Firestore

CS360 SPRING 2026

Adapted from CMPUT 301 – Software Engineering (University of Alberta)

Preparations

1. Fork the starter code repo from github
2. Clone the repo
3. Open Android Studios and initialize the project

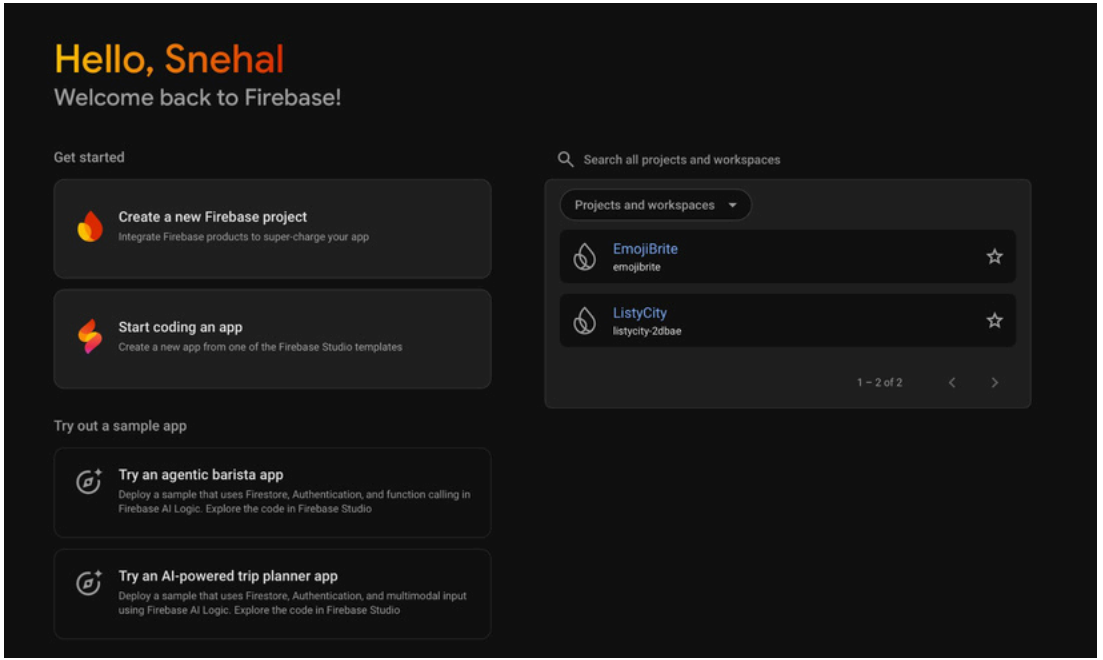
The First Look

- The project continues where we left off
- A list of cities and province abbreviations with the ability to
  - Add city
  - Edit an existing city

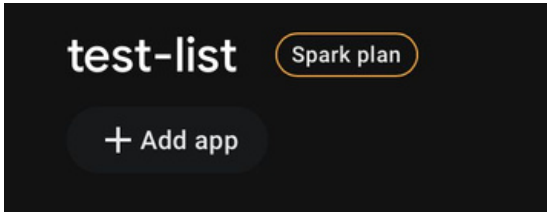
- What we are going to do:
  - Sendthisdatato thecloud(FireStore)
  - Synchronize after each action
  - TODO: introduce Delete action

Create a Firestore project

1. Go to https://console.firebase.google.com/ : The firestore website
2. Sign in
3. Create a project

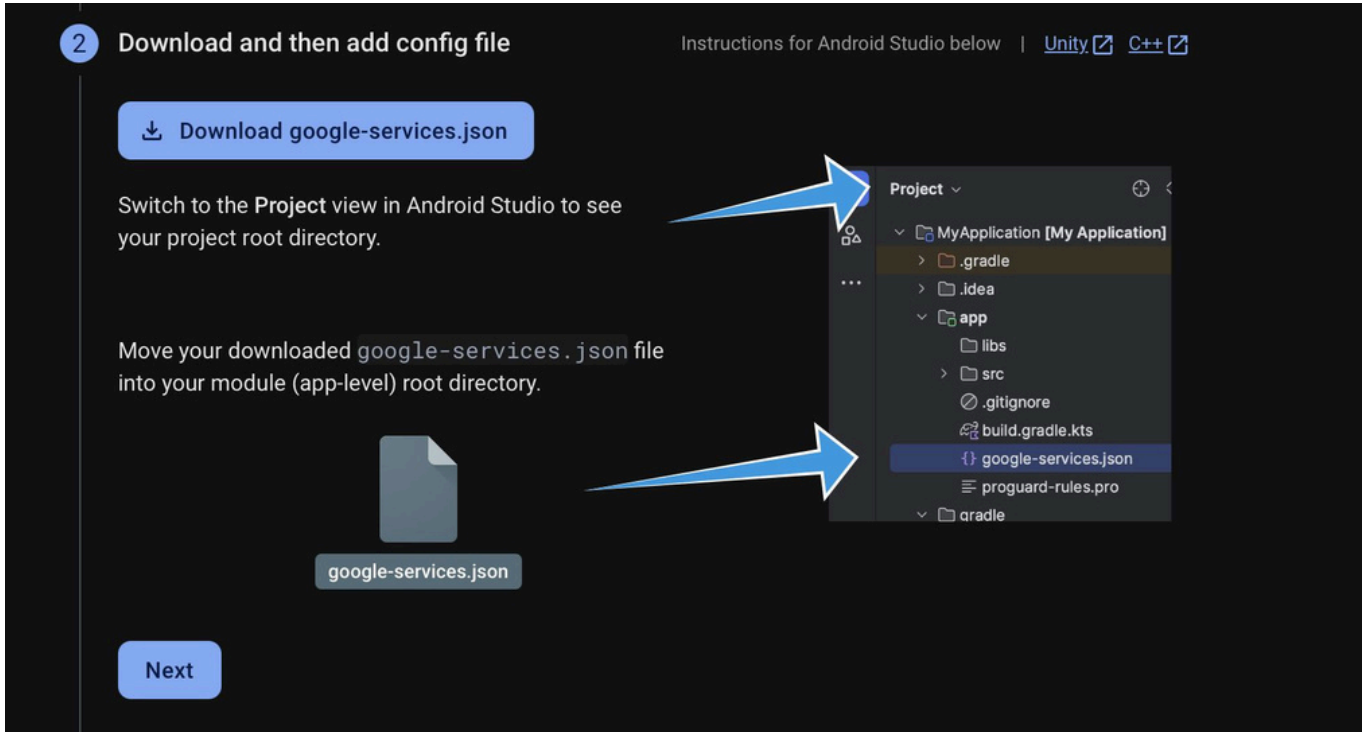


- Input the project name (the name is arbitrary)

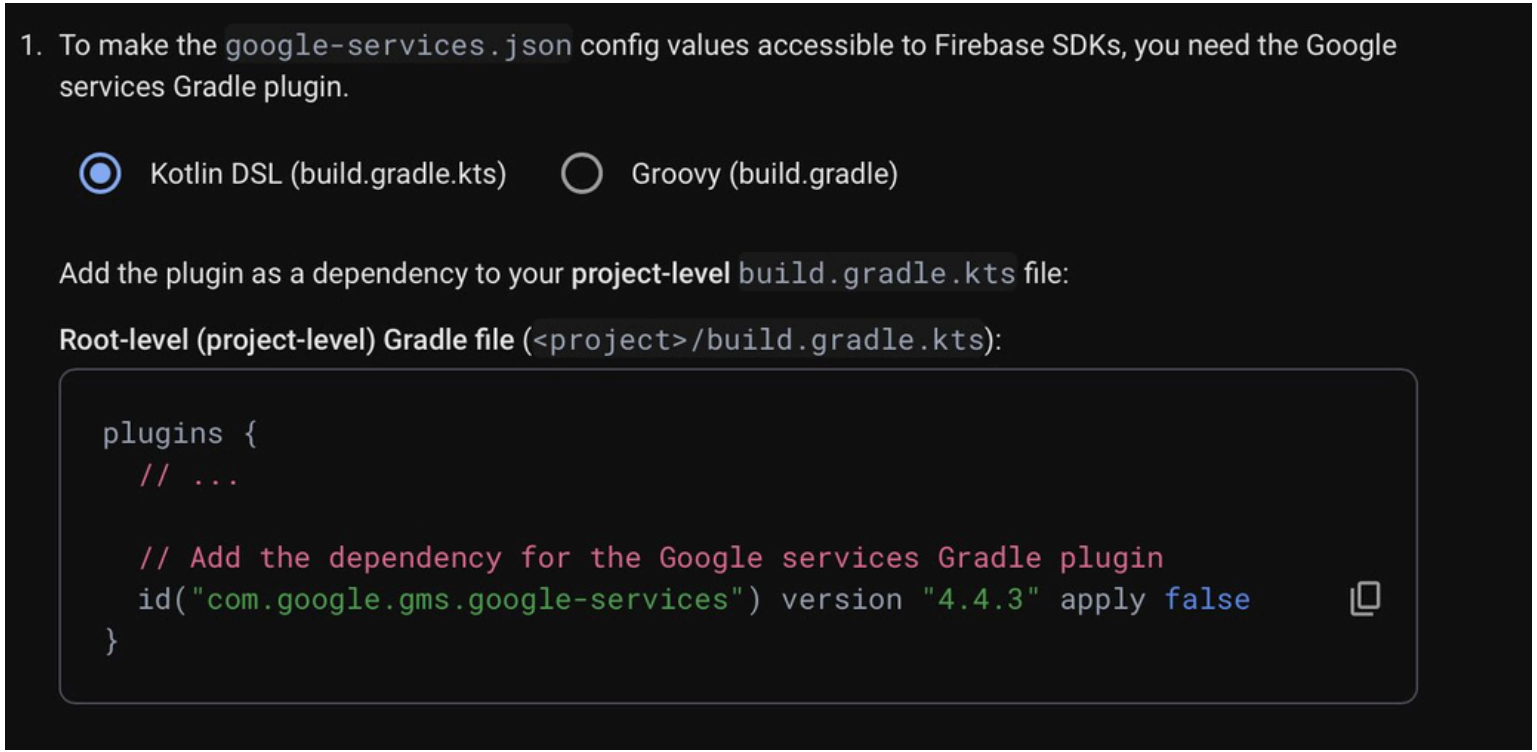


- Click on Add App and then click on android

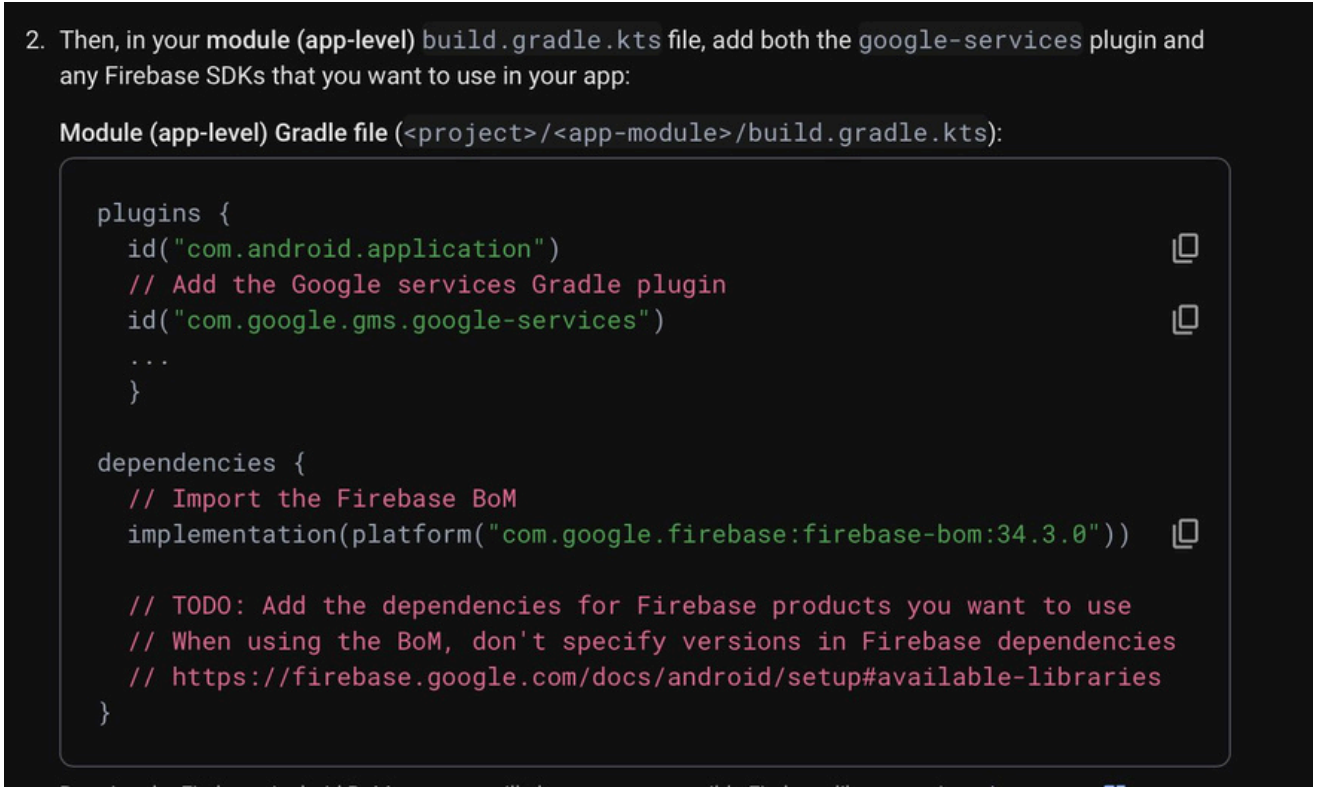
- Android project name: **com.example.lab5_starter**
- You should be able to download a google-services.json file



- Insert the google-services plugin in the project-level Gradle file



- Insert the google-services plugin and firebase dependencies to the app-level Gradle file



2. Then, in your **module (app-level)** `build.gradle.kts` file, add both the `google-services` plugin and any Firebase SDKs that you want to use in your app:

Module (app-level) Gradle file (`<project>/<app-module>/build.gradle.kts`):

```
plugins {
  id("com.android.application")
  // Add the Google services Gradle plugin
  id("com.google.gms.google-services")
  ...
  }

dependencies {
  // Import the Firebase BoM
  implementation(platform("com.google.firebase:firebase-bom:34.3.0"))

  // TODO: Add the dependencies for Firebase products you want to use
  // When using the BoM, don't specify versions in Firebase dependencies
  // https://firebase.google.com/docs/android/setup#available-libraries
}
```

Add Firebase to the Application (summarized)

1. After downloadingthe google-service.json,move thefileto the ListyCity/app/ folder in
2. your Android Studios
3. On Android Studios, open *build.gradle.kts (project: ListyCity)* and add
4. `id("com.google.gms.google-services") version "4.4.3" apply false` **inside**
5. Open *build.gradle.kts (Module:app)*
   Add `id("com.google.gms.google-services")` **inside plugins**
   Inside dependencies, add these 2 implementations:

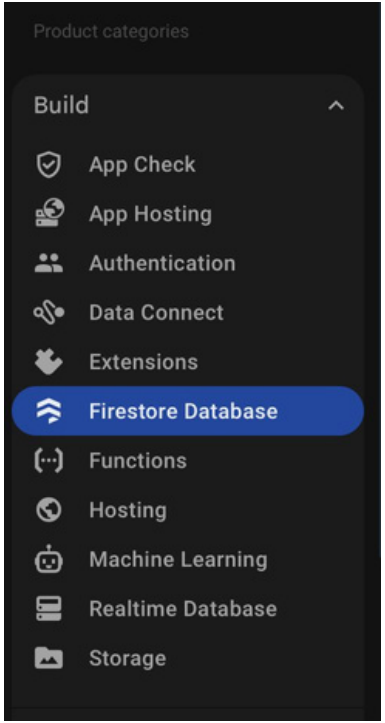
   ```
   implementation(platform("com.google.firebase:firebase-bom:34.3.0"))

   implementation("com.google.firebase:firebase-firestore")
   ```

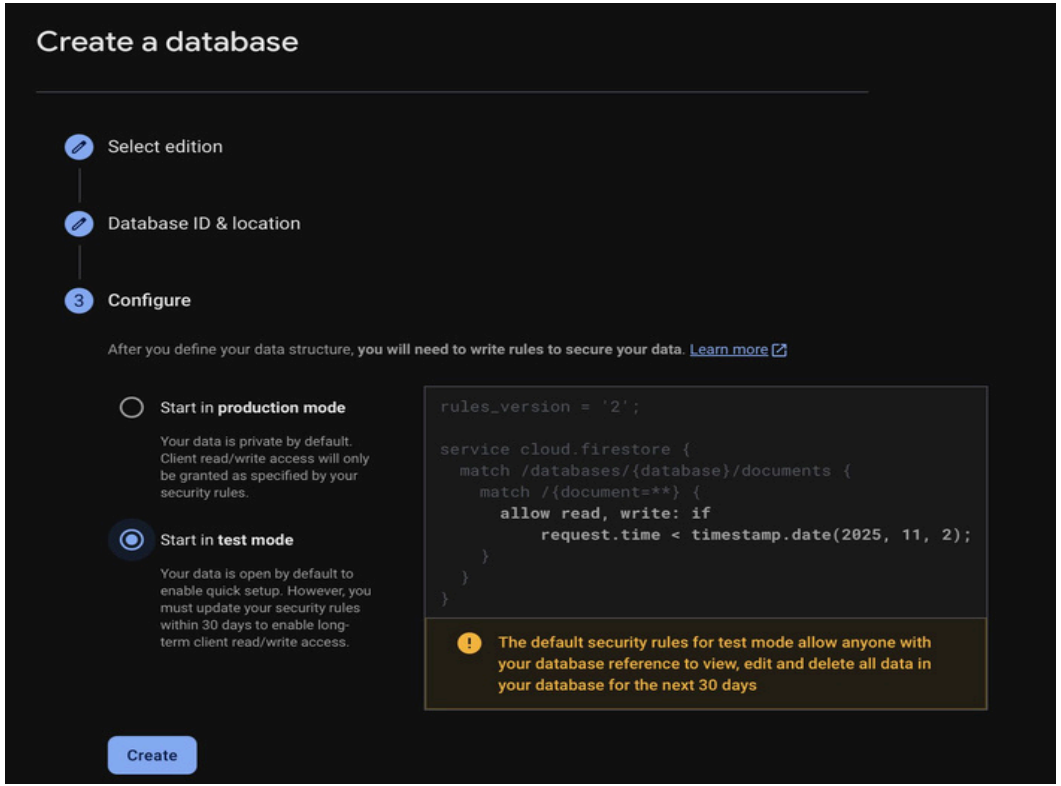
6. Sync

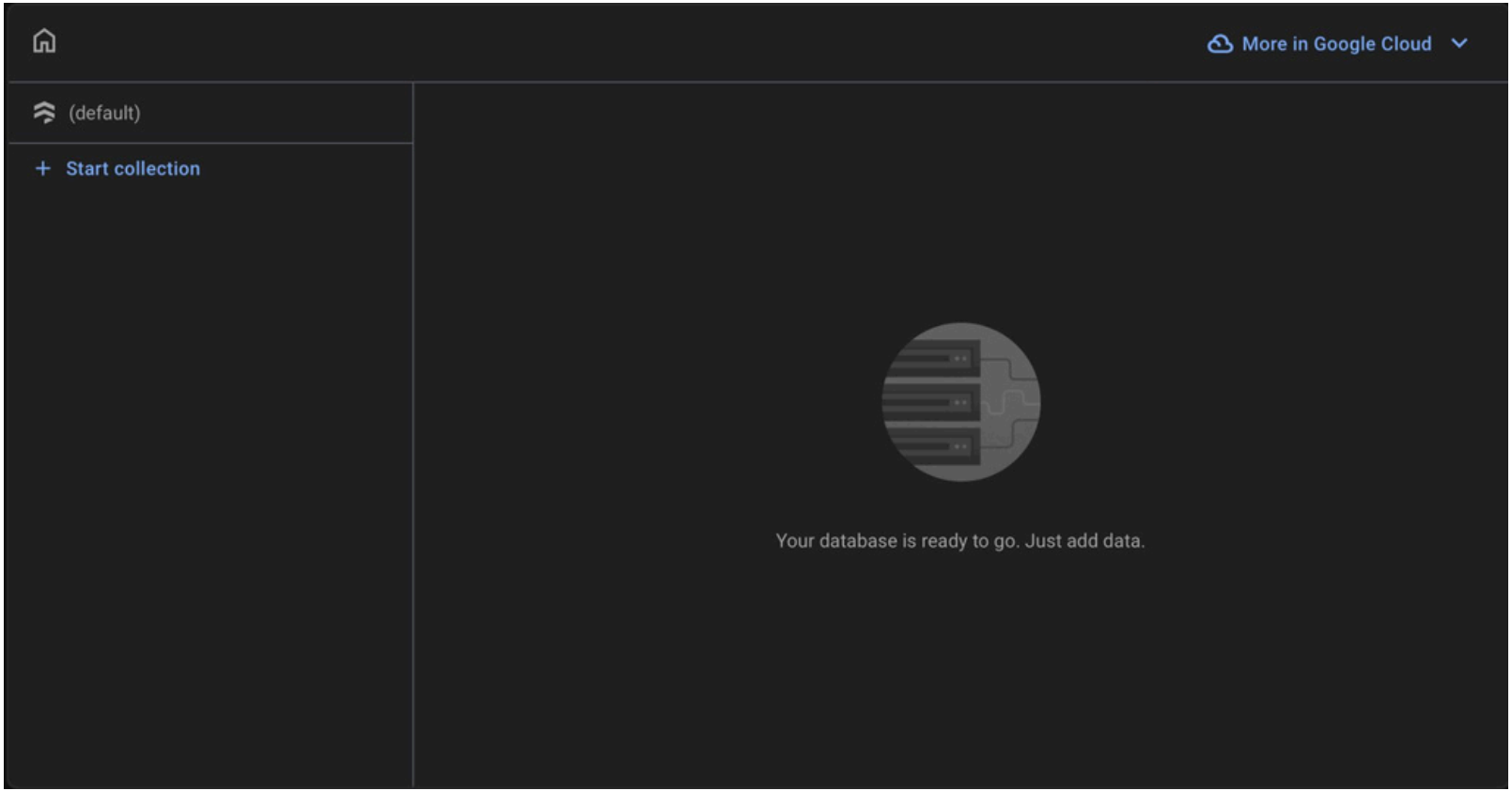
Create a Firestore Database

1. On the left, under “Product Categories”, Choose “Build -> Firestore Database”
2. Click “Create Database”
3. Select everything as given (Id and location)
4. Choose “Start in test mode”
5. You should see an empty database

Create a Firestore Database






More in Google Cloud
(default)
Start collection
Your database is ready to go. Just add data.

Use Firestore Database in MainActivity

- Removethehard-coded data inthelist (Remove the call to the addCitiesInit method in onCreate method of `MainActivity`).
- Add Firestore instance in MainActivity.java.

```
1 usage
private FirebaseFirestore db;

@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);

    // Rest of the code

    db = FirebaseFirestore.getInstance();
```

Adding Collection Reference

- Geta collectionreference,inthislab, we store all data in a collection called “*cities*”.

```
2 usages
private FirebaseFirestore db;
1 usage
private CollectionReference citiesRef;

@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);

    // Rest of the code

    db = FirebaseFirestore.getInstance();
    citiesRef = db.collection( collectionPath: "cities");
```

Adding Snapshot Listener to the Collection

```
db = FirebaseFirestore.getInstance();
citiesRef = db.collection( collectionPath: "cities");

citiesRef.addSnapshotListener(( QuerySnapshot value, FirebaseFirestoreException error) -> {
    if (error != null){
        Log.e( tag: "Firestore", error.toString());
    }
    if (value != null && !value.isEmpty()){
        cityArrayList.clear();
        for (QueryDocumentSnapshot snapshot : value){
            String name = snapshot.getString( field: "name");
            String province = snapshot.getString( field: "province");

            cityArrayList.add(new City(name, province));
        }
        cityArrayAdapter.notifyDataSetChanged();
    }
});
```

Modifying the AddCity method

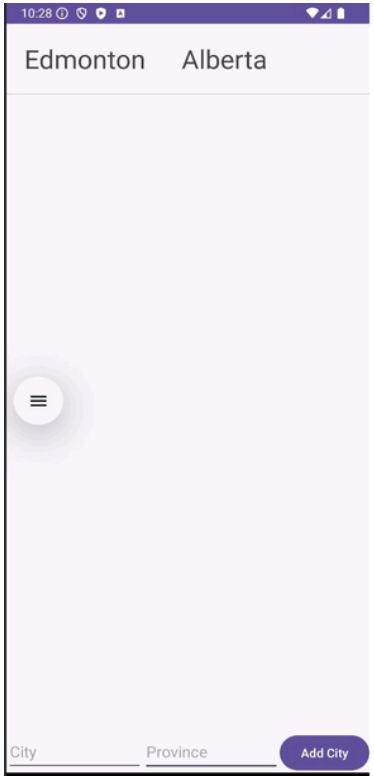
```
1 usage
@Override
public void addCity(City city){
    cityArrayList.add(city);
    cityArrayAdapter.notifyDataSetChanged();


    DocumentReference docRef = citiesRef.document(city.getName());
    docRef.set(city);
}
```

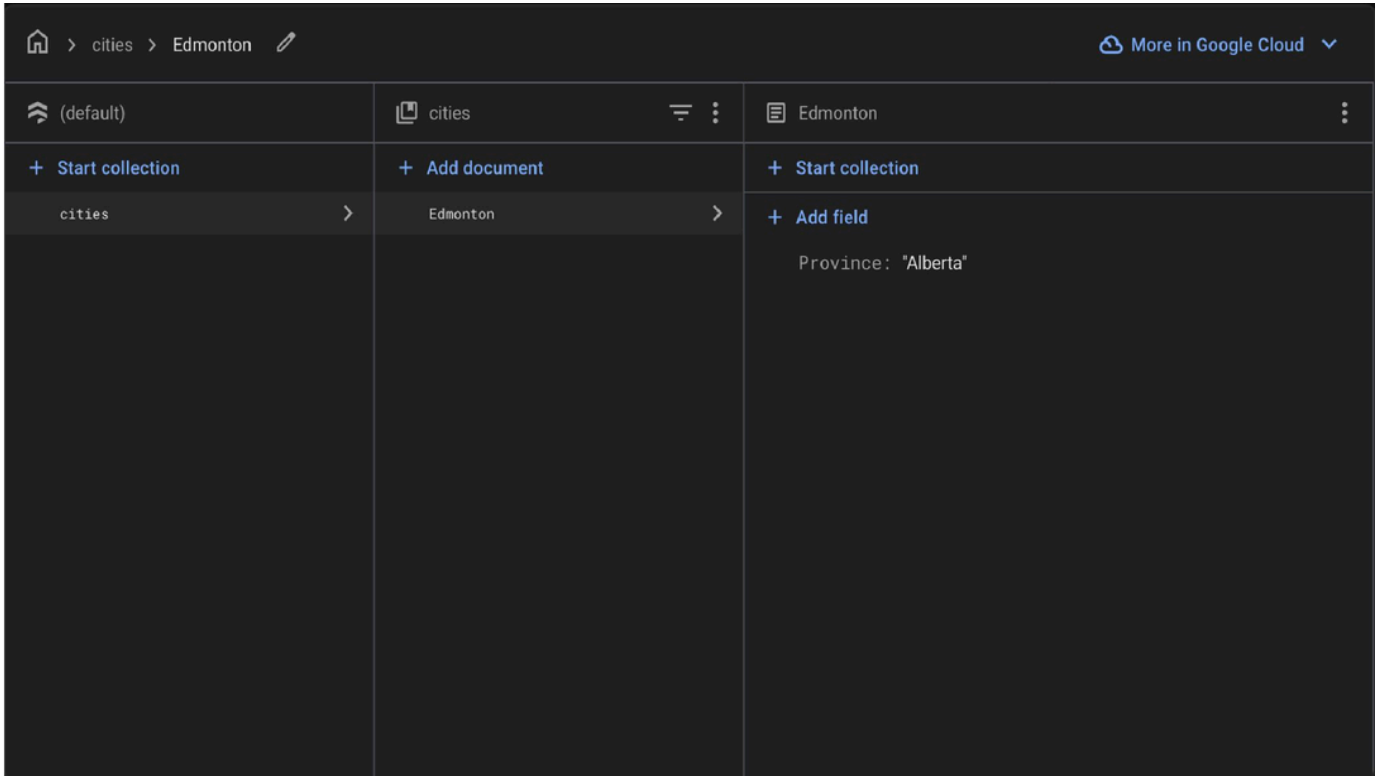
Optional: Logging

- Optionally, you can add listeners for logging while saving a city. You can find more listeners in the API references (link)

```
citiesRef
      .document(city.getCityName())
      .set(data)
      .addOnSuccessListener(new OnSuccessListener<Void>() {
            @Override
            public void onSuccess(Void aVoid) {
                  Log.d("Firestore", "DocumentSnapshot successfully written!");
            }
      });
```

Run The App


10:28
Edmonton
Alberta
City
Province
Add City


cities
Edmonton
More in Google Cloud
(default)
cities
Edmonton
Start collection
Add document
Start collection
cities
Edmonton
Add field
Province: "Alberta"

Lab 5 Participation Exercise

Task:Inthis exercise it is your task toadd theability to delete Cities and integrate this functionality with the Firestore database, allowing for the persistence of deletions.

- After applying the changes in the lab demo
- Add the ability to delete cities from the ListView and apply these same deletions to your instance of the Firestore database. If you have implemented this functionality correctly, restarting your app should not have an impact on what cities are displayed in your ListView after any addition or deletion actions.