



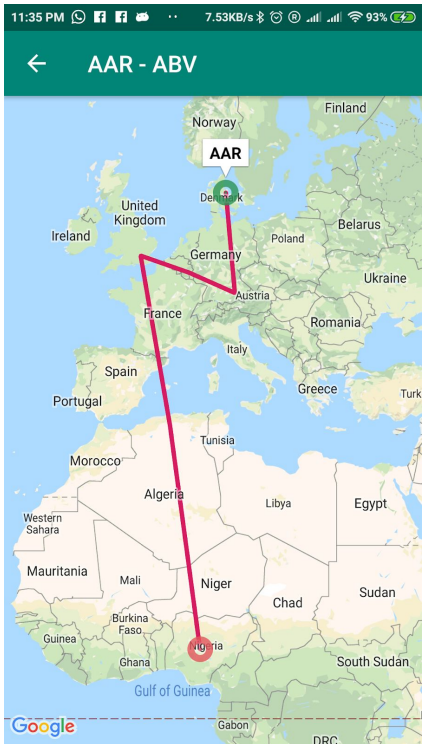
Search Flights Screen

Shows the user options to select origin, destination and date of the flight, then search for available flights.



Select Airport Screen

Shows a list of airports to the user to select one of them.



Map Screen

Shows a map with the route of the flight selected by the user.

Data Sources

There are two levels of data persistence:

- Network - Very slow.
- Disk(Room Database) - Slow.

The data layer consists of:

- A repository pattern to provide data outside the layer itself.
- A Remote data store layer to access remote server data.
- A Cached data store layer to access the local data from database.

The chosen fetch of data is simple:

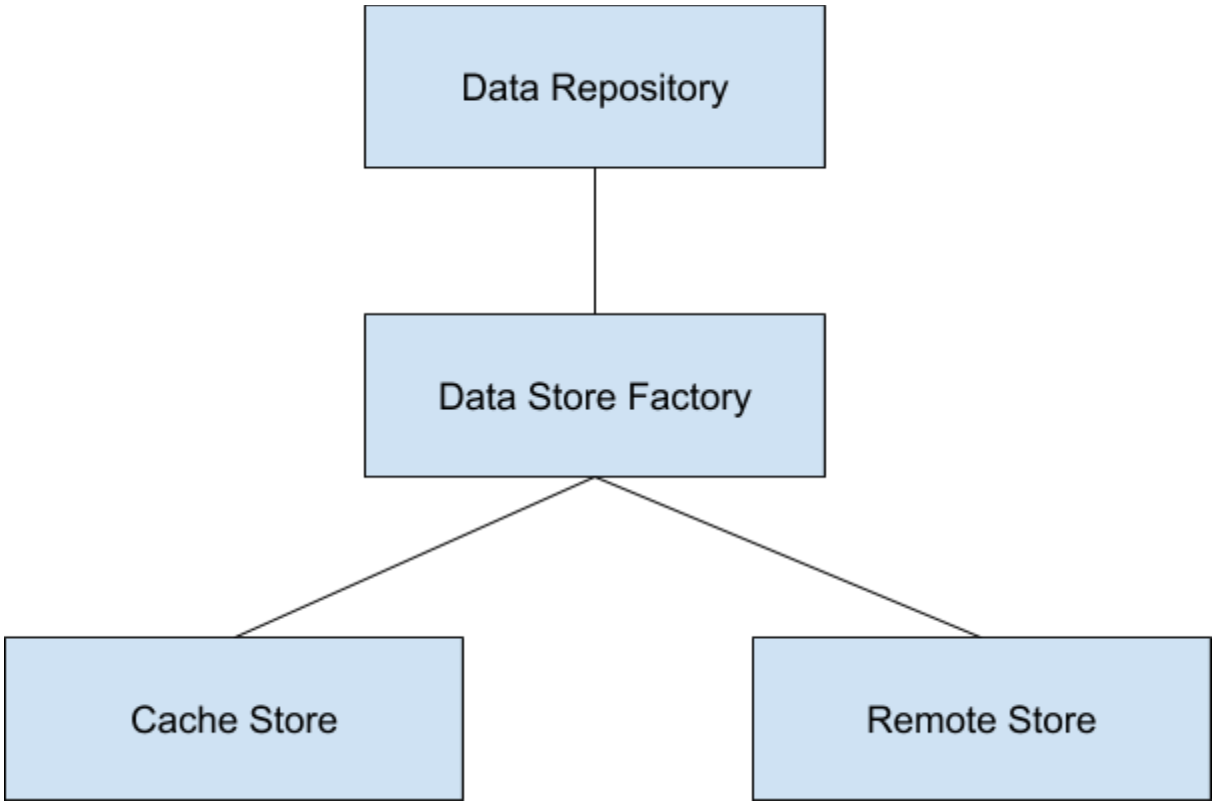
- In get airports operation:
    - Return local/cached copy if exists and not expired.
    - Return remote copy.
- In get access token operation:
    - Return remote copy.
    - Return local/cached copy if exists and not expired.
- In get flight schedules:
    - Return remote copy.

Remote data source””

The remote data source uses Okhttp or Retrofit API to call the Backend API.

Local data source””

The local data source uses both room database and shared preference to cache/add/update/delete data locally.



Dependency Injection

I've used **dagger** for dependency injection, also I've added different component and modules for test layer.

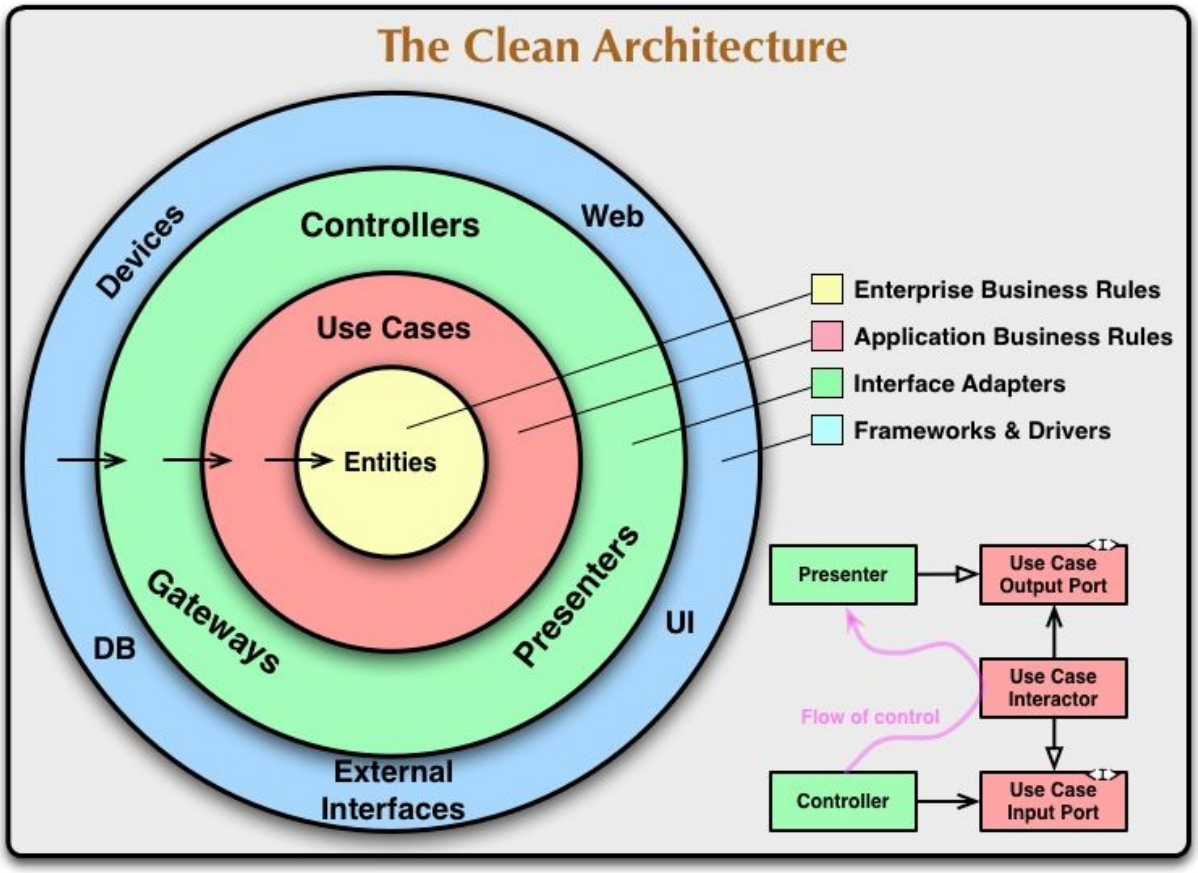
Testing

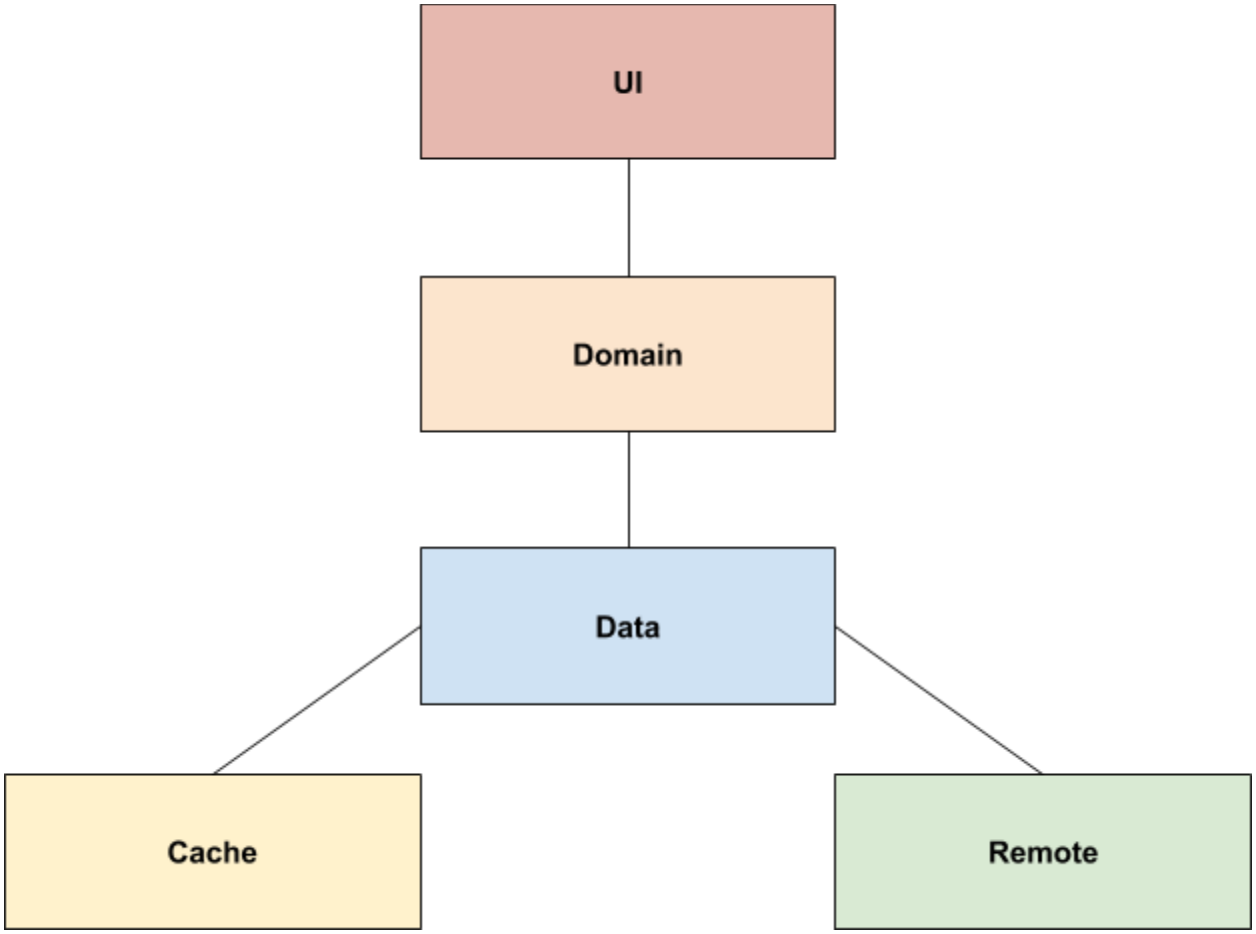
I have included the required Instrumentation, Unit and UI tests with the project:

- Unit tests for most of the app classes.
- Integration tests for testing integration between layers components and the layer itself.
- Ui tests using Espresso.

Architecture

I have used a custom version of **clean architecture** with **MVVM,** which has some of clean architecture principles except layer independence, as I've used data layer models across the domain and ui layer.





MVVM

The MVVM architecture.

- **Model**: refers either to a domain model, or to the data access layer.
- **View**: refers to the UI.
- **View model**: is an abstraction of the view exposing public properties and commands. It has a binder, which automates communication between the view and its bound properties in the view model.

Why MVVM?

- **A good event-driven architecture**: ViewModel exposes streams of events to which the Views can bind to.

- A **one-to-many relation** between View and ViewModel, it uses data binding to ensure that the View and ViewModel remain in sync bi-directionally.

- **Testability**: since presenters are hard bound to Views, writing unit test becomes slightly difficult as there is a dependency of a View. ViewModels are even more Unit Test friendly.

Libraries

- Common Android support libraries - Packages in the com.android.support.* namespace provide backwards compatibility and other features.

- AndroidX Library - AndroidX is a major improvement to the original Android Support Library. Like the Support Library, AndroidX ships separately from the Android OS and provides backwards-compatibility across Android releases. AndroidX fully replaces the Support Library by providing feature parity and new libraries.
- Mockito - A mocking framework used to implement unit tests.
- Play-services - for google maps support.
- Dagger - for dependency Injection
- Gson - a json serialize and deserialize library.
- RxJava - Reactive Extensions for the JVM – a library for composing asynchronous and event-based programs using observable sequences for the Java VM.
- Okhttp - An HTTP+HTTP/2 client for Android and Java applications.
- Hamcrest - Junit Matchers
- MockWebServer - A scriptable web server for testing HTTP clients.
- Retrofit - A type-safe HTTP client for Android and Java.
- Android Architecture Components - LiveData & ViewModel.

Thank you.