EXPERIMENT NO. 1
MAD and PWA Lab

Aim: Installation and Configuration of Flutter Environment.

Theory:

Flutter is a free and open-source mobile UI framework created by Google and released in May 2017. In a few words, it allows you to create a native mobile application with only one codebase. This means that you can use one programming language and one codebase to create two different apps (for iOS and Android).

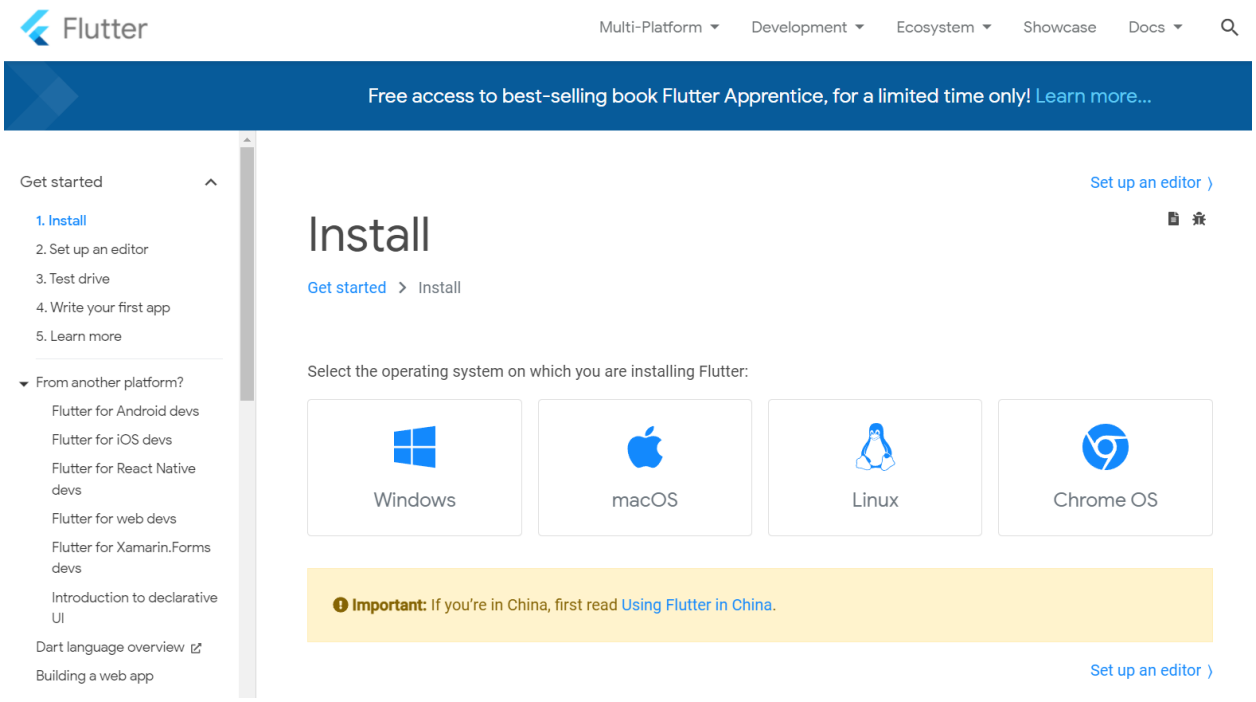
Flutter consists of two important parts:

- An SDK (Software Development Kit): A collection of tools that are going to help you develop your applications. This includes tools to compile your code into native machine code (code for iOS and Android).
- A Framework (UI Library based on widgets): A collection of reusable UI elements (buttons, text inputs, sliders, and so on) that you can personalize for your own needs.

To develop with Flutter, you will use a programming language called Dart. The language was created by Google in October 2011, but it has improved a lot over these past years. Dart focuses on front-end development, and you can use it to create mobile and web applications.

Steps:

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.

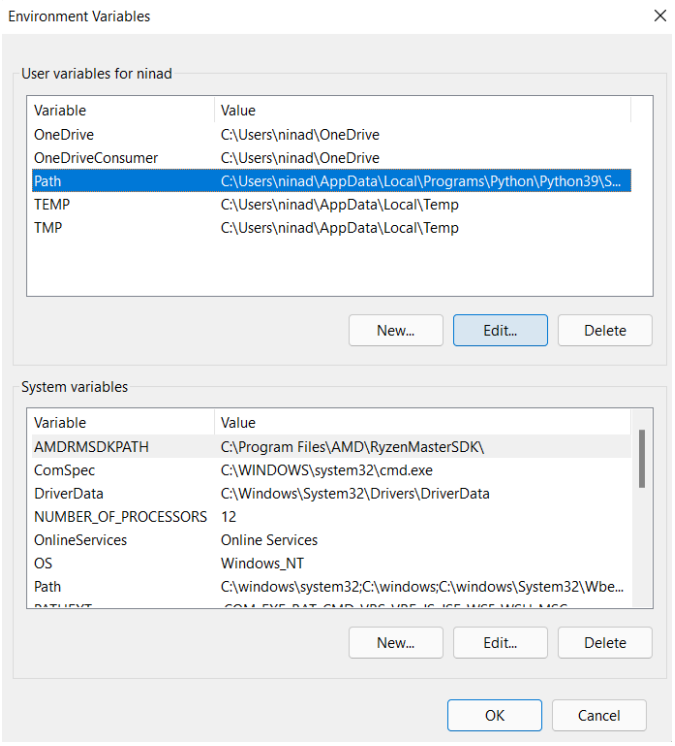


2. Next, to download the latest Flutter SDK, click on the **Windows icon**. Here, you will find the download link for SDK.

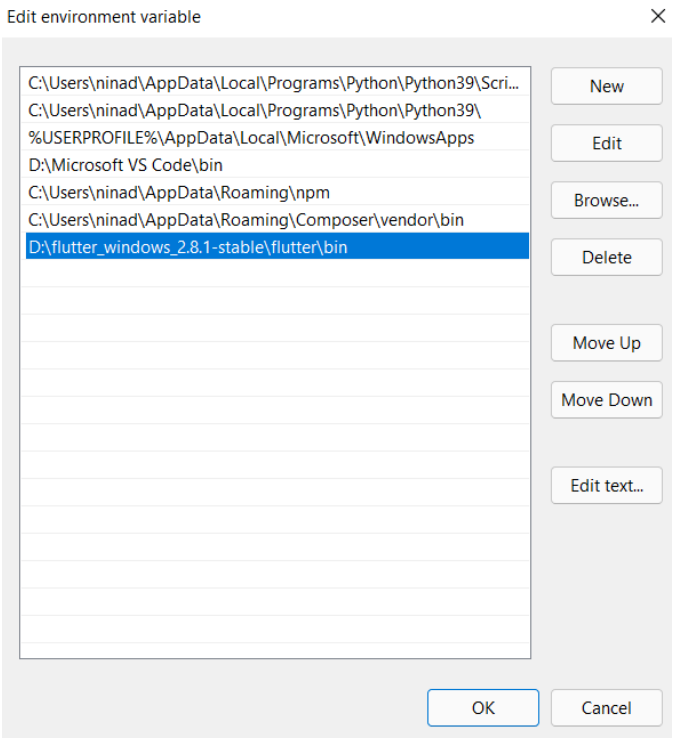
3. When your download is complete, extract the **zip file** and place it in the desired installation folder or location, for example C:/Flutter.

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

    a. Go to **My Computer properties** -> **Advanced tab** -> **Environment variables**. You will get the following screen.



b. Now, **select path** -> **click on edit**. The following screen appears:



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

5. Now, run the **$ flutter** command in the command prompt.

```
C:\Users\ninad>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.
    --suppress-analytics    Suppress analytics reporting when this command runs.
```

```
                Welcome to Flutter! - https://flutter.dev

The Flutter tool uses Google Analytics to anonymously report feature usage
statistics and basic crash reports. This data is used to help improve
Flutter tools over time.

Flutter tool analytics are not sent on the very first run. To disable
reporting, type 'flutter config --no-analytics'. To display the current
setting, type 'flutter config'. If you opt out of analytics, an opt-out
event will be sent, and then no further information will be sent by the
Flutter tool.

By downloading the Flutter SDK, you agree to the Google Terms of Service.
Note: The Google Privacy Policy describes how data is handled in this
service.

Moreover, Flutter includes the Dart SDK, which may send usage metrics and
crash reports to Google.

Read about data we send with crash reports:
https://flutter.dev/docs/reference/crash-reporting

See Google's privacy policy:
https://policies.google.com/privacy
```

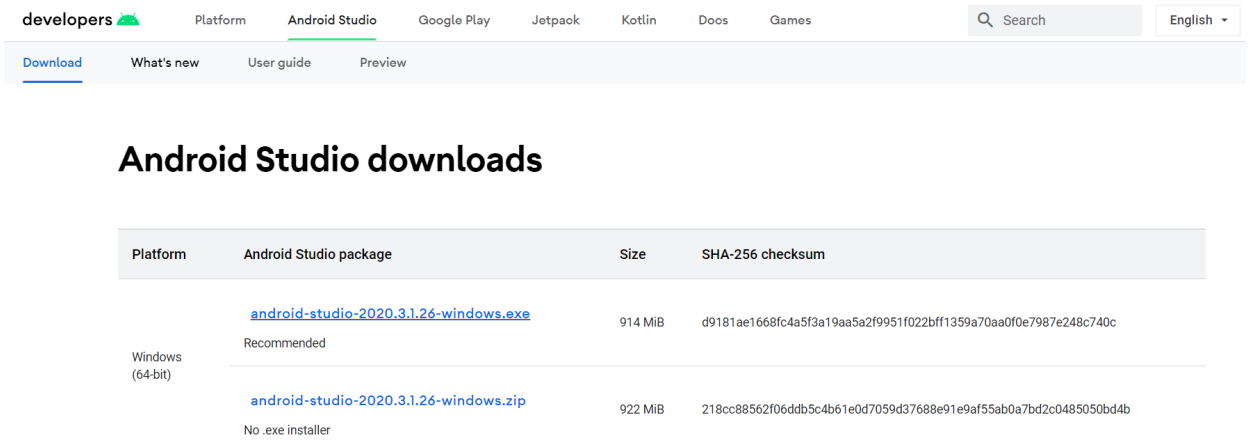
Now, run the **$ flutter doctor** command. This command checks for all the requirements of Flutter app development and displays a report of the status of your Flutter installation.

```
C:\Users\ninad>flutter doctor
Running "flutter pub get" in flutter_tools...                    12.6s
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
    ✗ 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
[!] Android Studio (not installed)
[✓] Connected device (2 available)

! Doctor found issues in 2 categories.
```

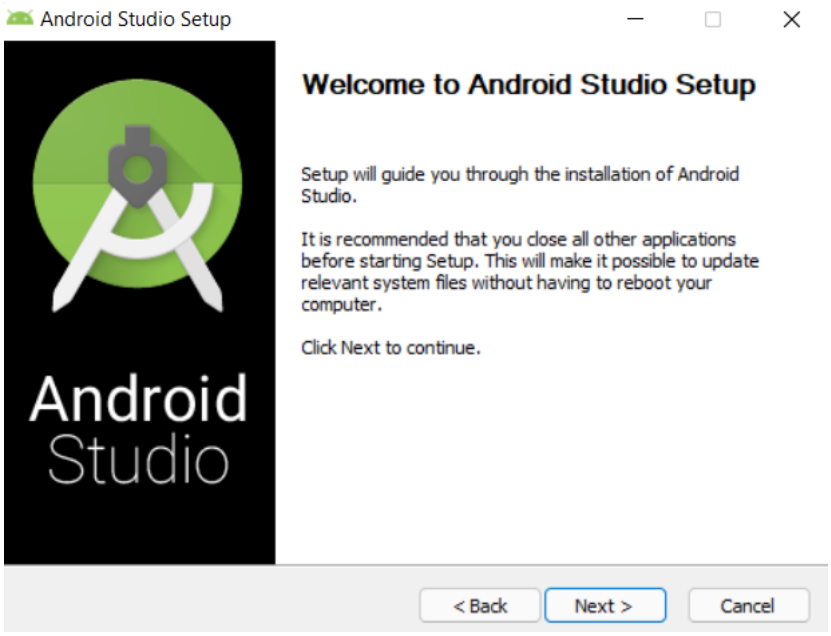
6. When you run the above command, it will analyze the system and show its report, as shown in the below image. Here, you will find the **details of all missing tools**, which are required to run Flutter as well as the **development tools that are available** but not connected with the device.

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:

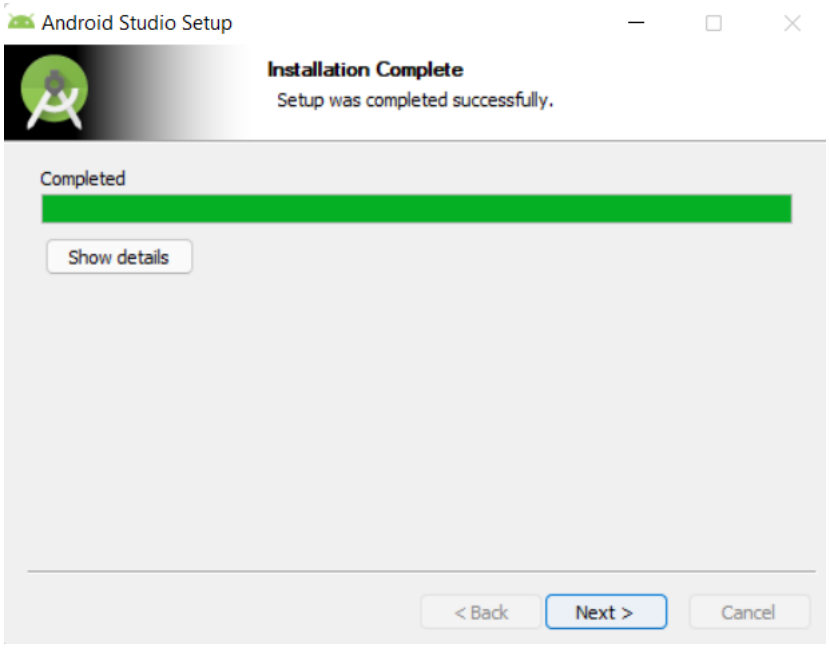
    a. Download the latest Android Studio executable or zip file from the official site.



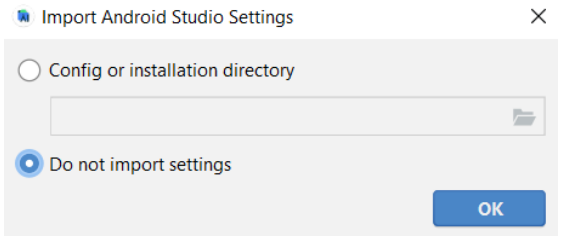
    b. When the download is complete, open the .exe file and run it. You will get the following dialog box.

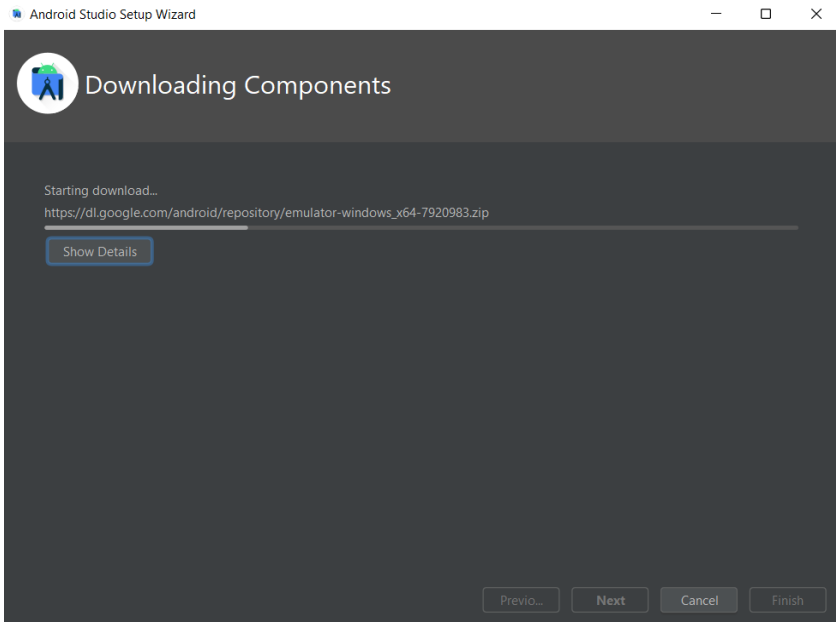


c. Follow the steps of the installation wizard. Once the installation wizard completes, you will get the following screen.



d. 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.



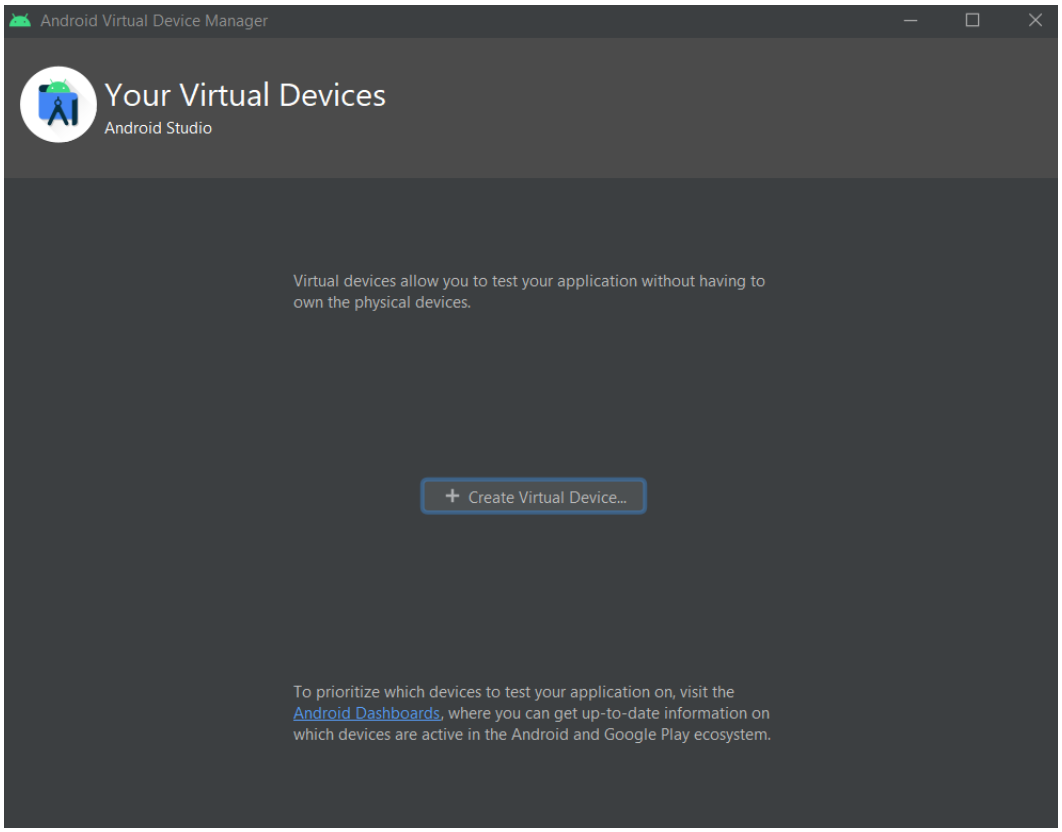


e. Run the **$ flutter doctor** command and Run **flutter doctor --android-licenses** command.

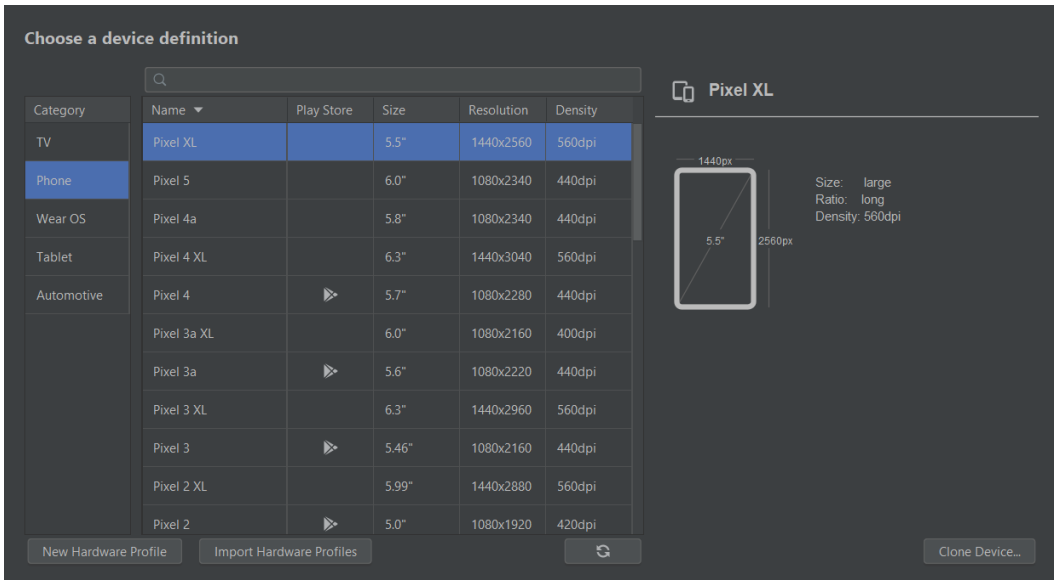
```
C:\Users\ninad>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 2.8.1, on Microsoft Windows [Version 10.0.22000.434], locale en-IN)
[✓] Android toolchain - develop for Android devices (Android SDK version 32.0.0)
[✓] Chrome - develop for the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

• No issues found!
```

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

   a. 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.

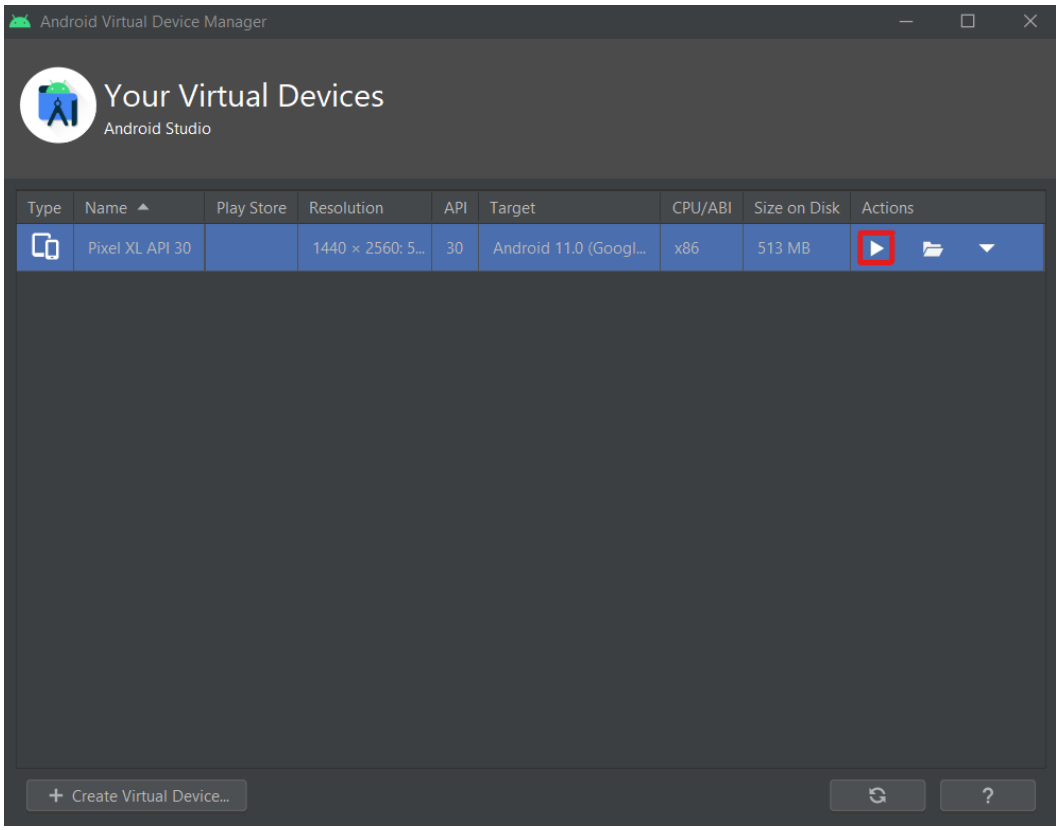


b. Choose your device definition and click on **Next**.



c. Select the system image for the latest Android version and click on **Next**.

d. Now, verify the all AVD configuration. If it is correct, click on **Finish**. The following screen appears.

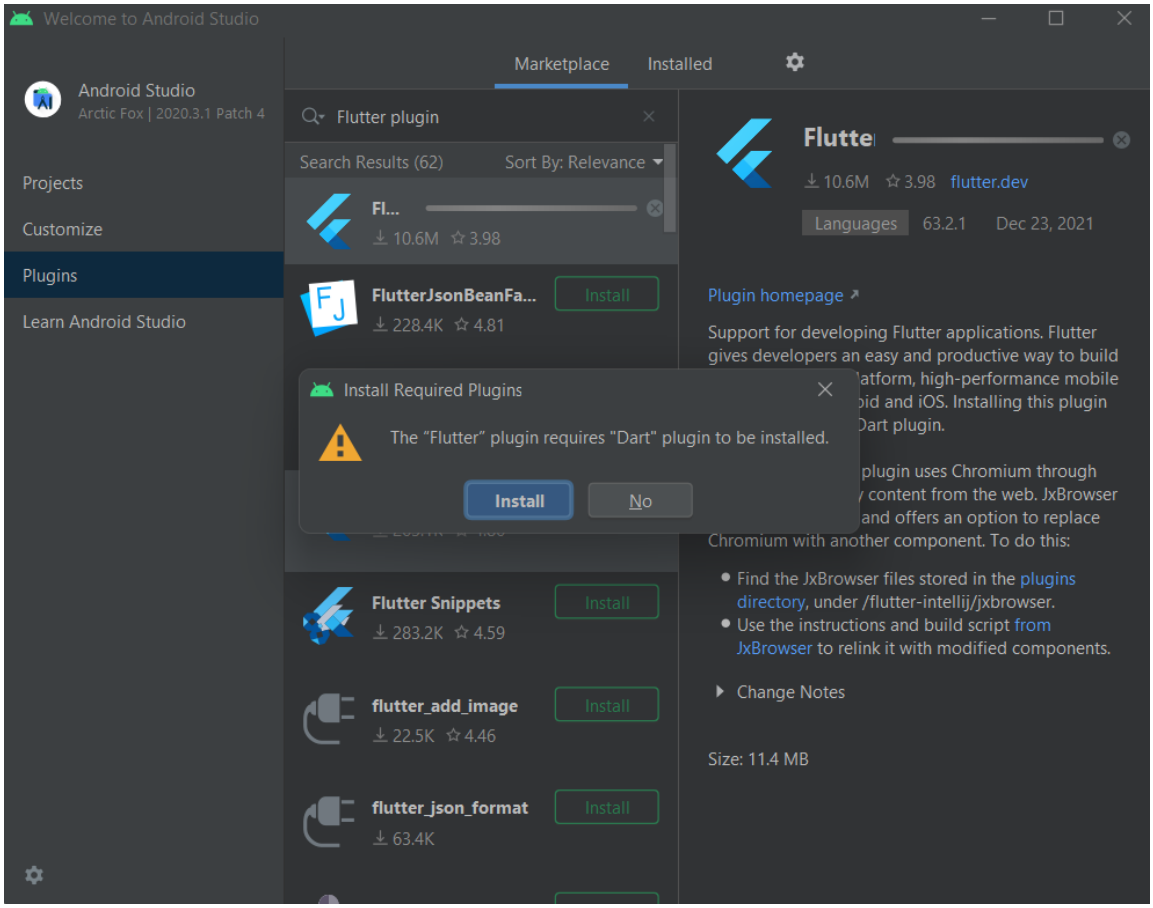


e. Last, click on the icon pointed into the **red color rectangle**. The Android emulator displayed as shown below screen.

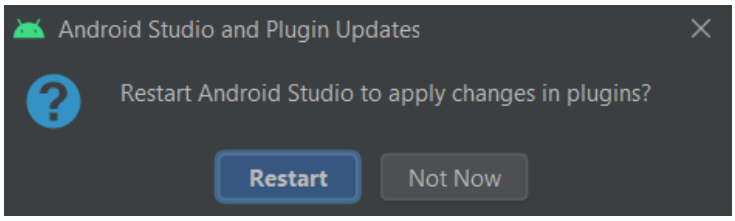
9. Now, install the **Flutter** and **Dart plugin** for building Flutter applications in Android Studio. These plugins provide a template to create a Flutter application, give an option to run and debug Flutter application in the Android Studio itself. Do the following steps to install these plugins.

    a. Open the Android Studio and then go to **File** -> **Settings** -> **Plugins**.

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



c. Restart the Android Studio.



Conclusion: Hence, we understood how to install and configure the Flutter environment by installing the Flutter SDK, installing and setting up Android Studio and in the end creating and adding a virtual device to the Android Studio.