Mobile Application

With Flutter

Slide URL : https://bit.ly/3bBBsHz

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(napi)
Okdii Solutions

{ Linux Server } { Web Development } { Mobile App Development }

Tell me about you?

Lecturers,
Developers,
Designer, Mac,
Linux, Windows,
Web, Mobile,
Android, iOs ?

Agenda

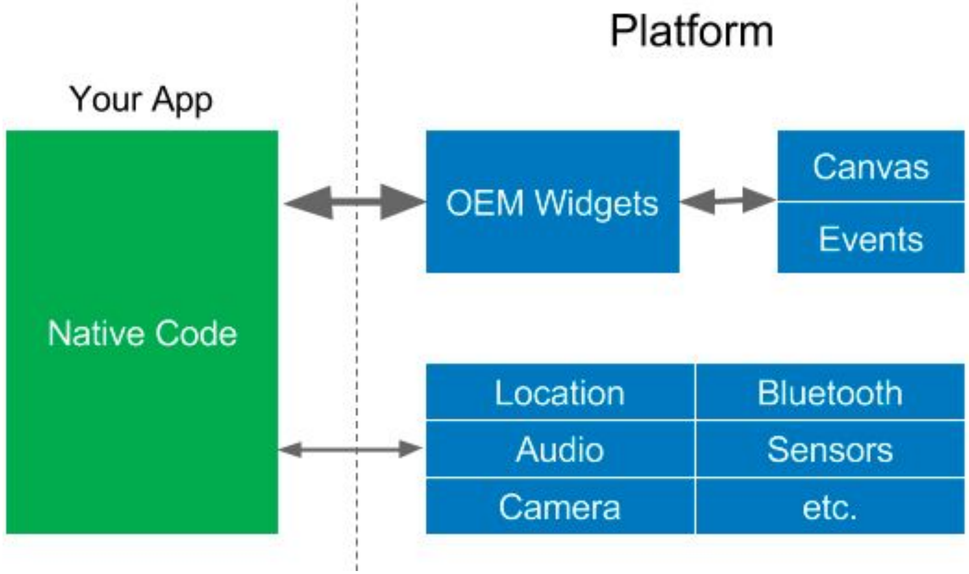
1. A brief history of mobile app dev
2. What is Flutter
3. Dart ?
4. Hello Flutter
5. Lab 1
6. Mobile SDK
7. Lab 2
8. Flutter's build modes
9. Widget & UI
10. Lab 3
11. Continue Widget & UI
12. Lab 4

A brief history of mobile app dev

The Platform SDKs

- The Apple iOS SDK was released in 2008 (Objective-C)
- Google Android SDK in 2009 (Java)

native

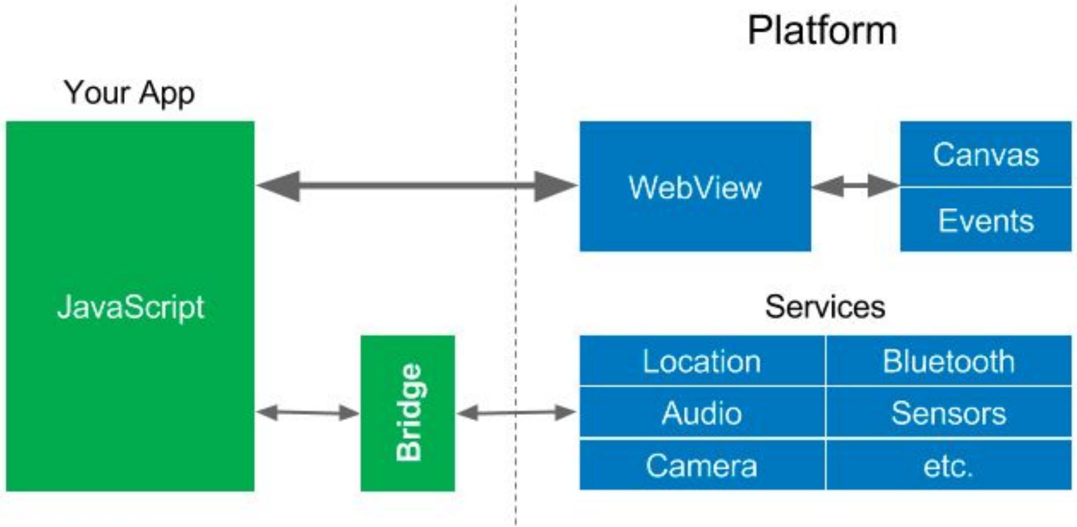

Platform
Your App
Native Code
OEM Widgets
Canvas
Events
Location
Bluetooth
Audio
Sensors
Camera
etc.

A brief history of mobile app dev

WebViews

- First cross-platform frameworks were based on JavaScript and WebViews.
  - PhoneGap, Apache Cordova, Ionic

WebViews

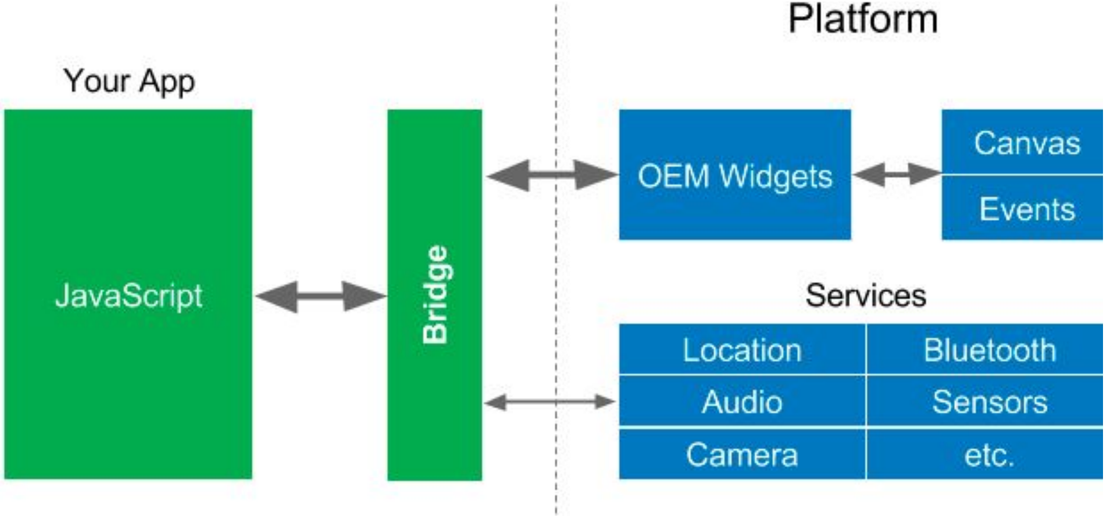

Platform
Your App
JavaScript
WebView
Canvas
Events
Services
Bridge
Location
Bluetooth
Audio
Sensors
Camera
etc.

A brief history of mobile app dev

Reactive Views

- simplify the creation of web views through the use of programming patterns borrowed from reactive programming
  - React Native, Flutter

Reactive Views



What is Flutter

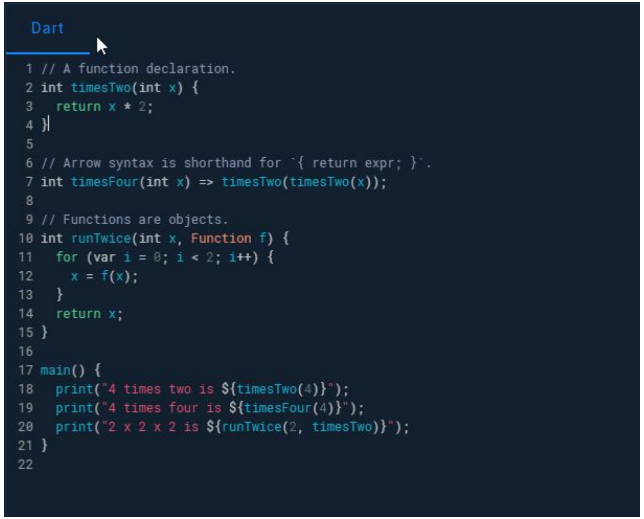
Flutter

Flutter is Google’s UI toolkit for building beautiful, natively compiled applications for mobile, web, and desktop from a single codebase

Dart ?

Dart ?

1. Open-source web programming language developed by Google
2. https://dart.dev/



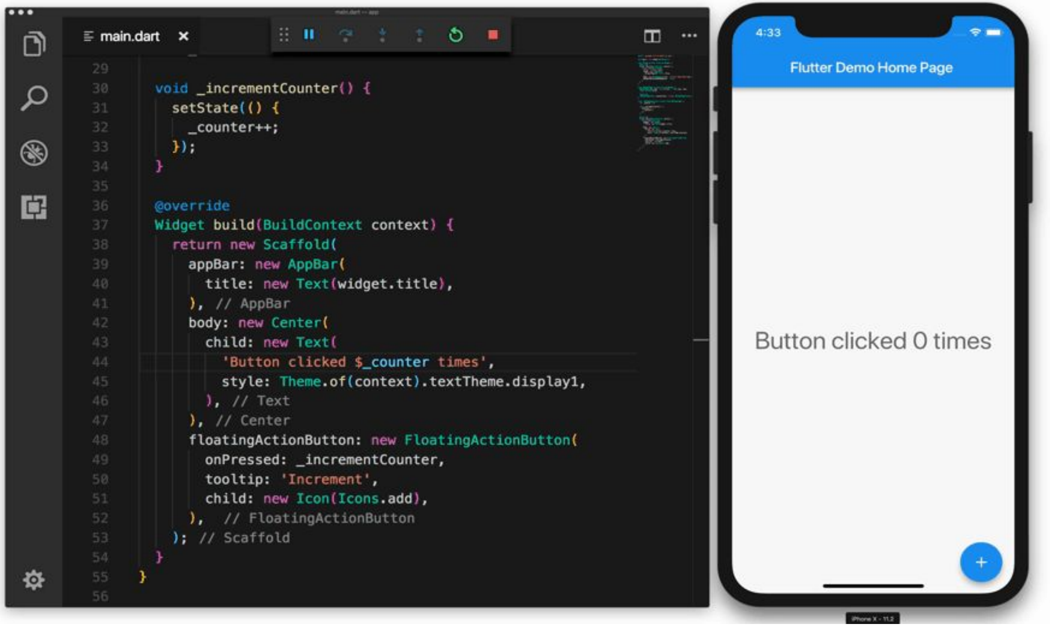
```dart
// A function declaration.
int timesTwo(int x) {
  return x * 2;
}

// Arrow syntax is shorthand for `{ return expr; }`.
int timesFour(int x) => timesTwo(timesTwo(x));

// Functions are objects.
int runTwice(int x, Function f) {
  for (var i = 0; i < 2; i++) {
    x = f(x);
  }
  return x;
}

main() {
  print("4 times two is ${timesTwo(4)}");
  print("4 times four is ${timesFour(4)}");
  print("2 x 2 x 2 is ${runTwice(2, timesTwo)}");
}
```

Hello Flutter



```
void _incrementCounter() {
  setState(() {
    _counter++;
  });
}

@override
Widget build(BuildContext context) {
  return new Scaffold(
    appBar: new AppBar(
      title: new Text(widget.title),
    ), // AppBar
    body: new Center(
      child: new Text(
        'Button clicked $_counter times',
        style: Theme.of(context).textTheme.display1,
      ), // Text
    ), // Center
    floatingActionButton: new FloatingActionButton(
      onPressed: _incrementCounter,
      tooltip: 'Increment',
      child: new Icon(Icons.add),
    ),  // FloatingActionButton
  ); // Scaffold
}
}
```

4:33

Flutter Demo Home Page

Button clicked 0 times

System requirements (MS Windows)

1. Operating Systems: Windows 7 SP1 or later (64-bit)
2. Disk Space: 400 MB (does not include disk space for IDE/tools).
3. Windows PowerShell 5.0 or newer (this is pre-installed with Windows 10)
4. Git for Windows 2.x

https://flutter.dev/docs/get-started/install/windows

System requirements (macOS)

1. Operating Systems: macOS (64-bit)
2. Disk Space: 2.8 GB (does not include disk space for IDE/tools).
3. Terminal
4. Git 2.x

https://flutter.dev/docs/get-started/install/macos

System requirements (Linux)

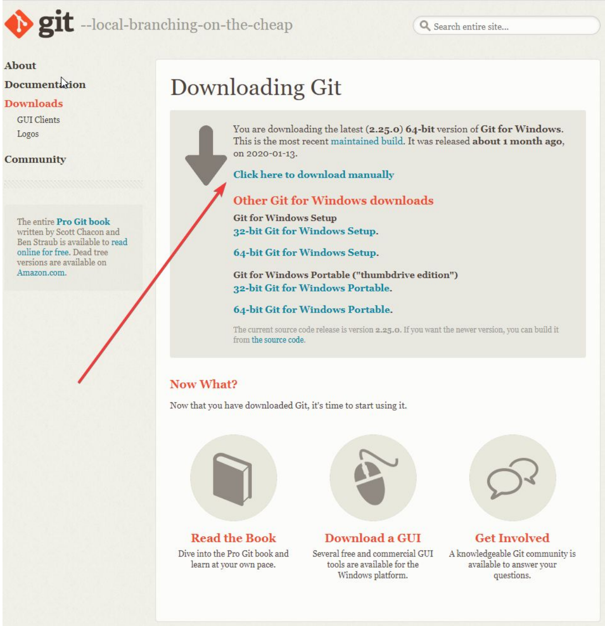
1. Operating Systems: Linux (64-bit)
2. Disk Space: 600 MB (does not include disk space for IDE/tools).
3. Terminal
4. Git 2.x

https://flutter.dev/docs/get-started/install/macos

Lab 1

Install Git

1. Download git from the following url https://git-scm.com/download/win
2. Install



The entire Pro Git book written by Scott Chacon and Ben Straub is available to read online for free. Dead tree versions are available on Amazon.com.

Downloading Git

You are downloading the latest (**2.25.0**) **64-bit** version of **Git for Windows**. This is the most recent maintained build. It was released **about 1 month ago**, on 2020-01-13.

Click here to download manually

Other Git for Windows downloads

Git for Windows Setup
32-bit Git for Windows Setup.

64-bit Git for Windows Setup.

Git for Windows Portable ("thumbdrive edition")
32-bit Git for Windows Portable.

64-bit Git for Windows Portable.

The current source code release is version **2.25.0**. If you want the newer version, you can build it from the source code.

Now What?

Now that you have downloaded Git, it's time to start using it.

Read the Book
Dive into the Pro Git book and learn at your own pace.

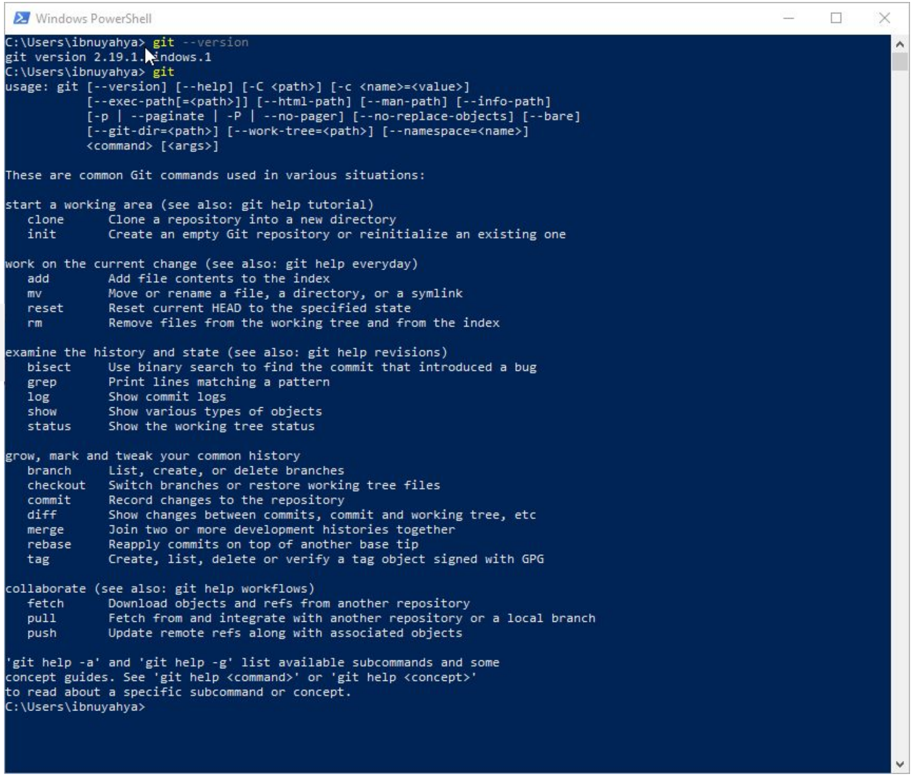
Download a GUI
Several free and commercial GUI tools are available for the Windows platform.

Get Involved
A knowledgeable Git community is available to answer your questions.

Verify Git

1. Open power shell
2. Type git --version

➔ git --version



```
C:\Users\ibnuyahya> git --version
git version 2.19.1.windows.1
C:\Users\ibnuyahya> git
usage: git [--version] [--help] [-C <path>] [-c <name>=<value>]
           [--exec-path[=<path>]] [--html-path] [--man-path] [--info-path]
           [-p | --paginate | -P | --no-pager] [--no-replace-objects] [--bare]
           [--git-dir=<path>] [--work-tree=<path>] [--namespace=<name>]
           <command> [<args>]

These are common Git commands used in various situations:

start a working area (see also: git help tutorial)
   clone      Clone a repository into a new directory
   init       Create an empty Git repository or reinitialize an existing one

work on the current change (see also: git help everyday)
   add        Add file contents to the index
   mv         Move or rename a file, a directory, or a symlink
   reset      Reset current HEAD to the specified state
   rm         Remove files from the working tree and from the index

examine the history and state (see also: git help revisions)
   bisect     Use binary search to find the commit that introduced a bug
   grep       Print lines matching a pattern
   log        Show commit logs
   show       Show various types of objects
   status     Show the working tree status

grow, mark and tweak your common history
   branch     List, create, or delete branches
   checkout   Switch branches or restore working tree files
   commit     Record changes to the repository
   diff       Show changes between commits, commit and working tree, etc
   merge      Join two or more development histories together
   rebase     Reapply commits on top of another base tip
   tag        Create, list, delete or verify a tag object signed with GPG

collaborate (see also: git help workflows)
   fetch      Download objects and refs from another repository
   pull       Fetch from and integrate with another repository or a local branch
   push       Update remote refs along with associated objects

'git help -a' and 'git help -g' list available subcommands and some
concept guides. See 'git help <command>' or 'git help <concept>'
to read about a specific subcommand or concept.
C:\Users\ibnuyahya>
```

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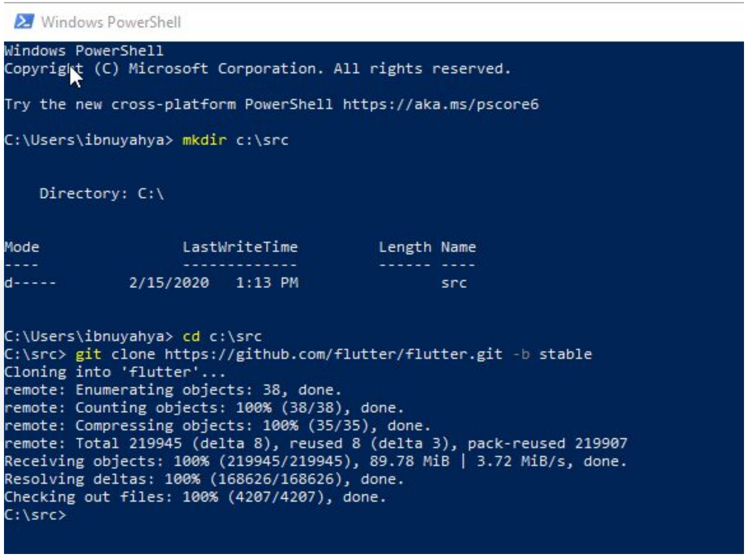
Get the Flutter SDK

1. Open powershell
2. Create src directory inside C:\
3. Cd into c:\src and run git clone

- ➔ mkdir C:\src
- ➔ cd C:\src
- ➔ git clone https://github.com/flutter/flutter.git -b stable



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

C:\Users\ibnuyahya> mkdir c:\src


    Directory: C:\


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
d-----        2/15/2020   1:13 PM                src


C:\Users\ibnuyahya> cd c:\src
C:\src> git clone https://github.com/flutter/flutter.git -b stable
Cloning into 'flutter'...
remote: Enumerating objects: 38, done.
remote: Counting objects: 100% (38/38), done.
remote: Compressing objects: 100% (35/35), done.
remote: Total 219945 (delta 8), reused 8 (delta 3), pack-reused 219907
Receiving objects: 100% (219945/219945), 89.78 MiB | 3.72 MiB/s, done.
Resolving deltas: 100% (168626/168626), done.
Checking out files: 100% (4207/4207), done.
C:\src>
```

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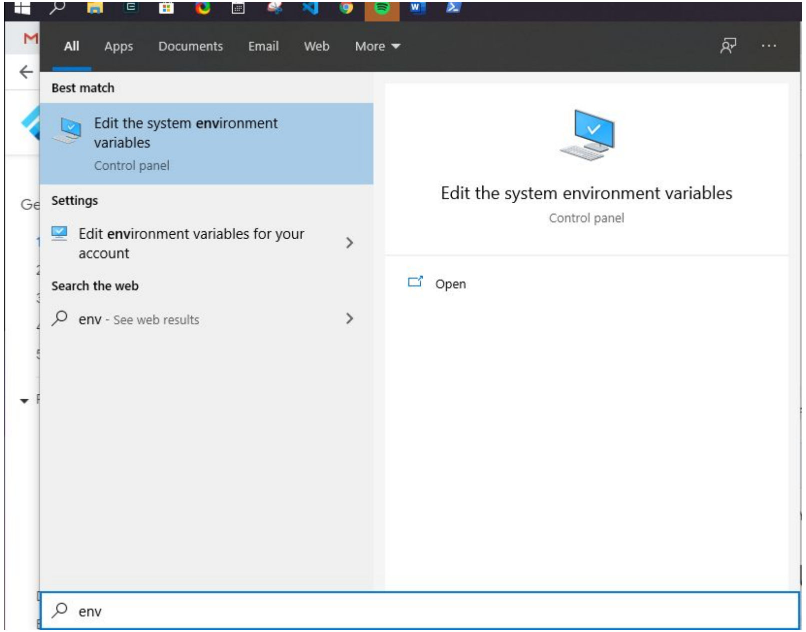
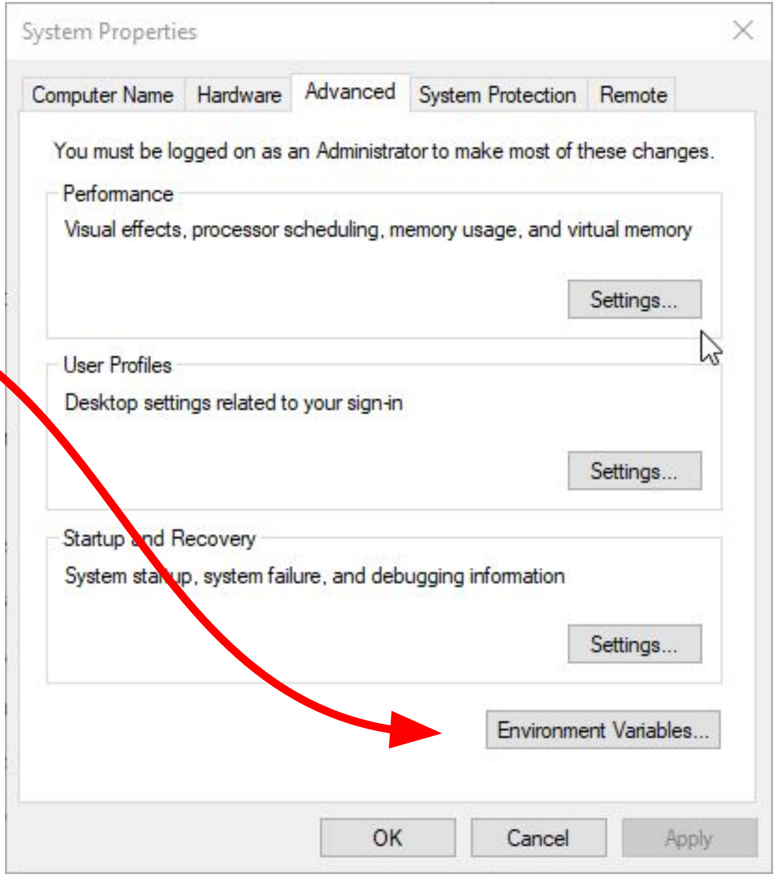
Set environment

1. Click on Start Windows, enter ‘env’ and select Edit environment variables


All
Apps
Documents
Email
Web
More
Best match
Edit the system environment variables
Control panel
Settings
Edit environment variables for your account
Search the web
env - See web results
Edit the system environment variables
Control panel
Open
env

Set environment

2. Click on Environment Variables...



You must be logged on as an Administrator to make most of these changes.

Performance

Visual effects, processor scheduling, memory usage, and virtual memory

User Profiles

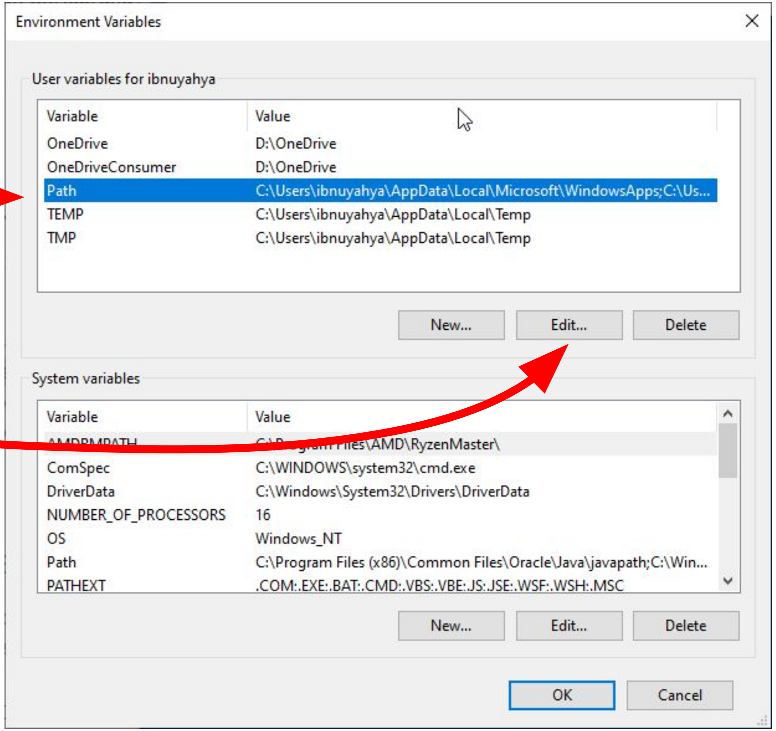
Desktop settings related to your sign-in

Startup and Recovery

System startup, system failure, and debugging information

Set environment

3. Select Path
4. Click on Edit...



Variable	Value
OneDrive	D:\OneDrive
OneDriveConsumer	D:\OneDrive
Path	C:\Users\ibnuyahya\AppData\Local\Microsoft\WindowsApps;C:\Us...
TEMP	C:\Users\ibnuyahya\AppData\Local\Temp
TMP	C:\Users\ibnuyahya\AppData\Local\Temp

Variable	Value
AMDRMPATH	C:\Program Files\AMD\RyzenMaster\
ComSpec	C:\WINDOWS\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PROCESSORS	16
OS	Windows_NT
Path	C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Win...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC

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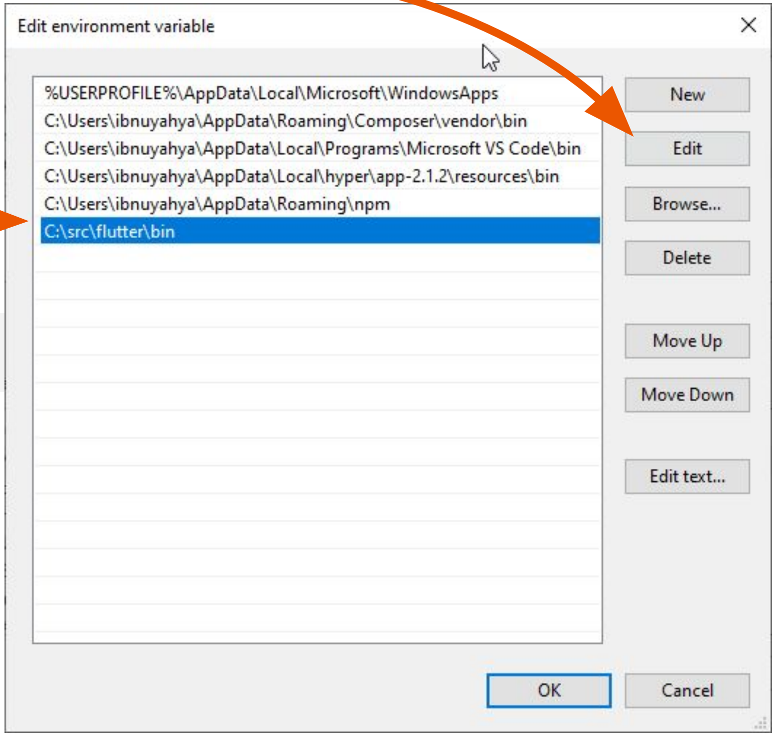
Set environment

5. Click on Edit
6. Add flutter path
7. Close and reopen powershell

➔ C:\src\flutter\bin



Edit environment variable

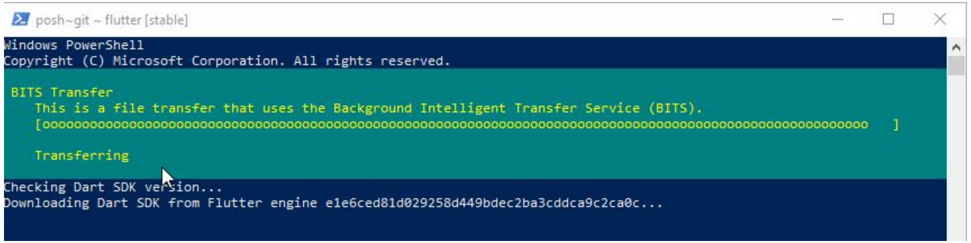
```
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
C:\Users\ibnuyahya\AppData\Roaming\Composer\vendor\bin
C:\Users\ibnuyahya\AppData\Local\Programs\Microsoft VS Code\bin
C:\Users\ibnuyahya\AppData\Local\hyper\app-2.1.2\resources\bin
C:\Users\ibnuyahya\AppData\Roaming\npm
C:\src\flutter\bin
```

Run flutter doctor

This command checks your environment and displays a report of the status of your Flutter installation

- ➔ cd C:\src\flutter
- ➔ flutter doctor

Check the output carefully for other software you might need to install or further tasks to perform

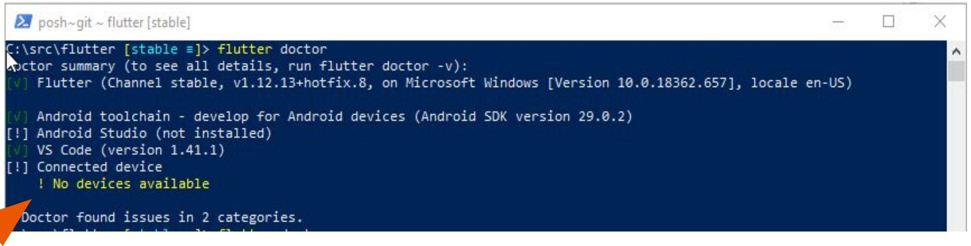


```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

 BITS Transfer
    This is a file transfer that uses the Background Intelligent Transfer Service (BITS).
    [oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo    ]

    Transferring

Checking Dart SDK version...
Downloading Dart SDK from Flutter engine e1e6ced81d029258d449bdec2ba3cddca9c2ca0c...
```



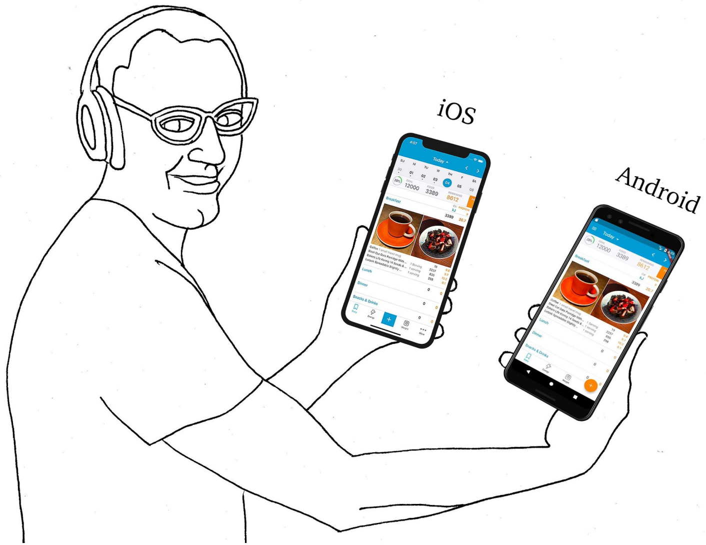
```
C:\src\flutter [stable ≡]> flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, v1.12.13+hotfix.8, on Microsoft Windows [Version 10.0.18362.657], locale en-US)

[√] Android toolchain - develop for Android devices (Android SDK version 29.0.2)
[!] Android Studio (not installed)
[√] VS Code (version 1.41.1)
[!] Connected device
    ! No devices available

! Doctor found issues in 2 categories.
```

End of Lab

Mobile SDK



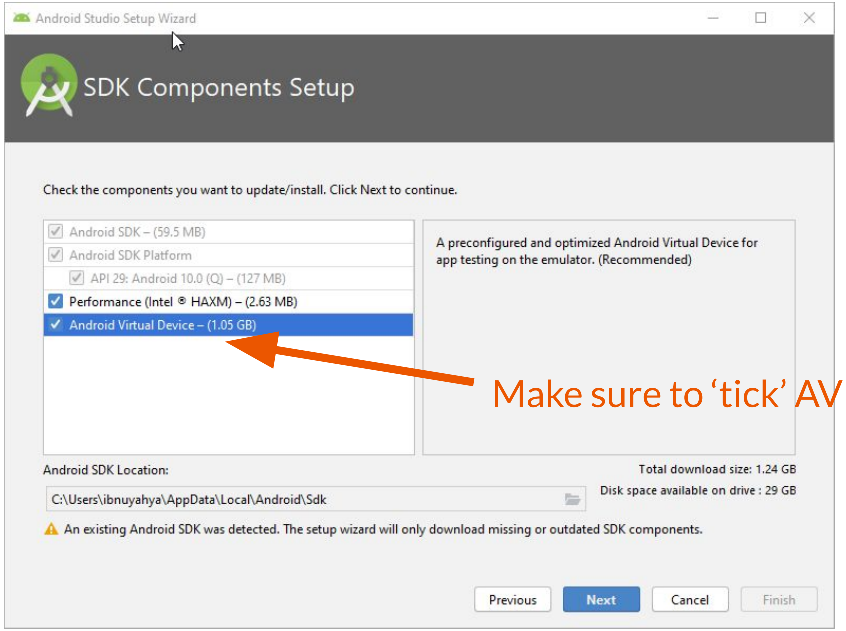
Lab 2

Install Android SDK

1. Download and install Android Studio.

➔ https://developer.android.com/studio

2. Start Android Studio, and go through the 'Android Studio Setup Wizard'.
3. This installs the latest Android SDK, Android SDK Platform-Tools, and Android SDK Build-Tools, which are required by Flutter when developing for Android.



Android Studio Setup Wizard

SDK Components Setup

Check the components you want to update/install. Click Next to continue.

- ☑ Android SDK – (59.5 MB)
- ☑ Android SDK Platform
  - ☑ API 29: Android 10.0 (Q) – (127 MB)
- ☑ Performance (Intel ® HAXM) – (2.63 MB)
- ☑ Android Virtual Device – (1.05 GB)

A preconfigured and optimized Android Virtual Device for app testing on the emulator. (Recommended)

Android SDK Location: C:\Users\ibnuyahya\AppData\Local\Android\Sdk

Total download size: 1.24 GB

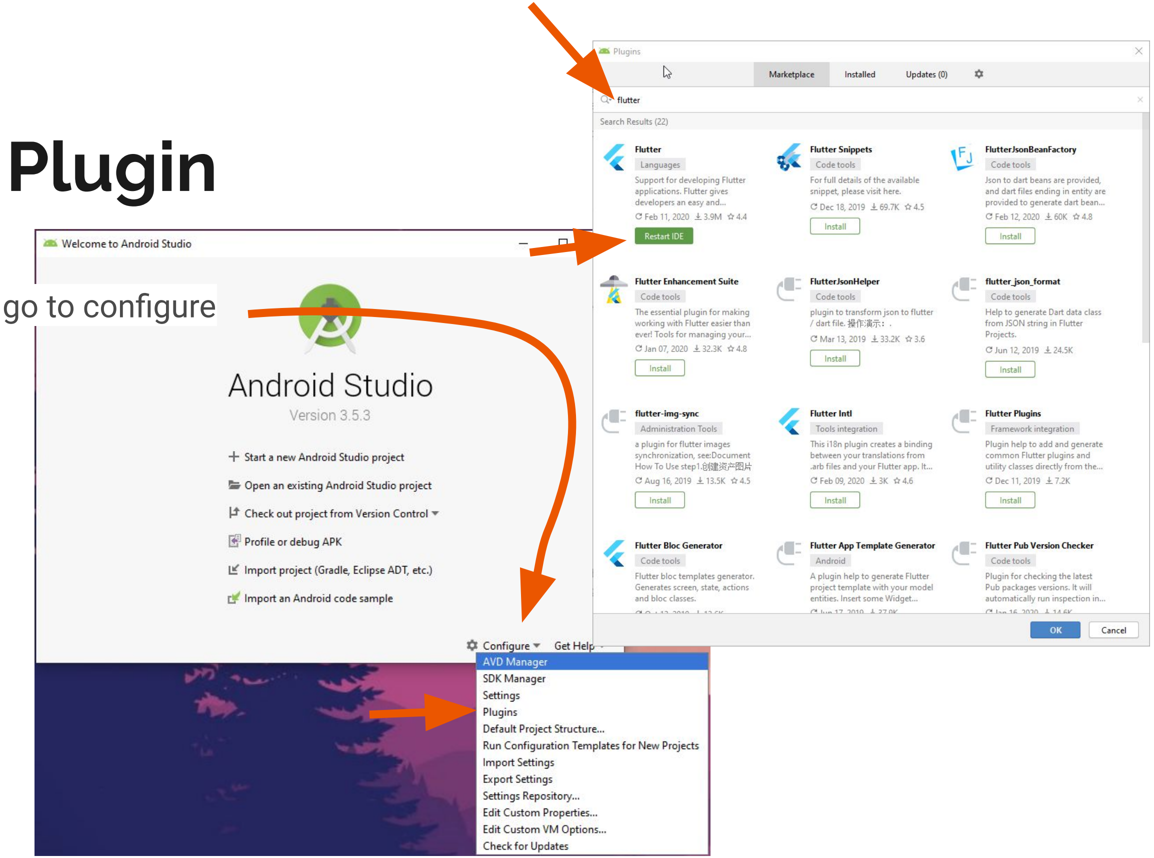
Disk space available on drive : 29 GB

⚠ An existing Android SDK was detected. The setup wizard will only download missing or outdated SDK components.

Make sure to 'tick' AVD

Install Flutter Plugin

1. Start Android Studio, and go to configure -> plugin
2. Search for ‘flutter’
3. Install Flutter plugin


Welcome to Android Studio
Android Studio
Version 3.5.3
+ Start a new Android Studio project
Open an existing Android Studio project
Check out project from Version Control
Profile or debug APK
Import project (Gradle, Eclipse ADT, etc.)
Import an Android code sample
Configure
Get Help
AVD Manager
SDK Manager
Settings
Plugins
Default Project Structure...
Run Configuration Templates for New Projects
Import Settings
Export Settings
Settings Repository...
Edit Custom Properties...
Edit Custom VM Options...
Check for Updates
Plugins
Marketplace
Installed
Updates (0)
OK
Cancel

flutter

Search Results (22)

Flutter
Languages
Support for developing Flutter applications. Flutter gives developers an easy and...
Feb 11, 2020 3.9M ☆ 4.4
Restart IDE

Flutter Snippets
Code tools
For full details of the available snippet, please visit here.
Dec 18, 2019 69.7K ☆ 4.5
Install

FlutterJsonBeanFactory
Code tools
Json to dart beans are provided, and dart files ending in entity are provided to generate dart bean...
Feb 12, 2020 60K ☆ 4.8
Install

Flutter Enhancement Suite
Code tools
The essential plugin for making working with Flutter easier than ever! Tools for managing your...
Jan 07, 2020 32.3K ☆ 4.8
Install

FlutterJsonHelper
Code tools
plugin to transform json to flutter / dart file. 操作演示： .
Mar 13, 2019 33.2K ☆ 3.6
Install

flutter_json_format
Code tools
Help to generate Dart data class from JSON string in Flutter Projects.
Jun 12, 2019 24.5K
Install

flutter-img-sync
Administration Tools
a plugin for flutter images synchronization, see:Document How To Use step1.创建资产图片
Aug 16, 2019 13.5K ☆ 4.5
Install

Flutter Intl
Tools integration
This i18n plugin creates a binding between your translations from .arb files and your Flutter app. It...
Feb 09, 2020 3K ☆ 4.6
Install

Flutter Plugins
Framework integration
Plugin help to add and generate common Flutter plugins and utility classes directly from the...
Dec 11, 2019 7.2K
Install

Flutter Bloc Generator
Code tools
Flutter bloc templates generator. Generates screen, state, actions and bloc classes.

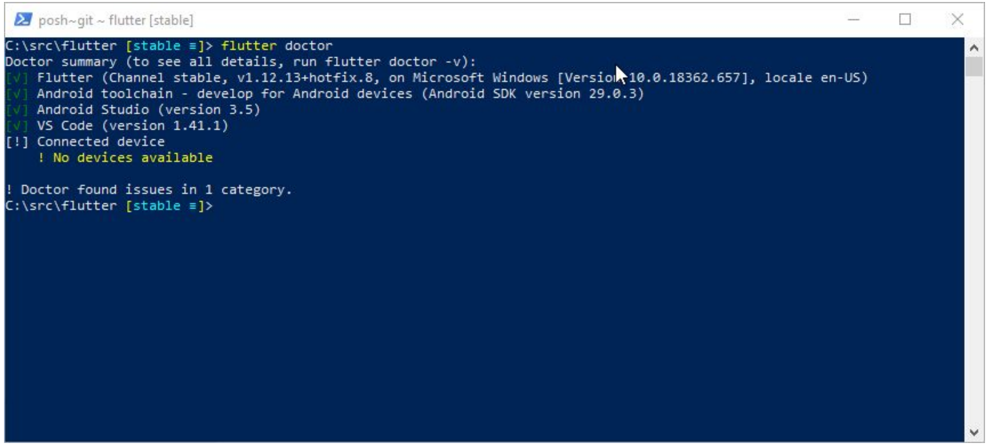
Flutter App Template Generator
Android
A plugin help to generate Flutter project template with your model entities. Insert some Widget...

Flutter Pub Version Checker
Code tools
Plugin for checking the latest Pub packages versions. It will automatically run inspection in...

Run flutter doctor

→ flutter doctor

Check the output carefully for other software you might need to install or further tasks to perform

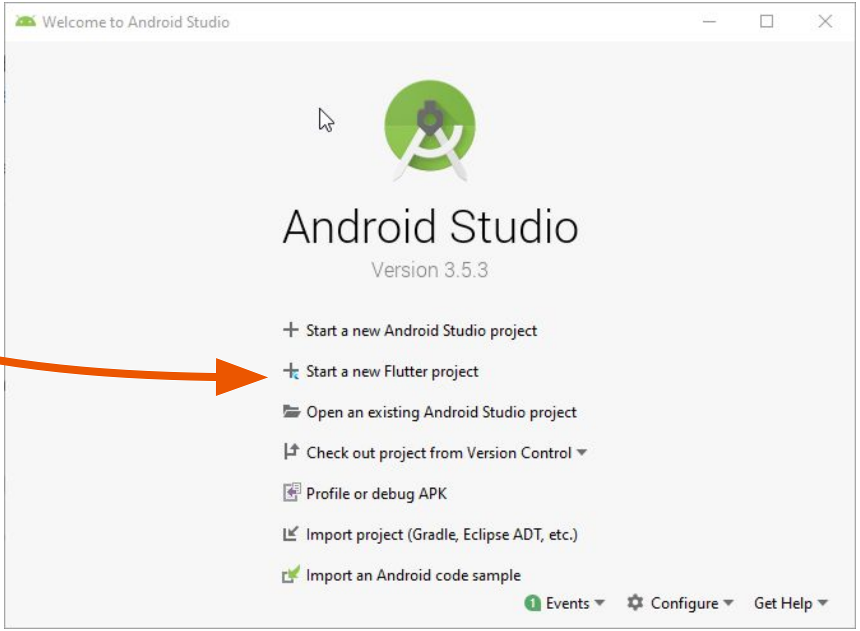


```
C:\src\flutter [stable ≡]> flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, v1.12.13+hotfix.8, on Microsoft Windows [Version 10.0.18362.657], locale en-US)
[√] Android toolchain - develop for Android devices (Android SDK version 29.0.3)
[√] Android Studio (version 3.5)
[√] VS Code (version 1.41.1)
[!] Connected device
    ! No devices available

! Doctor found issues in 1 category.
C:\src\flutter [stable ≡]>
```

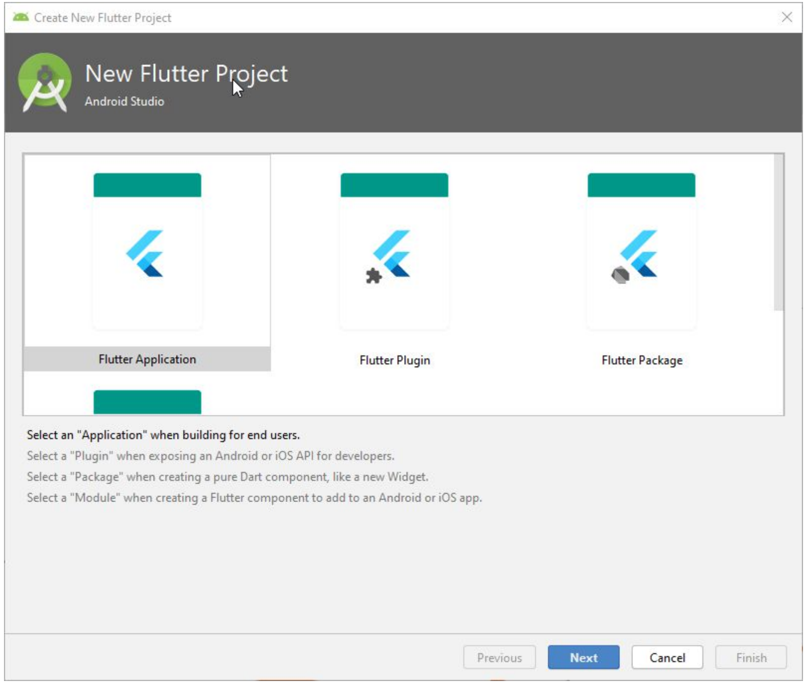
Test Drive

1. Open Android Studio
2. Select Start a new Flutter project.


Welcome to Android Studio
Android Studio
Version 3.5.3
Start a new Android Studio project
Start a new Flutter project
Open an existing Android Studio project
Check out project from Version Control
Profile or debug APK
Import project (Gradle, Eclipse ADT, etc.)
Import an Android code sample
Events
Configure
Get Help

Test Drive

1. Select Flutter Application.
2. Click Next



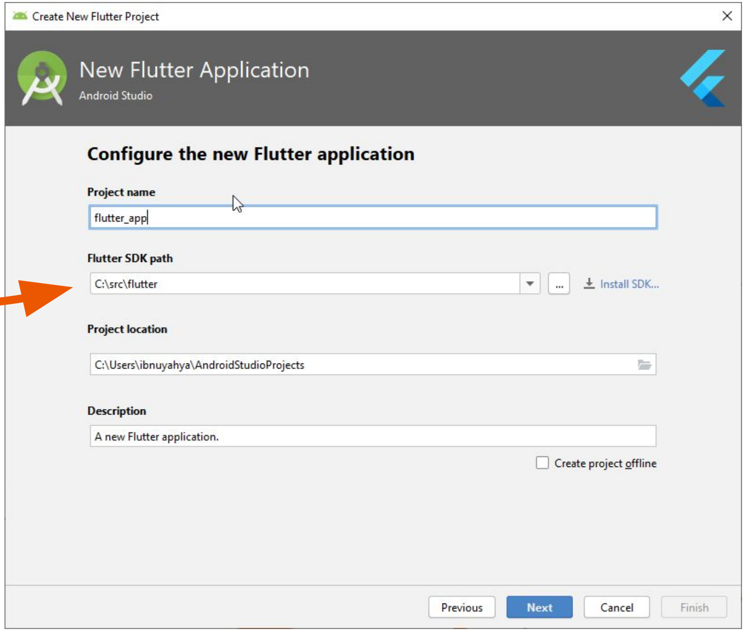
Select an "Application" when building for end users.
Select a "Plugin" when exposing an Android or iOS API for developers.
Select a "Package" when creating a pure Dart component, like a new Widget.
Select a "Module" when creating a Flutter component to add to an Android or iOS app.

Test Drive

1. Fill all info
2. Browser to your flutter SDK path

   (C:\src\flutter)

3. Click next



Configure the new Flutter application

Project name: flutter_app

Flutter SDK path: C:\src\flutter

Project location: C:\Users\ibnuyahya\AndroidStudioProjects

Description: A new Flutter application.

□ Create project offline

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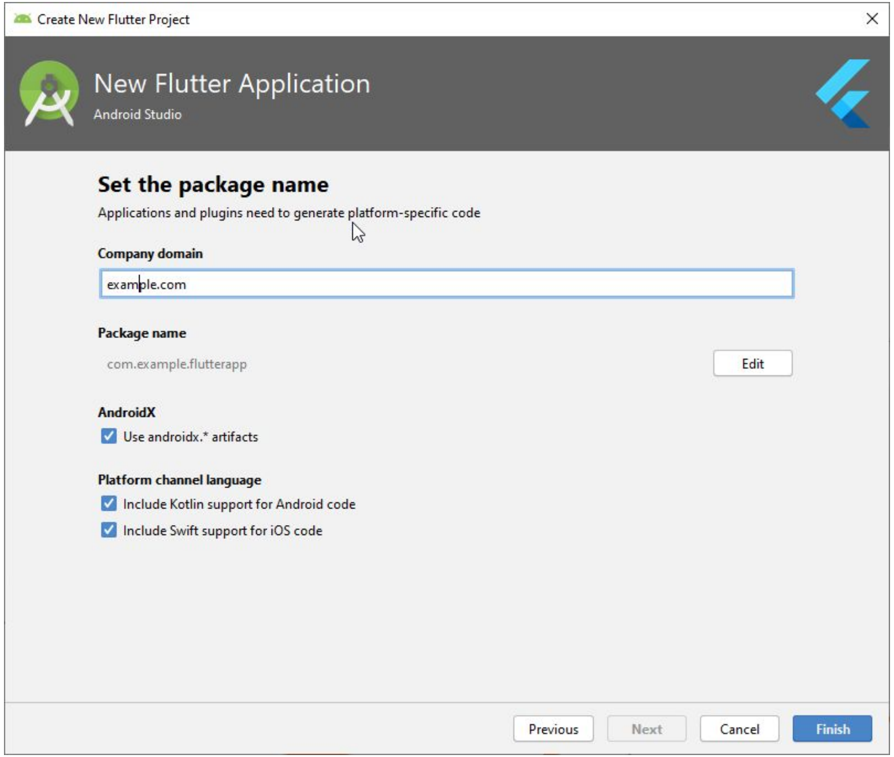
Test Drive

1. Set package name
2. Click Finish



Create New Flutter Project

New Flutter Application

Android Studio

Set the package name

Applications and plugins need to generate platform-specific code

Company domain: example.com

Package name: com.example.flutterapp

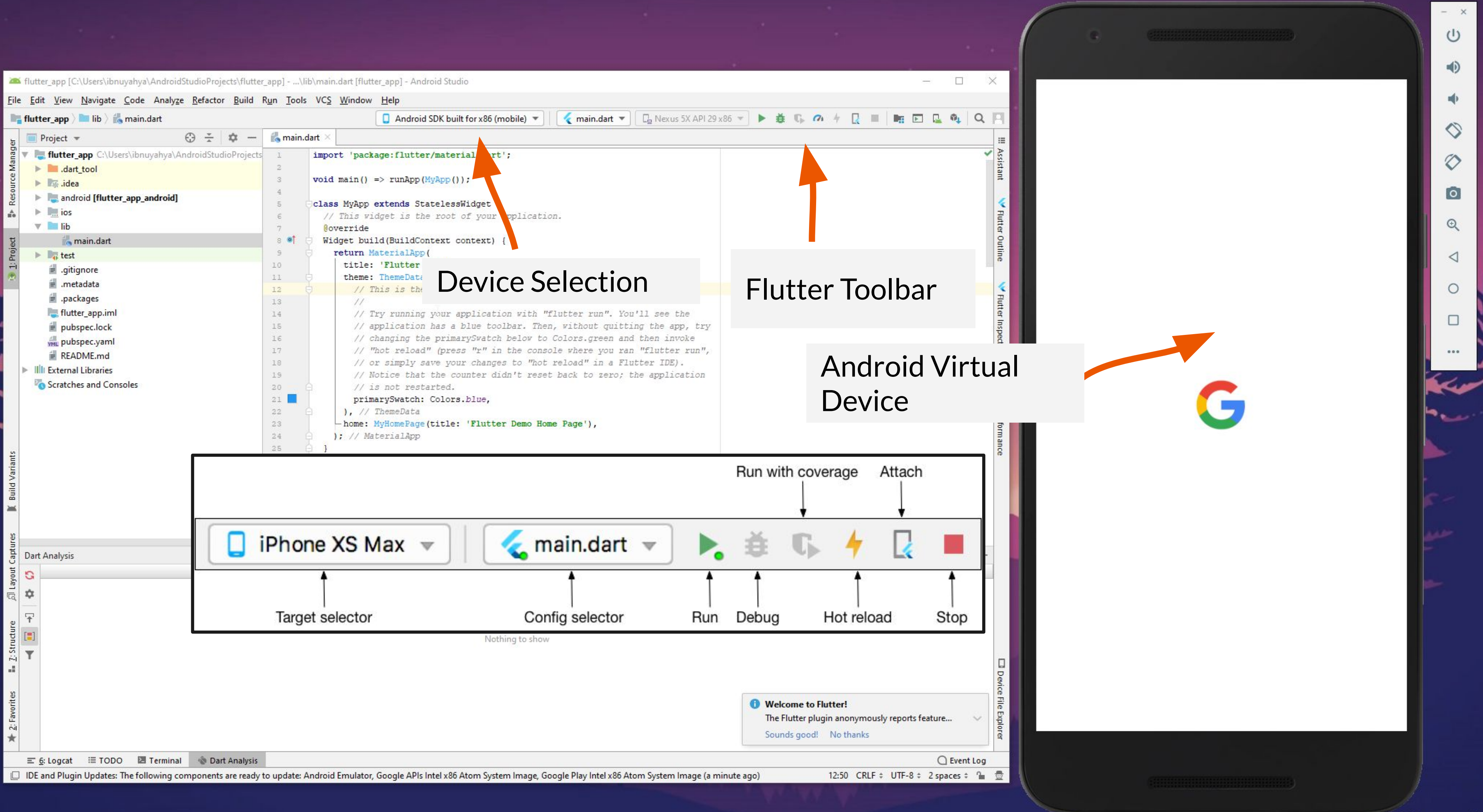
AndroidX

☑ Use androidx.* artifacts

Platform channel language

☑ Include Kotlin support for Android code

☑ Include Swift support for iOS code


flutter_app [C:\Users\ibnuyahya\AndroidStudioProjects\flutter_app] - ...\lib\main.dart [flutter_app] - Android Studio
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
flutter_app lib main.dart
Android SDK built for x86 (mobile)
main.dart
Nexus 5X API 29 x86
Project
flutter_app C:\Users\ibnuyahya\AndroidStudioProjects
.dart_tool
.idea
android [flutter_app_android]
ios
lib
main.dart
test
.gitignore
.metadata
.packages
flutter_app.iml
pubspec.lock
pubspec.yaml
README.md
External Libraries
Scratches and Consoles
Dart Analysis
Nothing to show
6: Logcat
TODO
Terminal
Dart Analysis
Event Log
12:50 CRLF UTF-8 2 spaces
Run with coverage
Attach
iPhone XS Max
main.dart
Target selector
Config selector
Run
Debug
Hot reload
Stop

Device Selection

Flutter Toolbar

Android Virtual Device

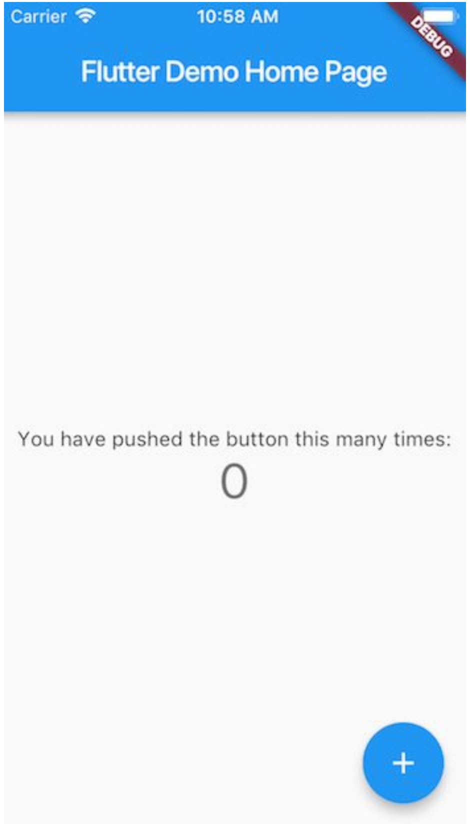
```
import 'package:flutter/material  rt';

void main() => runApp(MyApp());

class MyApp extends StatelessWidget
  // This widget is the root of your  pplication.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flutter
      theme: ThemeData
        // This is the
        //
        // Try running your application with "flutter run". You'll see the
        // application has a blue toolbar. Then, without quitting the app, try
        // changing the primarySwatch below to Colors.green and then invoke
        // "hot reload" (press "r" in the console where you ran "flutter run",
        // or simply save your changes to "hot reload" in a Flutter IDE).
        // Notice that the counter didn't reset back to zero; the application
        // is not restarted.
        primarySwatch: Colors.blue,
      ), // ThemeData
      home: MyHomePage(title: 'Flutter Demo Home Page'),
    ); // MaterialApp
  }
```

Welcome to Flutter!

The Flutter plugin anonymously reports feature...

Sounds good! No thanks

IDE and Plugin Updates: The following components are ready to update: Android Emulator, Google APIs Intel x86 Atom System Image, Google Play Intel x86 Atom System Image (a minute ago)



Flutter Demo Home Page

You have pushed the button this many times:

0

Hot reload

1. Open `lib/main.dart`.
2. Change the string

→ 'You have ~~pushed~~ the button this many times'

3. Into

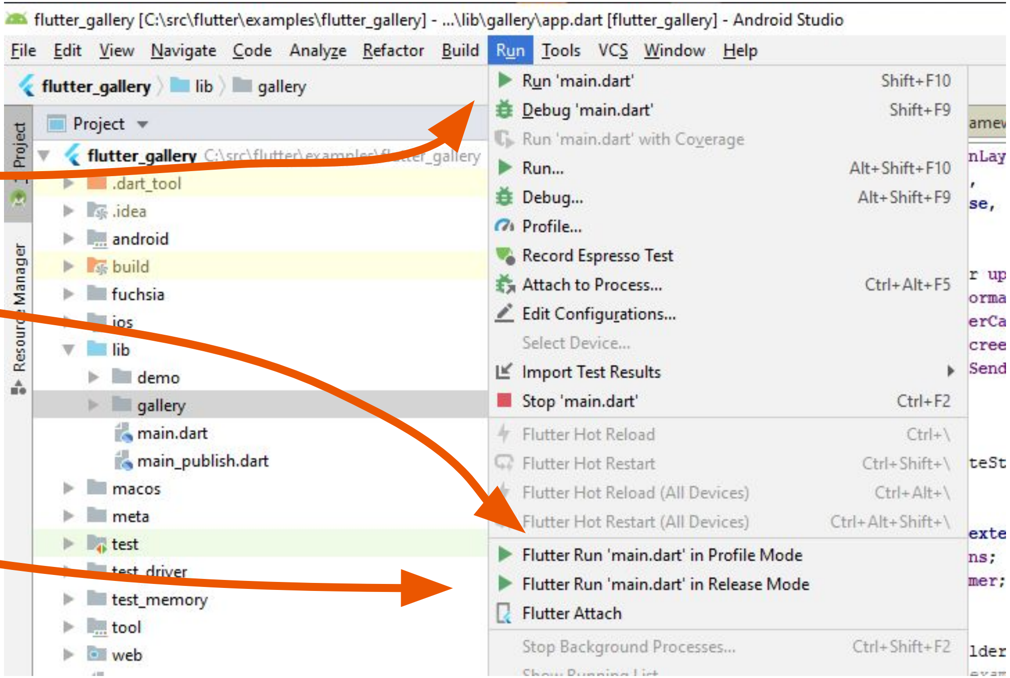
→ 'You have clicked the button this many times'

4. Check output at your Device

End of Lab

Flutter's build modes

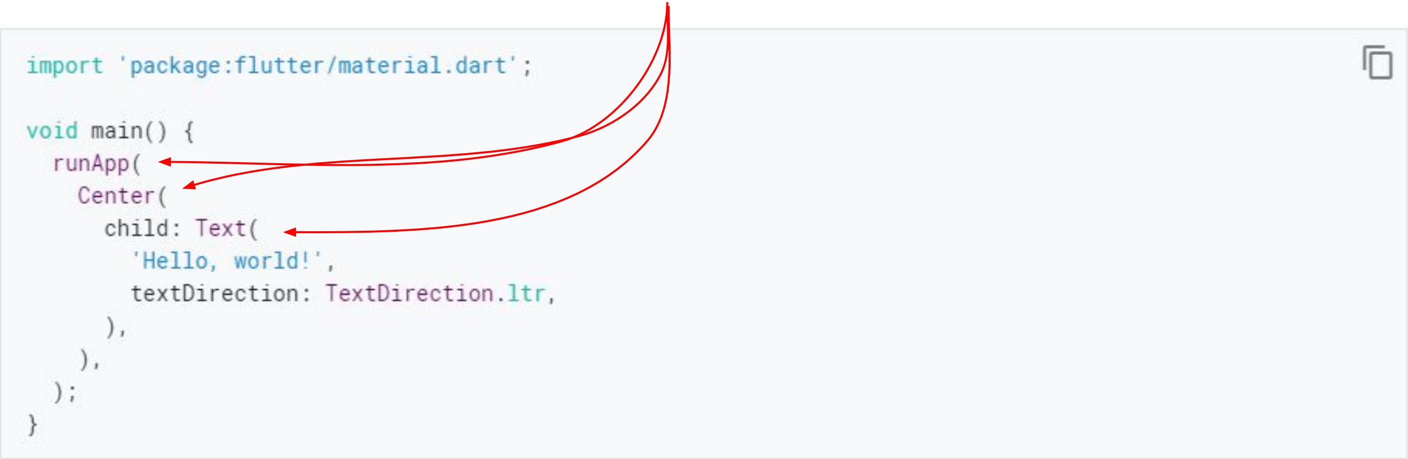
1. Debug
   - during development, when you want to use hot reload.
2. Profile.
   - when you want to analyze performance (on actual device)
3. Release
   - when you are ready to release your app



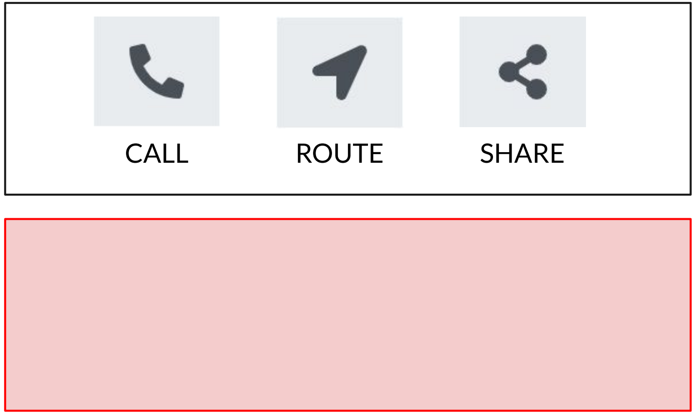
flutter_gallery [C:\src\flutter\examples\flutter_gallery] - ...\lib\gallery\app.dart [flutter_gallery] - Android Studio
File
Edit
View
Navigate
Code
Analyze
Refactor
Build
Run
Tools
VCS
Window
Help
flutter_gallery
lib
gallery
Project
flutter_gallery C:\src\flutter\examples\flutter_gallery
.dart_tool
.idea
android
build
fuchsia
ios
lib
demo
gallery
main.dart
main_publish.dart
macos
meta
test
test_driver
test_memory
tool
web
Resource Manager
Run 'main.dart' Shift+F10
Debug 'main.dart' Shift+F9
Run 'main.dart' with Coverage
Run... Alt+Shift+F10
Debug... Alt+Shift+F9
Profile...
Record Espresso Test
Attach to Process... Ctrl+Alt+F5
Edit Configurations...
Select Device...
Import Test Results
Stop 'main.dart' Ctrl+F2
Flutter Hot Reload Ctrl+\
Flutter Hot Restart Ctrl+Shift+\
Flutter Hot Reload (All Devices) Ctrl+Alt+\
Flutter Hot Restart (All Devices) Ctrl+Alt+Shift+\
Flutter Run 'main.dart' in Profile Mode
Flutter Run 'main.dart' in Release Mode
Flutter Attach
Stop Background Processes... Ctrl+Shift+F2
Show Running List

Widget & UI

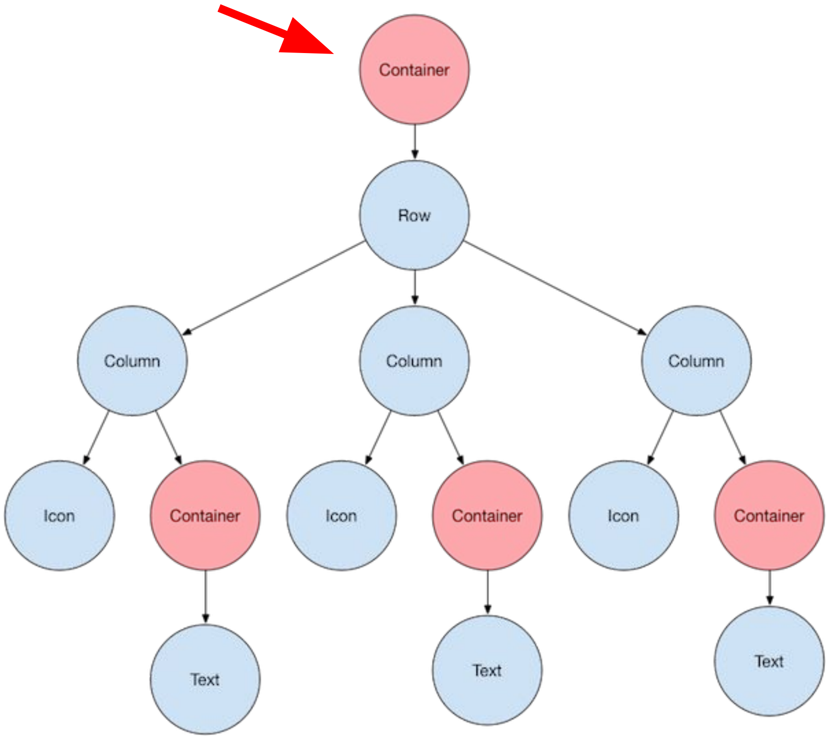
The core of Flutter’s layout mechanism is widgets

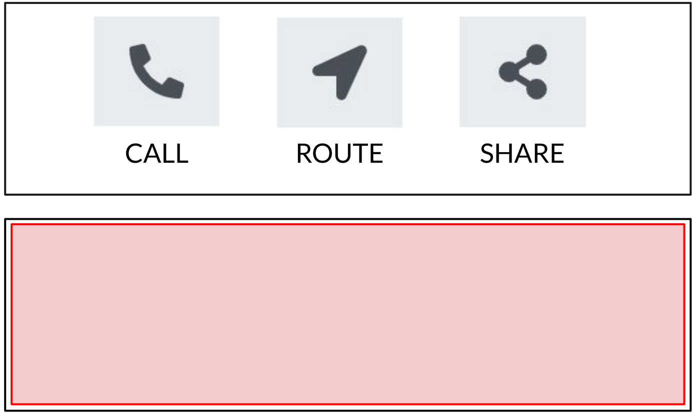


```
import 'package:flutter/material.dart';

void main() {
  runApp(
    Center(
      child: Text(
        'Hello, world!',
        textDirection: TextDirection.ltr,
      ),
    ),
  );
}
```

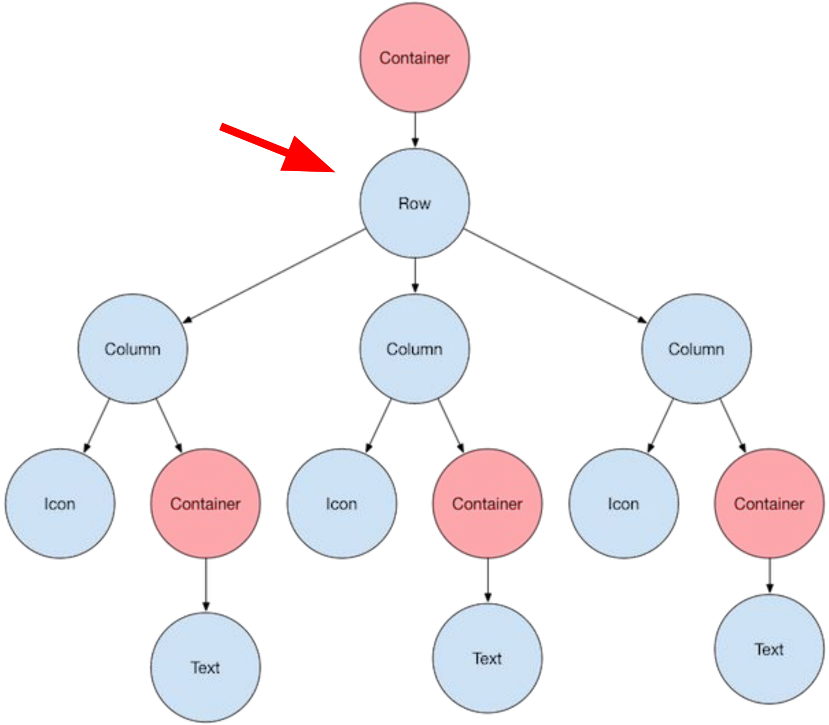


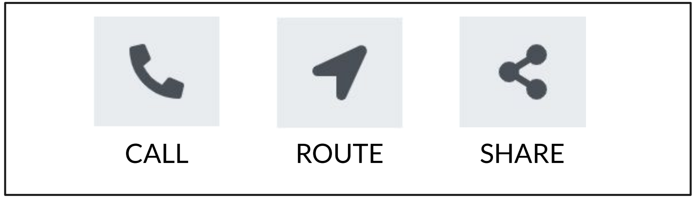
```
body: Container( ),
```



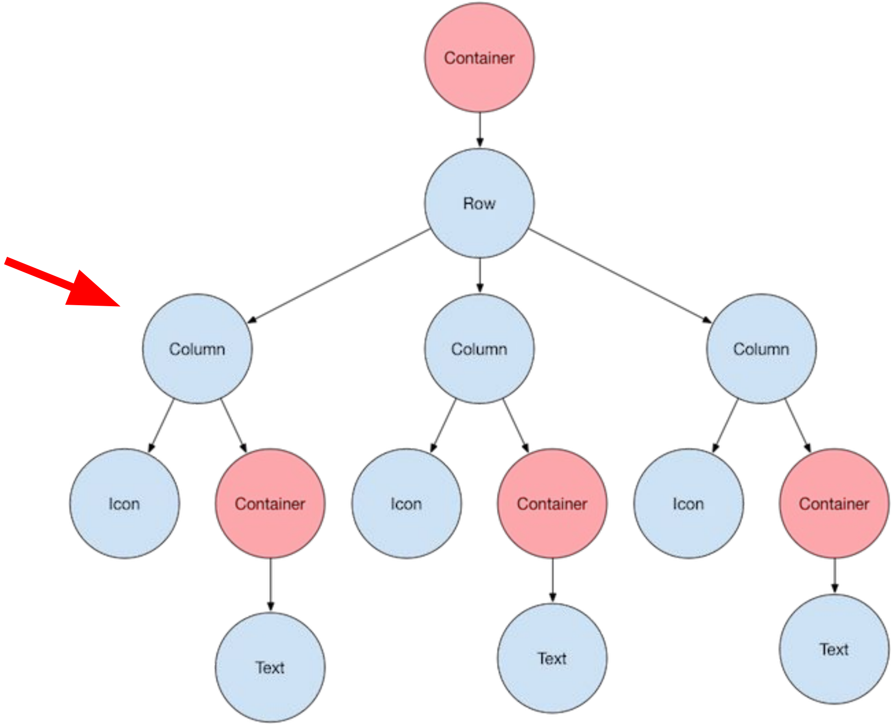


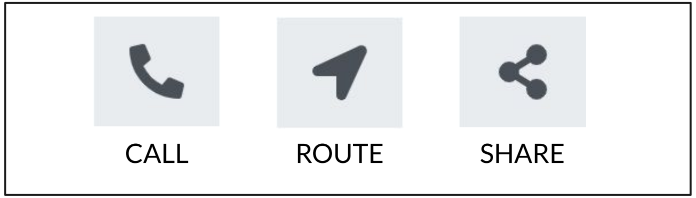
```
body: Container(
   child: Row(),
),
```

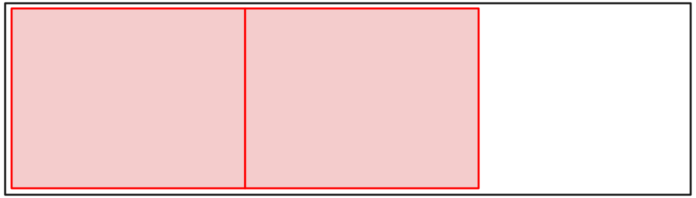




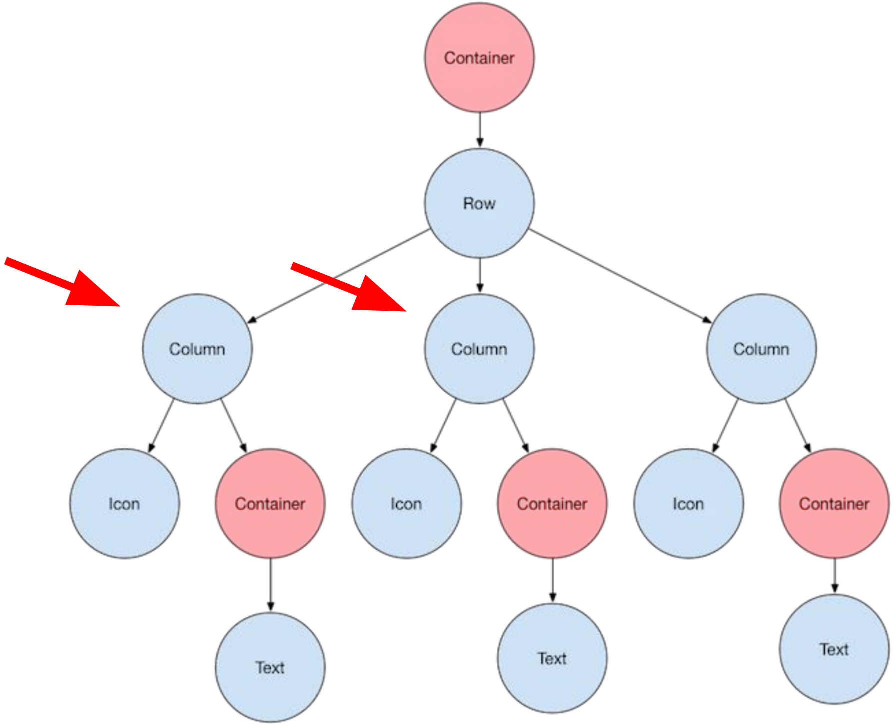
```
body: Container(
  child: Row(
    children: <Widget>[
      Column( )
    ],
  ),
),
```



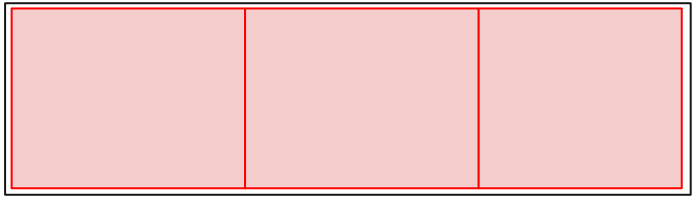




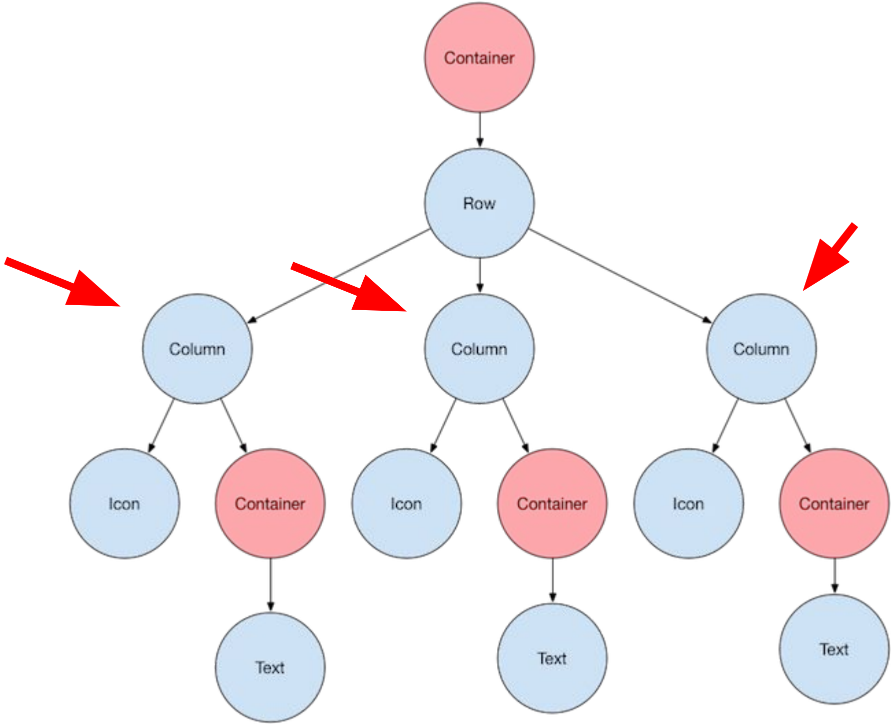
```
body: Container(
   child: Row(
      children: <Widget>[
         Column( ),
         Column( )
      ],
   ),
),
```



CALL
ROUTE
SHARE

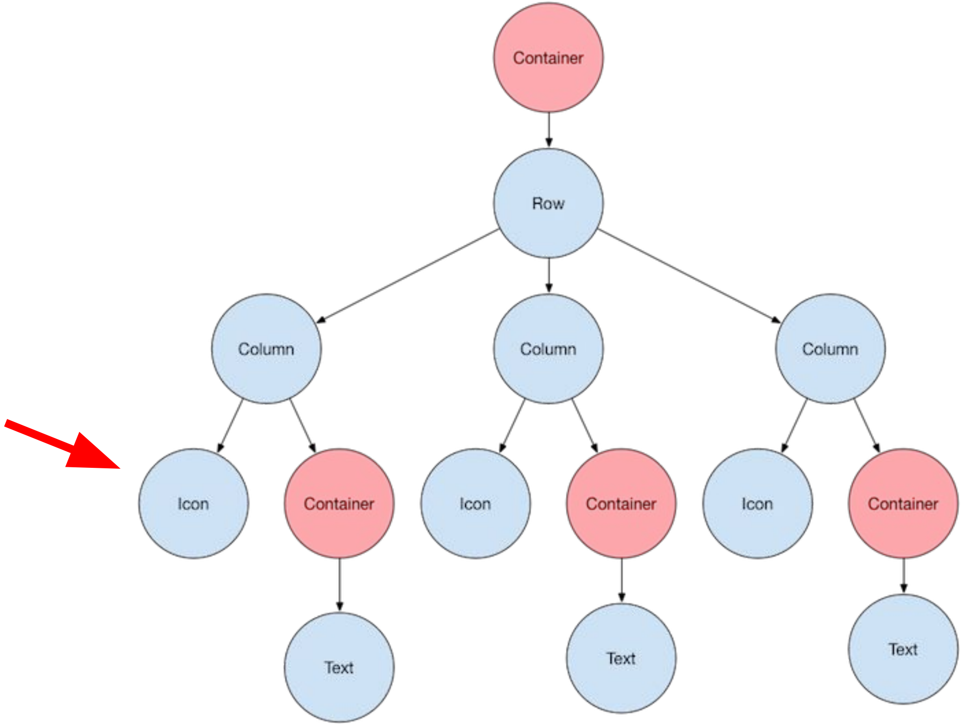


```
body: Container(
  child: Row(
    children: <Widget>[
      Column( ),
      Column( ),
      Column( )
    ],
  ),
),
```



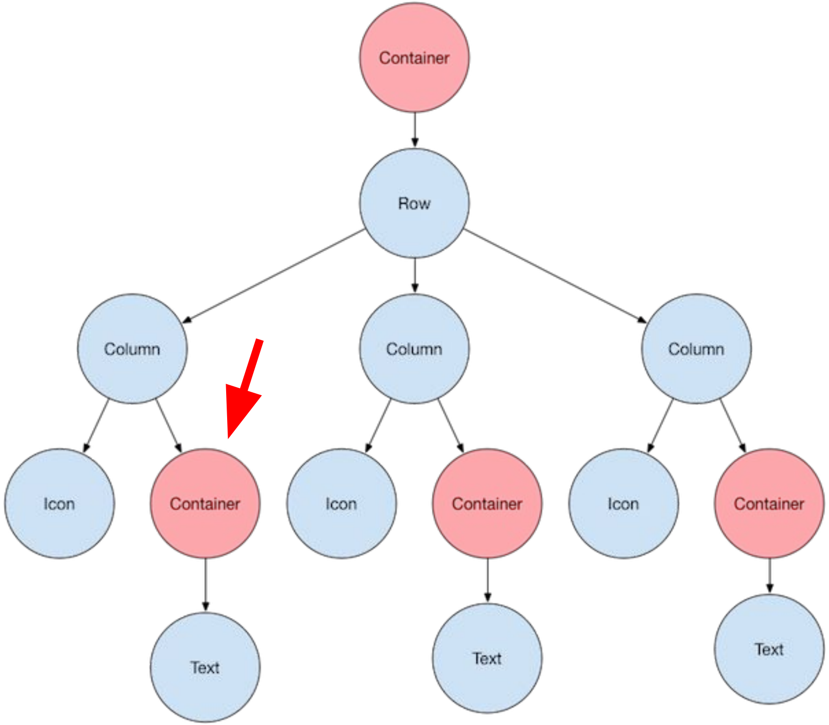
CALL
ROUTE
SHARE

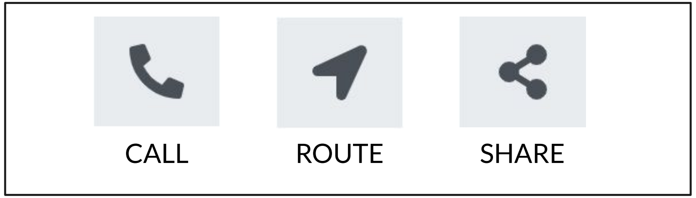
```
body: Container(
  child: Row(
    children: <Widget>[
      Column(
        children: <Widget>[
          Icon(Icons.phone)          ],
      ),
      Column( ),
      Column( )
    ],
  ),
),
```

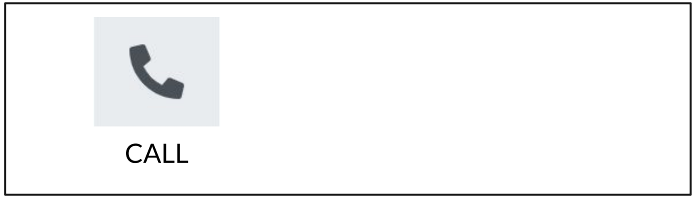


CALL
ROUTE
SHARE

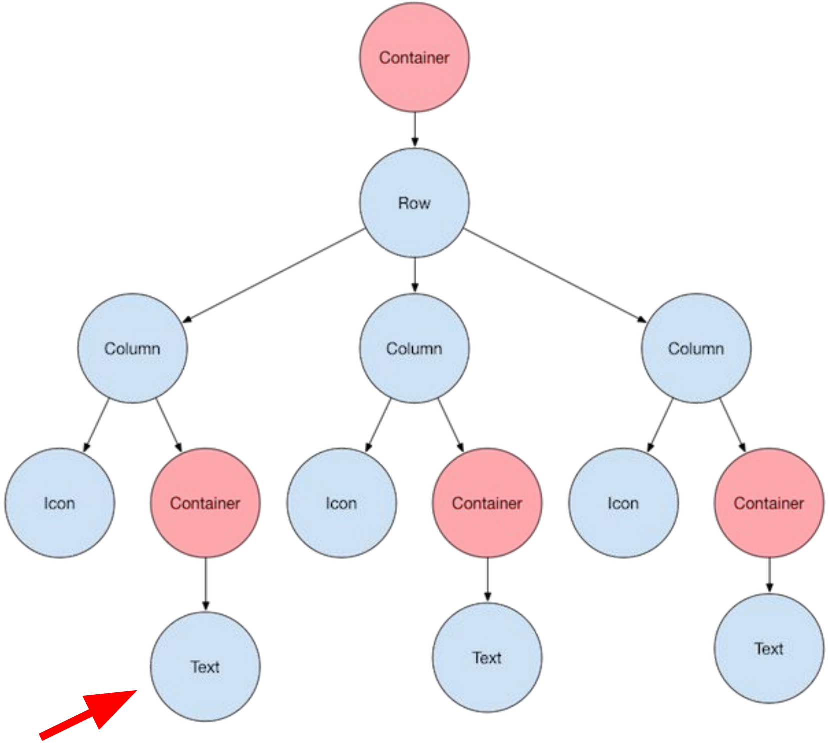
```
body: Container(
  child: Row(
    children: <Widget>[
      Column(
        children: <Widget>[
          Icon(Icons.phone),
          Container()
        ],
      ),
      Column( ),
      Column( )
    ],
  ),
),
```

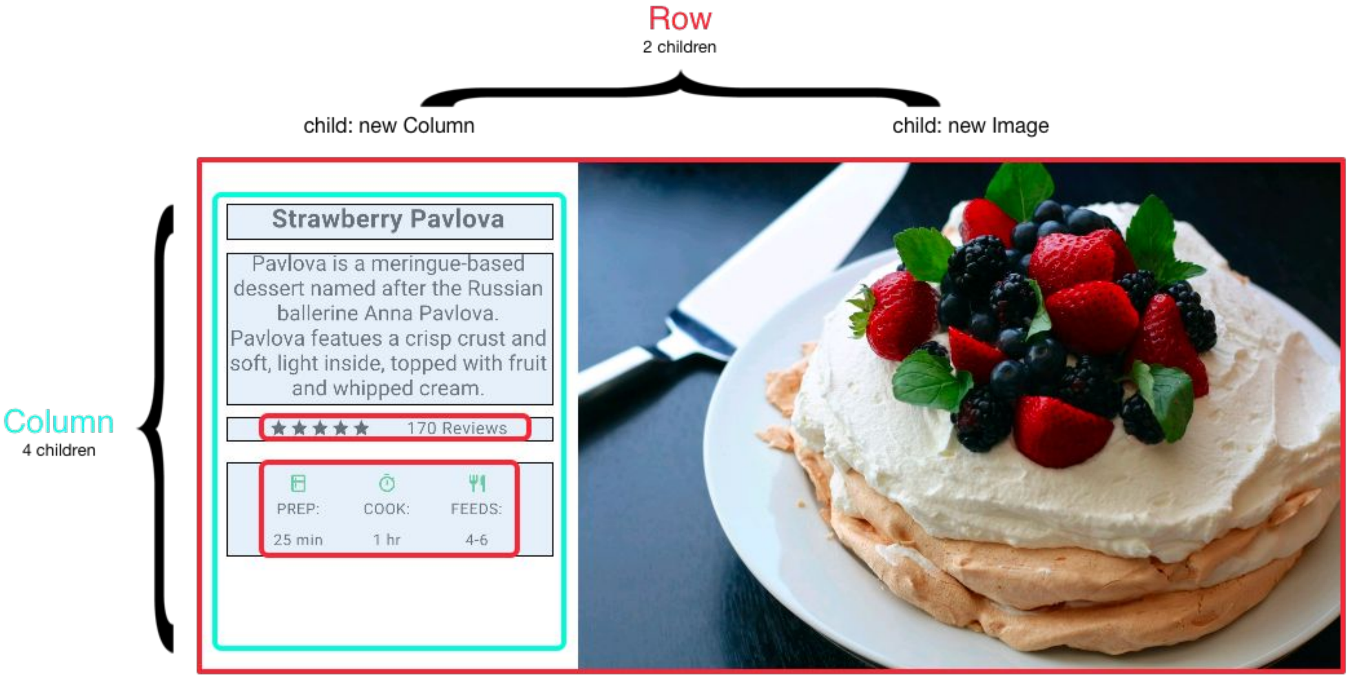






```
body: Container(
  child: Row(
    children: <Widget>[
      Column(
        children: <Widget>[
          Icon(Icons.phone),
          Container(
            child: Text('CALL')
          )
        ],
      ),
      Column( ),
      Column( )
    ],
  ),
),
```





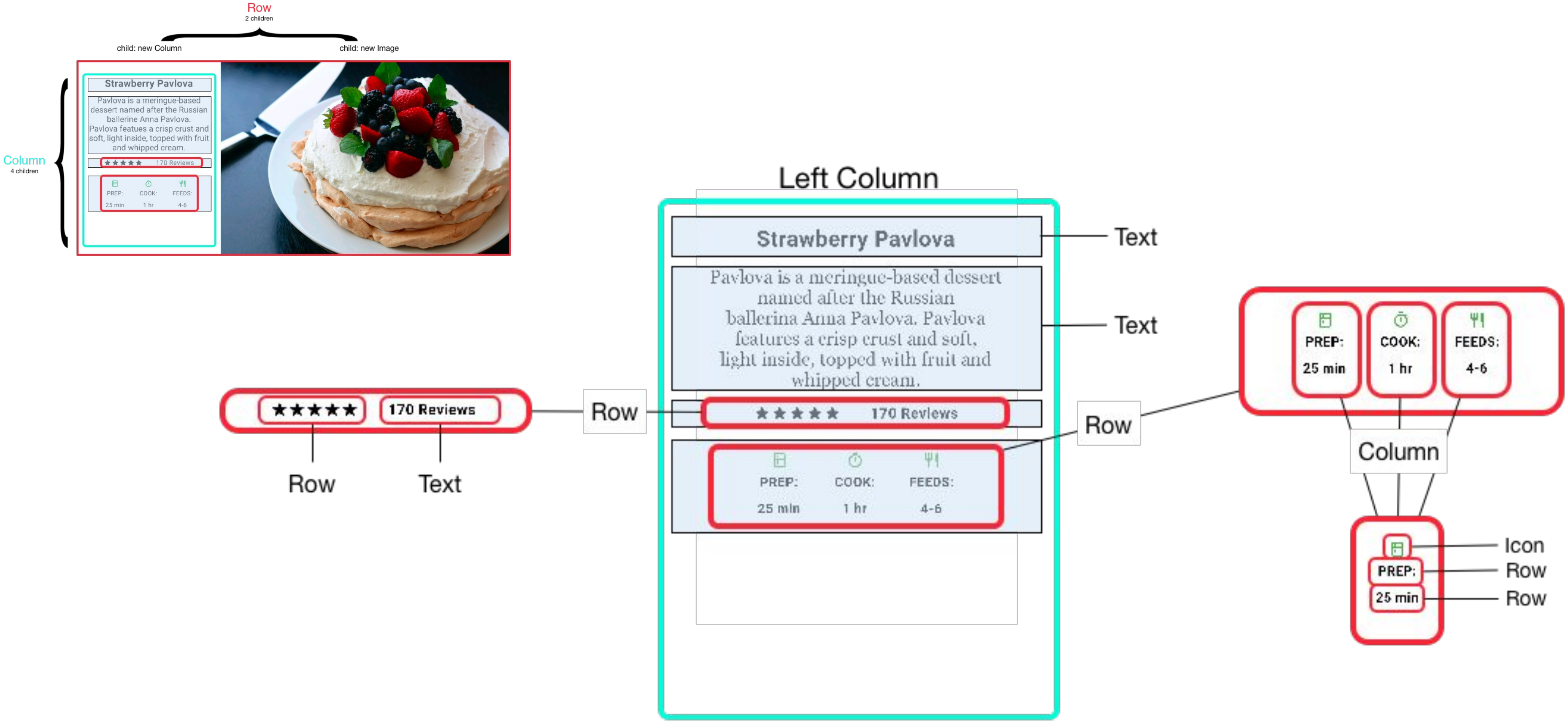
Strawberry Pavlova

Pavlova is a meringue-based dessert named after the Russian ballerine Anna Pavlova. Pavlova featues a crisp crust and soft, light inside, topped with fruit and whipped cream.

★★★★★ 170 Reviews

PREP:	COOK:	FEEDS:
25 min	1 hr	4-6

Row & Column

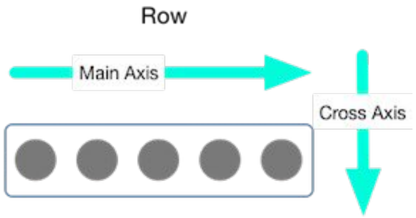


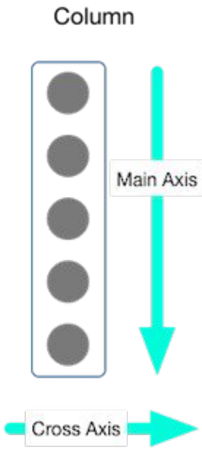
Pavlova is a meringue-based dessert named after the Russian ballerina Anna Pavlova. Pavlova featues a crisp crust and soft, light inside, topped with fruit and whipped cream.

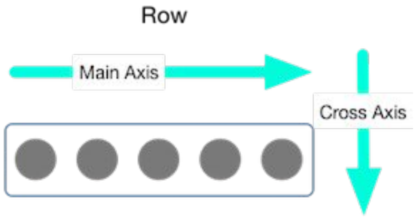
Row & Column

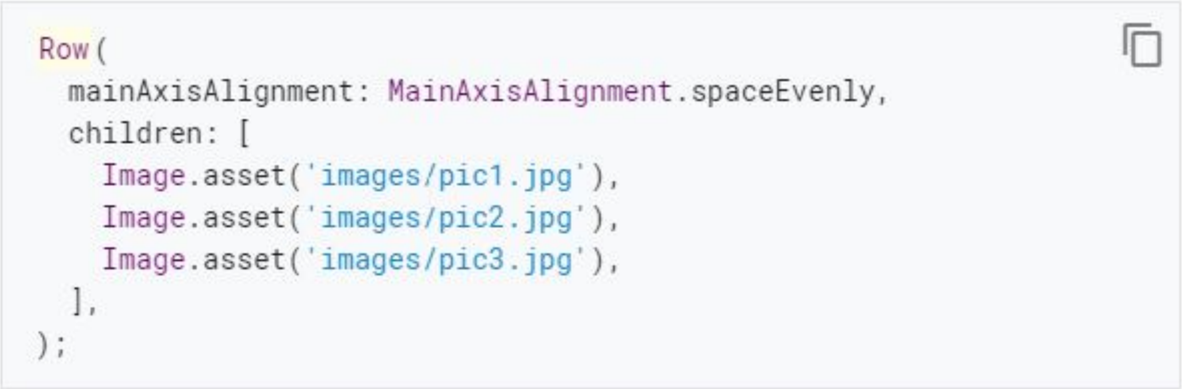
Aligning widgets

using the mainAxisAlignment and crossAxisAlignment properties

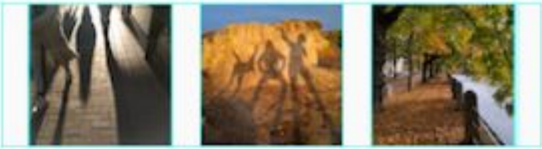




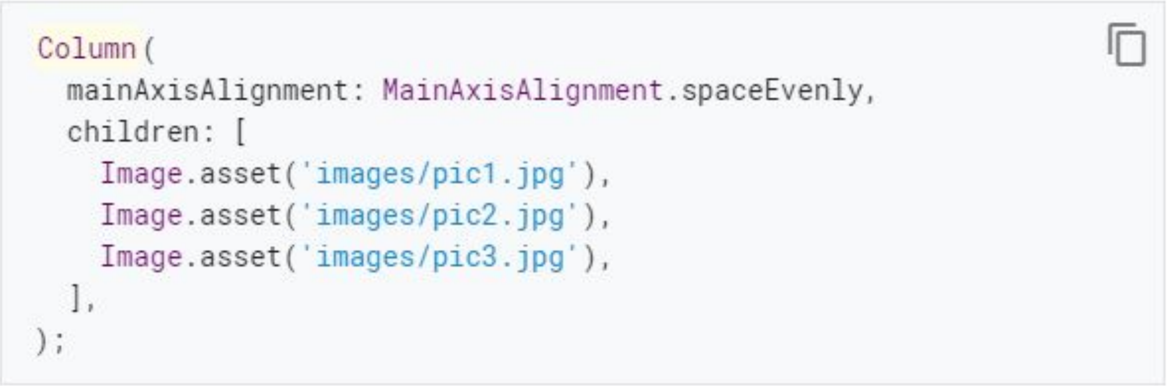




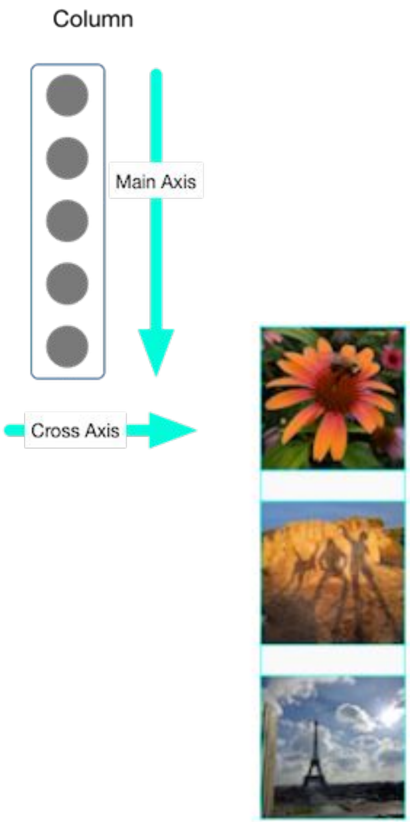
```
Row(
  mainAxisAlignment: MainAxisAlignment.spaceEvenly,
  children: [
    Image.asset('images/pic1.jpg'),
    Image.asset('images/pic2.jpg'),
    Image.asset('images/pic3.jpg'),
  ],
);
```



App source: row_column



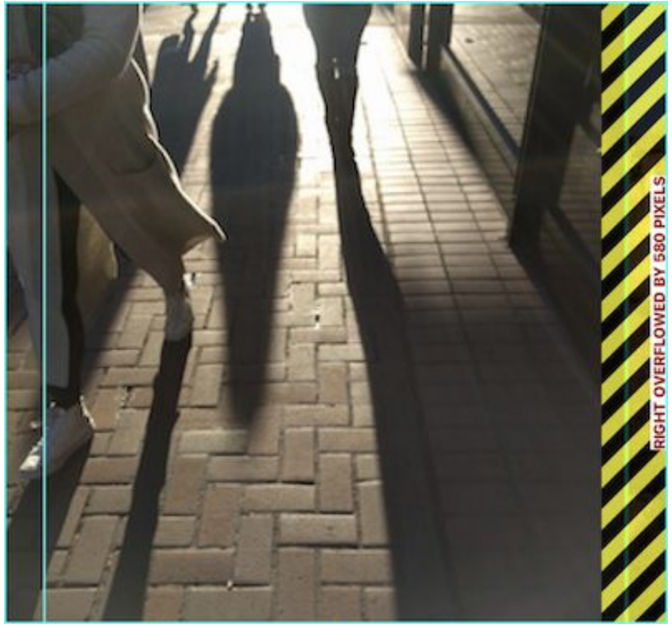
```
Column(
  mainAxisAlignment: MainAxisAlignment.spaceEvenly,
  children: [
    Image.asset('images/pic1.jpg'),
    Image.asset('images/pic2.jpg'),
    Image.asset('images/pic3.jpg'),
  ],
);
```

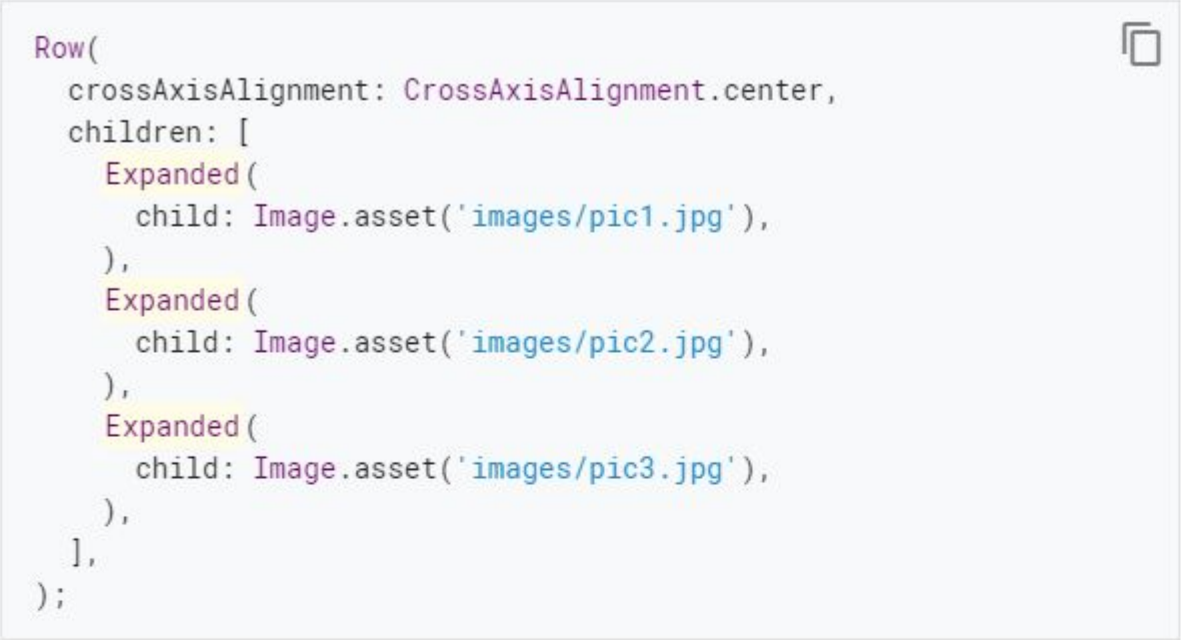


App source: row_column

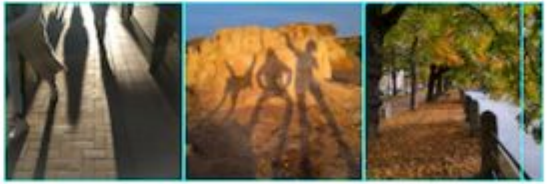
Sizing widgets

- When a layout is too large to fit a device, a yellow and black striped pattern appears along the affected edge
- Widgets can be sized to fit within a row or column by using the Expanded widget





```
Row(
  crossAxisAlignment: CrossAxisAlignment.center,
  children: [
    Expanded(
      child: Image.asset('images/pic1.jpg'),
    ),
    Expanded(
      child: Image.asset('images/pic2.jpg'),
    ),
    Expanded(
      child: Image.asset('images/pic3.jpg'),
    ),
  ],
);
```



App source: sizing

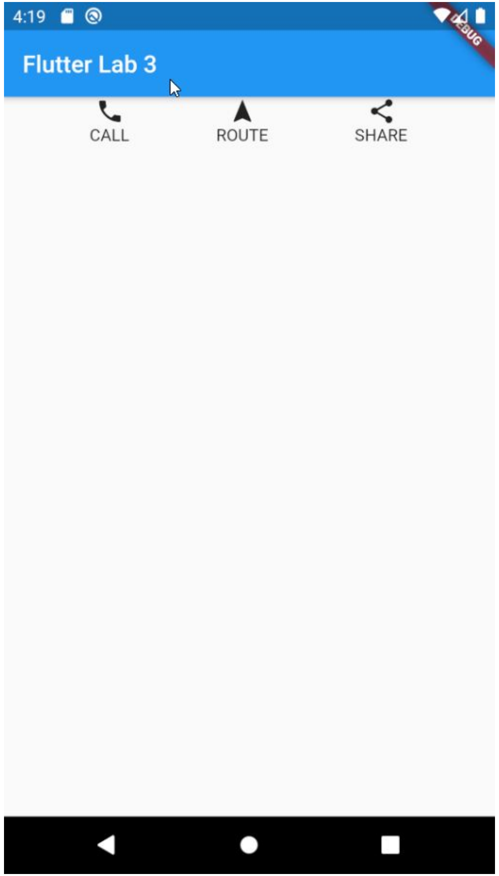
Expanded https://api.flutter.dev/flutter/widgets/Expanded-class.html

Lab 3

okdii solutions

Flutter Layout

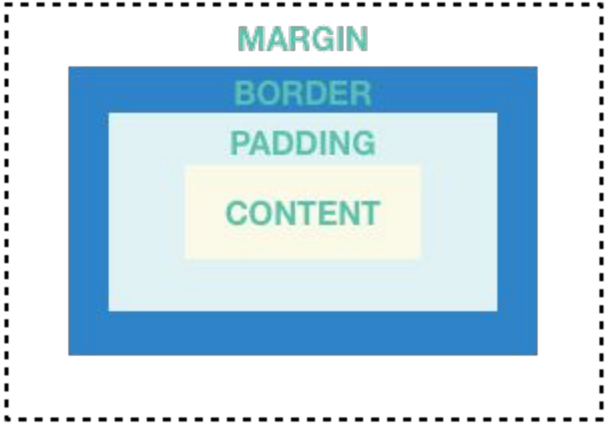
1. Create new flutter project
2. Replace main.dart code with the following
    - https://github.com/hanafiah/flutter_lab/blob/master/lib/main.dart
3. Change title into “Flutter Lab 3”
4. Create layout as per screen shot



End of Lab

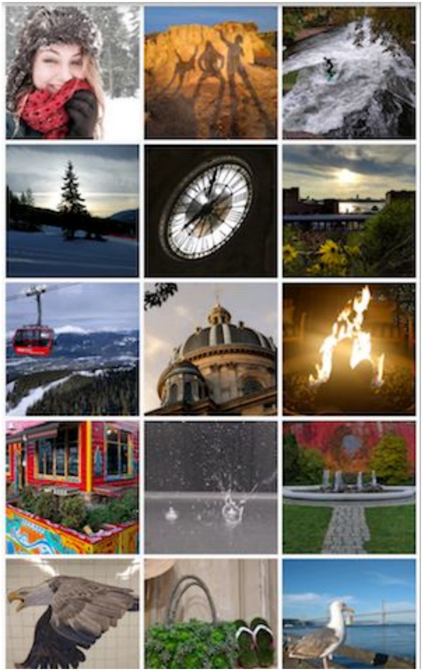
Standard widgets - Container

- Adds padding, margins, borders, background color, or other decorations to a widget
- https://api.flutter.dev/flutter/widgets/Container-class.html



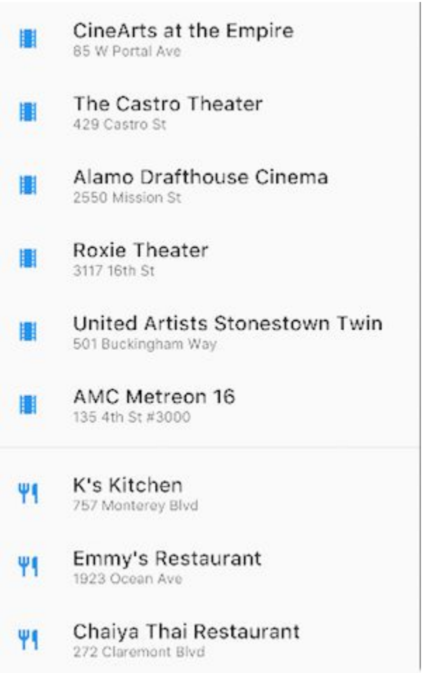
Standard widgets - GridView

- Lays widgets out as a scrollable grid
- https://api.flutter.dev/flutter/widgets/GridView-class.html



Standard widgets - ListView

- Lays widgets out as a scrollable list
- https://api.flutter.dev/flutter/widgets/ListView-class.html



CineArts at the Empire
85 W Portal Ave

The Castro Theater
429 Castro St

Alamo Drafthouse Cinema
2550 Mission St

Roxie Theater
3117 16th St

United Artists Stonestown Twin
501 Buckingham Way

AMC Metreon 16
135 4th St #3000

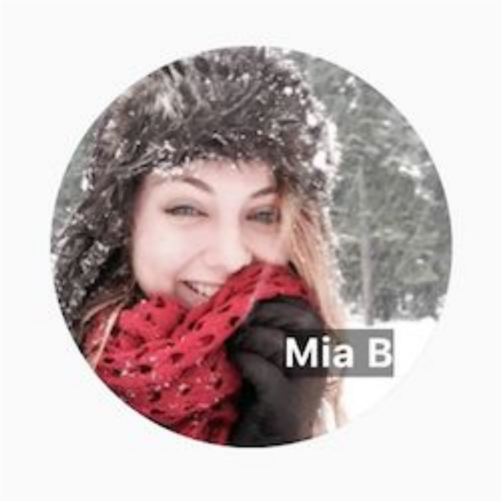
K's Kitchen
757 Monterey Blvd

Emmy's Restaurant
1923 Ocean Ave

Chaiya Thai Restaurant
272 Claremont Blvd

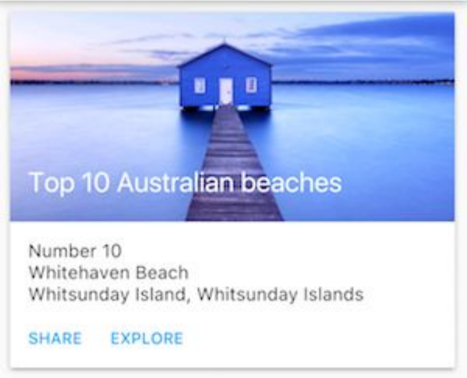
Standard widgets - Stack

- Overlaps a widget on top of another
- https://api.flutter.dev/flutter/widgets/Stack-class.html



Material widgets - Card

- Organizes related info into a box with rounded corners and a drop shadow
- https://api.flutter.dev/flutter/material/Card-class.html

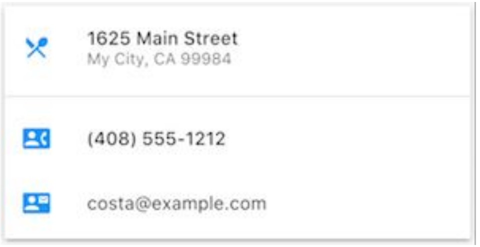


Top 10 Australian beaches

Number 10
Whitehaven Beach
Whitsunday Island, Whitsunday Islands

Material widgets - ListTile

- Organizes up to 3 lines of text, and optional leading and trailing icons, into a row
- https://api.flutter.dev/flutter/material/ListTile-class.html



1625 Main Street
My City, CA 99984

(408) 555-1212

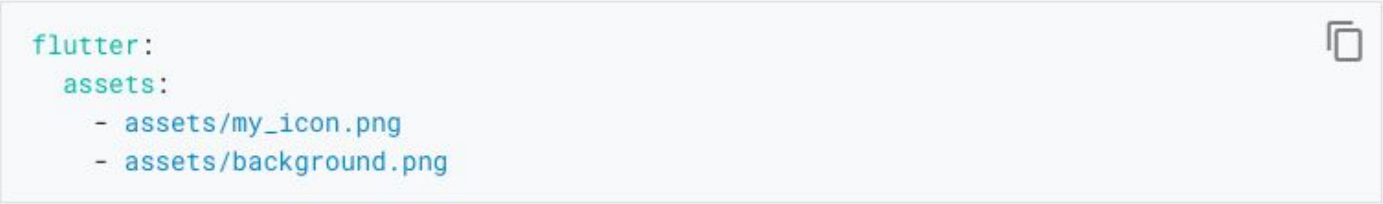
costa@example.com

Adding assets and images

- Flutter apps can include both code and assets (sometimes called resources)
- Common types of assets include static data (for example, JSON files), configuration files, icons, and images (JPEG, WebP, GIF, animated WebP/GIF, PNG, BMP, and WBMP).

Specifying assets

- Flutter uses the pubspec.yaml file, located at the root of your project, to identify assets required by an app.



```
flutter:
  assets:
    - assets/my_icon.png
    - assets/background.png
```

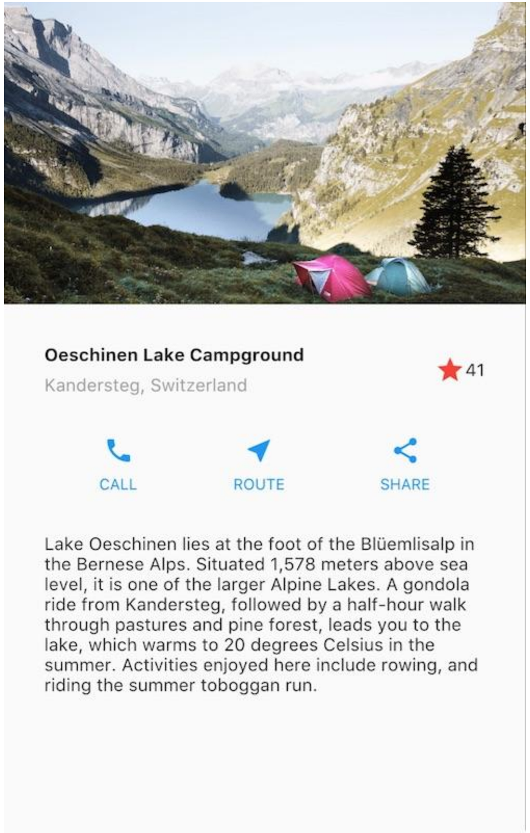
Widget Lists

https://api.flutter.dev/flutter/widgets/widgets-library.html

Lab 4

Flutter Layout

1. Create new flutter project
2. Replace main.dart code with the following
    - https://github.com/hanafiah/flutter_lab/blob/master/lib/main.dart
3. Change title into “Flutter Lab 4”
4. Create an images directory at the top of the project
5. Update the pubspec.yaml file to include an assets tag
6. Create layout as per screen shot



Oeschinen Lake Campground

Kandersteg, Switzerland

★ 41

Lake Oeschinen lies at the foot of the Blüemlisalp in the Bernese Alps. Situated 1,578 meters above sea level, it is one of the larger Alpine Lakes. A gondola ride from Kandersteg, followed by a half-hour walk through pastures and pine forest, leads you to the lake, which warms to 20 degrees Celsius in the summer. Activities enjoyed here include rowing, and riding the summer toboggan run.

End of Lab