

Experiment 1

Aim: Installation and Configuration of Flutter Environment.

Theory: Flutter, Google's open-source UI toolkit, is built around the concept of widgets, treating everything from individual UI components to entire screens as widgets. Widgets can be stateless, remaining immutable, or stateful, allowing dynamic alterations. The strength of Flutter lies in the composition of widgets, promoting a modular and scalable approach for developers to build intricate UIs by combining reusable components. This not only enhances code manageability but also facilitates a more efficient development process.

A standout feature of Flutter is "Hot Reload," allowing developers to witness immediate code changes without restarting the entire application. This real-time feedback significantly reduces development time, fostering an iterative and interactive coding process. Developers can experiment with various UI elements, layouts, and features, particularly beneficial during prototyping and debugging phases.

Flutter's commitment to cross-platform consistency is evident in its design libraries, implementing Material Design for Android and Cupertino for iOS. This ensures a cohesive and native-like user experience, allowing developers to seamlessly implement platform-specific UI elements. Additionally, Flutter provides a flexible layout system with constraints, enabling the creation of responsive and adaptive interfaces across diverse screen sizes and orientations.

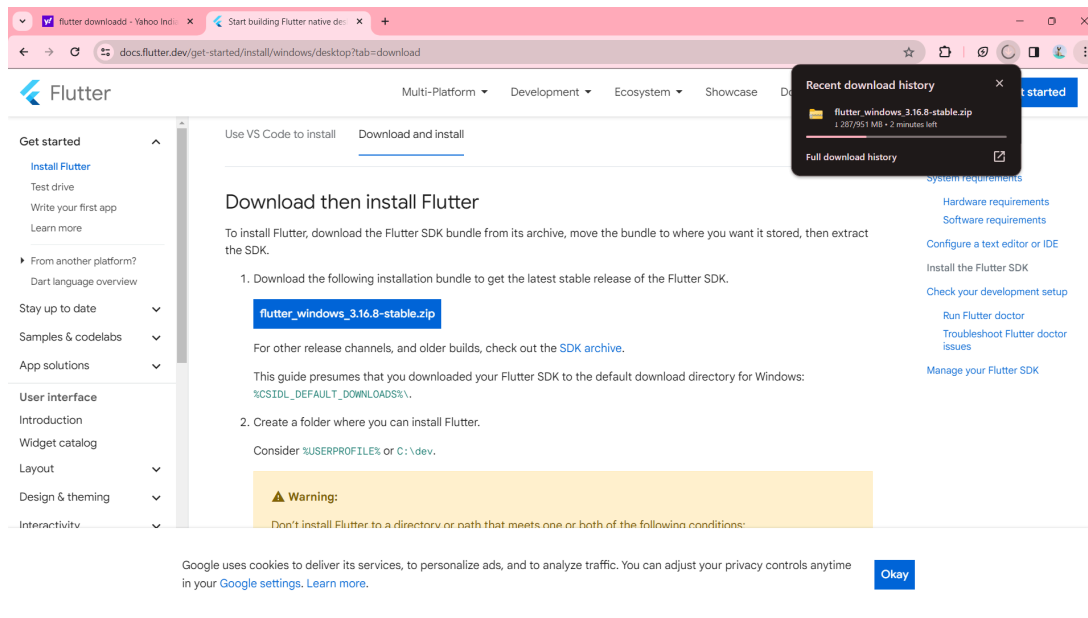
The framework also addresses state management through its widget tree, distinguishing between stateless and stateful widgets. Various state management approaches, such as `setState`, Provider, Bloc, Riverpod, and

MobX, offer developers flexibility based on the application's complexity. Flutter's animation framework further enhances the user experience, providing tools for creating visually appealing and smooth interfaces.

Install the Flutter SDK

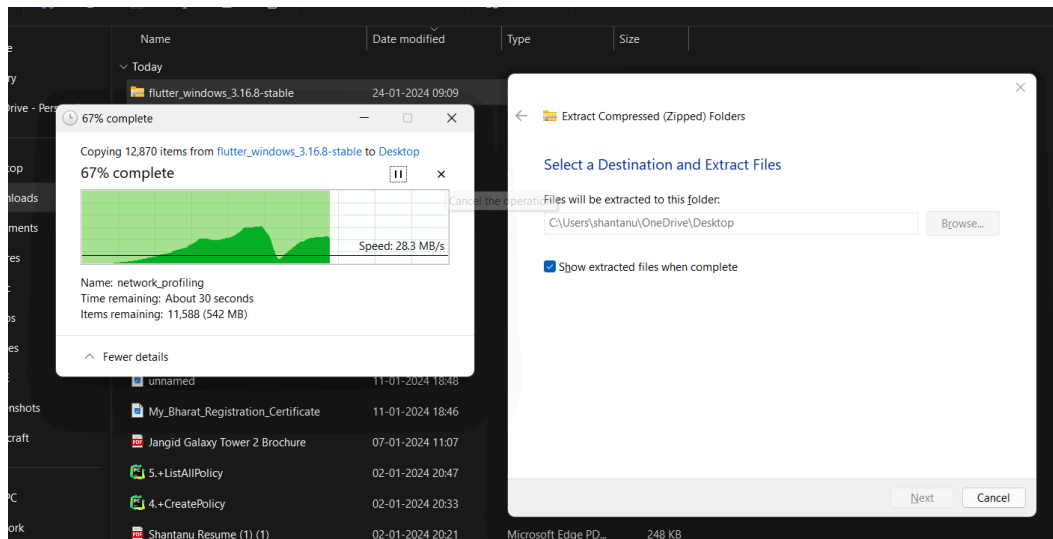
Step 1: Download the installation bundle of the Flutter Software Development Kit for windows.

To download Flutter SDK, Go to its official website <https://docs.flutter.dev/get-started/install> , you will get the following screen.



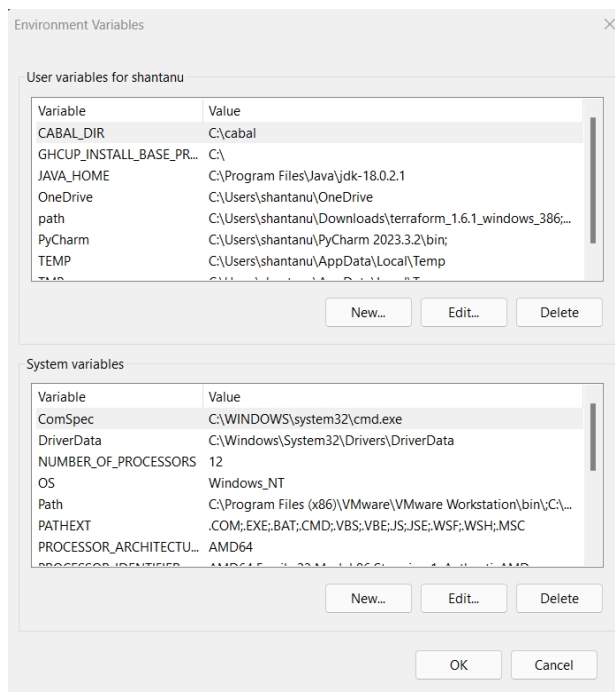
Step 2: Next, to download the latest Flutter SDK, click on the Windows icon. Here, you will find the download link for SDK.

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

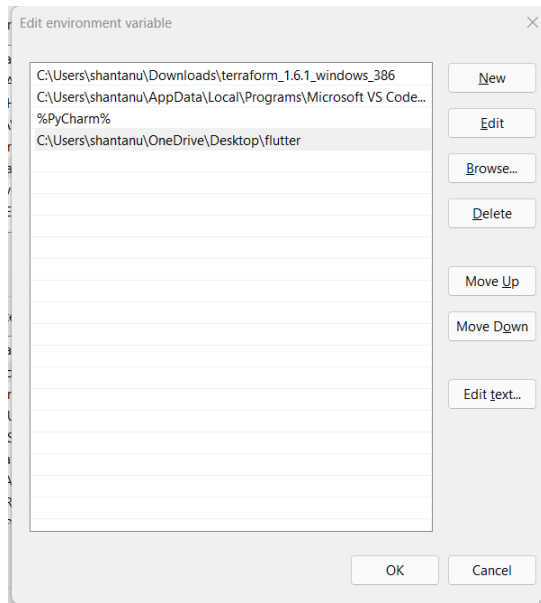


Step 4: To run the Flutter command in regular windows console, you need to update the system path to include the flutter bin directory. The following steps are required to do this:

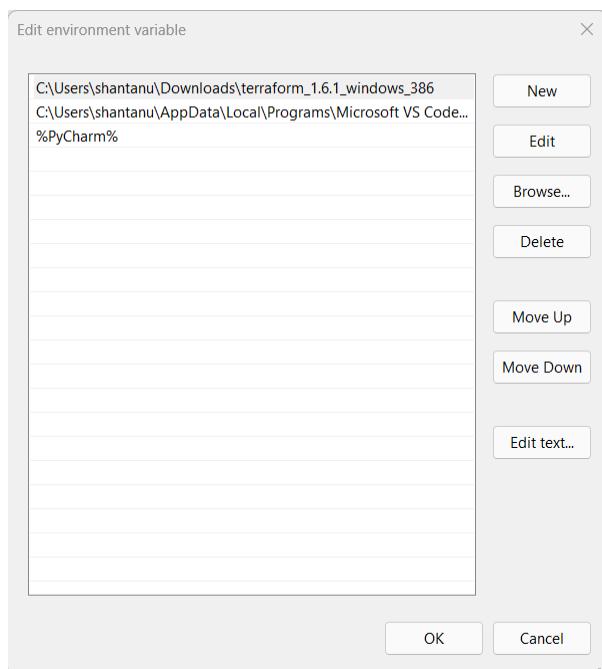
Step 4.1: Go to MyComputer properties -> advanced tab -> environment variables. You will get the following screen.



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

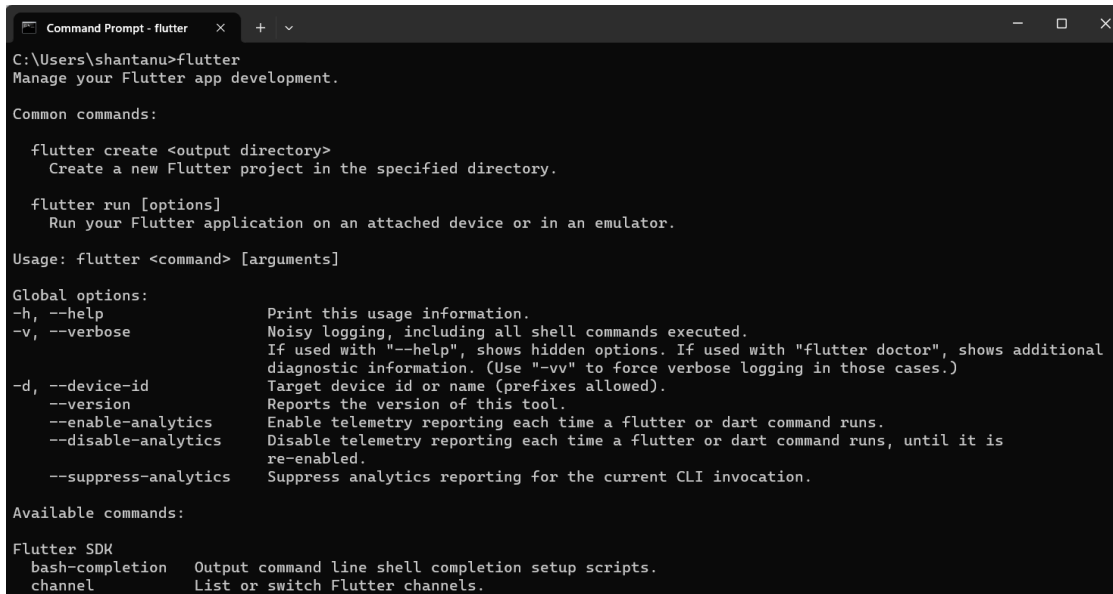


Step 4.3: In the above window, click on New->write path of Flutter bin folder in variable value -
> ok -> ok -> ok.



Step 5: Now, run the \$ flutter command in command prompt.

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 your Flutter installation.



```
Command Prompt - flutter
C:\Users\shantanu>flutter
Manage your Flutter app development.

Common commands:

  flutter create <output directory>
    Create a new Flutter project in the specified directory.

  flutter run [options]
    Run your Flutter application on an attached device or in an emulator.

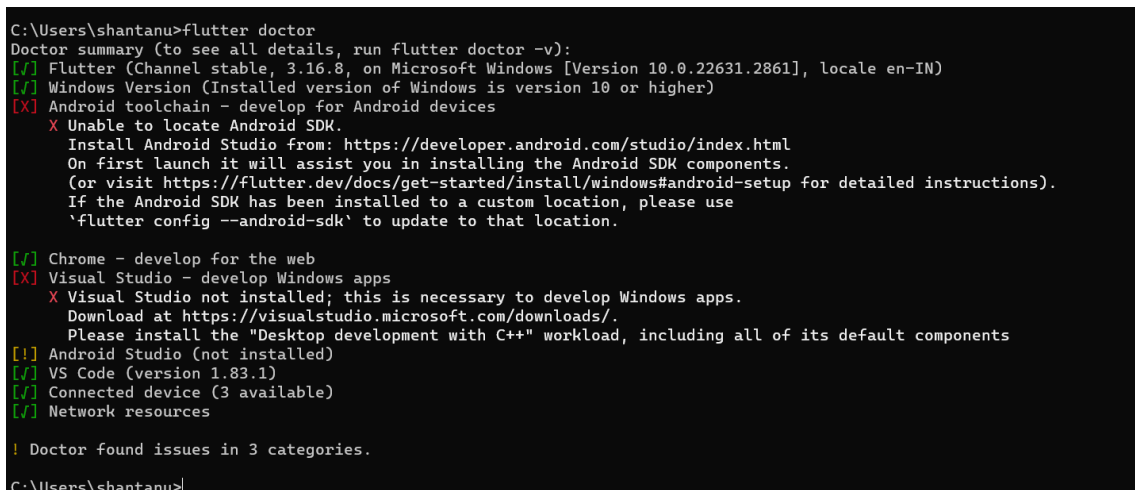
Usage: flutter <command> [arguments]

Global options:
-h, --help           Print this usage information.
-v, --verbose        Noisy logging, including all shell commands executed.
                     If used with "--help", shows hidden options. If used with "flutter doctor", shows additional
                     diagnostic information. (Use "-vv" to force verbose logging in those cases.)
-d, --device-id      Target device id or name (prefixes allowed).
--version            Reports the version of this tool.
--enable-analytics   Enable telemetry reporting each time a flutter or dart command runs.
--disable-analytics Disable telemetry reporting each time a flutter or dart command runs, until it is
                     re-enabled.
--suppress-analytics Suppress analytics reporting for the current CLI invocation.

Available commands:

Flutter SDK
bash-completion  Output command line shell completion setup scripts.
channel          List or switch Flutter channels.
```

Step 6: When you run the above command, it will analyze the system and show its report, as shown in the below image. Here, you will find the details of all missing tools, which required to run Flutter as well as the development tools that are available but not connected with the device.



```
C:\Users\shantanu>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 3.16.8, on Microsoft Windows [Version 10.0.22631.2861], locale en-IN)
[✓] Windows Version (Installed version of Windows is version 10 or higher)
[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/docs/get-started/install/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.

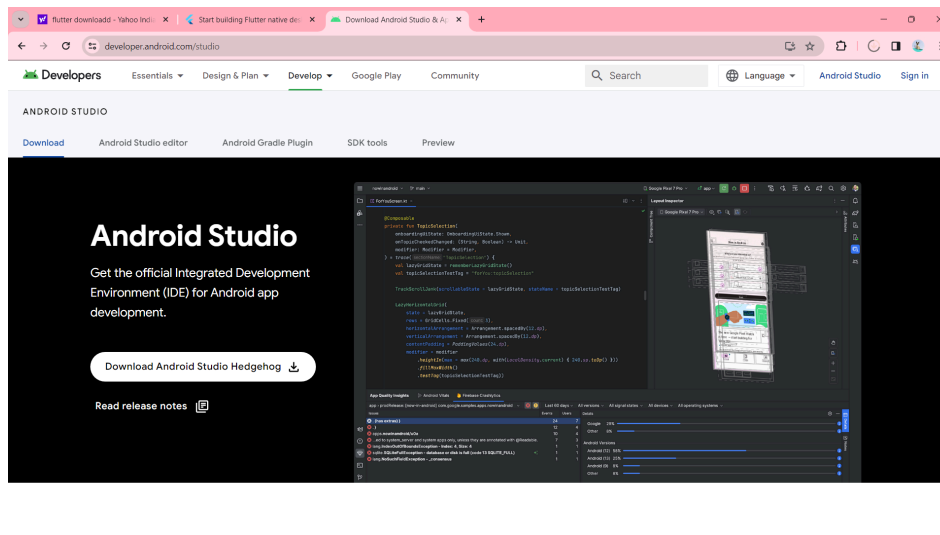
[✓] Chrome - develop for the web
[X] Visual Studio - develop Windows apps
    X Visual Studio not installed; this is necessary to develop Windows apps.
      Download at https://visualstudio.microsoft.com/downloads/.
      Please install the "Desktop development with C++" workload, including all of its default components
[!] Android Studio (not installed)
[✓] VS Code (version 1.83.1)
[✓] Connected device (3 available)
[✓] Network resources

! Doctor found issues in 3 categories.

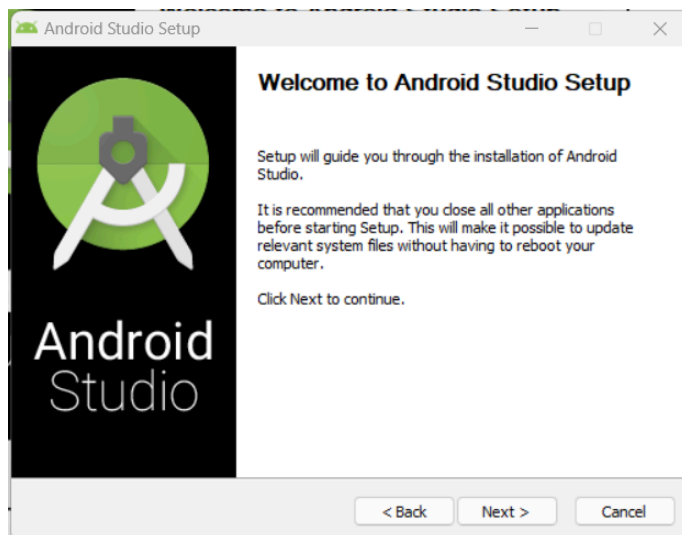
C:\Users\shantanu>
```

Step 7: Install the Android SDK. If the flutter doctor command does not find the Android SDK tool in your system, then you need first to install the Android Studio IDE. To install Android Studio IDE, do the following steps.

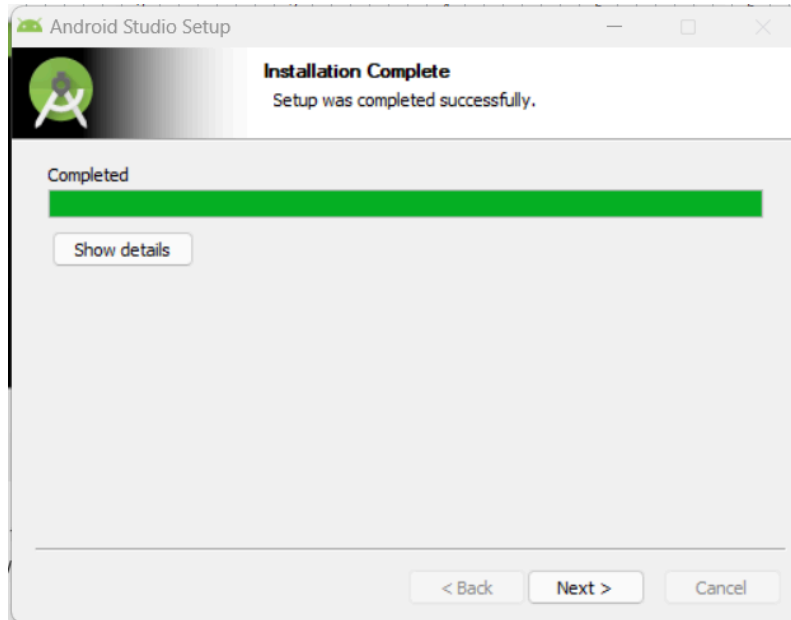
Step 7.1: Download the latest Android Studio executable or zip file from the official site.



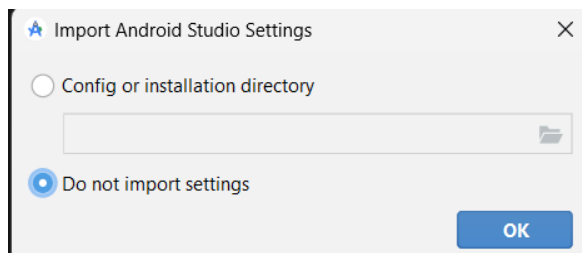
Step 7.2: When the download is complete, open the .exe file and run it. You will get the following dialog box.



Step 7.3: Follow the steps of the installation wizard. Once the installation wizard completes, you will get the following screen.



Step 7.4: In the above screen, click Next-> Finish. Once the Finish button is clicked, you need to choose the 'Don't import Settings option' and click OK. It will start the Android Studio.



Step 7.5: run the \$ flutter doctor command and Run flutter doctor --android-licenses command.

```
Command Prompt - flutter di X + v
C:\Users\shantanu>flutter doctor --android-licenses
[=====] 100% Computing updates...
5 of 7 SDK package licenses not accepted.
Review licenses that have not been accepted (y/N)? y

1/5: License android-googletv-license:
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Terms and Conditions

This is the Google TV Add-on for the Android Software Development Kit License Agreement.

1. Introduction

1.1 The Google TV Add-on for the Android Software Development Kit (referred to in this License Agreement as the "Google TV Add-on" and specifically including the Android system files, packaged APIs, and Google APIs add-ons) is licensed to you subject to the terms of this License Agreement. This License Agreement forms a legally binding contract between you and Google in relation to your use of the Google TV Add-on.

1.2 "Google" means Google Inc., a Delaware corporation with principal place of business at 1600 Amphitheatre Parkway, Mountain View, CA 94043, United States.

2. Accepting this License Agreement

2.1 In order to use the Google TV Add-on, you must first agree to this License Agreement. You may not use the Google TV Add-on if you do not accept this License Agreement.

2.2 You can accept this License Agreement by:

(A) clicking to accept or agree to this License Agreement, where this option is made available to you; or
```

```
Command Prompt - flutter di X + v

14.7 This License Agreement, and your relationship with Google under this License Agreement, shall be governed by the laws of the State of California without regard to its conflict of laws provisions. You and Google agree to submit to the exclusive jurisdiction of the courts located within the county of Santa Clara, California to resolve any legal matter arising from this License Agreement. Notwithstanding this, you agree that Google shall still be allowed to apply for injunctive remedies (or an equivalent type of urgent legal relief) in any jurisdiction.

November 19, 2013
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Accept? (y/N): y
All SDK package licenses accepted

C:\Users\shantanu>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 3.16.8, on Microsoft Windows [Version 10.0.22631.2861], locale en-IN)
[✓] Windows Version (Installed version of Windows is version 10 or higher)
[✓] Android toolchain - develop for Android devices (Android SDK version 34.0.0)
[✓] 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
[✓] Android Studio (version 2023.1)
[✓] VS Code (version 1.83.1)
[✓] Connected device (3 available)
[✓] Network resources

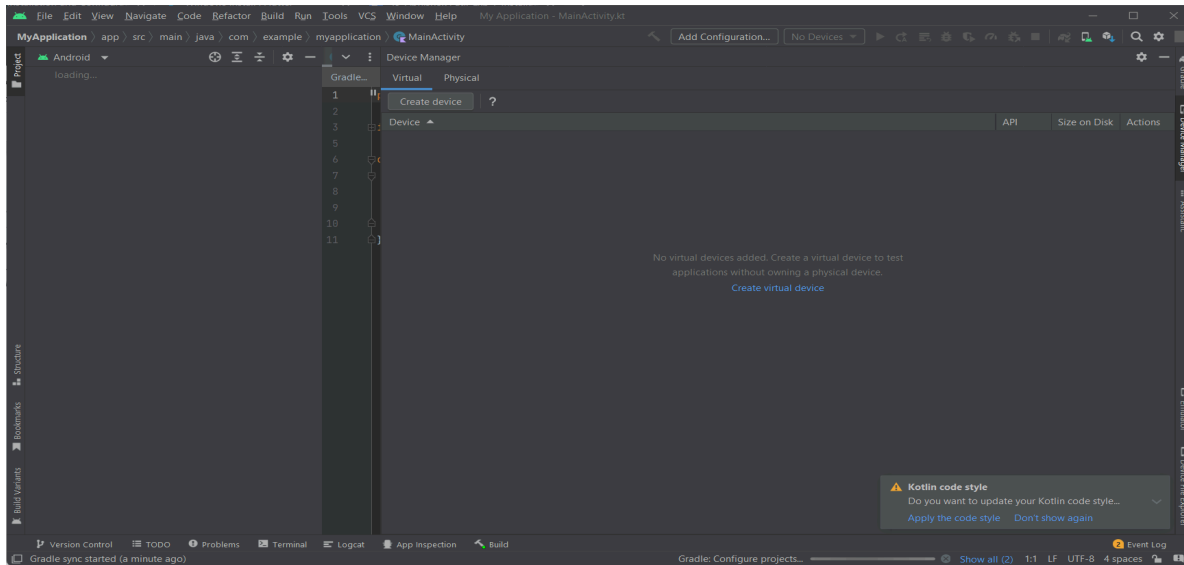
! Doctor found issues in 1 category.

C:\Users\shantanu>
```

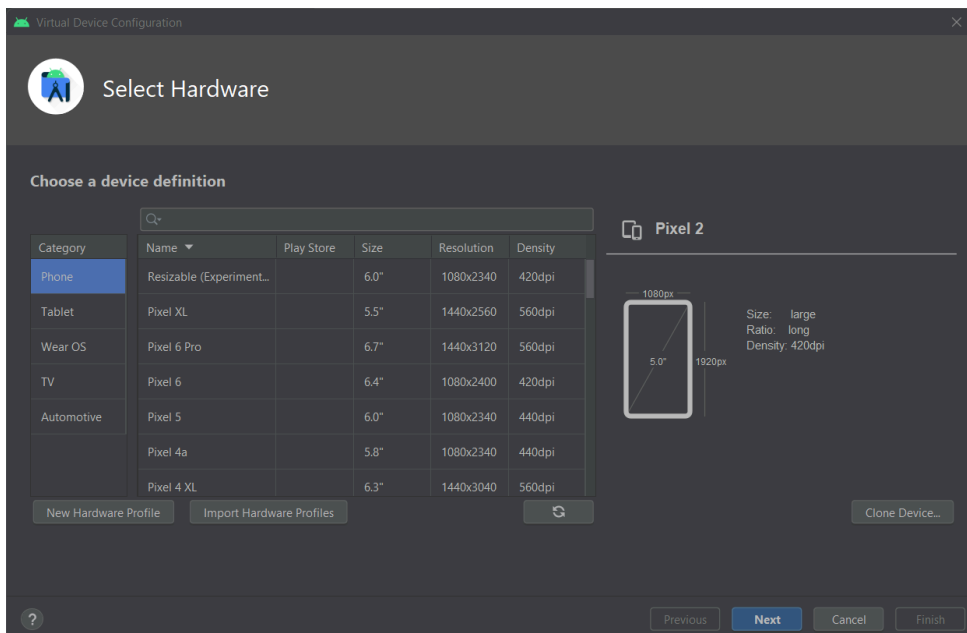
Step 8: Next, you need to set up an Android emulator. It is responsible for running and testing the Flutter application.

Step 8.1: To set an Android emulator, go to Android Studio > Tools > Android > AVD Manager

and select Create Virtual Device. Or, go to Help->Find Action->Type Emulator in the search box. You will get the following screen.

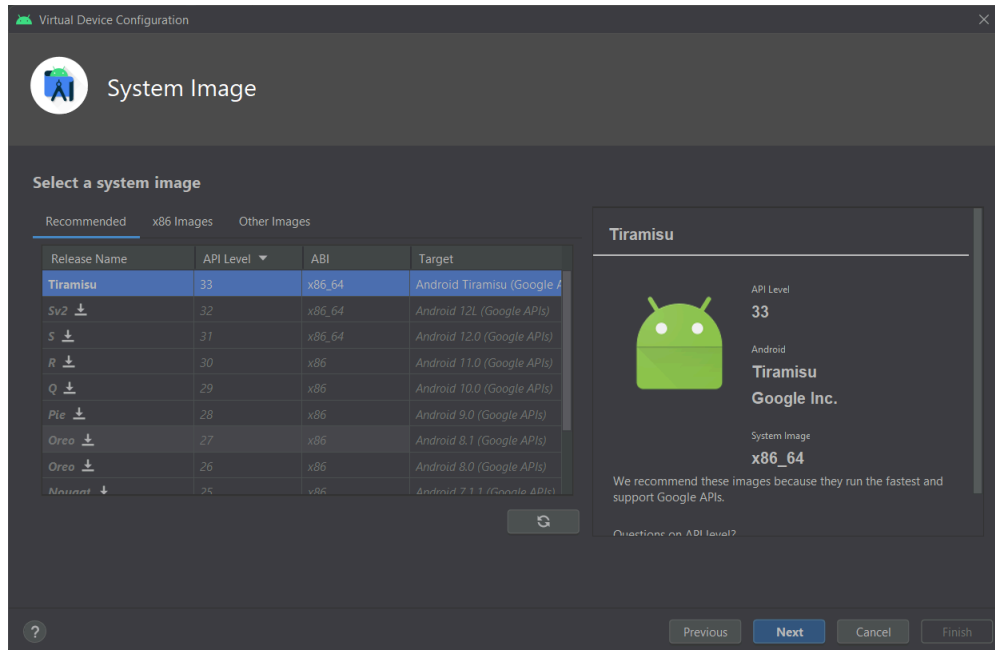


Step 8.2: Choose your device definition and click on Next.

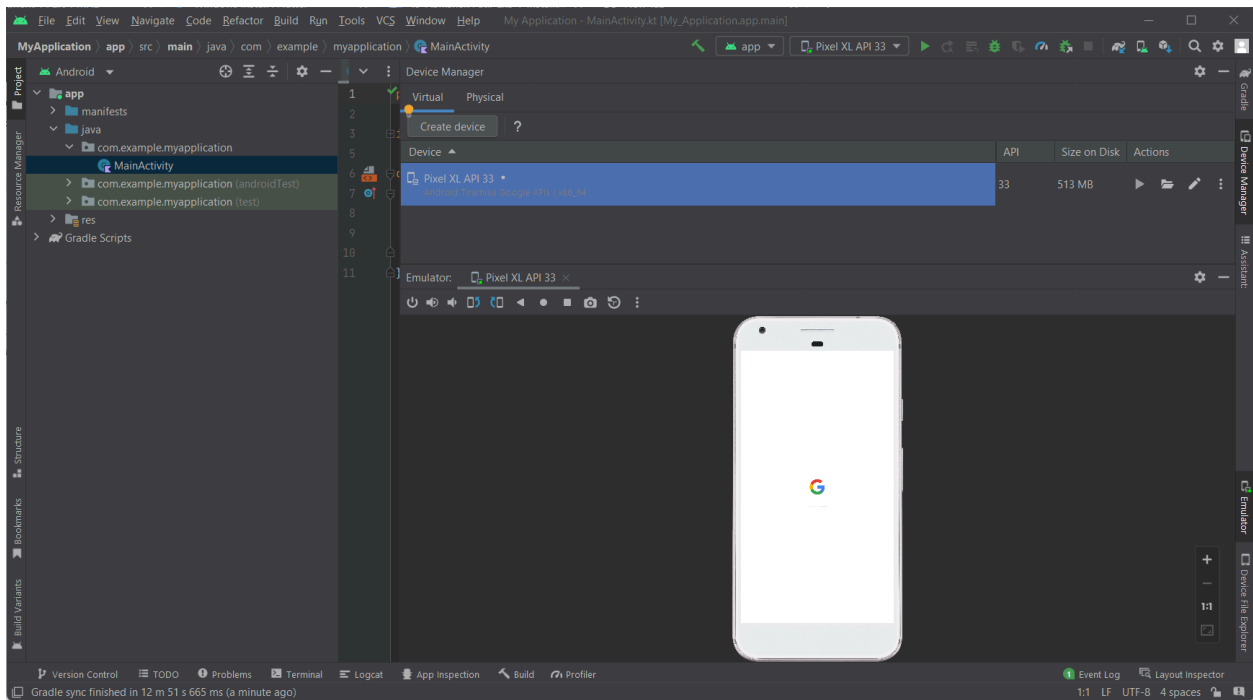


Step 8.3: Select the system image for the latest Android version and click on Next.

Step 8.4: Now, verify the all AVD configuration. If it is correct, click on Finish. The following screen appears.



Step 8.5: Last, click on the icon pointed into the red color rectangle. The Android emulator displayed as below screen.

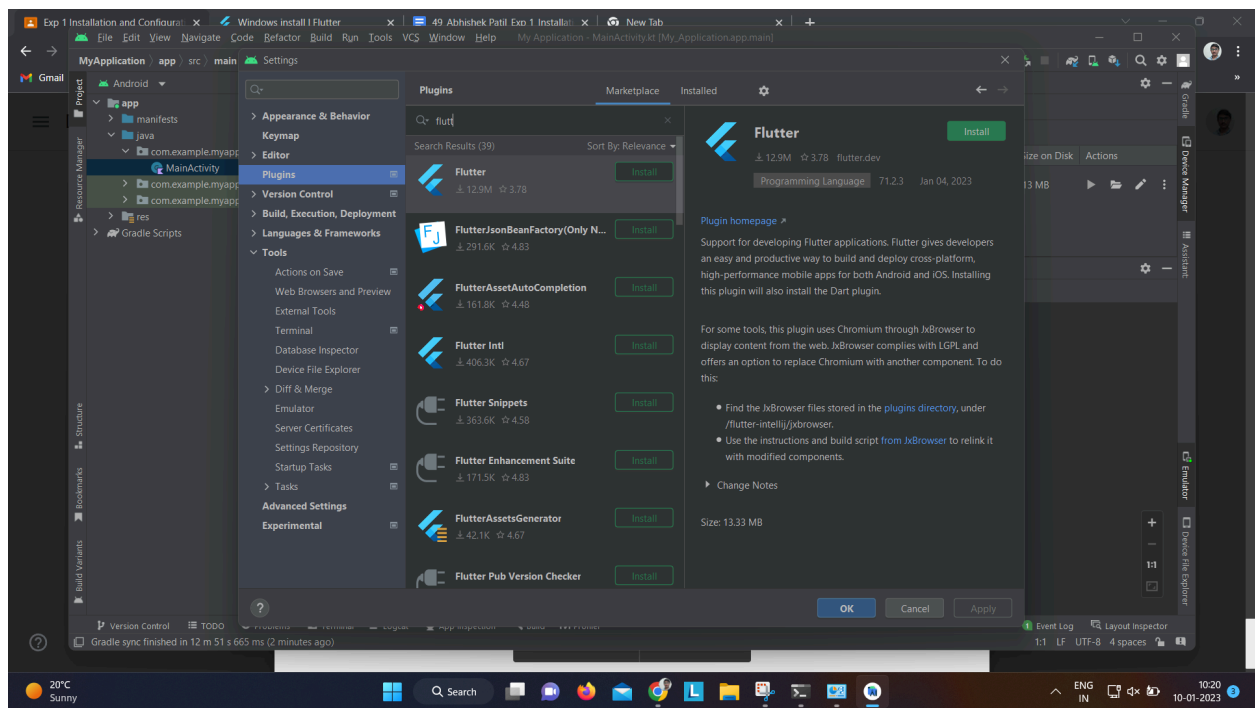


Step 9: Now, install Flutter and Dart plugin for building Flutter application in Android Studio.

These plugins provide a template to create a Flutter application, give an option to run and debug

Flutter application in the Android Studio itself. Do the following steps to install these plugins.

Step 9.1: Open the Android Studio and then go to File->Settings->Plugins.



Step 9.2: Now, search the Flutter plugin. If found, select Flutter plugin and click install. When you click on install, it will ask you to install Dart plugin as below screen. Click yes to proceed.

Step 9.3: Restart the Android Studio.

Conclusion: The experiment delving into the installation and configuration of the Flutter environment illuminates the framework's accessibility and adaptability for cross-platform development.