

EXPERIMENT NO 1

Aim: To install and configure flutter environment

Theory:

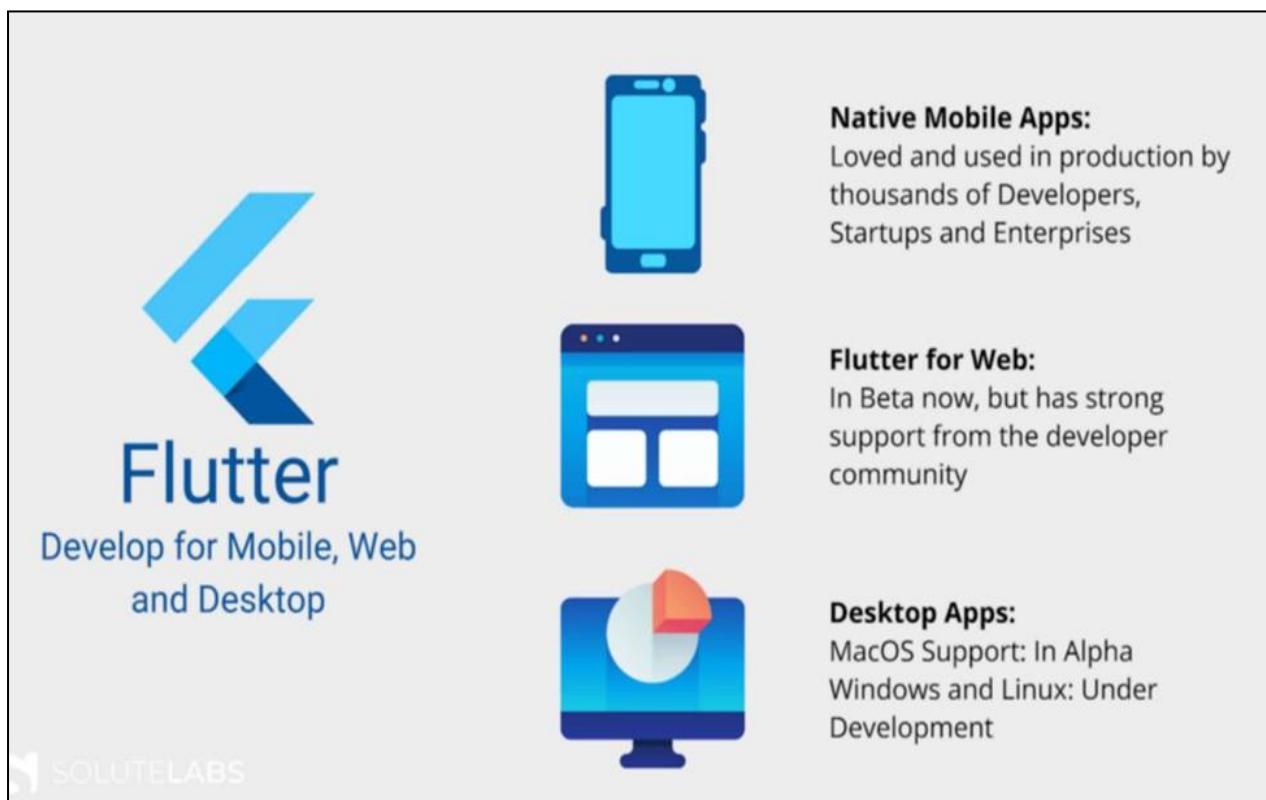
Flutter is an open-source UI framework developed by Google used to build cross-platform applications from a single codebase.

With Flutter, you can create apps for Android, iOS, Web, Windows, macOS, and Linux.

Flutter uses the Dart programming language and follows a widget-based architecture.

Key Features of Flutter

- Single codebase for multiple platforms
- Hot Reload (instant UI updates)
- Rich set of customizable widgets
- High-performance rendering using Skia
- Strong support from Google



The image features the Flutter logo at the top left. Below it, the text "Develop for Mobile, Web and Desktop" is displayed. To the right, there are three icons representing different platforms: a smartphone icon for Native Mobile Apps, a laptop screen icon for Flutter for Web, and a monitor icon for Desktop Apps. To the right of each icon is a descriptive text block.

Native Mobile Apps:
Loved and used in production by thousands of Developers, Startups and Enterprises

Flutter for Web:
In Beta now, but has strong support from the developer community

Desktop Apps:
MacOS Support: In Alpha
Windows and Linux: Under Development

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Advantages of Flutter

1. Single Codebase
 - o Write once, run on Android, iOS, Web, and Desktop.
2. Fast Development
 - o Hot Reload allows instant UI updates, speeding up development.
3. High Performance
 - o Compiles directly to native ARM code, close to native performance.
4. Rich UI & Customization
 - o Built-in widgets provide attractive and consistent UI across platforms.
5. Open Source & Strong Community
 - o Free to use, well-documented, and actively maintained.
6. Reduced Development Cost
 - o One team and one codebase save time and money.

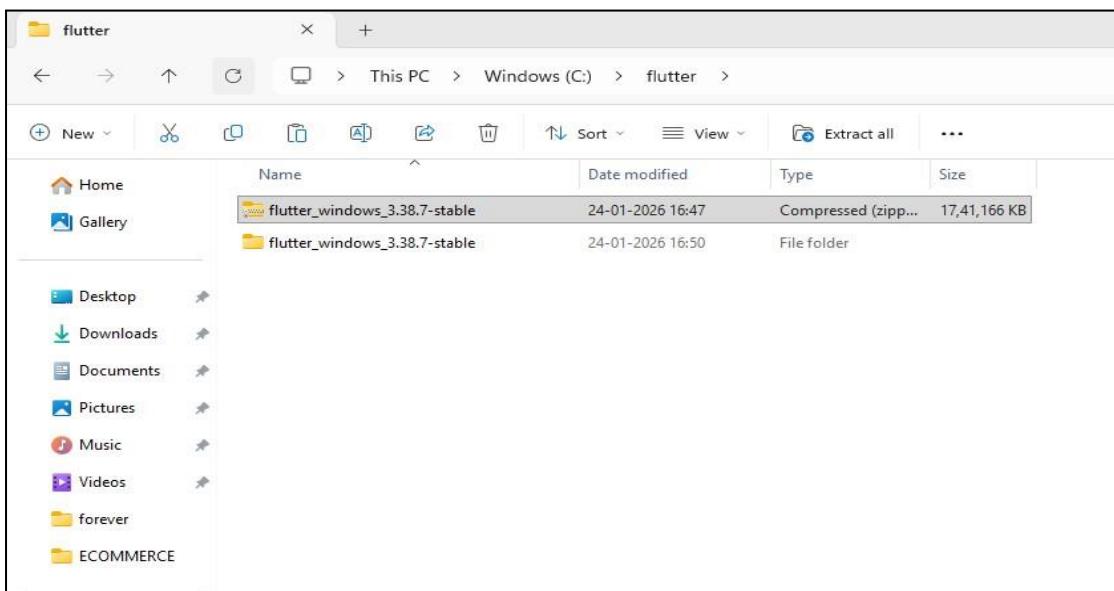
Disadvantages of Flutter

1. Large App Size
 - o Flutter apps are generally larger than native apps.
2. Dart Language Learning Curve
 - o Developers must learn Dart, which is less popular than JavaScript.
3. Limited Native Libraries
 - o Some device-specific features may require platform-specific code.
4. Not Ideal for Heavy Native Apps
 - o Complex native integrations can be challenging.
5. Relatively New Framework
 - o Fewer third-party libraries compared to older frameworks.

Procedures:

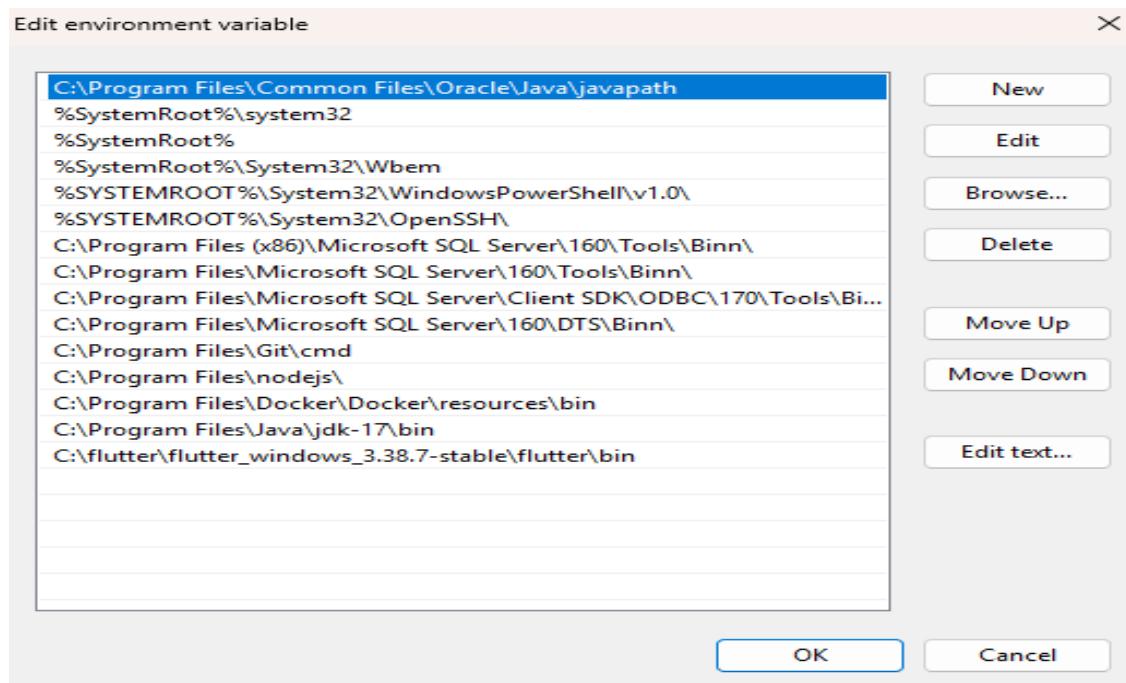
STEP 1: Download Flutter SDK

1. Open your browser
2. Go to flutter.dev
3. Click Get Started
4. Select Windows
5. Download the Flutter SDK (ZIP file)
6. Extract the downloaded ZIP file



STEP 2: Set Flutter Path (Environment Variable)

1. Press Windows + S → search Environment Variables
2. Click Edit the system environment variables
3. Click Environment Variables
4. Under System Variables, select Path
5. Click Edit → New
6. Add:
7. C:\flutter\bin
8. Click OK → OK



STEP 3: Verify Installation On command prompt

```
C:\Users\mokas>flutter --version
Building flutter tool...
Running pub upgrade...
Resolving dependencies... (1.1s)
Downloading packages... (42.2s)
Got dependencies.
Flutter 3.38.7 • channel stable • https://github.com/flutter/flutter.git
Framework • revision 3b62efc2a3 (11 days ago) • 2026-01-13 13:47:42 -0800
Engine • hash 6f3039bf7c3cb5306513c75092822d4d94716003 (revision 78fc3012e4) (16 days ago) • 2026-01-07 18:42:12.000Z
Tools • Dart 3.10.7 • DevTools 2.51.1

C:\Users\mokas>
```

```
C:\Users\mokas>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 3.38.7, on Microsoft Windows [Version 10.0.26100.7623], locale en-IN)
[✓] Windows Version (11 Home Single Language 64-bit, 24H2, 2009)
[✗] Android toolchain - develop for Android devices
    ✗ Unable to locate Android SDK.
      Install Android Studio from: https://developer.android.com/studio/index.html
      On first launch it will assist you in installing the Android SDK components.
      (or visit https://flutter.dev/to/windows-android-setup for detailed instructions).
      If the Android SDK has been installed to a custom location, please use
      'flutter config --android-sdk' to update to that location.

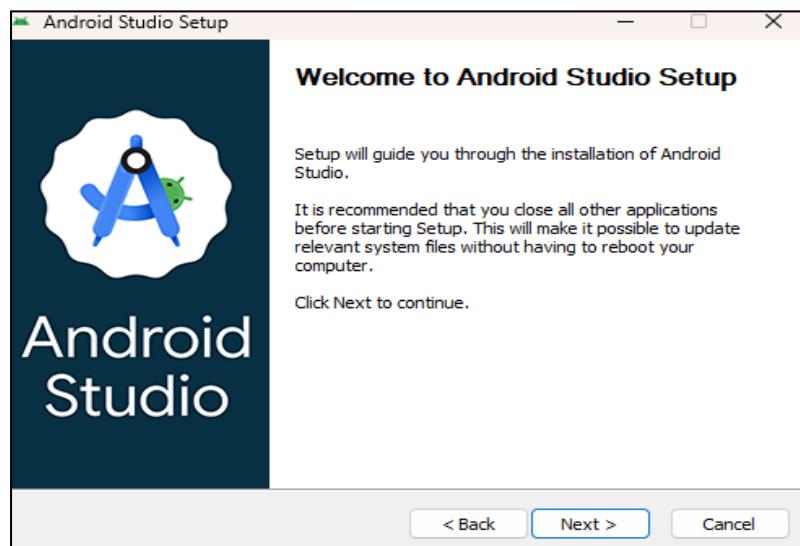
[✓] Chrome - develop for the web
[✗] Visual Studio - develop Windows apps
    ✗ Visual Studio not installed; this is necessary to develop Windows apps.
      Download at https://visualstudio.microsoft.com/downloads/.
      Please install the "Desktop development with C++" workload, including all of its default components
[✓] Connected device (3 available)
[✓] Network resources

! Doctor found issues in 2 categories.

C:\Users\mokas>
```

STEP 4: Install Android Studio

1. Download from developer.android.com/studio
2. Install Android Studio
3. During setup, select:
 - o Android SDK
 - o Android SDK Platform Tools
 - o Android Virtual Device

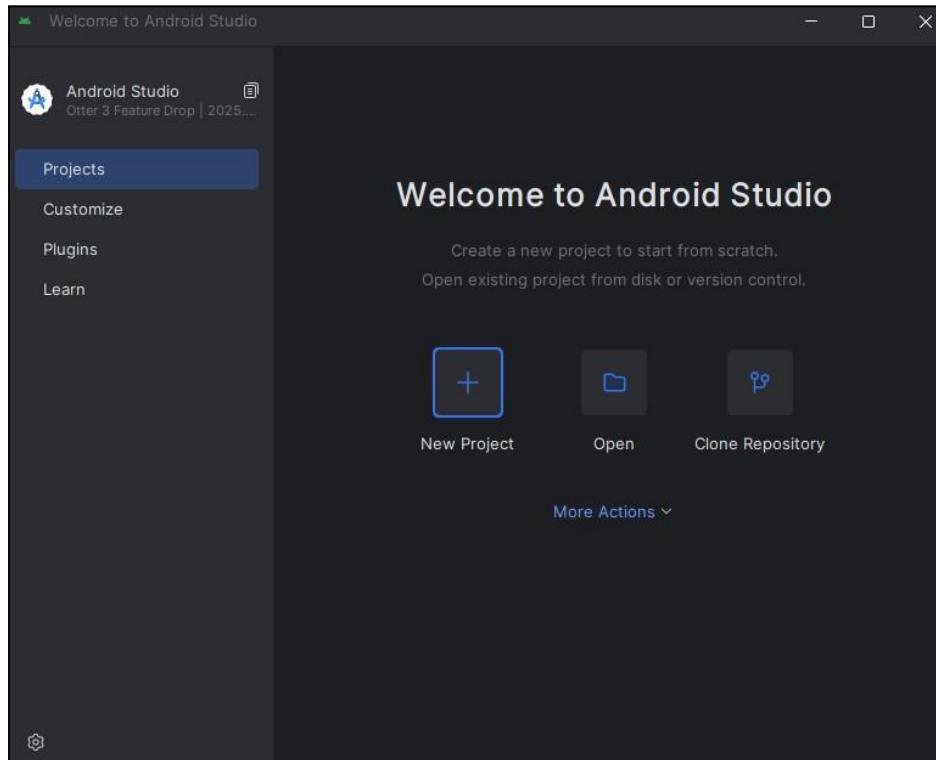


STEP 5: Set Up Android Emulator

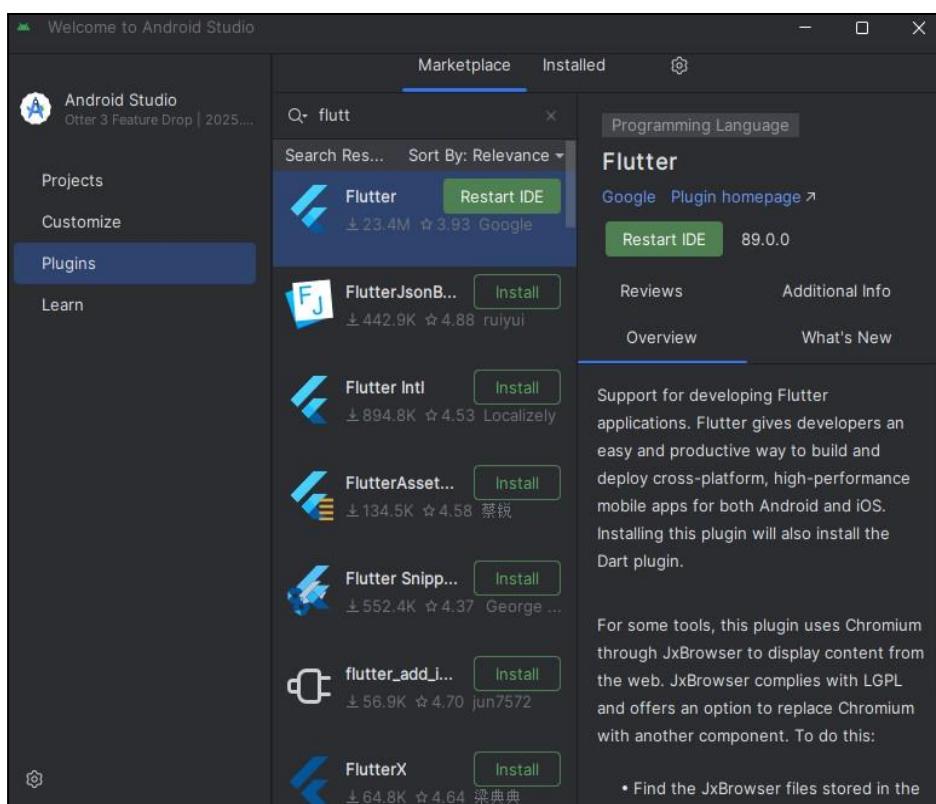
1. Open Android Studio
2. Go to Device Manager

3. Create a Virtual Device

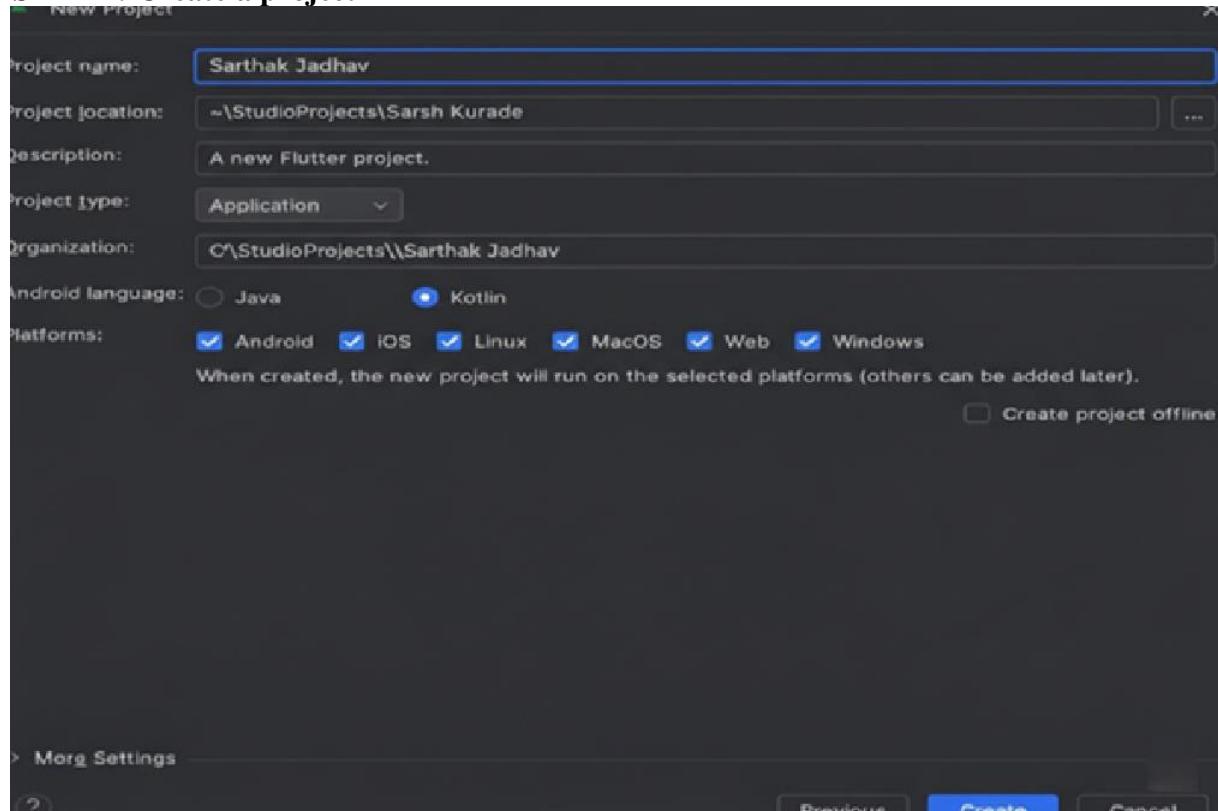
4. Start the emulator



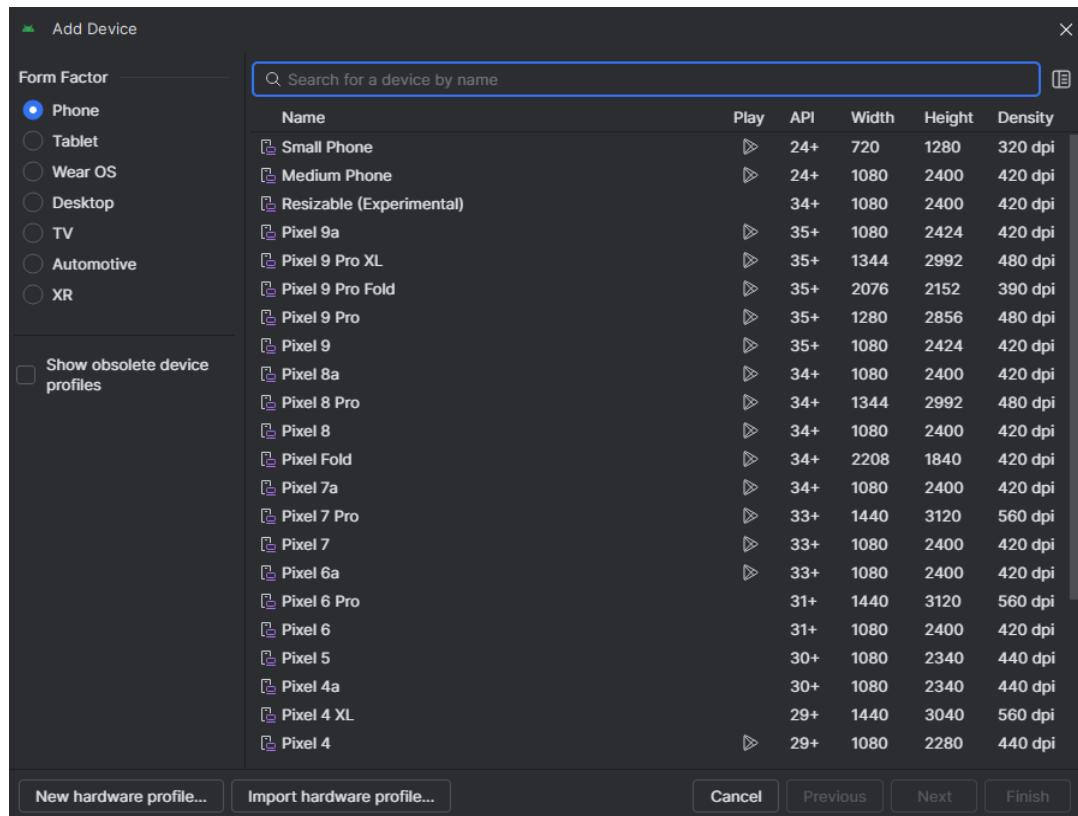
STEP 6: Plugins



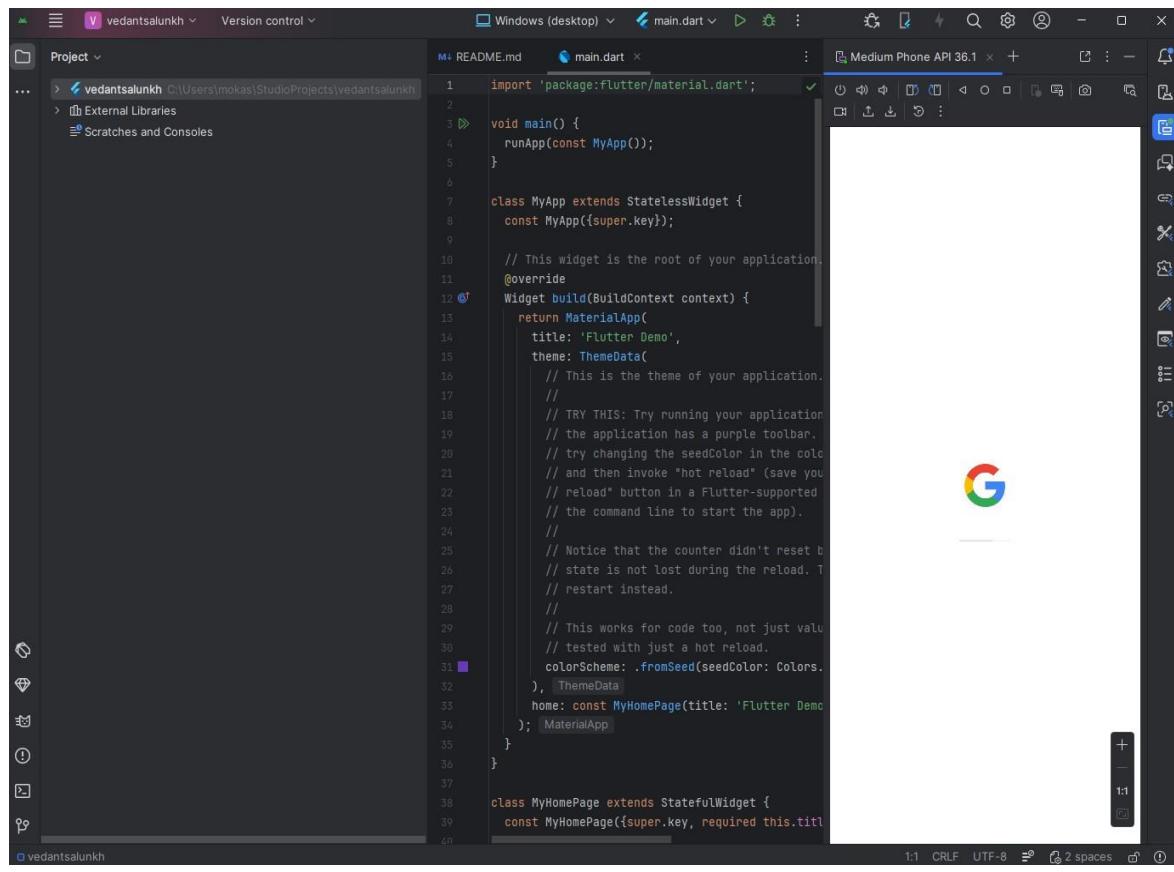
STEP 7: Create a project



STEP 8: Create a virtual device



STEP 9: Medium phone is downloaded



The screenshot shows the Visual Studio Code interface. On the left, the project structure for 'vedantsalunkh' is visible, containing 'main.dart' and 'README.md'. The main editor window displays the 'main.dart' code:

```
1 import 'package:flutter/material.dart';
2
3 void main() {
4   runApp(const MyApp());
5 }
6
7 class MyApp extends StatelessWidget {
8   const MyApp({super.key});
9
10 // This widget is the root of your application.
11 @override
12 Widget build(BuildContext context) {
13   return MaterialApp(
14     title: 'Flutter Demo',
15     theme: ThemeData(
16       // This is the theme of your application.
17       //
18       // TRY THIS: Try running your application
19       // the application has a purple toolbar.
20       // try changing the seedColor in the color
21       // and then invoke "hot reload" (save you
22       // reload" button in a Flutter-supported
23       // the command line to start the app).
24       //
25       // Notice that the counter didn't reset b
26       // state is not lost during the reload. T
27       // restart instead.
28       //
29       // This works for code too, not just val
30       // tested with just a hot reload.
31       colorScheme: .fromSeed(seedColor: Colors.
32       ), ThemeData
33       home: const MyHomePage(title: 'Flutter Demo'
34     );
35   }
36 }
37
38 class MyHomePage extends StatefulWidget {
39   const MyHomePage({super.key, required this.title});
40 }
```

To the right of the editor is a preview window titled 'Medium Phone API 36.1'. It displays a white screen with a small, colorful 'G' logo in the center, representing the Google search bar.

Conclusion:

Flutter is an open-source UI framework developed by Google for cross-platform app development. It allows developers to build high-performance applications using a single codebase. Flutter provides rich widgets and fast development through Hot Reload. It supports Android, iOS, web, and desktop platforms.