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UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Engineering, Built Environment and Information Technology

Department of Computer Science

Faculty of Engineering, Built Environment & IT

University of Pretoria

COS301 - Software Engineering

# Coviduous

Installation Manual

August 19, 2021

**Team Name:** **CAPSlock**

**Team Members:** ** - indicates team leader*

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# Contents

## 1 Introduction

**Coviduous** is an app that companies and their employees can use to facilitate office space bookings during the COVID-19 pandemic. The app is divided into two distinct subsystems, related to the two different types of customers mentioned before, as well as a third **Visitor** subsystem for temporary company visitors. The **User** subsystem is how employees will interact with the app. They have the option to view available office spaces, book an office space, view their current bookings, view announcements that are made by their companies, view notifications sent to them, and manage their COVID-related health documentation. The **Admin** subsystem is how employers will interact with the app. They have the option to manage floor plans, manage employee shifts, manage company-wide announcements, send notifications to employees, and view reports based on their company's statistics.

The following sections details how to download and install the app in its current state.

## 2 System requirements

The Demo 3 version of the app currently has to be run using an Android emulator or web browser, with the backend running on your computer's localhost. The system has been fully tested on Windows 10, but not on Linux, Macintosh, or earlier versions of Windows.

For all three parts of the system, you will need:

- A program to extract .zip archives. For example, WinZip or 7-Zip.
- Access to your computer's command prompt.
- A simple text editor, such as Notepad or Notepad++.

### 2.1 Artificial intelligence

To run the artificial intelligence service, you will need:

- Python version 3.9.4 or higher
- Pip version 21.2.4 or higher (comes with Python)

### 2.2 Backend

To run the backend, you will need:

- NodeJS version 14.16.1 or higher
- Node Package Manager (NPM) version 7.20.6 or higher (comes with NodeJS)
- Firebase Command Line Interface (CLI) version 9.16.3 or higher
- Java version 1.8 or higher
- A Google account

### 2.3 Frontend

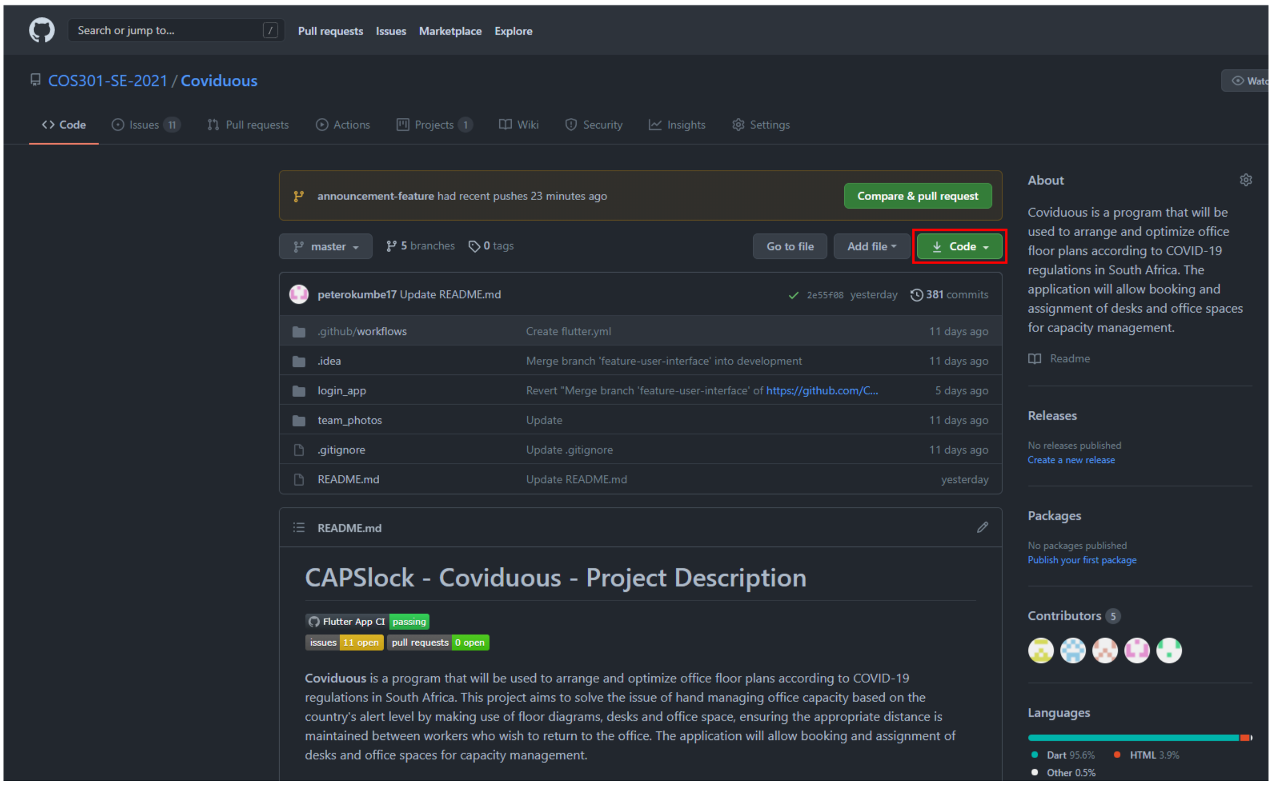
To run the frontend, you will need:

- Flutter version 2.2.3 or higher
- Dart version 2.13.4 or higher (comes with Flutter)
- Android Studio version 4.2.1 or higher

## 3 Download the source code

To get a copy of Coviduous, first download the repository from GitHub onto your local machine:

- In a web browser, go to https://github.com/COS301-SE-2021/Coviduous, click on the green "Code" button, and then "Download ZIP". [Figure 1] [Figure 2]
- Extract the .zip archive to a new folder anywhere on your computer.



announcement-feature had recent pushes 23 minutes ago

peterokumbe17 Update README.md ✓ 2e55f08 yesterday 381 commits

| | | |
|---|---|---|
| .github/workflows | Create flutter.yml | 11 days ago |
| .idea | Merge branch 'feature-user-interface' into development | 11 days ago |
| login_app | Revert "Merge branch 'feature-user-interface' of https://github.com/C... | 5 days ago |
| team_photos | Update | 11 days ago |
| .gitignore | Update .gitignore | 11 days ago |
| README.md | Update README.md | yesterday |

README.md

CAPSlock - Coviduous - Project Description

Flutter App CI passing
issues 11 open pull requests 0 open

Coviduous is a program that will be used to arrange and optimize office floor plans according to COVID-19 regulations in South Africa. This project aims to solve the issue of hand managing office capacity based on the country's alert level by making use of floor diagrams, desks and office space, ensuring the appropriate distance is maintained between workers who wish to return to the office. The application will allow booking and assignment of desks and office spaces for capacity management.

About

Coviduous is a program that will be used to arrange and optimize office floor plans according to COVID-19 regulations in South Africa. The application will allow booking and assignment of desks and office spaces for capacity management.

Readme

Releases

No releases published
Create a new release

Packages

No packages published
Publish your first package

Contributors 5

Languages

Dart 95.6% HTML 3.9%
Other 0.5%

Figure 1: Download the source code

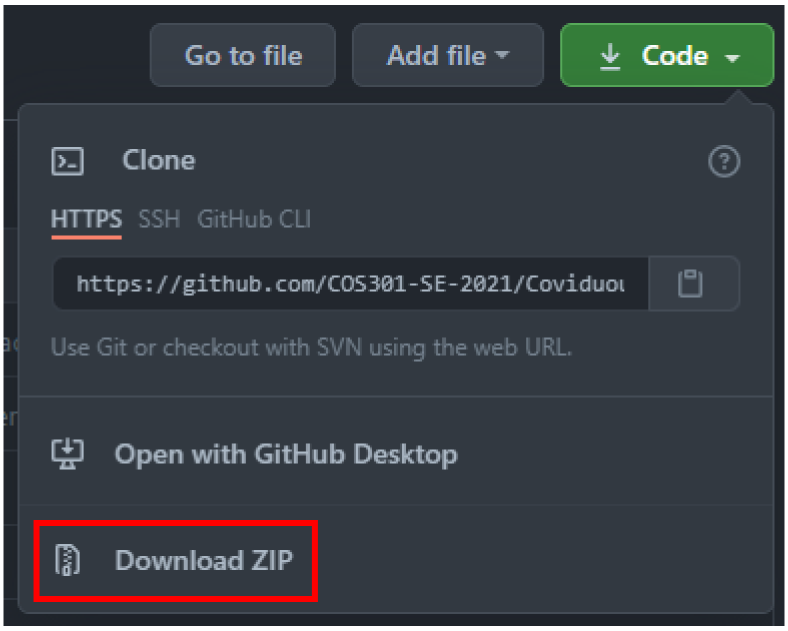

Go to file
Add file
Code
Clone
HTTPS SSH GitHub CLI
https://github.com/COS301-SE-2021/Coviduou
Use Git or checkout with SVN using the web URL.
Open with GitHub Desktop
Download ZIP

Figure 2: Download the source code

## 4 Installation

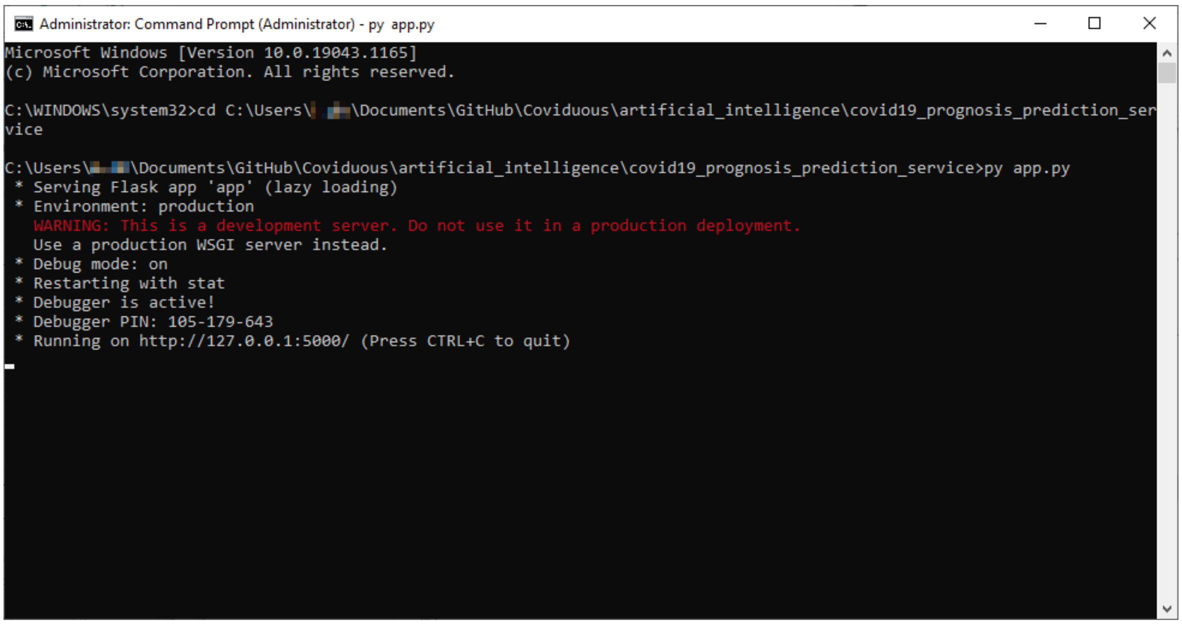
### 4.1 Artificial intelligence

To run the artificial intelligence service, do the following: [Figure 3]

- Open a new command prompt, and navigate into the artificial_intelligence/covid19_prognosis_predicti directory of your extracted .zip archive.
- Run the following commands:
  - `py -m pip install flask`
  - `py -m pip install gunicorn`
  - `py -m pip install matplotlib`
  - `py -m pip install seaborn`
  - `py -m pip install pandas`
  - `py -m pip install numpy`
  - `py -m pip install scikit_learn`
- Then, run the service using the command:

  ```
  py app.py
  ```

  You can stop the service by pressing Ctrl+C while the command prompt is open.



```
Administrator: Command Prompt (Administrator) - py  app.py
Microsoft Windows [Version 10.0.19043.1165]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:\Users\[redacted]\Documents\GitHub\Coviduous\artificial_intelligence\covid19_prognosis_prediction_ser
vice

C:\Users\[redacted]\Documents\GitHub\Coviduous\artificial_intelligence\covid19_prognosis_prediction_service>py app.py
 * Serving Flask app 'app' (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 105-179-643
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

Figure 3: Start up the AI service

## 4.2 Backend

As the backend requires a private key generated by Firebase to interact with it, you will need to set up a new Firebase project. We cannot provide the private key that we have generated for our system as that is a huge security risk.

- Log into your Google account and go to https://firebase.google.com. Select "Go to console" at the top right corner of the page. [Figure 4]
- Select "Add project", enter a name when prompted, disable Google Analytics, and select "Create project". [Figure 5] [Figure 6]
- After your project has been created, you will be taken to its overview page. Under "Get started by adding Firebase to your app", select the Android option. [Figure 7]
- Enter an Android package name when prompted and (optionally) an app nickname. [Figure 8]
- Download the google-services.json file and go to where you extracted the .zip archive on your computer. Place the file in frontend/android/app, overwriting the google-services.json that is already there. [Figure 9]
- Ignore the instructions on how to add the Firebase SDK, as that has already been done for Coviduous. Select "Continue to the console". [Figure 10]
- Back on the project overview page, select the "Authentication" option in the "Build" tab on the left side of the screen. [Figure 11]
- Select "Get started", and on the next page, under "Sign-in providers", edit the "Email/Password" option and enable it. You do not need to enable "Email link (passwordless sign-in)". Click "Save". [Figure 12]

- Then, on the left side of your screen, next to "Project Overview", select the settings icon (the gear) and then "Project settings". Navigate to the "Service accounts" tab and select "Generate new private key". This will download a .json file to your computer. Rename the file to "permissions.json" and place it in the backend/functions folder of your extracted .zip archive. [Figure 13]
- In backend/functions, create a new file named ".env", without anything before the dot. Using a text editor, add lines in the file as shown in Figure 14. The FirebaseClientAPIKey can be found in your Firebase project's settings, under the "General" tab. Copy the key and paste it after the equals sign. The FirebaseClientProjectID is your project's ID (also found in the "General" tab), and the FirebaseClientAuthDomain is your project's ID with ".firebaseapp.com" appended to the end. For example, "test.firebaseapp.com".
- Finally, in a new command prompt, navigate to the backend/functions directory and run the command:

```
npm install
```

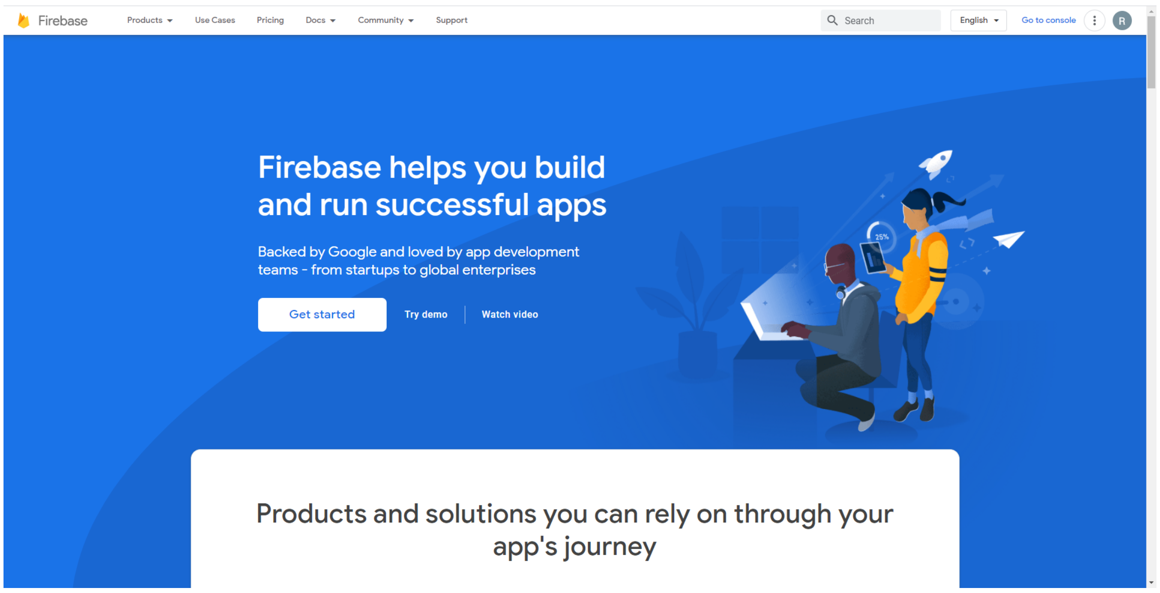
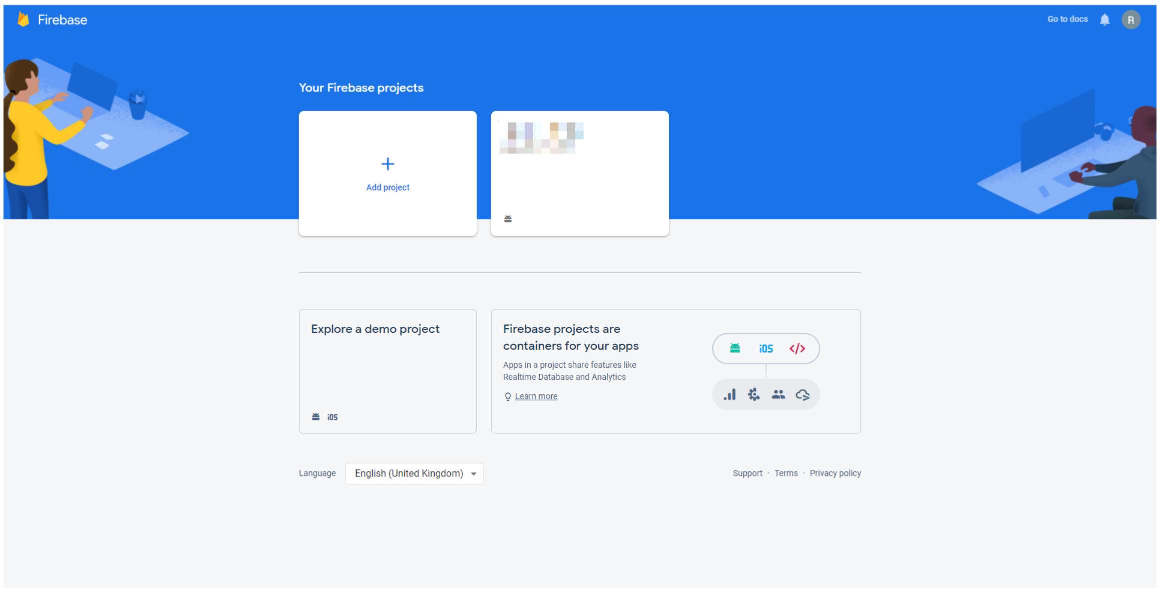

Firebase
Products
Use Cases
Pricing
Docs
Community
Support
Search
English
Go to console
Firebase helps you build and run successful apps
Backed by Google and loved by app development teams - from startups to global enterprises
Get started
Try demo
Watch video
Products and solutions you can rely on through your app's journey

Figure 4: Set up Firebase



Your Firebase projects

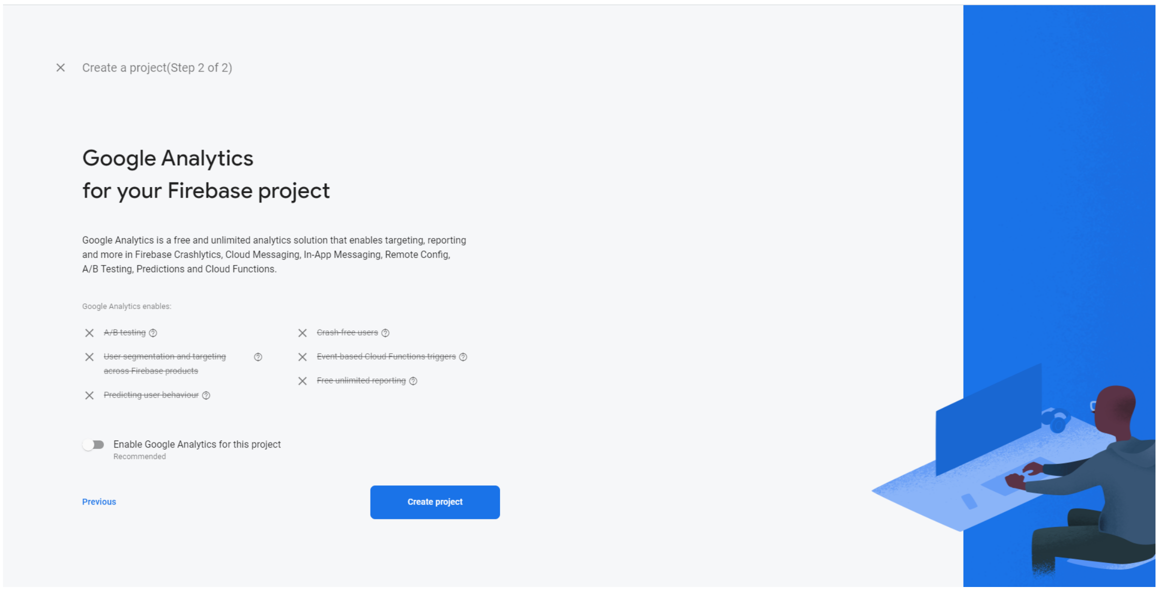
[redacted]

Explore a demo project

Firebase projects are containers for your apps

Apps in a project share features like Realtime Database and Analytics

Figure 5: Set up Firebase



Google Analytics
for your Firebase project

Google Analytics is a free and unlimited analytics solution that enables targeting, reporting and more in Firebase Crashlytics, Cloud Messaging, In-App Messaging, Remote Config, A/B Testing, Predictions and Cloud Functions.

Google Analytics enables:

- ~~A/B testing~~
- ~~User segmentation and targeting across Firebase products~~
- ~~Predicting user behaviour~~
- ~~Crash-free users~~
- ~~Event-based Cloud Functions triggers~~
- ~~Free unlimited reporting~~

Enable Google Analytics for this project
Recommended

Figure 6: Set up Firebase

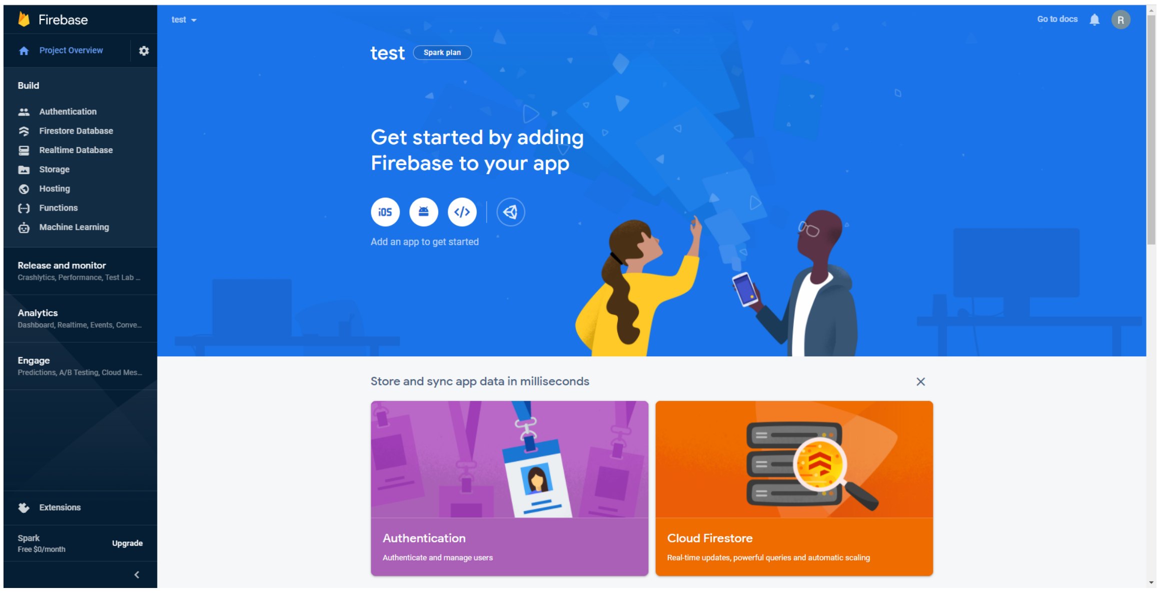

Firebase
Project Overview
Build
Authentication
Firestore Database
Realtime Database
Storage
Hosting
Functions
Machine Learning
Release and monitor
Crashlytics, Performance, Test Lab ...
Analytics
Dashboard, Realtime, Events, Conve...
Engage
Predictions, A/B Testing, Cloud Mes...
Extensions
Spark
Free $0/month
Upgrade
test
Go to docs
test
Spark plan
Get started by adding Firebase to your app
iOS
Add an app to get started
Store and sync app data in milliseconds
Authentication
Authenticate and manage users
Cloud Firestore
Real-time updates, powerful queries and automatic scaling

Figure 7: Firebase project overview

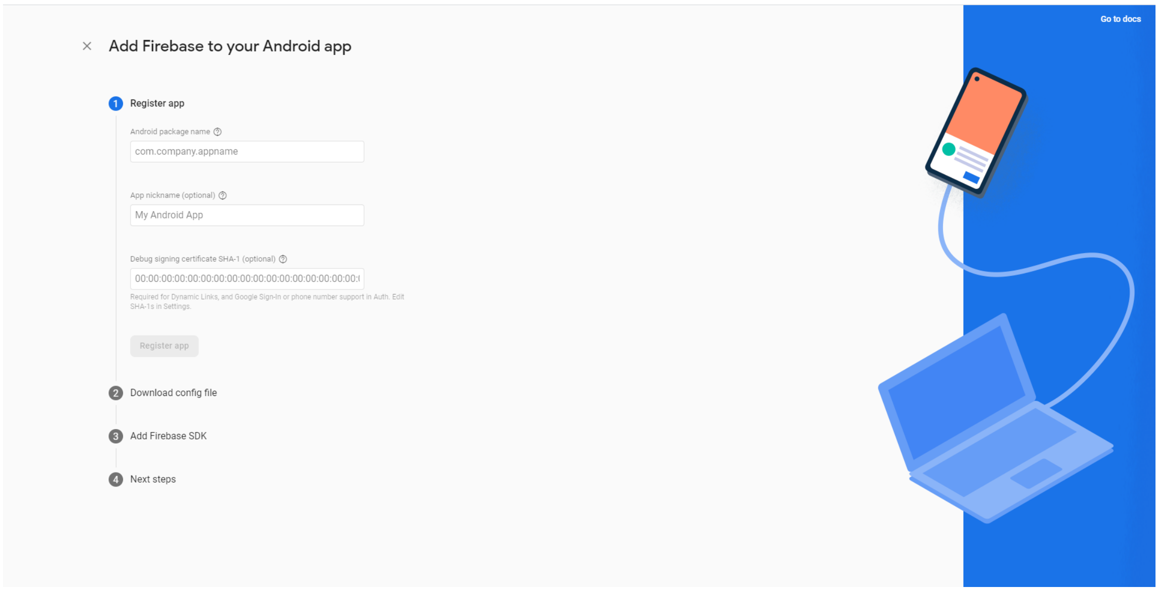
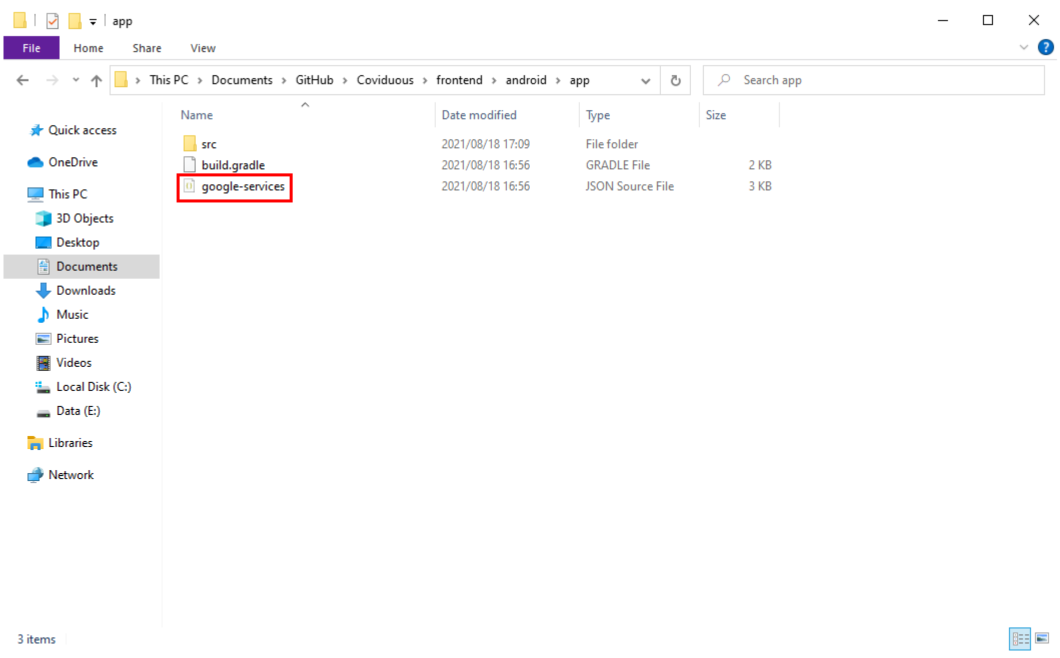
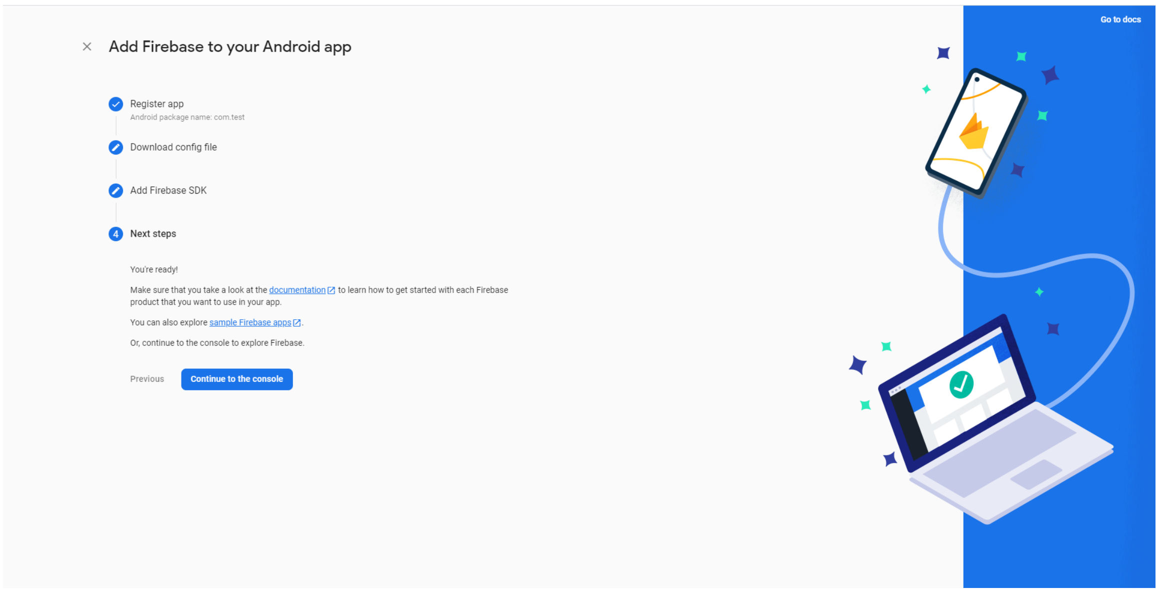


Figure 8: Generate Firebase config files



| Name | Date modified | Type | Size |
|---|---|---|---|
| src | 2021/08/18 17:09 | File folder | |
| build.gradle | 2021/08/18 16:56 | GRADLE File | 2 KB |
| google-services | 2021/08/18 16:56 | JSON Source File | 3 KB |

Figure 9: Generate Firebase config files



Add Firebase to your Android app

1. Register app
   Android package name: com.test
2. Download config file
3. Add Firebase SDK
4. Next steps

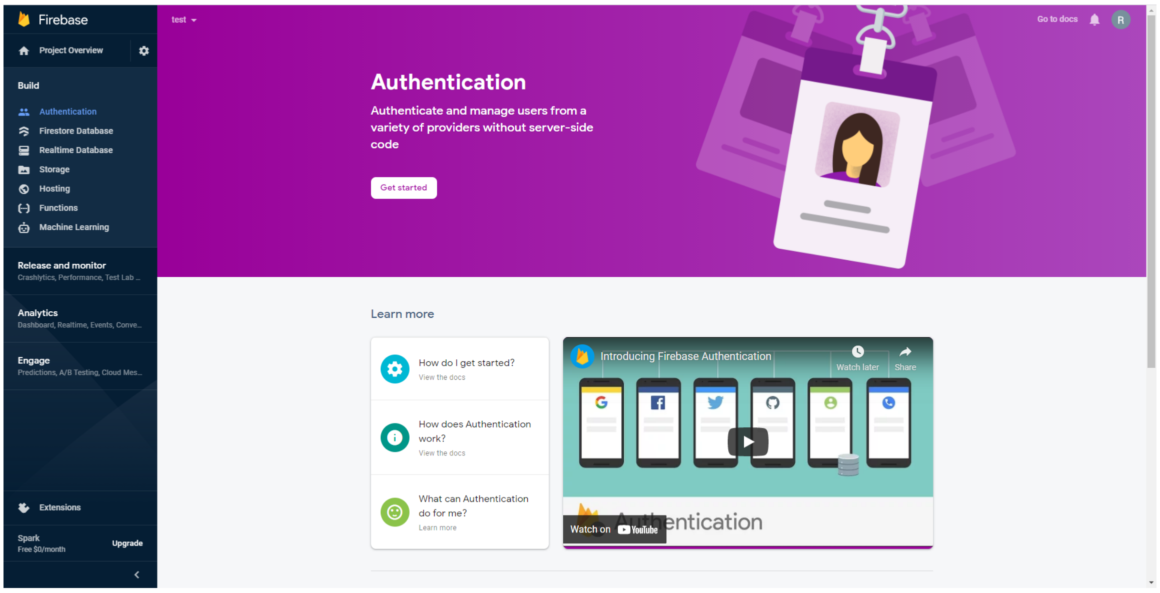
You're ready!

Make sure that you take a look at the documentation to learn how to get started with each Firebase product that you want to use in your app.

You can also explore sample Firebase apps.

Or, continue to the console to explore Firebase.

Figure 10: Generate Firebase config files



Authentication

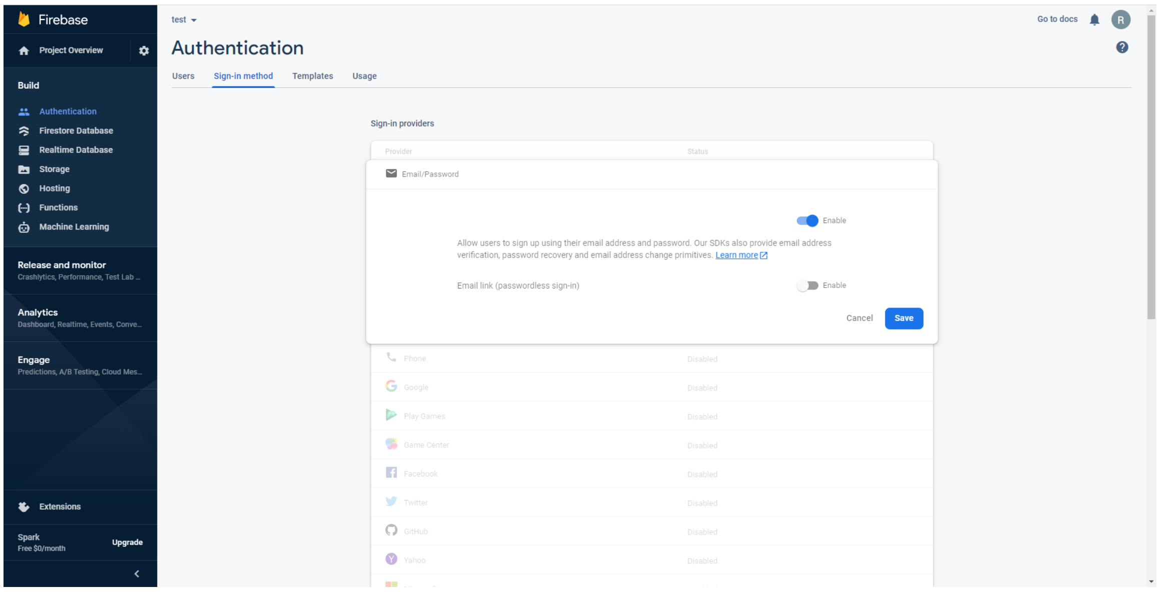
Authenticate and manage users from a variety of providers without server-side code

How do I get started?

How does Authentication work?

What can Authentication do for me?

Figure 11: Set up Firebase Authentication



Authentication

Sign-in providers

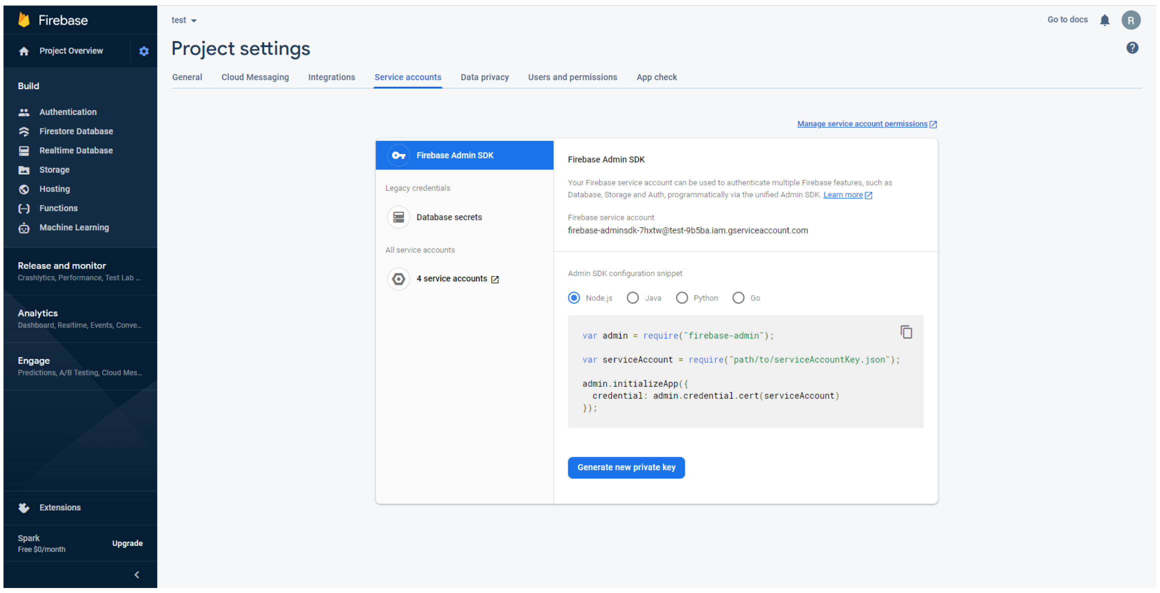
| Provider | Status |
|---|---|
| Email/Password | |
| Phone | Disabled |
| Google | Disabled |
| Play Games | Disabled |
| Game Center | Disabled |
| Facebook | Disabled |
| Twitter | Disabled |
| GitHub | Disabled |
| Yahoo | Disabled |

Email/Password: [✓ Enable]

Allow users to sign up using their email address and password. Our SDKs also provide email address verification, password recovery and email address change primitives. Learn more

Email link (passwordless sign-in): Enable

Figure 12: Set up Firebase Authentication



Firebase Admin SDK

Your Firebase service account can be used to authenticate multiple Firebase features, such as Database, Storage and Auth, programmatically via the unified Admin SDK. Learn more

Firebase service account
firebase-adminsdk-7hxtw@test-9b5ba.iam.gserviceaccount.com

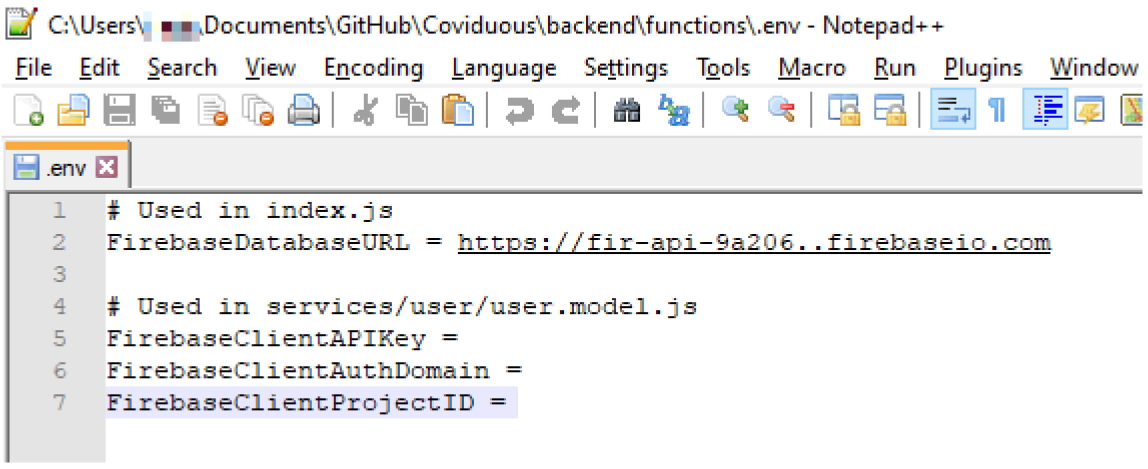
Admin SDK configuration snippet: [✓ Node.js] Java Python Go

```
var admin = require("firebase-admin");

var serviceAccount = require("path/to/serviceAccountKey.json");

admin.initializeApp({
  credential: admin.credential.cert(serviceAccount)
});
```

Figure 13: Download your app's private key


C:\Users\[redacted]\Documents\GitHub\Coviduous\backend\functions\.env - Notepad++
File
Edit
Search
View
Encoding
Language
Settings
Tools
Macro
Run
Plugins
Window
.env

```
# Used in index.js
FirebaseDatabaseURL = https://fir-api-9a206..firebaseio.com

# Used in services/user/user.model.js
FirebaseClientAPIKey =
FirebaseClientAuthDomain =
FirebaseClientProjectID =
```

Figure 14: Create .env file

Now that Firebase is set up for your project, you have to set up the emulators on your local machine. Using your computer's command prompt, navigate into the backend folder of your extracted .zip archive. Run the following commands:

- `firebase --version`
  - This is to check if you have Firebase CLI installed. If it is not, please follow the link under the "System requirements" section in this manual.
- `firebase init`
- `firebase init emulators`
  - Install the emulators for Functions and Firestore. The rest are unnecessary. Navigate the options using your arrow keys, select an option using the spacebar, and confirm your selection using the enter key.

– Now you can start up the emulators by navigating into the functions directory and running the command:

```
firebase emulators:start
```

You can stop the emulators by pressing Ctrl+C while the command prompt is open.

## 4.3 Frontend

Using Flutter, you can run an emulated version of the frontend app on either a web browser or an Android emulator (provided by Android Studio).

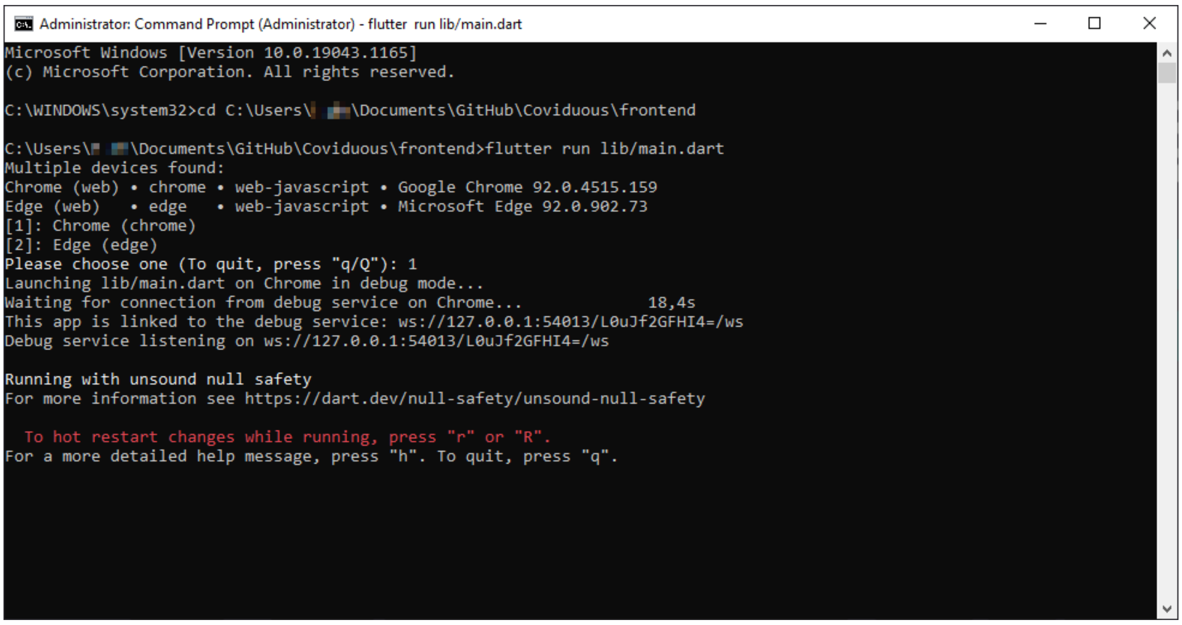
### 4.3.1 Run on a web browser

To run the app on a web browser: [Figure 15] [Figure 16]

- Open a new command prompt and navigate into the frontend directory of your extracted .zip archive.
- Run the command:

  ```
  flutter run lib/main.dart
  ```

- When prompted, select which browser you would like to use. After a few seconds, the app should open in a new browser window. Depending on whether the backend and the AI service are also running, the app may have limited functionality.
- To stop the app, press the Q key while the command prompt is open. Give it some time to shut down properly (usually a minute or so). If it takes much longer than a minute, force the app to stop with Ctrl+C.



```
Administrator: Command Prompt (Administrator) - flutter  run lib/main.dart
Microsoft Windows [Version 10.0.19043.1165]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:\Users\[redacted]\Documents\GitHub\Coviduous\frontend

C:\Users\[redacted]\Documents\GitHub\Coviduous\frontend>flutter run lib/main.dart
Multiple devices found:
Chrome (web) • chrome • web-javascript • Google Chrome 92.0.4515.159
Edge (web)   • edge   • web-javascript • Microsoft Edge 92.0.902.73
[1]: Chrome (chrome)
[2]: Edge (edge)
Please choose one (To quit, press "q/Q"): 1
Launching lib/main.dart on Chrome in debug mode...
Waiting for connection from debug service on Chrome...             18,4s
This app is linked to the debug service: ws://127.0.0.1:54013/L0uJf2GFHI4=/ws
Debug service listening on ws://127.0.0.1:54013/L0uJf2GFHI4=/ws

Running with unsound null safety
For more information see https://dart.dev/null-safety/unsound-null-safety

  To hot restart changes while running, press "r" or "R".
For a more detailed help message, press "h". To quit, press "q".
```

Figure 15: Run the app in the command prompt

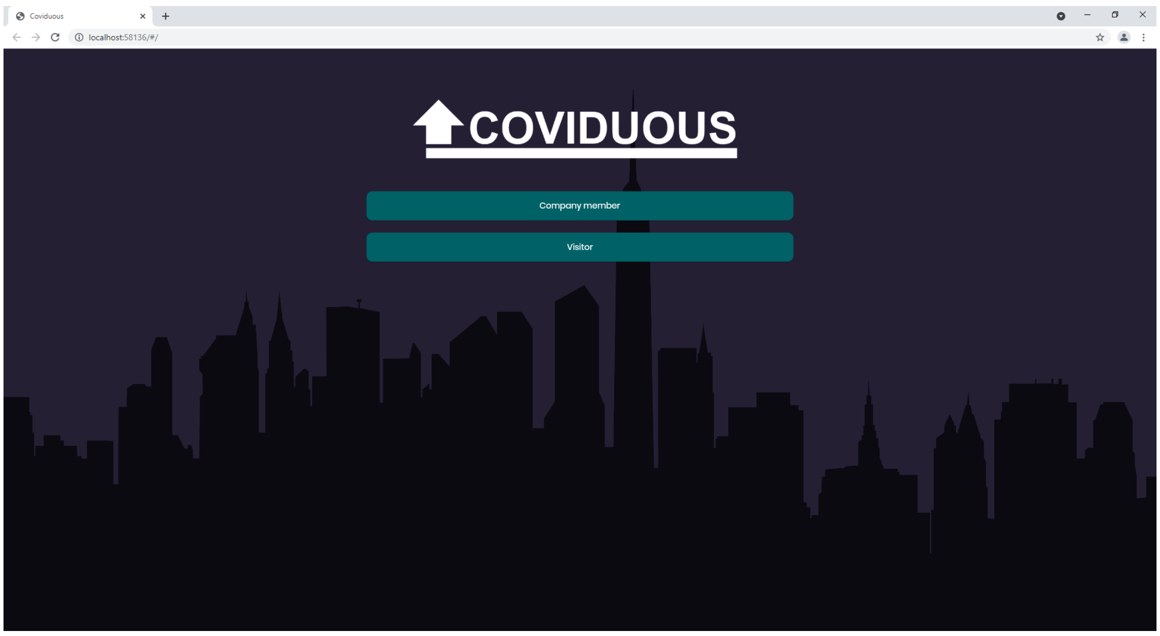


Figure 16: The app running on Google Chrome

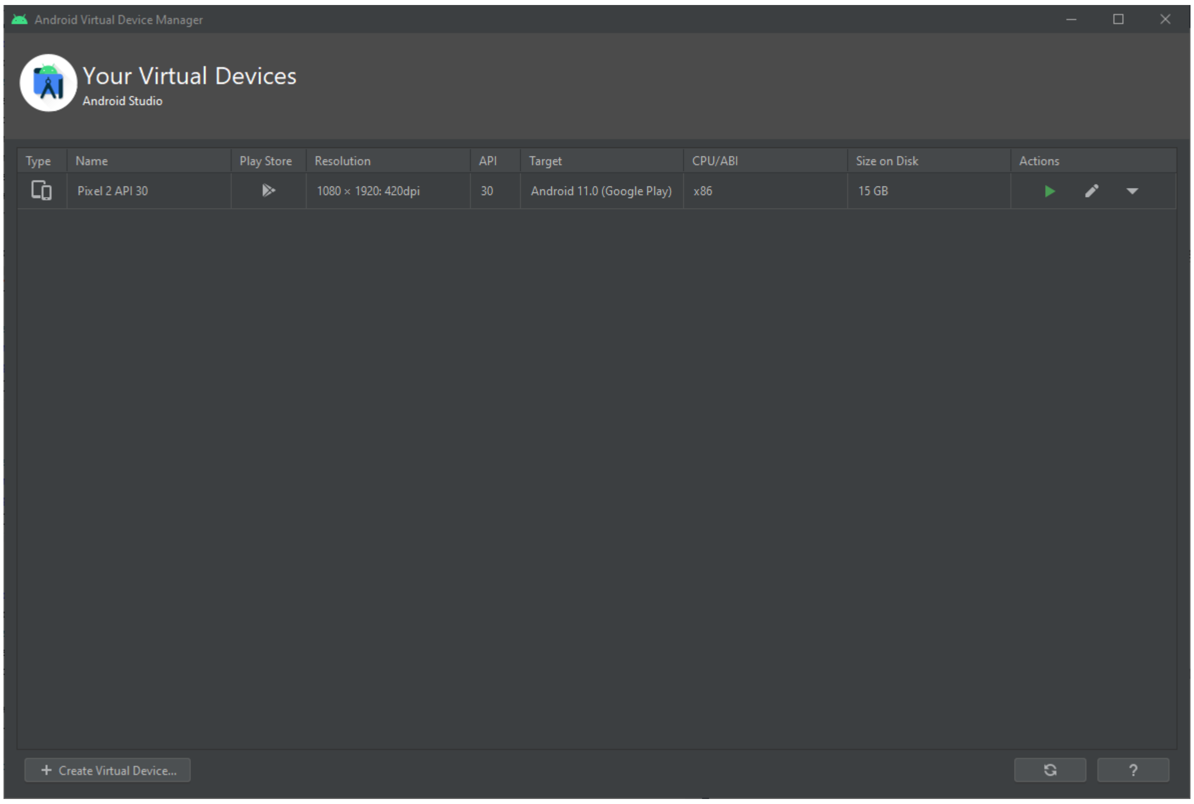
### 4.3.2 Run on an Android emulator

To run the app on an Android emulator:

- Open Android Studio and navigate to the AVD manager and create a new AVD if there is not one already. [Figure 17]
- Start your emulator and wait for it to display a phone home screen. [Figure 18]
- Run the command:

  ```
  flutter run lib/main.dart
  ```

  [Figure 19]
- Flutter will automatically try to use the emulator when it is running. After a few minutes, the app should appear on your emulator screen. [Figure 20]
- To stop the app, press the Q key while the command prompt is open. Give it some time to shut down properly (usually a minute or so). If it takes much longer than a minute, force the app to stop with Ctrl+C.



| Type | Name | Play Store | Resolution | API | Target | CPU/ABI | Size on Disk | Actions |
|---|---|---|---|---|---|---|---|---|
|  | Pixel 2 API 30 |  | 1080 × 1920: 420dpi | 30 | Android 11.0 (Google Play) | x86 | 15 GB |  |

Figure 17: Open the AVD manager in Android Studio

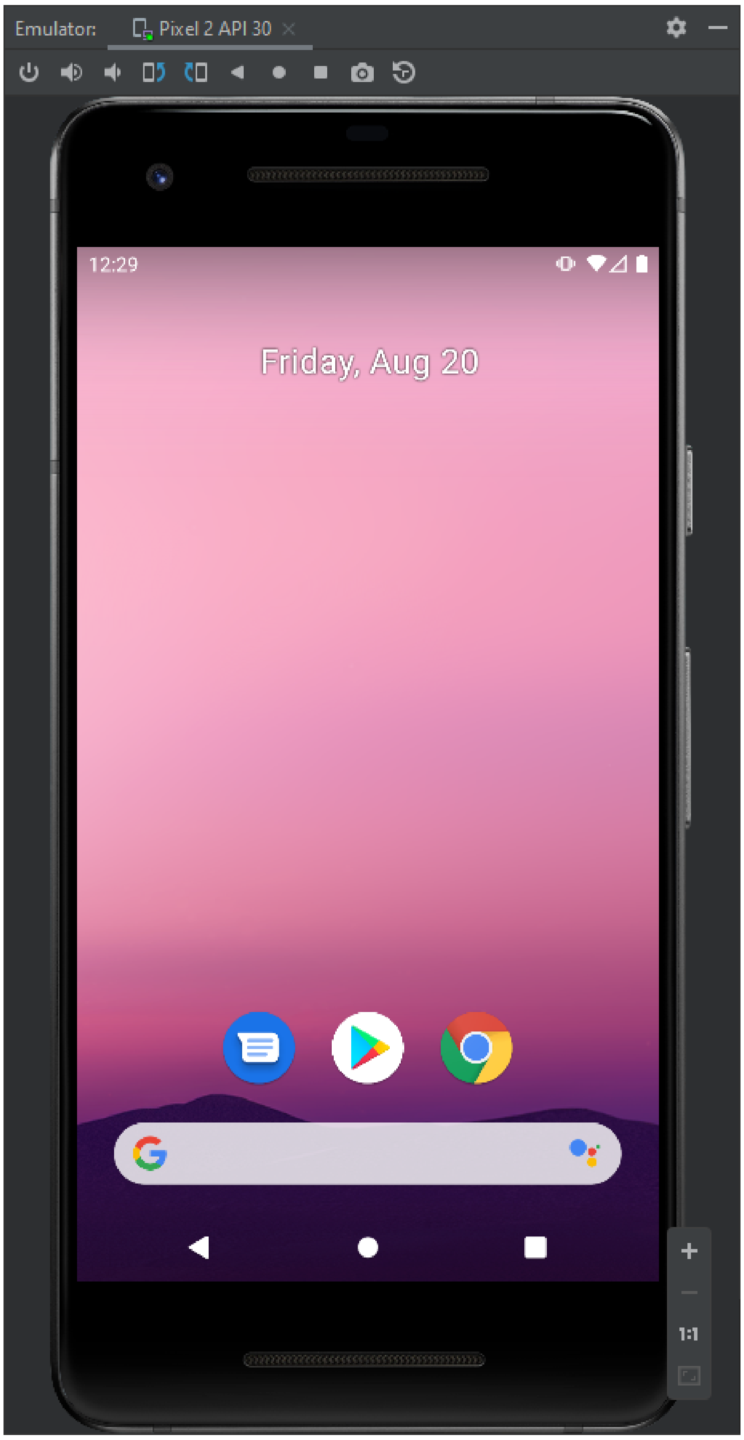
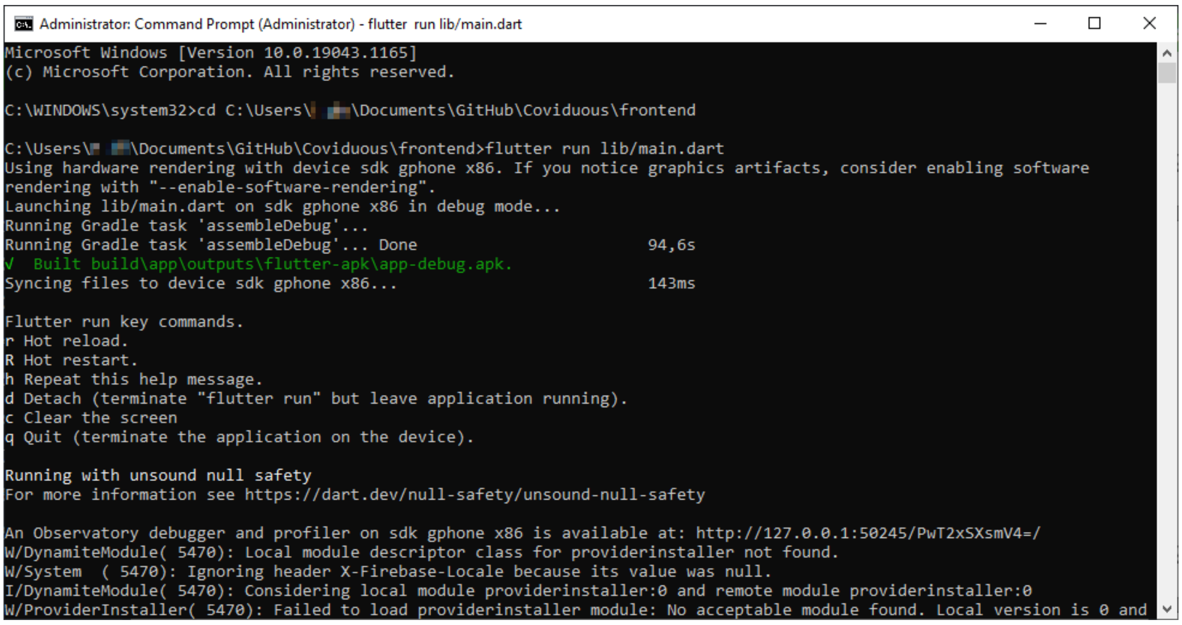


Figure 18: Run the Android emulator


Administrator: Command Prompt (Administrator) - flutter  run lib/main.dart

```
Microsoft Windows [Version 10.0.19043.1165]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:\Users\[redacted]\Documents\GitHub\Coviduous\frontend

C:\Users\[redacted]\Documents\GitHub\Coviduous\frontend>flutter run lib/main.dart
Using hardware rendering with device sdk gphone x86. If you notice graphics artifacts, consider enabling software
rendering with "--enable-software-rendering".
Launching lib/main.dart on sdk gphone x86 in debug mode...
Running Gradle task 'assembleDebug'...
Running Gradle task 'assembleDebug'... Done                        94,6s
√  Built build\app\outputs\flutter-apk\app-debug.apk.
Syncing files to device sdk gphone x86...                          143ms

Flutter run key commands.
r Hot reload.
R Hot restart.
h Repeat this help message.
d Detach (terminate "flutter run" but leave application running).
c Clear the screen
q Quit (terminate the application on the device).

Running with unsound null safety
For more information see https://dart.dev/null-safety/unsound-null-safety

An Observatory debugger and profiler on sdk gphone x86 is available at: http://127.0.0.1:50245/PwT2xSXsmV4=/
W/DynamiteModule( 5470): Local module descriptor class for providerinstaller not found.
W/System   ( 5470): Ignoring header X-Firebase-Locale because its value was null.
I/DynamiteModule( 5470): Considering local module providerinstaller:0 and remote module providerinstaller:0
W/ProviderInstaller( 5470): Failed to load providerinstaller module: No acceptable module found. Local version is 0 and
```

Figure 19: Run the app in the command prompt

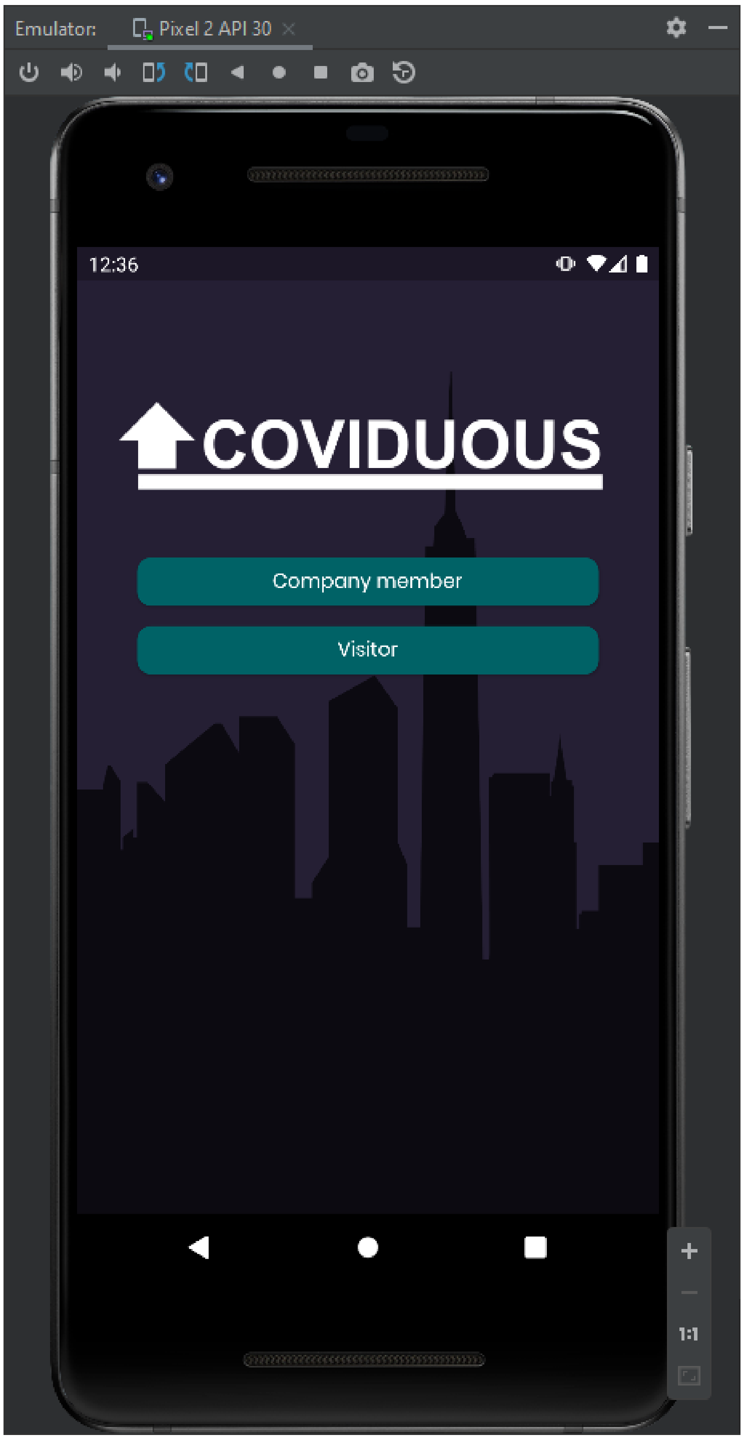


Figure 20: The app running on the emulator