

EXPERIMENT NO 1

Aim: To install and configure flutter environment

Theory:

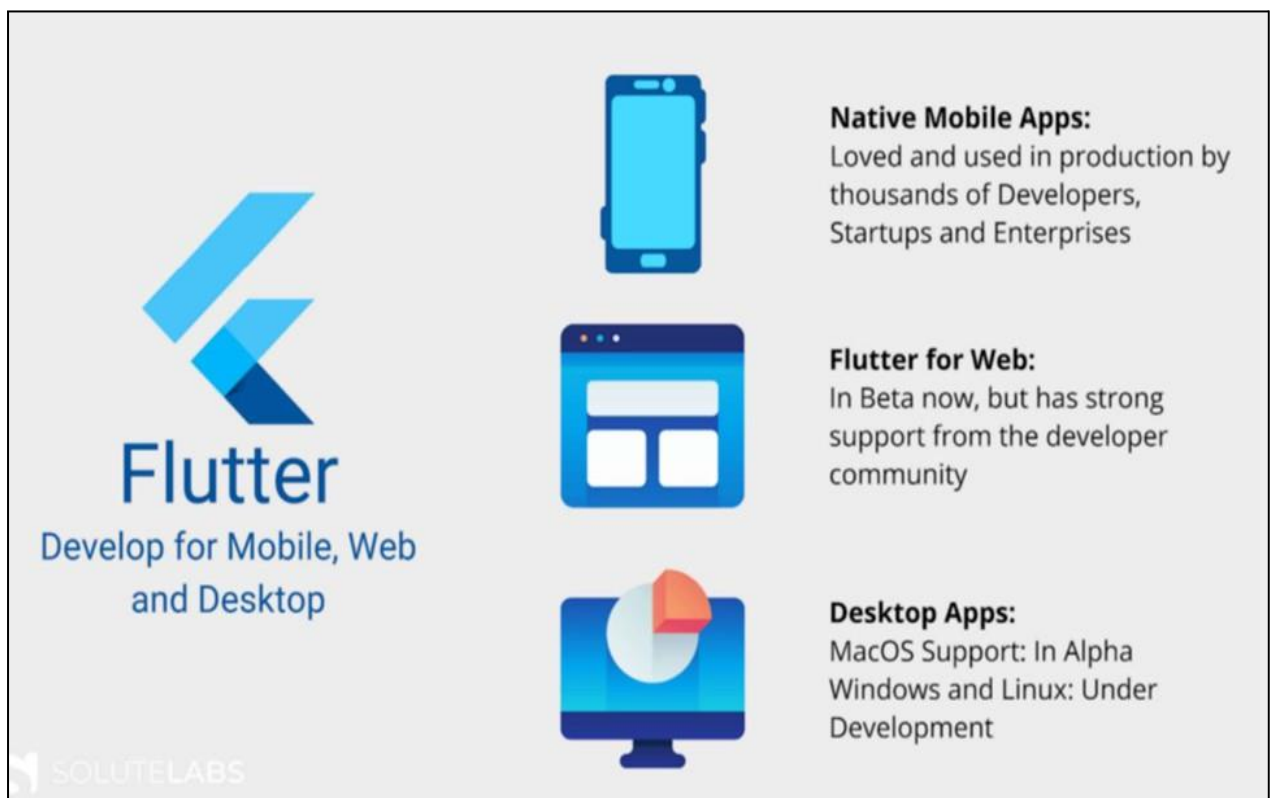
Flutter is an open-source UI framework developed by Google used to build cross-platform applications from a single codebase.

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



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.

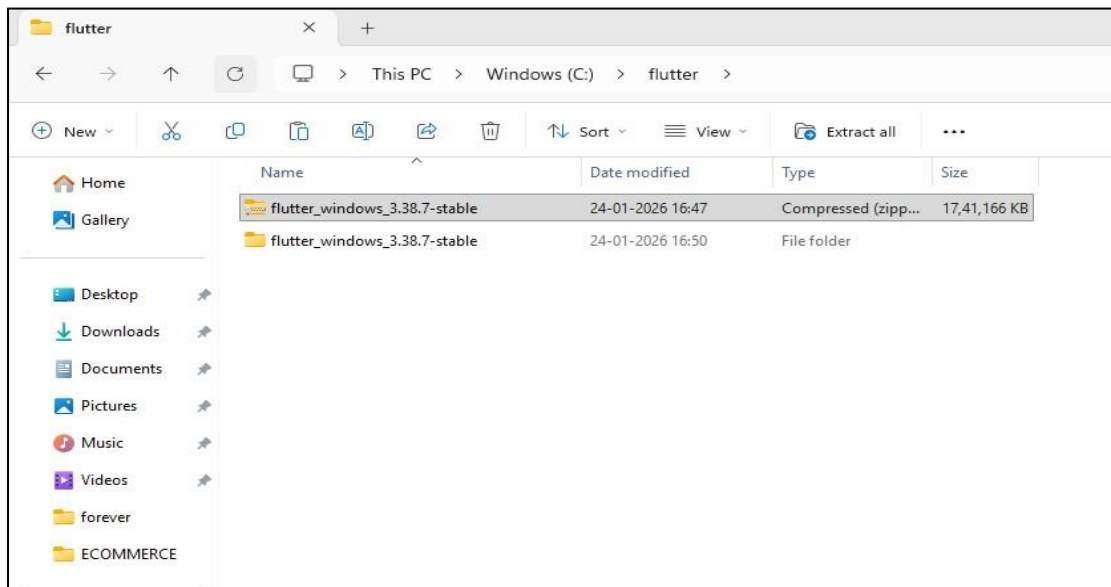
Disadvantages of Flutter

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:

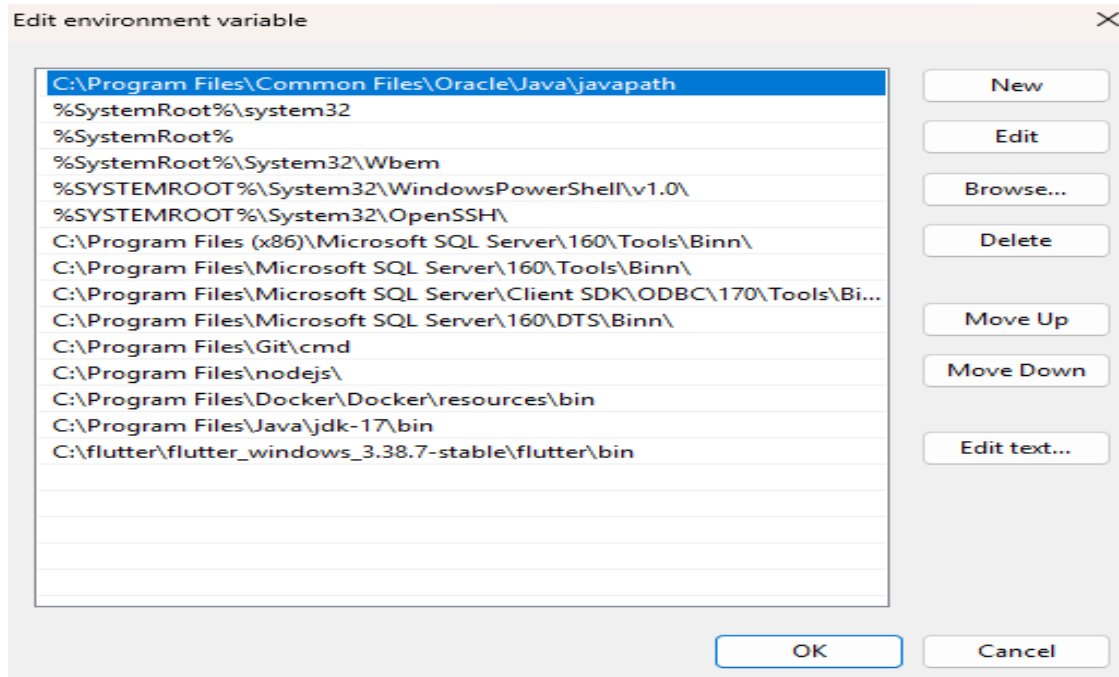
STEP 1: Download Flutter SDK

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

```

Microsoft Windows [Version 10.0.26100.7623]
(c) Microsoft Corporation. All rights reserved.

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)
[X] Android toolchain - develop for Android devices
    X 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
[X] Visual Studio - develop Windows apps
    X 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

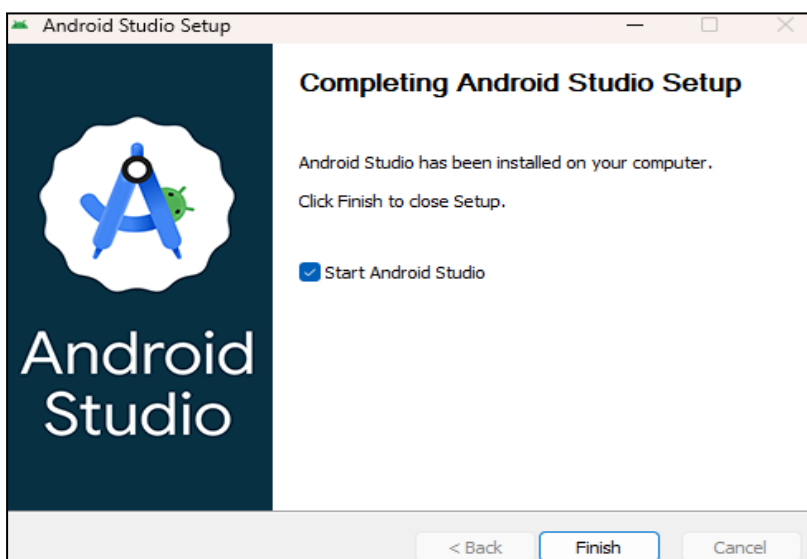
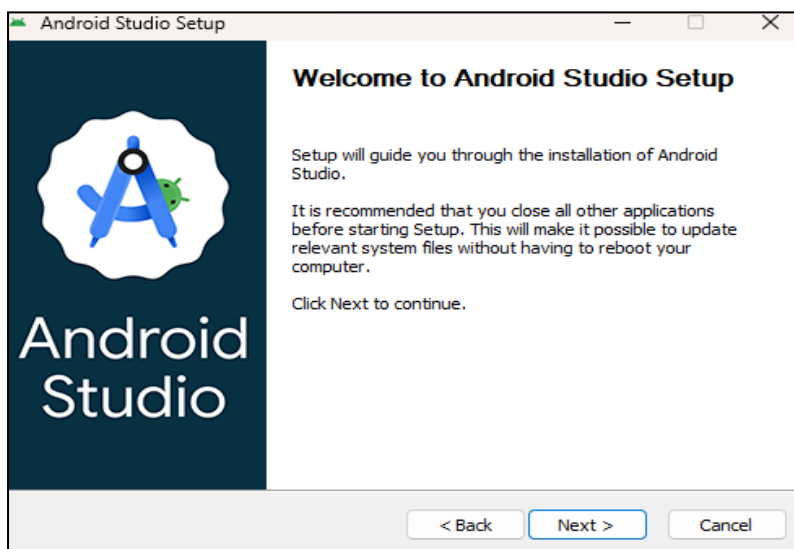
! Doctor found issues in 2 categories.

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

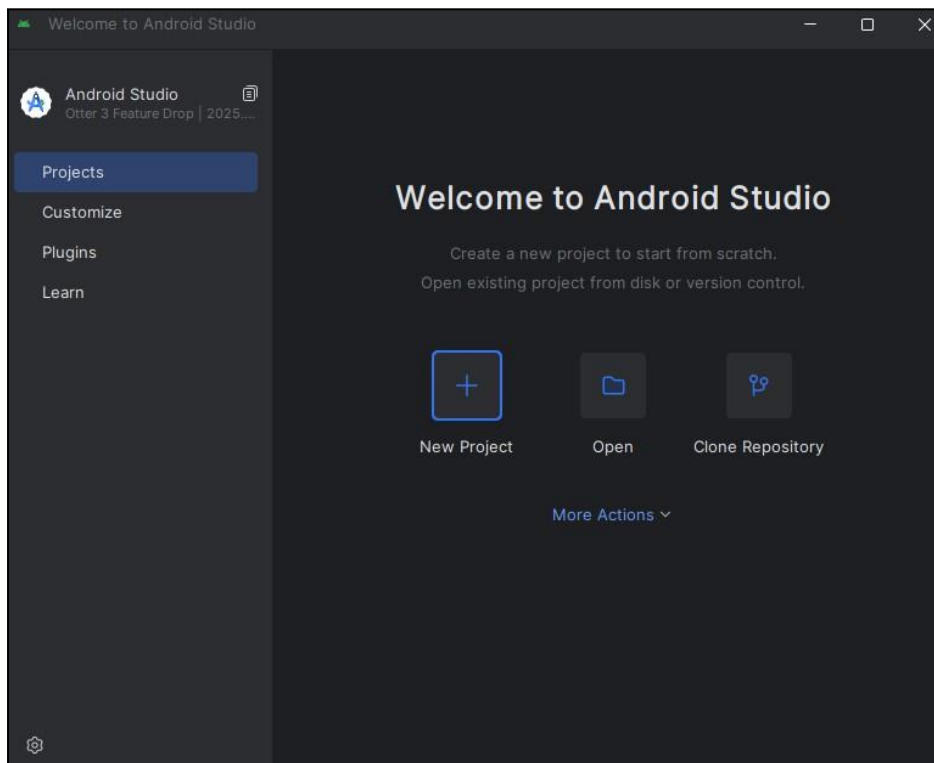


STEP 5: Set Up Android Emulator

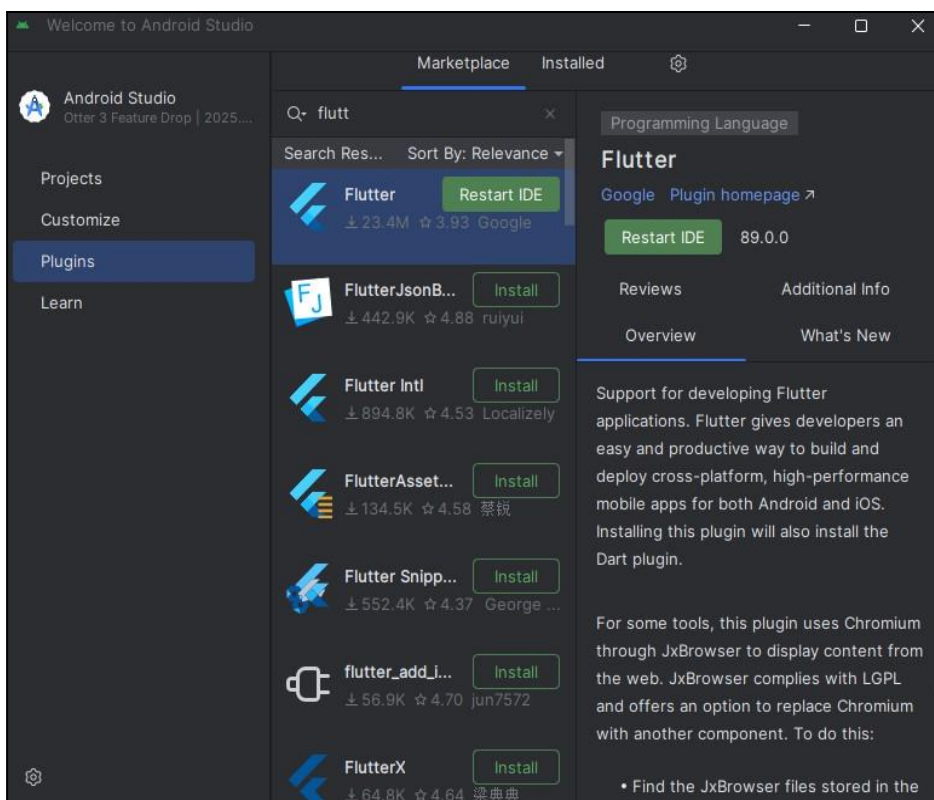
1. Open Android Studio
2. Go to Device Manager

3. Create a Virtual Device

4. Start the emulator



STEP 6: Plugins



STEP 7: Create a project

New Project

Project name:

Project location: ...

Description:

Project type:

Organization:

Android language: ☐ Java ☒ Kotlin

Platforms: ☒ Android ☒ iOS ☒ Linux ☒ MacOS ☒ Web ☒ Windows

When created, the new project will run on the selected platforms (others can be added later).

☐ Create project offline

> More Settings

Previous Create Cancel

STEP 8: Create a virtual device

Add Device

Form Factor

- ☒ Phone
- ☐ Tablet
- ☐ Wear OS
- ☐ Desktop
- ☐ TV
- ☐ Automotive
- ☐ XR

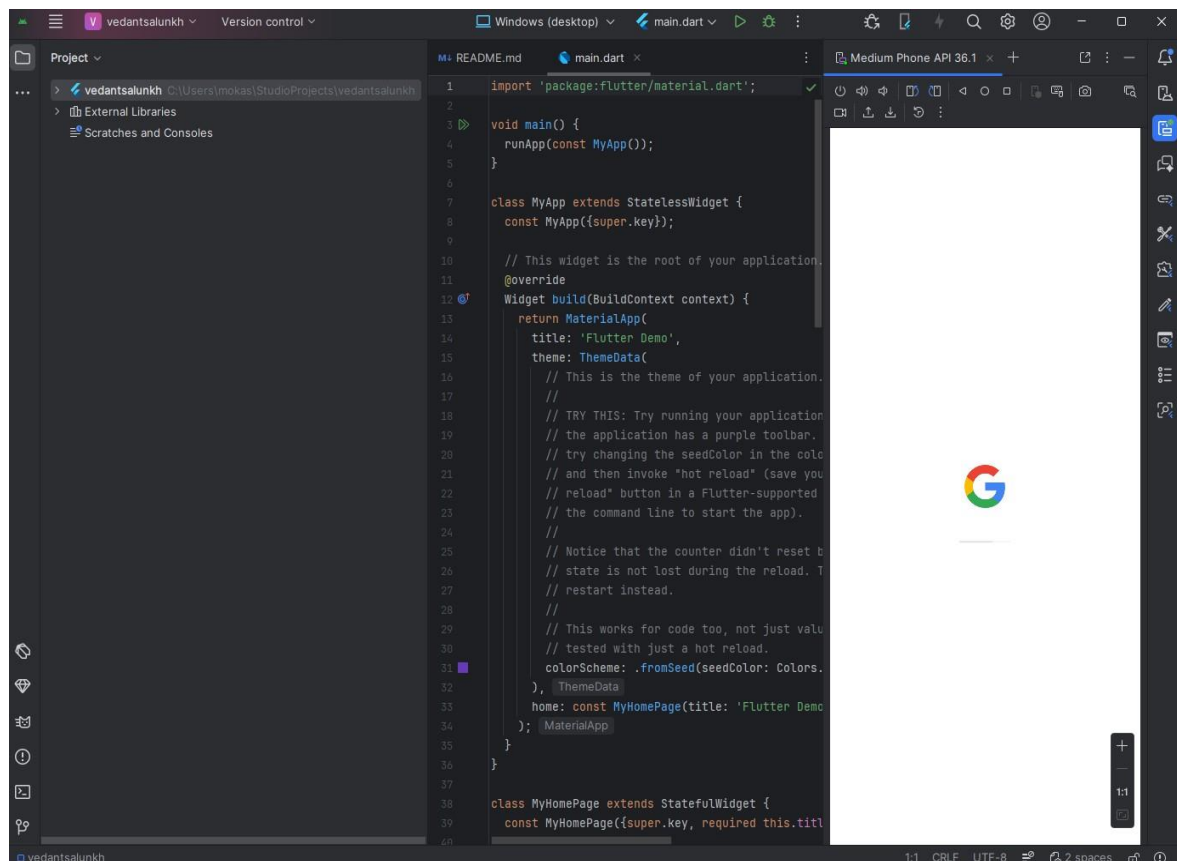
☐ Show obsolete device profiles

Search for a device by name

Name	Play	API	Width	Height	Density
Small Phone	▶	24+	720	1280	320 dpi
Medium Phone	▶	24+	1080	2400	420 dpi
Resizable (Experimental)		34+	1080	2400	420 dpi
Pixel 9a	▶	35+	1080	2424	420 dpi
Pixel 9 Pro XL	▶	35+	1344	2992	480 dpi
Pixel 9 Pro Fold	▶	35+	2076	2152	390 dpi
Pixel 9 Pro	▶	35+	1280	2856	480 dpi
Pixel 9	▶	35+	1080	2424	420 dpi
Pixel 8a	▶	34+	1080	2400	420 dpi
Pixel 8 Pro	▶	34+	1344	2992	480 dpi
Pixel 8	▶	34+	1080	2400	420 dpi
Pixel Fold	▶	34+	2208	1840	420 dpi
Pixel 7a	▶	34+	1080	2400	420 dpi
Pixel 7 Pro	▶	33+	1440	3120	560 dpi
Pixel 7	▶	33+	1080	2400	420 dpi
Pixel 6a	▶	33+	1080	2400	420 dpi
Pixel 6 Pro	▶	31+	1440	3120	560 dpi
Pixel 6	▶	31+	1080	2400	420 dpi
Pixel 5	▶	30+	1080	2340	440 dpi
Pixel 4a	▶	30+	1080	2340	440 dpi
Pixel 4 XL	▶	29+	1440	3040	560 dpi
Pixel 4	▶	29+	1080	2280	440 dpi

New hardware profile... Import hardware profile... Cancel Previous Next Finish

STEP 9: Medium phone is downloaded



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.