

EXPERIMENT 1: Installation and Configuration of Flutter Environment.

Aim: To install and configure a flutter environment.

Theory :

What is Flutter?

Flutter is an open source framework developed and supported by Google. Frontend and full-stack developers use Flutter to build an application's user interface (UI) for multiple platforms with a single codebase.

When Flutter launched in 2018, it mainly supported mobile app development. Flutter now supports application development on six platforms: iOS, Android, the web, Windows, MacOS, and Linux.

Flutter simplifies the process of creating consistent, appealing UIs for an application across the six platforms it supports.

Because Flutter is a cross-platform development framework, we'll first compare it to native development. Then, we can highlight features that are unique to Flutter.

The advantages of Flutter

Here are some ways that Flutter stands out as a cross-platform development framework:

- Close-to-native performance. Flutter uses the programming language Dart and compiles into machine code. Host devices understand this code, which ensures a fast and effective performance.
- Fast, consistent, and customizable rendering. Instead of relying on platform-specific rendering tools, Flutter uses Google's open-source Skia graphic library to render UI. This provides users with consistent visuals no matter what platform they use to access an application.
- Developer-friendly tools. Google built Flutter with an emphasis on ease-of-use. With tools like hot reload, developers can preview what code changes will look like without losing state. Other tools like the widget inspector make it easy to visualize and solve issues with UI layouts.

Android Studio

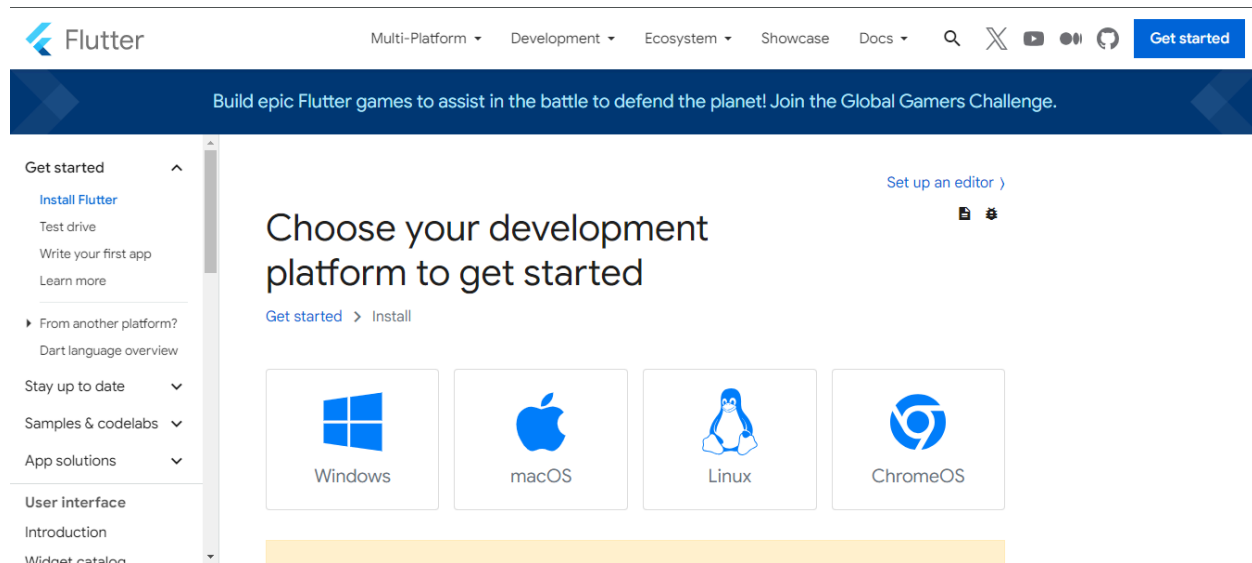
Android Studio is the official Integrated Development Environment (IDE) for Android app development. Based on the powerful code editor and developer tools from IntelliJ IDEA ,

Android Studio offers even more features that enhance your productivity when building Android apps, such as:

- A flexible Gradle-based build system
- A fast and feature-rich emulator
- A unified environment where you can develop for all Android devices
- Live Edit to update composables in emulators and physical devices in real time
- Code templates and GitHub integration to help you build common app features and import sample code
- Extensive testing tools and frameworks
- Lint tools to catch performance, usability, version compatibility, and other problems
- C++ and NDK support
- Built-in support for Google Cloud Platform, making it easy to integrate Google Cloud Messaging and App Engine

Install the Flutter SDK

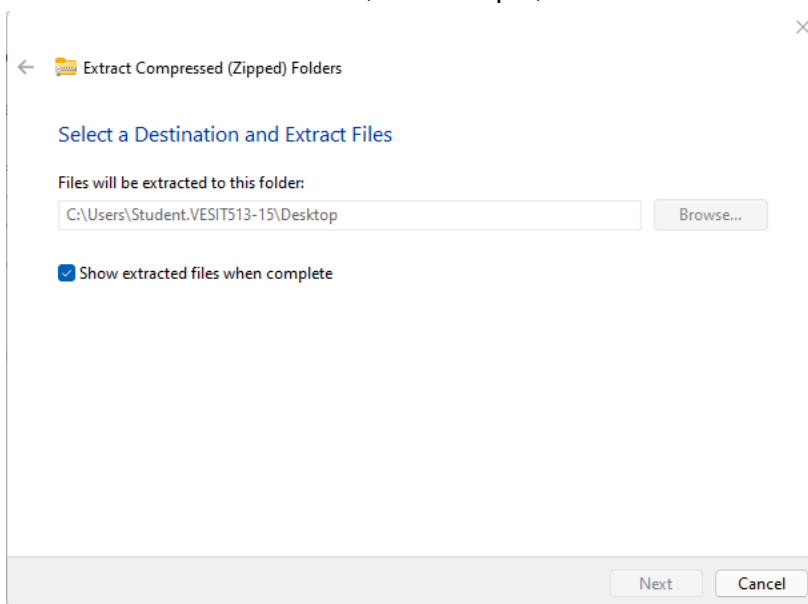
Step 1: Download the installation bundle of the Flutter Software Development Kit for windows. To download Flutter SDK, Go to its official website <https://docs.flutter.dev/get-started/install> , you will get the following screen.



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

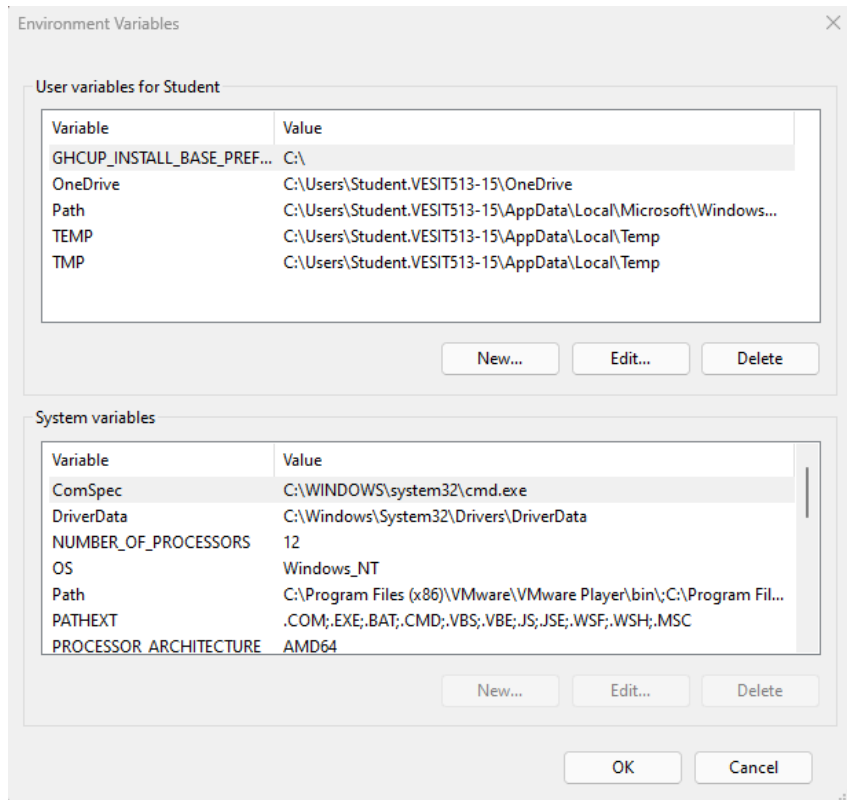
The screenshot shows the Flutter website's installation guide. The left sidebar contains navigation links like 'Get started', 'Test drive', and 'User interface'. The main content area is titled 'Download then install Flutter' and provides instructions on how to download the Flutter SDK bundle. A blue button labeled 'flutter_windows_3.16.8-stable.zip' is highlighted. Below the instructions, there is a yellow warning box with a triangle icon and the text: 'Warning: Don't install Flutter to a directory or path that meets one or both of the following conditions:'. The right sidebar contains a 'Contents' section with links to 'System requirements', 'Hardware requirements', 'Software requirements', and other setup steps.

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.

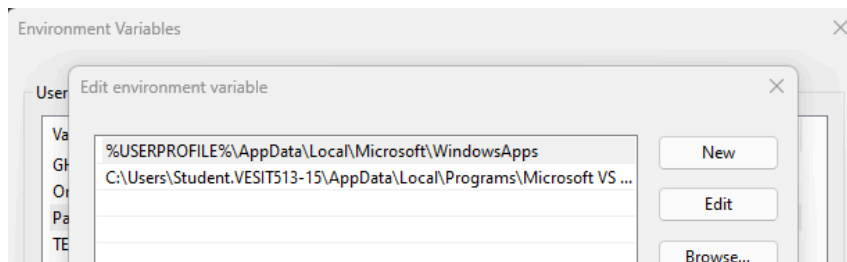


Step 4: To run the Flutter command in regular windows console, you need to update the system path to include the flutter bin directory. The following steps are required to do this:

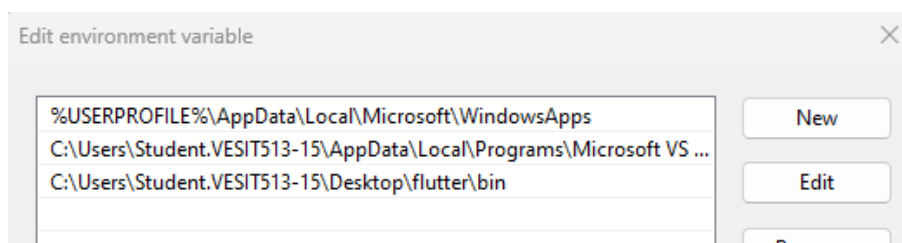
Step 4.1: Go to MyComputer properties -> advanced tab -> environment variables. You will get the following screen.



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.

```
PS C:\Users\Student.VESIT513-15> flutter --version
Flutter 3.16.8 • channel stable • https://github.com/flutter/flutter.git
Framework • revision 67457e669f (6 days ago) • 2024-01-16 16:22:29 -0800
Engine • revision 6e2ea58a5c
Tools • Dart 3.2.5 • DevTools 2.28.5
```

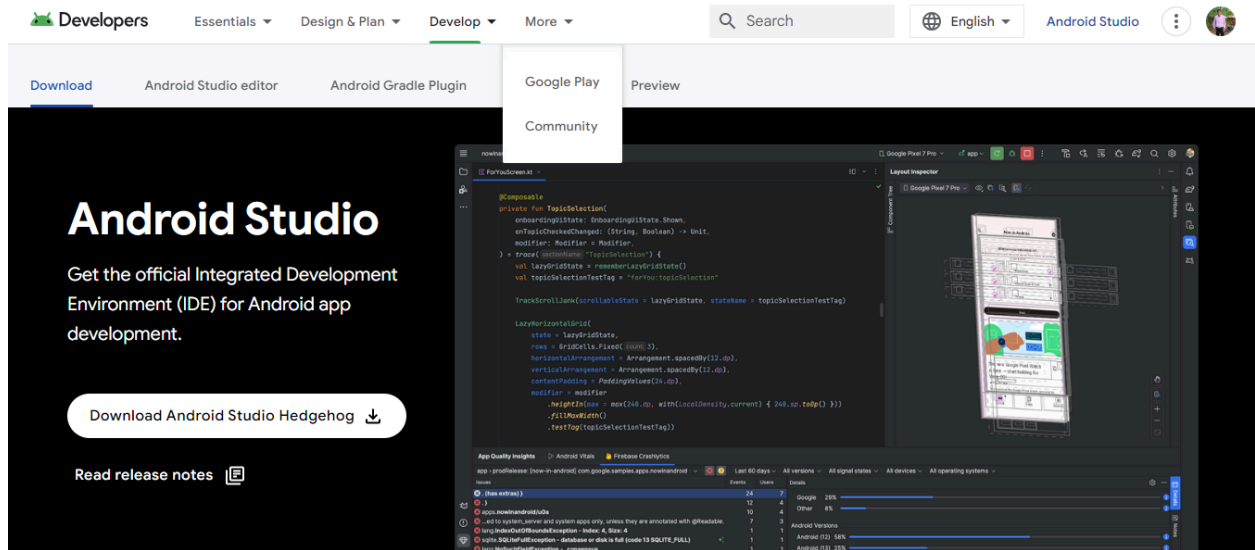
Step 6: When you run the above command, it will analyze the system and show its report, as shown in the below image. Here, you will find the details of all missing tools, which required to run Flutter as well as the development tools that are available but not connected with the device.

```
PS C:\Users\Student.VESIT513-15> flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 3.16.8, on Microsoft Windows [Version 10.0.22621.2428], 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.

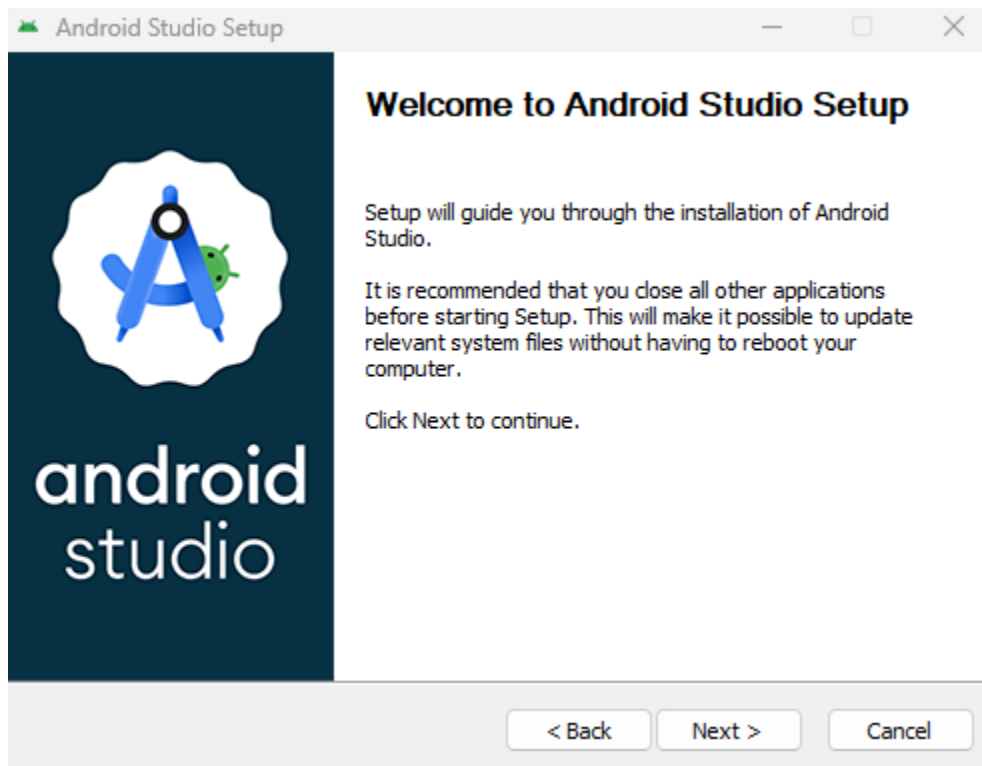
[✓] Chrome - develop for the web
[!] Visual Studio - develop Windows apps (Visual Studio Community 2022 17.3.1)
    x Visual Studio is missing necessary components. Please re-run the Visual Studio installer for the "Desktop
      development with C++" workload, and include these components:
        MSVC v142 - VS 2019 C++ x64/x86 build tools
          - If there are multiple build tool versions available, install the latest
        C++ CMake tools for Windows
        Windows 10 SDK
```

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.

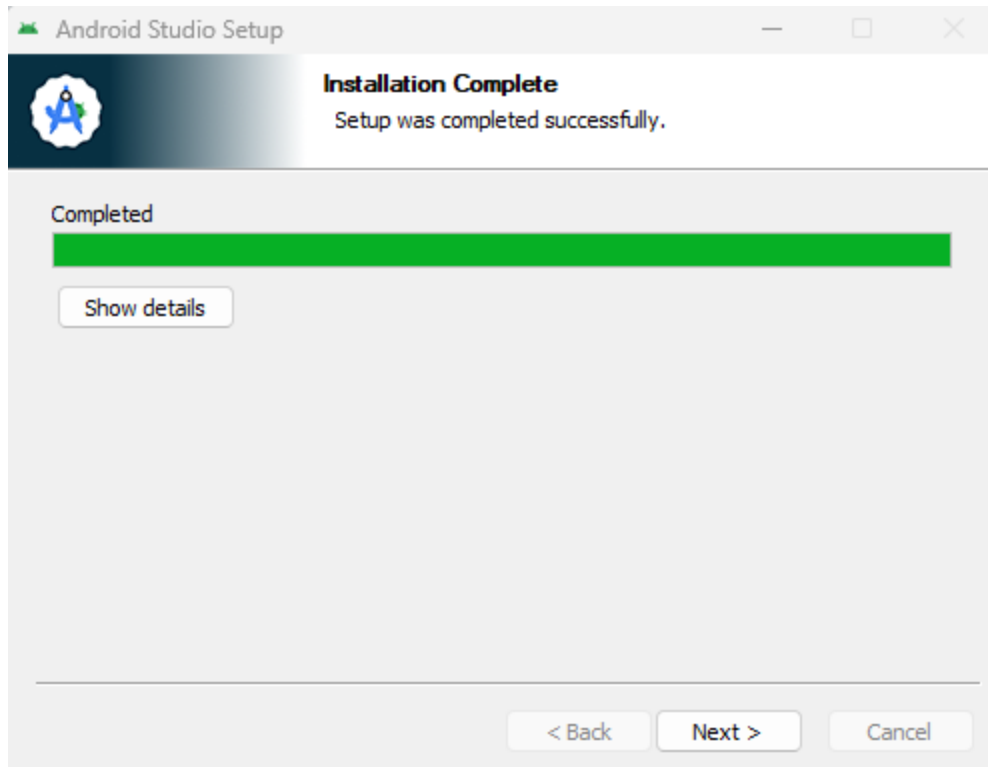
Step 7.1: Download the latest Android Studio executable or zip file from the official site.



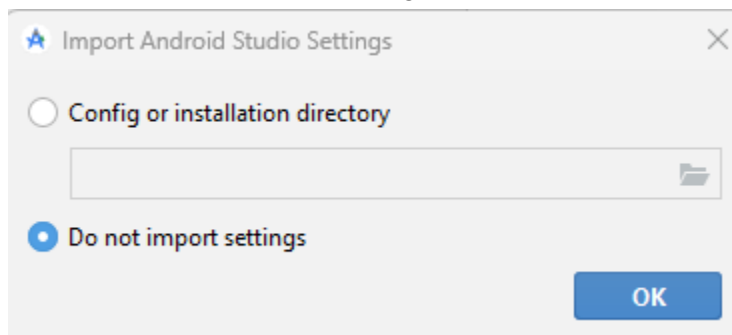
Step 7.2: When the download is complete, open the .exe file and run it. You will get the following dialog box.



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.





License Agreement

Read and agree to the licenses for the components which will be installed

Licenses

▼ android-sdk-license

- Android Emulator
- Android Emulator hypervisor
- Sources for Android 34
- Android SDK Platform 34
- Android SDK Build-Tools 34
- Android SDK Platform-Tools

▼ android-sdk-arm-dbt-license

- Google APIs Intel x86_64 Ator

▼ intel-android-extra-license

- Intel x86 Emulator Accelerato

Intel (R) Hardware Accelerated Execution Manager End-User License Agreement

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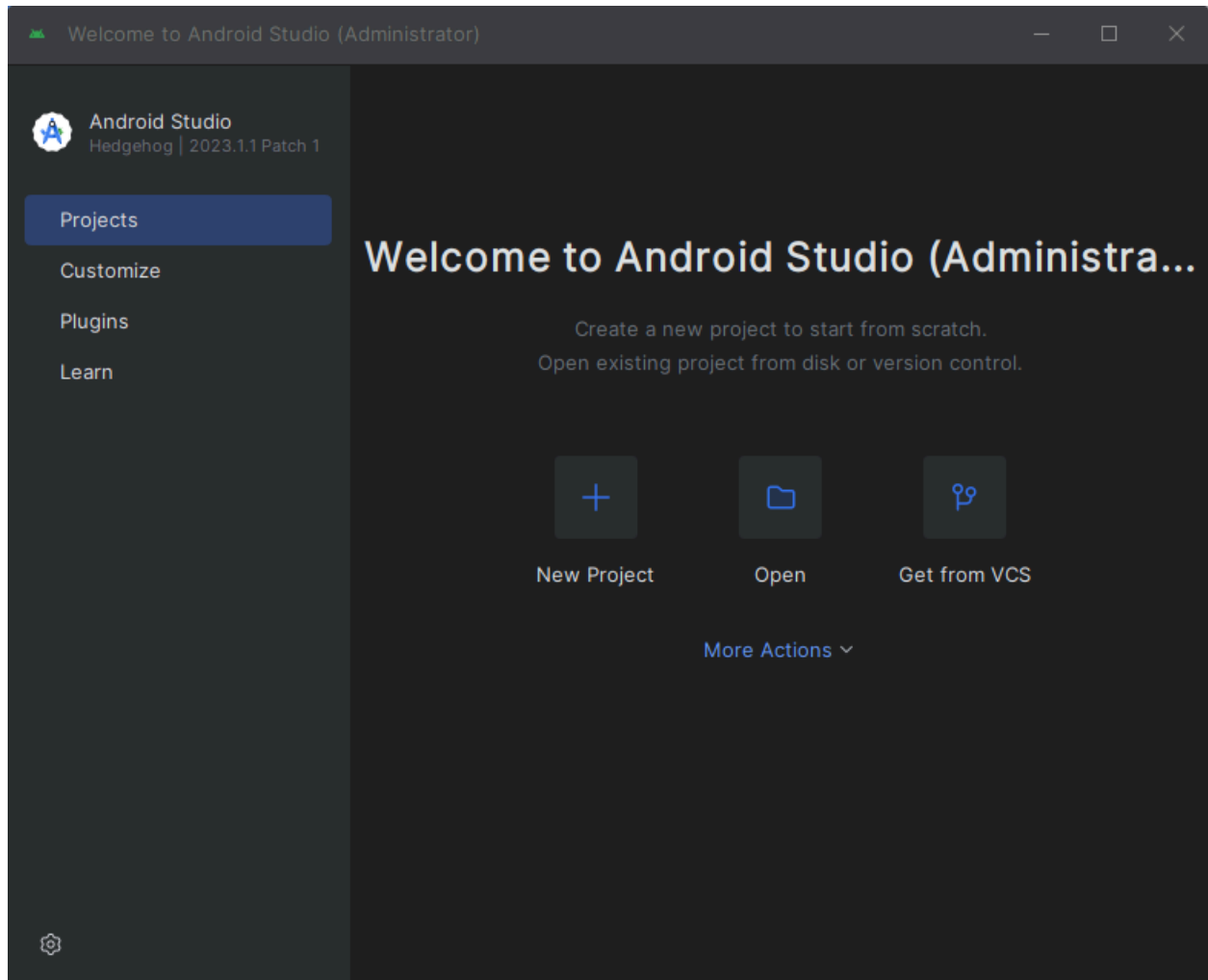
☐ Decline ☒ Accept

Previ...

Next

Cancel

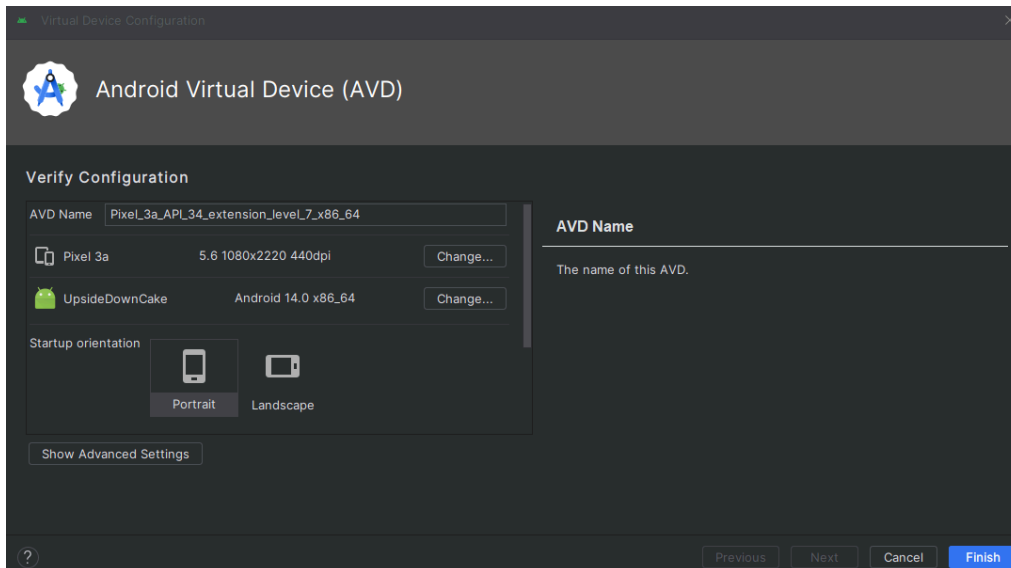
Finish



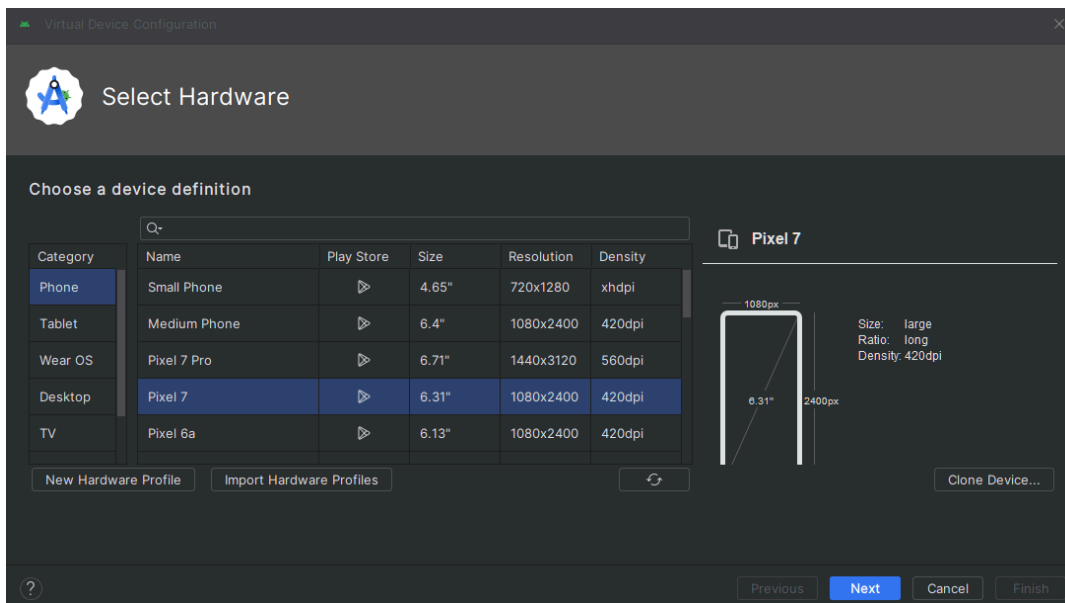
Step 7.5: run the \$ flutter doctor command and Run flutter doctor --android-licenses command.

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.

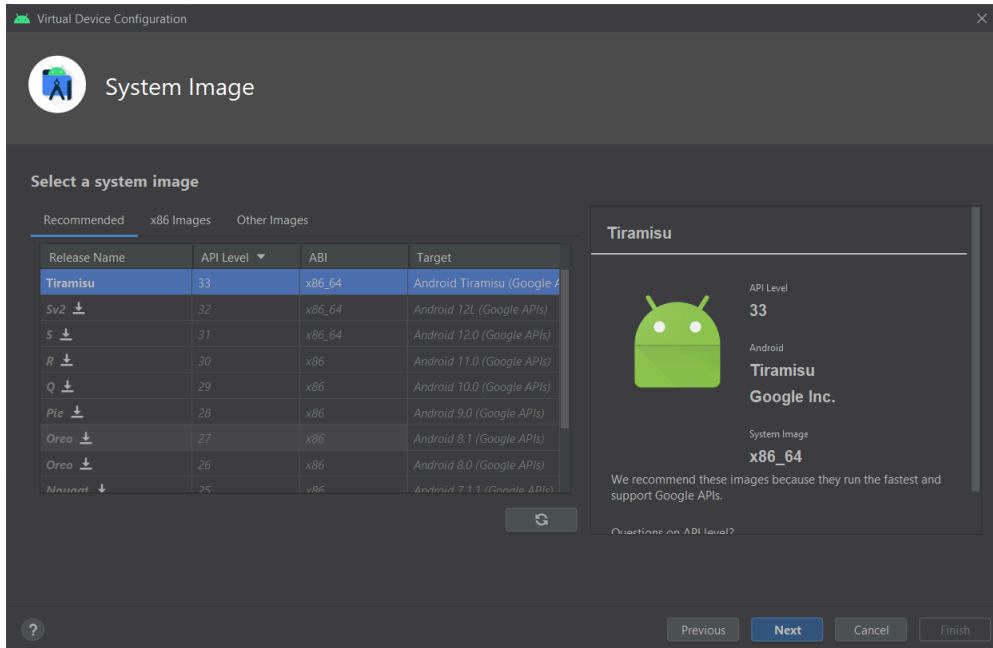


Step 8.2: Choose your device definition and click on Next.

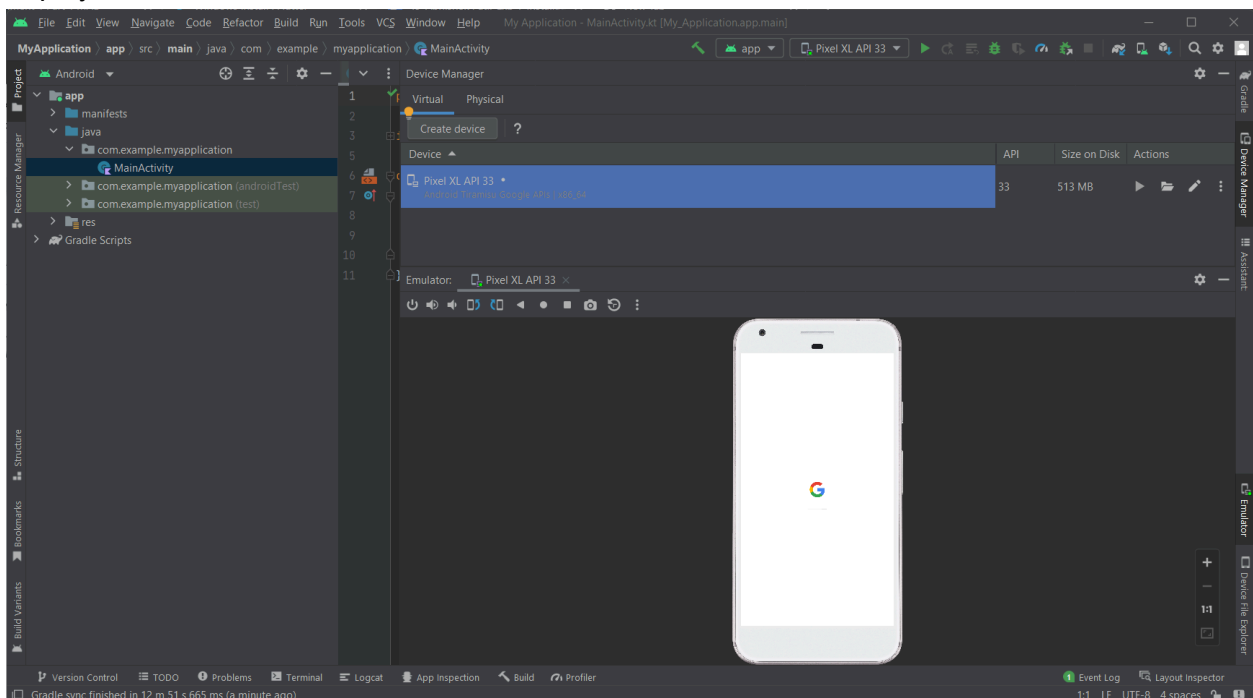


Step 8.3: Select the system image for the latest Android version and click on Next.

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



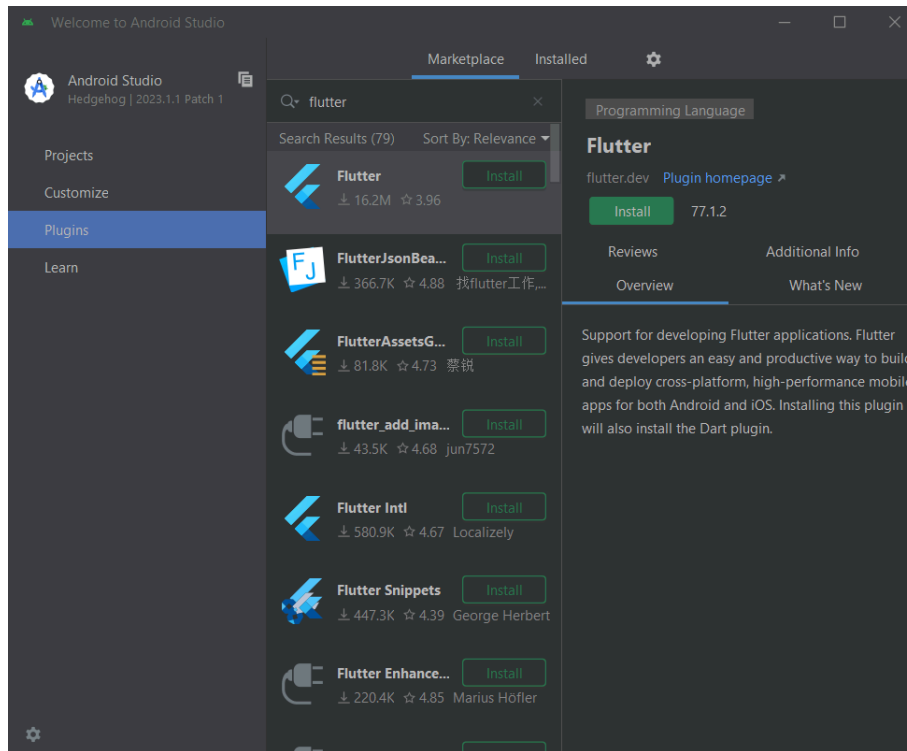
Step 8.5: Last, click on the icon pointed into the red color rectangle. The Android emulator displayed as below screen.



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 :

In conclusion, we efficiently achieved the installation and configuration of the Flutter environment on Windows. With its use of Dart, and developer-friendly tools, Flutter proves valuable for cross-platform development. Thus we have created a foundation for our future flutter application development.