COM413 – Mobile App Development – Workbook Practical 2

Introduction

In weeks 2/3 we worked on creating simple UIs within applications and adding functionality. We created and app which had more than one activity that had a multi-functioning interface: web search, phone call and SMS messaging. So now to move on from where we left off.

We will now create a login/register page and use SQLite to record the users and their data, so that they can log into the app.

Basic:
Create a login page, which will also allow users to register:

- Must use SQLite for this
- View the data using DB Browser

We will now create a login page with a separate Register Activity. Again, we will use SQLite to record the users and their data. But we will use the register button as an OnClickListerner to start a new activity called Register, this will open the register layout.

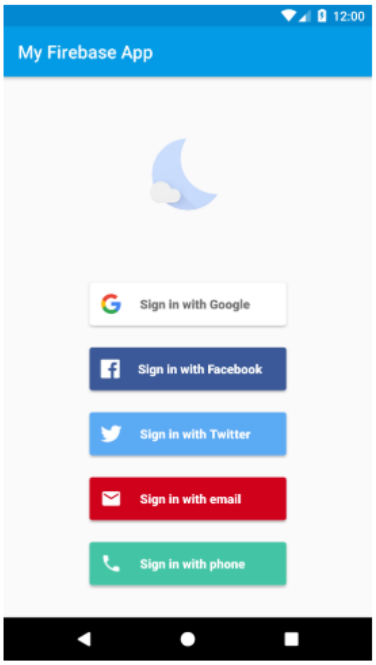
Advanced:
Connecting your app to Firebase
There is a lot of information regarding connecting Firebase to an android app, I will be going over this in the lecture. If you can set up Firebase and connect it to a new project, I will discuss how to use authentication on Friday and next week's Practical we will set-up Firebase Authentication.

Additional:
Connecting your Firebase to other login types.
The advanced functionality is to use Twitter or Facebook to Log in to your app.

Easily add sign-in to your Android app with FirebaseUI

FirebaseUI is a library built on top of the Firebase Authentication SDK that provides drop-in UI flows for use in your app. FirebaseUI provides the following benefits:

- **Multiple Providers** - sign-in flows for email/password, email link, phone authentication, Google Sign-In, Facebook Login, Twitter Login, and GitHub Login.
- **Account Management** - flows to handle account management tasks, such as account creation and password resets.
- **Account Linking** - flows to safely link user accounts across identity providers.
- **Anonymous User Upgrading** - flows to safely upgrade anonymous users.
- **Custom Themes** - customize the look of FirebaseUI to match your app. Also, because FirebaseUI is open source, you can fork the project and customize it exactly to your needs.
- **Smart Lock for Passwords** - automatic integration with Smart Lock for Passwords for fast cross-device sign-in.



Advanced Functionality:

Firebase

Easily add sign-in to your Android app with FirebaseUI

FirebaseUI is a library built on top of the Firebase Authentication SDK that provides drop-in UI flows for use in your app. FirebaseUI provides the following benefits:

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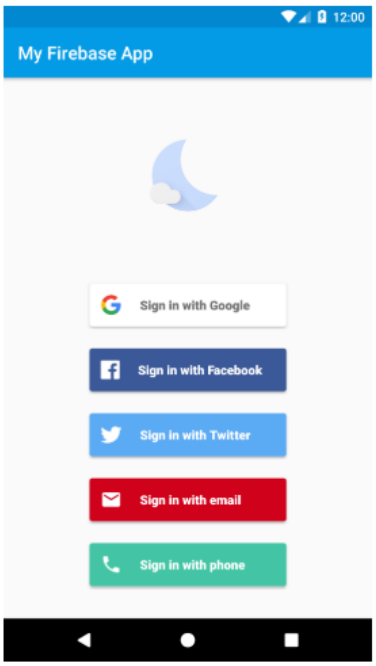

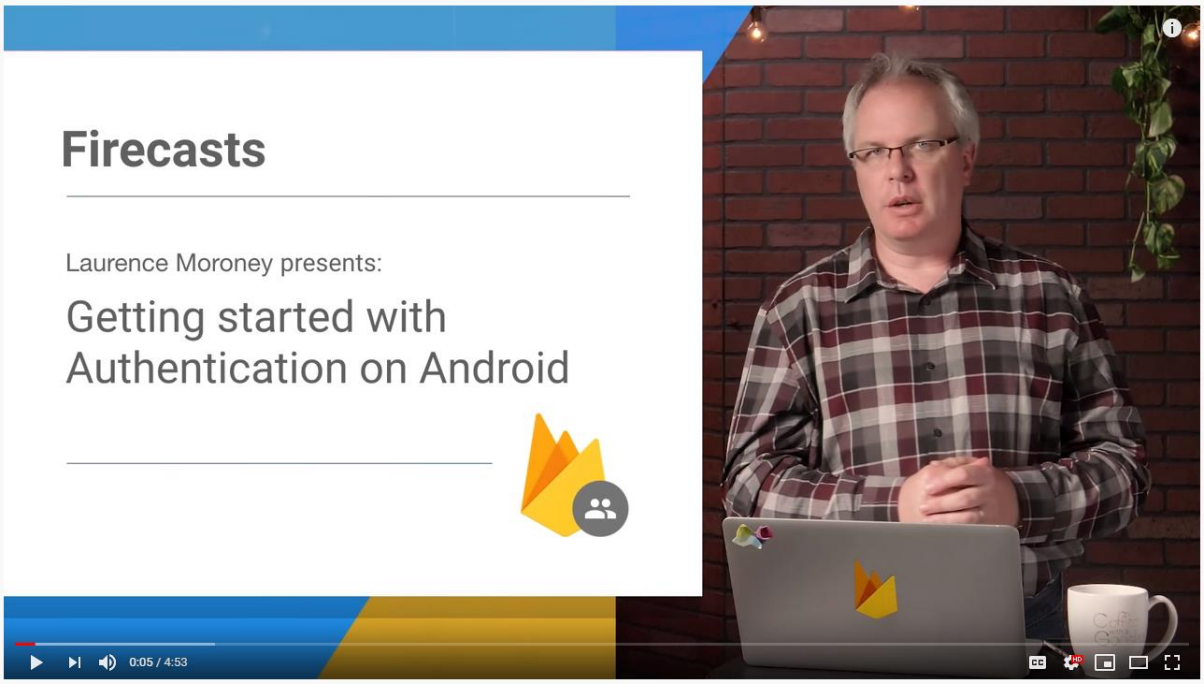

Getting Started with Firebase Auth on Android - Firecasts

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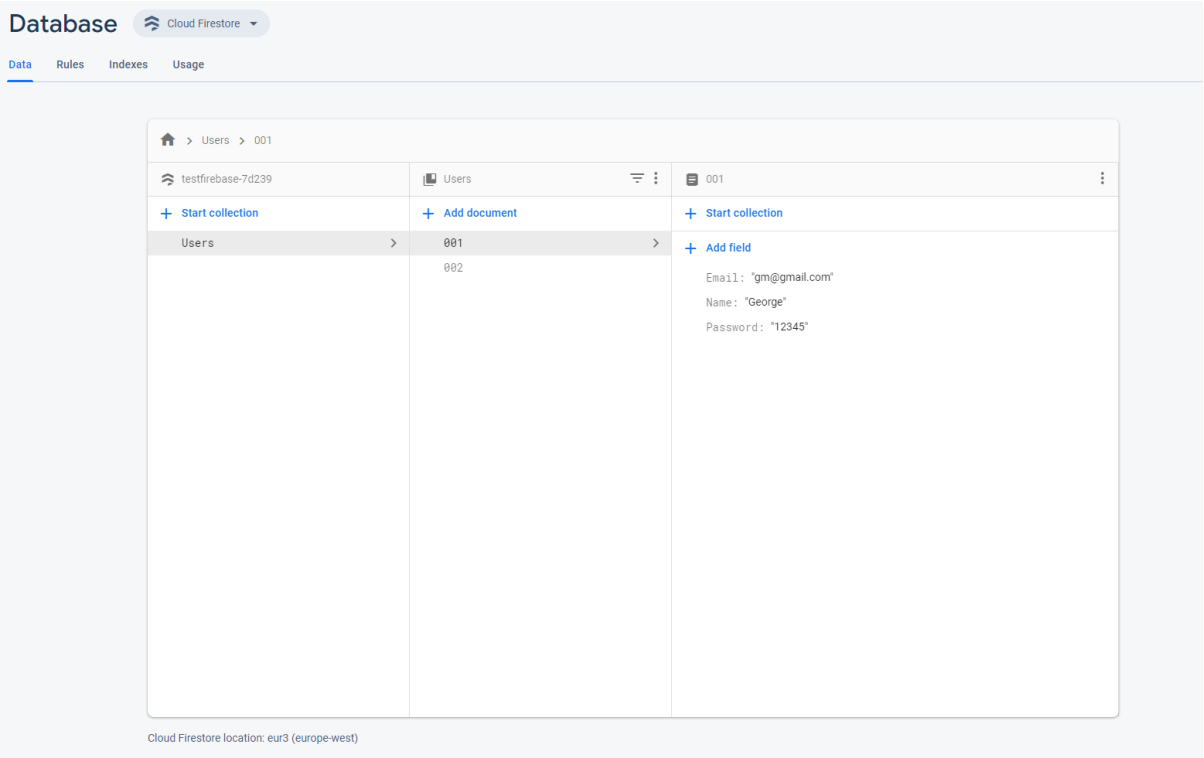
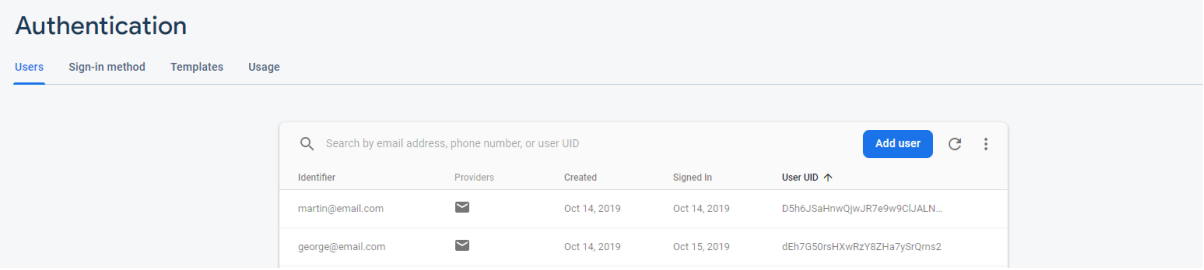
So, what is Firebase:

Firebase allows us to create a database and attach it to our project:



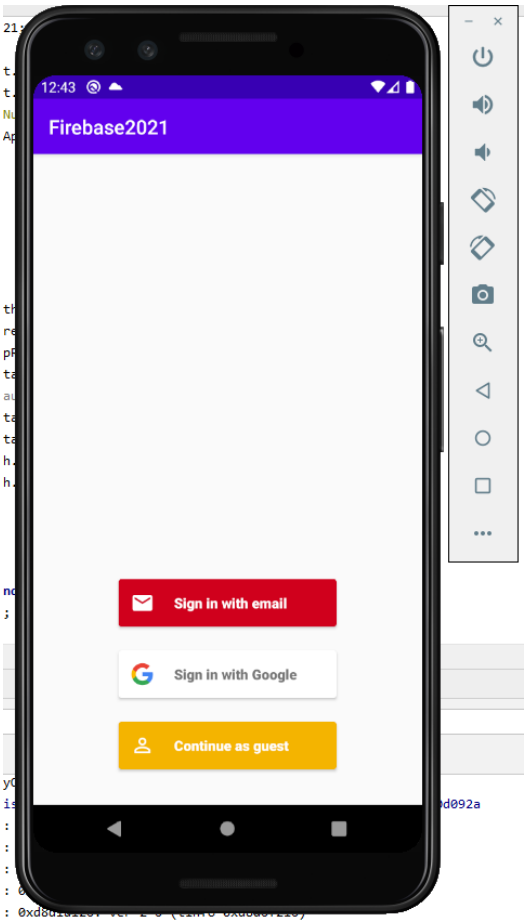
It also allows us to create authentication with emails:



Or use other accounts such as Gmail:

Sign-in providers

Provider	Status
Email/Password	Enabled
Phone	Disabled
Google	Enabled
Play Games	Disabled
Game Center Beta	Disabled
Facebook	Disabled
Twitter	Disabled
GitHub	Disabled
Yahoo	Disabled
Microsoft	Disabled
Anonymous	Disabled



First of all go to **Firebase and use your gmail account to log in.**

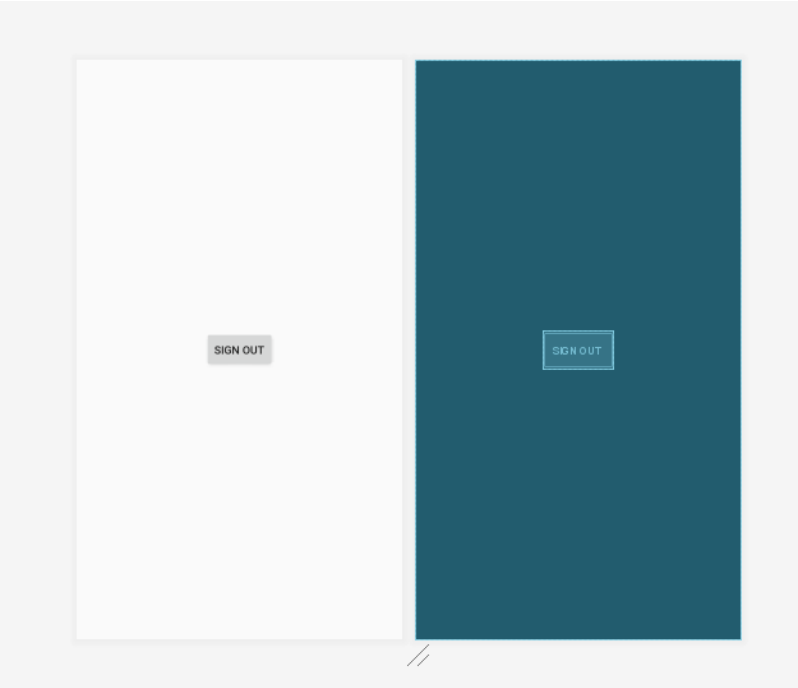
If you don't have a gmail, create one.

We will create our Firebase through Android, this seems to be the best way.

So, getting started with Firebase:

First start with a new project and choose Empty Activity.

We will add a button named btnSignout on the XML layout to the Android project like this:

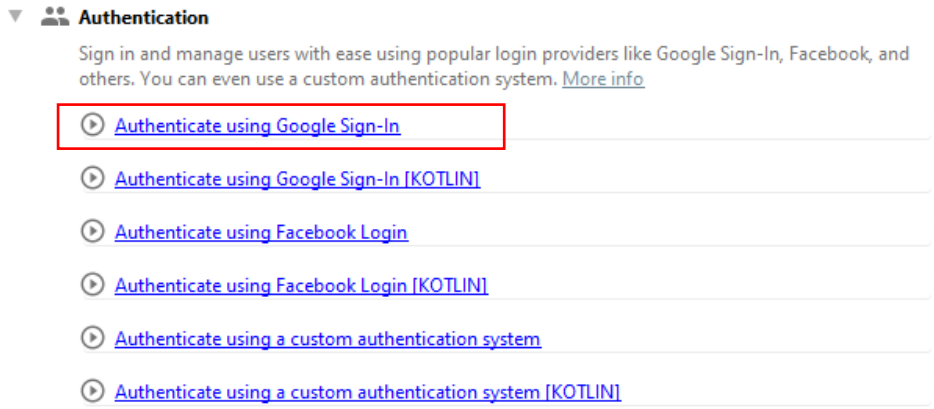


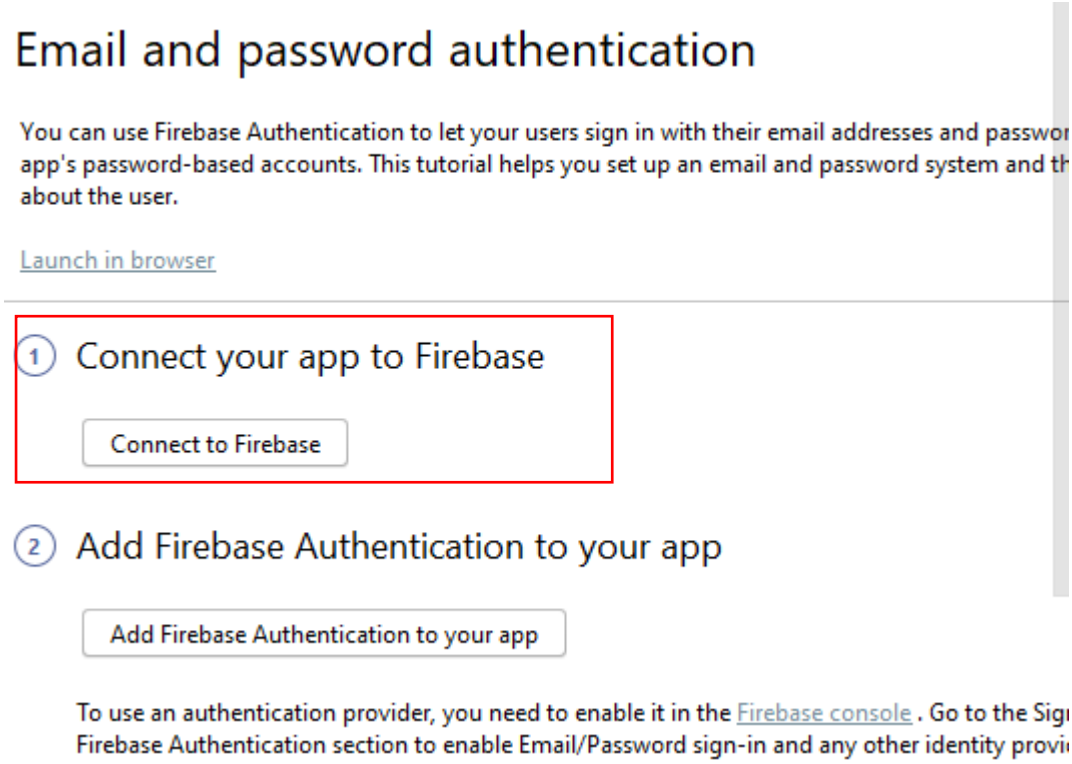
Next, we will create a Firebase account.

To do this, go to **Tools** and click **Firebase**:

You will open the following:

Open **Authentication -> Authenticate using Google Sign-In:**

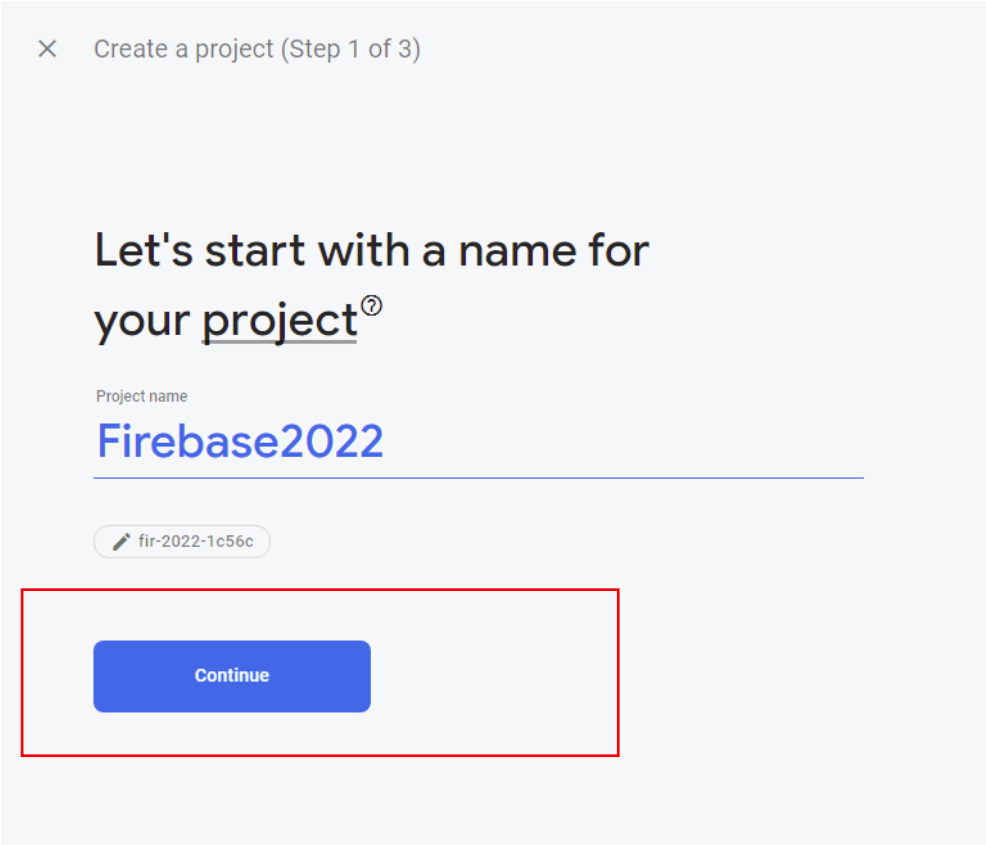




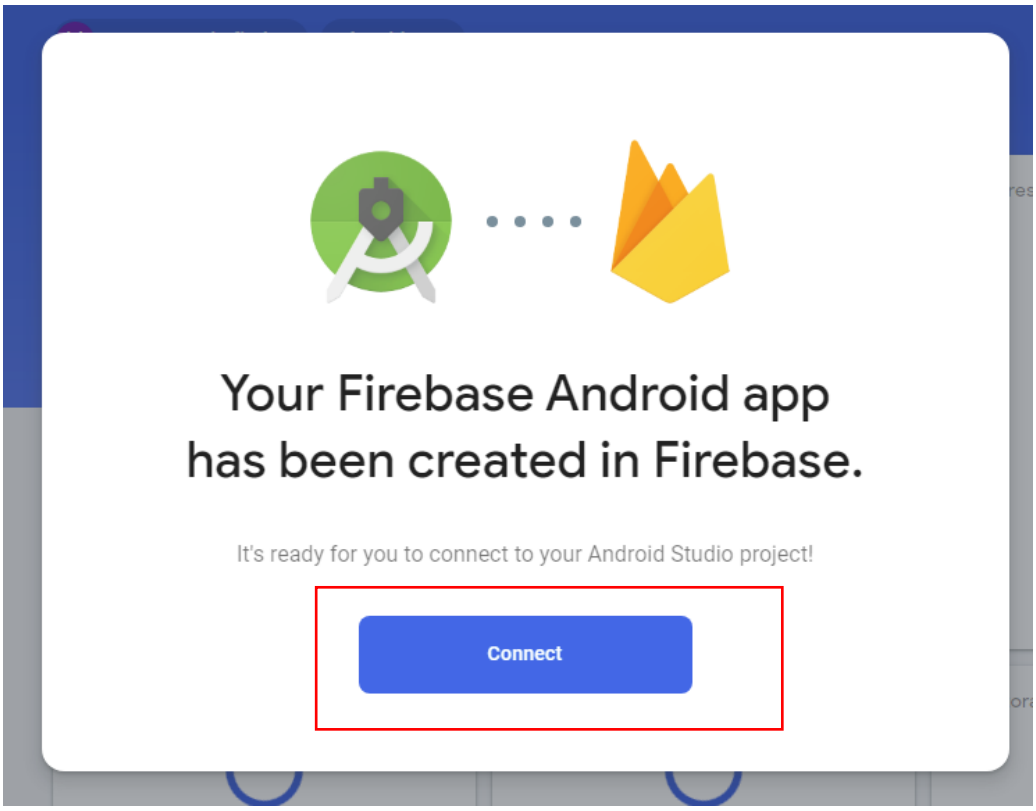
And Click connect to **Firebase**:

This window will open and ask you to connect to an existing project or create a new project.

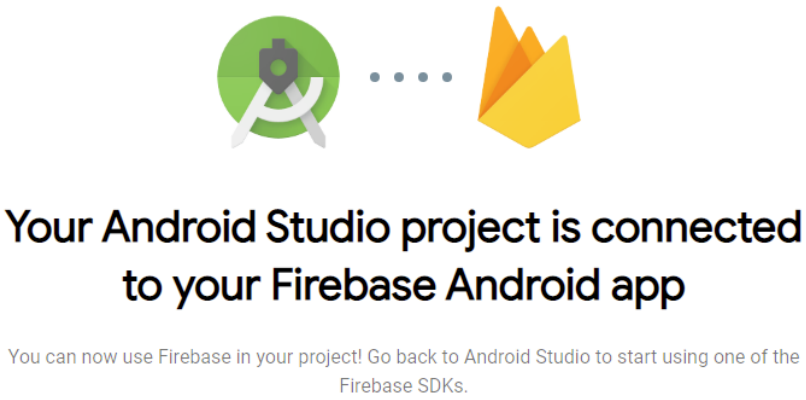
Click **Create New** and give it a **name before pressing continue**:



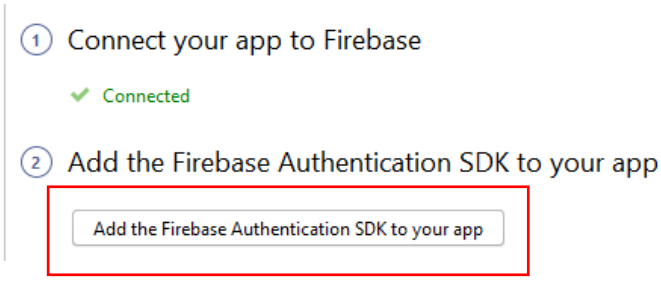
If you go to your **Firebase** account, you should see the new project in your **Firebase** console:



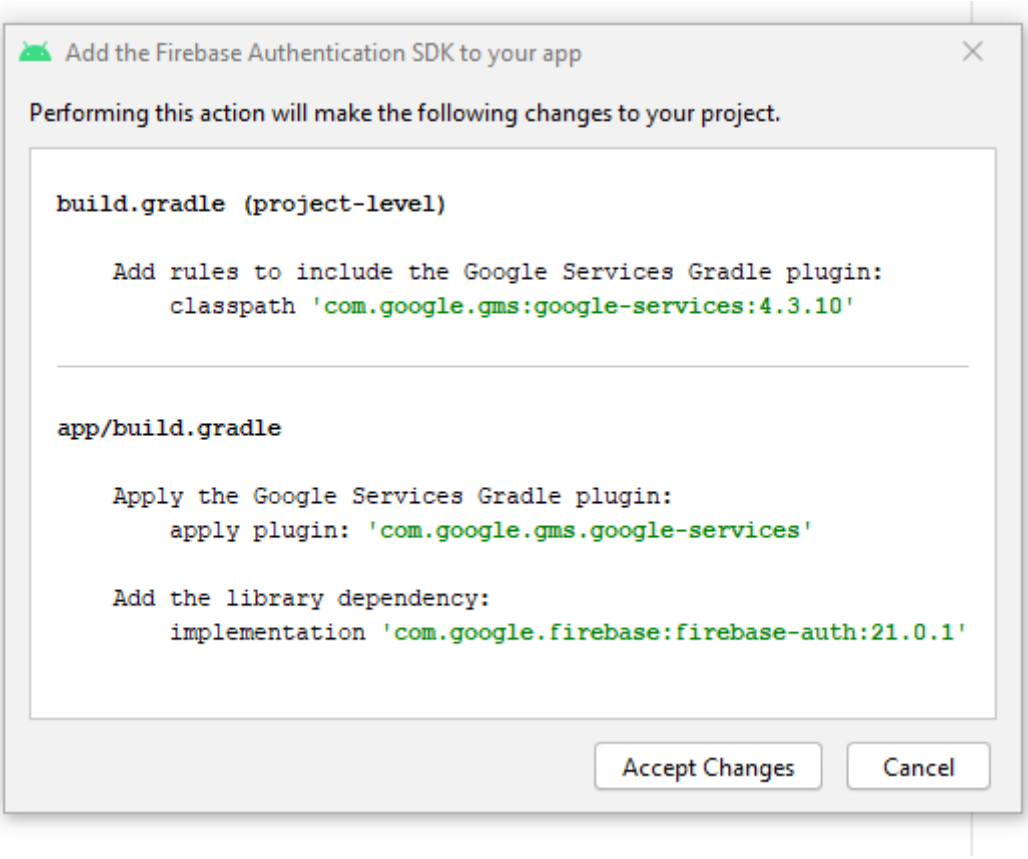
Click Connect:



This will appear in the **Firebase Assistant,** and click **add the Firebase Authentication:**



This will add the following to the build gradle:

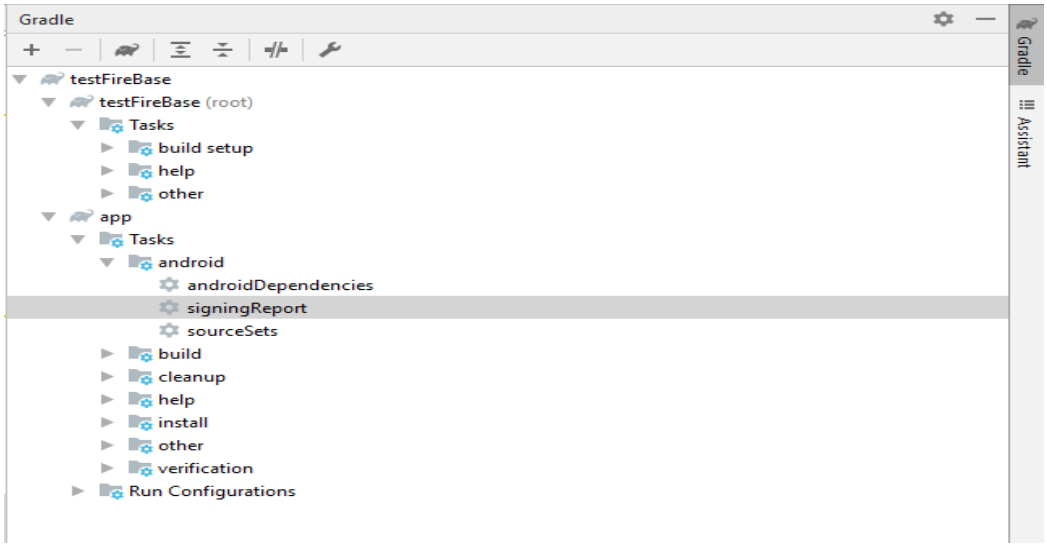


Click Accept changes and move to step 3:

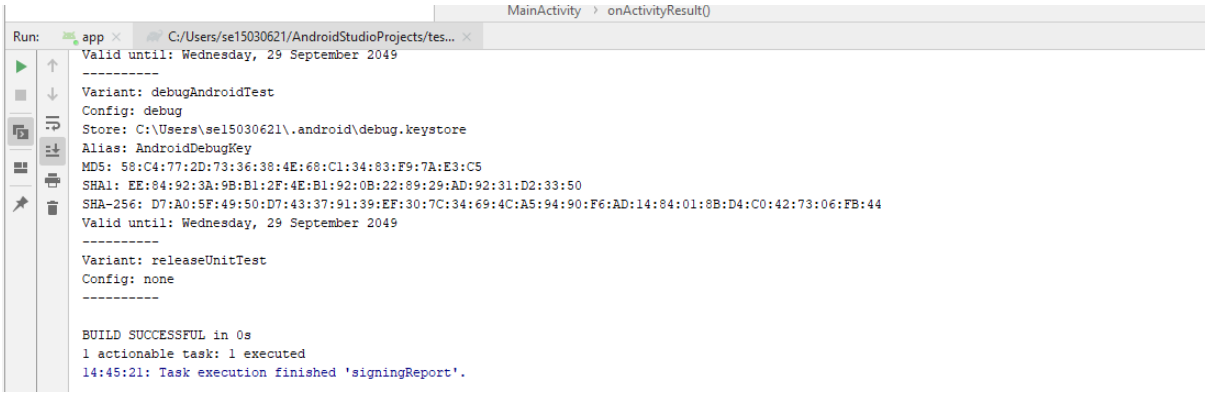
③ Complete your set up in the Firebase console

- If you haven't yet, specify your app's SHA-1 fingerprint. You can do this in your Project settings in the Firebase console. Refer to Authenticating Your Client for details on how to get your app's SHA-1 fingerprint.
- To use an authentication provider, you need to enable it for your Firebase project. Enable **Google** (Google Sign-In) in the Sign-in method tab of the Firebase Authentication section of the Firebase console.

Sometimes Google has trouble connecting the files, to generate an SHA1 key do the following, click Gradle top right hand side and go to **Tasks->android->signingreport:**

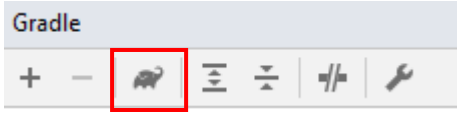


If we click SigningReport we generate our SHA-1 fingerprint:



You can also generate this without going to tasks:

Click gradle in the top right and press the little elephant button:

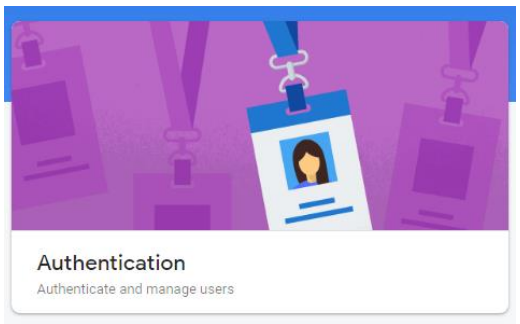


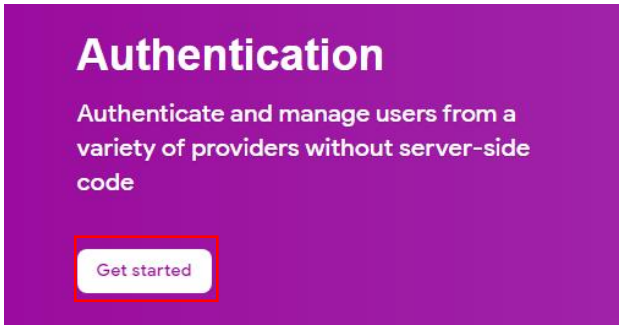
A window appears and will allow you to type: gradle **signingreport**. The Gradle will be autofilled so just write **signingreport** and click **enter**. This will generate your SHA1 key:

```
> Task :app:signingReport
Variant: debugUnitTest
Config: debug
Store: C:\Users\Me\.android\debug.keystore
Alias: AndroidDebugKey
MD5: F4:76:73:AD:49:76:41:7B:05:6B:42:31:F9:2F:C3:44
SHA1: 4A:85:94:7E:20:92:57:8E:AC:00:36:E3:5D:0F:BA:A2:69:60:FB:21
SHA-256: 76:13:25:C9:0B:98:2C:60:9E:39:40:A2:13:A1:3C:6E:19:E3:26:86:A1:A4:8C:D7:15:4F:CF:B6:0C:58:78:98
Valid until: Sunday, 18 September 2050
```

Next go to **Firebase Console**.

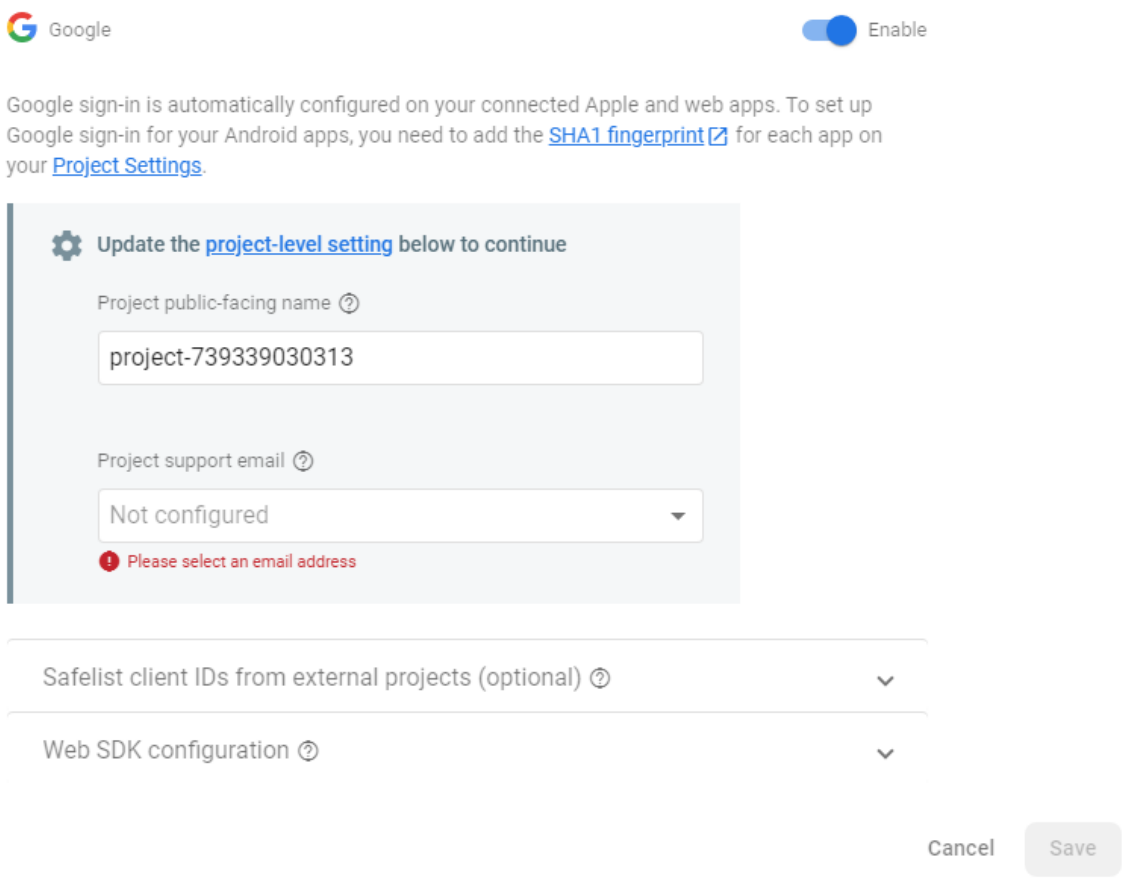
Click on your **New Firebase Project** and go to **Authentication -> Get Started**:





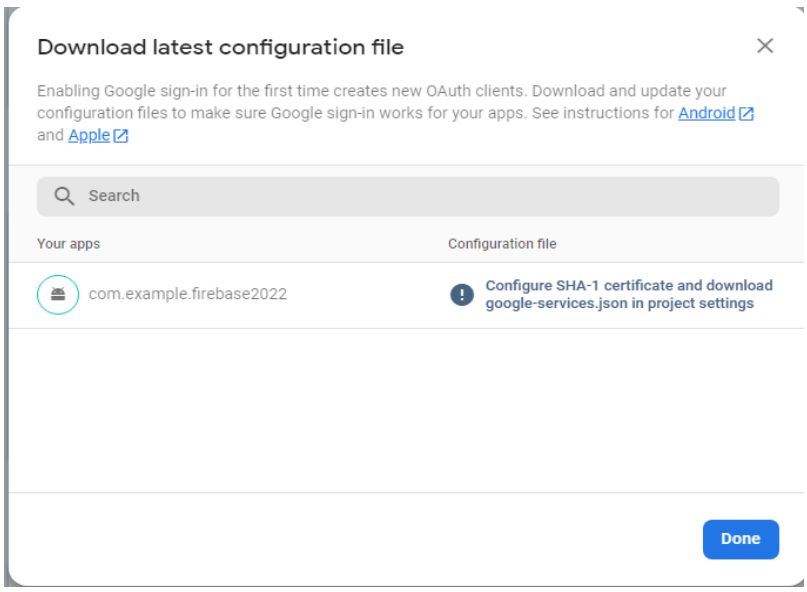
Firebase authentication:

From here, we can go into the project and find Authentication and enable **Email/Password**, **Google** and **Anonymous**:



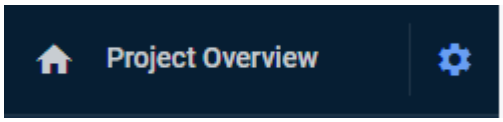
Google will ask for a project support email address, use the one you used to create the Firebase account. Click Save.

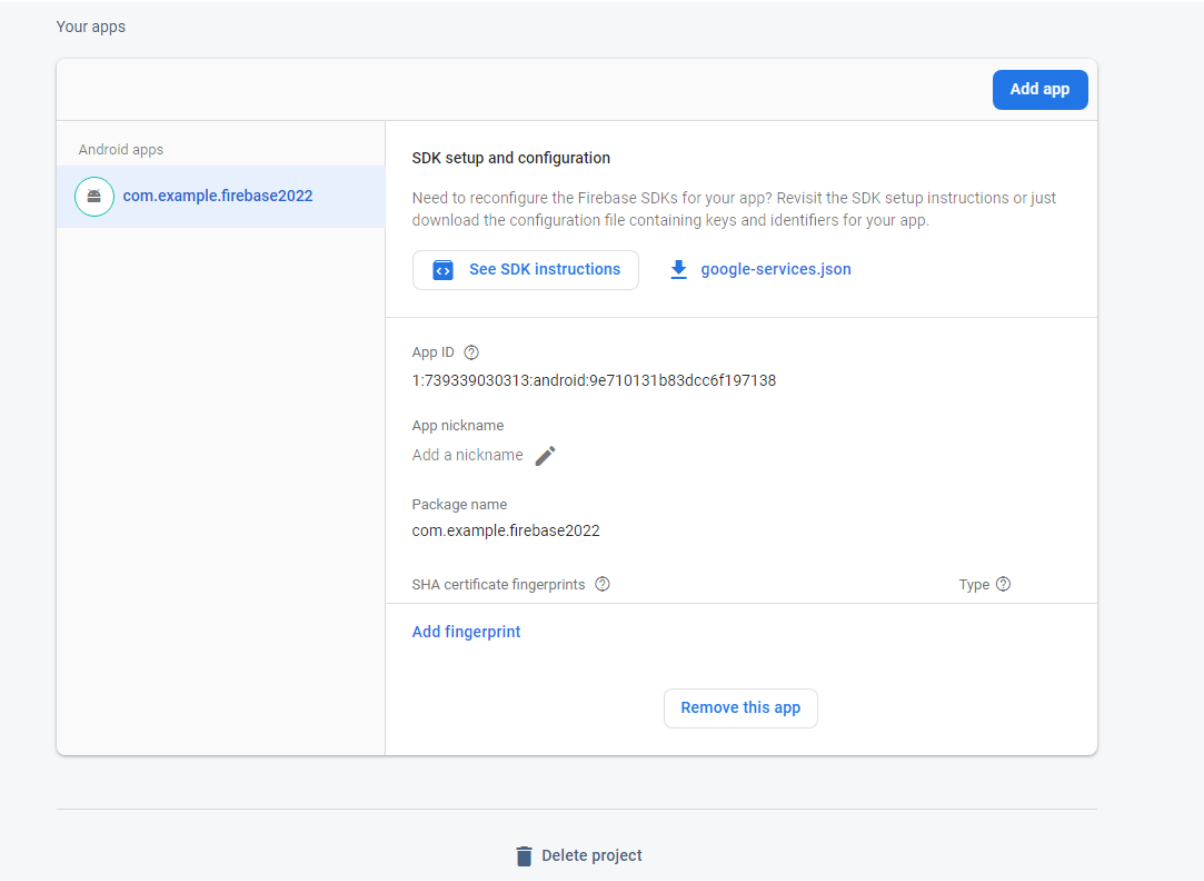
Next, we will see the following:



We now need to configure the SHA-1 key in Firebase.

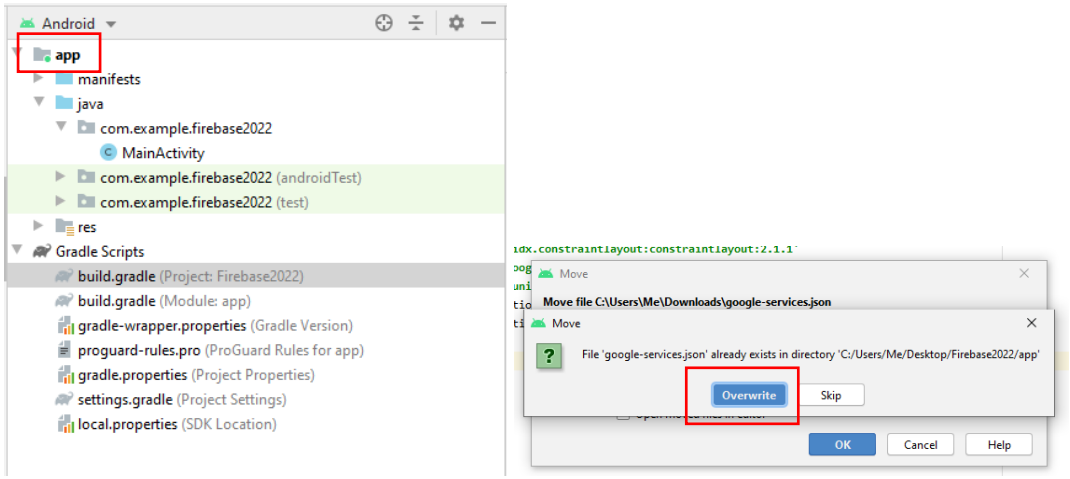
Go to **Project Overview** -> **settings**.





Add your SHA-1 key by clicking **Add fingerprint** and when this is done click the **google-services.json** to download our new config file.

Drag this file from **Downloads** into android studio, and copy to **app,** then **Overwrite** the previous version of the file:



Next, we will use the **Firebase** walkthrough found here:

https://firebase.google.com/docs/auth/android/google-signin

Java Android | Kotlin+KTX Android

```
dependencies {
    // Import the BoM for the Firebase platform
    implementation platform('com.google.firebase:firebase-bom:29.0.0')

    // Declare the dependency for the Firebase Authentication library
    // When using the BoM, you don't specify versions in Firebase library dependencies
    implementation 'com.google.firebase:firebase-auth'

    // Also declare the dependency for the Google Play services library and specify its versio
    implementation 'com.google.android.gms:play-services-auth:19.2.0'
}
```

Add these dependencies to your **build.gradle** and **sync**:

```
dependencies {
    implementation fileTree(dir: "libs", include: ["*.jar"])
    implementation 'androidx.appcompat:appcompat:1.3.1'
    implementation 'androidx.constraintlayout:constraintlayout:2.1.1'
    implementation 'com.google.firebase:firebase-auth:21.0.1'
    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'androidx.test.ext:junit:1.1.3'
    androidTestImplementation 'androidx.test.espresso:espresso-core:3.4.0'

    // Import the BoM for the Firebase platform
    implementation platform('com.google.firebase:firebase-bom:29.0.0')

    // Declare the dependency for the Firebase Authentication library
    // When using the BoM, you don't specify versions in Firebase library dependencies
    implementation 'com.google.firebase:firebase-auth'

    // Also declare the dependency for the Google Play services library and specify its version
    implementation 'com.google.android.gms:play-services-auth:19.2.0'
}
```

Next, go to this link:

https://firebase.google.com/docs/auth/android/firebaseui

This will give you a walkthrough and give you the code to implement the default Google login to your app. Add the first line to your dependencies:

```
dependencies {
    // ...

    implementation 'com.firebaseui:firebase-ui-auth:7.2.0'

    // Required only if Facebook login support is required
    // Find the latest Facebook SDK releases here: https://goo.gl/Ce5L94
    implementation 'com.facebook.android:facebook-android-sdk:8.x'
}
```

```
dependencies {
    implementation fileTree(dir: "libs", include: ["*.jar"])
    implementation 'androidx.appcompat:appcompat:1.3.1'
    implementation 'androidx.constraintlayout:constraintlayout:2.1.1'
    implementation 'com.google.firebase:firebase-auth:21.0.1'
    testImplementation 'junit:junit:4.12'
    androidTestImplementation 'androidx.test.ext:junit:1.1.3'
    androidTestImplementation 'androidx.test.espresso:espresso-core:3.4.0'

    // Import the BoM for the Firebase platform
    implementation platform('com.google.firebase:firebase-bom:29.0.0')

    // Declare the dependency for the Firebase Authentication library
    // When using the BoM, you don't specify versions in Firebase library dependencies
    implementation 'com.google.firebase:firebase-auth'
    implementation 'com.firebaseui:firebase-ui-auth:7.2.0'

    // Also declare the dependency for the Google Play services library and specify its version
    implementation 'com.google.android.gms:play-services-auth:19.2.0'
}
```

At the top of the file add the following:

```
compileOptions {
    sourceCompatibility JavaVersion.VERSION_1_8
    targetCompatibility JavaVersion.VERSION_1_8
}
```

It should look like this:

```
android {
    compileSdkVersion 30
    buildToolsVersion "30.0.2"

    compileOptions {
        sourceCompatibility JavaVersion.VERSION_1_8
        targetCompatibility JavaVersion.VERSION_1_8
    }

    defaultConfig {
        applicationId "com.example.firebase2022"
        minSdkVersion 29
        targetSdkVersion 30
        versionCode 1
        versionName "1.0"

        testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"
    }
```

That's our dependencies set up.

On to the **code**.

I use both links so be careful of the walkthrough you use here:

First, we want to add 2 global variables:

```
public class MainActivity extends AppCompatActivity {
    private FirebaseAuth mAuth;
    Button SignOut;
```

Under this we want to use a new activity lifecycle function called OnStart():

```
    @Override
    public void onStart() {
        super.onStart();
        // Check if user is signed in (non-null) and update UI accordingly.
        FirebaseUser currentUser = mAuth.getCurrentUser();
    }
```

This will get the current user when the app begins.

We then add a new ActivityResultLauncher. This will handle our logins to the app.

```
private final ActivityResultLauncher<Intent> signInLauncher = registerForActivityResult(
        new FirebaseAuthUIActivityResultContract(),
        new ActivityResultCallback<FirebaseAuthUIAuthenticationResult>() {
            @Override
            public void onActivityResult(FirebaseAuthUIAuthenticationResult result) {
                onSignInResult(result);
            }
        }
);
```

And then we get to our onCreate():

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    mAuth = FirebaseAuth.getInstance();
    createSignInIntent();

    SignOut = (Button)findViewById(R.id.btn_signOut);
    SignOut.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) { signOut(); }
    });
}
```

Get the firebaseAuth to grab the current user and set up our button with an onClickListener which calls a function signOut(); All together it looks like this:

```
public class MainActivity extends AppCompatActivity {
    private FirebaseAuth mAuth;
    Button SignOut;

    @Override
    public void onStart() {
        super.onStart();
        // Check if user is signed in (non-null) and update UI accordingly.
        FirebaseUser currentUser = mAuth.getCurrentUser();
    }

    private final ActivityResultLauncher<Intent> signInLauncher = registerForActivityResult(
            new FirebaseAuthUIActivityResultContract(),
            new ActivityResultCallback<FirebaseAuthUIAuthenticationResult>() {
                @Override
                public void onActivityResult(FirebaseAuthUIAuthenticationResult result) {
                    onSignInResult(result);
                }
            }
    );

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        mAuth = FirebaseAuth.getInstance();
        createSignInIntent();

        SignOut = (Button)findViewById(R.id.btn_signOut);
        SignOut.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) { signOut(); }
        });
    }
```

Now, under our onCreate() we will create 3 functions.

CreateSigninIntent:

```
public void createSignInIntent() {
    // Choose authentication providers
    List<AuthUI.IdpConfig> providers = Arrays.asList(
            new AuthUI.IdpConfig.EmailBuilder().build(),
            new AuthUI.IdpConfig.GoogleBuilder().build(),
            new AuthUI.IdpConfig.AnonymousBuilder().build());

    // Create and launch sign-in intent
    Intent signInIntent = AuthUI.getInstance() AuthUI
            .createSignInIntentBuilder() AuthUI.SignInIntentBuilder
            .setAvailableProviders(providers)
            .build();
    signInLauncher.launch(signInIntent);
}
```

onSignInResult:

```
private void onSignInResult(FirebaseAuthUIAuthenticationResult result) {
    IdpResponse response = result.getIdpResponse();
    if (result.getResultCode() == RESULT_OK) {
        //Successfully signed in
        FirebaseUser user = FirebaseAuth.getInstance().getCurrentUser();
        Toast.makeText( context: this, user.getEmail(), Toast.LENGTH_SHORT).show();
    } else {
        // Sign in failed. If response is null the user canceled the
        Toast.makeText( context: this,  text: "Failed Login", Toast.LENGTH_SHORT).show();
    }
}
```

signOut:

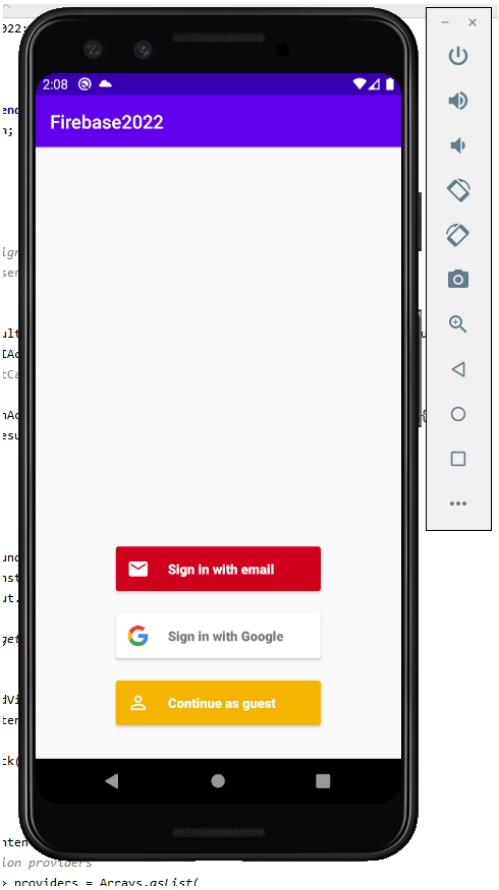
```
private void signOut() {
    AuthUI.getInstance()
            .signOut( context: this)
            .addOnCompleteListener(new OnCompleteListener<Void>() {
                public void onComplete(@NonNull Task<Void> task) { createSignInIntent(); }
            });
}
```

All together this should look like the following:

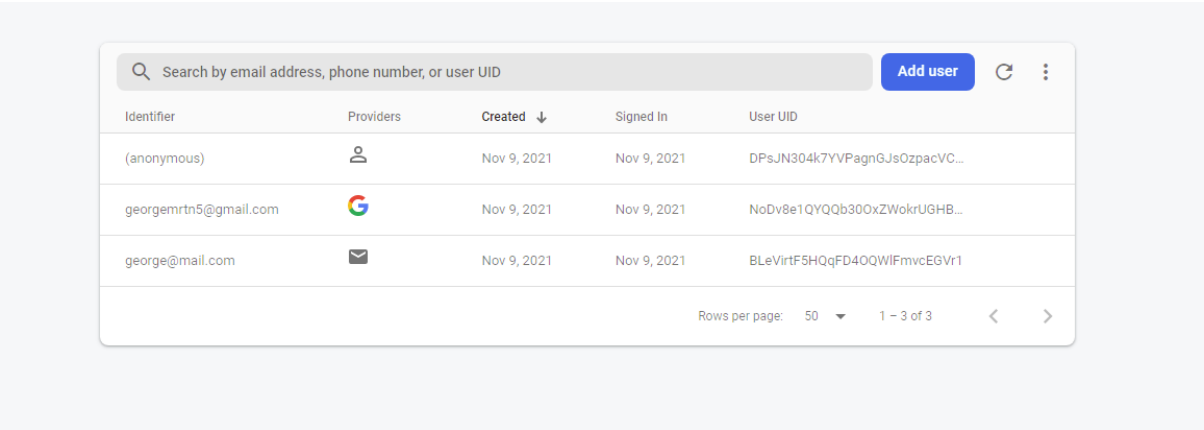
```java
public class MainActivity extends AppCompatActivity {
    private FirebaseAuth mAuth;
    Button SignOut;

    @Override
    public void onStart() {
        super.onStart();
        // Check if user is signed in (non-null) and update UI accordingly.
        FirebaseUser currentUser = mAuth.getCurrentUser();
    }

    private final ActivityResultLauncher<Intent> signInLauncher = registerForActivityResult(
            new FirebaseAuthUIActivityResultContract(),
            new ActivityResultCallback<FirebaseAuthUIAuthenticationResult>() {
                @Override
                public void onActivityResult(FirebaseAuthUIAuthenticationResult result) {
                    onSignInResult(result);
                }
            }
    );

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        mAuth = FirebaseAuth.getInstance();
        createSignInIntent();

        SignOut = (Button)findViewById(R.id.btn_signOut);
        SignOut.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) { signOut(); }
        });
    }
```

```java
    public void createSignInIntent() {
        // Choose authentication providers
        List<AuthUI.IdpConfig> providers = Arrays.asList(
                new AuthUI.IdpConfig.EmailBuilder().build(),
                new AuthUI.IdpConfig.GoogleBuilder().build(),
                new AuthUI.IdpConfig.AnonymousBuilder().build());

        // Create and launch sign-in intent
        Intent signInIntent = AuthUI.getInstance() AuthUI
                .createSignInIntentBuilder() AuthUI.SignInIntentBuilder
                .setAvailableProviders(providers)
                .build();
        signInLauncher.launch(signInIntent);
    }

    private void onSignInResult(FirebaseAuthUIAuthenticationResult result) {
        IdpResponse response = result.getIdpResponse();
        if (result.getResultCode() == RESULT_OK) {
            //Successfully signed in
            FirebaseUser user = FirebaseAuth.getInstance().getCurrentUser();
            Toast.makeText( context: this, user.getEmail(), Toast.LENGTH_SHORT).show();
        } else {
            // Sign in failed. If response is null the user canceled the
            Toast.makeText( context: this,  text: "Failed Login", Toast.LENGTH_SHORT).show();
        }
    }

    private void signOut() {
        AuthUI.getInstance()
                .signOut( context: this)
                .addOnCompleteListener(new OnCompleteListener<Void>() {
                    public void onComplete(@NonNull Task<Void> task) { createSignInIntent(); }
                });
    }
}
```

Now if we run our project we should get the following:



We can now sign in and our Authentication page on the Firebase Console will have updated:



Additional:
Connecting your Firebase to other login types.

The advanced functionality is to use Twitter or Facebook to Log in to your app.

This one is for you to explore other app logins. They can be slightly tricky but they're good to know, you might have to know Windows Command line, but there are plenty of tutorials on YouTube.