Flutter Training

MUST READ - The Withcenter Policy
MUST Master - [The Basic Knowledge of Development - Withcenter Development Practice]
Must - Master Programming Language

Resources

Important Flutter training Course ** IMPORTANT **

Paid Tutorial - Fireship

Learn from Fireship.io - Dart
Learn from Fireship.io - Flutter & Firebase
Learn from Fireship.io - Firebase Security

Free tutorial but very good
https://heyflutter.com/courses/slkfjfACehTdLLgscSRg/LwfWEy28TUGXyItgc8HU

Important Source Code - For re-using

- Paid Flutter UI Library and Mock-up Apps - ProKit
- Install it on mobile phone with release mode to see it better.

https://github.com/thruthesky/prokit

It works with; Flutter version 3.10.4

```
% .fvm/flutter_sdk/bin/flutter --version
Flutter 3.10.4 • channel stable • https://github.com/flutter/flutter.git
Framework • revision 682aa387cf (3 months ago) • 2023-06-05 18:04:56 -0500
Engine • revision 2a3401c9bb
Tools • Dart 3.0.3 • DevTools 2.23.1
```

First thing to Learn Before Flutter

Most developers who end up quitting without gaining after 20 years of working didn't learn the very basic thing when they first start.

MUST Master - [The Basic Knowledge of Development - Withcenter Development Practice]

UI/UX - Withcenter Study 2023

Quick start - Create sample project and Run

- [ ] Install Flutter

1. Check the requirements
   To install on Mac, there are requirements.

See the MacOS System Requirements

2. Get the Flutter sdk from github
   See the guideline

3. Update your path
   Remember: 99.99% of developers and people are experiencing difficulties installing because of the path.

Done. You have installed the Flutter on your frame(box, machine).

- [ ] Create your project

  % **flutter create project-name**

- [ ] Change directory (go into) to newly created project.

  % **cd project-name**

- [ ] Run the project using `flutter run` command.

  % **flutter run**

  When you do this,

  It will build, link, signing the app (of the project)

  then, it will ask which device you want to use (to run the app). Or maybe not.

To select a device to use to debug run

First, you can see(list) which devices are available by `flutter devices`

```
% flutter devices
Multiple devices found:
iPhone11MaxPro (mobile)     • 00008030-E    • ios   • iOS 15.6.1 19G82
iPhone 14 Pro Max (mobile) • 8A752CFC5E    • ios   • com.apple.CoreSimulator.SimRiOS-(simulator)
macOS (desktop)             • macos         • darwin-arm64   • macOS 13.3.1 220a darwin-arm64
```

```
Chrome (web)                • chrome        • web-javascript • Google Chrome 112.0.5615.137
```

See the purple colored word. That's the Device ID. It's important to know.

When you run, flutter is asking you which device you want to use. You can select the number.

```
% flutter run

[1]: iPhone11MaxPro (00008030-000904C80290802E)
[2]: iPhone 14 Pro Max (8A752C04-06F3-4B21-9B5E-BEEDF313FC5E)
[3]: macOS (macos)
[4]: Chrome (chrome)
Please choose one (To quit, press "q/Q"): 2
```

But isn't it extra work to choose the device? You have lots of, lots of, lots of things to do in a limited amount of time. If you are a pro, then you should work as a pro. And pros don't choose the number.

Run the project using -d option

You can use the `-d` option to specify which device you want to use.
For instance, the device id of `iPhone 14 Pro Max` is `8A752C04-06F3-4B21-9B5E-BEEDF313FC5E`.

So, you can do this

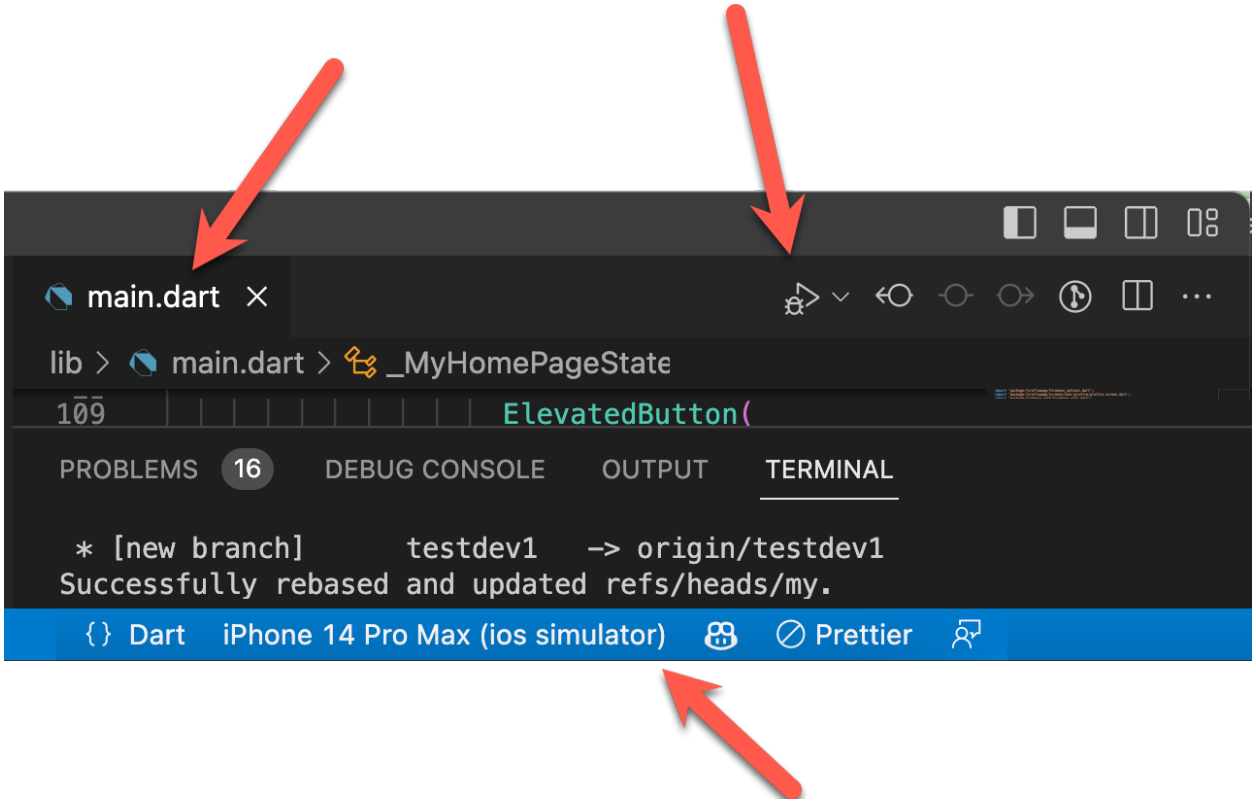
```
% flutter run -d 8A752C04-06F3-4B21-9B5E-BEEDF313FC5E
```

And it will run on iPhone 14 Pro Max.

But still, it's extra work. It's not what professionals do.

Run from main.dart in VSCode

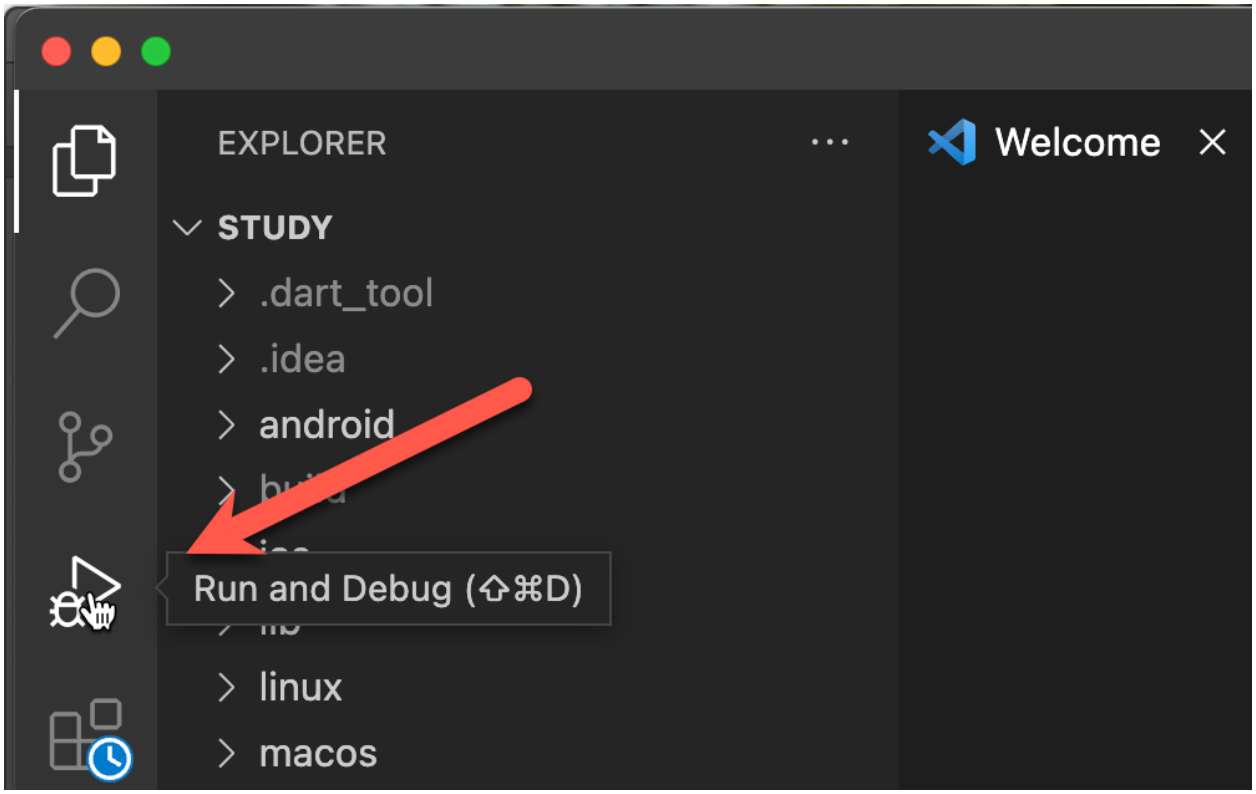
You can open main.dart in VSCode and choose which device you want to run, then press the Debug button to run.



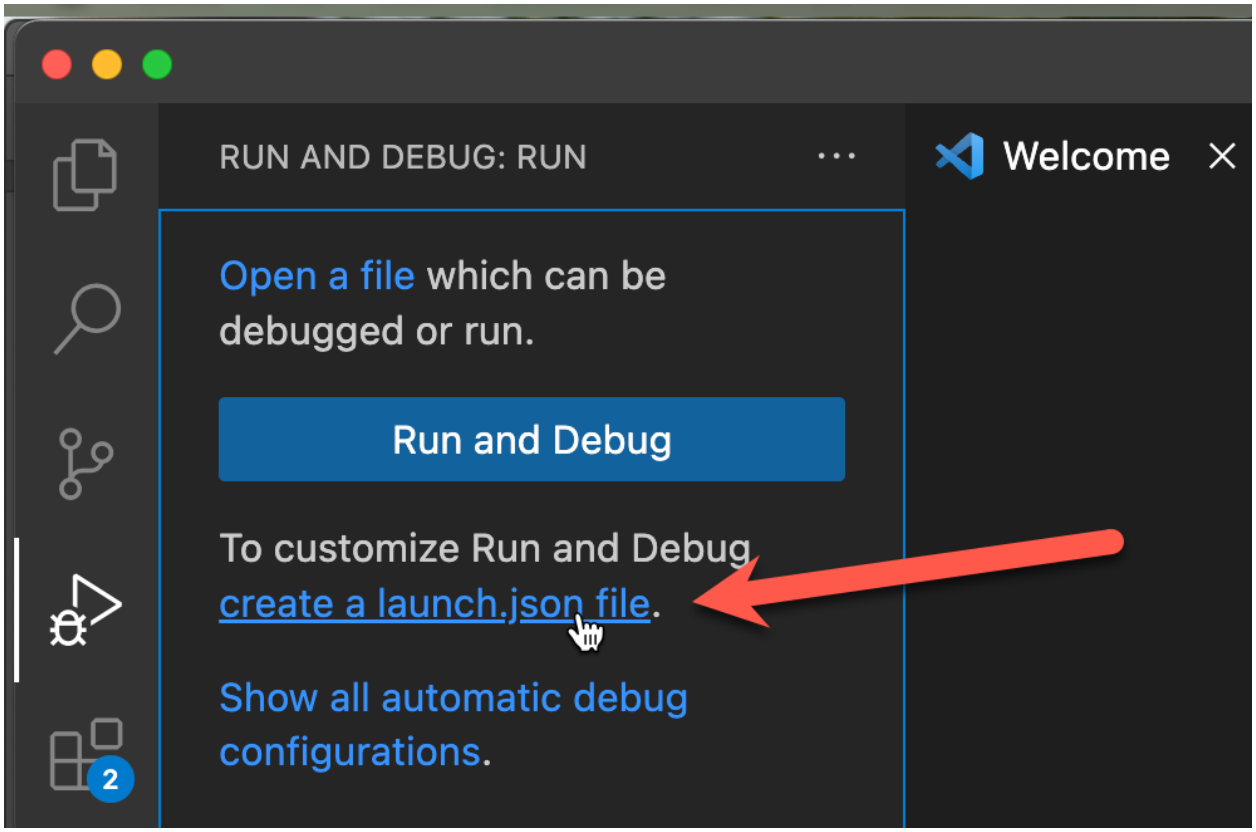
Run from VSCode settings

The better way of running your app is to add the settings on your VSCode settings.

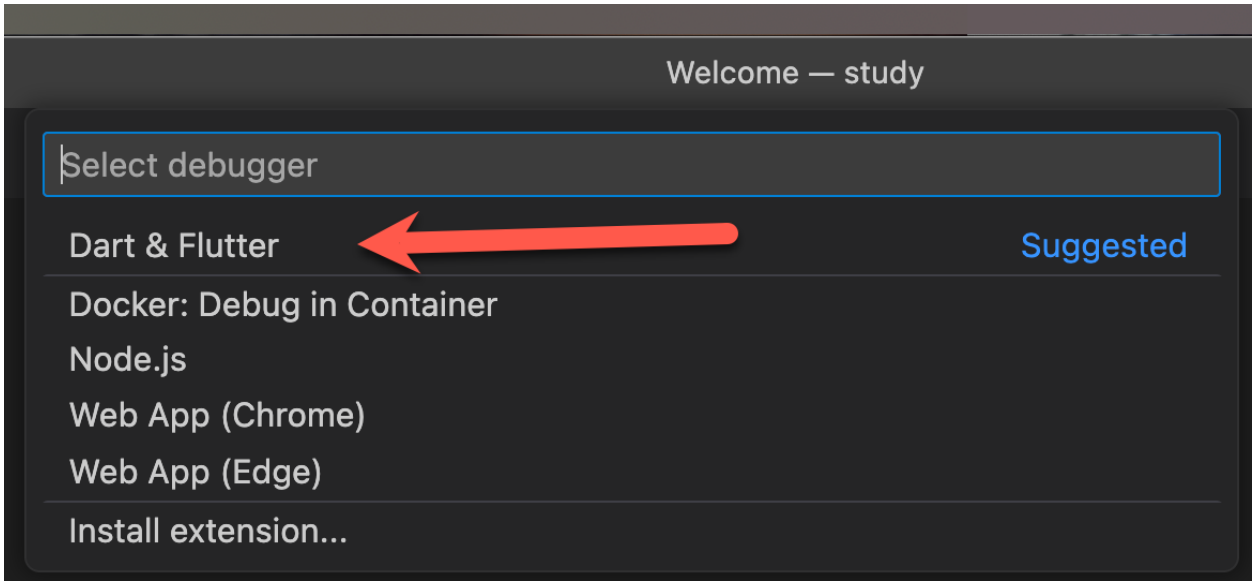
- Click Debug Settings



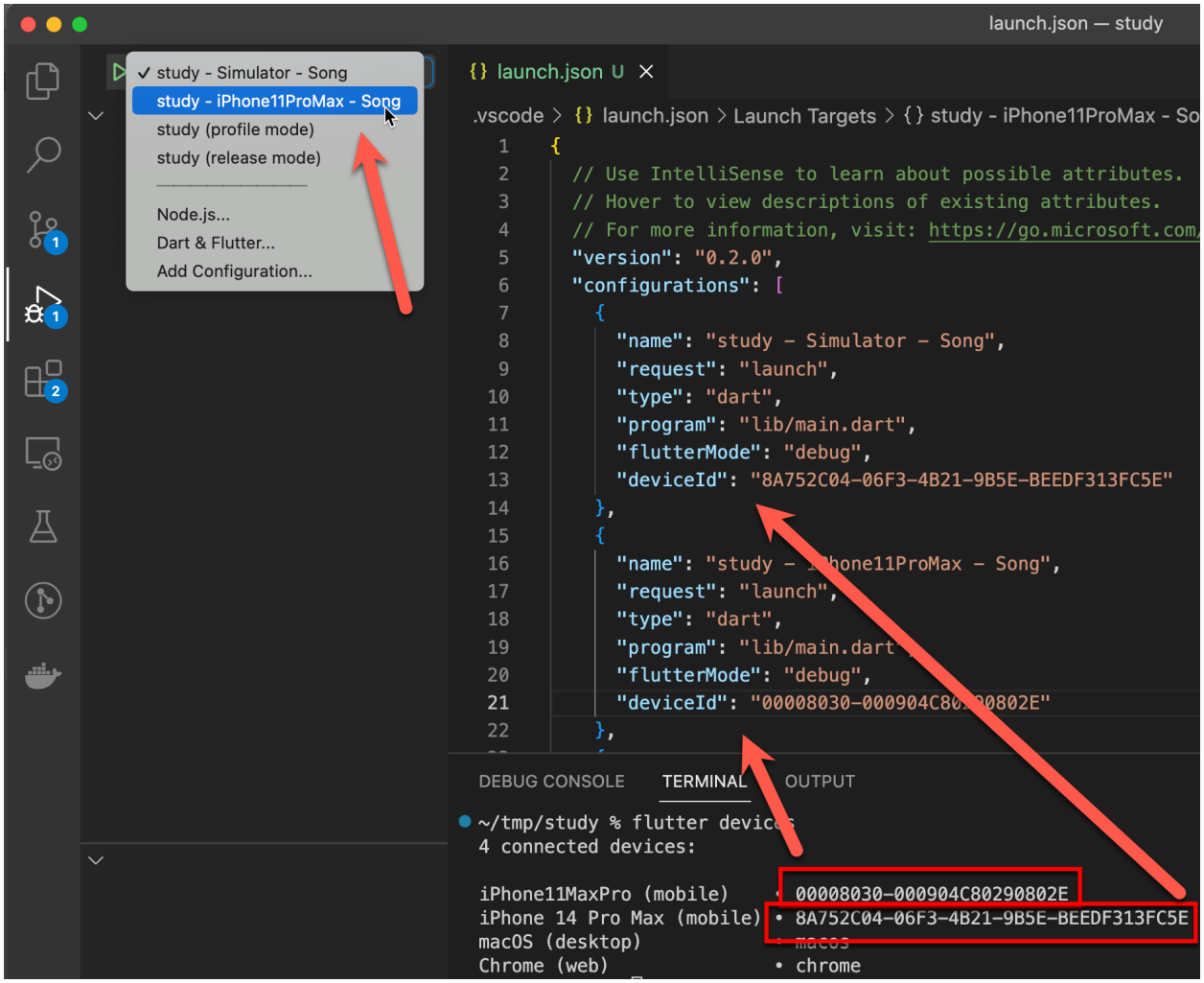
- Create launch.json file



- Click Dart & Flutter



- Then, add
    - name, request, type, program, flutterMode, deviceId like below.
    - Then, you can click the name on the dropdown in left panel.



What is flutter?

What is Flutter SDK?

Dart SDK

Dart is a programming language. It's a language only.

You need to have more tools to develop applications(softwares) with Dart programming language.
Tools something likes

- compiler, builder, linker and more to develop.
- Packager, installer to distribute.

These are SDK. and it's for Dart. so it's called Dart SDK.

Flutter SDK

Dart is a programming language and Dart SDK is for building softwares using Dart programming language.

You can develop your own UI library for your app using Dart programming language. But it's not easy and it's a huge amount of work. So, google provides one for you.

It's called a UI library named Flutter.
But Flutter is merely a UI library. You may really use it for building web/apps with it.
But you will spend lots of time and effort to build without its helper tools like Flutter boilerplate code generation, Flutter UI library run/managing process, Flutter Debug Tools.

With the help of tools, you can build better with ease.

So, Flutter SDK means, Flutter UI library with help tools.

So, where is it?

It's on github. And when you install Flutter, it will clone the source repo into your computer.

In MacOS, it's usually inside ~/bin/flutter

Flutter SDK: **~/bin/flutter**
Flutter UI Library: **~/bin/flutter/packages/flutter**

Then, How to use it?

Since the UI Library is inside `~/bin/flutter/packages`, just import as `import package:`

The `import package:` will point to `~/bin/flutter/packages`

So, `import package:/flutter` will point to `~/bin/flutter/packages/flutter`.

And most of the time, you will use Material Design.
So, you need to use the Material UI Library inside the Flutter UI Library.
To use it, you need to import it. The file name of the Material UI is `material.dart` which exists under `~/bin/flutter/packages/flutter/lib` folder. All the source code of Flutter goes in `/lib` folder. So, it is `~/bin/fluter/packages/flutter/lib` folder.
So, `import package:flutter/material.dart` points to `~/bin/flutter/packages/flutter/lib/material.dart`

The material.dart has all the widgets you are using when you build Flutter app like

- Text, Container, SizedBox, Row, Column, Stack or whatever are included by material.dart

pubspec.yaml & SDK constraints

```
environment:
 sdk: ">=2.12.0 <3.0.0"
```

The above is called SDK constraints.

SDK constraints)

```
sdk: ">=2.12.0 <3.0.0"
```

From Official doc: https://dart.dev/tools/pub/pubspec#sdk-constraints

SDK constraints is;

A package can indicate which versions of its dependencies it supports, but packages have another implicit dependency: the Dart platform itself

For example, the following constraint says that this package works with any **Dart SDK** that's version 3.0.0 or higher:

environment:
  sdk: ^3.0.0

It's clearly indicating that the SDK is Dart SDK.

It means, A package can define which version of SDK it supports.
If a dart program(project) has a `pubspec.yaml`, it's called a package. (from Mr. Song)
A package can be published to `pub.dev`.
You can set the package (updating pubspc.yaml) not to be published (by accident) using, `publish_to: 'none'` option. Especially when it is a flutter application, you should use this option.

```
environment:
 sdk: ">=2.12.0 <3.0.0" // This package will depends on >=2.12 <3
of Dart SDK
// the pubspec.yaml contains settings for a dart package.
// The sdk constraints tells that this package will only work
between >=2.12 and <3 version of Dart SDK.



dependencies:
```

```
 flutter:
   sdk: flutter // This is the Flutter SDK. This package uses
this version of Flutter SDK.


 app_links: 3.4.1
 auto_size_text: 3.0.0
```

Flutter SDK constraints

You can specify the flutter sdk version additionally.

```
environment:
  sdk: '>=1.19.0 <3.0.0'
  flutter: ^0.1.2
```

Then, Where is the Dart SDK?

Dart and its enviroment evolves over time. And things change.

Before you have to install Dart SDK and Flutter SDK separately.

But now, the Flutter SDK contains Dart SDK. So, Flutter SDK will install Dart SDK and put the Dart SDK in the same place as Flutter SDK.

It's in `~/bin/flutter`.
And most of the tools are in `~/bin/flutter/bin`.

Ex)

https://github.com/flutter/flutter is the flutter.

You put a Text widget.

Where is it coming from?

The answer is it's coming from Flutter. But what is flutter?

The flutter is https://github.com/flutter/flutter

Meaning, the Text widget is coming from https://github.com/flutter/flutter.

Where? Tell me exactly where it is coming from.

The answer is:
https://github.com/flutter/flutter/blob/master/packages/flutter/lib/src/widgets/text.dart

How to install Flutter?

You can use brew.

% brew install flutter

You can simply clone

% git clone https://github.com/flutter/flutter

You can download and install from the official website.

```
environment:
  sdk: ">=2.19.2 <3.0.0"
```

Things to know first

- Style Guide
  Dart style guide
  Flutter style guide
    - Remove blocks as much as you can.
        - The block is a block of codes like { … }

```
if ( x ) {
  // this is block
}
```

- State

- `const` is built on build time.

Anatomy of StatelessWidget

```
class MyWidget extends StatelessWidget {
 build(_) => Container();
}
```

Anatomy of StatefulWidget

```
class MyWidget extends StatefulWidget {
 createState() => __();
}
class __ extends State {
 build(_) => Container();
}
```

First app - Test drive

https://docs.flutter.dev/get-started/test-drive

Learn how to create a flutter app and test run.
Learn hot reload.

Learning Dart Language

https://dart.dev/language
https://dart.dev/language/variables
https://dart.dev/language/collections
https://dart.dev/language/typedefs
https://dart.dev/language/functions
https://dart.dev/language/control-flow
https://dart.dev/language/error-handling
https://dart.dev/language/classes
https://dart.dev/language/constructors
https://dart.dev/language/methods
https://dart.dev/language/extend
https://dart.dev/language/extension-methods
https://dart.dev/language/enum
https://dart.dev/language/callable-classes
https://dart.dev/language/async
https://dart.dev/language/concurrency
https://dart.dev/null-safety
https://dart.dev/codelabs/async-await
https://dart.dev/tutorials/language/streams

Write your first Flutter app

https://github.com/withcenterdev3/your-first-app

The video
Follow This YouTube (Very Good)

The Codelab

https://codelabs.developers.google.com/codelabs/flutter-codelab-first#2

Flutter Basic

- Introduction to widgets
- Building layouts tutorial
- Add interactivity tutorial

UI - Animation, Design, Effects, FORM

https://docs.flutter.dev/cookbook/design/snackbars
https://docs.flutter.dev/cookbook/design/themes
https://docs.flutter.dev/cookbook/effects/expandable-fab
https://docs.flutter.dev/cookbook/effects/gradient-bubbles

- Build a form with validation
- Create and style a text field
- Focus and text fields
- Handle changes to a text field
- Retrieve the value of a text field

- Add Material touch ripples
- Handle taps
- Implement swipe to dismiss

- Display images from the internet
- Fade in images with a placeholder
- Work with cached images

- Create a grid list
- Create a horizontal list
- Create lists with different types of items
- Place a floating app bar above a list
- Use lists
- Work with long lists

- Report errors to a service
-

- Fetch data from the internet
- Make authenticated requests
- Parse JSON in the background
- Send data to the internet
- Update data over the internet
- Delete data on the internet

- Animate a widget across screens
- Navigate to a new screen and back
- Navigate with named routes
- Pass arguments to a named route
- Set up app links for Android
- Set up universal links for iOS
- Return data from a screen
- Send data to a new screen

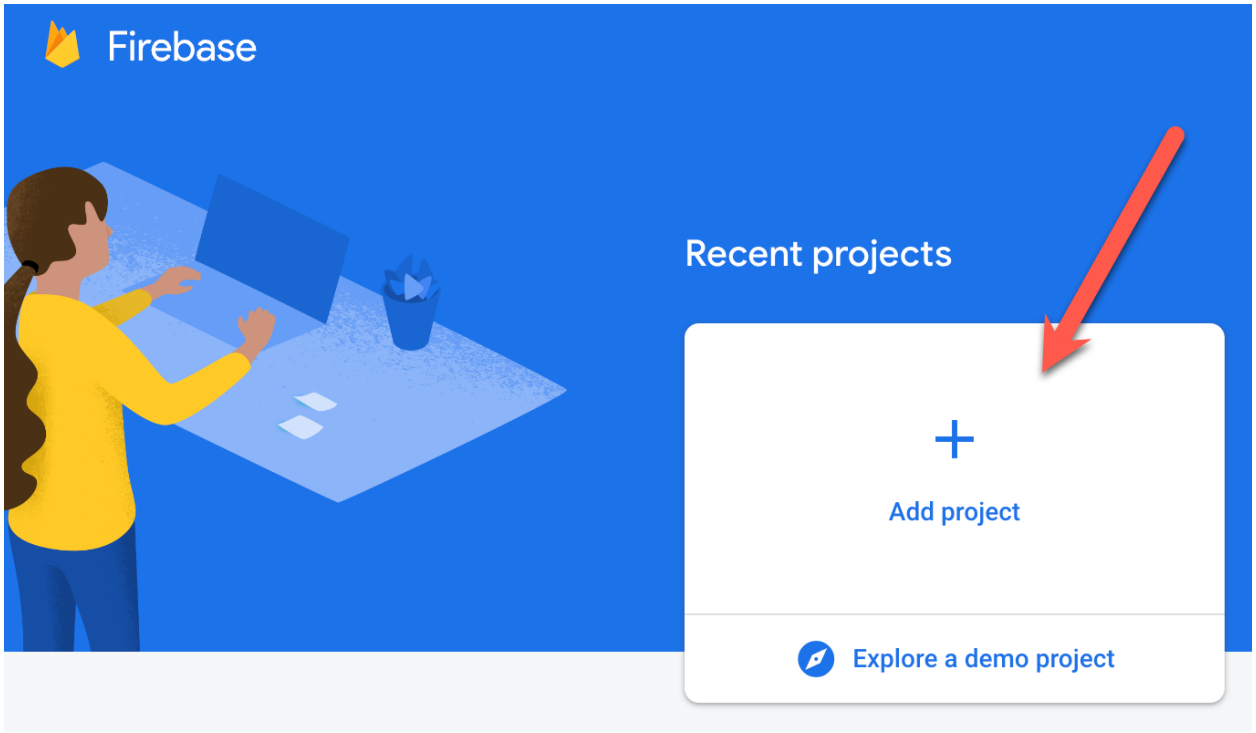
https://docs.flutter.dev/cookbook/animation/page-route-animation
https://docs.flutter.dev/cookbook/animation/animated-container
https://docs.flutter.dev/cookbook/animation/opacity-animation

Firebase

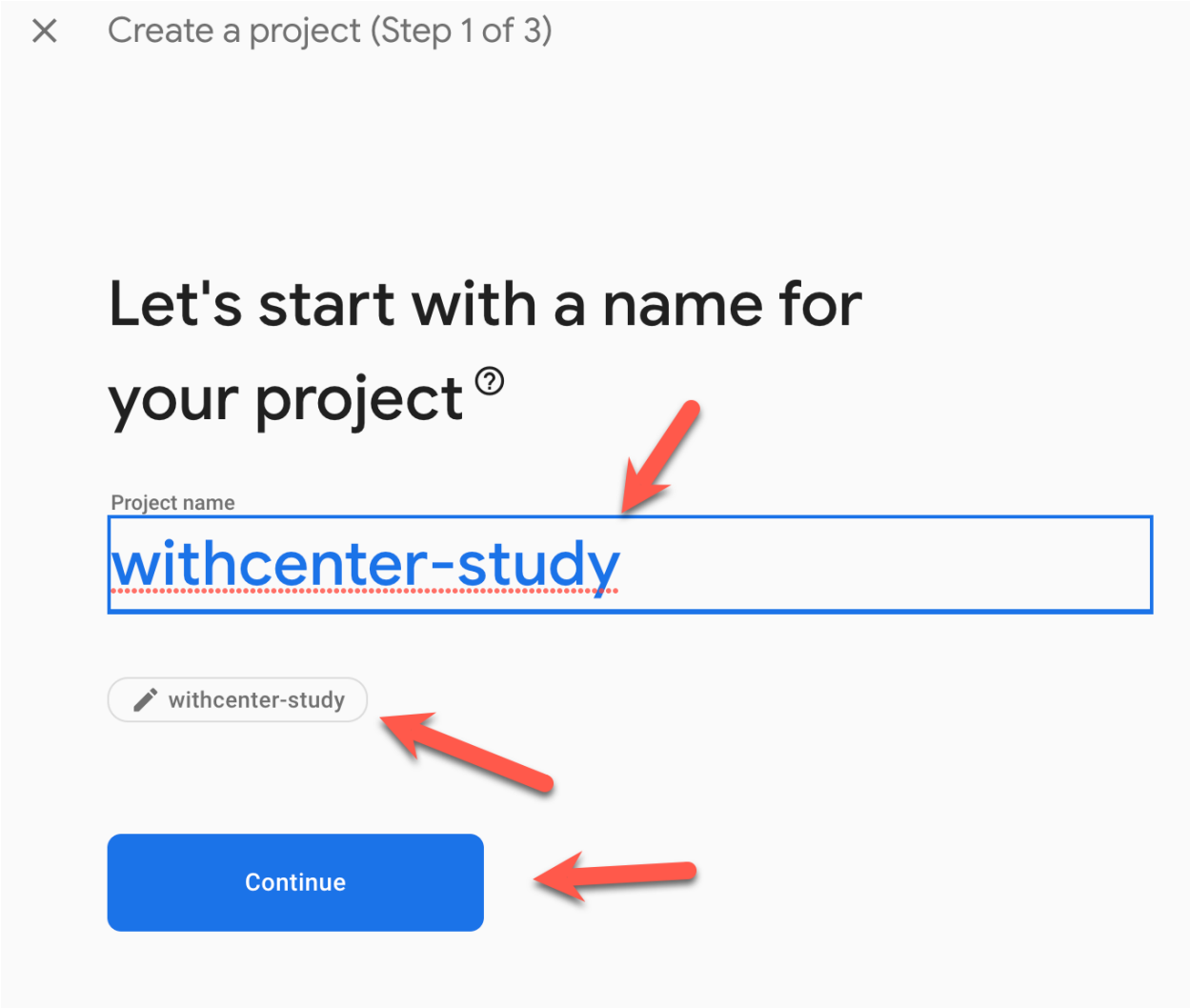
Firebase Installation

See https://firebase.google.com/docs/flutter/setup?platform=ios and follow.

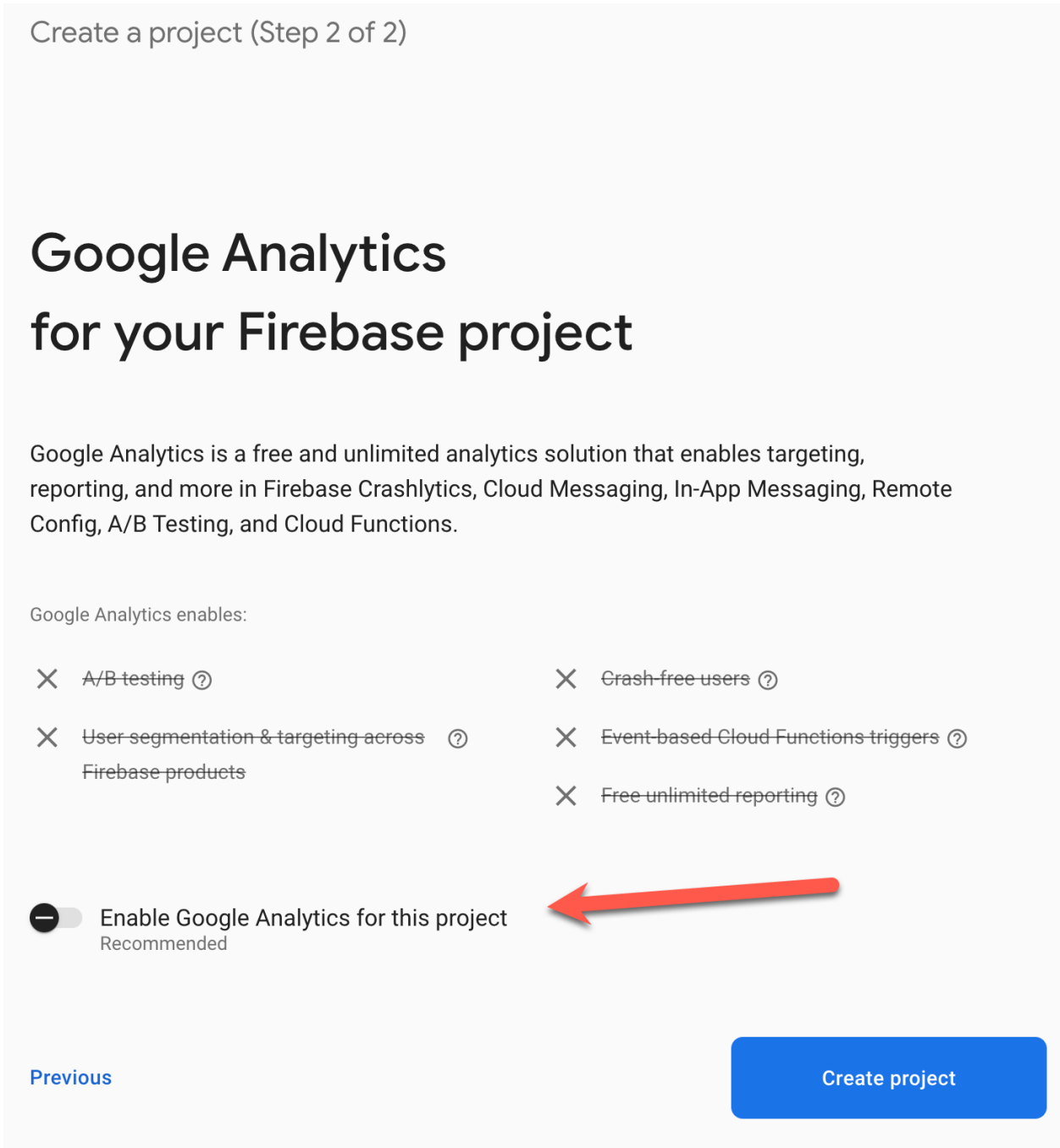
- [ ] Create a new Firebase Project (or you can use existing one)



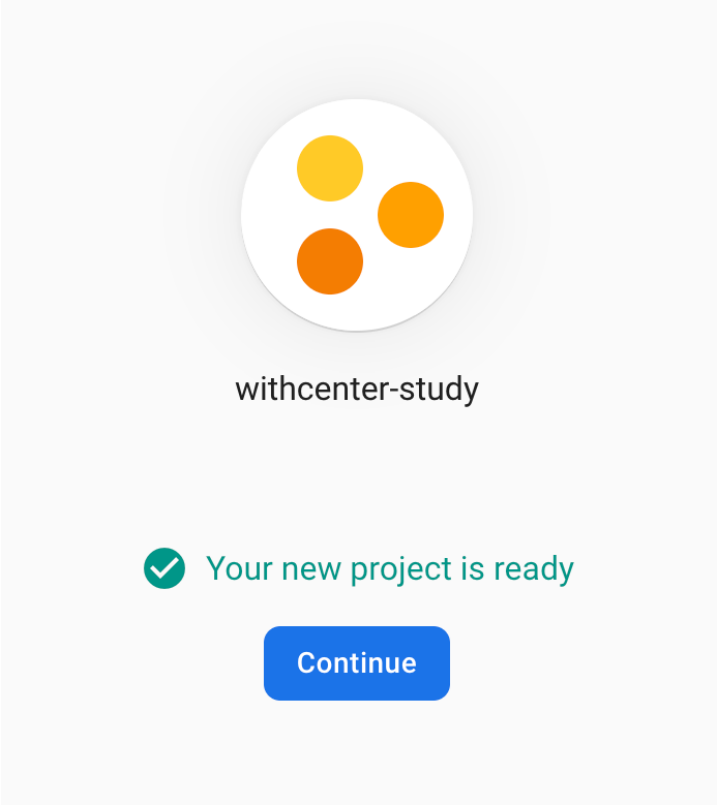
Input the project name.



No need to enable statistics for learning (or testing)


Create a project (Step 2 of 2)
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, and Cloud Functions.
Google Analytics enables:
A/B testing
User segmentation & targeting across Firebase products
Crash-free users
Event-based Cloud Functions triggers
Free unlimited reporting
Enable Google Analytics for this project
Recommended
Previous
Create project

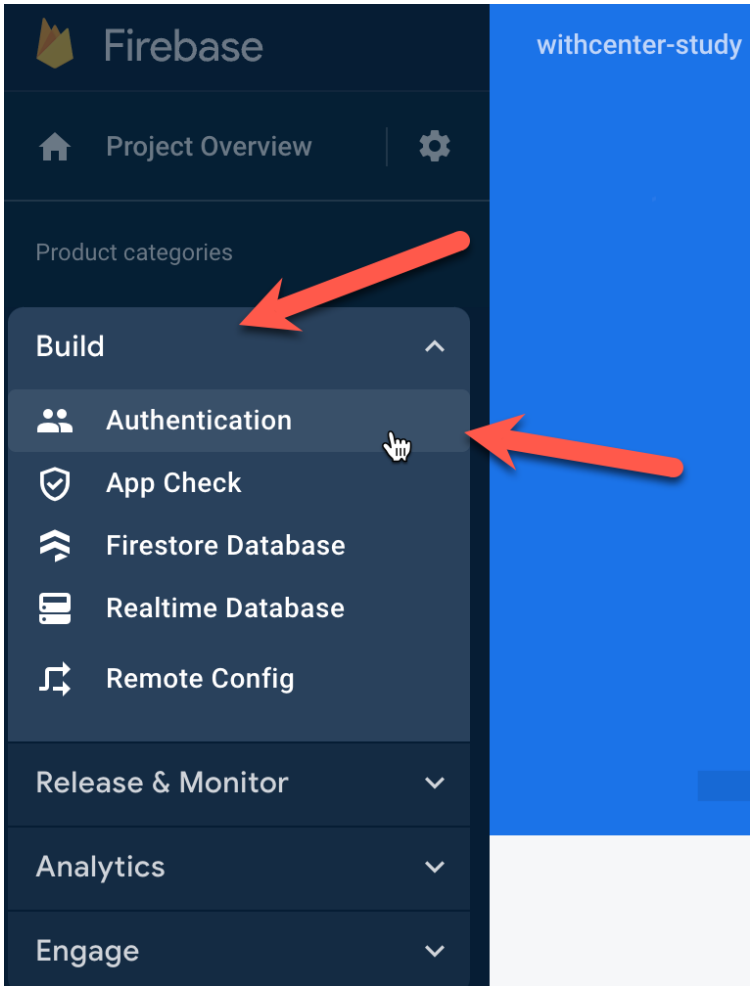
Done.



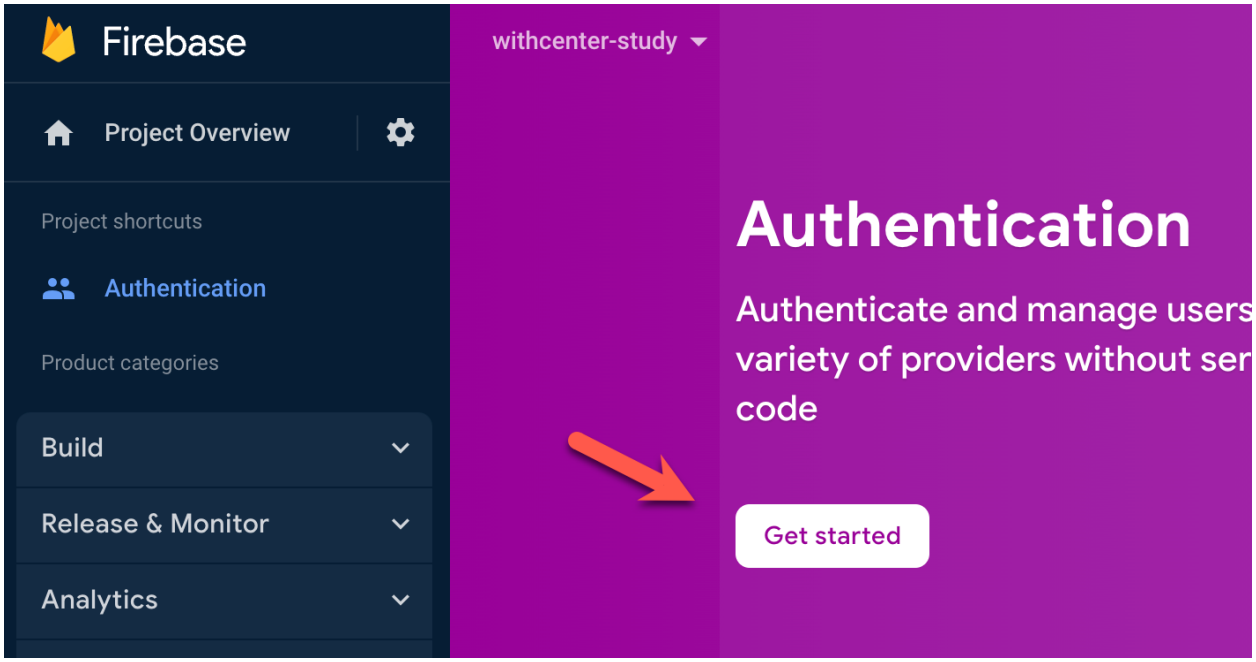
Now you have created your Firebase project.
You can use it as your Database or backend of your application.

- [ ] Enable User Authentication. So, your app(or your users) can create accounts and login.

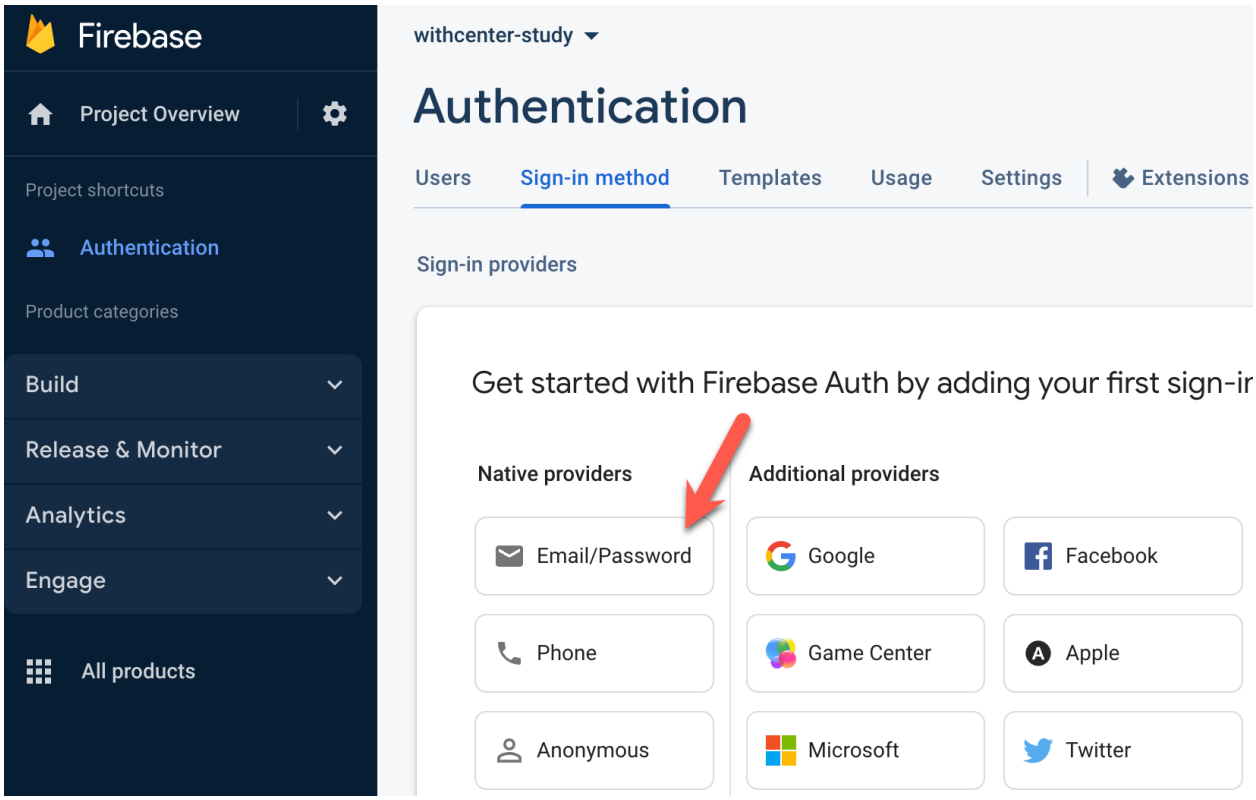
Open Build → Authentication page



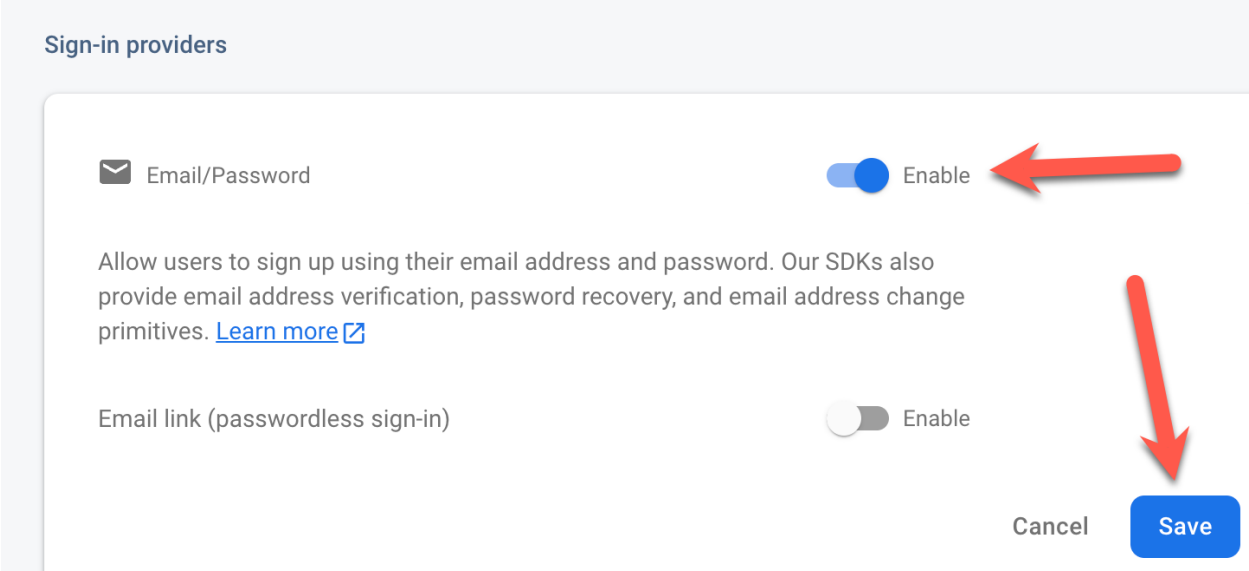
Then, press [Get started]



Then, click [Email/Password] in Build → Authentication → Sign-in method.



And enable [Email/Password] option. Then [Save]



So far, you have created your own Firebase project and enabled the Authentication feature. So, your users can register and login with their emails.

- [ ] Create Flutter App

Create your flutter app like below. The project name is `ff`.

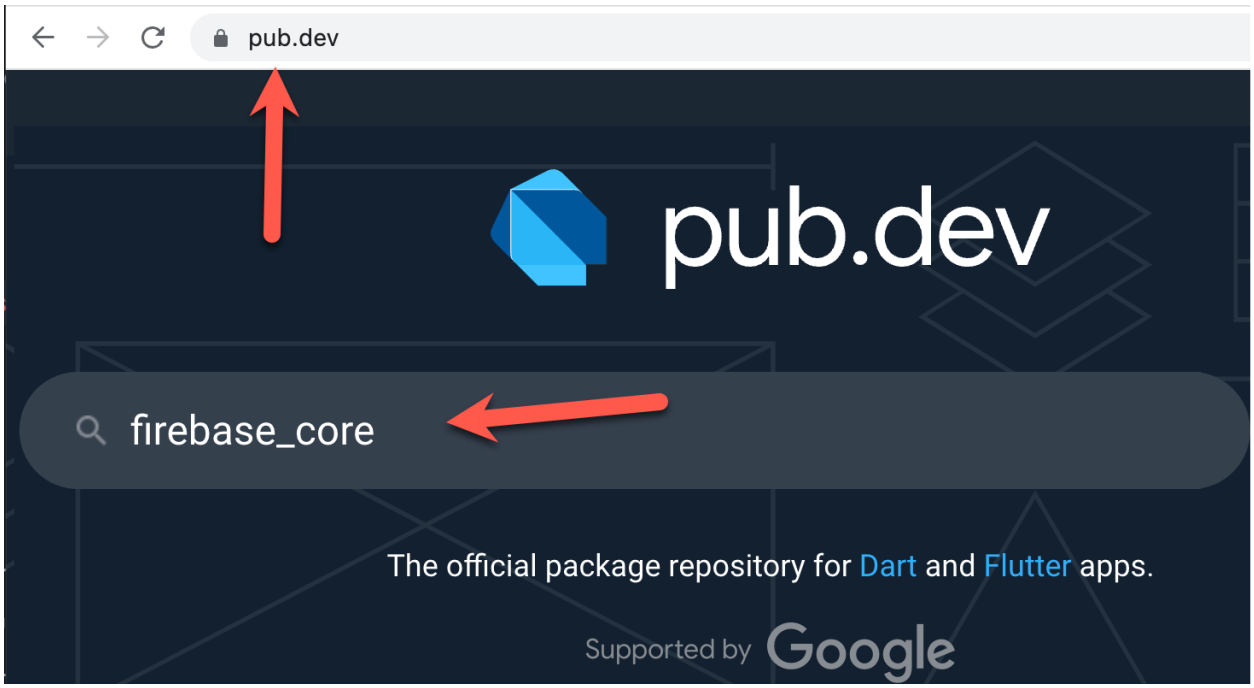
```
% flutter create ff
% cd ff
```

- [ ] Do the Firebase setup to your Flutter project. So, your app can use(connect) to Firebase.

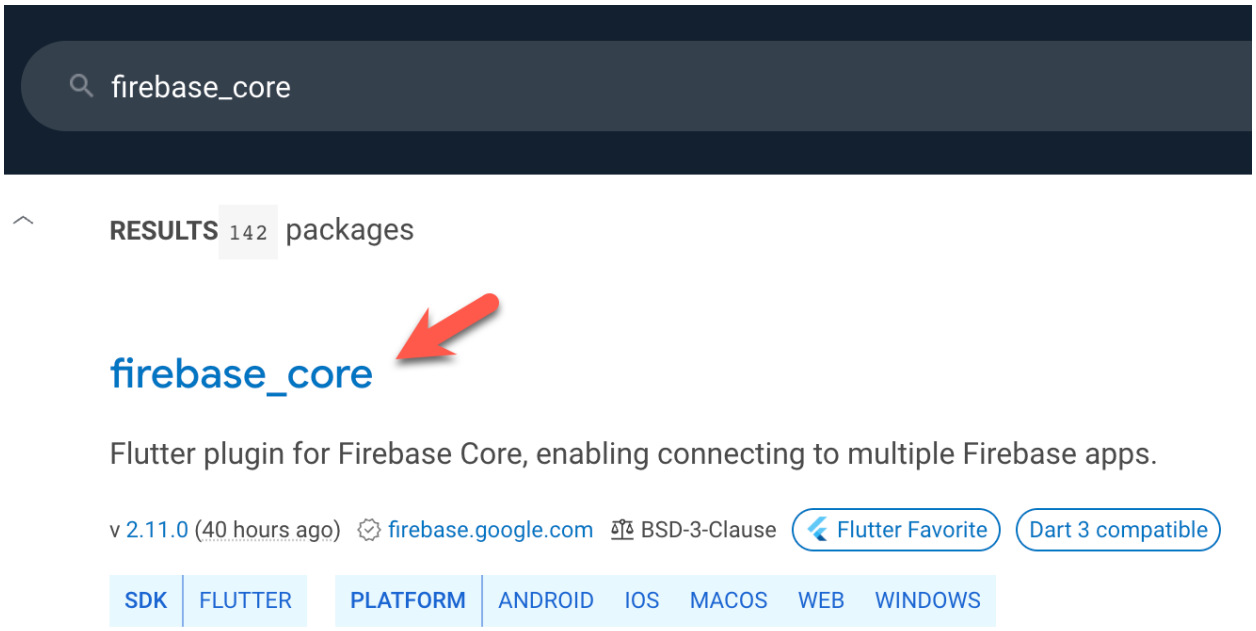
```
% firebase login
% dart pub global activate flutterfire_cli
% flutterfire configure
// → Then, select your firebase project.
// → update *build.gradle files.
```

- [ ] Install Firebase Core Library(plugin)

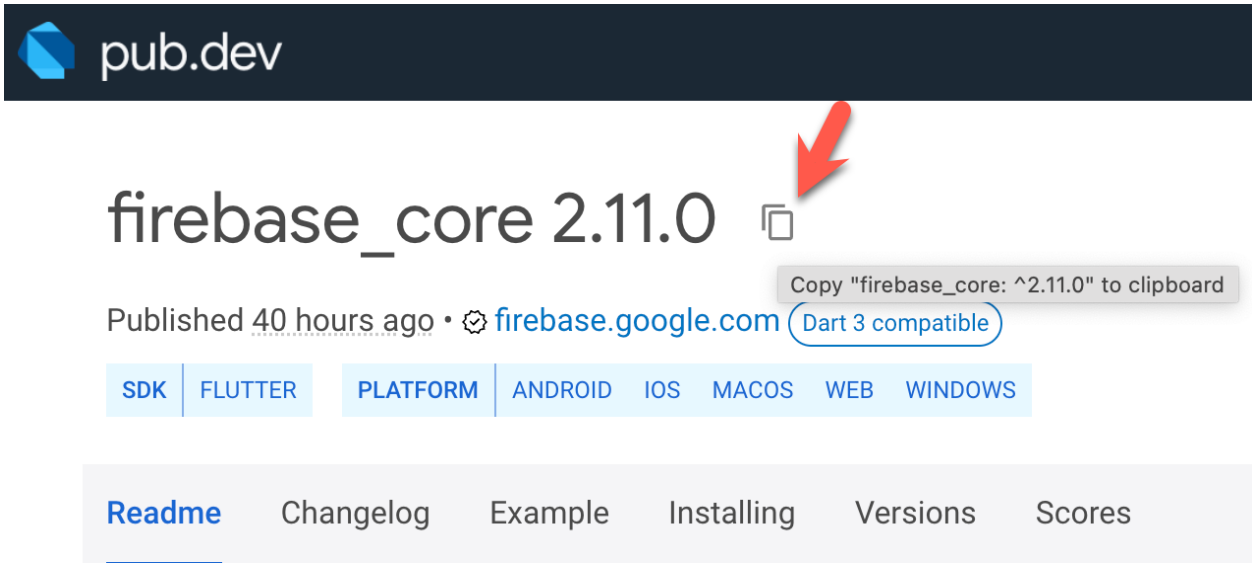
Open https://pub.dev and search for `firebase_core`.



Open the `firebase_core` package page.

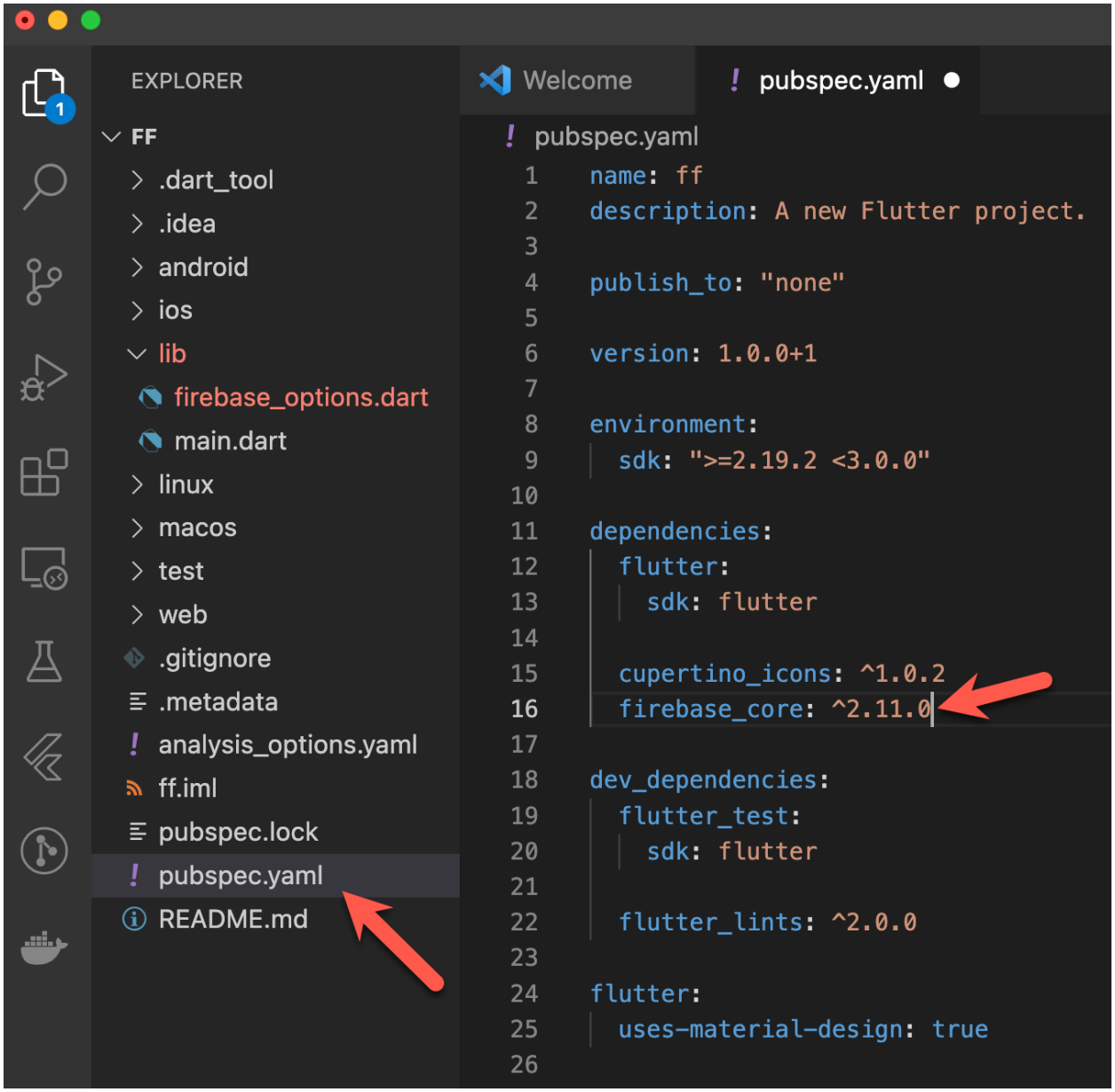


Copy the latest version.



Open pubspec.yaml file in VSCode.

And paste the latest version into the dependencies.



- [ ] Add Firebase Auth package to code email registration and login. So, your users can actually sign up and sign in.

Install `firebase_auth` just as exactly the same way of installing `firebase_core` package.

So far, you have

- Created your firebase project.
- Enabled Authentication in Firebase project. So your users can register/login by their emails.
- Create a Flutter app.
    - And setup your flutter app with Firebase.
- And installed Firebase Core plugin in your Flutter app to connect and use Firebase.
- Then, lastly, you have installed the Firebase Authentication package to build user registration and login.

Firebase Authentication

- [ ] Code for firebase connection. So, when your app is running, your app can actually use the Firebase.

With the code below, your app is now using Firebase.

lib/main.dart)

```
import 'package:ff/firebase_options.dart';
import 'package:firebase_core/firebase_core.dart';
import 'package:flutter/material.dart';

void main() async {
 WidgetsFlutterBinding.ensureInitialized();
 await Firebase.initializeApp(
   options: DefaultFirebaseOptions.currentPlatform,
 );
 runApp(const MyApp());
}
```

- [ ] Add registration code

With the code below, your user(or you) can register into Firebase.

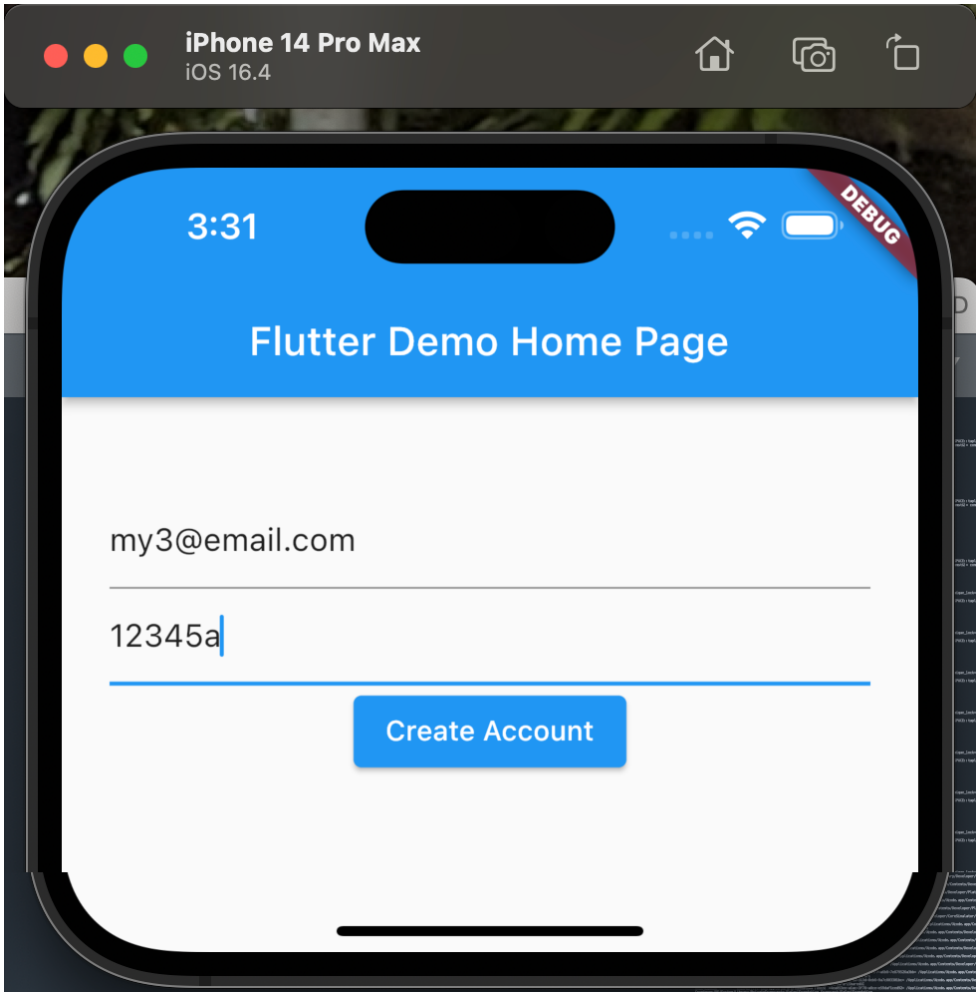
lib/main.dart)

```
import 'package:ff/firebase_options.dart';
import 'package:firebase_auth/firebase_auth.dart';
import 'package:firebase_core/firebase_core.dart';
import 'package:flutter/material.dart';

void main() async {
 WidgetsFlutterBinding.ensureInitialized();
 await Firebase.initializeApp(
   options: DefaultFirebaseOptions.currentPlatform,
 );
 runApp(const MyApp());
}

class MyApp extends StatelessWidget {
 const MyApp({super.key});

 @override
 Widget build(BuildContext context) {
   return MaterialApp(
     title: 'Flutter Demo',
     theme: ThemeData(
       primarySwatch: Colors.blue,
     ),
     home: const MyHomePage(title: 'Flutter Demo Home Page'),
   );
 }
}

class MyHomePage extends StatefulWidget {
```

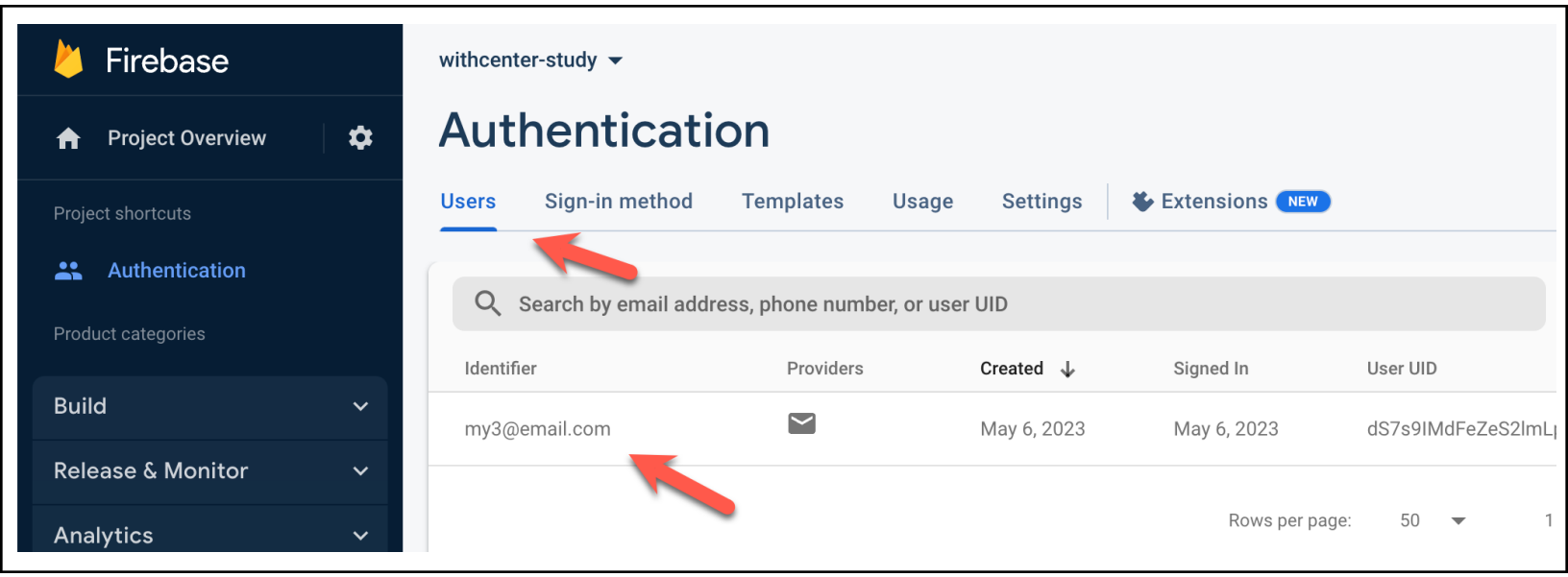
```dart
 const MyHomePage({super.key, required this.title});

 final String title;

 @override
 State<MyHomePage> createState() => _MyHomePageState();
}

class _MyHomePageState extends State<MyHomePage> {
 final email = TextEditingController();
 final password = TextEditingController();

 @override
 Widget build(BuildContext context) {
   return Scaffold(
     appBar: AppBar(
       title: Text(widget.title),
     ),
     body: Center(
       child: Padding(
         padding: const EdgeInsets.all(24),
         child: Column(
           mainAxisAlignment: MainAxisAlignment.center,
           children: <Widget>[
             TextField(
               controller: email,
               decoration: const InputDecoration(hintText: 'Input Email'),
             ),
             TextField(
               controller: password,
               decoration: const InputDecoration(hintText: 'Input Password'),
             ),
             ElevatedButton(
                 onPressed: () async {
```

```
                    try {
                      final credential = await FirebaseAuth.instance
                          .createUserWithEmailAndPassword(
                        email: email.text,
                        password: password.text,
                      );
                      print(credential.user);
                    } on FirebaseAuthException catch (e) {
                      if (e.code == 'weak-password') {
                        print('The password provided is too weak.');
                      } else if (e.code == 'email-already-in-use') {
                        print('The account already exists for that email.');
                      }
                    } catch (e) {
                      print(e);
                    }
                  },
                  child: const Text('Create Account'))
            ],
          ),
        ),
      ),
    );
  }
}
```

You will see a screen like below with the code above.



Once you register, you will see your account in the Firebase Authentication page.



☐ Let's display user email when user register or login (instead of the registration form).

The code below shows user email information when user registered or logged in (instead of register or login form.)

```
import 'package:ff/firebase_options.dart';
import 'package:firebase_auth/firebase_auth.dart';
import 'package:firebase_core/firebase_core.dart';
import 'package:flutter/material.dart';

void main() async {
 WidgetsFlutterBinding.ensureInitialized();
 await Firebase.initializeApp(
   options: DefaultFirebaseOptions.currentPlatform,
 );
 runApp(const MyApp());
}

class MyApp extends StatelessWidget {
 const MyApp({super.key});

 @override
 Widget build(BuildContext context) {
```

```
    return MaterialApp(
      title: 'Flutter Demo',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: const MyHomePage(title: 'Flutter Demo Home Page'),
    );
  }
}

class MyHomePage extends StatefulWidget {
  const MyHomePage({super.key, required this.title});

  final String title;

  @override
  State<MyHomePage> createState() => _MyHomePageState();
}

class _MyHomePageState extends State<MyHomePage> {
  final email = TextEditingController();
  final password = TextEditingController();

  User? user;

  @override
  void initState() {
    super.initState();

    FirebaseAuth.instance.authStateChanges().listen((user) {
      if (user == null) {
        print('User is currently signed out!');
      } else {
        print('User is signed in!');
      }
      setState(() {
        this.user = user;
      });
    });
  }
```

```dart
@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text(widget.title),
    ),
    body: Center(
      child: Padding(
        padding: const EdgeInsets.all(24),
        child: Column(
          mainAxisAlignment: MainAxisAlignment.center,
          children: <Widget>[
            if (user == null) ...[
              TextField(
                controller: email,
                decoration: const InputDecoration(hintText: 'Input Email'),
              ),
              TextField(
                controller: password,
                decoration: const InputDecoration(hintText: 'Input Password'),
              ),
              Row(
                children: [
                  ElevatedButton(
                    onPressed: () async {
                      try {
                        final credential = await FirebaseAuth.instance
                            .signInWithEmailAndPassword(
                          email: email.text,
                          password: password.text,
                        );
                        print(credential.user);
                      } on FirebaseAuthException catch (e) {
                        if (e.code == 'user-not-found') {
                          print('No user found for that email.');
                        } else if (e.code == 'wrong-password') {
                          print('Wrong password provided for that user.');
                        } else {
                          print(e.code);
                          print(e.message);
                        }
```

```
                } catch (e) {
                  print(e);
                }
              },
              child: const Text('Login'),
            ),
            const Spacer(),
            ElevatedButton(
              onPressed: () async {
                try {
                  final credential = await FirebaseAuth.instance
                      .createUserWithEmailAndPassword(
                    email: email.text,
                    password: password.text,
                  );
                  print(credential.user);
                } on FirebaseAuthException catch (e) {
                  if (e.code == 'weak-password') {
                    print('The password provided is too weak.');
                  } else if (e.code == 'email-already-in-use') {
                    print('The account already exists for that email.');
                  }
                } catch (e) {
                  print(e);
                }
              },
              child: const Text('Register'),
            ),
          ],
        ),
      ],
      if (user != null) ...[
        Text('User: ${user!.email}'),
        ElevatedButton(
          onPressed: () async {
            await FirebaseAuth.instance.signOut();
          },
          child: const Text('Sign Out'),
        ),
      ]
    ],
```

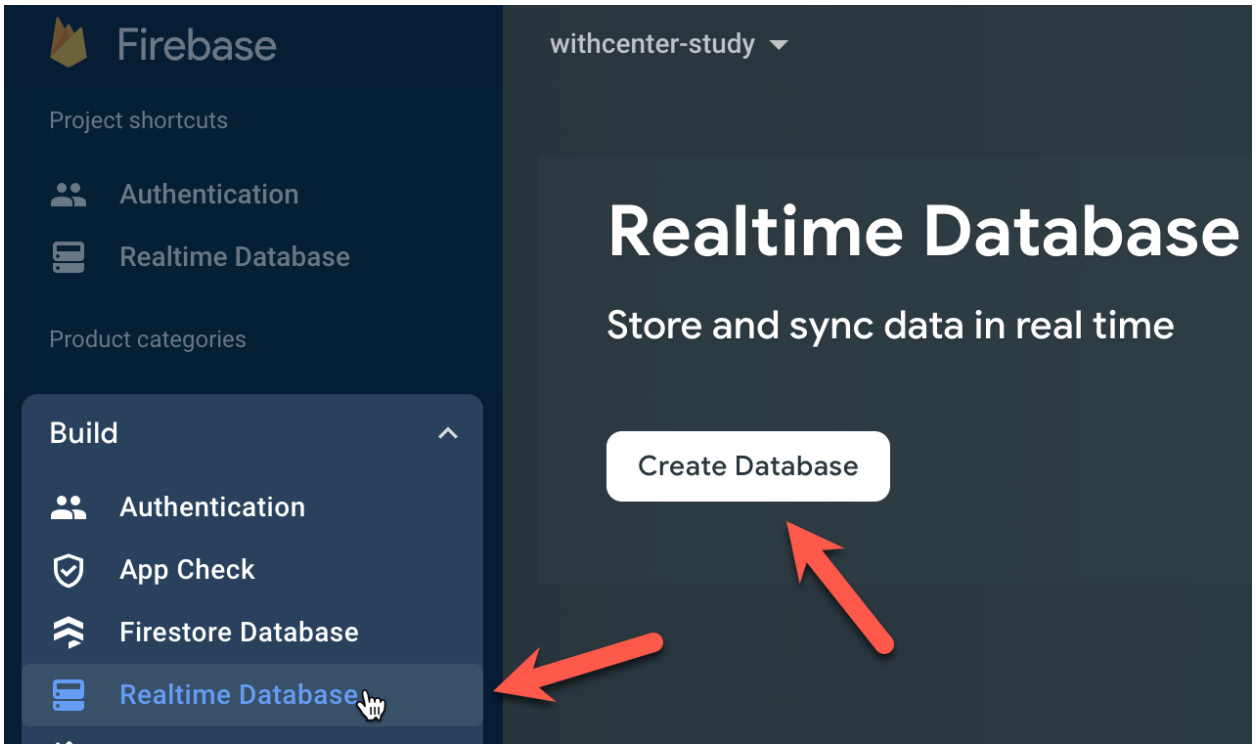
```
          ),
        ),
      ),
    );
  }
}
```

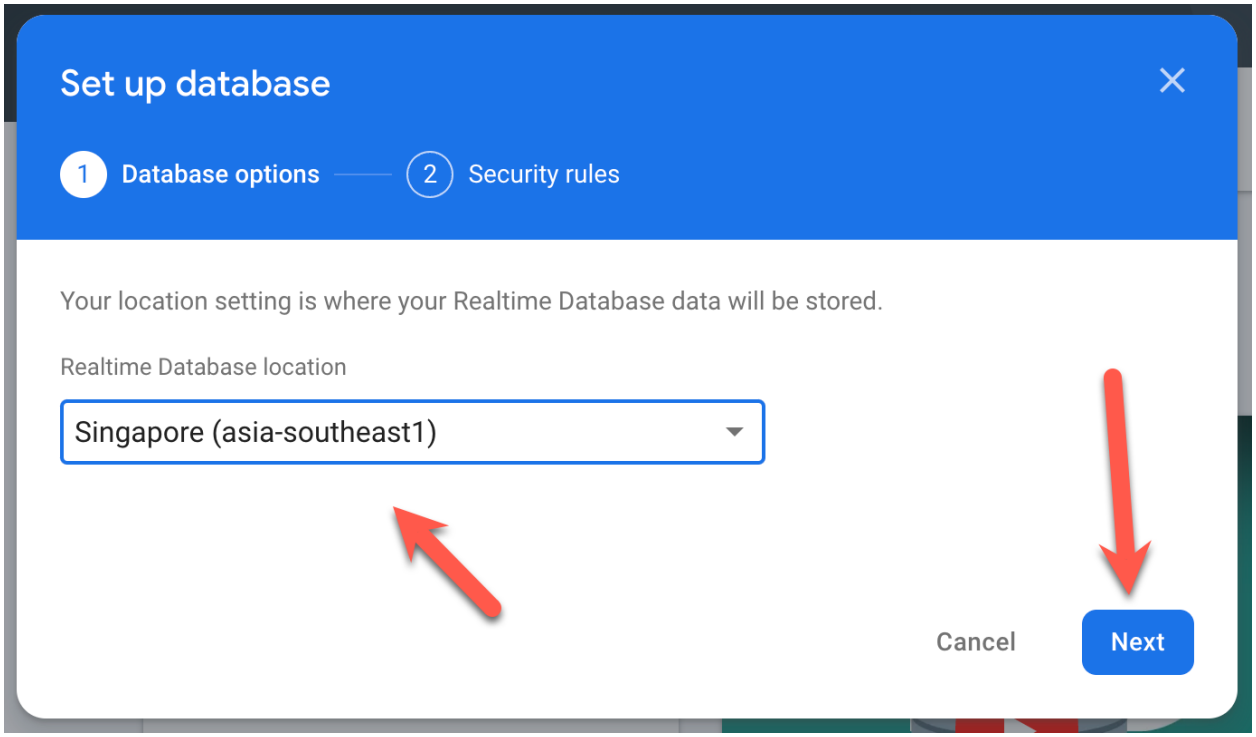
Firebase Profile Update

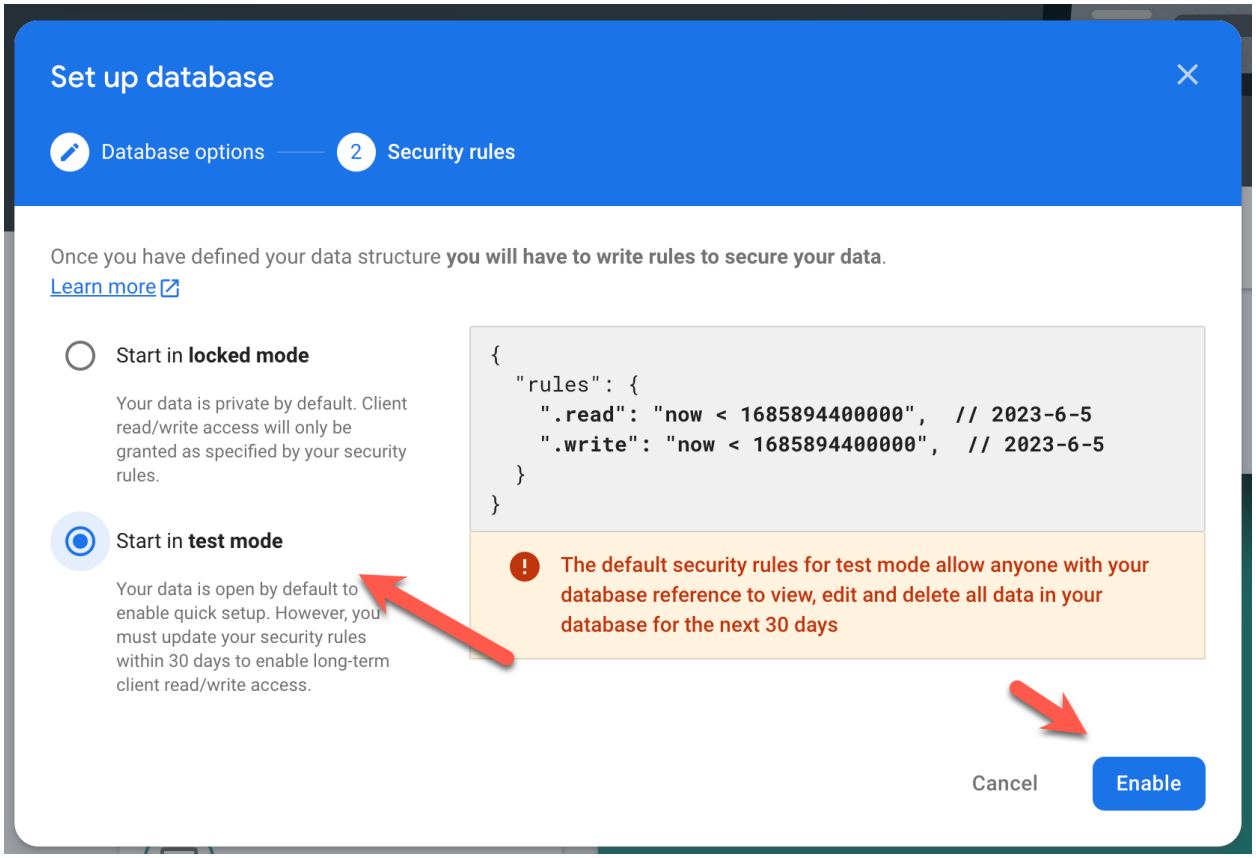
- [ ] Create a profile page. Use go_router.

Follow the [Go_Route Office document]

- [ ] Create the realtime database


Firebase
withcenter-study
Project shortcuts
Authentication
Realtime Database
Product categories
Build
Authentication
App Check
Firestore Database
Realtime Database
Realtime Database
Store and sync data in real time
Create Database


Set up database
1 Database options
2 Security rules
Your location setting is where your Realtime Database data will be stored.
Realtime Database location
Singapore (asia-southeast1)
Cancel
Next



- [ ] Install `firebase_database`.

After installing the firebase_database package. You must run `futterfire_cli` again. By doing this, it will add database information into the setup.

- [ ] Update user display name into realtime database.

See the official documents. https://firebase.google.com/docs/database/flutter/start

See the complete working study source in github:
https://github.com/thruthesky/study-flutter/tree/firebase-profile

Day 0 - How run Flutter

% flutter run

Day 1 - StatelessWidget, StatefulWidget, Typing, Types

- Variable types in Dart

Day 2 - Layout - Constraints go down, Sizes go up, Parents set the Position **

This is the most important part **

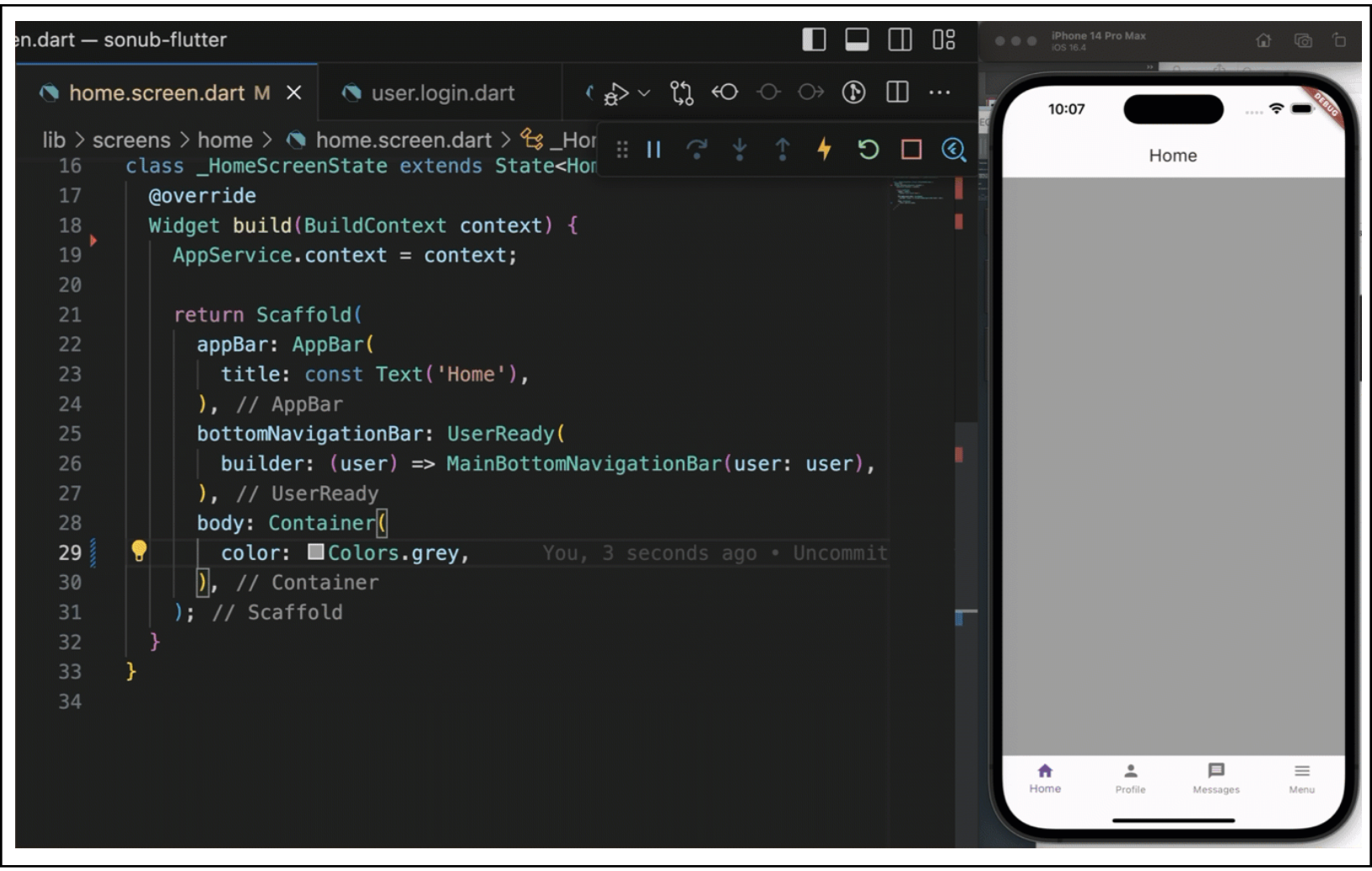
https://docs.flutter.dev/ui/layout
https://docs.flutter.dev/ui/layout/constraints

Good understanding on how layout works.
https://docs.google.com/document/d/1lXCs1eDw58J4hd6yfdLFDHf8S4KwWzAanwf4BKqYrF0/edit#heading=h.t2x75s299otu

The nature of Container

This is Mr. Song's own thoughts. It is welcome to prove that this thought is wrong.

- A container with no constraints
    - will fit into the child. (as small as its child.)
    - and no child will fit into the parent's available space.



The nature of other widgets ??

This is Mr. Song's own thoughts. It is welcome to prove that this thought is wrong.

Just like a container, if a widget has no constraints, then it will act as Container

Especially some widget that cannot have constraints will shrink its size on the cross axis only.
Like Column, Row, and others.

Know the nature of the widgets

- Row, Column will shrink its cross axis size to its child size. Not the main axis.
- Align - will take as much available space from its parent.

Day 3 - How to Use Material 3 and Theme, Layout

Don’t use Column, Row, Wrap for Adaptive layout.
Design for every device with Flutter and Material 3

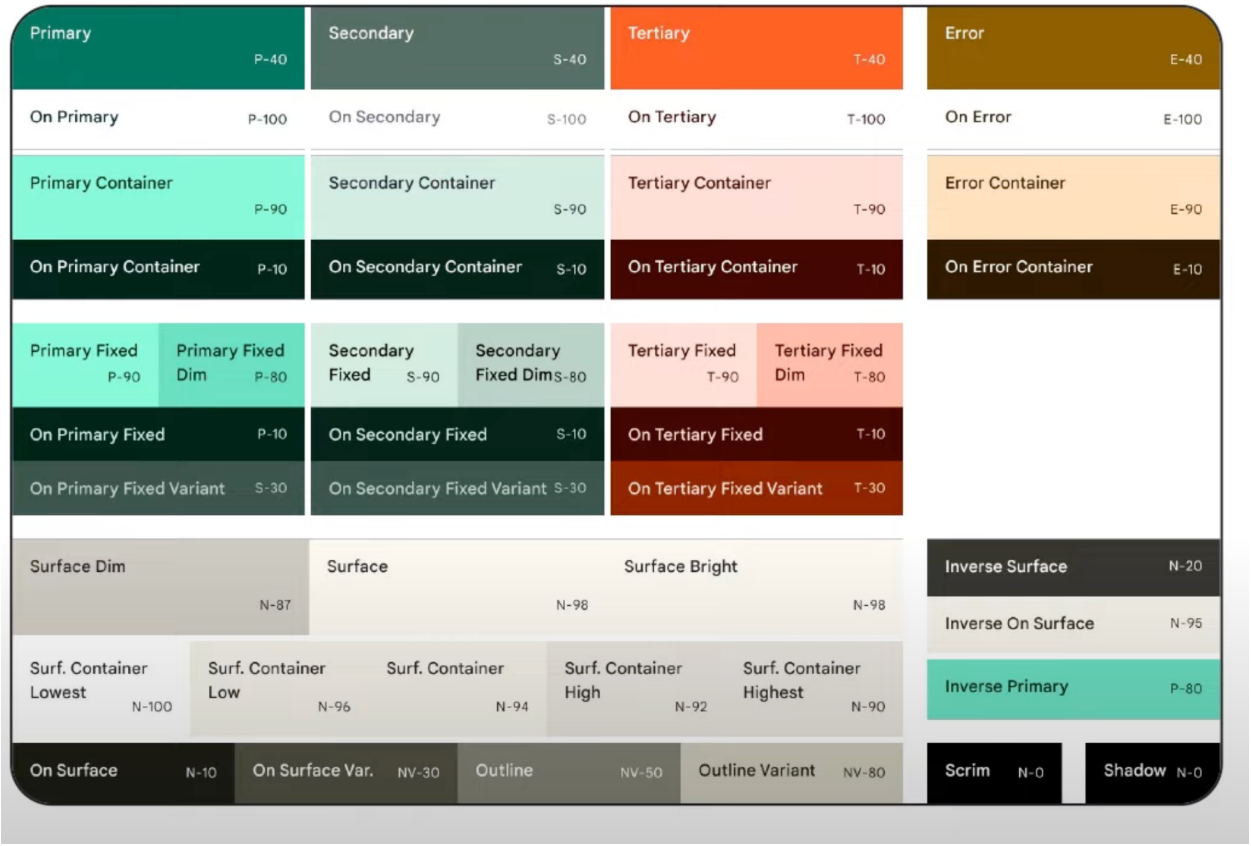
Use grid for the layout;
https://pub.dev/packages/flutter_layout_grid
See this video: Design for every device with Flutter and Material 3

01: GRID - Use grid for better RWD

```
...
return LayoutGrid(
    columnSizes: List.generate(12, (index) => 1.fr),
    rowSizes: [kToolbarHeight.px, 1.fr],
    children: const [
    GridPlacement(
        columnStart: 1,
        columnSpan: 12,
        child: Center(child: Text('Header')),
    ),
    GridPlacement(
        columnStart: 2,
        columnSpan: 10,
        child: Center(child: Text('Content')),
    ),
   ],
);
...
```

02: Color

Material 3 Color Scheme



Day 4 - How to use global variables to use consistent UI, spaces and sizes.

xs, sm, lg, xl, 2xl, 3xl

fontXs, Sm, Lg, Xl, 2xl,
iconXs, Sm, Lg, Xl, 2xl,
spaceXs, spaceSm, Md, Lg, Xl, 2xl, 3xl

Page() widget which has a scrollable Column.

primaryColor, backgroundColor, primaryTextColor, backgroundTextColor,

Day 5 - Provider - state management

From Mr. Song - It may be wrong.

> **The state** is the value of a variable. So, let's think about it as **a variable**.

Then, what is **state management?**

> Some times (or more often in Flutter) **the variable shows(displays) a wrong value**.
> And we need to manage it (to make it show correct value). This is called state management.

For instance) the code below does not show the correct value on screen.

```
class MyState extends State<StScreen> {
 String abc = 'Sample value';
```

```
@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: const Text('StScreen'),
    ),
    body: Container(
      width: double.infinity,
      padding: const EdgeInsets.all(24),
      child: Column(
        mainAxisAlignment: MainAxisAlignment.center,
        children: <Widget>[
          Text('StScreen; variable: $abc'),
          ElevatedButton(
            onPressed: () {
              abc = 'New value';
              debugPrint('abc: $abc');
            },
            child: const Text('Change value'),
```

So, what we need to do in this case is simply to call `setState()` which will manage the state.

```
setState(() {
 abc = 'New value';
});
```

Managing state means, to show the actual value on the screen. You can use `setState()` if the logic is simple and for the class member variable of the stateful widget.

What if you need to update a state which is across multiple widgets and screens? `setState()` may not work in this case.

And there are lots of helpful libraries for managing states. To name few,

- Provider
    - Official Doc
- Riverpod
- Getx
- Redux
- MobX
- BLoC
- Git it
- states_rebuilder
- Triple Pattern
- solidart
- flutter_reactive_widget

Day 6 - Go Router

Day 7 - HTTP, Modeling

https://docs.flutter.dev/cookbook/networking/fetch-data

Day 8 - Firebase

Firebase Database

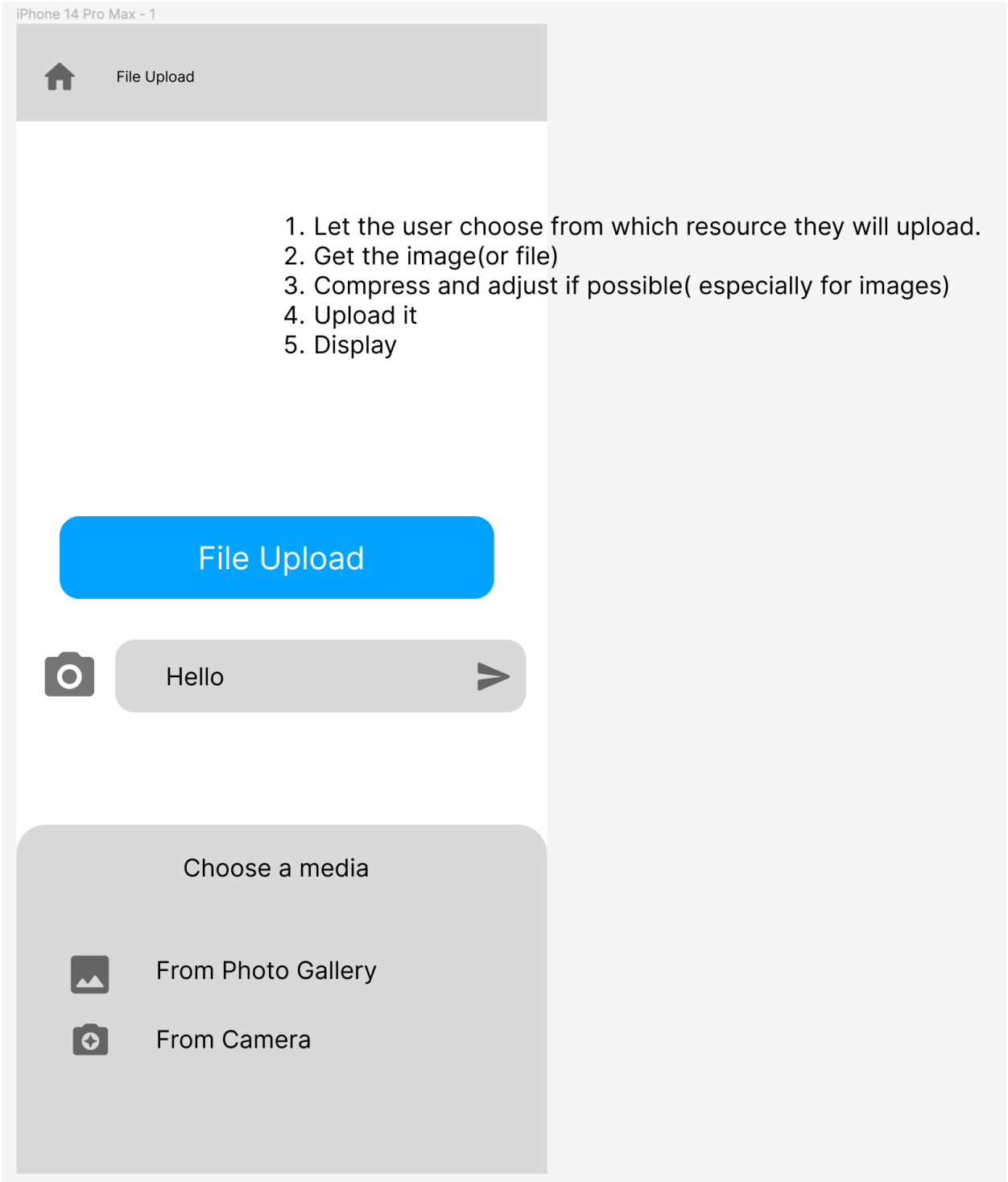
How to get newly added document

Since it listens to a single (newly added) data, the snapshot has a single document information.

ex)

```
StreamBuilder<DatabaseEvent>(
    stream: ForumService.instance
        .categoryRef(widget.category)
        .orderByChild('orderNo')
        .limitToFirst(1)
        .onChildAdded,
    builder: (context, snapshot) {
      if (snapshot.connectionState == ConnectionState.waiting) {
        return CircularProgressIndicator();
      }
      if (snapshot.hasError) {
        return Text('Error: ${snapshot.error}');
      }

      final post = PostModel.fromSnapshot(snapshot.data!.snapshot);
```

Day 9 - Image & File Upload


iPhone 14 Pro Max - 1
File Upload
1. Let the user choose from which resource they will upload.
2. Get the image(or file)
3. Compress and adjust if possible(especially for images)
4. Upload it
5. Display
File Upload
Hello
Choose a media
From Photo Gallery
From Camera

Building a package

See official Doc
https://docs.flutter.dev/packages-and-plugins/developing-packages