120A3043

Adhikari Salman Juber

Div E3

Experiment No. : 1

Aim: To install and configure Flutter Environment in Windows.

Theory:

Cross Platform App/Dev

Cross-platform application development is about building a single application that can run on various operating systems, instead of developing different app versionsfor each platform. The driving force for cross-platform application development is to produce software that works well in more than one specific digital environment, with the main purpose of selling it to a wider customer base. When you work on cross-platform app development, you can launch your software quickly on various platforms. The source code is written once for all platforms. This means you don’t need to hire a separate software development team for each platform, as it’s possible to launch and update the software by using a variety of cross-platform development tools.

It requires the deployment of a single script instead of writing separate scripts for each platform. This significantly speeds up development time and cuts time to market**,** which benefits everyone, from the dev team all the way to marketing.

Since cross-platform applications are Internet-based, updates are nice and easy. Users don’t have to download separate updates, which would require the maintenance and support of multiple app versions. The app is updated automatically for all customers to ensure they always have the most current version of the app, which positively impacts itsperformance.

What is Flutter?

Flutter was introduced by Google as an open-source technology for coding and creating native apps for Android and iOS. Flutter is relatively new as it was officially presented in December 2018 as the first stable version 1.0 at the Flutter Live event.

Flutter combines ease of development with performance similar to native performance while maintaining visual consistency between platforms. Flutter's programming language, Dart, was initially intended as a replacement for JavaScript. Most importantly, Flutter is open-source and completely free. As a cross-platform framework, Flutter mostclosely resembles React Native. Both allow for a reactive and declarative style of programming. Unlike React Native, however, Flutter doesn't need to use a JavaScript bridge, which improves app startup times and overall performance. Dart achieves this byusing Ahead-Of-Time (AOT) compilation.

What is Dart?

Dart is an open-source, general-purpose, object-oriented programming language with C- style syntax developed by Google in 2011. The purpose of Dart programming is to createa frontend user interfaces for the web and mobile apps. It is under active development, compiled to native machine code for building mobile apps, inspired by other programming languages such as Java, JavaScript, C#, and is Strongly Typed. Since Dart is a compiled language so you cannot execute your code directly; instead, the compiler parses it and transfer it into machine code.

It supports most of the common concepts of programming languages like classes, interfaces, functions, unlike other programming languages. Dart language does not

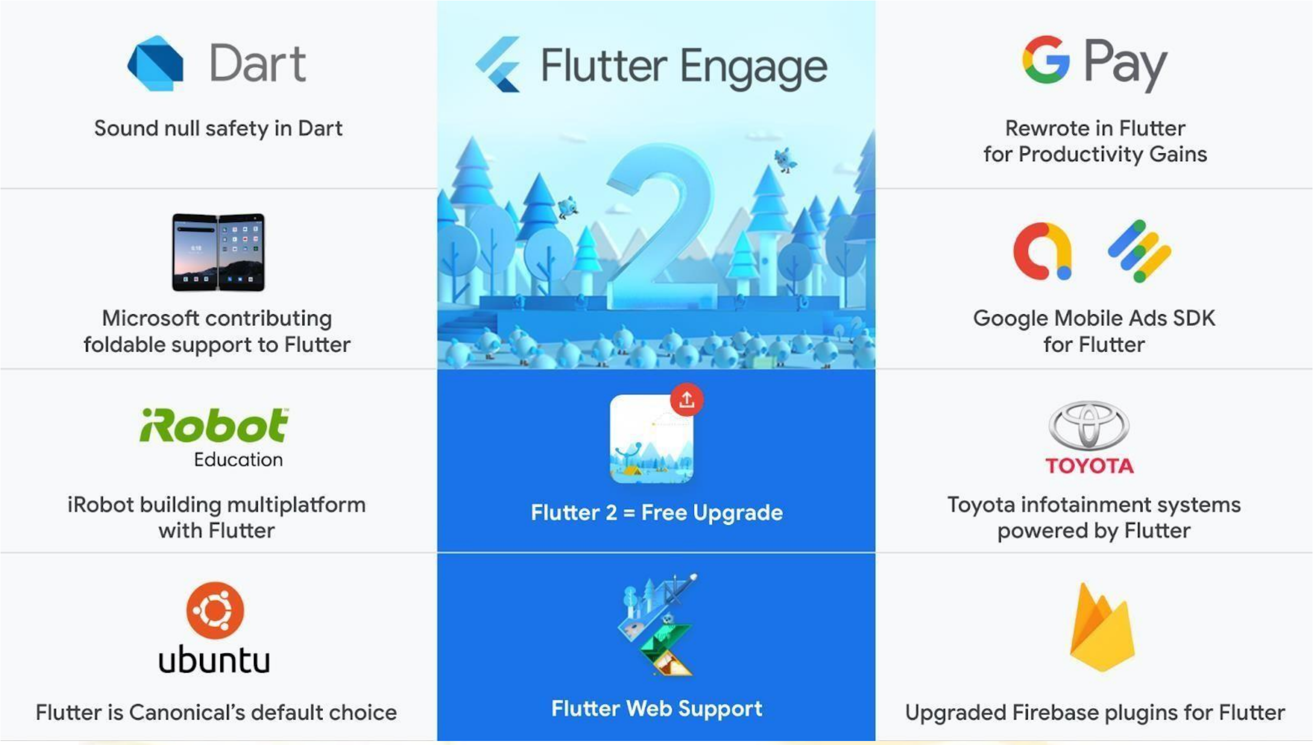
support arrays directly. It supports collection, which is used to replicate the data structuresuch as arrays, generics, and optional typing.

Example:

```
void main() {
        for (int i = 0; i < 5; i++) {
        print('hello ${i + 1}');
}
                }
```

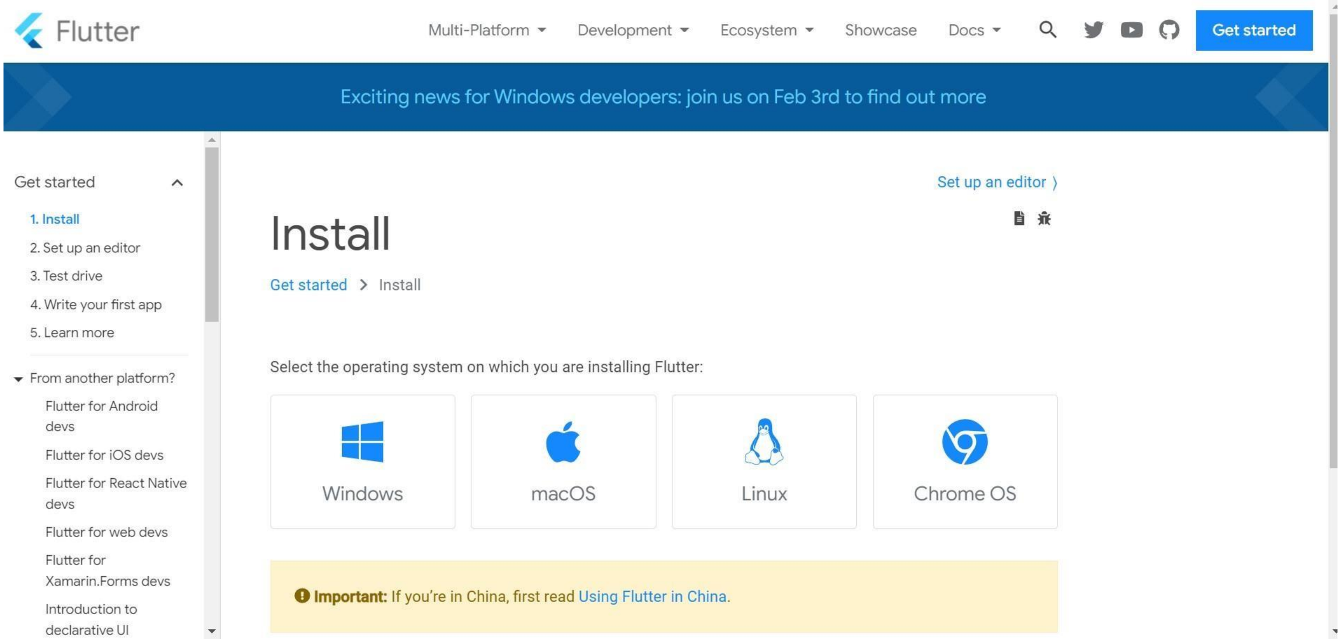
Features of Flutter-

- **High productivity:** Since Flutter is cross-platform, you can use the same code base for your iOS and Android app. This can definitely save you both time and resources.
- **Great performance:** Dart compiles into native code and there is no need to access OEM widgets as Flutter has its own. This means less mediated communication between the app and the platform.
- **Fast and simple development:** One of the most lauded features of Flutter is *hot reload* which allows you to instantly view the changes made in the code on emulators, simulators and hardware. In less than a second, the changed code is reloaded while the app is running with no need for a restart. This is great not just for building UIs or adding features but also for bug fixing. As far as simplicity is concerned, Flutter claims in its docs that programming with Flutter is so easy that no prior programming knowledge is required.
- **Compatibility:** Since widgets are part of the app and not the platform, you'll likely experience less or no compatibility issues on different OS versions. This in turnmeans less time spent on testing.
- **Open-source:** Both Flutter and Dart are open-source and free to use, and provideextensive documentation and community support to help out with any issues you may encounter.


Dart
Sound null safety in Dart
Flutter Engage
G Pay
Rewrote in Flutter for Productivity Gains
Microsoft contributing foldable support to Flutter
Google Mobile Ads SDK for Flutter
iRobot Education
iRobot building multiplatform with Flutter
Flutter 2 = Free Upgrade
TOYOTA
Toyota infotainment systems powered by Flutter
ubuntu
Flutter is Canonical's default choice
Flutter Web Support
Upgraded Firebase plugins for Flutter

Steps For Installation: VSCode

Step 1: Download the installation bundle of the Flutter Software Development Kit for windows. To download Flutter SDK, go to its official website, click on Get started button, you will get the following screen.



Exciting news for Windows developers: join us on Feb 3rd to find out more

Install

Select the operating system on which you are installing Flutter:

Important: If you're in China, first read Using Flutter in China.

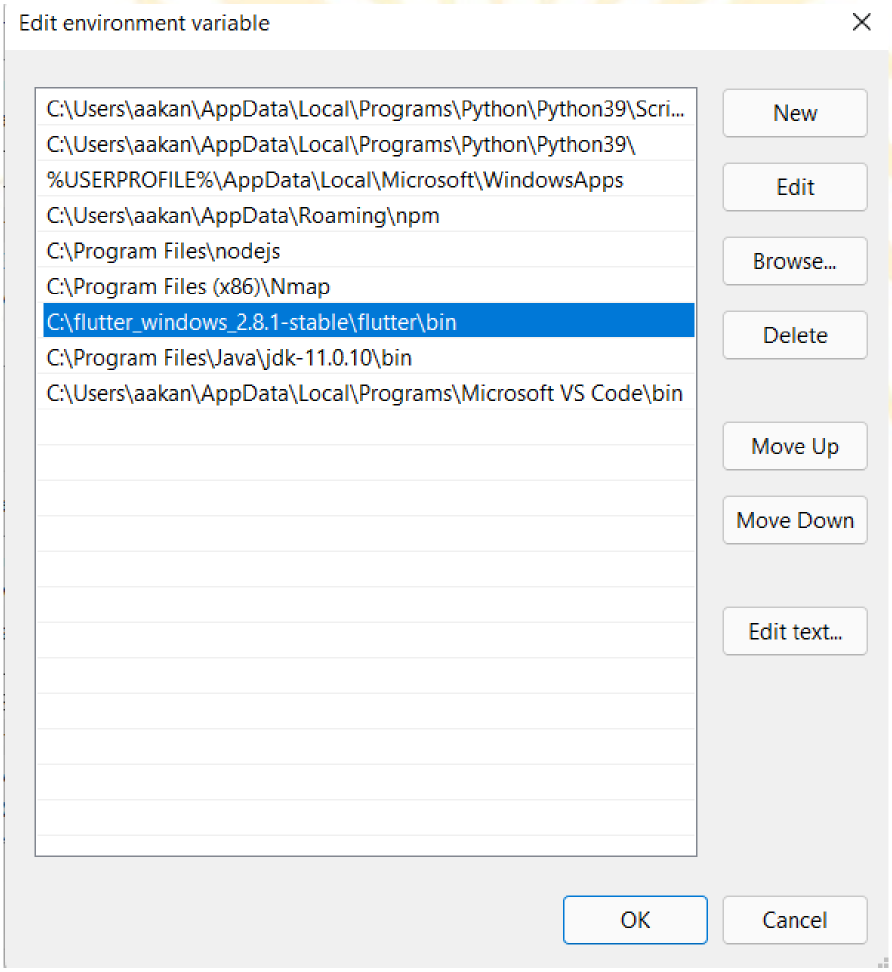
Step 2: Next, to download the latest Flutter SDK, click on the Windows icon. Here, youwill find the download link for SDK.

Step 3: When your download is complete, extract the zip file and place it in the desired installation folder or location, for example, D: /Flutter.required.

Step 4: To run the Flutter command in regular windows console, you need to update thesystem path to include the flutter bin directory. The following steps are required to do this:

Step 4.1: Go to MyComputer properties -> advanced tab -> environment variables. Youwill get the following screen.

Step 4.2: Now, select path -> click on edit. The following screen appears.

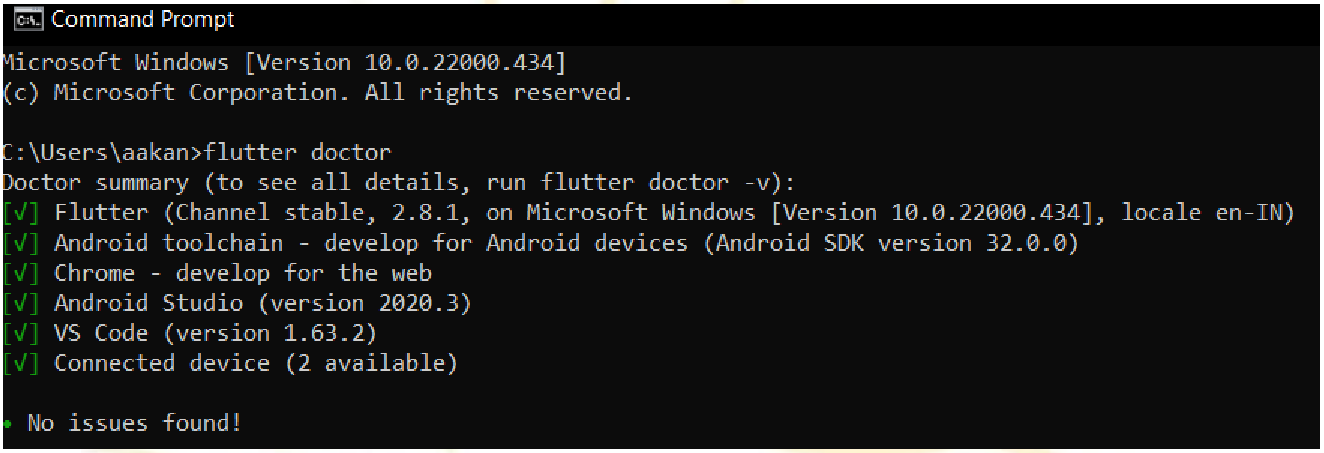


```
C:\Users\aakan\AppData\Local\Programs\Python\Python39\Scri...
C:\Users\aakan\AppData\Local\Programs\Python\Python39\
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
C:\Users\aakan\AppData\Roaming\npm
C:\Program Files\nodejs
C:\Program Files (x86)\Nmap
C:\flutter_windows_2.8.1-stable\flutter\bin
C:\Program Files\Java\jdk-11.0.10\bin
C:\Users\aakan\AppData\Local\Programs\Microsoft VS Code\bin
```

Step 4.3: In the above window, click on New->write path of Flutter bin folder in variablevalue -> ok -> ok -> ok.

Step 5: Now, run the $ flutter doctor command. This command checks for all the requirements of Flutter app development and displays a report of the status of yourFlutter installation.

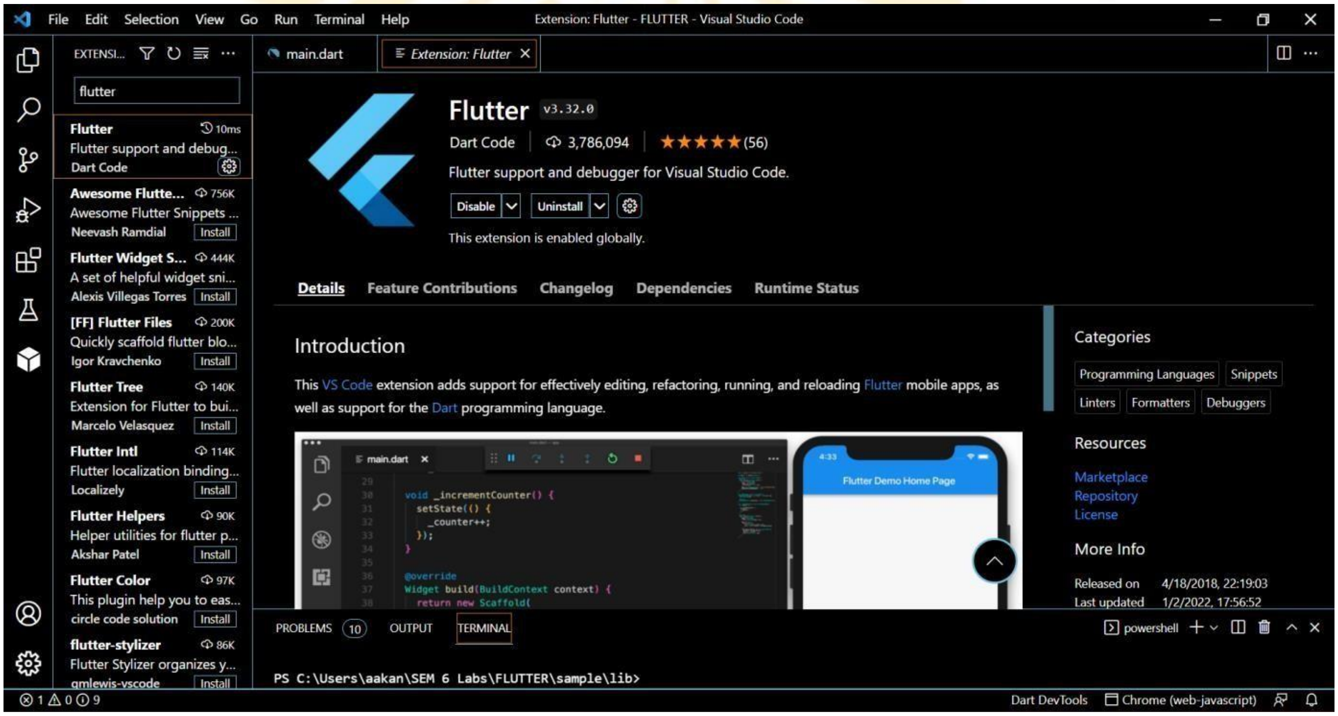
$ flutter doctor



Command Prompt

```
Microsoft Windows [Version 10.0.22000.434]
(c) Microsoft Corporation. All rights reserved.

C:\Users\aakan>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, 2.8.1, on Microsoft Windows [Version 10.0.22000.434], locale en-IN)
[√] Android toolchain - develop for Android devices (Android SDK version 32.0.0)
[√] Chrome - develop for the web
[√] Android Studio (version 2020.3)
[√] VS Code (version 1.63.2)
[√] Connected device (2 available)

• No issues found!
```

Step 6: Installing Flutter in Visual Studio Code



Flutter support and debugger for Visual Studio Code.

This extension is enabled globally.

Introduction

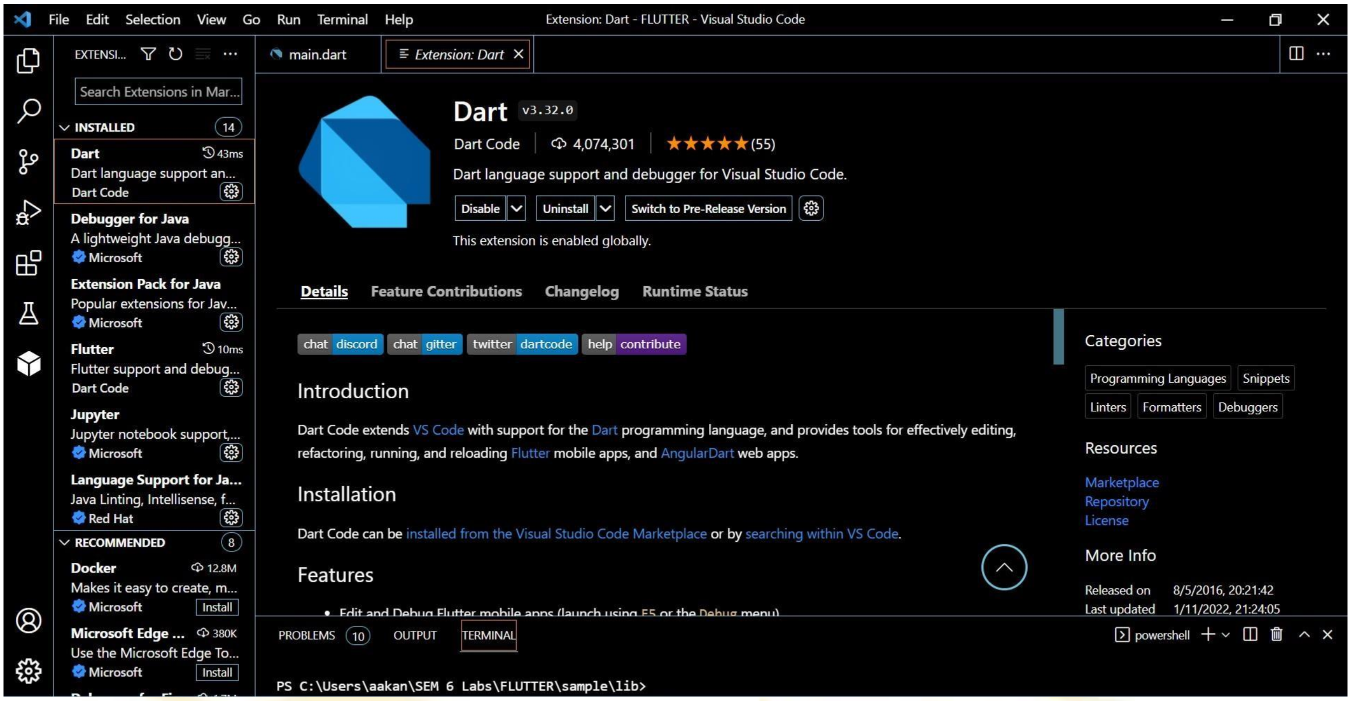
This VS Code extension adds support for effectively editing, refactoring, running, and reloading Flutter mobile apps, as well as support for the Dart programming language.

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

@override
Widget build(BuildContext context) {
  return new Scaffold(
```

Released on 4/18/2018, 22:19:03
Last updated 1/2/2022, 17:56:52

```
PS C:\Users\aakan\SEM 6 Labs\FLUTTER\sample\lib>
```

Step 7: Now install Dart in Visual Studio Code



Dart language support and debugger for Visual Studio Code.

This extension is enabled globally.

Introduction

Dart Code extends VS Code with support for the Dart programming language, and provides tools for effectively editing, refactoring, running, and reloading Flutter mobile apps, and AngularDart web apps.

Installation

Dart Code can be installed from the Visual Studio Code Marketplace or by searching within VS Code.

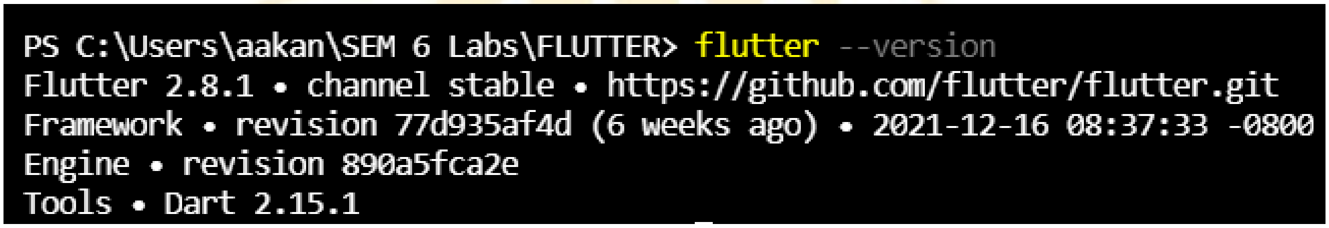
Features

- Edit and Debug Flutter mobile apps (launch using F5 or the Debug menu)

Released on	8/5/2016, 20:21:42
Last updated	1/11/2022, 21:24:05

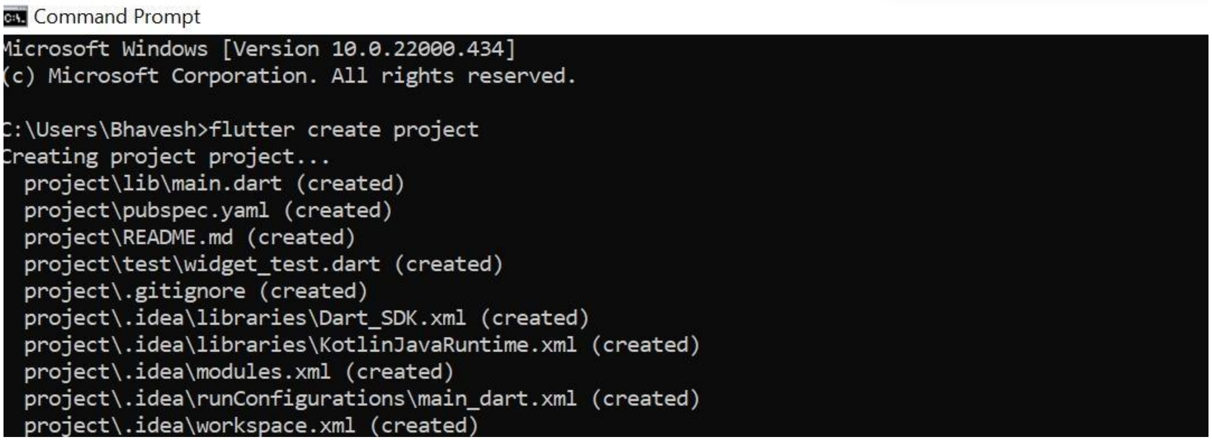
```
PS C:\Users\aakan\SEM 6 Labs\FLUTTER\sample\lib>
```

Step 8: Now we have successfully added Flutter and Dart to the Visual studio code, nowlet’s check if flutter is installed or not. For this we will open a new terminal in Visual Studio Code and type the following “flutter –version”, if everything is fine then it will normally show the version of the installed flutter.

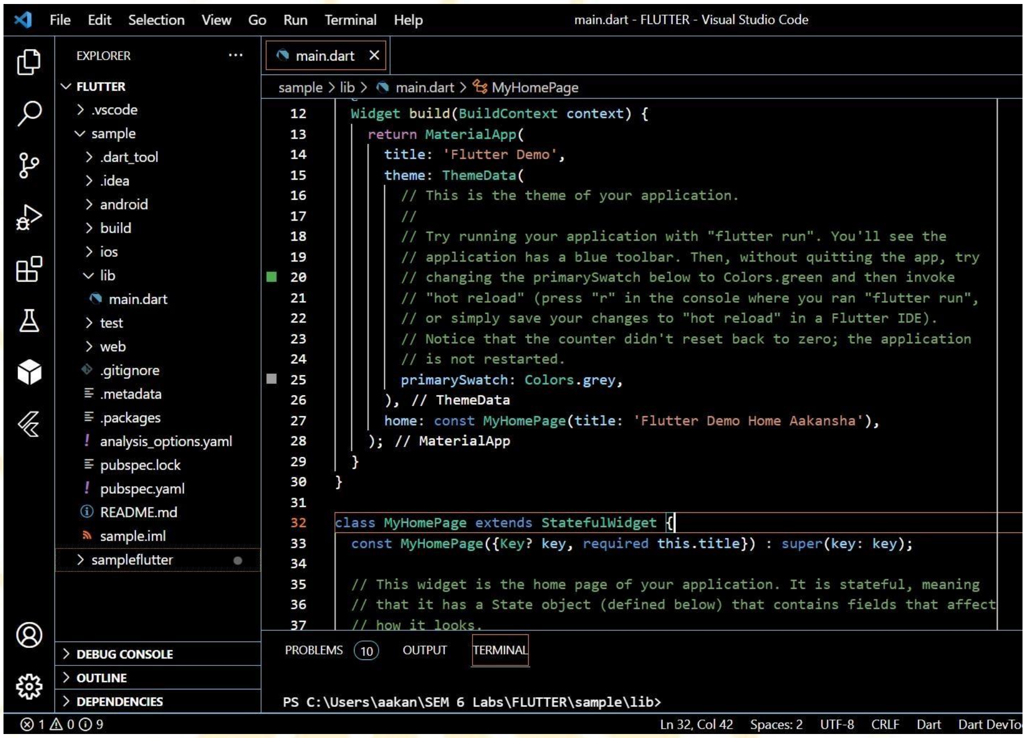


```
PS C:\Users\aakan\SEM 6 Labs\FLUTTER> flutter --version
Flutter 2.8.1 • channel stable • https://github.com/flutter/flutter.git
Framework • revision 77d935af4d (6 weeks ago) • 2021-12-16 08:37:33 -0800
Engine • revision 890a5fca2e
Tools • Dart 2.15.1
```

Step 9: Now for creating a new flutter project write the following in the visual studio Code terminal, “**flutter create sample**”. After that project will be created inside the test project directory.



```
Microsoft Windows [Version 10.0.22000.434]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Bhavesh>flutter create project
Creating project project...
  project\lib\main.dart (created)
  project\pubspec.yaml (created)
  project\README.md (created)
  project\test\widget_test.dart (created)
  project\.gitignore (created)
  project\.idea\libraries\Dart_SDK.xml (created)
  project\.idea\libraries\KotlinJavaRuntime.xml (created)
  project\.idea\modules.xml (created)
  project\.idea\runConfigurations\main_dart.xml (created)
  project\.idea\workspace.xml (created)
```

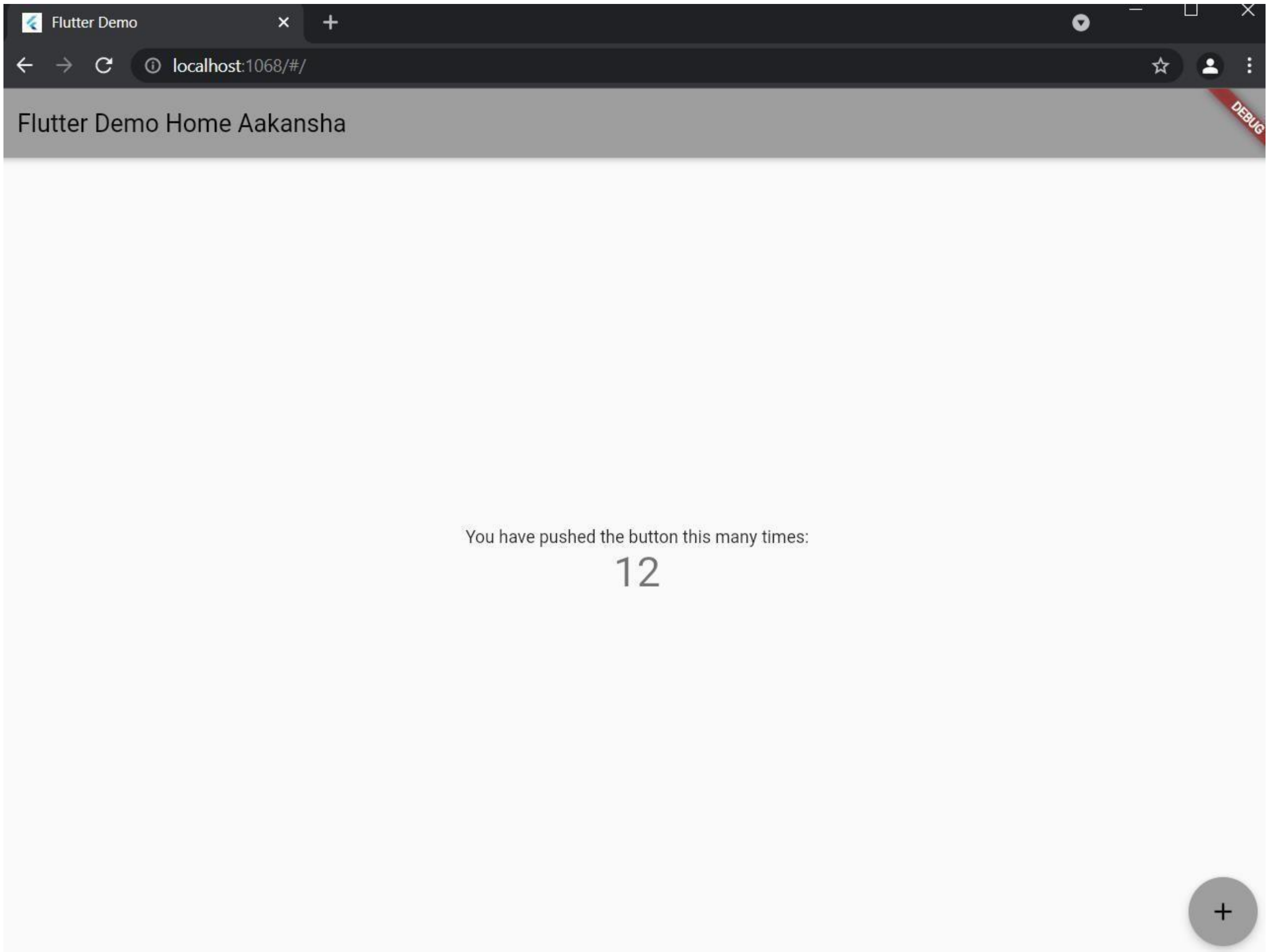


```
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flutter Demo',
      theme: ThemeData(
        // This is the theme of your application.
        //
        // Try running your application with "flutter run". You'll see the
        // application has a blue toolbar. Then, 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.grey,
      ), // ThemeData
      home: const MyHomePage(title: 'Flutter Demo Home Aakansha'),
    ); // MaterialApp
  }
}

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

  // This widget is the home page of your application. It is stateful, meaning
  // that it has a State object (defined below) that contains fields that affect
  // how it looks.
```

```
PS C:\Users\aakan\SEM 6 Labs\FLUTTER\sample\lib>
```

Output:

Now we are ready to see the output, by default it has a program in which there is a buttonby clicking on the that a counter will be displayed in the centre.

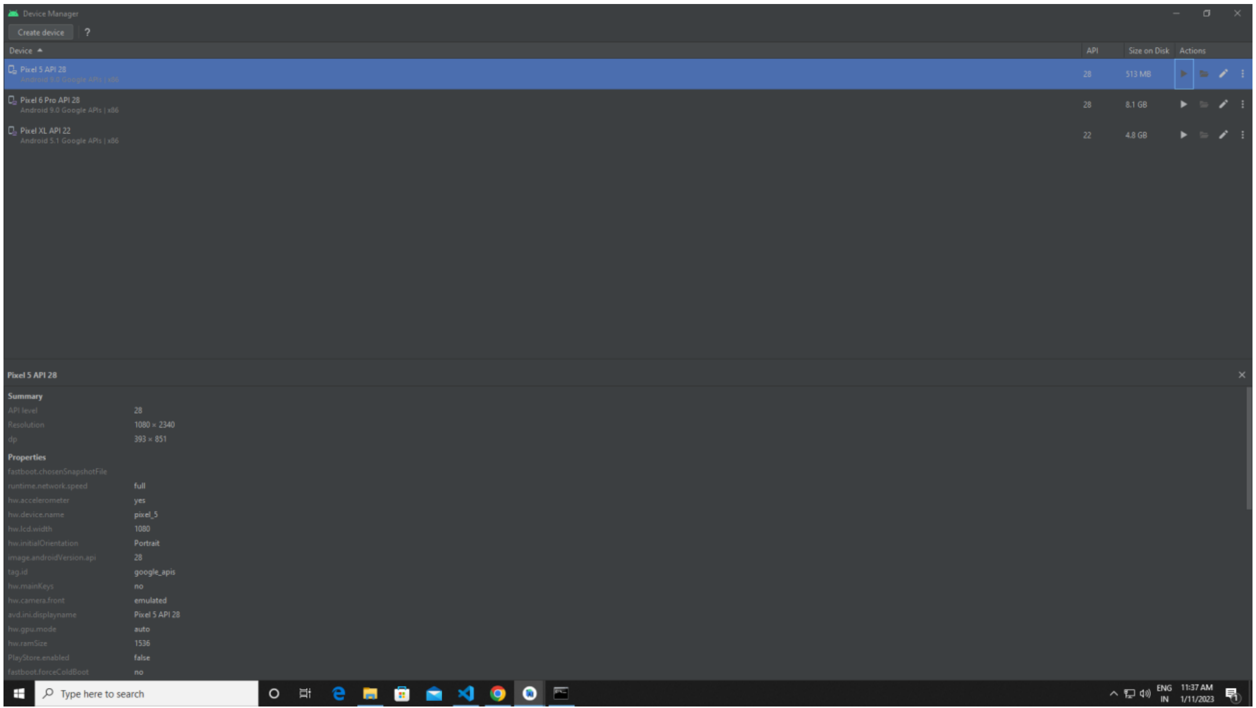


Flutter Demo Home Aakansha

You have pushed the button this many times:

12

Result:



Device	API	Size on Disk	Actions
Pixel 5 API 28 Android 9.0 Google APIs | x86	28	513 MB	▶ ✎ ⋮
Pixel 6 Pro API 28 Android 9.0 Google APIs | x86	28	8.1 GB	▶ ✎ ⋮
Pixel XL API 22 Android 5.1 Google APIs | x86	22	4.8 GB	▶ ✎ ⋮

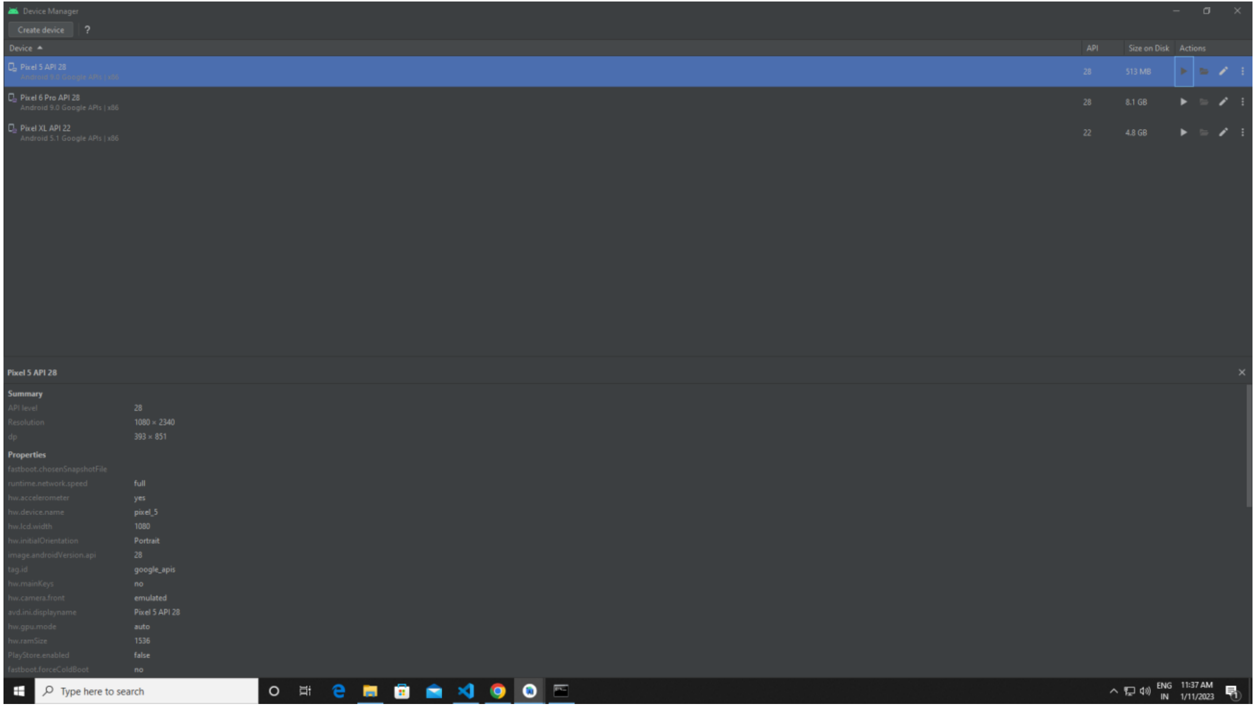
Pixel 5 API 28

Summary

API level	28
Resolution	1080 × 2340
dp	393 × 851

Properties

fastboot.chosenSnapshotFile	
runtime.network.speed	full
hw.accelerometer	yes
hw.device.name	pixel_5
hw.lcd.width	1080
hw.initialOrientation	Portrait
image.androidVersion.api	28
tag.id	google_apis
hw.mainKeys	no
hw.camera.front	emulated
avd.ini.displayname	Pixel 5 API 28
hw.gpu.mode	auto
hw.ramSize	1536
PlayStore.enabled	false
fastboot.forceColdBoot	no



Device	API	Size on Disk	Actions
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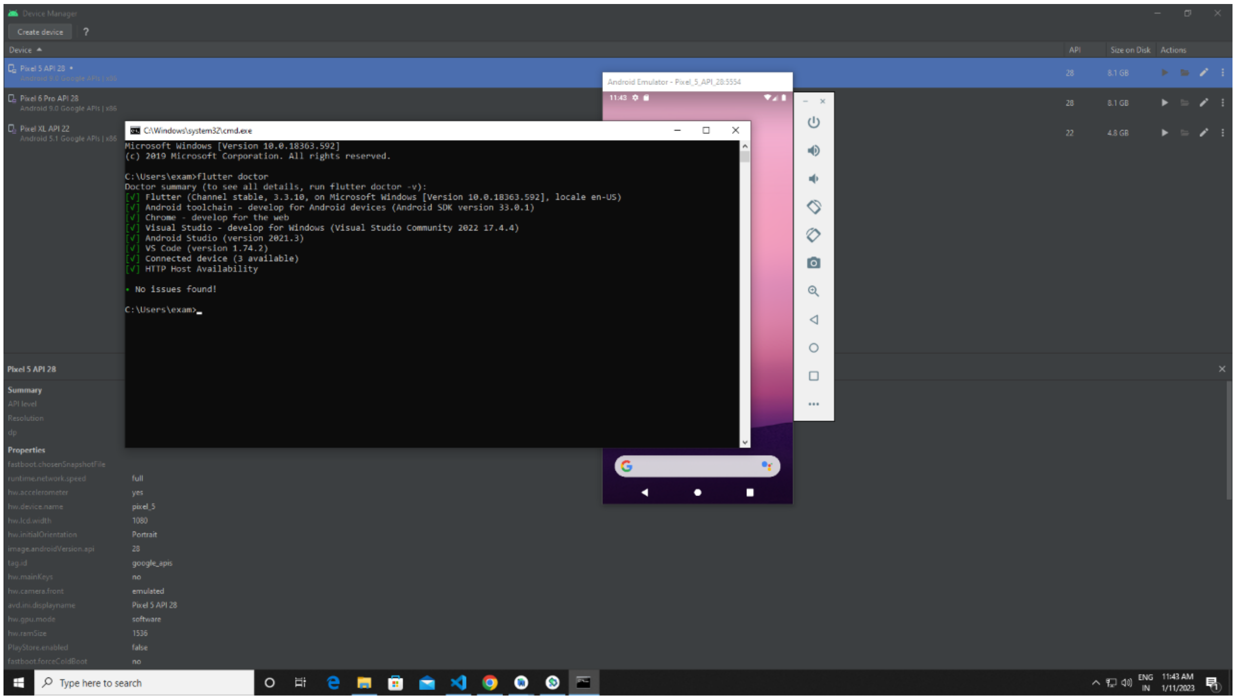
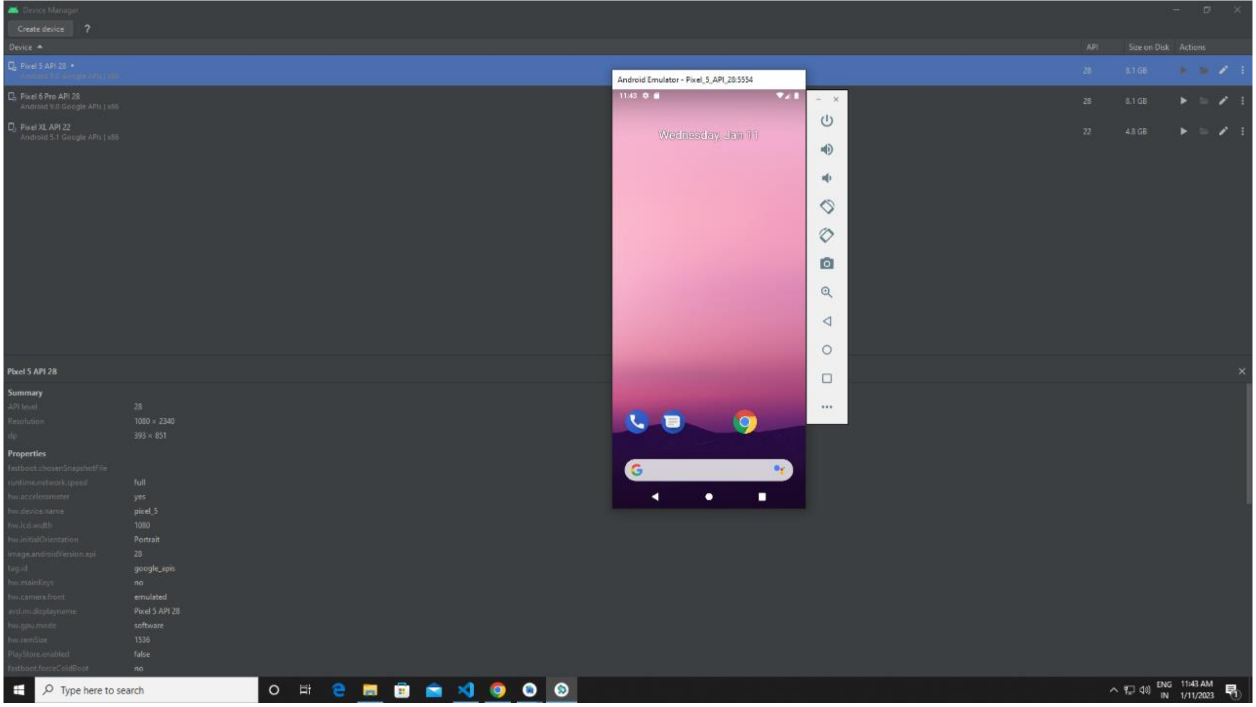


```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.18363.592]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\exam>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, 3.3.10, on Microsoft Windows [Version 10.0.18363.592], locale en-US)
[√] Android toolchain - develop for Android devices (Android SDK version 33.0.1)
[√] Chrome - develop for the web
[√] Visual Studio - develop for Windows (Visual Studio Community 2022 17.4.4)
[√] Android Studio (version 2021.3)
[√] VS Code (version 1.74.2)
[√] Connected device (3 available)
[√] HTTP Host Availability

• No issues found!

C:\Users\exam>_
```



Device	API	Size on Disk	Actions
Pixel 5 API 28 Android 9.0 Google APIs | x86	28	8.1 GB	
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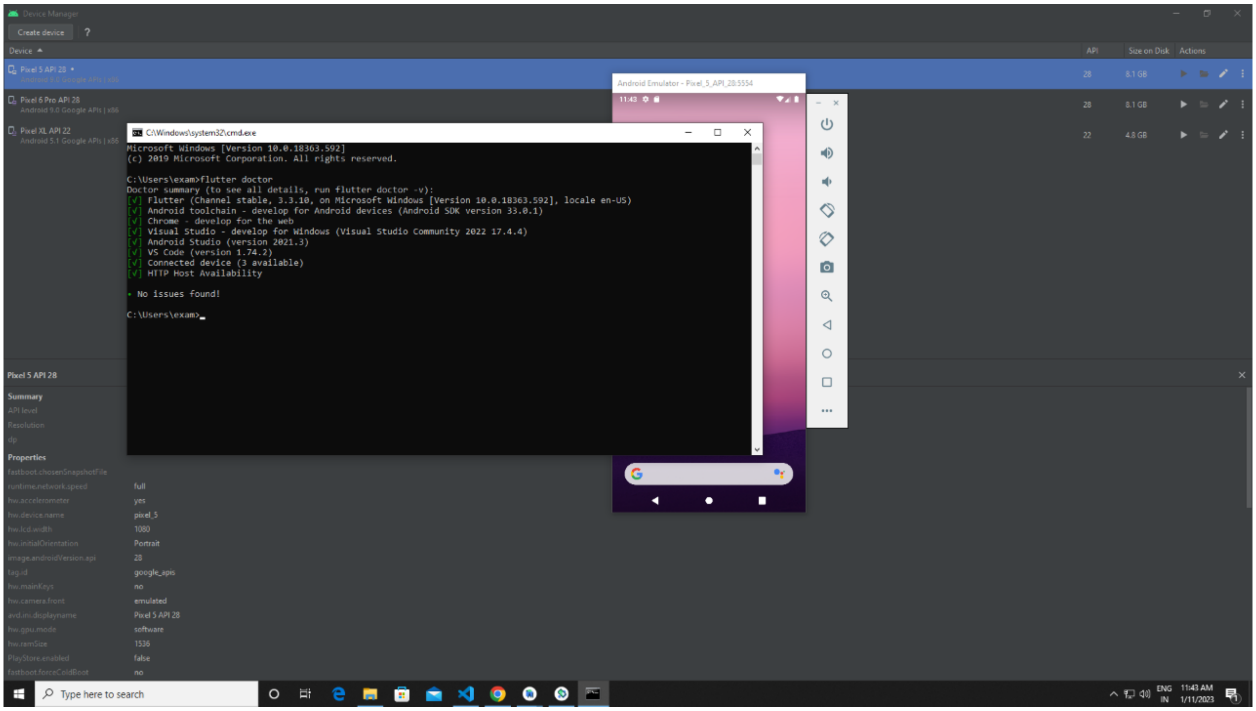
hw.lcd.width	1080
hw.initialOrientation	Portrait
image.androidVersion.api	28
tag.id	google_apis
hw.mainKeys	no
hw.camera.front	emulated
avd.ini.displayname	Pixel 5 API 28
hw.gpu.mode	software
hw.ramSize	1536
PlayStore.enabled	false
fastboot.forceColdBoot	no



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.18363.592]
(c) 2019 Microsoft Corporation. All rights reserved.

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[√] Chrome - develop for the web
[√] Visual Studio - develop for Windows (Visual Studio Community 2022 17.4.4)
[√] Android Studio (version 2021.3)
[√] VS Code (version 1.74.2)
[√] Connected device (3 available)
[√] HTTP Host Availability

• No issues found!

C:\Users\exam>_
```

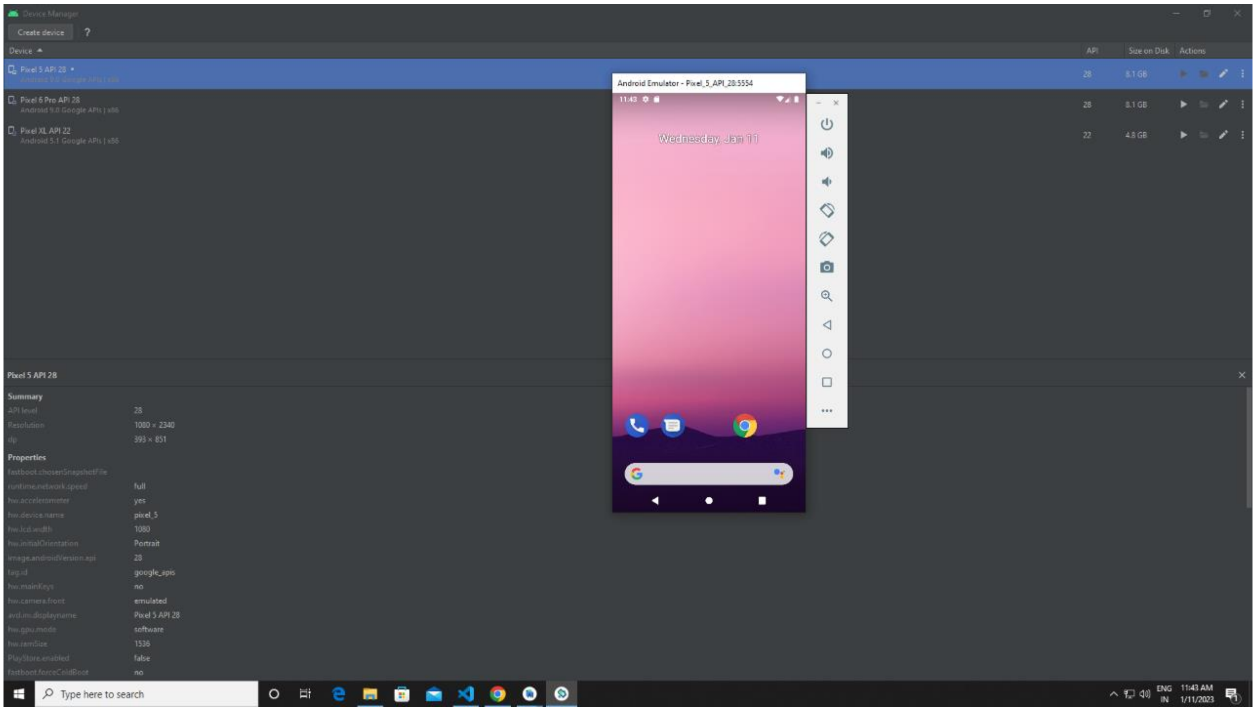

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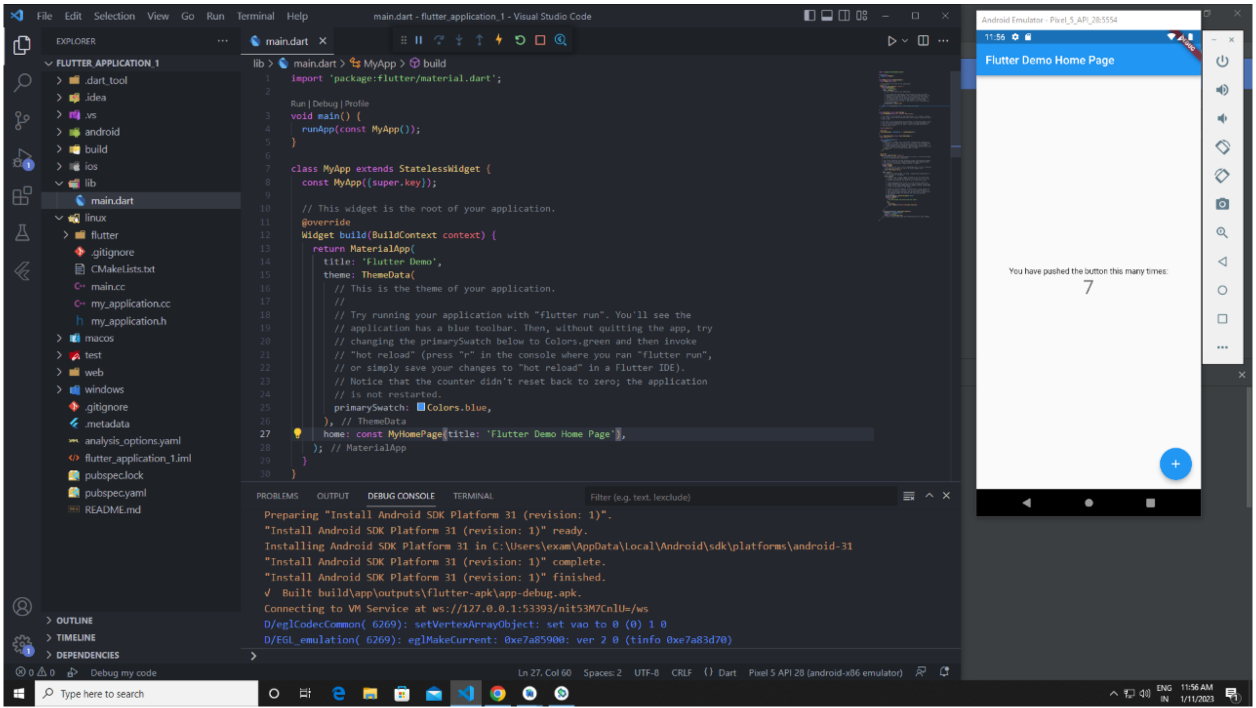
image.androidVersion.api	28
tag.id	google_apis
hw.mainKeys	no
hw.camera.front	emulated
avd.ini.displayname	Pixel 5 API 28
hw.gpu.mode	software
hw.ramSize	1536
PlayStore.enabled	false
fastboot.forceColdBoot	no



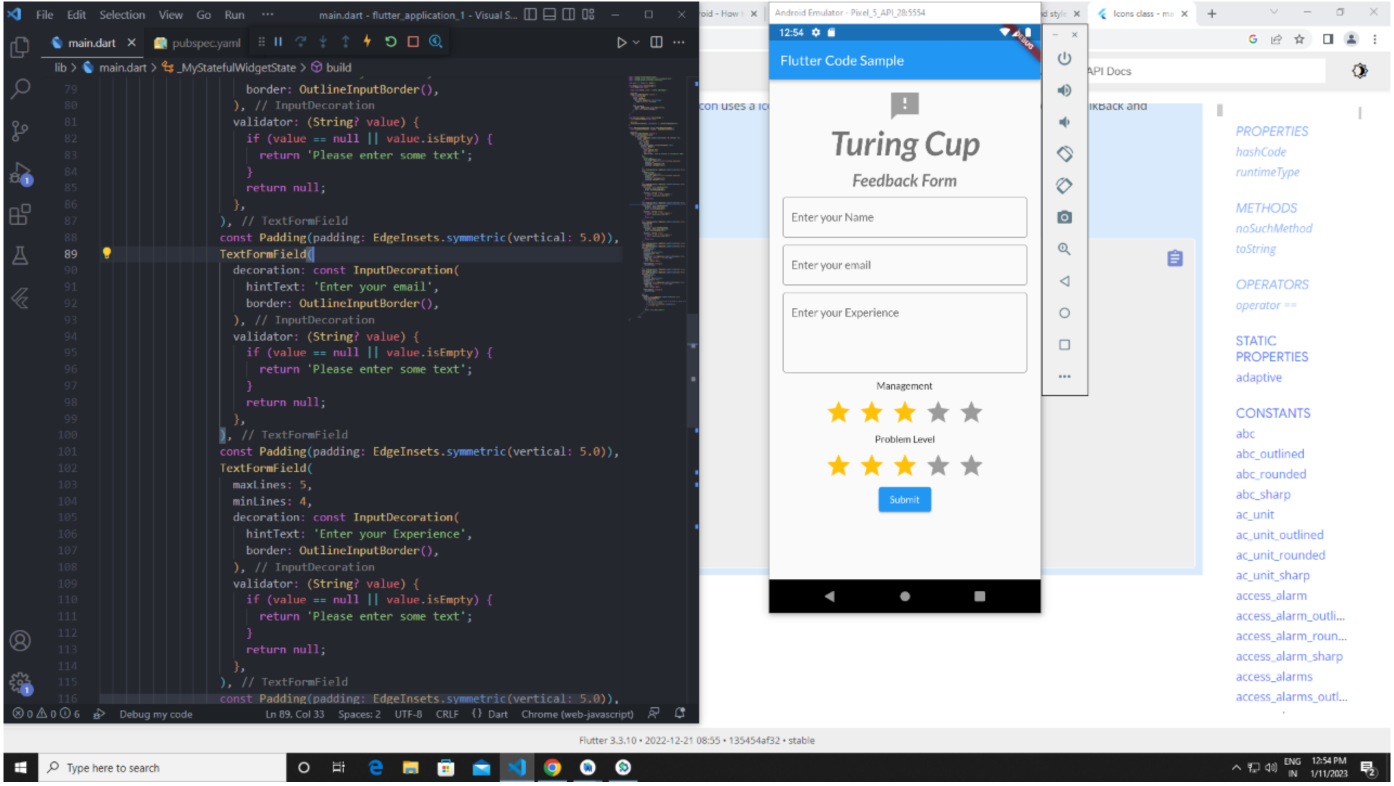
```
import 'package:flutter/material.dart';

void main() {
  runApp(const MyApp());
}

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

  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flutter Demo',
      theme: ThemeData(
        // This is the theme of your application.
        //
        // 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: const MyHomePage(title: 'Flutter Demo Home Page'),
    ); // MaterialApp
  }
}
```

```
Preparing "Install Android SDK Platform 31 (revision: 1)".
"Install Android SDK Platform 31 (revision: 1)" ready.
Installing Android SDK Platform 31 in C:\Users\exam\AppData\Local\Android\sdk\platforms\android-31
"Install Android SDK Platform 31 (revision: 1)" complete.
"Install Android SDK Platform 31 (revision: 1)" finished.
√  Built build\app\outputs\flutter-apk\app-debug.apk.
Connecting to VM Service at ws://127.0.0.1:53393/nit53M7CnlU=/ws
D/eglCodecCommon( 6269): setVertexArrayObject: set vao to 0 (0) 1 0
D/EGL_emulation( 6269): eglMakeCurrent: 0xe7a85900: ver 2 0 (tinfo 0xe7a83d70)
```

Flutter Demo Home Page

You have pushed the button this many times:

7



```
            border: OutlineInputBorder(),
          ), // InputDecoration
          validator: (String? value) {
            if (value == null || value.isEmpty) {
              return 'Please enter some text';
            }
            return null;
          },
        ), // TextFormField
        const Padding(padding: EdgeInsets.symmetric(vertical: 5.0)),
        TextFormField(
          decoration: const InputDecoration(
            hintText: 'Enter your email',
            border: OutlineInputBorder(),
          ), // InputDecoration
          validator: (String? value) {
            if (value == null || value.isEmpty) {
              return 'Please enter some text';
            }
            return null;
          },
        ), // TextFormField
        const Padding(padding: EdgeInsets.symmetric(vertical: 5.0)),
        TextFormField(
          maxLines: 5,
          minLines: 4,
          decoration: const InputDecoration(
            hintText: 'Enter your Experience',
            border: OutlineInputBorder(),
          ), // InputDecoration
          validator: (String? value) {
            if (value == null || value.isEmpty) {
              return 'Please enter some text';
            }
            return null;
          },
        ), // TextFormField
        const Padding(padding: EdgeInsets.symmetric(vertical: 5.0)),
```

Flutter Code Sample

Turing Cup

Feedback Form

Enter your Name

Enter your email

Enter your Experience

Management

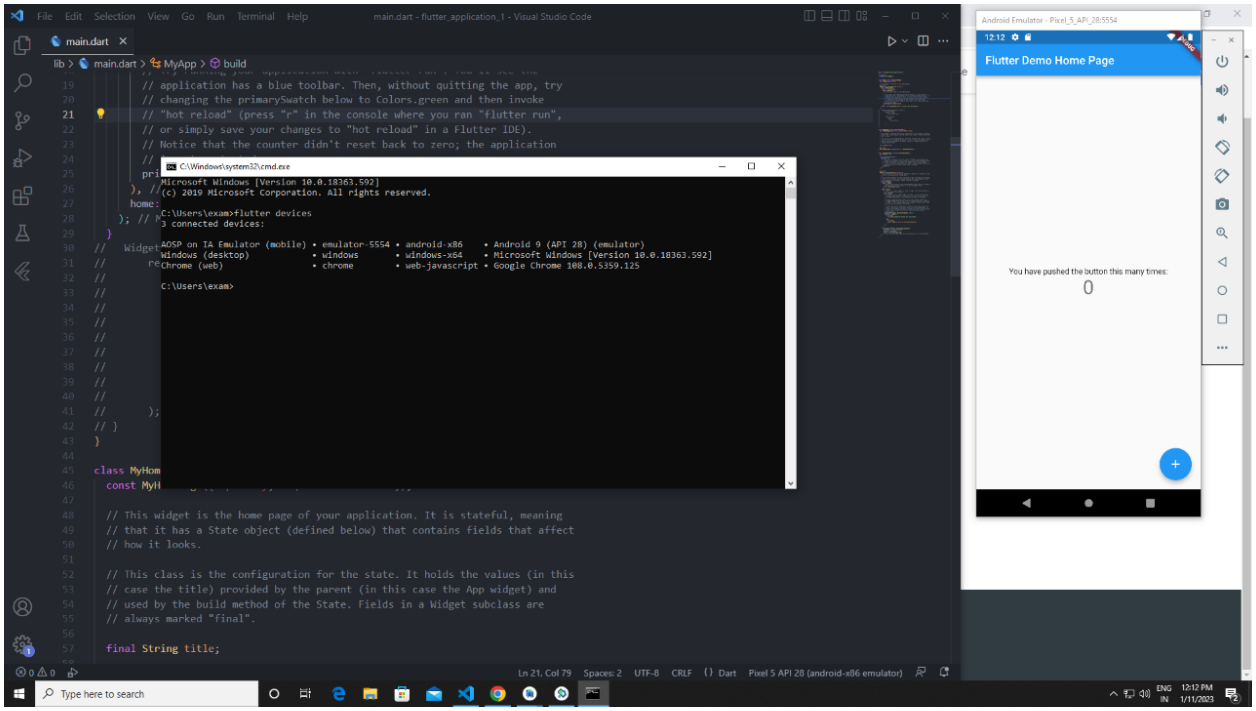
★★★☆☆

Problem Level

★★★☆☆

Submit

Flutter 3.3.10 • 2022-12-21 08:55 • 135454af32 • stable


File Edit Selection View Go Run Terminal Help
main.dart - flutter_application_1 - Visual Studio Code
main.dart
lib > main.dart > MyApp > build
C:\Windows\system32\cmd.exe
Android Emulator - Pixel_5_API_28:5554
Ln 21, Col 79 Spaces: 2 UTF-8 CRLF {} Dart Pixel 5 API 28 (android-x86 emulator)
Type here to search
ENG IN 12:12 PM 1/11/2023

```
        // 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
```

```
  // This widget is the home page of your application. It is stateful, meaning
  // that it has a State object (defined below) that contains fields that affect
  // how it looks.

  // This class is the configuration for the state. It holds the values (in this
  // case the title) provided by the parent (in this case the App widget) and
  // used by the build method of the State. Fields in a Widget subclass are
  // always marked "final".

  final String title;
```

```
Microsoft Windows [Version 10.0.18363.592]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\exam>flutter devices
3 connected devices:

AOSP on IA Emulator (mobile) • emulator-5554 • android-x86    • Android 9 (API 28) (emulator)
Windows (desktop)            • windows       • windows-x64    • Microsoft Windows [Version 10.0.18363.592]
Chrome (web)                 • chrome        • web-javascript • Google Chrome 108.0.5359.125

C:\Users\exam>
```

Flutter Demo Home Page

You have pushed the button this many times:

0

Conclusion:

Hence, we have understood the basics of cross-platform app development, flutter and dart. Flutter is very beneficial in making websites. It is an is an open source frameworkby Google for building beautiful, natively compiled, multi-platform applications from asingle codebase.

We have also completed the steps for flutter installation in VSCode.