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.

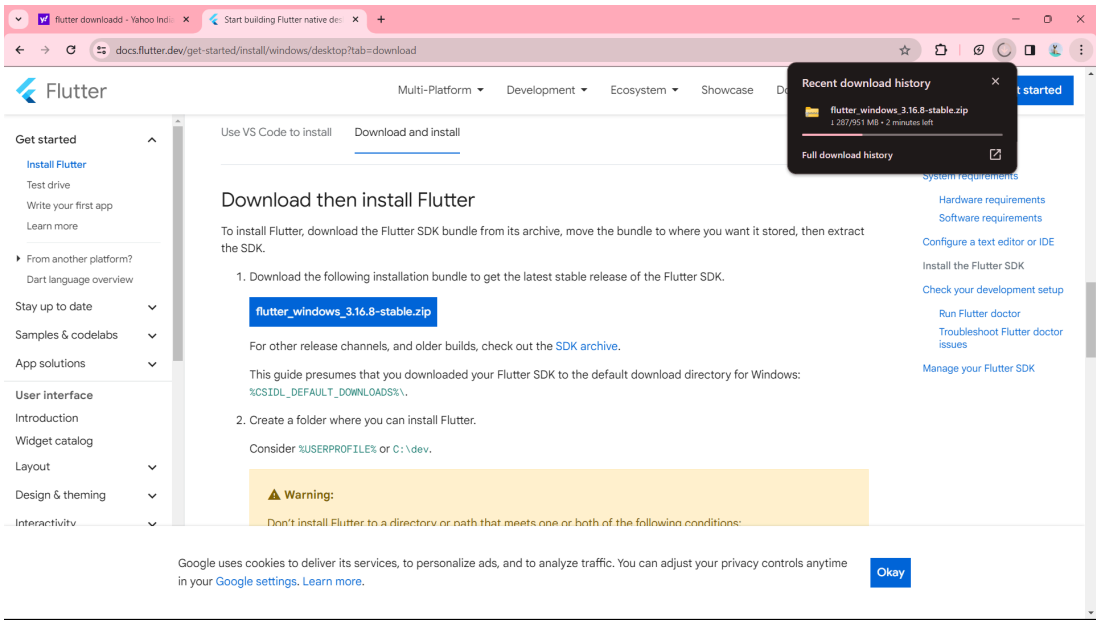
Flutter's commitment to cross-platform consistency is evident in its design libraries, implementing Material Design for Android and Cupertino for iOS. This ensures a cohesive and native-like user experience, allowing developers to seamlessly implement platform-specific UI elements. Additionally, Flutter 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.



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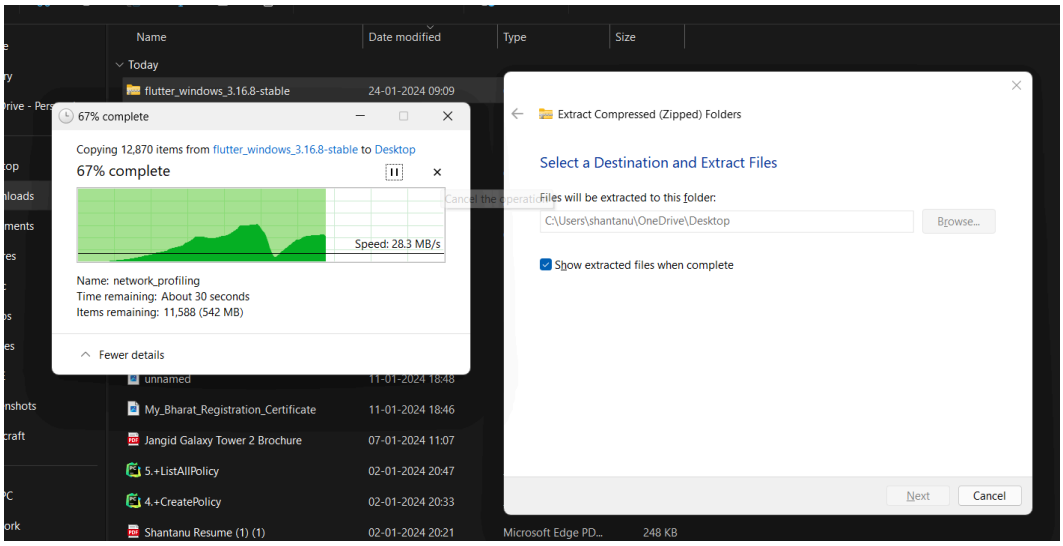
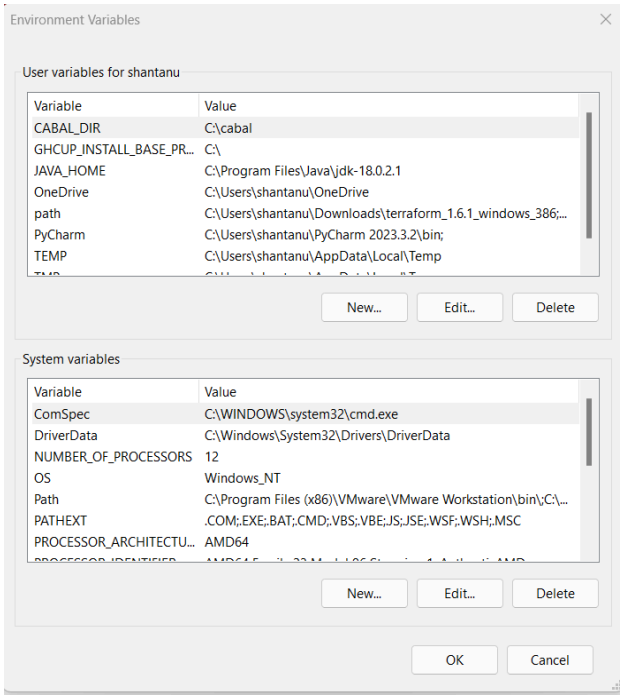
Step 2: Next, to download the latest Flutter SDK, click on the Windows icon. Here, you will
find the download link for SDK.

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.

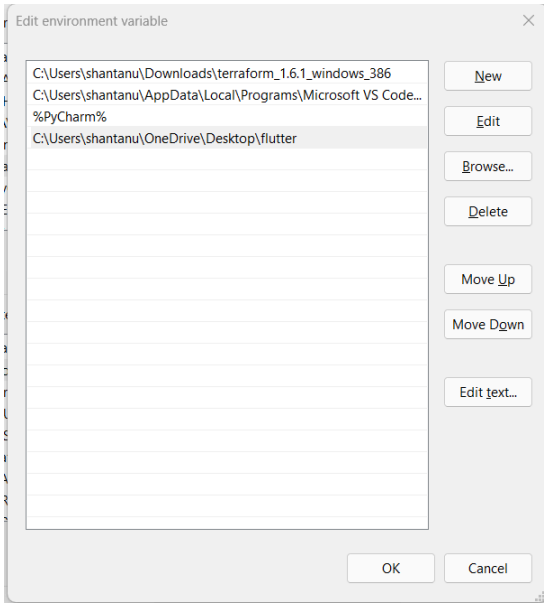


Step 4: To run the Flutter command in regular windows console, you need to update the system
path to include the flutter bin directory. The following steps are required to do this:

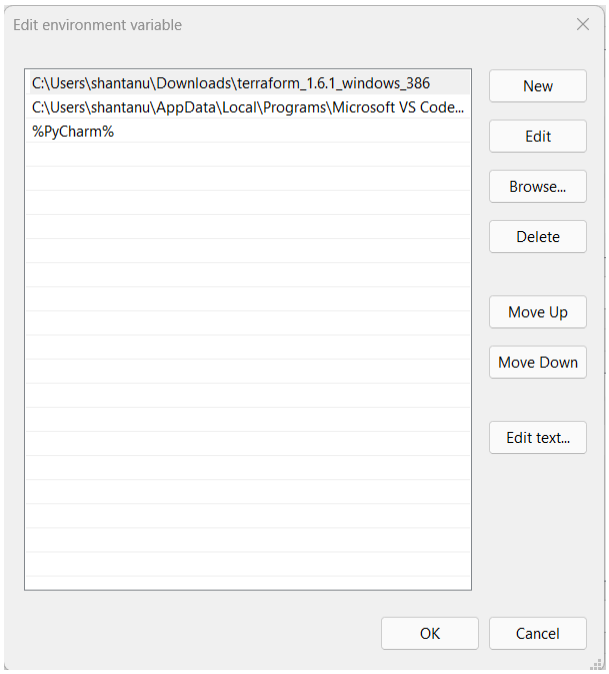
Step 4.1: Go to MyComputer properties -> advanced tab -> environment variables. You will get
the following screen.



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

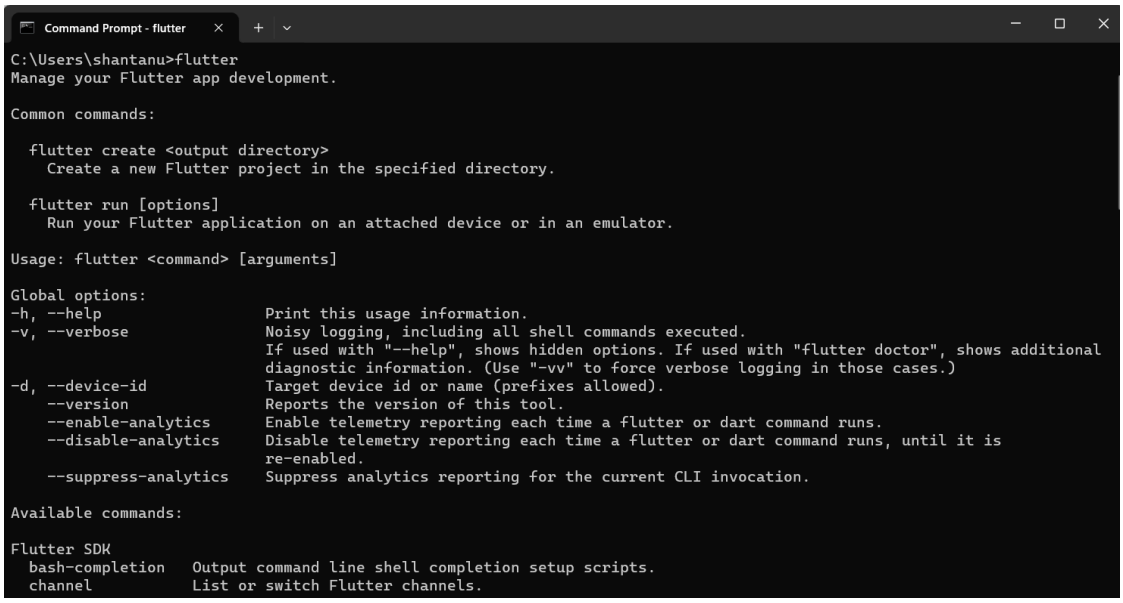


Step 4.3: In the above window, click on New->write path of Flutter bin folder in variable value -
> ok -> ok -> ok.

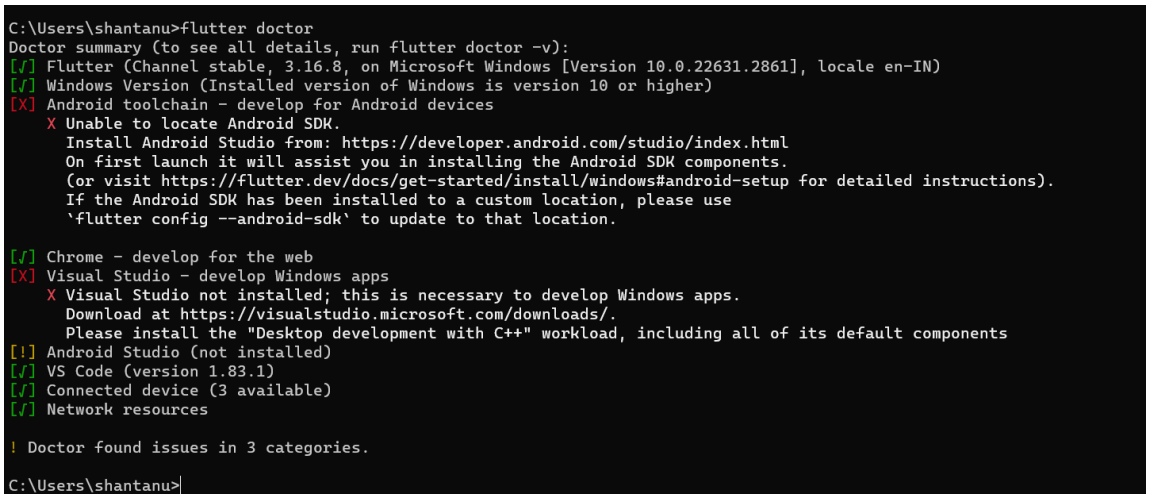


Step 5: Now, run the $ flutter command in command prompt.

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.

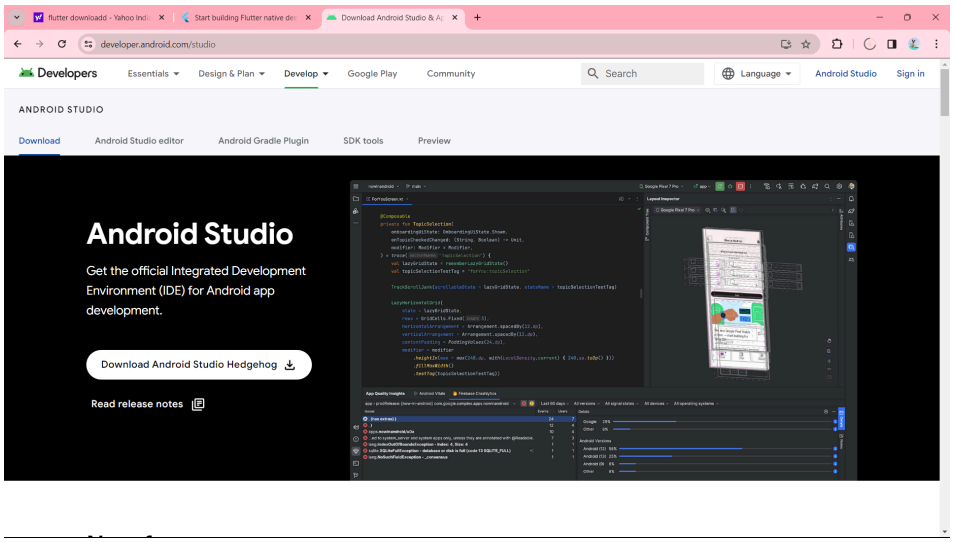


Step 6: When you run the above command, it will analyze the system and show its report, as
shown in the below image. Here, you will find the details of all missing tools, which required to
run Flutter as well as the development tools that are available but not connected with the device.

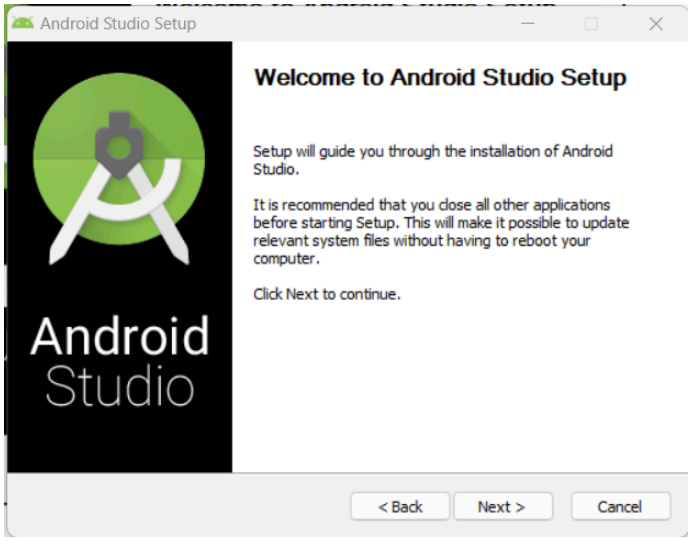


Step 7: Install the Android SDK. If the flutter doctor command does not find the Android SDK
tool in your system, then you need first to install the Android Studio IDE. To install Android
Studio IDE, do the following steps.

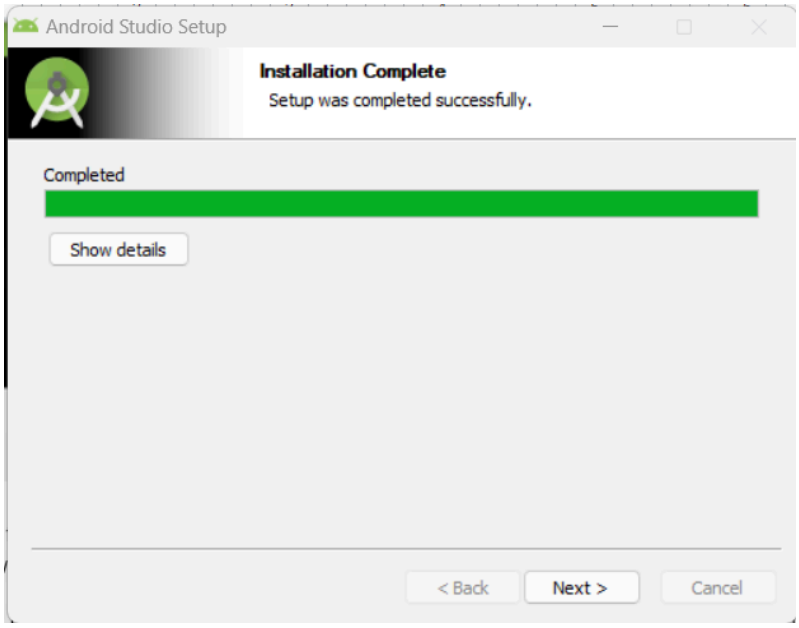
Step 7.1: Download the latest Android Studio executable or zip file from the official site.



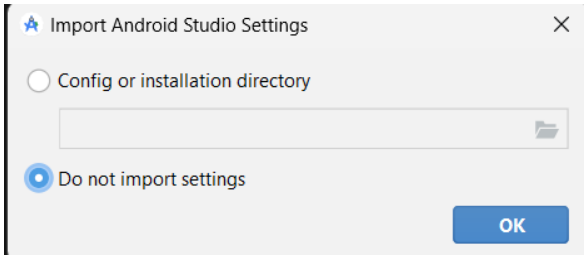
Step 7.2: When the download is complete, open the .exe file and run it. You will get the
following dialog box.



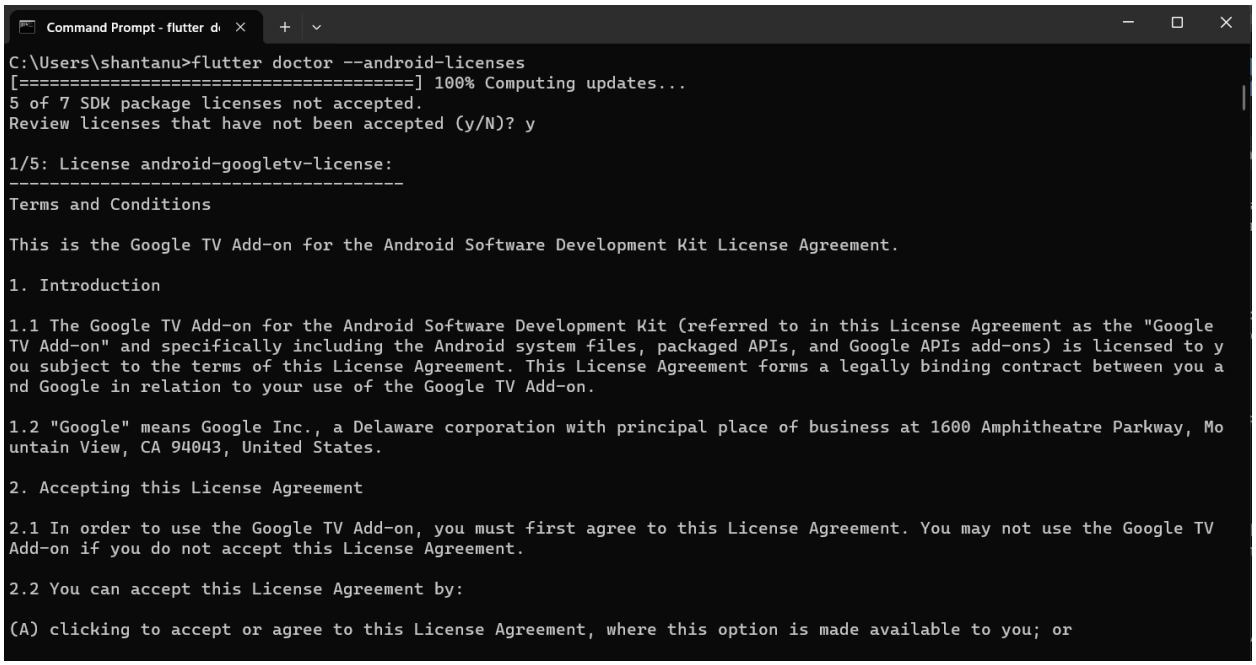
Step 7.3: Follow the steps of the installation wizard. Once the installation wizard completes, you
will get the following screen.

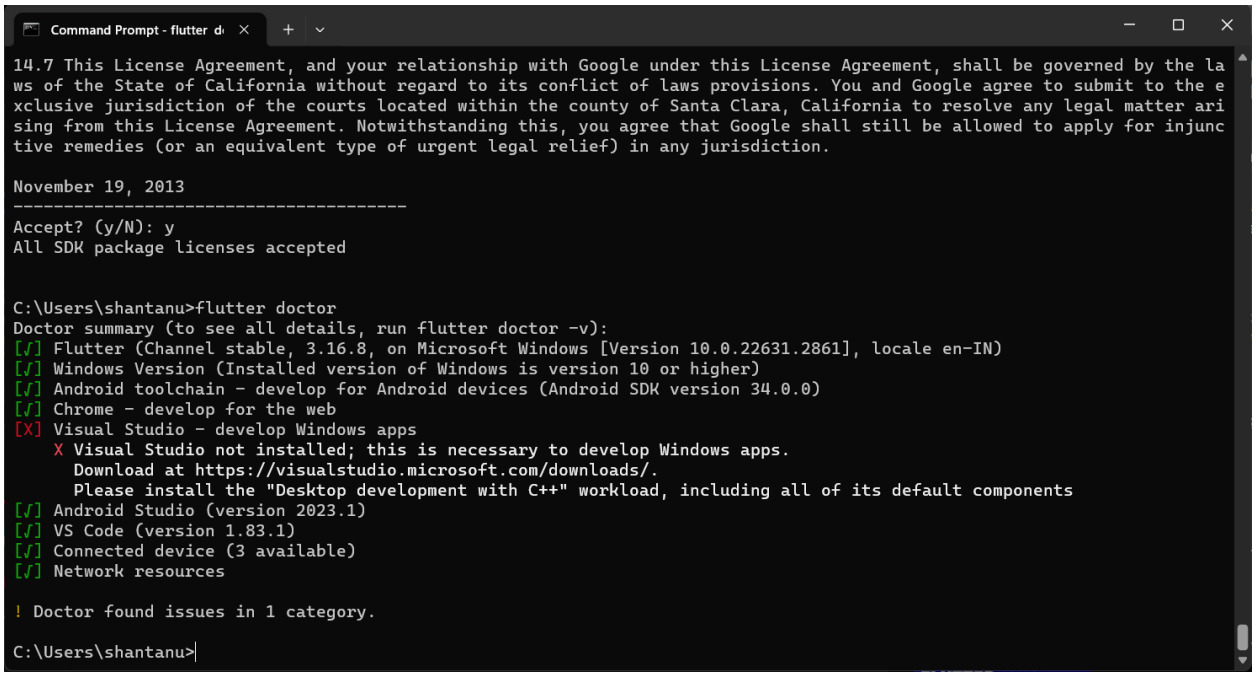


Step 7.4: In the above screen, click Next-> Finish. Once the Finish button is clicked, you need to
choose the 'Don't import Settings option' and click OK. It will start the Android Studio.



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

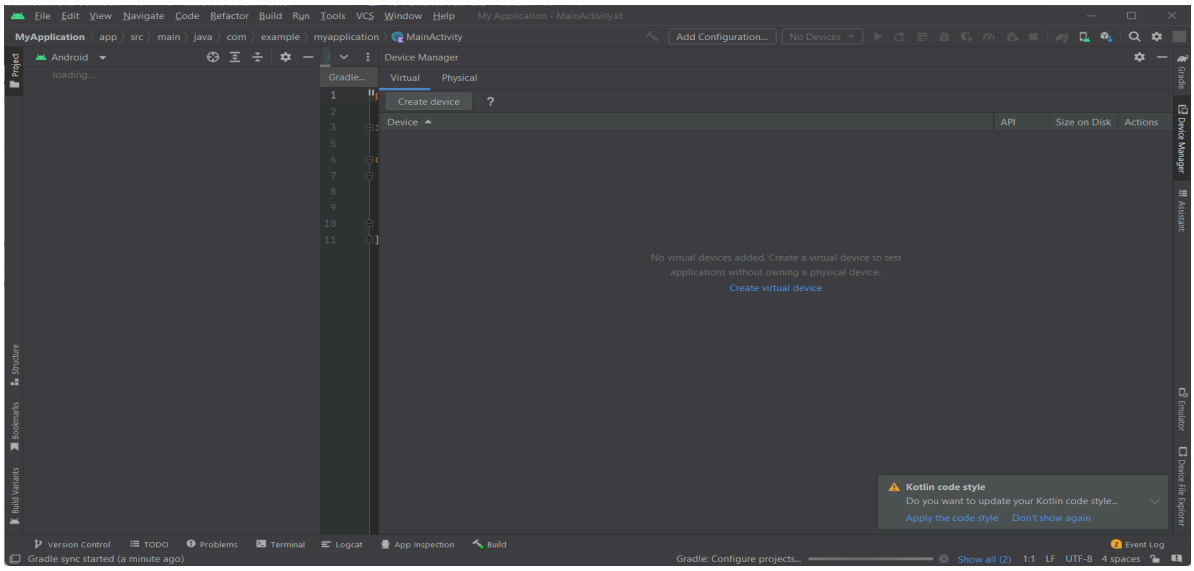




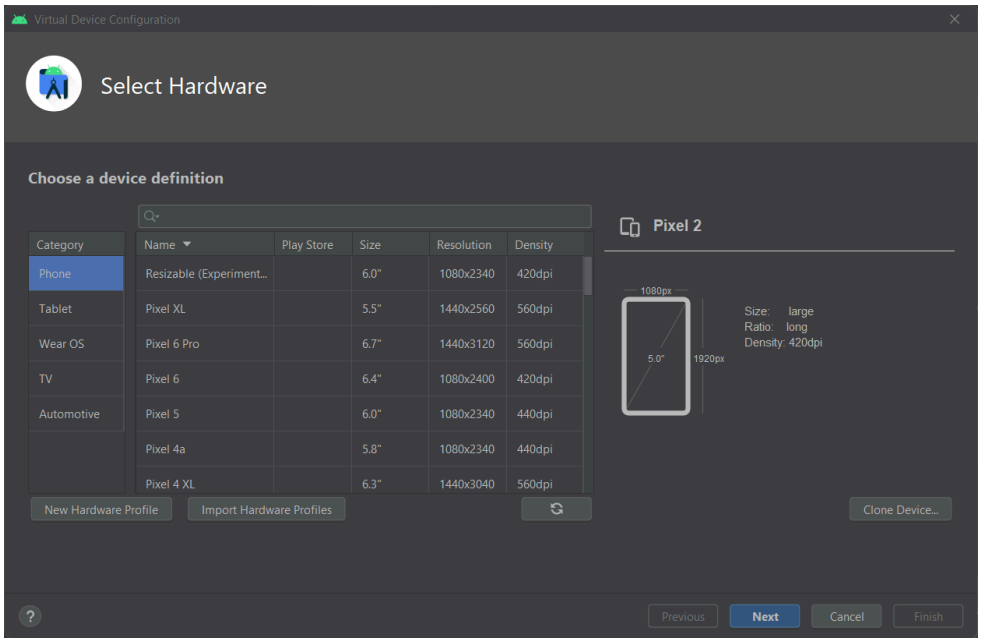
Step 8: Next, you need to set up an Android emulator. It is responsible for running and testing
the Flutter application.

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.

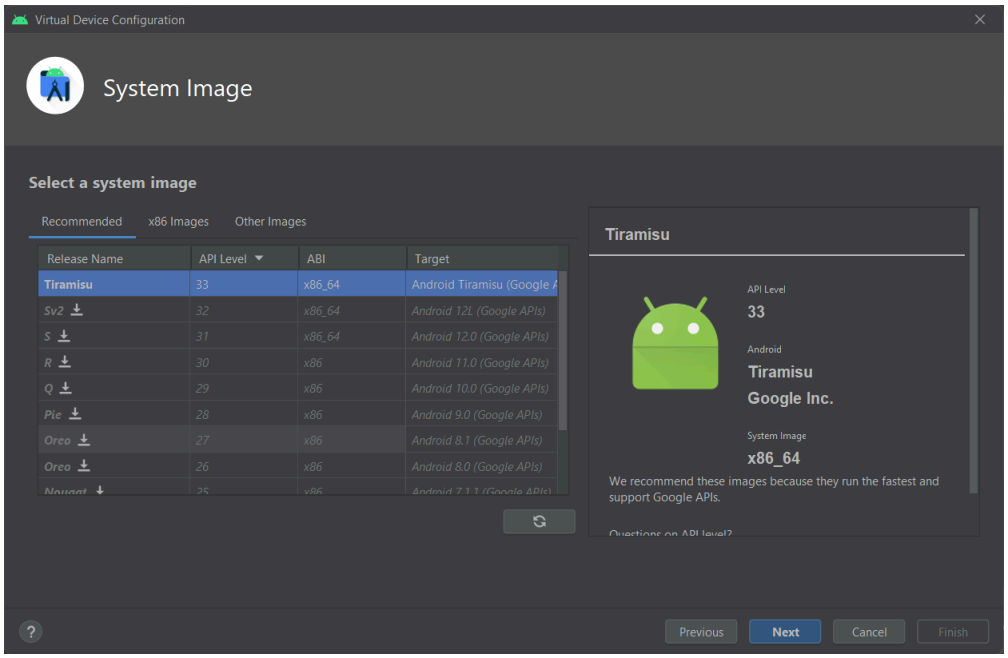


Step 8.2: Choose your device definition and click on Next.

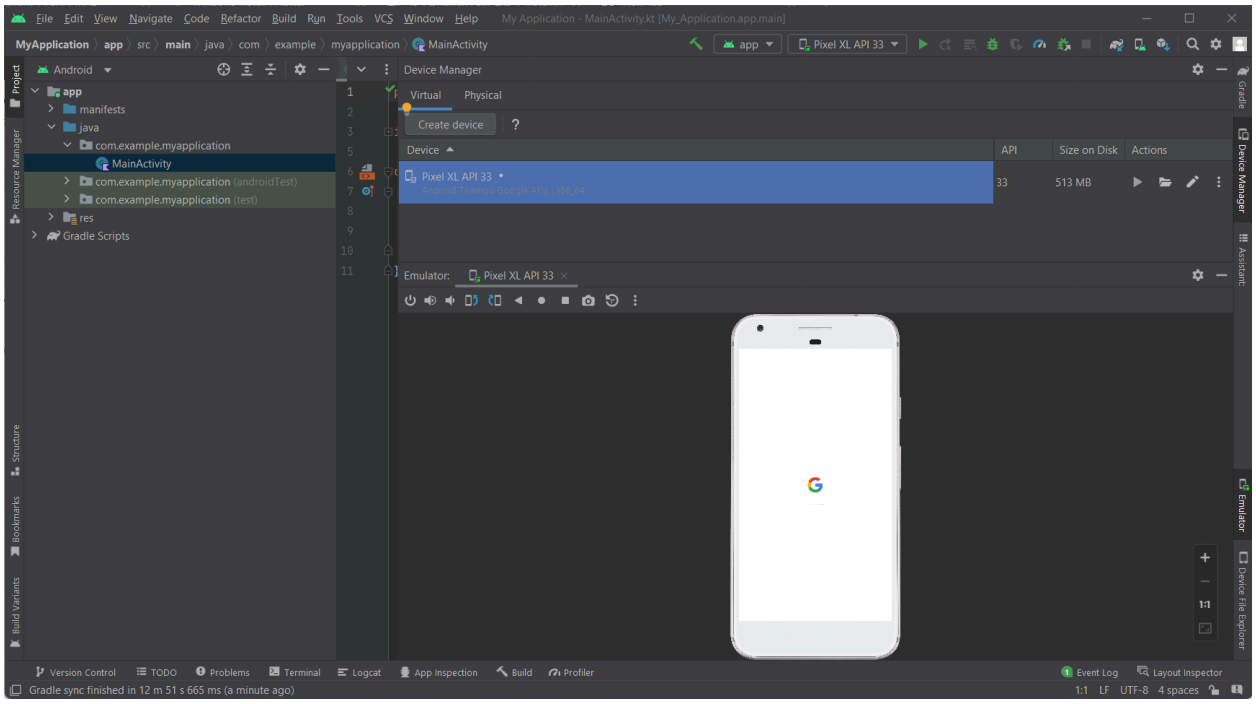


Step 8.3: Select the system image for the latest Android version and click on Next.

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

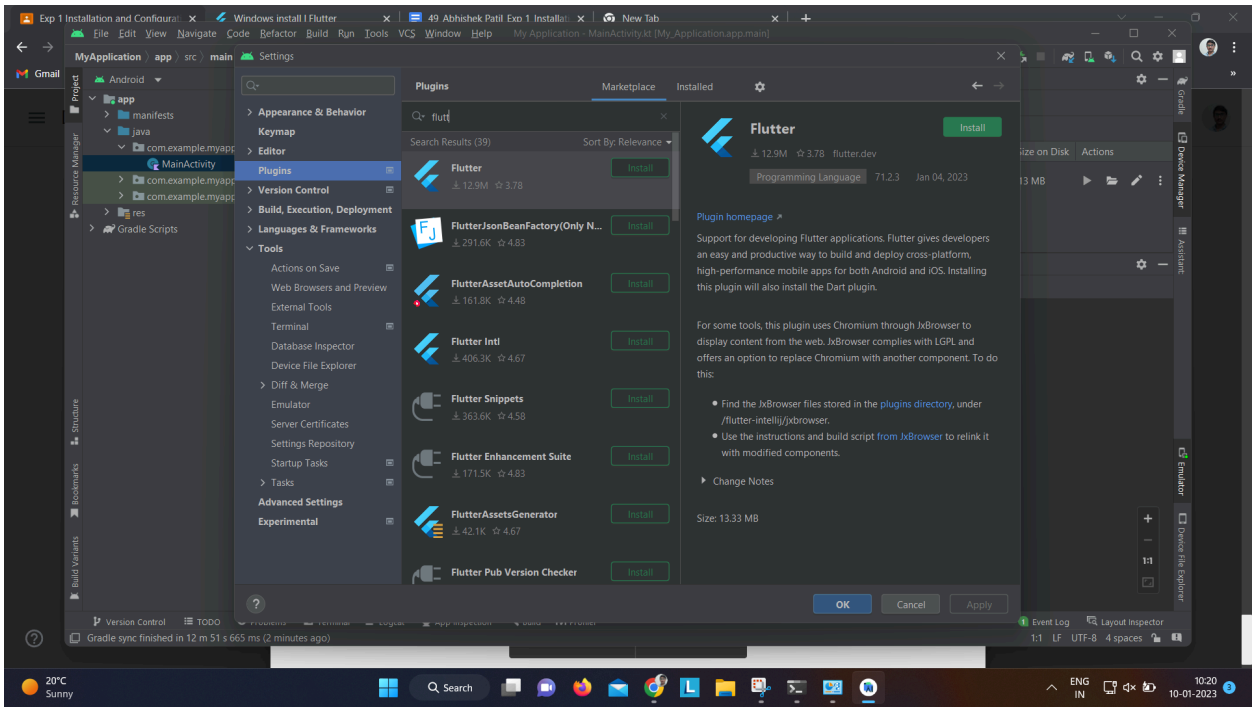


Step 8.5: Last, click on the icon pointed into the red color rectangle. The Android emulator
displayed as below screen.



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.