Resource Software Solution

Introduction

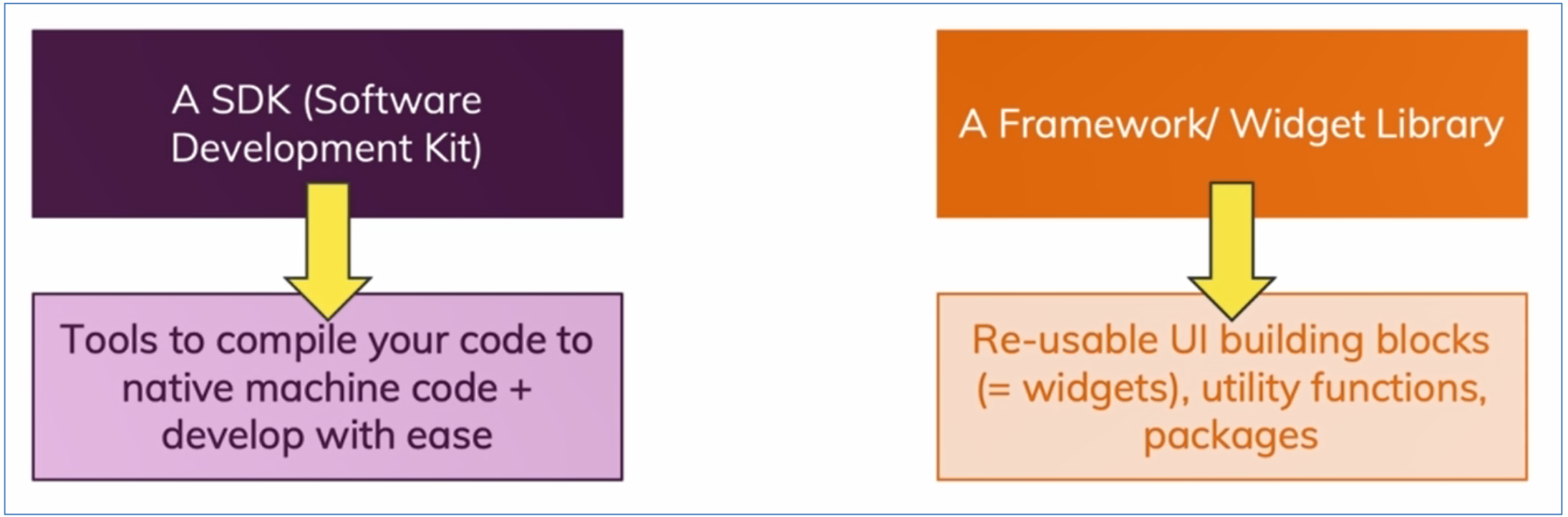
Contents

What is Flutter?

- A “tool” that allows you to build native cross-flatform (iOS, Android) apps with one programming language.
  - Using one programming language: Dart
  - Working in one project, one source code, but get two different apps as a result.
  - Normally, for native apps, you have to build two projects with different languages.
    - Native iOS app: Swift or Objective C
    - Native Android app: Kotlin or Java

What is Flutter?

- Flutter refers to two major things



What is Dart?

- Developed by Google
- A programming language focused on front-end (mobile apps, web apps) user interface (UI) development.
- Dart can also be used to build server and desktop apps.
- Dart is an object-oriented, class-based, garbage-collected language with C-style syntax (mixture of JavaScript, Java, C#).

Flutter App Architecture

UI as Code: Build a Widget Tree

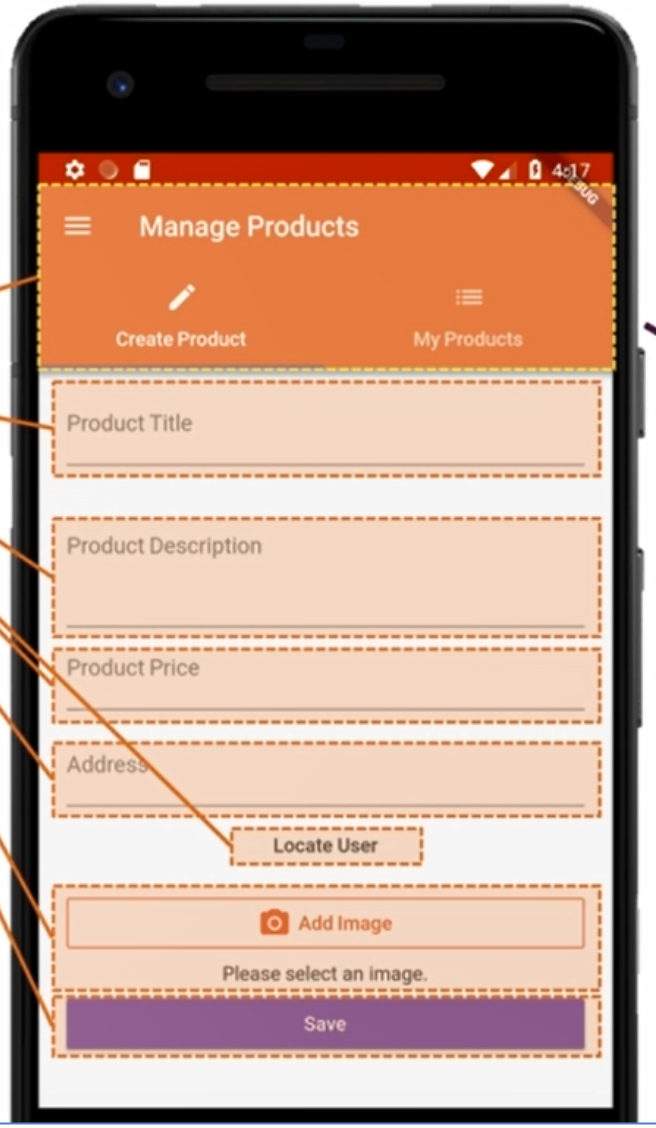
Embrace Platform Differences

One Codebase

Flutter App Architecture

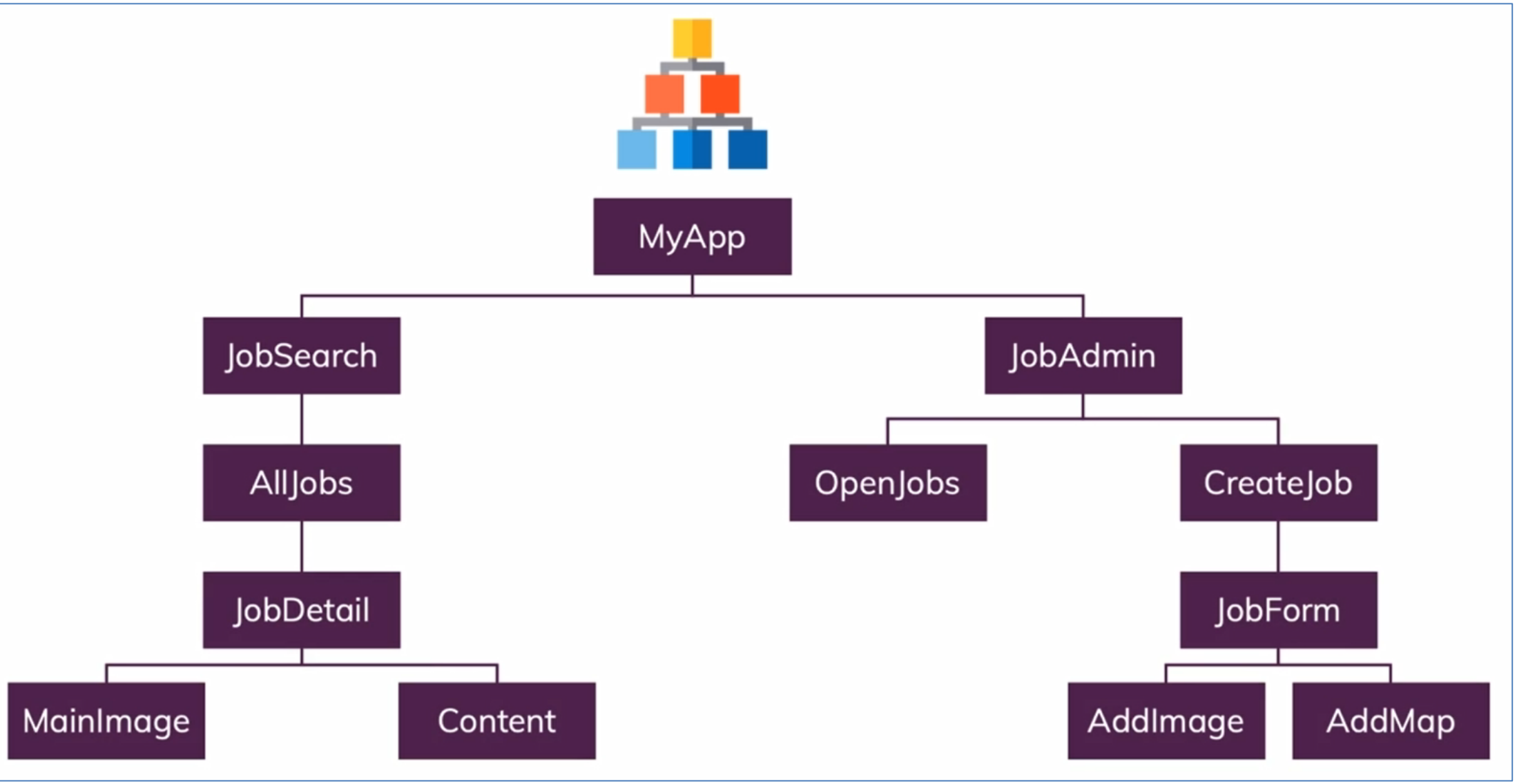
Resource Software Solution

Widgets!



Actually, the whole page is a Widget!

Flutter App Architecture



Flutter App Architecture

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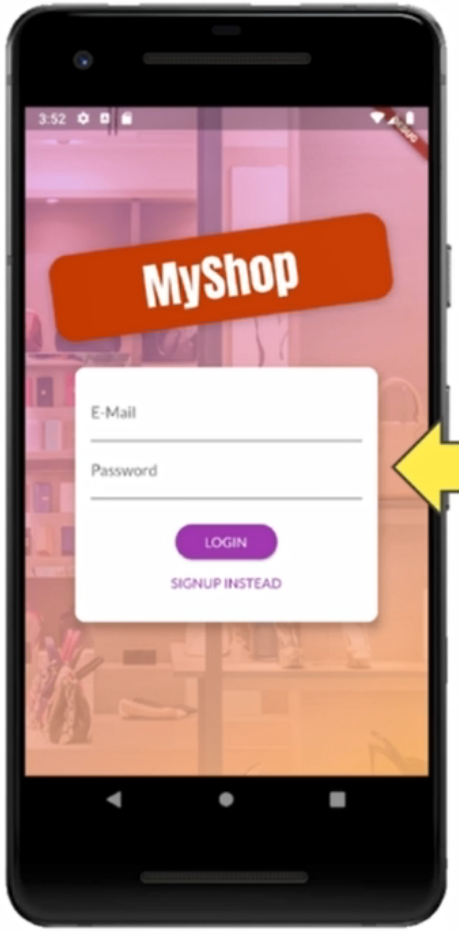
"UI as Code"

No Drag & Drop

No Visual Editor

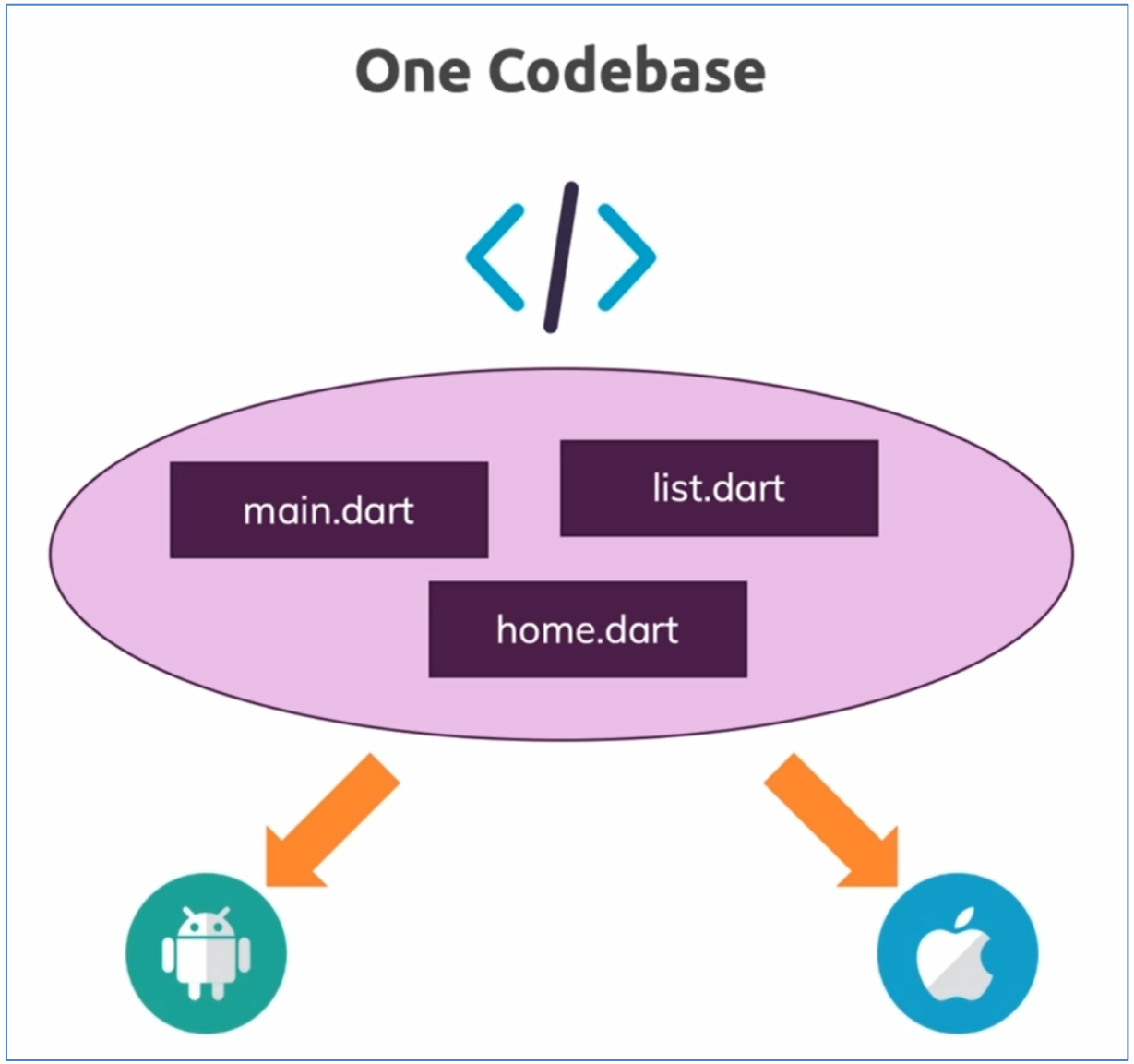
Code only

But extremely straightforward




```
body: Stack(
  children: <Widget>[
    Container(
      decoration: BoxDecoration(
        image: DecorationImage(
          image: AssetImage('assets/images/store.jpg'),
          fit: BoxFit.cover,
          alignment: Alignment.center,
        ), // DecorationImage
      ), // BoxDecoration
    ), // Container
    Container(
      // width: double.infinity,
      // height: double.infinity,
      decoration: BoxDecoration(
        gradient: LinearGradient(
          colors: [
            Color.fromRGBO(215, 117, 255, 1).withOpacity(0.5),
            Color.fromRGBO(255, 188, 117, 1).withOpacity(0.9),
          ],
          begin: Alignment.topLeft,
          end: Alignment.bottomRight,
          stops: [0, 1],
        ), // LinearGradient
      ), // BoxDecoration
    ), // Container
    SingleChildScrollView(
```

Flutter App Architecture

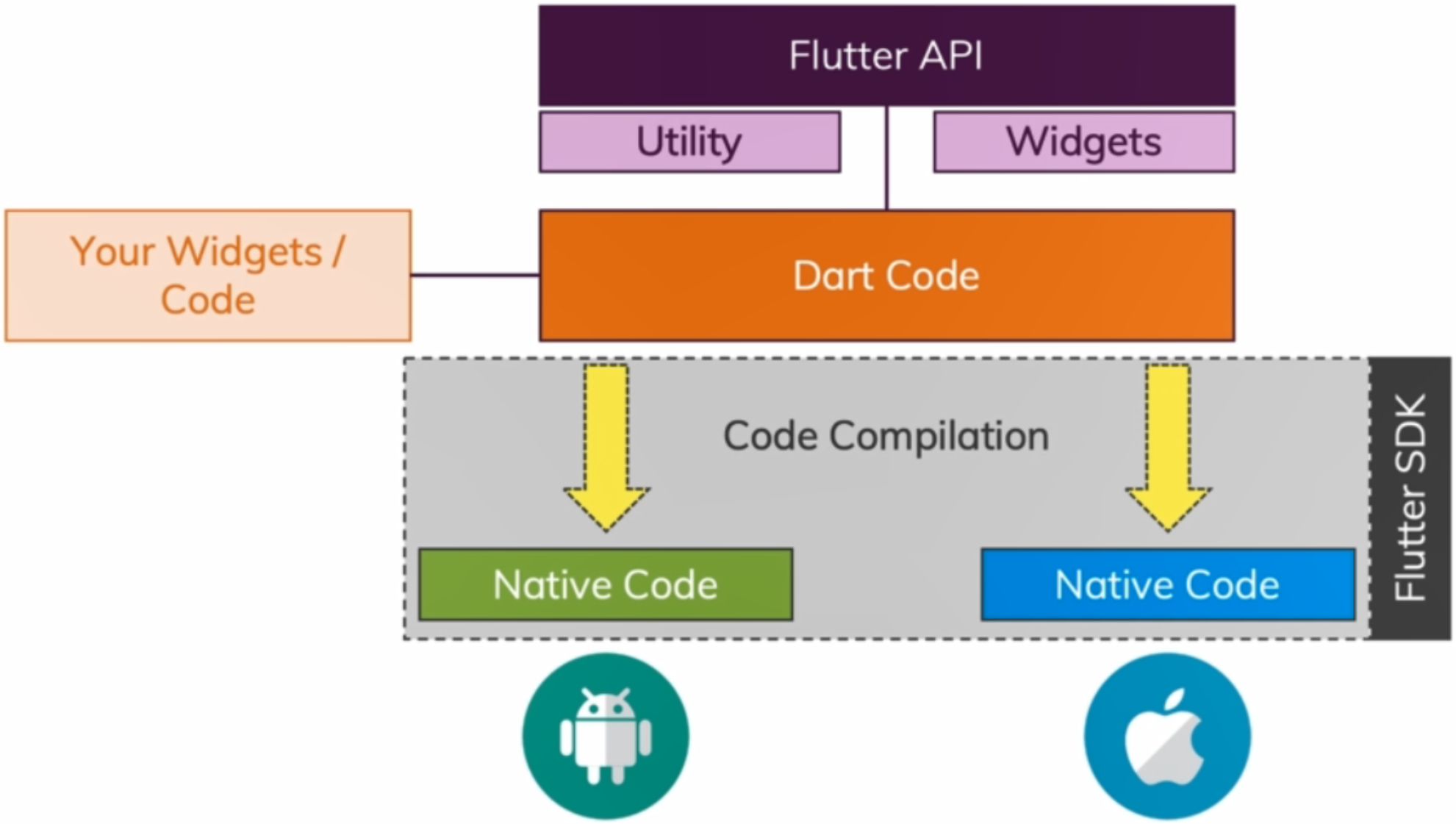


Flutter App Architecture

Embrace Platform Differences

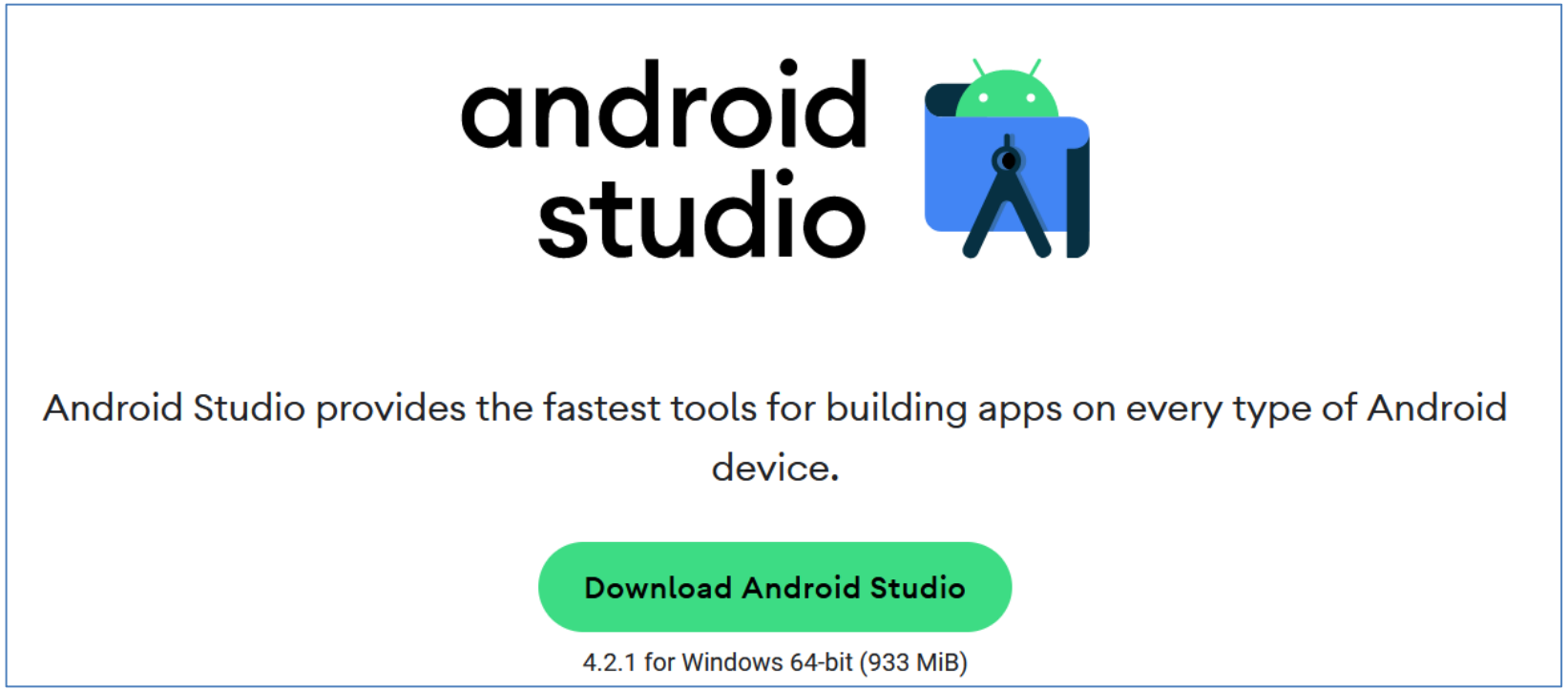
```
child: Theme.of(context).platform == TargetPlatform.iOS
       ? CupertinoButton(…) // Apple look & feel
       : RaisedButton(…) // Material (Google) look & feel
```

How is Flutter “transformed” to native app?



Flutter Setup

- Android Setup
  - Download and install Android Studio
    - Url: https://developer.android.com/studio



Flutter Setup

- Set up your Android device

  To prepare to run and test your Flutter app on an Android device, you need an **Android device** running Android 11 or higher.

  1. Enable Developer options and USB debugging on your device. Detailed instructions are available in the Android documentation.
  2. Windows-only: Install the Google USB Driver.
  3. Using a USB cable, plug your phone into your computer. If prompted on your device, authorize your computer to access your device.
  4. In the terminal, run the flutter devices command to verify that Flutter recognizes your connected Android device.

Flutter Setup

- Set up the Android emulator

  To prepare to run and test your Flutter app on the **Android emulator**, follow these steps:

  1. Enable VM acceleration on your machine.
  2. Launch Android Studio, click the **AVD Manager** icon, and select **Create Virtual Device…**
  3. Choose a device definition and select **Next**.
  4. Select one or more system images for the Android versions you want to emulate, and select **Next**. An *x86* or *x86_64* image is recommended.
  5. Select one or more system images for the Android versions you want to emulate, and select **Next**. An *x86* or *x86_64* image is recommended.
  6. Verify the AVD configuration is correct, and select **Finish**.
  7. In Android Virtual Device Manager, click **Run** in the toolbar.

Flutter Setup

- Installing Flutter SDK
  - Use command prompt
    - Create a new folder named “flutter-sdk”
    - Move to “flutter-sdk” folder then type:

      git clone https://github.com/flutter/flutter.git -b stable
  - Download
    - Download the following installation bundle

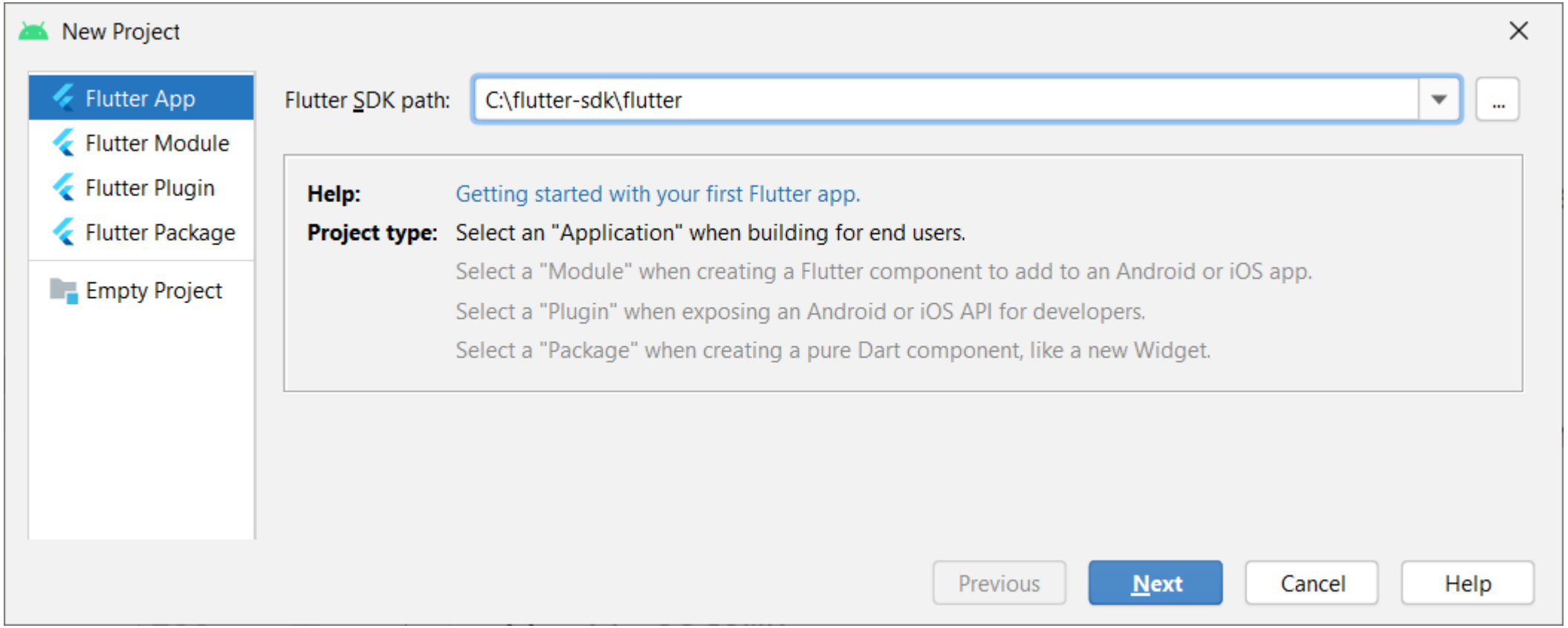
      https://docs.flutter.dev/get-started/install/
    - Extract the zip file and place the contained `flutter`

Using Android Studio

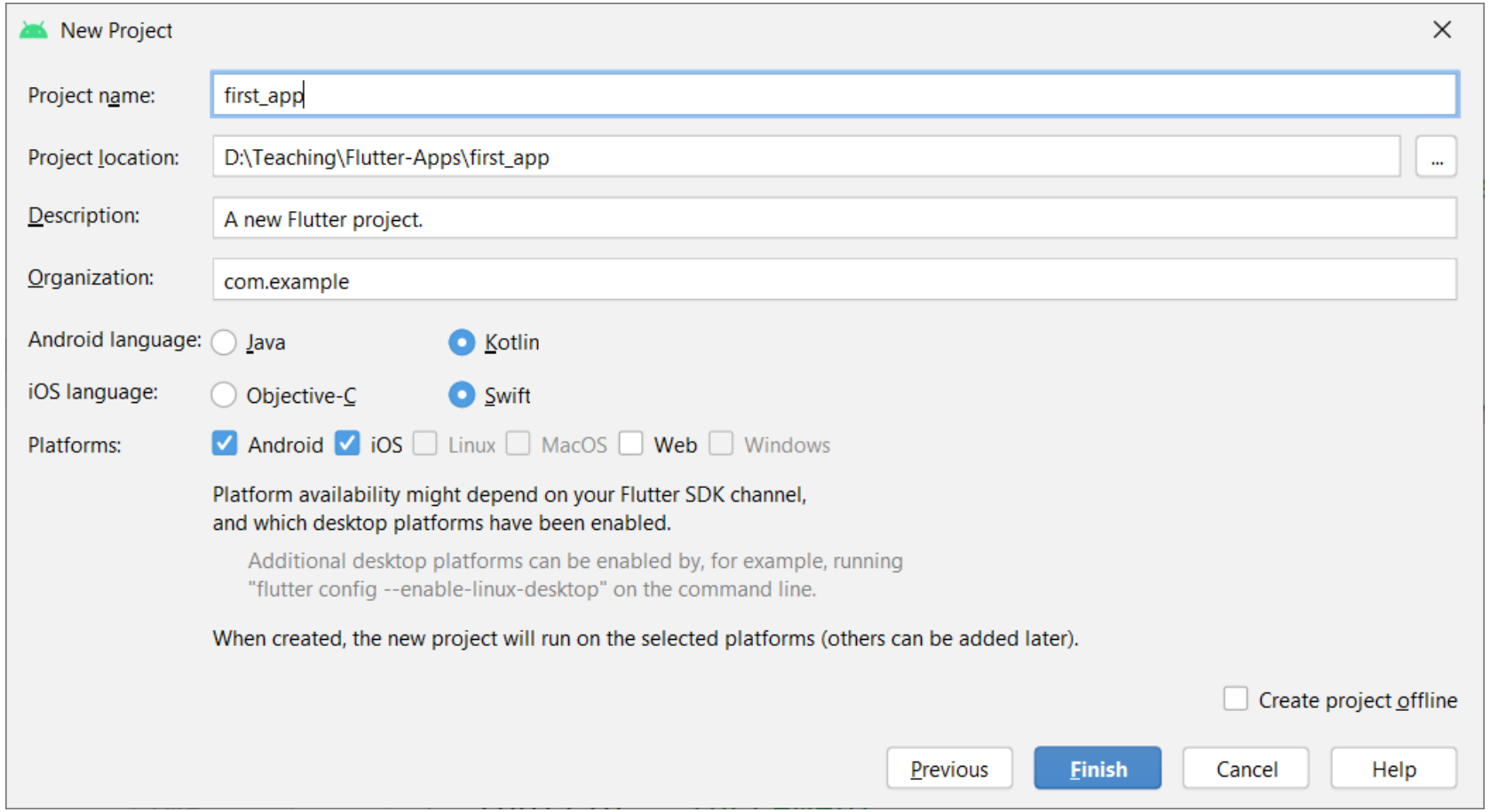
- Installing Flutter Plugin in Android Studio
  - Select File → Settings → Plugins
  - Select Marketplace tab, then type "flutter" in the search box
  - Click install button to download and install the plugin

Using Android Studio

- Select File → New → New Flutter Project…
- Browse Flutter SDK path, then click Next button

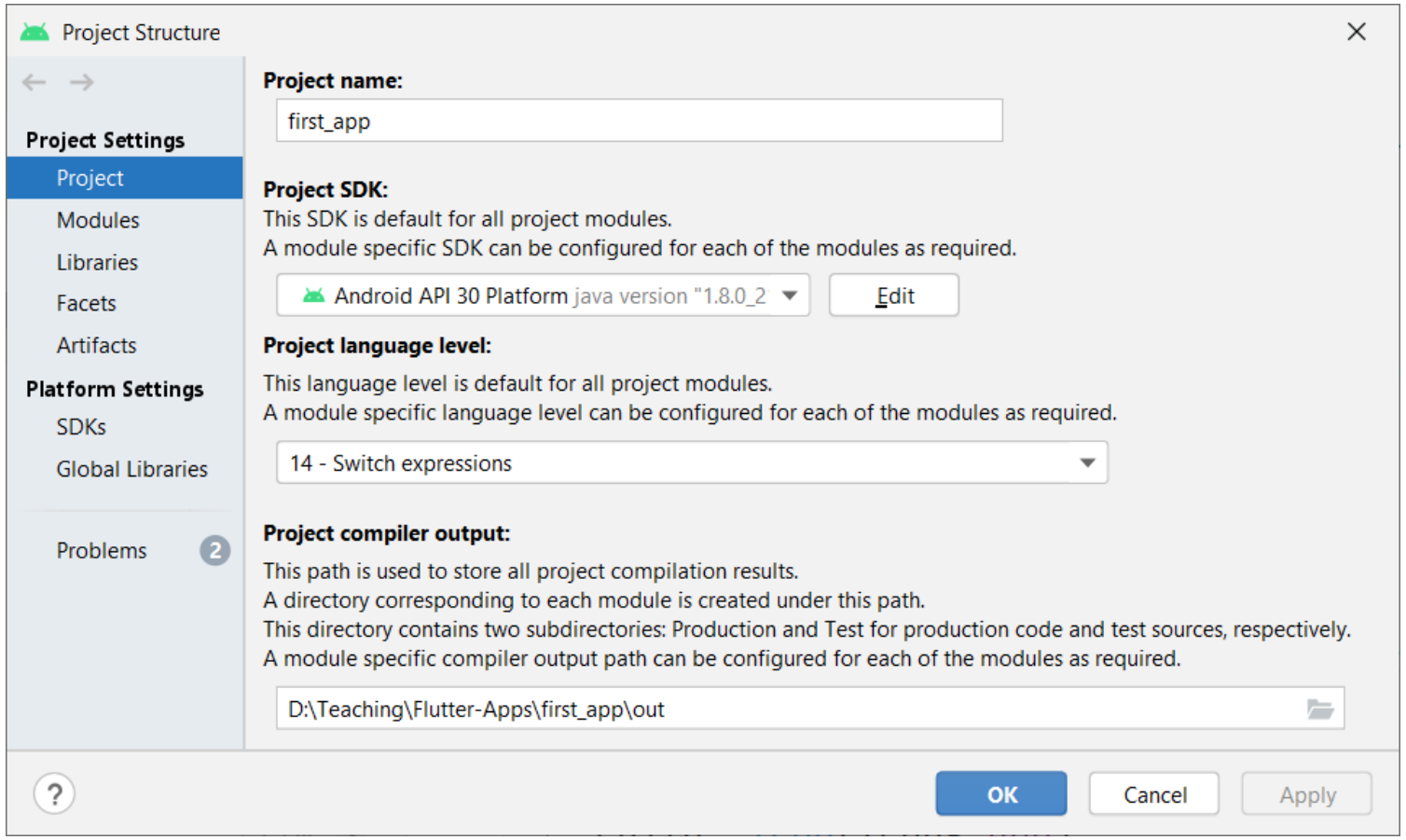


Using Android Studio



- Fill the app info then click “Finish” button

Using Android Studio



- Select File → Project Structure…, then select Project SDK

Using Android Studio

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File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help first_app - main.dart

first_app > lib > main.dart | Redmi Note 8 Pro (mobile) | main.dart

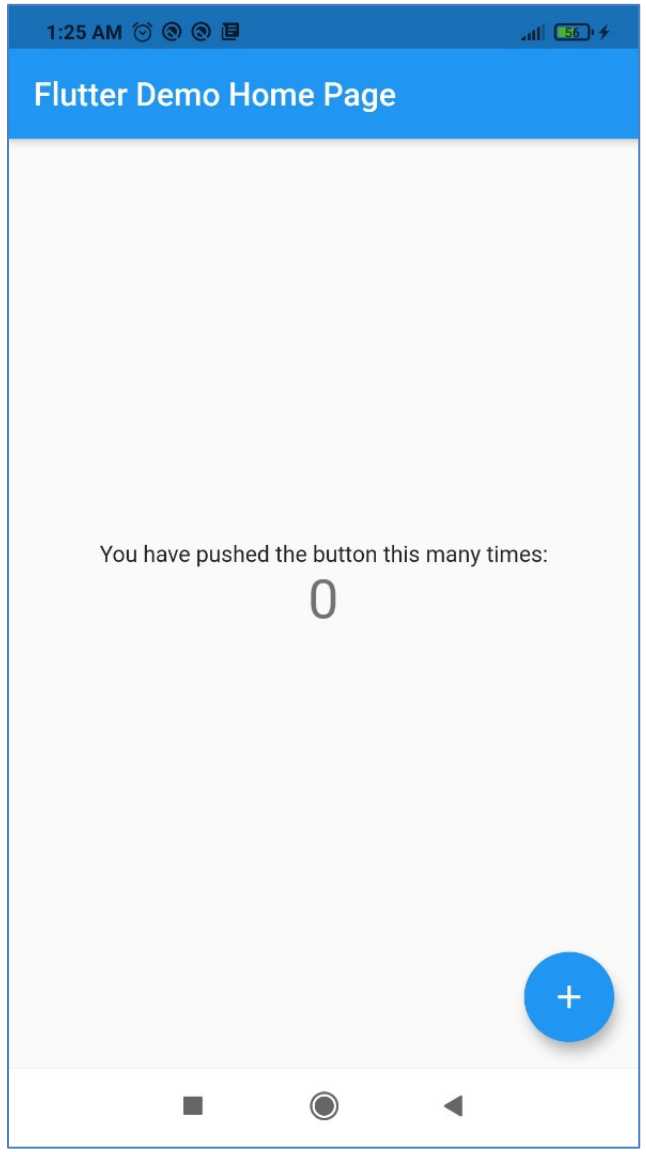
Project | main.dart | pubspec.yaml | first_app.iml

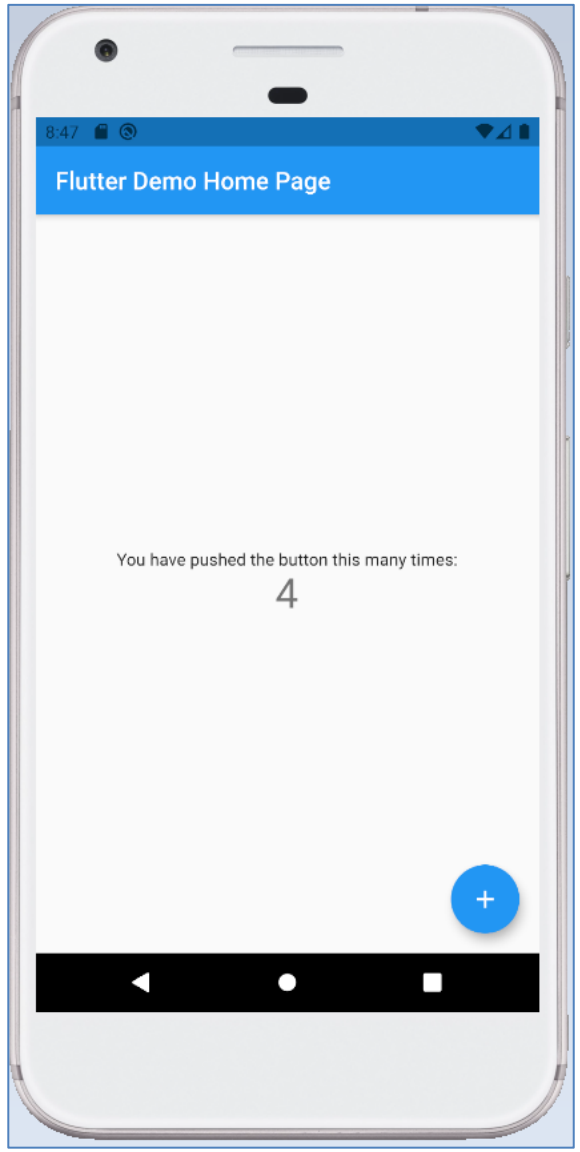
first_app D:\Teaching\Flutter-Apps\first_app
- .dart_tool
  - flutter_build
  - package_config.json
  - package_config_subset
  - version
- .idea
- android
- build
- ios
- lib
  - main.dart
- test
- .gitignore
- .metadata
- .packages
- first_app.iml
- pubspec.lock
- pubspec.yaml
- README.md
- External Libraries
- Scratches and Consoles

```
94        // horizontal).
95        mainAxisAlignment: MainAxisAlignment.center,
96        children: <Widget>[
97          Text(
98            'You have pushed the button this many times:',
99          ),  // Text
100         Text(
101           '$_counter',
102           style: Theme.of(context).textTheme.headline4,
103         ),  // Text
104       ],  // <Widget>[]
105     ),  // Column
106   ),  // Center
107   floatingActionButton: FloatingActionButton(
108     onPressed: _incrementCounter,
109     tooltip: 'Increment',
110     child: Icon(Icons.add),
```

- Select a device, then click Run button

Using Android Studio





Sharing project source code

- Clean project, type: flutter clean
- Build project
  - Android, type: flutter build apk or flutter build appbundle
  - iOS, type: flutter build ios or flutter build ipa