



Research & Development Team

Mobile Programming with Flutter

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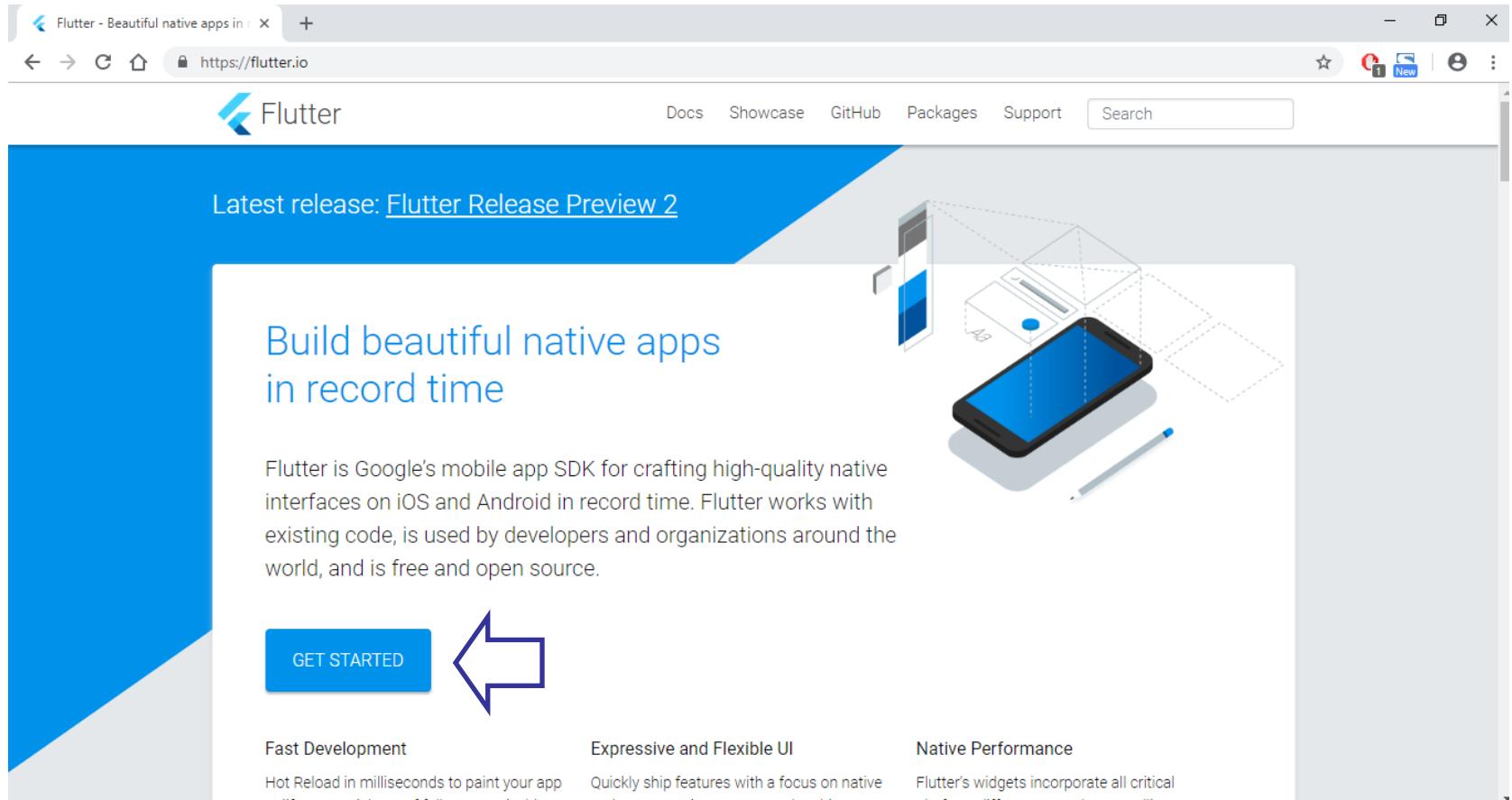
Software

INSTALLATION

การติดตั้ง

FLUTTER

เข้า url <https://flutter.io>



The screenshot shows the Flutter website homepage. At the top, there's a navigation bar with links for Docs, Showcase, GitHub, Packages, and Support, along with a search bar. Below the navigation, a banner announces the "Latest release: [Flutter Release Preview 2](#)". The main headline reads "Build beautiful native apps in record time". A descriptive paragraph explains that Flutter is Google's mobile app SDK for crafting high-quality native interfaces on iOS and Android in record time. It highlights that Flutter works with existing code, is used by developers and organizations around the world, and is free and open source. Below this, there's a large blue "GET STARTED" button with a white arrow pointing towards it. To the right of the button is a graphic showing a smartphone, a laptop, and a tablet connected by dashed lines, symbolizing跨平台 (cross-platform) development. At the bottom, there are three sections: "Fast Development" (Hot Reload in milliseconds to paint your app), "Expressive and Flexible UI" (Quickly ship features with a focus on native user experience), and "Native Performance" (Flutter's widgets incorporate all critical platform differences such as scrolling).

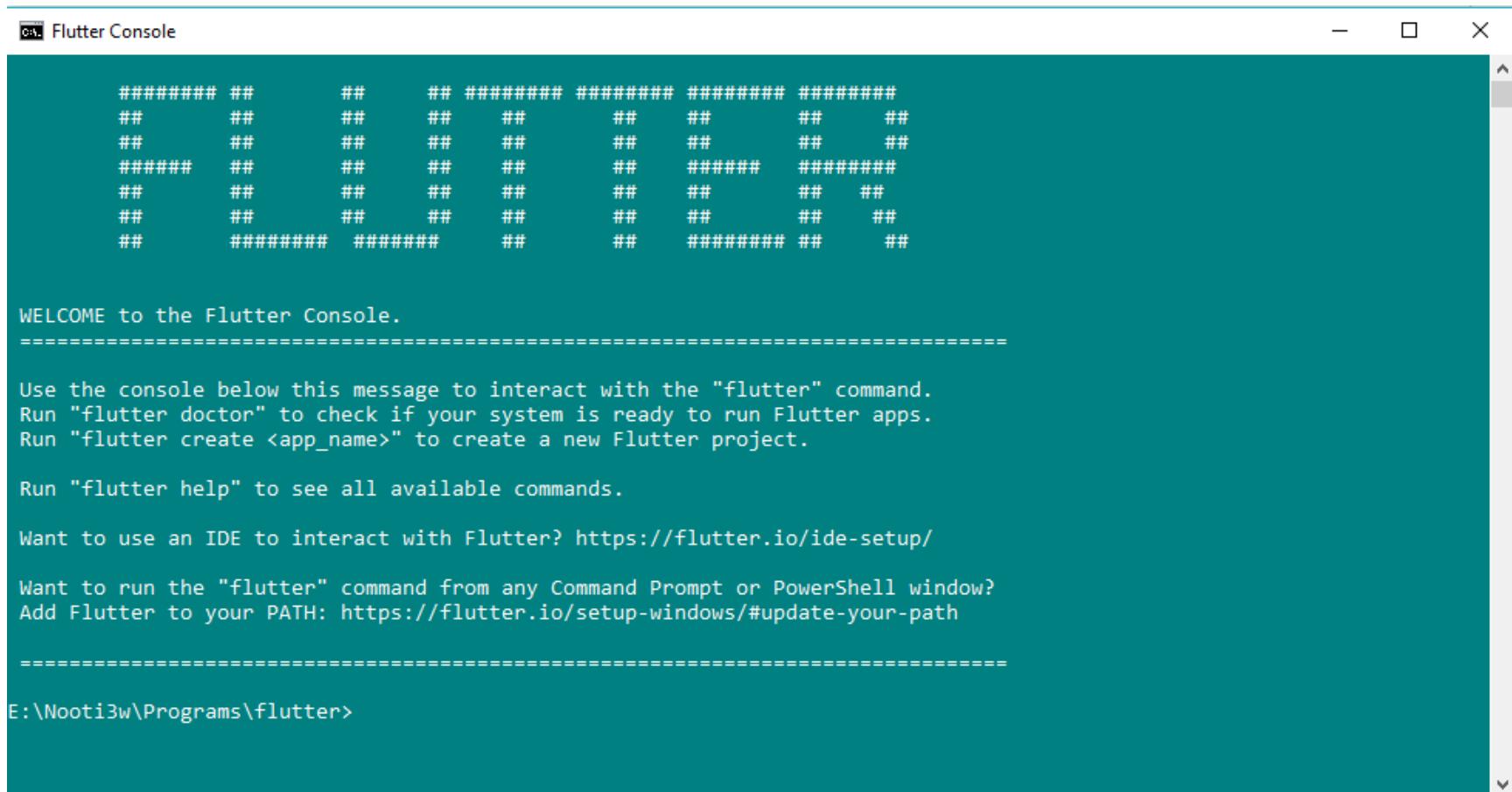
ເລືອກ version ທີ່ຕຽງກັບ OS

The screenshot shows a web browser displaying the Flutter website at <https://flutter.io/get-started/install/>. The page title is "Get Started: Install". On the left sidebar, there are links for "Get started" (with steps 1-5), "Build UIs" (with sub-links like "Tour the framework", "Widget catalog", etc.), and "Flutter for" sections for various platforms. The main content area has a heading "Get Started: Install" and a note: "Please select the operating system on which you are installing Flutter:". Three blue buttons below the note are labeled "INSTALL ON WINDOWS", "INSTALL ON MACOS", and "INSTALL ON LINUX". A note at the bottom of the page says: "Note: If you're in China, please read [this wiki article](#) first." The footer contains the Flutter logo, links to "flutter-dev@", "twitter", "github", "terms", "privacy", and "社区中文资源", and a note about the Creative Commons Attribution 4.0 International License.

flutter file zip នឹង download មាន

Name	Date modified	Type	Size
.git	9/19/2018 2:36 AM	File folder	
.github	9/19/2018 2:35 AM	File folder	
.idea	9/19/2018 2:40 AM	File folder	
.pub-cache	9/19/2018 2:35 AM	File folder	
bin	9/19/2018 2:35 AM	File folder	
dev	9/19/2018 2:35 AM	File folder	
examples	9/19/2018 2:35 AM	File folder	
packages	9/19/2018 2:35 AM	File folder	
.cirrus.yml	9/19/2018 2:35 AM	Yaml Source File	7 KB
.gitattributes	9/19/2018 2:35 AM	Git Attributes Sour...	1 KB
.gitignore	9/19/2018 2:35 AM	Git Ignore Source ...	2 KB
analysis_options.yaml	9/19/2018 2:35 AM	Yaml Source File	8 KB
appveyor.yml	9/19/2018 2:35 AM	Yaml Source File	1 KB
AUTHORS	9/19/2018 2:35 AM	File	2 KB
CONTRIBUTING.md	9/19/2018 2:35 AM	Markdown Source...	14 KB
flutter_console.bat	9/19/2018 2:35 AM	Windows Batch File	2 KB
flutter_root.iml	9/19/2018 2:35 AM	IML File	1 KB
LICENSE	9/19/2018 2:35 AM	File	2 KB
PATENTS	9/19/2018 2:35 AM	File	2 KB
README.md	9/19/2018 2:35 AM	Markdown Source...	7 KB
version	9/19/2018 2:41 AM	File	1 KB

run คำสั่ง flutter_console



Flutter Console

```
#####
##      ##    ## ##### ## ##### ## ##### ## #####
##      ##    ## ## ## ## ## ## ## ## ## ## ##
##      ##    ## ## ## ## ## ## ## ## ## ## ##
##### ##    ## ## ## ## ## ## ## ## ## ## ##
##      ##    ## ## ## ## ## ## ## ## ## ## ##
##      ##    ## ## ## ## ## ## ## ## ## ## ##
##      ##    ## ## ## ## ## ## ## ## ## ## ##
```

WELCOME to the Flutter Console.
=====

Use the console below this message to interact with the "flutter" command.
Run "flutter doctor" to check if your system is ready to run Flutter apps.
Run "flutter create <app_name>" to create a new Flutter project.

Run "flutter help" to see all available commands.

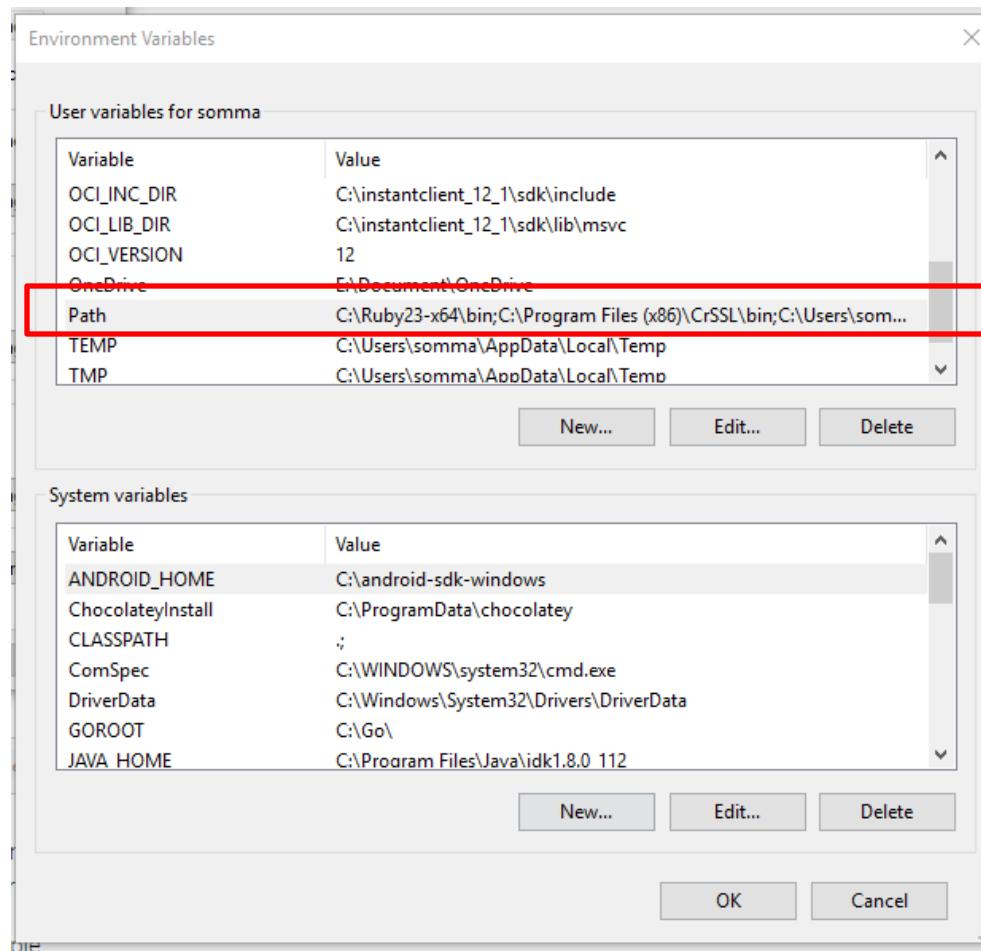
Want to use an IDE to interact with Flutter? <https://flutter.io/ide-setup/>

Want to run the "flutter" command from any Command Prompt or PowerShell window?
Add Flutter to your PATH: <https://flutter.io/setup-windows/#update-your-path>

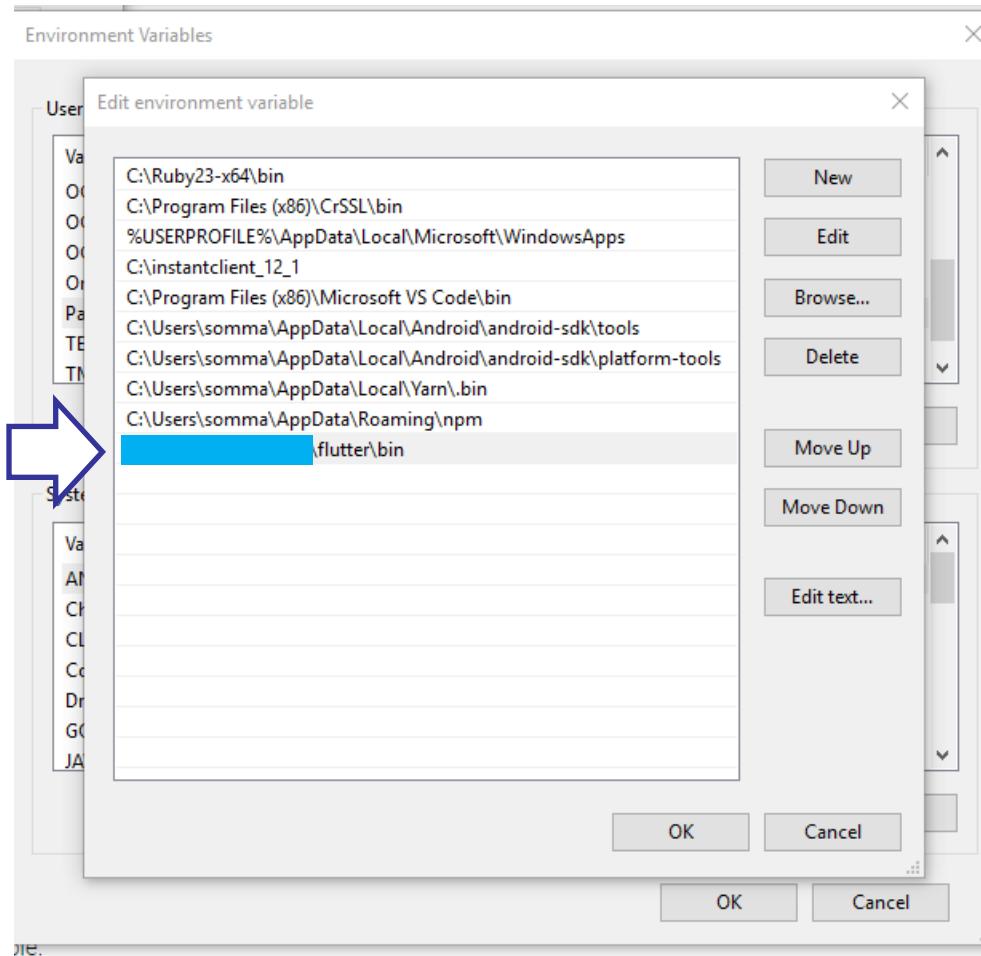
=====

E:\Nooti3w\Programs\flutter>

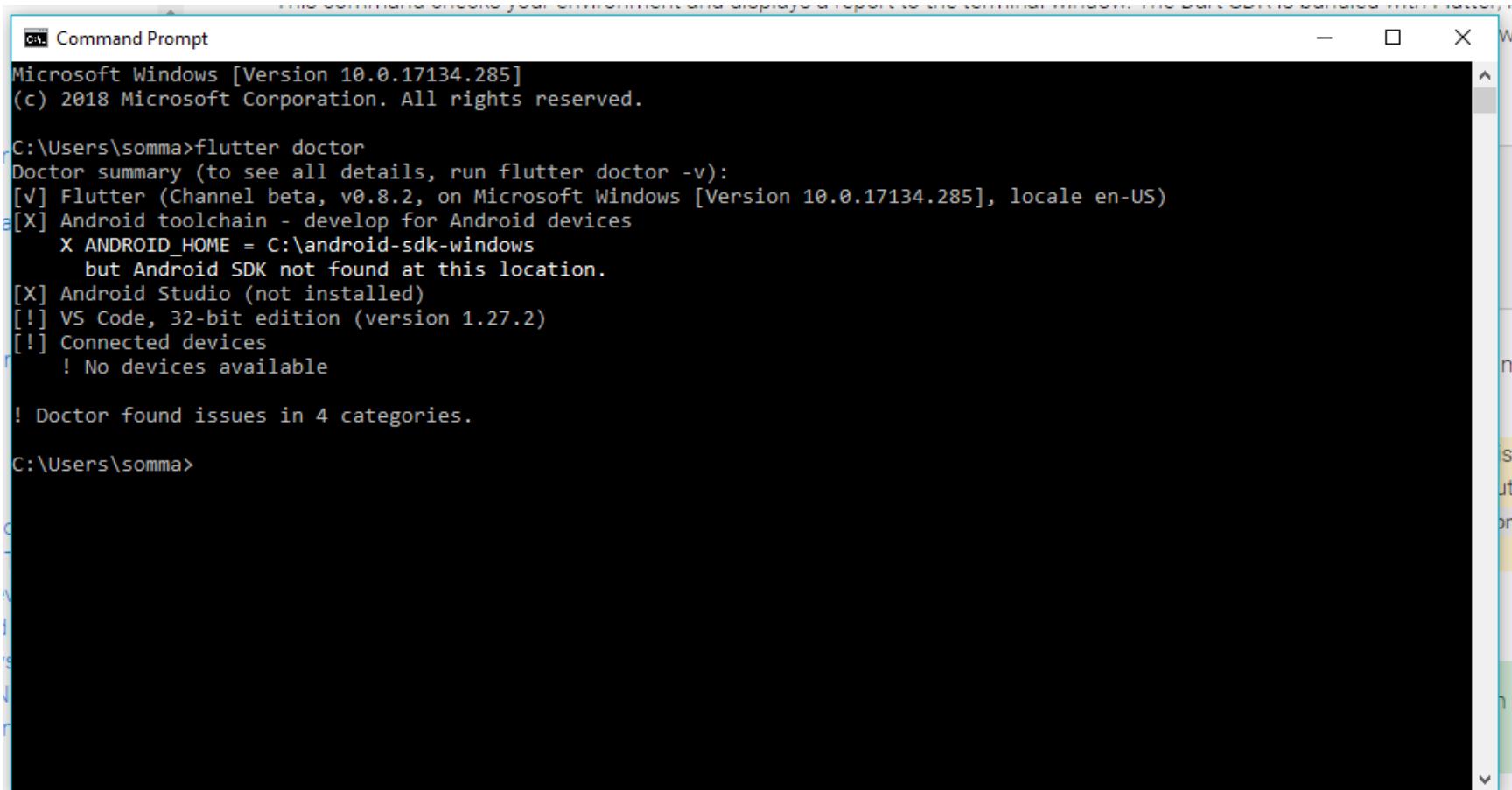
ตั้งค่า system path



ໃຫ້ສຳນັກ flutter/bin



ตรวจสอบการติดตั้งด้วยคำสั่ง flutter doctor



```
Command Prompt
Microsoft Windows [Version 10.0.17134.285]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\somma>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[!] Flutter (Channel beta, v0.8.2, on Microsoft Windows [Version 10.0.17134.285], locale en-US)
  ✘ Android toolchain - develop for Android devices
    X ANDROID_HOME = C:\android-sdk-windows
      but Android SDK not found at this location.
  ✘ Android Studio (not installed)
  [!] VS Code, 32-bit edition (version 1.27.2)
  [!] Connected devices
    ! No devices available

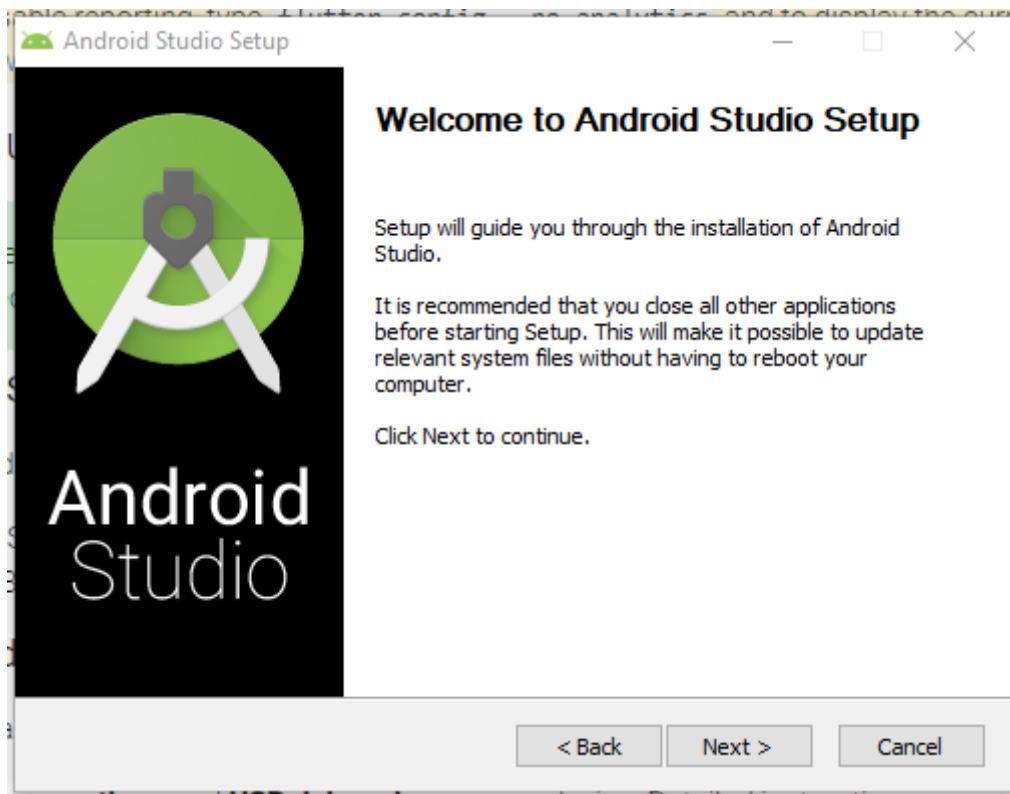
! Doctor found issues in 4 categories.

C:\Users\somma>
```

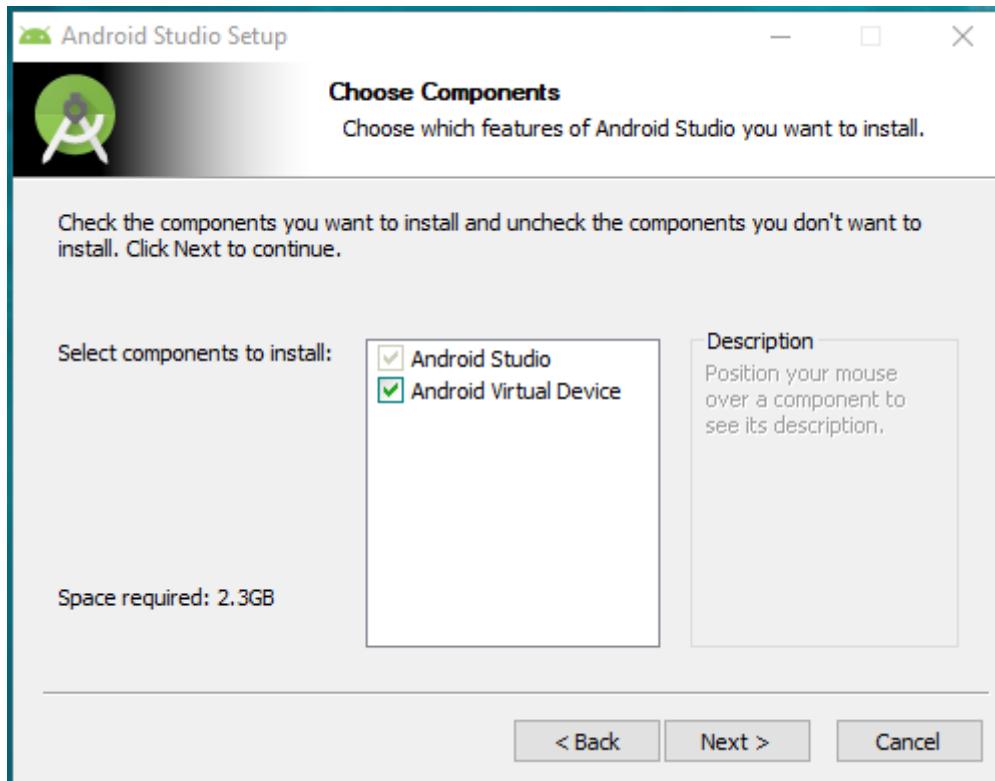
การติดตั้ง

ANDROID STUDIO

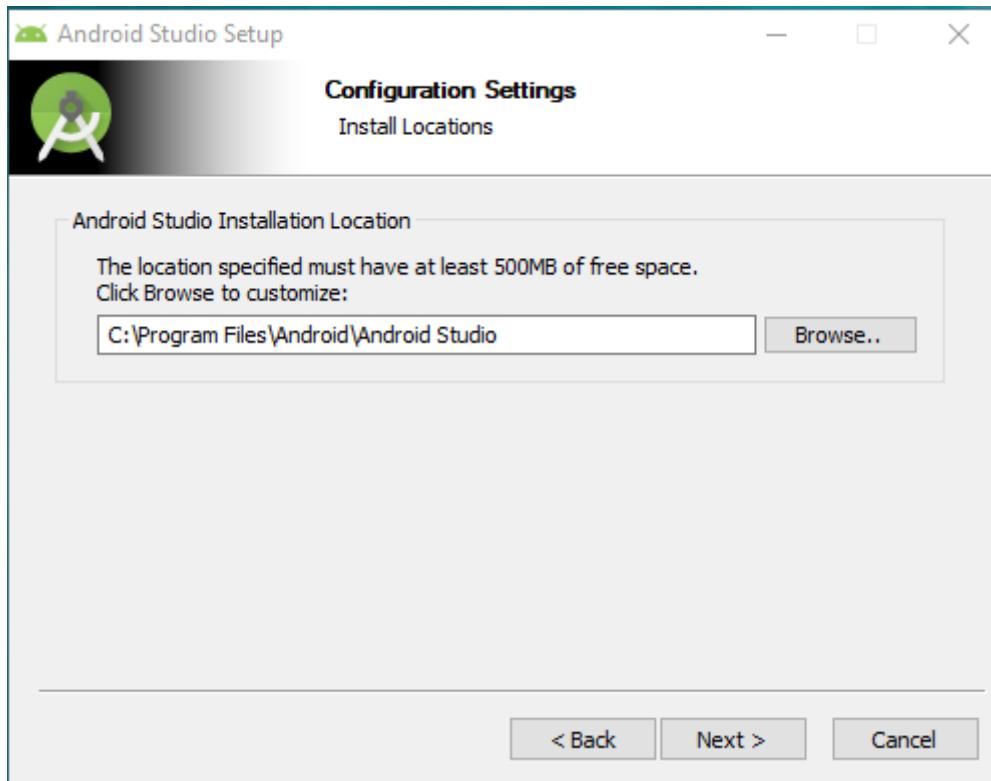
ຕាបពី Android Studio #1



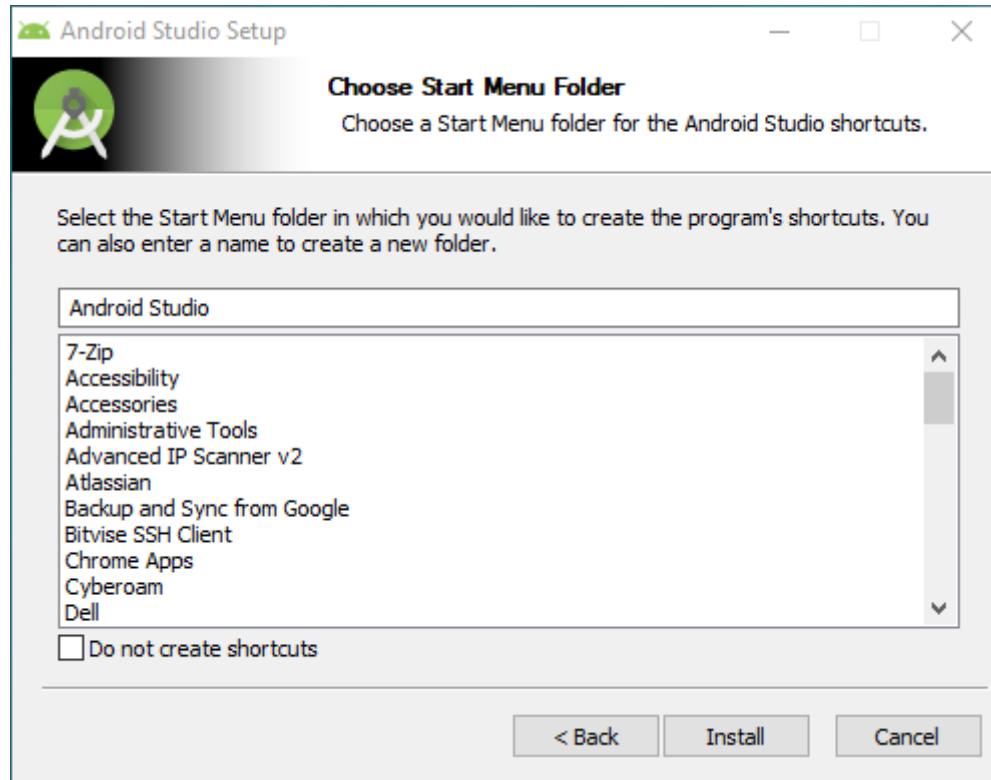
ຕັດຕັ້ງ Android Studio #2



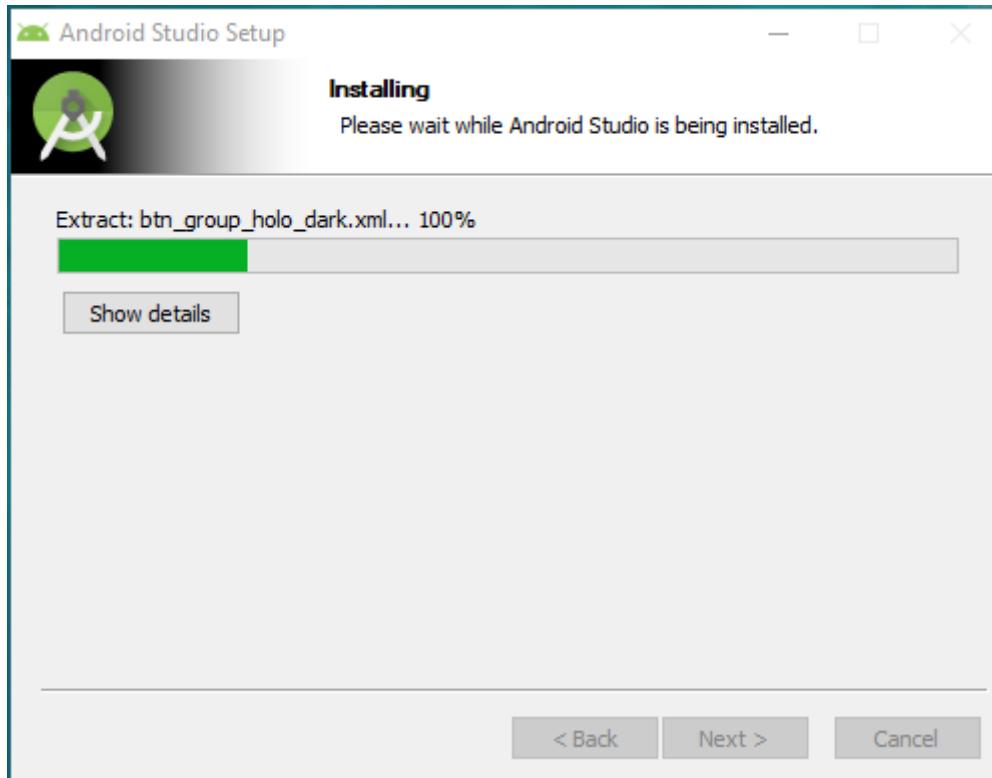
ຕັດຕັ້ງ Android Studio #3



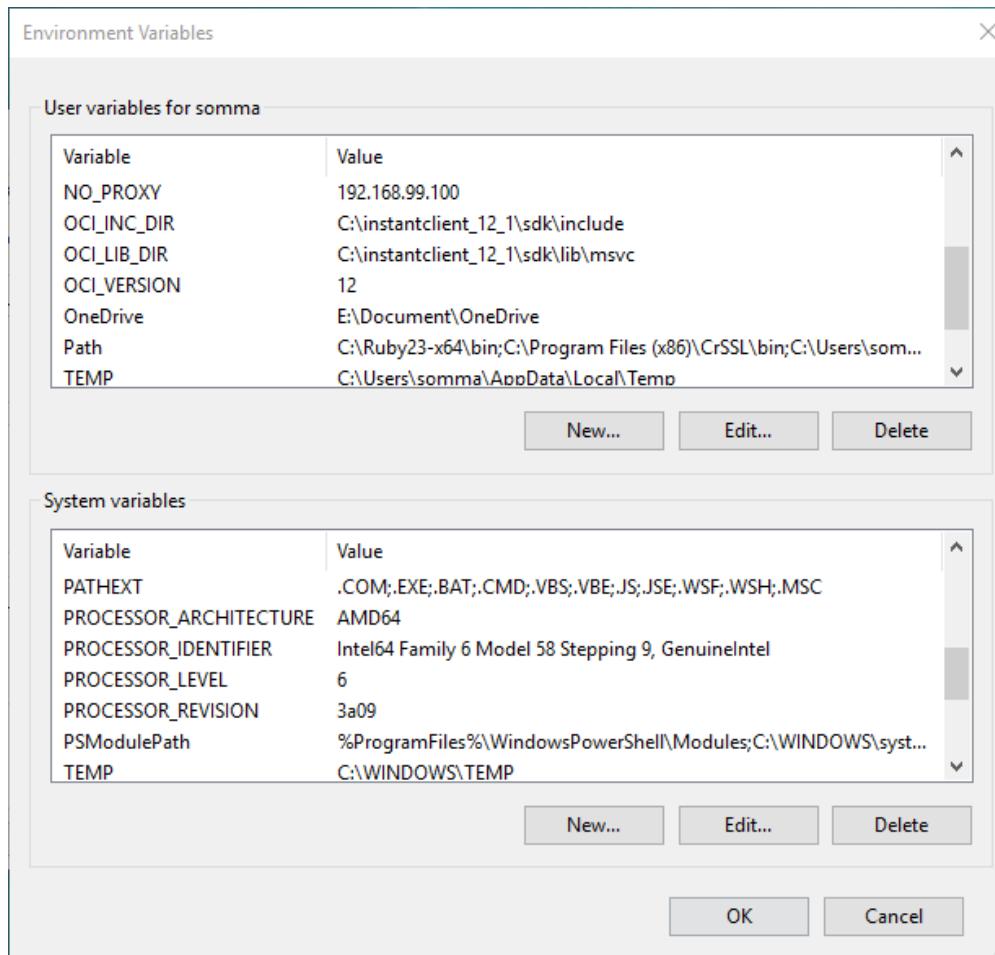
ຕັດຕັ້ງ Android Studio #4



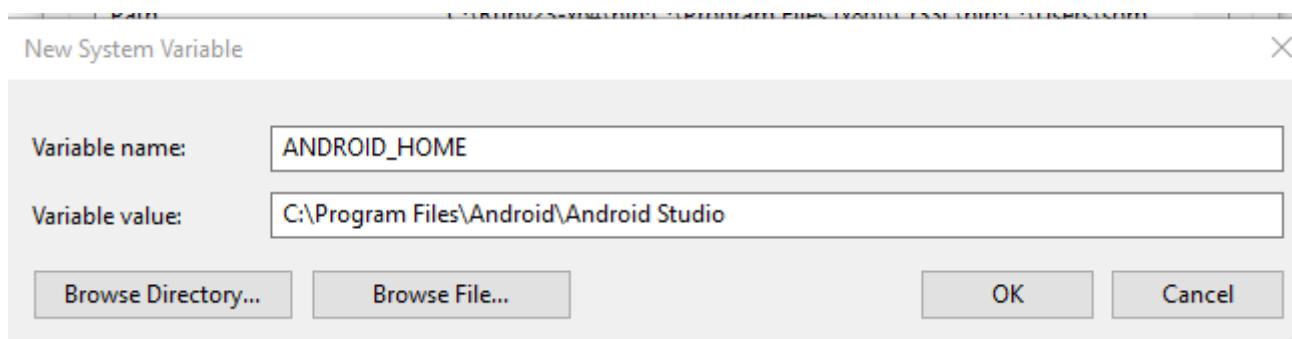
ຕັດຕັ້ງ Android Studio #5



ตั้งค่า System Path



เพิ่ม ANDROID_HOME ให้ชี้ไปที่ path ที่ติดตั้ง Android studio



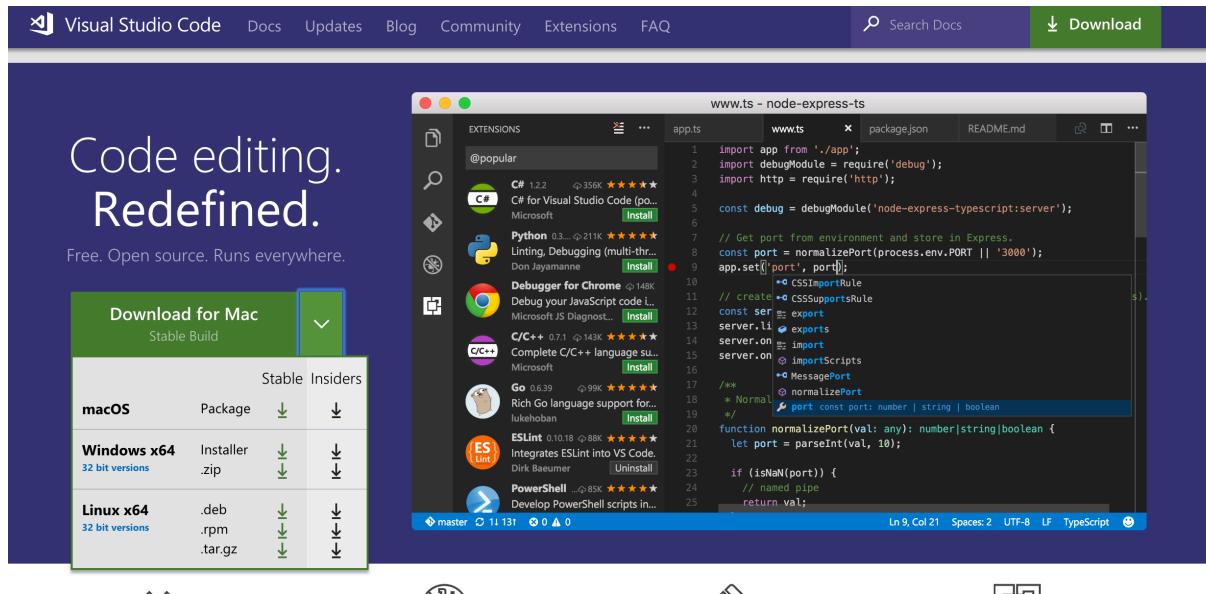
การติดตั้ง

VISUAL STUDIO CODE

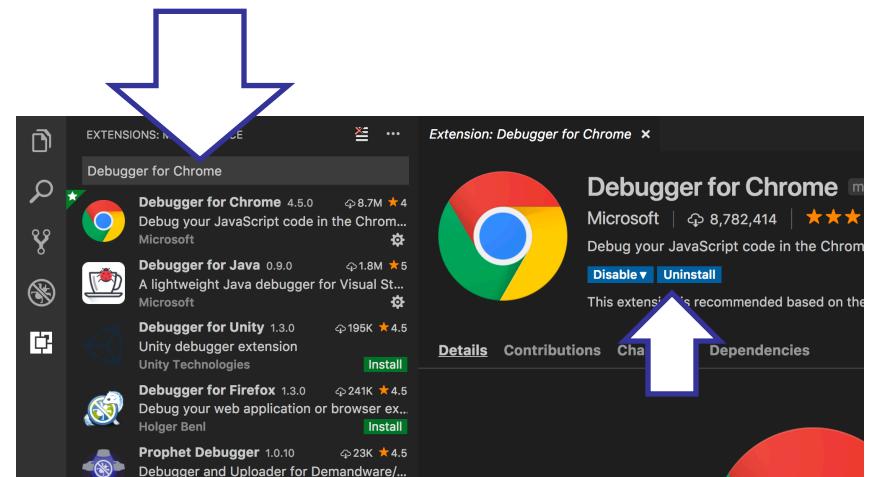
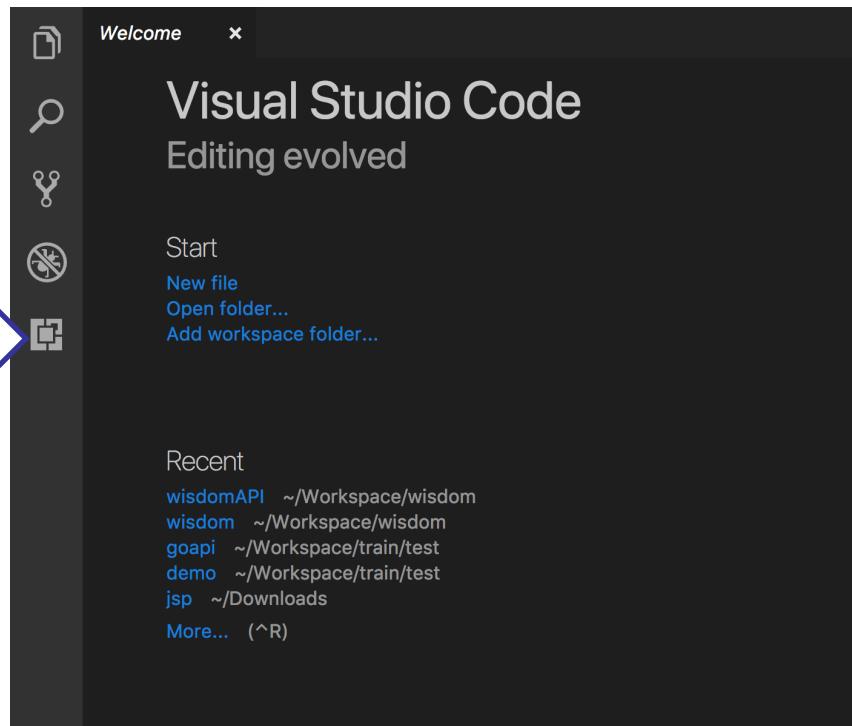
การติดตั้ง VSC

เข้าไปที่ website <https://code.visualstudio.com/>

เลือก download สำหรับ windows (stable)



Install Extensions

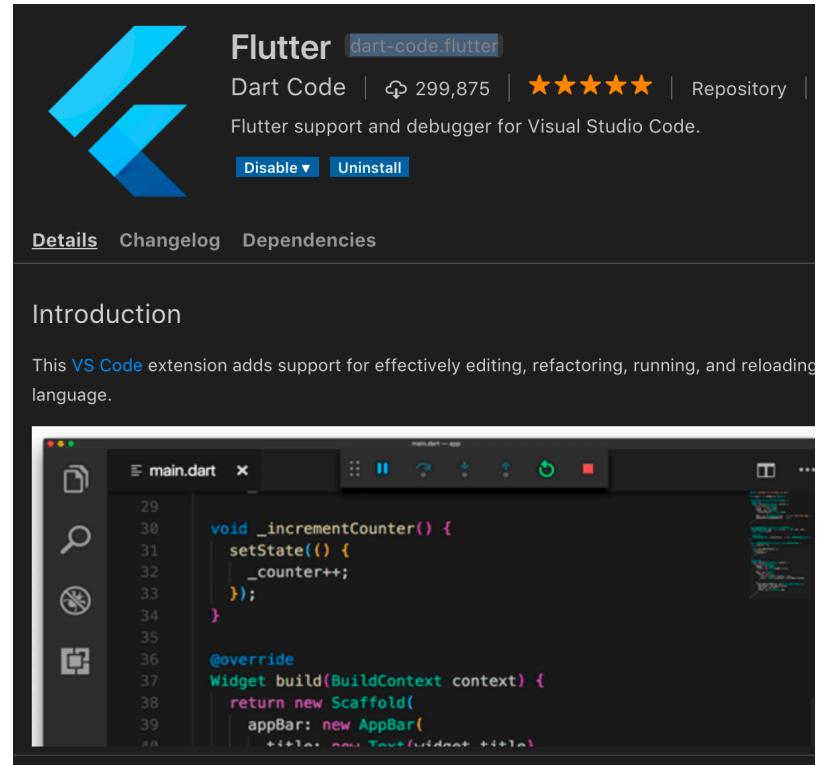


Install Extensions

Visual Studio Code Extensions

Dart [dart-code.dart-code]

Flutter [dart-code.flutter]

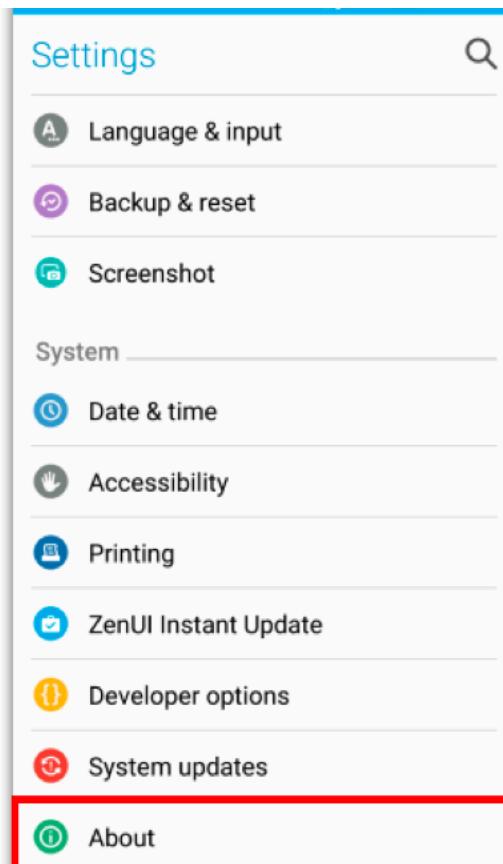


วิธีการตั้งค่า

DEVELOPER MODE ใน ANDROID

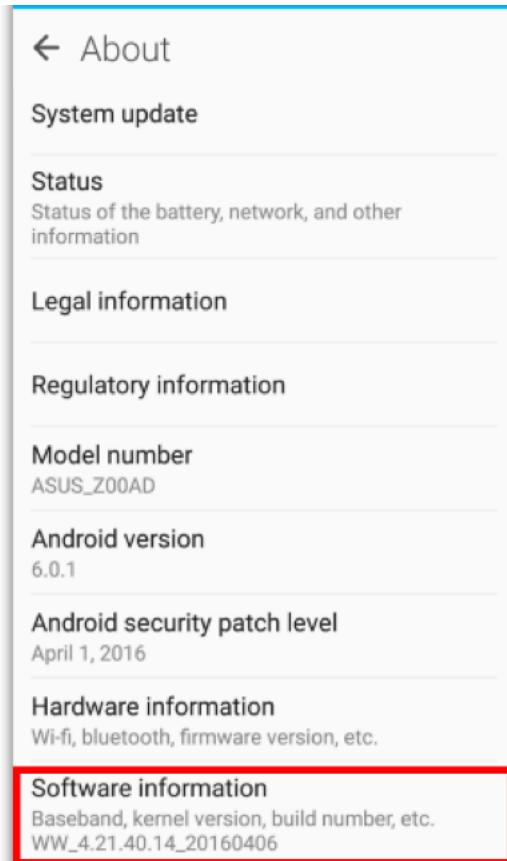
ตั้งค่า developer mode

- เลือก Settings / About



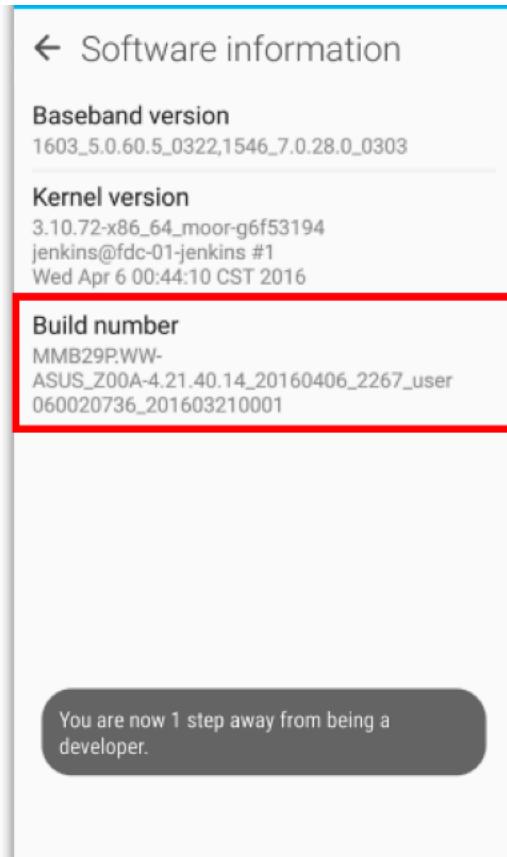
ຕັ້ງຄ່າ developer mode #2

- ເລືອກ software information



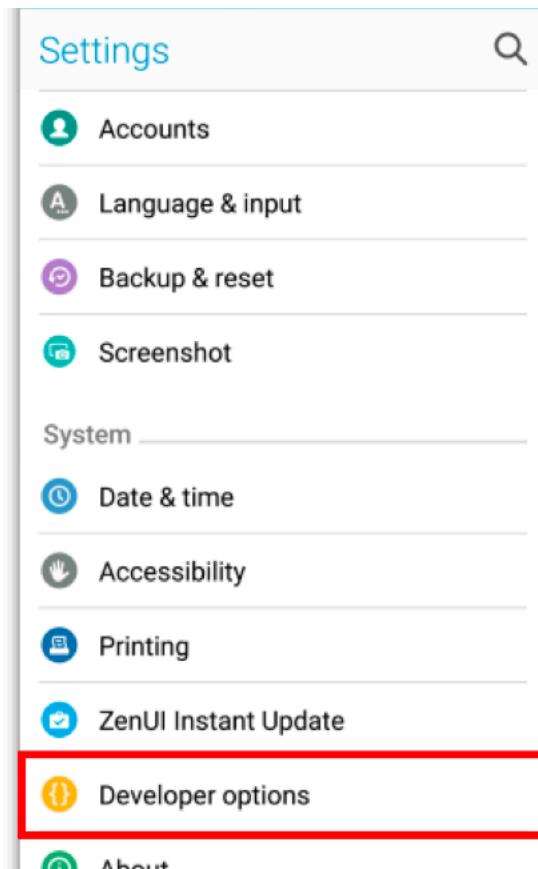
ຕັ້ງຄ່າ developer mode #3

- ເຄາະກໍ Build number 7
ຄຽງເພື່ອເປີດ mode
developer



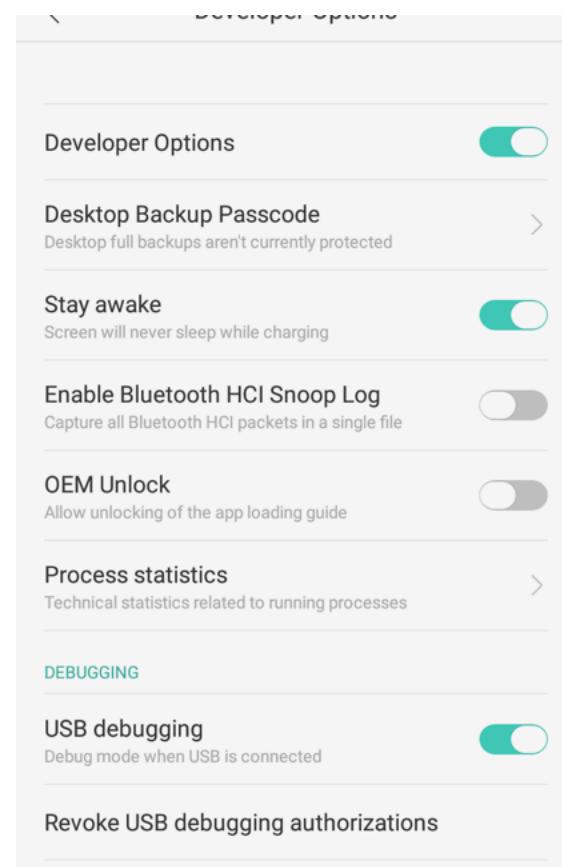
ตั้งค่า developer mode #4

- เลือก Developer options เพื่อตั้งค่าใช้งาน



ตั้งค่า developer mode #5

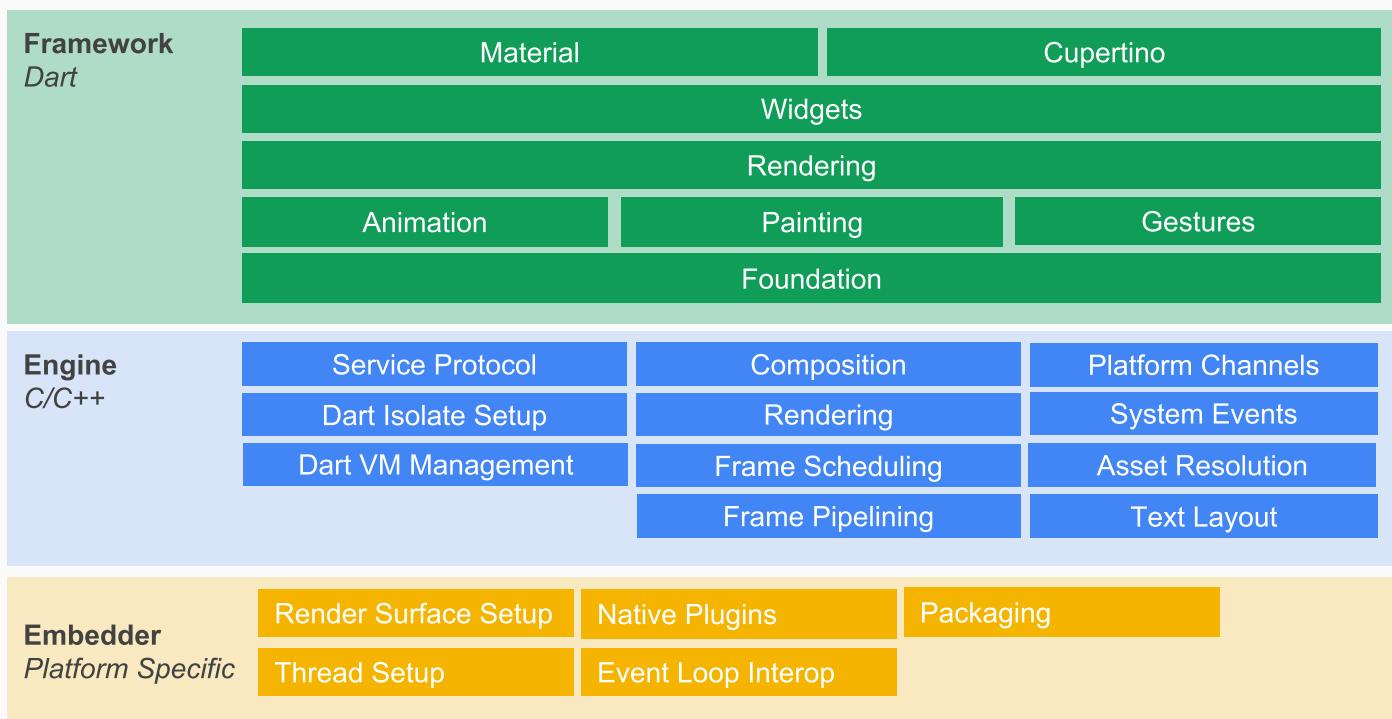
- เปิดการใช้งานดังนี้
- Developer Options
- Stay awake
- USB debugging



Introduction to
FLUTTER

Flutter System Overview

Flutter System Overview



Dart Programming Language

WHAT IS DART?

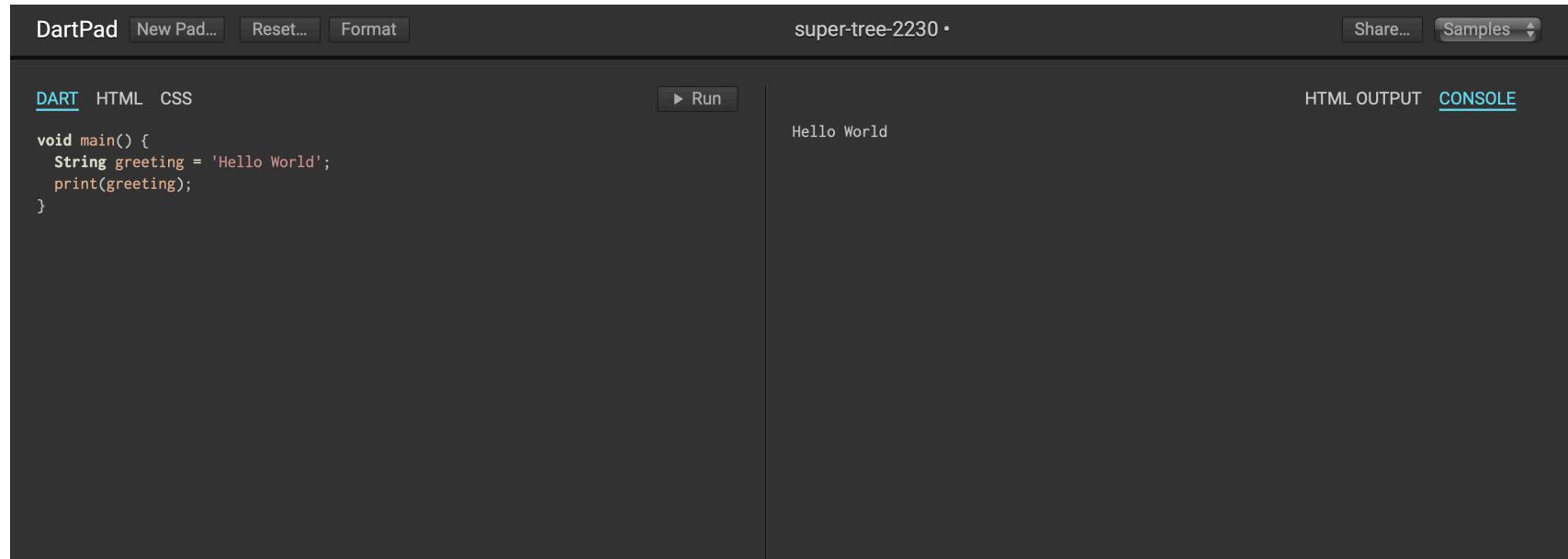
- Dynamic scripting language (runs in a VM)
- Intended as successor to Javascript
 - Better performance, better tooling, better for larger projects
 - Built by people who built V8 and Java HotSpot
- Oct 2011: Announced by Google
- Nov 2013: Stable v1.0 release
- Dec 2013: Setup ECMA TC52 for standardization
- www.dartlang.org
- dartpad.dartlang.org

A basic dart program

- รูปแบบการเขียนเหมือนภาษา JavaScript เช่น if, for, comment
- โปรแกรมจะเริ่มทำงานภายใต้ method void main(){...}
- method print(...) สำหรับแสดงผลที่ console
- dart ไม่มี public, private, protected ถ้าอยากให้ตัวแปร private ให้เติม _ ด้านหน้าตัวแปร และ class ต้องอยู่ใน library
- dart รองรับการเขียนแบบ OOP
- dart สามารถติดตั้ง lib เพิ่มเติมผ่าน file pubspec.yaml

Hello Dart World

```
void main() {  
    String greeting = 'Hello Dart World';  
    print(greeting);  
}
```



The screenshot shows the DartPad interface. The top bar includes 'DartPad' (highlighted in blue), 'New Pad...', 'Reset...', 'Format', the workspace name 'super-tree-2230 •', 'Share...', and 'Samples'. Below the bar, tabs for 'DART' (highlighted in blue), 'HTML', and 'CSS' are visible, along with a 'Run' button. The 'DART' tab contains the Dart code:

```
void main() {  
    String greeting = 'Hello World';  
    print(greeting);  
}
```

. The 'CONSOLE' tab on the right shows the output:

```
Hello World
```

.

Variables

- ตัวแปรใน dart จะมี type หรือไม่มีก็ได้ เช่น
 - var name = 'John';
 - String name = 'John';
 - dynamic name = 'John';

final and const

- ใช้ final หรือ const สำหรับตัวแปรที่ไม่ต้องมีการเปลี่ยนแปลงค่า
- ทั้ง final และ const ต้องมีการใส่ค่าเริ่มต้น
- final ต้องใส่ค่าก่อนที่ constructor จะเริ่ม
- const ต้องใส่ค่าเลย โดย const จะมีการตั้งค่าที่ระดับ compile time

```
void main() {  
    const prefix = 'Hello';  
    Data d = Data('value');  
    print('${prefix} ${d.value}');  
}
```

```
class Data {  
    final value;  
    Data(this.value);  
}
```

Built-in types

- int
- double
- String
- bool
- List (array)
- Map (json)

int

```
void main() {  
    int a = 10;  
    int b = int.parse('10');  
    print('$a + $b = ${a+b}');  
    String c = a.toString();  
    print(c);  
}
```

double

```
void main() {  
    double a = 10.5;  
    double b = double.parse('10.5');  
    print('$a + $b = ${a+b}');  
    String c = a.toString();  
    print(c);  
}
```

string

- string ของ dart เก็บข้อมูลแบบ UTF-16
- string สามารถอ้างถึงตัวแปรภายในวงล้อได้ผ่าน \${expression}, \$expression

```
void main() {  
    String a = 'Hello';  
    String b = 'World';  
    String c = '$a $b';  
    print(c);  
}
```

string

- เราสามารถ concat string ด้วย + หรือ เขียนต่อกันไปก่อน ;
- เราสามารถทำ multiline string ได้ด้วย ""

```
void main() {  
    String a = 'Hello'+'World';  
    String b = 'Hello' 'World';  
    String c = ""  
        Hello  
        World  
        "";  
}
```

bool

- ตัวแปร bool คือตัวแปรสำหรับเก็บค่า Boolean true/false

```
void main() {  
    bool a = true;  
    print(a);  
}
```

List (array)

- dart เก็บ array ในรูปแบบ list
- สามารถอ้างถึงข้อมูลใน list ได้ทั้งแบบ [index] หรือผ่าน method elementAt(index)

```
void main() {  
    List data = [1,2,3,4];  
    List list = ['One', 'Two', 'Three'];  
    print(list[0]);  
    print(data.elementAt(0));  
}
```

Map

- สามารถประกาศ map ได้โดยใช้ { 'key' : 'value' } หรือ Map()
- วิธีการอ้างถึงใช้การอ้างผ่าน [key]

```
void main() {
    Map data = {
        'code' : '007'
    };
    print(data['code']);
}
```

```
Map key = Map();
key['code'] = '008';
print(key['code']);
}
```

Control flow and function in
DART

Control flow

You can control the flow of your Dart code using any of the following:

- if and else
- for loops
- while and do-while loops
- break and continue
- switch and case
- assert
- conditional expressions

if and else

syntax

```
if (true) {  
    // true statement  
} else {  
    // false statement  
}
```

example

```
void main() {  
    bool isActive = true;  
    if(isActive){  
        print('active');  
    }else {  
        print('not active');  
    }  
}
```

for loops

syntax

```
for (initial_count_value; termination-condition; step) {  
    //statements  
}
```

example

```
void main() {  
    List data = [1,2,3,4];  
    for(int i=0; i<data.length; i++){  
        print(data[i]);  
    }  
}
```

while and do-while loops

syntax

```
while (expression) {  
    Statement(s) to be executed if expression is true  
}  
  
do {  
    Statement(s) to be executed;  
} while (expression);
```

example

```
void main() {  
    int n = 10;  
    while (n >= 0) {  
        print('from while $n');  
        n--;  
    }  
    do {  
        print('from do-while $n');  
        n--;  
    } while (n >= 0);  
}
```

break

- break เอาไว้สำหรับออกจำ flow การทำงาน

```
void main() {  
    int i = 1;  
    while(i<=10) {  
        if (i % 5 == 0) {  
            print("The first multiple of 5 between 1 and 10 is : ${i}");  
            break ;  
            //exit the loop if the first multiple is found  
        }  
        i++;  
    }  
}
```

continue

- continue จะเป็นการสั่งให้ไปเริ่มทำงานใน loop ใหม่ ไม่ต้องทำ statement ต่อจากนี้แล้ว

```
void main() {  
    var num = 0;  
    var count = 0;  
  
    for (num = 0; num <= 20; num++) {  
        if (num % 2 == 0) {  
            continue;  
        }  
        print('odd $num');  
        count++;  
    }  
    print(" The count of odd values between 0 and 20 is: ${count}");  
}
```

switch and case

syntax

```
switch(variable_expression) {  
    case constant_expr1: { // statements; } break;  
    default: { //statements; }  
}
```

example

```
void main() {  
    int status = 4;  
  
    switch (status) {  
        case 0: print('Normal'); break;  
        case 1: print('Close'); break;  
        default: print('Error');  
    }  
}
```

assert

- assert ใช้สำหรับตรวจสอบค่าถ้าเป็น false จะ throw exception ออกมาและหยุดการทำงาน
- assert ทำงานใน mode development เท่านั้น ใน production จะไม่ทำงาน

```
void main() {  
    int status = 4;  
    assert(status == 5, 'Status must be 5');  
}
```

conditional expressions

- conditional expressions. คือการเขียน if-else ในรูปแบบสั้นๆ
- dart มีการใช้ conditional expressions อยู่ 2 แบบ คือ
- condition ? expr1 : expr2 ถ้า condition เป็น true จะได้ค่า expr1, false จะได้ค่า expr2
- expr1 ?? expr2 ถ้า expr1 เป็น null จะได้ค่า expr2

```
void main() {  
    bool active = false;  
    String a = 'Simple String';  
    String b = 'Hello World';  
    print( active? 'Active': 'Inactive');  
    print( a??b);  
}
```

Function in Dart [shorthand]

- For functions that contain just one expression, you can use a shorthand syntax:
- The `=> expr` syntax is a shorthand for `{ return expr; }`.
- The `=>` notation is sometimes referred to as arrow syntax.

```
void main() {  
    var loudify = (msg) => '${msg.toUpperCase()}';  
    print(loudify('hello'));  
  
    greet(String msg) => 'Hello Mr. $msg';  
    print(greet('Sommai'));  
}
```

Optional named parameters

- When defining a function, use `{param1, param2, ...}` to specify named parameters:

```
greet({String title, String msg}) => 'Hello $title $msg';
```

- When calling a function, you can specify named parameters using `paramName: value`. For example:

```
greet(title: 'Mr.', msg: 'Sommai');
```

Optional positional parameters

- Wrapping a set of function parameters in [] marks them as optional positional parameters:

```
greet(String title, [String msg, String name]) => '$msg $title $name';
```

Default parameter values

- Your function can use = to define default values for both named and positional parameters.
- The default values must be compile-time constants. If no default value is provided, the default value is null.

```
greet(String title, [
    String msg = 'Hello',
    String name = 'John'
]) => '$msg $title $name';
```

The try / on / catch Blocks

syntax

```
try {  
    // ...  
} on Exception catch (e) {  
    print('Exception details:\n $e');  
} catch (e, s) {  
    print('Exception details:\n $e'); print('Stack trace:\n $s');  
}
```

on ใช้สำหรับ เลือกจับ exception ที่ระบุ catch ใช้สำหรับจับ object ของ exception

```
main() {  
    List a = [1, 2];  
    try {  
        a[2];  
    } on RangeError catch (e, s) {  
        print('Index not found');  
        print(e);  
    }  
}
```

OOP Programming In **DART**

Declaring a Class

syntax

```
class class_name {  
    <fields>  
    <getters/setters>  
    <constructors>  
    <functions>  
}
```

example

```
class Car {  
    String engine;  
  
    Car(this.engine);  
    String display() => 'Engine is $engine' ;  
}
```

Creating Instance of the class

syntax

```
var object_name = new class_name([ arguments ]);  
class_name object_name = new class_name([ arguments ]);  
**จะมี new หรือไม่มีก็ได้**
```

example

```
void main() {  
    Car c = new Car('V8');  
    print(c.display());  
  
    Car b = Car('Twin cam 16 V');  
    print(b.display());  
}
```

Constructors

syntax

```
Class_name(parameter_list) {  
    //constructor body  
}
```

example

```
void main() {  
    Car c = new Car('E1001');  
}
```

```
class Car {  
    Car(String engine) {  
        print(engine);  
    }  
}
```

Named Constructors

syntax

```
Class_name.constructor_name(param_list)
```

example

```
void main() {  
    Car c1 = new Car.namedConst('E1001');  
    Car c2 = new Car();  
}  
  
class Car {  
    Car() {  
        print("Non-parameterized constructor invoked");  
    }  
    Car.namedConst(String engine) {  
        print("The engine is : ${engine}");  
    }  
}
```

Named Parameter constructors

syntax

```
Class_name({param_name_list}) {  
    //constructor body  
}
```

example

```
class Car {  
    String engine;  
  
    Car({this.engine});  
    String display() => 'Engine is $engine';  
}
```

factory constructors

- factory constructor เခາໄວ້ສໍາຮັບໃກ້ class ສຮ້າງ instance ຂອງ class ຕົວເວັງ

```
void main() {  
    Data d = Data.create("007", "Jame bond");  
    print(d.code);  
}
```

```
class Data {  
    String code;  
    String name;  
  
    Data({this.code, this.name});
```

```
factory Data.create(String code, String name) {  
    return Data(code: code, name: name);  
}  
}
```

Getters and Setters

syntax getter

```
Return_type get identifier { }
```

syntax setter

```
set identifier { }
```

example

```
class Car {  
    String engine;  
    Car({this.engine});  
    String get display => 'Engine is $engine';  
    set color(String color) => print('set $color');  
}
```

```
void main() {  
    Car c = new Car(engine: 'V8');  
    c.color = 'Red';  
    print(c.display);  
}
```

Class Inheritance

syntax

```
class child_class_name extends parent_class_name
```

example

```
class Shape {  
    void cal_area() {  
        print("calling calc area defined in the Shape class");  
    }  
}
```

```
class Circle extends Shape {}
```

```
void main() {  
    var obj = new Circle();  
    obj.cal_area();  
}
```

Class Inheritance and Method Overriding

example

```
void main() {  
    Child c = new Child();  
    c.m1(12);  
}  
  
class Parent {  
    void m1(int a) {  
        print("value of a ${a}");  
    }  
}  
  
class Child extends Parent {  
    @override  
    void m1(int b) {  
        print("value of b ${b}");  
    }  
}
```

The static Keyword

example

```
class StaticMem {  
    static int num;  
    static disp() {  
        print("The value of num is ${StaticMem.num}");  
    }  
}  
  
void main() {  
    StaticMem.num = 12;  
    // initialize the static variable }  
    StaticMem.disp();  
    // invoke the static method  
}
```

The super, this Keyword

super keyword เอาไว้สำหรับให้ child class อ้างถึงตัวแปรของ parent

this keyword เอาไว้สำหรับอ้างถึงตัวแปรของ class ตัวเอง

```
void main() {  
    Child c = new Child();  
    c.m1(12);  
}  
  
class Parent {  
    String msg = "message variable from the parent class";  
    void m1(int a) {  
        print("value of a ${a}");  
    }  
}  
  
class Child extends Parent {  
    String title = 'Child title';  
    @override  
    void m1(int b) {  
        print("${this.title} value of b ${b}");  
        super.m1(13);  
        print("${super.msg}");  
    }  
}
```

abstract class

```
void main() {  
    Data d = Data("007", "Jame bond");  
    print(d.display());  
}
```

```
class Data extends More {  
    String code;  
    String name;  
  
    Data(this.code, this.name);  
    String display() {  
        return this.code;  
    }  
}
```

```
abstract class More {  
    String display();  
}
```

interface class

```
void main() {  
    Calculator c = new Calculator();  
    print("The gross total : ${c.ret_tot()}");  
    print("Discount : ${c.ret_dis()}");  
}  
  
class Calculate_Total {  
    int ret_tot() => 0;  
}  
  
class Calculate_Discount {  
    int ret_dis() => 0;  
}  
  
class Calculator implements Calculate_Total, Calculate_Discount {  
    int ret_tot() {  
        return 1000;  
    }  
  
    int ret_dis() {  
        return 50;  
    }  
}
```

Generics

เพื่อกำหนดให้ collection เก็บค่าตัวแปรที่อยู่ในรูปแบบเดียวกัน

syntax

```
Collection_name <data_type> identifier= new Collection_name<data_type>
```

example

```
main() {  
    List<int> a = [1, 2, "xxx"]; // จะเกิด error  
    for (int i = 0; i < a.length; i++) {  
        print(a[i]);  
    }  
}
```

The Cascade operator (..)

.. เอาไว้อ้างถึง method ของ object กี่ดูกสร้างขึ้นมา

```
void main() {  
    Car(model: 'Colora', engine: 'V8')  
        ..build()  
        ..display();  
}  
  
class Car {  
    String model;  
    String engine;  
    String fullSpec;  
  
    Car({this.model, this.engine});  
  
    void build() {  
        this.fullSpec = '$model $engine';  
    }  
  
    void display() => print('full spec = $fullSpec');  
}
```

Mobile programming with
FLUTTER

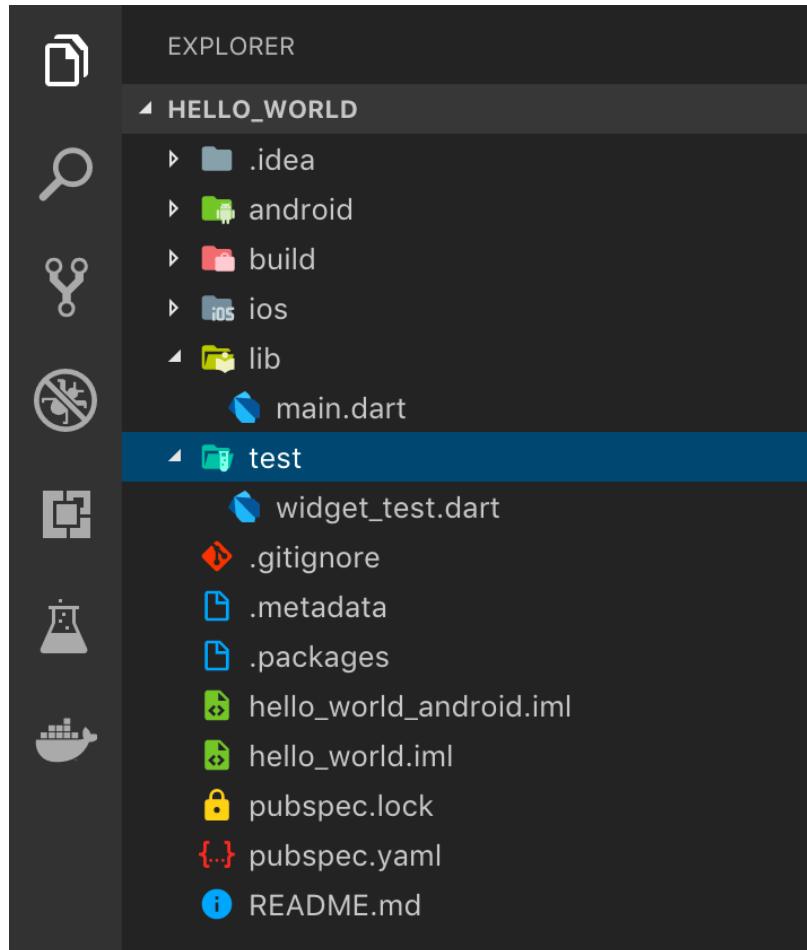
flutter cli

- flutter doctor
- flutter create
- flutter packages get
- flutter emulators
- flutter emulators --launch "emulator id"
- flutter devices
- flutter run -d "device id"

new project

- command line
 - flutter create project_name
 - flutter create --org com.example project_name
- new project from visual studio code
 - กด ctrl + shift + p หรือ command + shift + p
 - พิมพ์ Flutter: New Project
 - พิมพ์ ชื่อ project ที่ต้องการสร้าง
 - เลือก path ที่ต้องการสร้าง project

Dart package, library and project structure



- folder lib เอาไว้เก็บ source code
- folder test เอาไว้เก็บ test code
- file pubspec.yaml เอาไว้เก็บข้อมูล lib ที่ใช้ในระบบ

Basic Layouts and Container Widgets

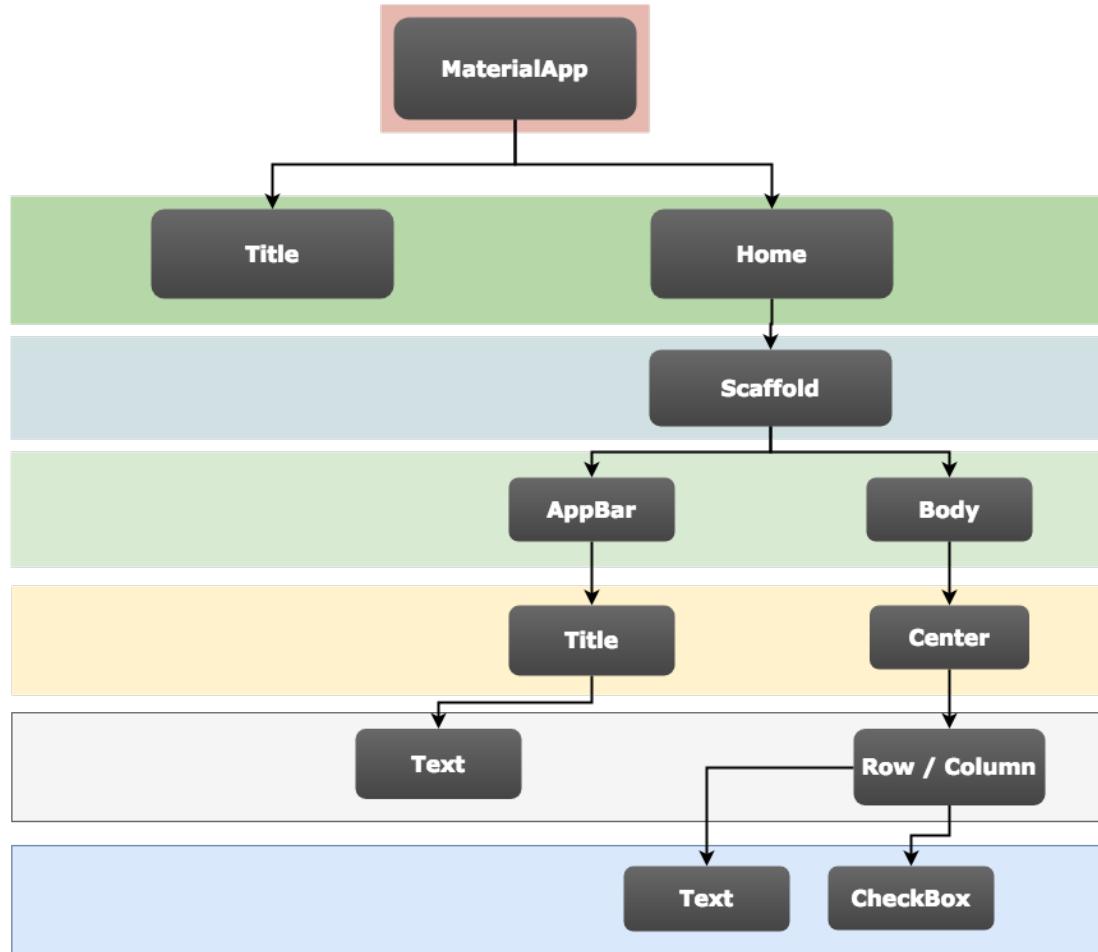
```
import 'package:flutter/material.dart';

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

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flutter Demo',
      debugShowCheckedModeBanner: false,
      theme: ThemeData(
        primarySwatch: Colors.teal,
      ), // ThemeData
      home: MyHomePage(),
    ); // MaterialApp
  }
}
```

```
class MyHomePage extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Text('Hello World'),
      ), // AppBar
      body: Text('Body'),
    ); // Scaffold
  }
}
```

Basic Layouts and Container Widgets #2

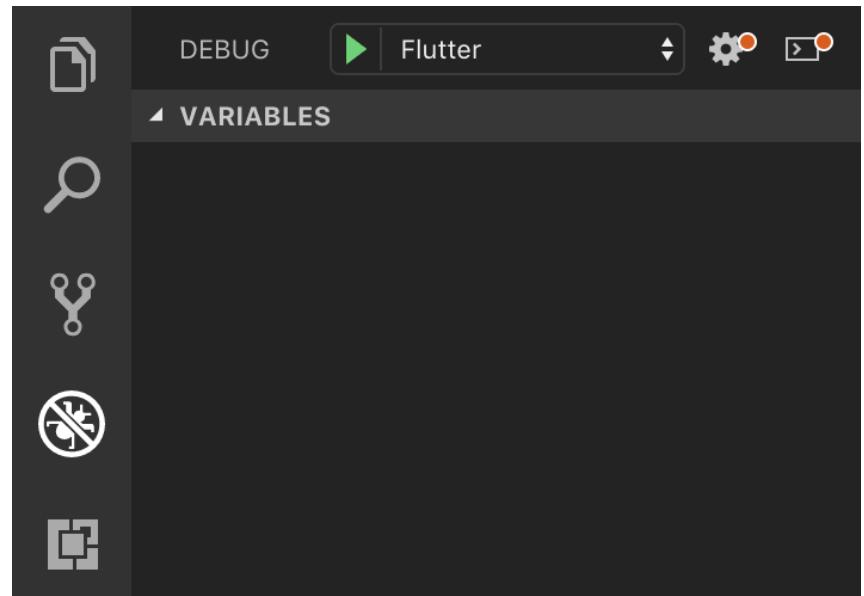


Run flutter

command line

- flutter run
- กด r เพื่อ hot reload
- กด R เพื่อ restart application
- กด q เพื่อออกจาก การทำงาน

debug from VSC



Flutter Stateless and Stateful Widgets

- Stateless is a widget that does not require mutable state.
- Stateful is a widget that has mutable state.
- Stateful promptly notified when such state changes,
using [State.setState](#).

StatelessWidget

```
class GreenFrog extends StatelessWidget {  
    const GreenFrog({ Key key }) : super(key: key);  
    @override Widget build(BuildContext context) {  
        return Container(color: Colors.blue);  
    }  
}
```

Stateful

```
class YellowBird extends StatefulWidget {  
    const YellowBird({ Key key }) : super(key: key);  
    @override _YellowBirdState createState() => _YellowBirdState();  
}  
  
class _YellowBirdState extends State<YellowBird> {  
    @override Widget build(BuildContext context) {  
        return Container(color: const Colors.yellow);  
    }  
}
```

Flutter and Material Design Widgets

- Scaffold
- AppBar
- Center
- Text
- Icon
- Container
- Row
- Column
- RaisedButton
- Tab
- Navigation
- Form with validate
- Text Form field
- Inputdecoration
- Radio
- Checkbox
- Dropdown
- Date picker
- List view
- Image
- Image picker

Scaffold, AppBar, Center, Text, Icon

```
class MyHomePage extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Text('Hello World'),
      ), // AppBar
      body: Center(
        child: Text('Body'),
      ), // Center
      floatingActionButton: FloatingActionButton(
        child: Icon(Icons.add),
        onPressed: () {},
      ), // FloatingActionButton
    ); // Scaffold
  }
}
```

Container, Row, Column, RaisedButton

```
Container(  
    child: Row(  
        mainAxisAlignment: MainAxisAlignment.center,  
        children: <Widget>[  
            Column(  
                mainAxisAlignment: MainAxisAlignment.center,  
                children: <Widget>[  
                    RaisedButton(  
                        child: Text('One'),  
                        onPressed: () => print('One Click'),  
                    ),  
                    Text("Two"),  
                ],  
            ),  
        ],  
    ),  
)
```

Tab

```
class TabBarDemo extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: DefaultTabController(
        length: 3,
        child: Scaffold(
          appBar: AppBar(
            bottom: TabBar(
              tabs: [
                Tab(icon: Icon(Icons.directions_car)),
                Tab(icon: Icon(Icons.directions_transit)),
                Tab(icon: Icon(Icons.directions_bike)),
              ],
            ),
            title: Text('Tabs Demo'),
          ),
          body: TabBarView(
            children: [
              Icon(Icons.directions_car),
              Icon(Icons.directions_transit),
              Icon(Icons.directions_bike),
            ],
          ),
        ),
      );
    }
}
```

Navigation

- Define the routes

```
MaterialApp(  
    // Start the app with the "/" named route. In our case, the app will start  
    // on the FirstScreen Widget  
    initialRoute: '/',  
    routes: {  
        // When we navigate to the "/" route, build the FirstScreen Widget  
        '/': (context) => FirstScreen(),  
        // When we navigate to the "/second" route, build the SecondScreen Widget  
        '/second': (context) => SecondScreen(),  
    },  
);
```

Navigation #2

- Navigate to the screen

```
// Within the `FirstScreen` Widget
 onPressed: () {
    // Navigate to the second screen using a named route
    Navigator.pushNamed(context, '/second');
}
```

```
onPressed: () {
|   Navigator.pushReplacementNamed(context, '/login');
},
```

Navigation #3

- Navigate with passing data

```
Navigator.push(  
  context,  
  MaterialPageRoute(  
    builder: (context) => DetailScreen(todo: todos[index]),  
  ),  
);
```

Navigation #4

- Return to the previous screen

```
// Within the SecondScreen Widget
 onPressed: () {
    // Navigate back to the first screen by popping the current route
    // off the stack
    Navigator.pop(context);
}
```

Form with validate #1

- Create a Form with a GlobalKey

```
class MyCustomForm extends StatefulWidget {
    @override
    MyCustomFormState createState() {
        return MyCustomFormState();
    }
}

class MyCustomFormState extends State<MyCustomForm> {
    final GlobalKey<FormState> _formKey = GlobalKey<FormState>();

    @override
    Widget build(BuildContext context) {
        return Form(
            key: _formKey,
            child: ListView(),
        ); // Form
    }
}
```

Form with validate #2

- Add a TextFormField with validation logic

```
TextFormField(  
    // The validator receives the text the user has typed in  
    validator: (value) {  
        if (value.isEmpty) {  
            return 'Please enter some text';  
        }  
    },  
);
```

Form with validate #3

- Create a button to validate and submit the form

```
RaisedButton(  
    onPressed: () {  
        if (_formKey.currentState.validate()) {  
            Scaffold.of(context)  
                .showSnackBar(SnackBar(content: Text('Processing Data')));  
        }  
    },  
    child: Text('Submit'),  
) // RaisedButton
```

TextField, Inputdecoration

```
TextField(  
    decoration: InputDecoration(  
        icon: Icon(Icons.email),  
        labelText: 'User Id',  
        hintText: 'Please input your email'  
    ), // InputDecoration  
    keyboardType: TextInputType.emailAddress,  
    onSaved: (value) => print(value),  
) // TextFormField
```

Password Field

```
TextField(  
    decoration: InputDecoration(  
        icon: Icon(Icons.lock),  
        labelText: 'Password',  
        hintText: 'Please input your password',  
    ), // InputDecoration  
    obscureText: true,  
    keyboardType: TextInputType.text,  
    onSaved: (value) => print(value),  
) // TextFormField
```

Radio

```
Radio(  
  value: 1,  
  groupValue: route,  
  onChanged: (value) {  
    setState(() {  
      route = value;  
    });  
  },  
, // Radio  
Text("Round Trip"),  
Radio(  
  value: 0,  
  groupValue: route,  
  onChanged: (value) {  
    setState(() {  
      route = value;  
    });  
  },  
, // Radio  
Text("One Way"),
```

Checkbox

```
Checkbox(  
    value: checkboxValueA,  
    onChanged: (bool value) {  
        setState(() {  
            checkboxValueA = value;  
        });  
    },  
) ,
```

Dropdown

- Create list value

```
List<String> _passengers = <String>['', '1', '2', '3', '4', '5'];
```

Dropdown #2

```
InputDecorator(  
  decoration: const InputDecoration(  
    icon: const Icon(Icons.person),  
    labelText: 'Passenger',  
  ), // InputDecoration  
  isEmpty: _passenger == '',  
  child: DropdownButtonHideUnderline(  
    child: DropdownButton<String>(  
      value: _passenger,  
      isDense: true,  
      onChanged: (String value) {  
        setState(() {  
          _passenger = value;  
        });  
      },  
      items: _passengers.map((String value) {  
        return DropdownMenuItem<String>(  
          value: value,  
          child: Text(value),  
        ); // DropdownMenuItem  
      }).toList(),  
    ), // DropdownButton  
  ), // DropdownButtonHideUnderline  
, // InputDecorator
```

ListView

```
class MyList extends StatelessWidget {  
    @override  
    Widget build(BuildContext context) {  
        // TODO: implement build  
        return ListView(  
            children: <Widget>[  
                Text('One'),  
                Text('Two'),  
                Text('Three'),  
            ], // <Widget>[]  
        ); // ListView  
    }  
}
```

Date picker

- install dependencies

dependencies:

```
datetime_picker_formfield: ^0.1.4
```

- run command

```
flutter packages get
```

- import package in code

```
import 'package:datetime_picker_formfield/datetime_picker_formfield.dart';
```

Date picker #2

```
DateTimePickerFormField(  
    format: dateFormat,  
    decoration: InputDecoration(labelText: 'Date'),  
    onChanged: (dt) => setState(() => date = dt),  
,
```

Image picker

- install dependencies

dependencies:

```
image_picker: ^0.4.10
```

- run command

```
flutter packages get
```

- import package in code

```
import 'package:image_picker/image_picker.dart';
```

Image picker #2

- IOS
 - Add the following keys to your *Info.plist* file, located in <project root>/ios/Runner/Info.plist:
 - NSPhotoLibraryUsageDescription - describe why your app needs permission for the photo library. This is called *Privacy - Photo Library Usage Description* in the visual editor.
 - NSCameraUsageDescription - describe why your app needs access to the camera. This is called *Privacy - Camera Usage Description* in the visual editor.
 - NSMicrophoneUsageDescription - describe why your app needs access to the microphone, if you intend to record videos. This is called *Privacy - Microphone Usage Description* in the visual editor.

Image picker #3

```
import 'package:image_picker/image_picker.dart';

class MyHomePage extends StatefulWidget {
    @override
    _MyHomePageState createState() => new _MyHomePageState();
}

class _MyHomePageState extends State<MyHomePage> {
    File _image;

    Future getImage() async {
        var image = await ImagePicker.pickImage(source: ImageSource.camera);

        setState(() {
            _image = image;
        });
    }

    @override
    Widget build(BuildContext context) {
        return new Scaffold(
            appBar: new AppBar(
                title: new Text('Image Picker Example'),
            ),
            body: new Center(
                child: _image == null
                    ? new Text('No image selected.')
                    : new Image.file(_image),
            ),
            floatingActionButton: new FloatingActionButton(
                onPressed: getImage,
                tooltip: 'Pick Image',
                child: new Icon(Icons.add_a_photo),
            ),
        );
    }
}
```

Introduction to HTTP and JSON

- install dependencies

dependencies:

```
http: ^0.11.3
```

- run command

```
flutter packages get
```

- import package in code

```
import 'package:http/http.dart' as http;  
import 'dart:convert';
```

Introduction to HTTP and JSON #2

- get method

```
Future loadData() async {
```

```
    http.Response resp = await http.get("your server url");
    Map<String, dynamic> data = json.decode(resp.body);
```

```
}
```

Introduction to HTTP and JSON #3

- post method

```
Map<String, dynamic> postBody = {  
    'key': 'value'  
};  
  
Map<String, dynamic> postHeader = {  
    'Content-Type' : 'application/json',  
    'Authorization' : 'token'  
};  
  
http.Response postResp = await http.post('url', body: postBody, headers: postHeader);  
  
print(postResp.body);
```

Introduction to HTTP and JSON #4

- delete method

```
Future loadData() async {  
  
    http.Response resp = await http.delete("your server url");  
    Map<String, dynamic> data = json.decode(resp.body);
```

```
}
```

Introduction to HTTP and JSON #5

- put method

```
Map<String, dynamic> postBody = {  
    'key': 'value'  
};  
  
Map<String, dynamic> postHeader = {  
    'Content-Type' : 'application/json',  
    'Authorization' : 'token'  
};  
  
http.Response postResp = await http.put('url', body: postBody, headers: postHeader);  
  
print(postResp.body);
```

Data parsing and ListView Widgets

- create model
- parse JSON into a List of Objects
- fetch data
- create ListView widget
- Display data

Create Model

```
class Post {  
    final int userId;  
    final int id;  
    final String title;  
    final String body;  
  
    Post({this.userId, this.id, this.title, this.body});  
  
    factory Post.fromJson(Map<String, dynamic> json) {  
        return Post(  
            userId: json['userId'] as int,  
            id: json['id'] as int,  
            title: json['title'] as String,  
            body: json['body'] as String,  
        );  
    }  
}
```

Parse JSON into a List of Objects

```
List<Post> parsePosts(String responseBody) {  
    final parsed = json.decode(responseBody).cast<Map<String, dynamic>>();  
  
    return parsed.map<Post>((json) => Post.fromJson(json)).toList();  
}
```

fetch data

```
Future<List<Post>> fetchPosts(http.Client client) async {
    final response = await client.get('https://jsonplaceholder.typicode.com/posts');

    // compute function to run parsePosts in a separate isolate
    return compute(parsePosts, response.body);
}
```

create ListView widget

```
class ListViewPosts extends StatelessWidget {
    final List<Post> posts;

    ListViewPosts({Key key, this.posts}) : super(key: key);

    @override
    Widget build(BuildContext context) {
        return Container(
            child: ListView.builder(
                itemCount: posts.length,
                padding: const EdgeInsets.all(15.0),
                itemBuilder: (context, position) {
                    return Column(
                        children: <Widget>[
                            Divider(height: 5.0),
                            ListTile(
                                title: Text('${posts[position].title}'),
                                subtitle: Text('${posts[position].body}'),
                                leading: ...,
                                onTap: () => _onTapItem(context, posts[position]),
                            ),
                        ],
                    );
                },
            );
    }

    void _onTapItem(BuildContext context, Post post) { ... }
}
```

Display data

```
FutureBuilder<List<Post>>(
    future: fetchPosts(http.Client()),
    builder: (context, snapshot) {
        if (snapshot.hasError) print(snapshot.error);

        return snapshot.hasData
            ? ListViewPosts(posts: snapshot.data) // return the ListView widget
            : Center(child: CircularProgressIndicator());
    },
),
```

Flutter I/O Read Write to device

- install dependencies

dependencies:

```
path_provider: ^0.4.1
```

- run command

```
flutter packages get
```

- import package in code

```
import 'package:path_provider/path_provider.dart';
```

Flutter I/O Read Write to device #2

- កិច្ច application path

```
Future<String> get _localPath async {  
final directory = await getApplicationDocumentsDirectory();  
return directory.path;  
}
```

- សរាង file

```
Future<File> get _localFile async {  
final path = await _localPath;  
return File('$path/counter.txt');  
}
```

Flutter I/O Read Write to device #3

- write av file

```
Future<File> writeCounter(int counter) async {  
    final file = await _localFile;  
    return file.writeAsString('$counter');  
}
```

Flutter I/O Read Write to device #3

- read จาก file

```
Future<int> readCounter() async {
    try {
        final file = await _localFile;
        String contents = await file.readAsString();
        return int.parse(contents);
    } catch (e) {
        return 0;
    }
}
```

Data Persistence in Flutter

- install dependencies

dependencies:

shared_preferences: ^0.4.3

- run command

flutter packages get

- import package in code

```
import 'package:shared_preferences/shared_preferences.dart';
```

Data Persistence in Flutter

- Get Instance

```
final prefs = await SharedPreferences.getInstance();
```

- Save data

```
prefs.setInt('counter', counter);
```

- Read data

```
final counter = prefs.getInt('counter') ?? 0;
```

- Remove data

```
prefs.remove('counter');
```

Flutter Database Using SQFLITE

- install dependencies

dependencies:

```
sqflite: ^0.12.2+1
```

- run command

```
flutter packages get
```

- import package in code

```
import 'package:sqflite/sqflite.dart';
```

CRUD Operation with SQFLITE #1

```
final String tableTodo = "todo";
final String columnId = "_id";
final String columnTitle = "title";
final String columnDone = "done";

class Todo {
    int id;
    String title;
    bool done;

    Map<String, dynamic> toMap() {
        var map = <String, dynamic>{
            columnTitle: title,
            columnDone: done == true ? 1 : 0
        };
        if (id != null) {
            map[columnId] = id;
        }
        return map;
    }

    Todo();
}

Todo.fromMap(Map<String, dynamic> map) {
    id = map[columnId];
    title = map[columnTitle];
    done = map[columnDone] == 1;
}
```

CRUD Operation with SQFLITE #2

```
class TodoProvider {
    Database db;

    Future open(String path) async {
        db = await openDatabase(path, version: 1,
            onCreate: (Database db, int version) async {
                await db.execute('''
                    create table $tableTodo (
                        $columnId integer primary key autoincrement,
                        $columnTitle text not null,
                        $columnDone integer not null)
                ''');
            });
    }

    Future<Todo> insert(Todo todo) async {
        todo.id = await db.insert(tableTodo, todo.toMap());
        return todo;
    }
}
```

CRUD Operation with SQFLITE #3

```
Future<Todo> getTodo(int id) async {
    List<Map> maps = await db.query(tableTodo,
        columns: [columnId, columnDone, columnTitle],
        where: "$columnId = ?",
        whereArgs: [id]);
    if (maps.length > 0) {
        return new Todo.fromMap(maps.first);
    }
    return null;
}

Future<int> delete(int id) async {
    return await db.delete(tableTodo, where: "$columnId = ?", whereArgs: [id]);
}

Future<int> update(Todo todo) async {
    return await db.update(tableTodo, todo.toMap(),
        where: "$columnId = ?", whereArgs: [todo.id]);
}

Future close() async => db.close();
}
```

Serverless With
FIREBASE

What is Serverless ?

- Serverless is a new paradigm of computing that abstracts away the complexity associated with managing servers for mobile and API backends, ETL, data processing jobs, databases, and more.
- No upfront provisioning - Just provide your code and data, and Google dynamically provisions resources as needed.
- No management of servers - Get out of the repetitive and error-prone task of managing or automating server management like scaling your cluster, OS security patches, etc.
- Pay-for-what-you-use - Because of the dynamic provisioning and automatic scaling, you only pay for what you use.

Why Serverless

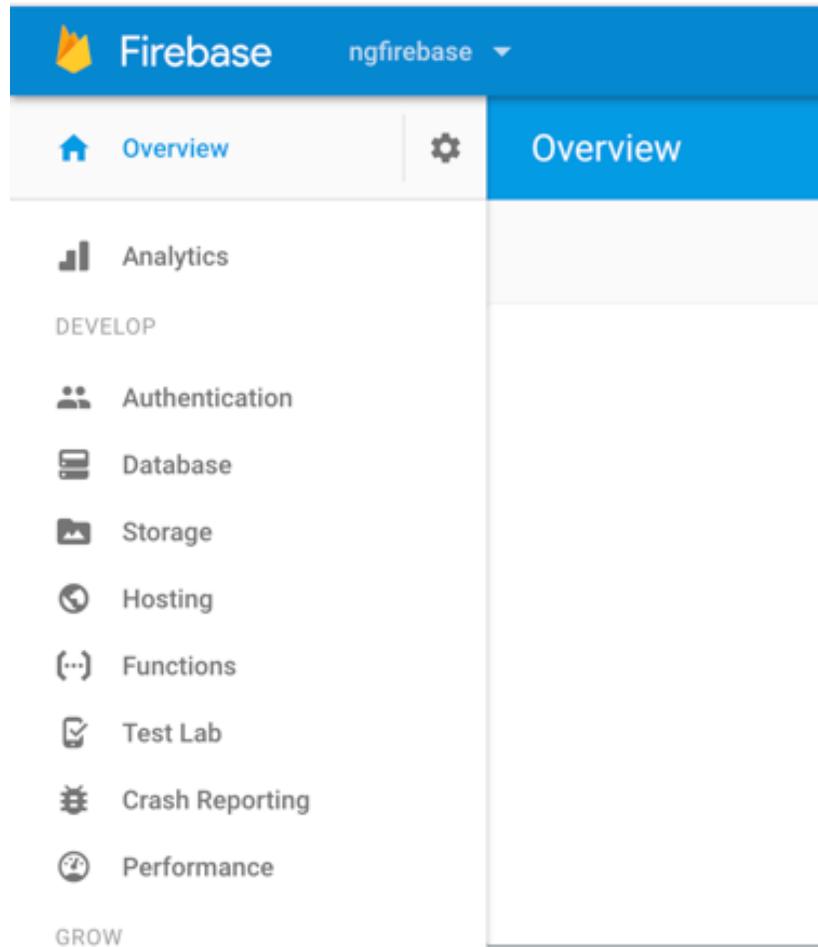
- Time-To-Market Improvement - Infrastructure management takes time, so eliminating it means you can get new code to production faster.
- Infrastructure Cost Reduction - Paying only for what you use means lower costs.
- Ops Cost Reduction - Automating repetitive provisioning and management tasks means you get to do higher-value devops tasks.

Setup

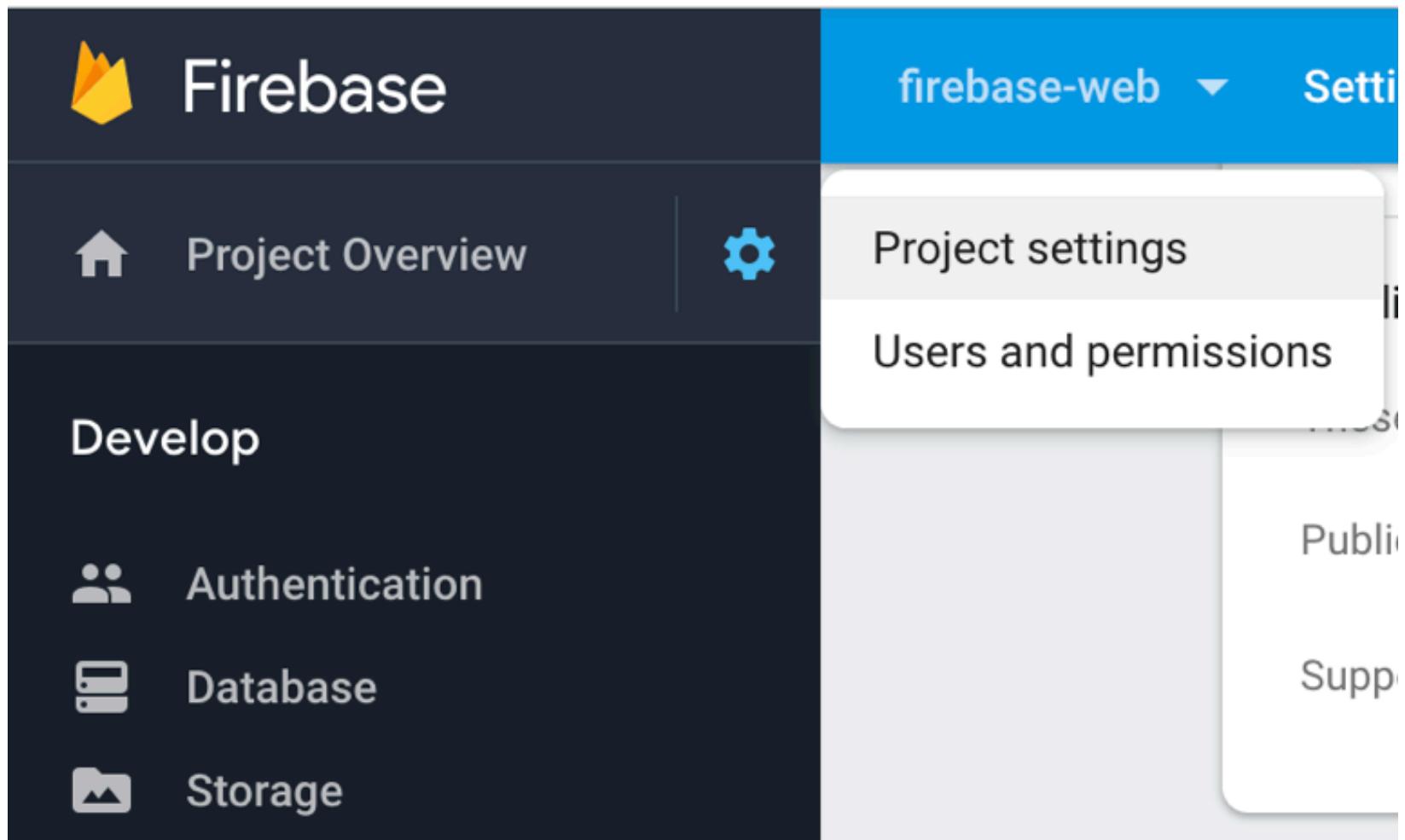
FIREBASE

Create firebase project

- เข้า url
<https://firebase.google.com/>
- กดปุ่ม GO TO CONSOLE
- กดปุ่ม Add project
- กรอก Project name
- กด Create project



ตั้งค่า project



The screenshot shows the Firebase Project Overview interface. On the left, there's a sidebar with icons for Authentication, Database, and Storage. The main area has a "Project Overview" section with a house icon and a gear icon for settings. A blue header bar at the top right shows the project name "firebase-web" and a "Settings" dropdown. A dropdown menu is open from the "Settings" button, listing "Project settings" and "Users and permissions". To the right of the dropdown, there are partially visible sections for "Public" and "Support".

Firebase

Project Overview

Develop

Authentication

Database

Storage

firebase-web ▾ Settings

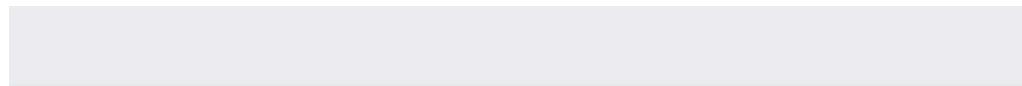
Project settings

Users and permissions

Public

Support

ເລືອກ android



There are currently no apps in the project firebase-web



Add Firebase to
your iOS app



Add Firebase to
your Android app

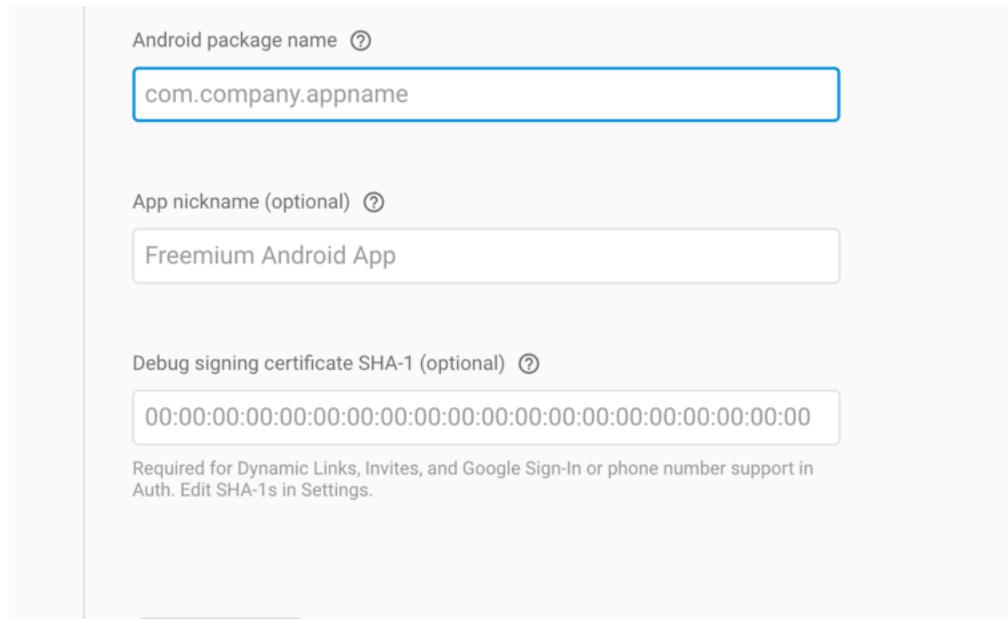


Add Firebase to
your web app



ຮະບຸຫຼືວ package

ຂອງ flutter (android) ທີ່ເຮົາຈະເຊື່ອມຕ່ວດ້ວຍ ໂດຍສາມາດຮັກຫາ application id ໄດ້ກໍ
android/app/build.gradle



ກດປຸ່ມ download

google-service.json ແລ້ວນໍາ file ໄປວາງໄວ້ໃນ path android/app

2 Download config file

Instructions for Android Studio below | [Unity](#) [C++](#)

[Download google-services.json](#)

Switch to the Project view in Android Studio to see your project root directory.

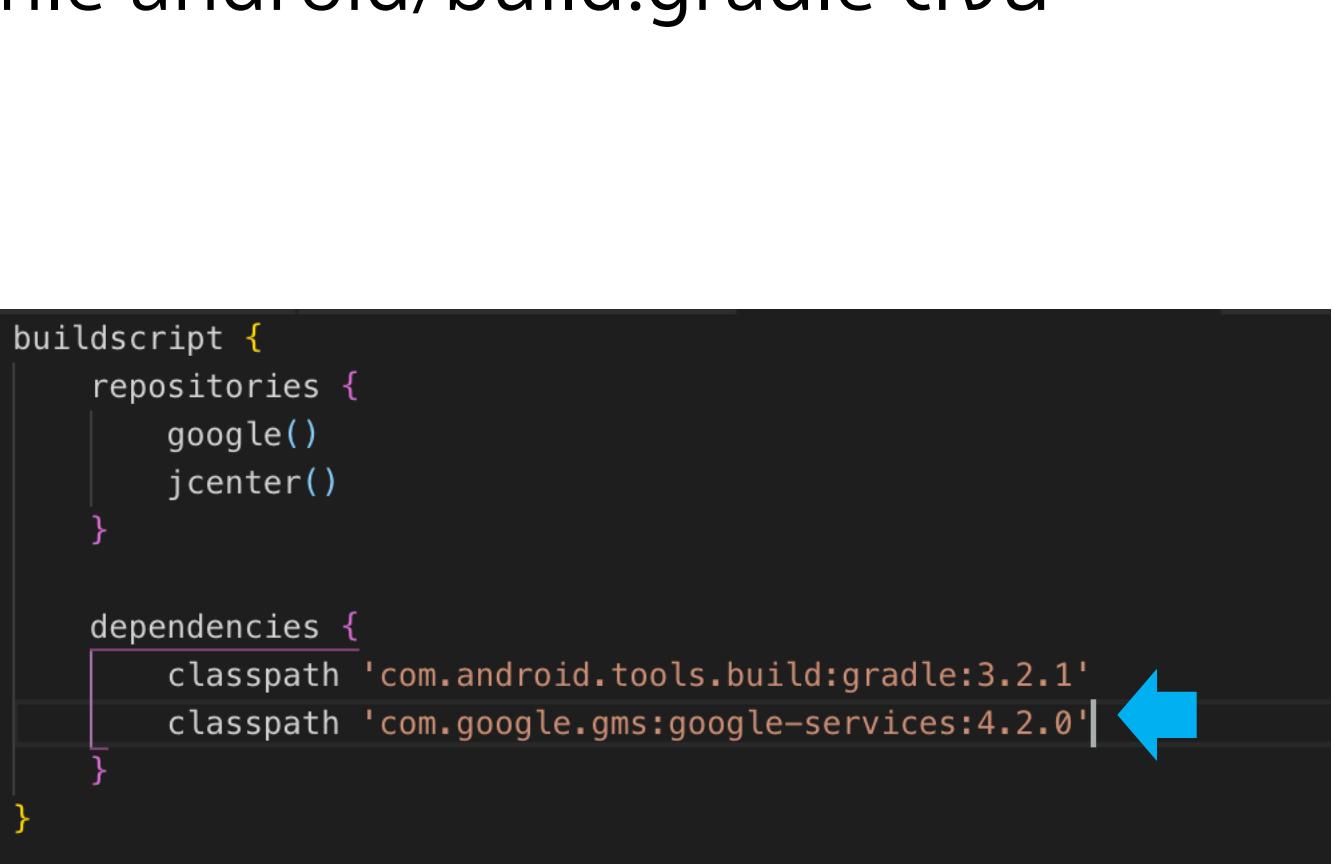
Move the google-services.json file you just downloaded into your Android app module root directory.

google-services.json

Previous [Next](#)

|| กําไฟ file android/build.gradle ดังนี้

```
buildscript {  
    repositories {  
        google()  
        jcenter()  
    }  
  
    dependencies {  
        classpath 'com.android.tools.build:gradle:3.2.1'  
        classpath 'com.google.gms:google-services:4.2.0'|  
    }  
}
```



||ກໍໃບ file android/app/build.gradle ດັນນີ້

```
defaultConfig {  
    // TODO: Specify your own unique Application ID (https://developer.android.com/studio/publish/configure-app-manifest#unique-application-id)  
    applicationId "com.example.lab_firebase"  
    minSdkVersion 16  
    targetSdkVersion 28  
    multiDexEnabled true ←  
    versionCode flutterVersionCode.toInt()  
    versionName flutterVersionName  
    testInstrumentationRunner "android.support.test.runner.AndroidJUnitRunner"  
}  
  
buildTypes {  
    release {  
        // TODO: Add your own signing config for the release build.  
        // Signing with the debug keys for now, so `flutter run --release` works.  
        signingConfig signingConfigs.debug  
    }  
}  
  
flutter {  
    source '../..'  
}  
  
dependencies {  
    testImplementation 'junit:junit:4.12'  
    androidTestImplementation 'com.android.support.test:runner:1.0.2'  
    androidTestImplementation 'com.android.support.test.espresso:espresso-core:3.0.2'  
}  
  
apply plugin: 'com.google.gms.google-services' ←
```

|| ก็ไข file android/gradle.properties ดังนี้

```
org.gradle.jvmargs=-Xmx1536M  
android.useAndroidX=true  
android.enableJetifier=true
```

ກົດໃບ file pubspec.yaml

```
dependencies:  
  flutter:  
    sdk: flutter  
  firebase_auth: ^0.8.4+5  
  cloud_firestore: ^0.9.13+1
```

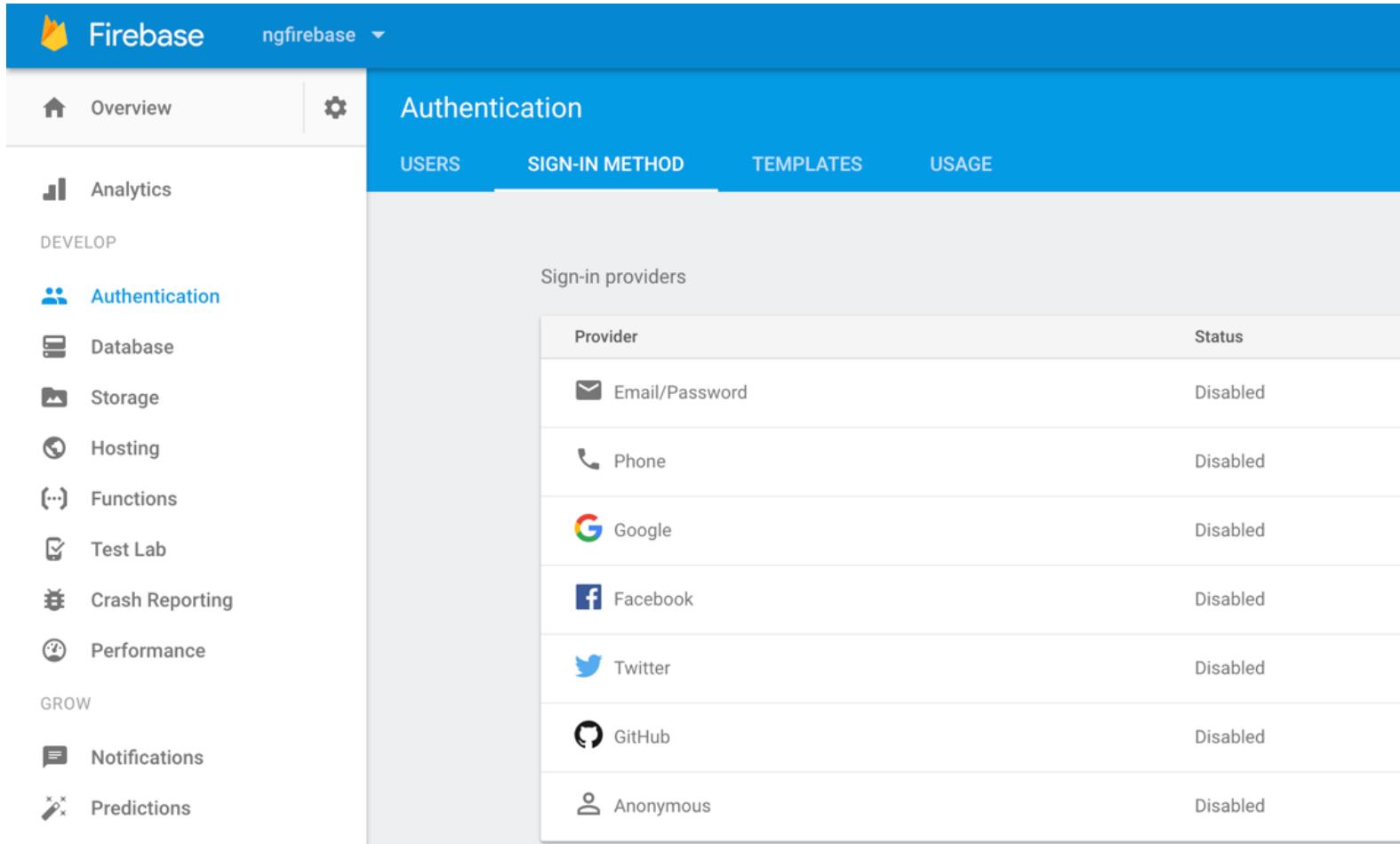
Firebase auth

- Authentication with

Login With Email / Password

- enable provider
- register
- send confirm email
- user click link in email
- sign in with email / password provider

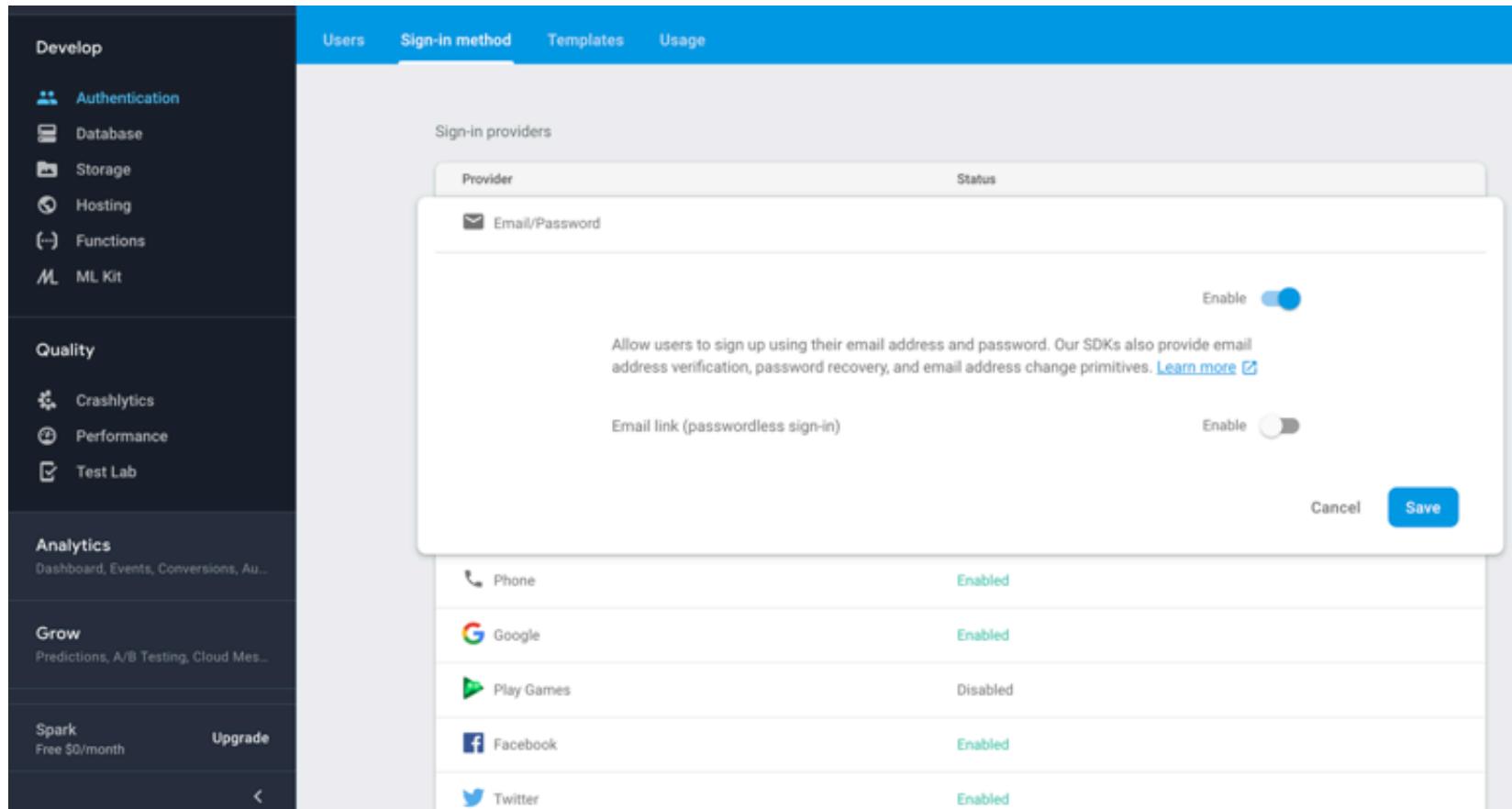
Sign in providers



The screenshot shows the Firebase console interface. The left sidebar has sections for Overview, Analytics, DEVELOP (Authentication, Database, Storage, Hosting, Functions, Test Lab, Crash Reporting, Performance), and GROW (Notifications, Predictions). The main content area is titled "Authentication" and has tabs for USERS, SIGN-IN METHOD (selected), TEMPLATES, and USAGE. The "SIGN-IN METHOD" tab displays a table of sign-in providers:

Provider	Status
Email/Password	Disabled
Phone	Disabled
Google	Disabled
Facebook	Disabled
Twitter	Disabled
GitHub	Disabled
Anonymous	Disabled

Enable Email/Password Provider



The screenshot shows the Firebase console's Authentication section. The left sidebar includes Develop, Quality, Analytics, Grow, and Spark sections. The main navigation bar has tabs for Users, Sign-in method (which is selected), Templates, and Usage. The 'Sign-in providers' section lists several providers: Phone (Enabled), Google (Enabled), Play Games (Disabled), Facebook (Enabled), and Twitter (Enabled). The 'Email/Password' provider is highlighted, showing its status as 'Enabled' with a blue toggle switch. A tooltip explains that it allows users to sign up using their email address and password, mentioning email address verification, password recovery, and email address change primitives, with a link to 'Learn more'. Below this, there is a section for 'Email link (passwordless sign-in)' which is currently disabled. At the bottom right are 'Cancel' and 'Save' buttons.

Provider	Status
Email/Password	Enabled
Phone	Enabled
Google	Enabled
Play Games	Disabled
Facebook	Enabled
Twitter	Enabled

ຕົວຢ່າງ code

```
import 'package:firebase_auth/firebase_auth.dart';

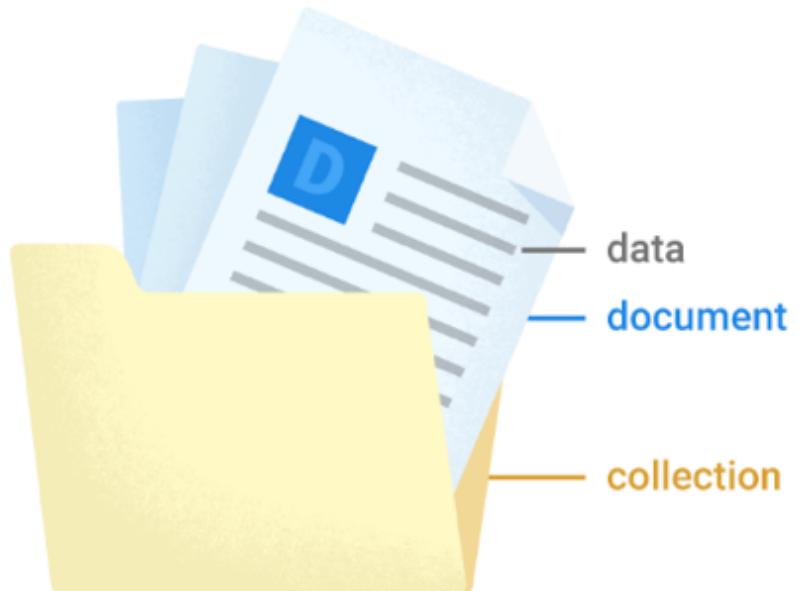
var auth = FirebaseAuth.instance;
auth
    .signInWithEmailAndPassword(email: "x@x.com", password: "xxxx")
    .then((user) {
    if (user.isEmailVerified) {
        // goto home screen
    } else {
        // alert
    }
});
auth
    .createUserWithEmailAndPassword(
        email: "email@x.com", password: "password")
    .then((user) {
    user.sendEmailVerification();
});
}
```

No SQL with

FIREBASE FIRESTORE

Firebase Firestore

- คือ no sql db ที่ทำงานบน cloud ของ google
- เหมาะสำหรับ software ที่ไม่ต้องการความเป็น transaction
- เหมาะสำหรับงานที่ต้องการความ realtime
- เหมาะสำหรับงานที่ต้องการเก็บข้อมูลเยอะ และหลากหลาย



ຕົວຢ່າງການໃຊ້ firebase firestore

```
import 'package:cloud_firestore/cloud_firestore.dart';
```

```
Firebase _store = Firestore.instance;

Widget listData() {
    return StreamBuilder(
        builder: (context, AsyncSnapshot<QuerySnapshot> snapshot) {
            if (snapshot.hasData) {
                return ListView.builder(
                    itemCount: snapshot.data.documents.length,
                    itemBuilder: (BuildContext context, int index) {
                        return ListTile(
                            title: Text(
                                snapshot.data.documents.elementAt(index).data["title"], // Text
                            ); // ListTile
                    },
                ); // ListView.builder
            } else {
                return Text("No data found");
            }
        },
        stream: _store.collection("books").snapshots(),
    ); // StreamBuilder
}
```

CRUD

Add / Set Object

```
Firestore.instance.collection('books').document().setData({ 'title': 'title', 'author': 'author' });
```

Add list data

```
Firestore.instance.collection('books').add({'title': 'title', 'author': 'author'});
```

Delete Object

```
Firestore.instance.collection('books').document('id').delete();
```

Get Document Data

```
Firestore.instance.collection('books').document('id').get().then((snapshot) {  
    print(snapshot.data["title"]);  
});
```

Get all object from collection

```
Firestore.instance.collection('books').snapshots()
```

Google Map with
FLUTTER

pubspec.yaml

```
dependencies:  
  flutter:  
    sdk: flutter  
  google_maps_flutter: ^0.5.7
```

android/app/src/AndroidManifest.xml

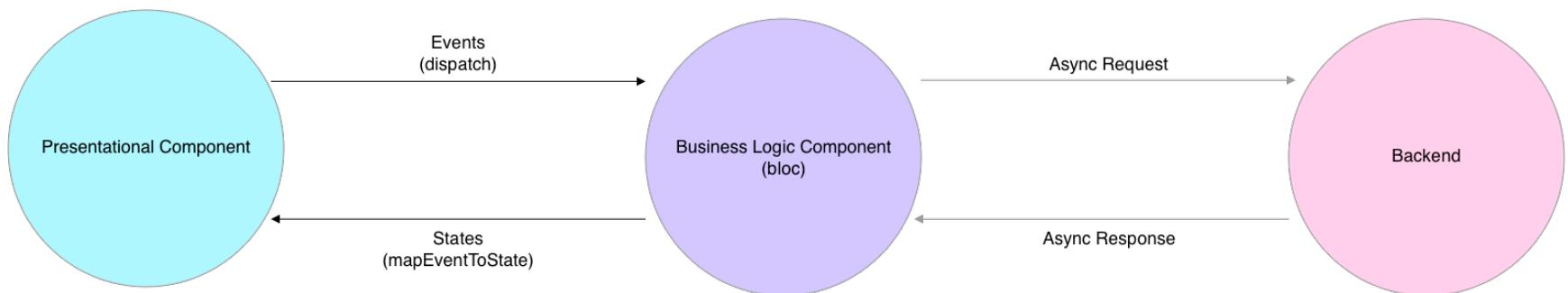
```
<application
    android:name="io.flutter.app.FlutterApplication"
    android:label="lab_firebase"
    android:icon="@mipmap/ic_launcher">
    <meta-data android:name="com.google.android.geo.API_KEY"
        android:value="" /> ← ใส่ค่า google map api key
    <activity
```

```
import 'package:google_maps_flutter/google_maps_flutter.dart';
```

```
Completer<GoogleMapController> _controller = Completer<GoogleMapController>();  
  
static final CameraPosition _kGooglePlex = CameraPosition(  
    target: LatLng(37.42796133580664, -122.085749655962),  
    zoom: 14.4746,  
) ; // CameraPosition  
  
Widget showMap() {  
    return GoogleMap(  
        mapType: MapType.normal,  
        initialCameraPosition: _kGooglePlex,  
        onMapCreated: (GoogleMapController controller) {  
            _controller.complete(controller);  
        },  
    );  
}
```

State Management with
BLOC PATTERN

Overview



pubspec.yaml

```
dependencies:  
  flutter:  
    sdk: flutter  
  flutter_bloc: ^0.11.0  
  meta: ^1.1.6
```

Events

```
enum CounterEvent { increment, decrement }
```

Bloc

```
class CounterBloc extends Bloc<CounterEvent, int> {

    @override
    int get initialState => 0;

    @override
    Stream<int> mapEventToState(CounterEvent event) async* {
        switch (event) {
            case CounterEvent.decrement:
                yield currentState - 1;
                break;
            case CounterEvent.increment:
                yield currentState + 1;
                break;
        }
    }
}
```

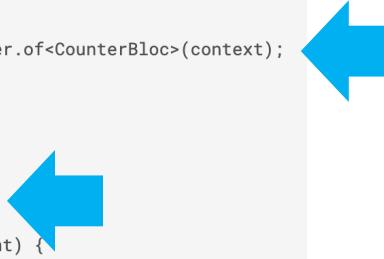
Example [BLOC PROVIDER]

```
void main() => runApp(MyApp());  
  
class MyApp extends StatefulWidget {  
  @override  
  State<StatefulWidget> createState() => MyAppState();  
}  
  
class MyAppState extends State<MyApp> {  
  final CounterBloc _counterBloc = CounterBloc(); ←  
  
  @override  
  Widget build(BuildContext context) {  
    return MaterialApp(  
      title: 'Flutter Demo',  
      home: BlocProvider<CounterBloc>(  
        bloc: _counterBloc,  
        child: CounterPage(), ←  
      ),  
    );  
  }  
  
  @override  
  void dispose() {  
    _counterBloc.dispose();  
    super.dispose();  
  }  
}
```

Example [BLOC BUILDER]

```
class CounterPage extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    final CounterBloc _counterBloc = BlocProvider.of<CounterBloc>(context);

    return Scaffold(
      appBar: AppBar(title: Text('Counter')),
      body: BlocBuilder<CounterEvent, int>(
        bloc: _counterBloc,
        builder: (BuildContext context, int count) {
          return Center(
            child: Text(
              '$count',
              style: TextStyle(fontSize: 24.0),
            ),
          );
        },
      ),
      floatingActionButton: Column(
        mainAxisAlignment: MainAxisAlignment.end,
        mainAxisSize: MainAxisSize.end,
        children: <Widget>[
          Padding(
            padding: EdgeInsets.symmetric(vertical: 5.0),
            child: FloatingActionButton(
              child: Icon(Icons.add),
              onPressed: () {
                _counterBloc.dispatch(CounterEvent.increment);
              },
            ),
          ),
        ],
      ),
    );
  }
}
```



Any questions?

