EXPERIMENT NO. 1
MAD and PWA Lab

Aim: Installation and Configuration of Flutter Environment.

Theory:

Flutter is an open-source UI toolkit developed by Google that allows developers to create cross-platform applications using a single codebase. It simplifies the development process by providing a collection of pre-designed widgets, enabling seamless UI design for both Android and iOS platforms. Flutter utilizes the Dart programming language, which is optimized for building fast and scalable applications.

Flutter consists of two major components:

• **Software Development Kit (SDK):** A collection of essential tools for building applications, including a compiler that converts the code into native machine code for Android and iOS.

• **UI Framework (Widget Library):** A set of reusable UI components like buttons, text fields, and sliders that can be customized according to the app's requirements.

Step-by-Step Installation and Configuration:

1. **Download Flutter SDK**

   o   Visit the official Flutter website: Flutter Install Guide. o   Click on the Windows icon to

   download the latest stable version of Flutter.
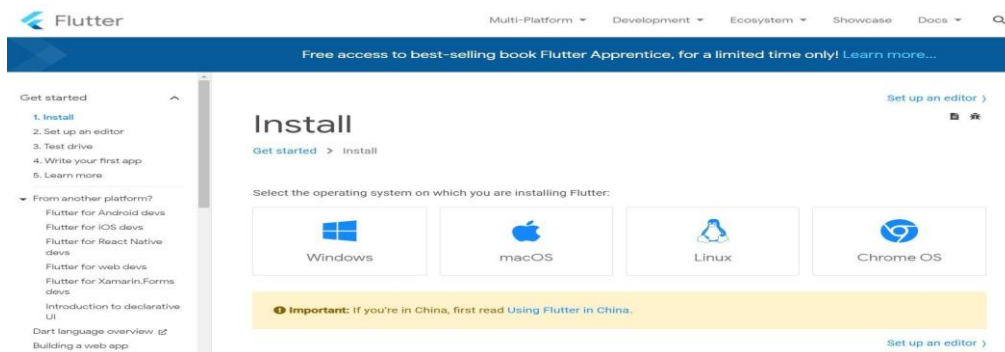
2.Extract and Set Up Flutter

o   Once downloaded, extract the ZIP file and move the Flutter folder to the desired installation location, e.g., C:/Flutter.
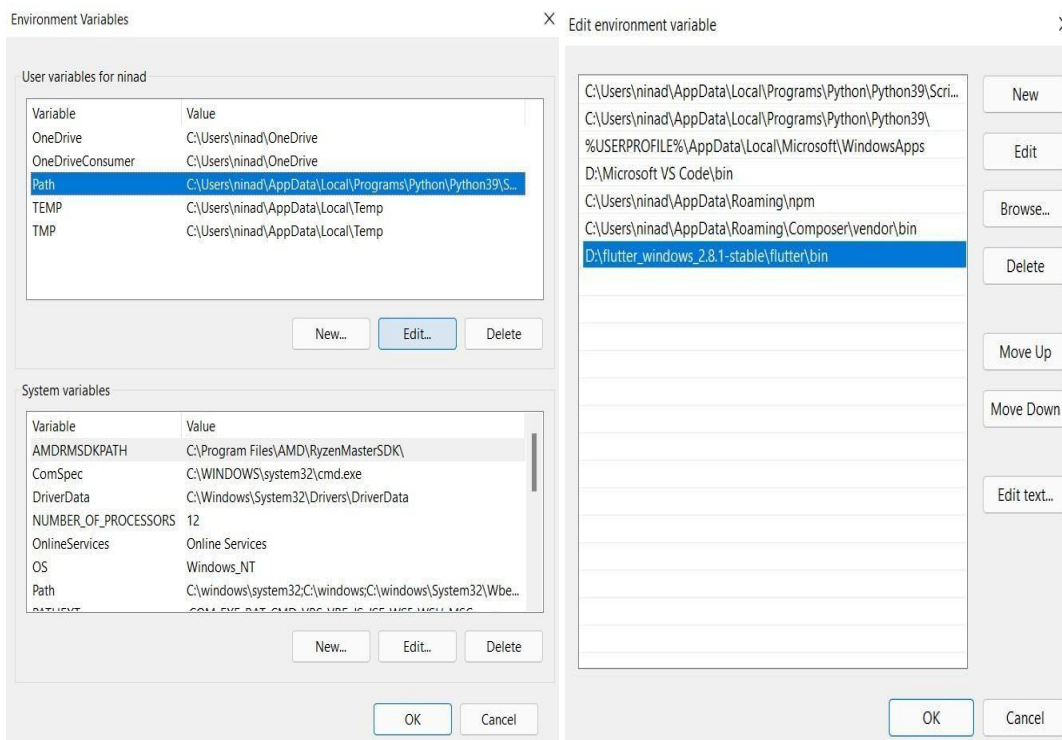
Update System Path

To use Flutter commands globally, add Flutter to the system path:
Open **My Computer** > **Properties** > **Advanced System Settings** > **Environment Variables**.
Locate the **Path** variable, click **Edit**, then **New**.
Add the path to the bin folder inside the Flutter directory. Click
OK to save the changes.

- **Verify Flutter Installation**
  Flutter command

  Open the command prompt and enter:

```
C:\Users\HP>flutter

 A new version of Flutter is available!

 To update to the latest version, run "flutter upgrade".

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.
```

  flutter doctor
This command checks for system dependencies and lists any missing components.

  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\HP>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, 3.27.4, on Microsoft Windows [Version 10.0.26100.3624], locale en-IN)
[√] Windows Version (Installed version of Windows is version 10 or higher)
[√] Android toolchain - develop for Android devices (Android SDK version 35.0.1)
[√] Chrome - develop for the web
[√] Visual Studio - develop Windows apps (Visual Studio Build Tools 2019 16.11.39)
[√] Android Studio (version 2024.2)
[√] VS Code (version 1.98.2)
[√] Connected device (3 available)
[√] Network resources

• No issues found!

C:\Users\HP>
```

  This command checks for system dependencies and lists any missing components.

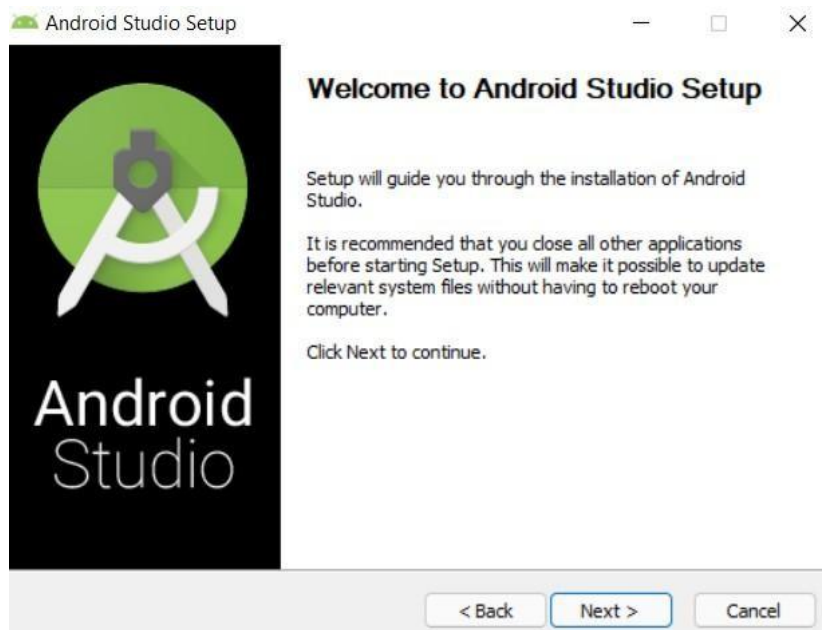 **Install Android Studio**

- If flutter doctor detects a missing Android SDK, install **Android Studio**:
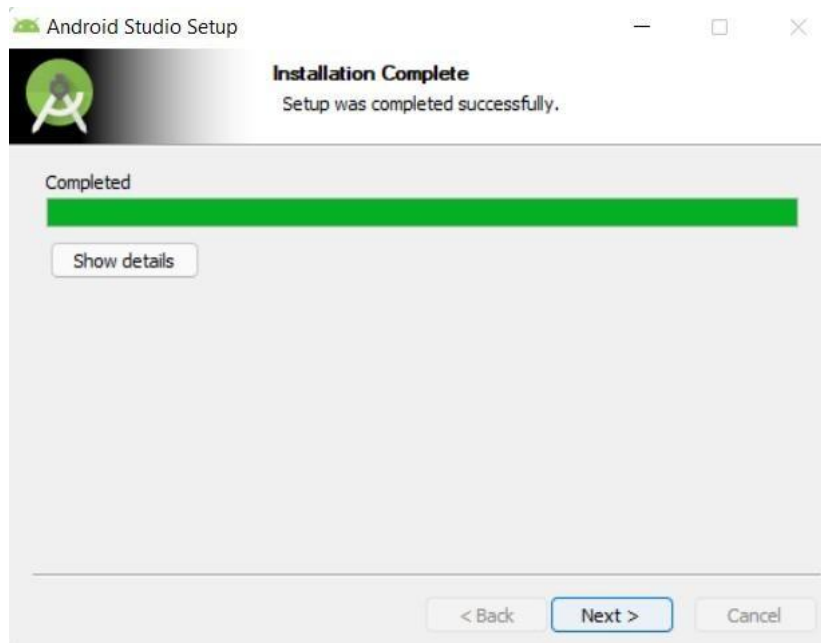
    Open the command prompt and execute:

    Download the latest version from the official website.

    Run the installation wizard and follow the on-screen instructions.

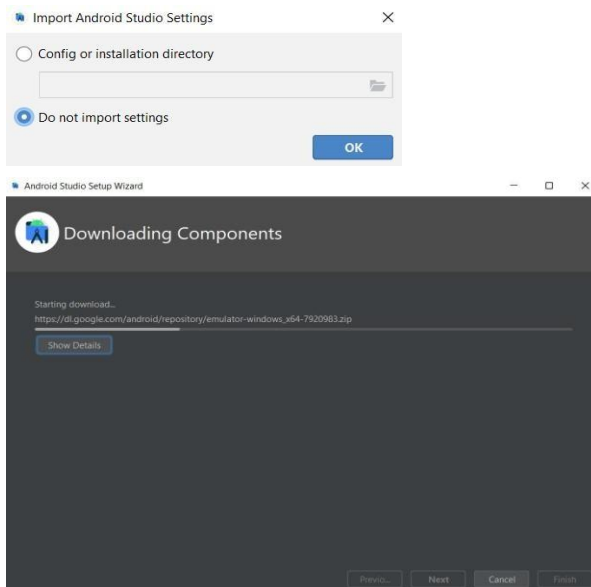   Follow the steps of the installation wizard. Once the installation wizard completes, you will get the following screen.

a. 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.

Choose **'Don't import Settings'** when prompted, then click **OK**.

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

```
C:\Users\HP>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, 3.27.4, on Microsoft Windows [Version 10.0.26100.3624], locale en-IN)
[√] Windows Version (Installed version of Windows is version 10 or higher)
[√] Android toolchain - develop for Android devices (Android SDK version 35.0.1)
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[√] Visual Studio - develop Windows apps (Visual Studio Build Tools 2019 16.11.39)
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[√] VS Code (version 1.98.2)
[√] Connected device (3 available)
[√] Network resources

• No issues found!

C:\Users\HP>
```
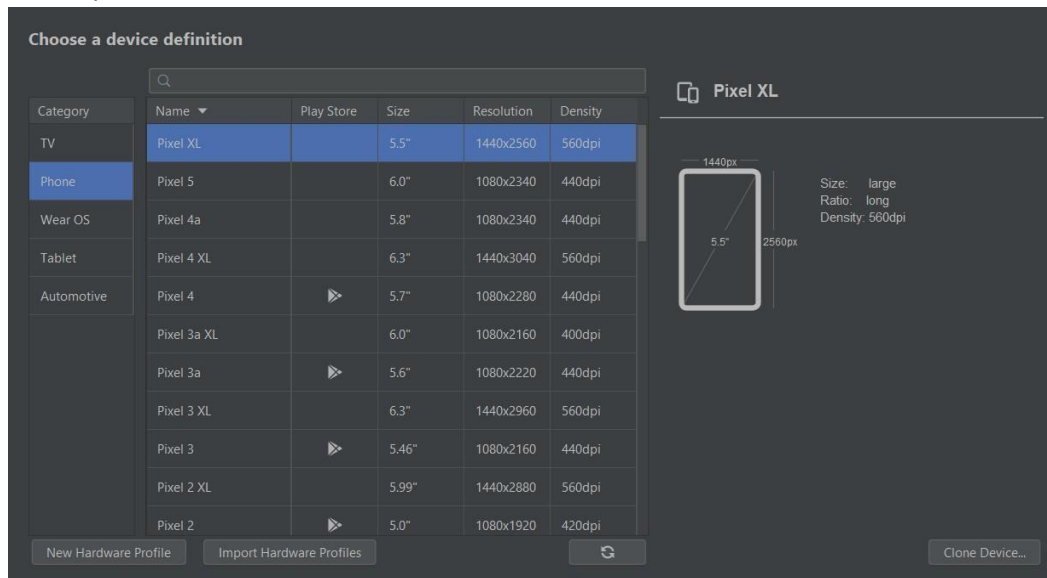
1. Next, you need to set up an Android emulator. It is responsible for running and testing the Flutter application.
    a. To set an Android emulator, go to **Android Studio** -> **Tools** -> **Android** -> **AVD Manager** and select Create Virtual Device. Or, go to **Help** -> **Find Action** -> **Type Emulator** in the search box. You will get the following screen.
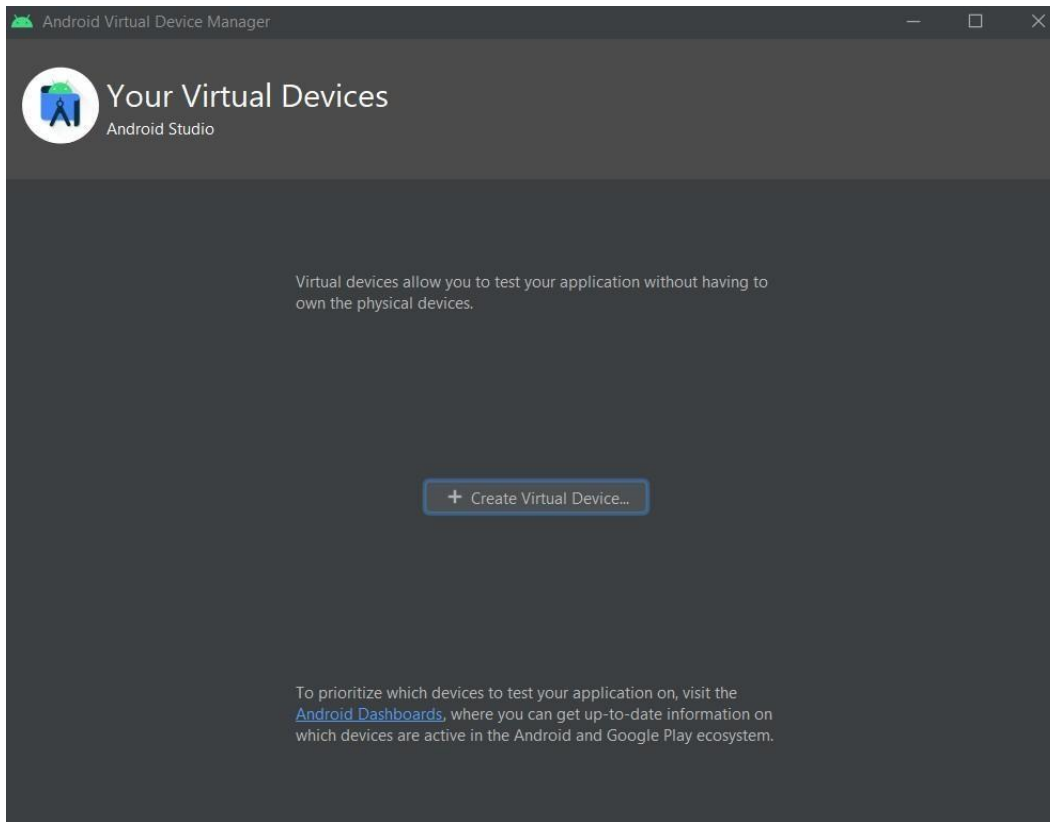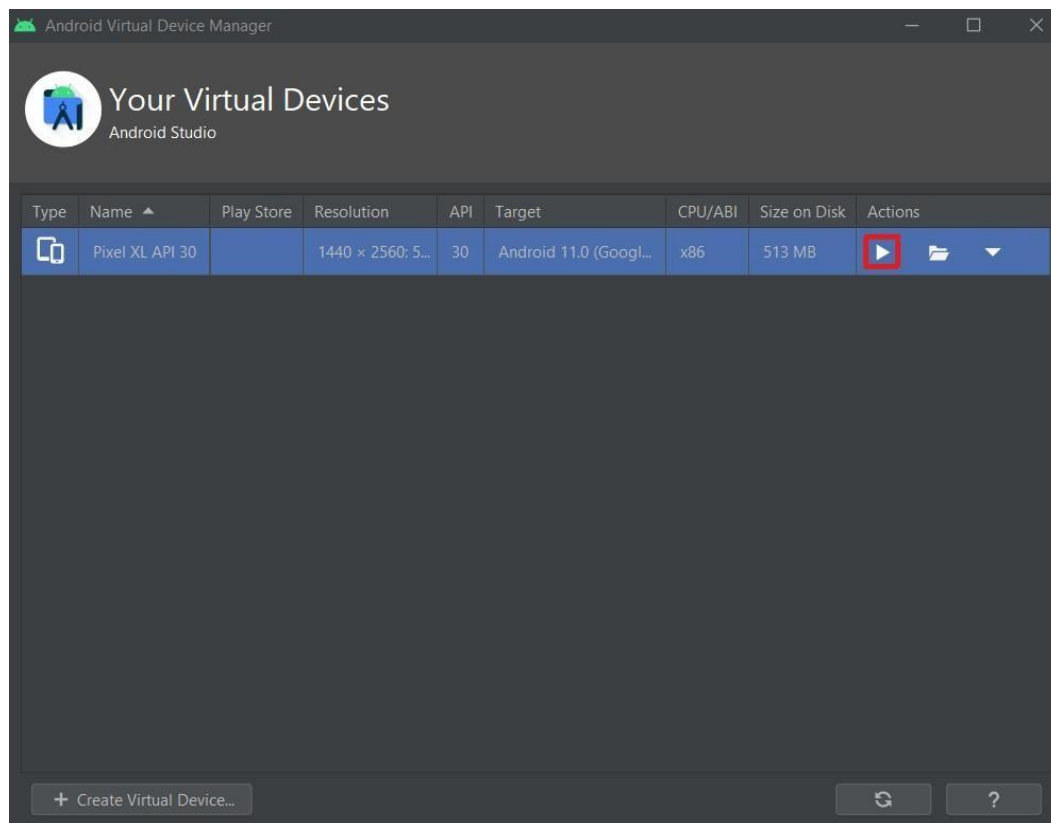
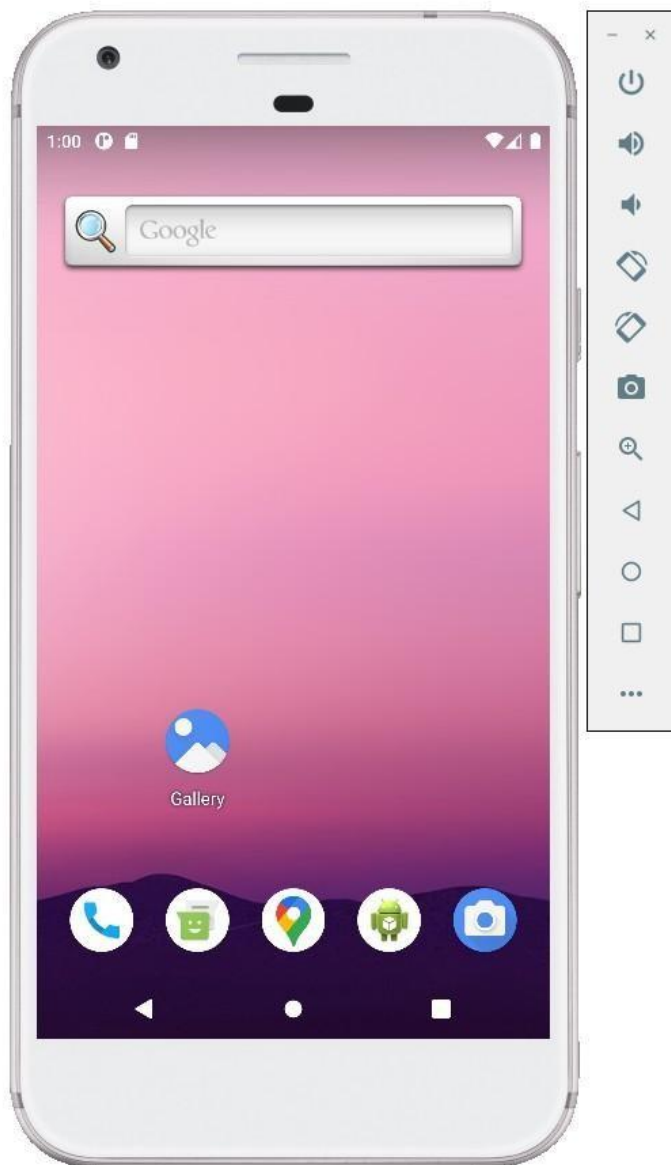b.   Choose your device definition and click on **Next**.

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.


2. 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.

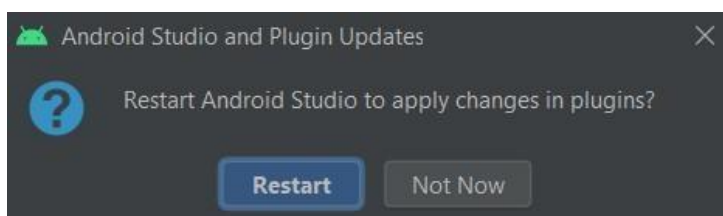a. Open the Android Studio and then go to **File** -> **Settings** -> **Plugins**.

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.
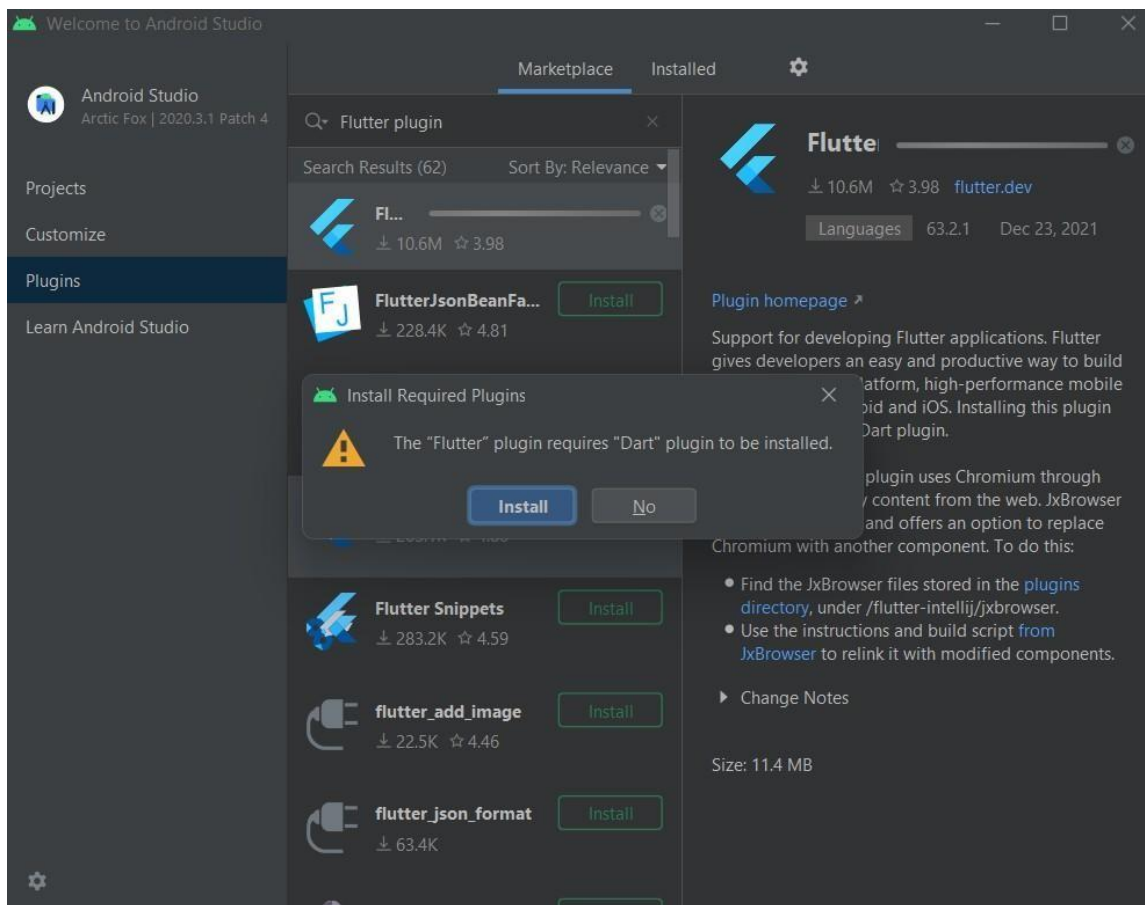
c.

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.