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MPI Practical 1

Aim:

To install and configure the Flutter development environment for building cross-platform applications using Dart.

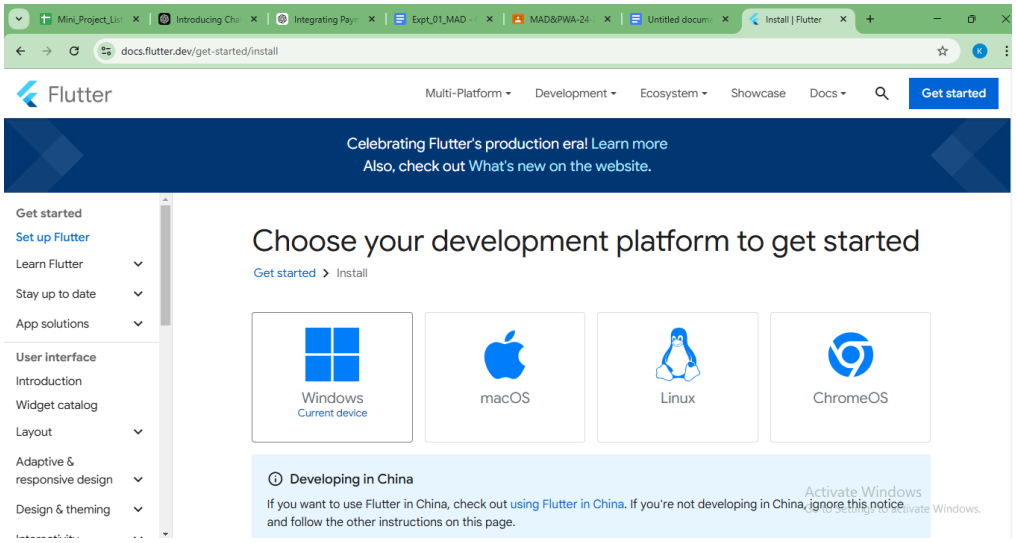
Theory:

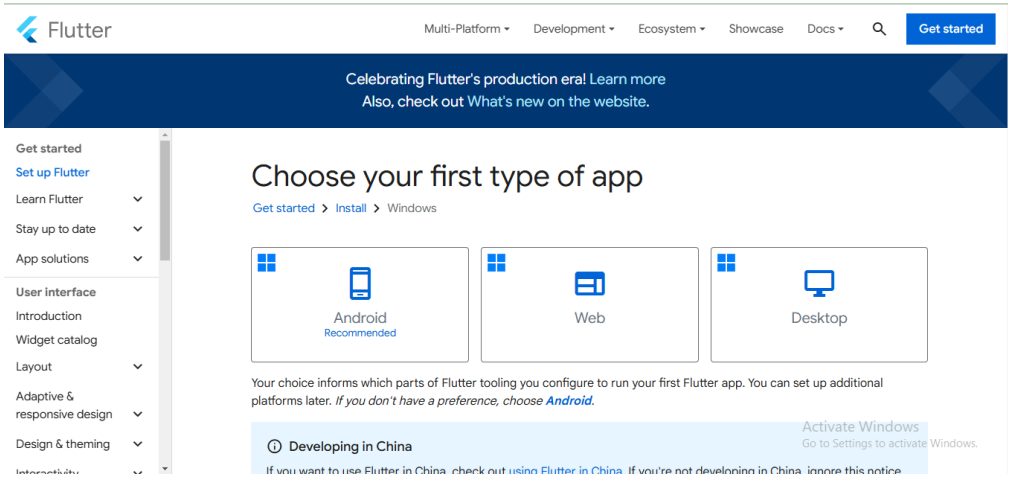
Flutter is an open-source UI software development kit created by Google. It is used to develop applications for mobile (Android & iOS), web, and desktop from a single codebase. Flutter uses the Dart programming language and provides a rich set of pre-designed widgets for creating responsive UI.

The installation and configuration of the Flutter environment involve the following steps:

1. **Installing Flutter SDK** – Download and extract the Flutter SDK from the official website.
2. **Setting Up Environment Variables** – Add Flutter to the system's PATH to enable global access.
3. **Installing Required Dependencies** – Ensure that necessary dependencies like Git and Android Studio are installed.
4. **Setting Up an Emulator or Physical Device** – Use Android Studio's emulator or connect a physical device for testing.
5. **Verifying Installation** – Run `flutter doctor` to check for missing dependencies and configuration issues.
6. **Setting Up an IDE** – Use VS Code, Android Studio, or IntelliJ IDEA with the Flutter and Dart plugins for efficient development.
7. **Running a Sample App** – Execute `flutter create my_app` followed by `flutter run` to verify the setup.

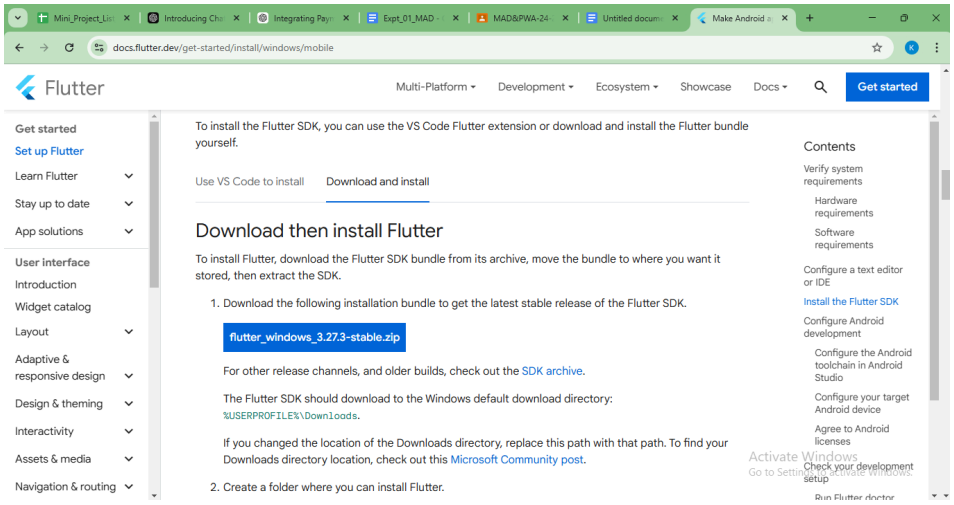
Step 1: Download the installation bundle of the Flutter Software Development Kit for windows. To download Flutter SDK, Go to its official website https://docs.flutter.dev/get-started/install , you will get the following screen.





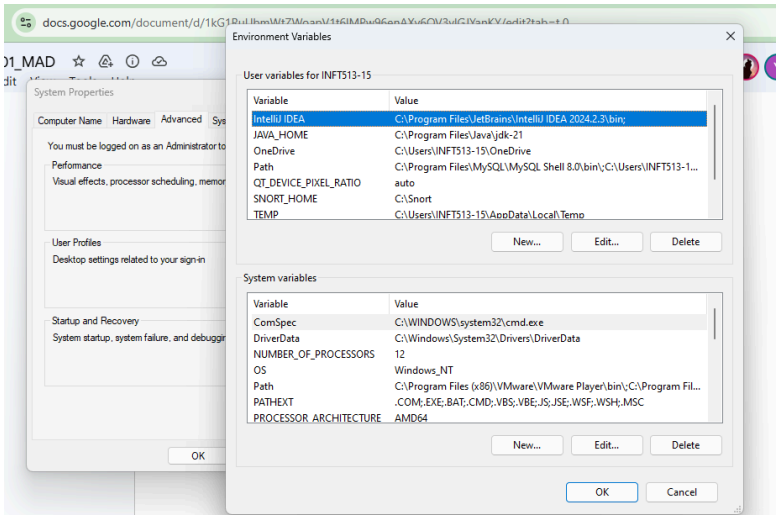
Step 2: Next, to download the latest Flutter SDK, click on the Windows icon. Here, you will find the download link for SDK.

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.



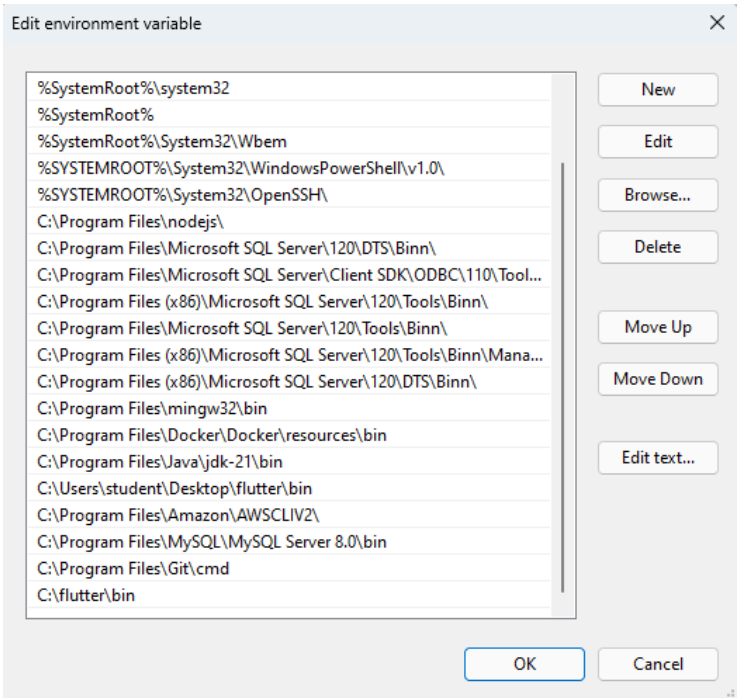
Step 4: To run the Flutter command in regular windows console, you need to update the system path to include the flutter bin directory. The following steps are required to do this:

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



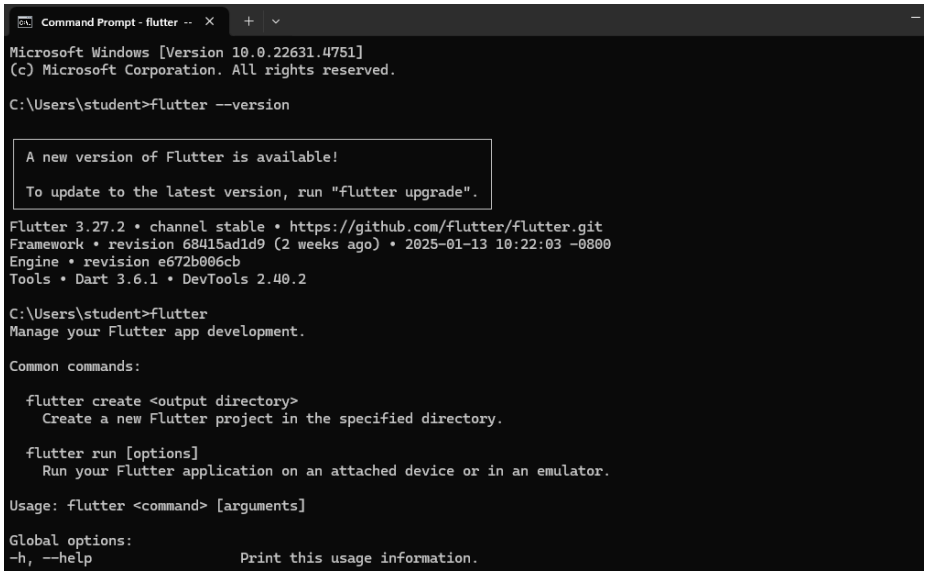
Step 4.2: Now, select path -> click on edit. The following screen appears

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.

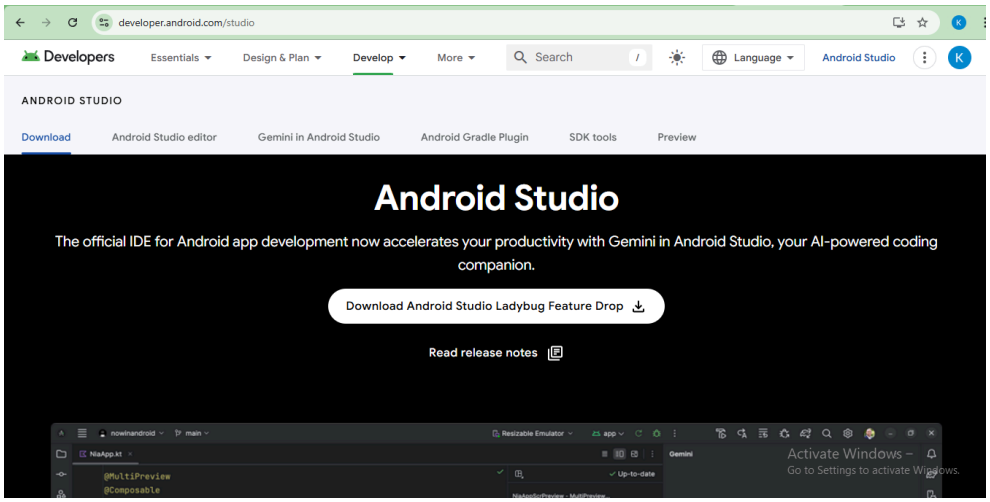


Step 6: When you run the above command, it will analyze the system and show its report, as shown in the below image. Here, you will find the details of all missing tools, which required to run Flutter as well as the development tools that are available but not connected with the device.

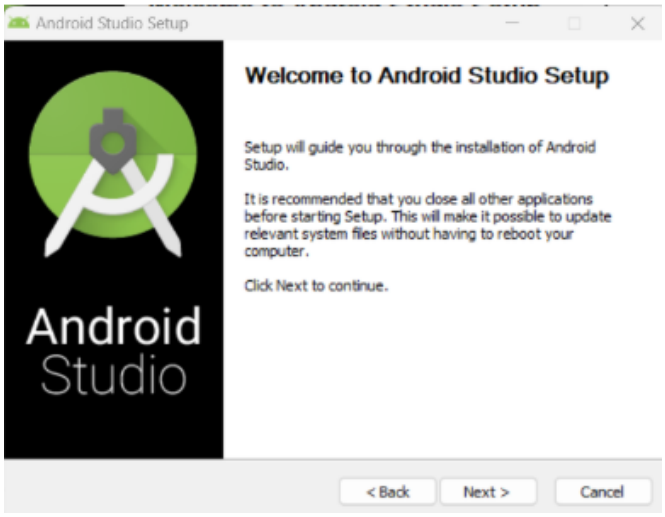
```
C:\Users\student>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, 3.27.2, on Microsoft Windows [Version 10.0.22631.4751], locale en-IN)
[√] Windows Version (Installed version of Windows is version 10 or higher)
[!] Android toolchain - develop for Android devices (Android SDK version 34.0.0)
    X cmdline-tools component is missing
      Run `path/to/sdkmanager --install "cmdline-tools;latest"`
      See https://developer.android.com/studio/command-line for more details.
    X Android license status unknown.
      Run `flutter doctor --android-licenses` to accept the SDK licenses.
      See https://flutter.dev/to/windows-android-setup for more details.
[√] 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 1.96.4)
[√] Connected device (3 available)
[√] Network resources

! Doctor found issues in 2 categories.

C:\Users\student>
```

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.

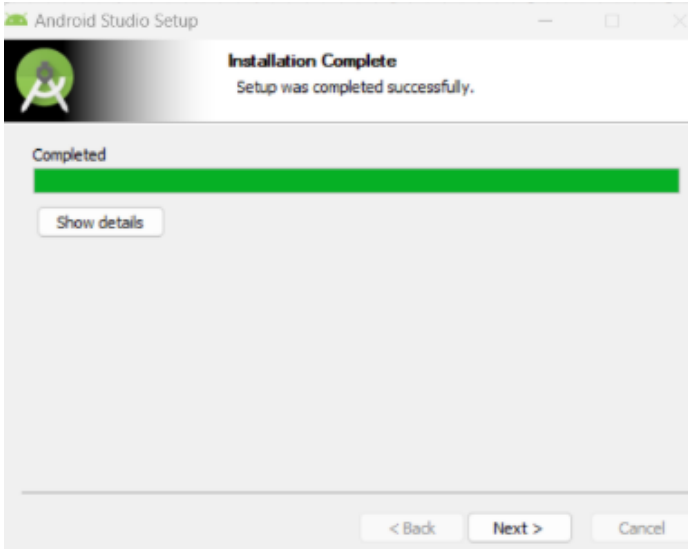
Step 7.1: Download the latest Android Studio executable or zip file from the official site.



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



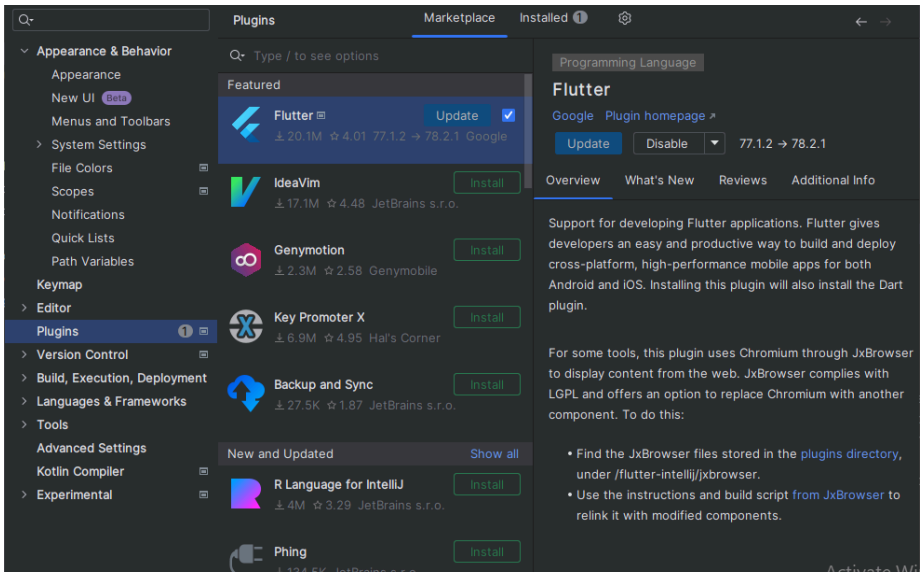
Step 7.3: Follow the steps of the installation wizard. Once the installation wizard completes, you will get the following screen.



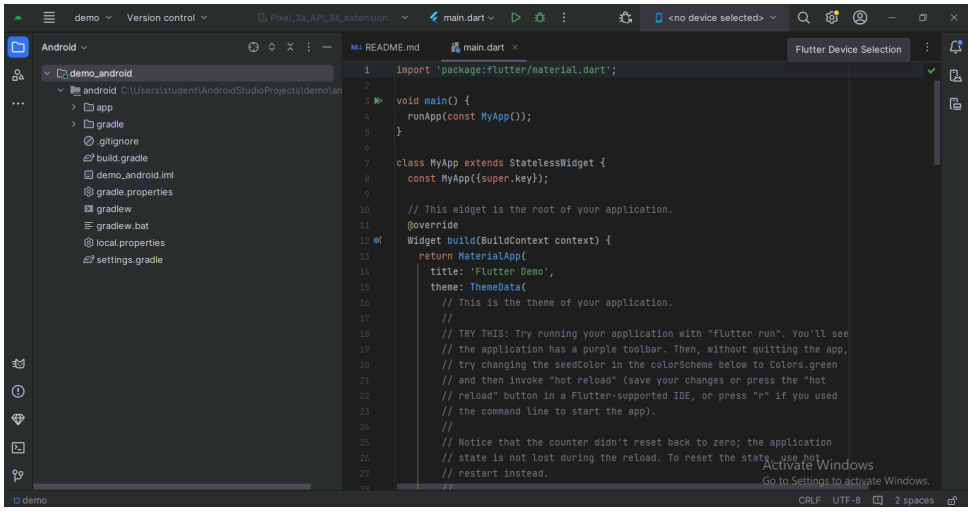
Step 7.4: In the above screen, click Next-> Finish. Once the Finish button is clicked, you need to
choose the 'Don't import Settings option' and click OK. It will start the Android Studio.

Step 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.

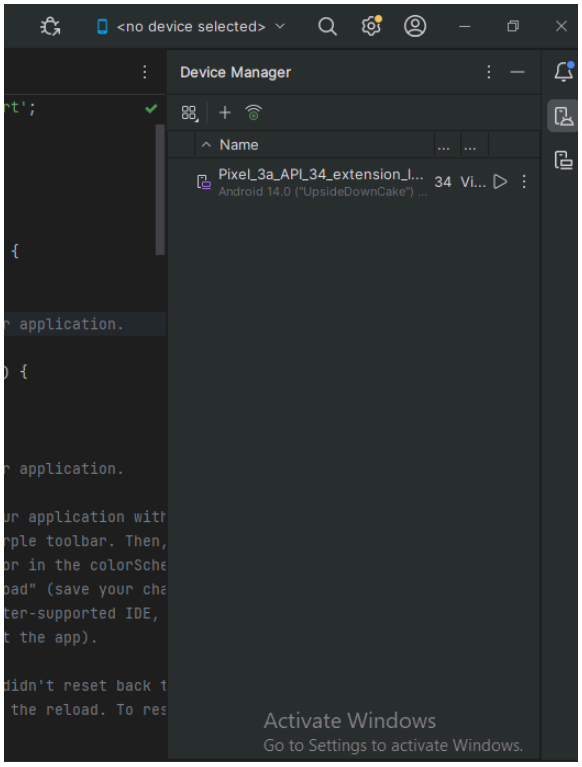


Step 8.2: Choose your device definition and click on Next.

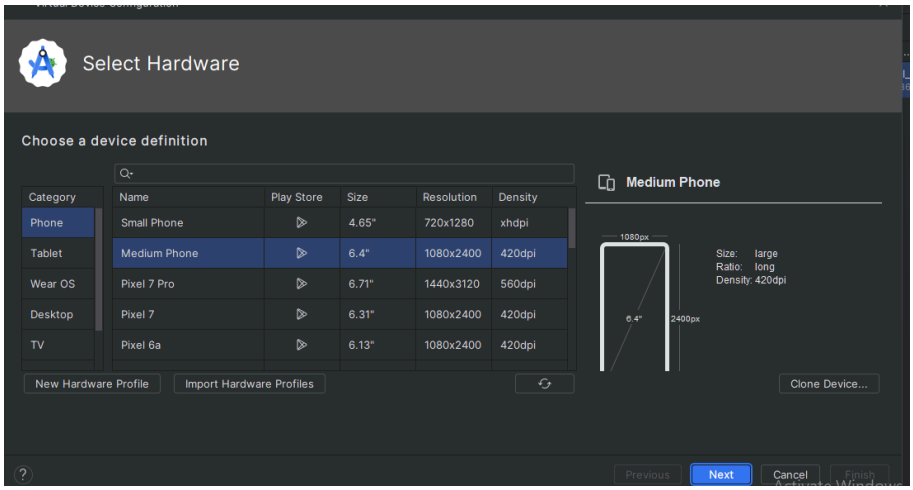


Step 8.3: Select the system image for the latest Android version and click on Next.

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

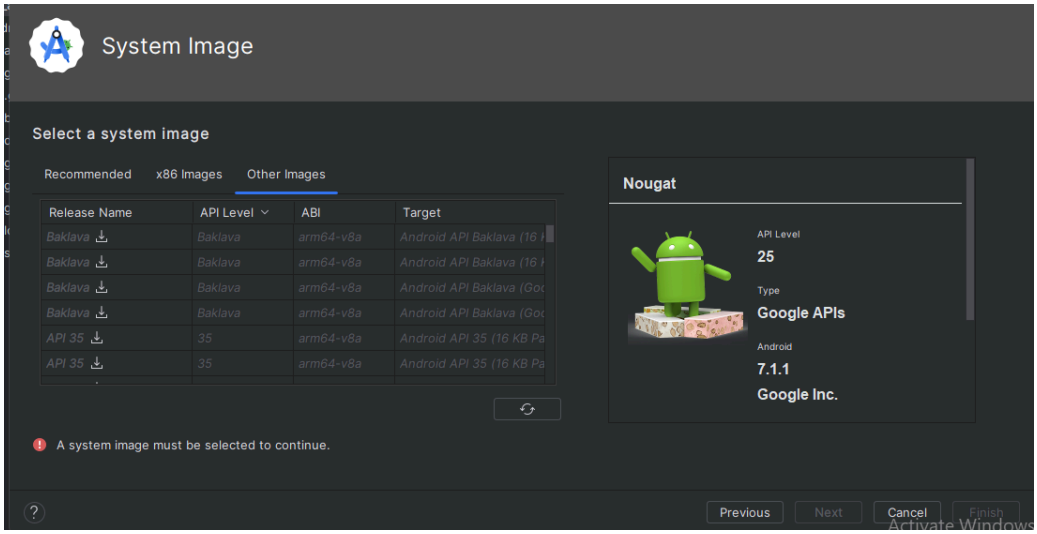


Step 8.5: Last, click on the icon pointed into the red color rectangle. The Android emulator



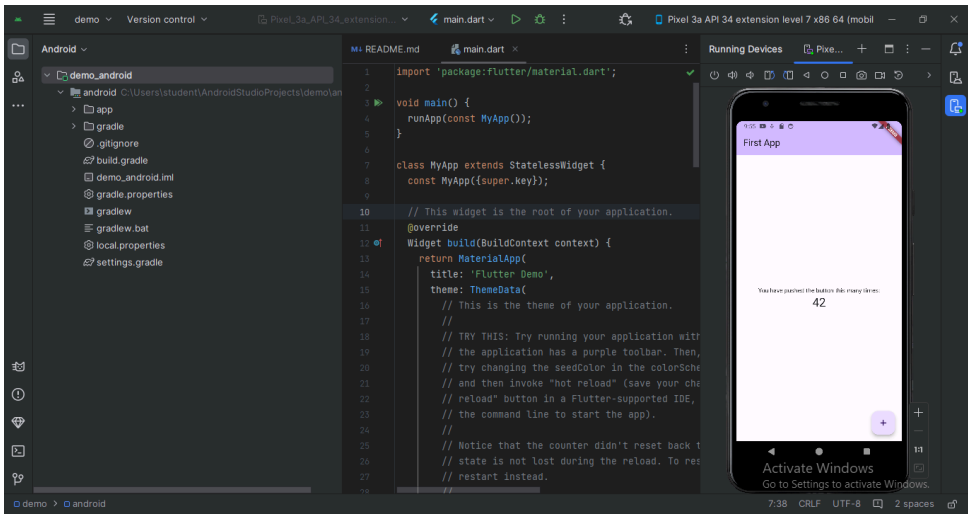
Step 9: Now, install Flutter and Dart plugin for building Flutter application in Android Studio. These plugins provide a template to create a Flutter application, give an option to run and debug Flutter application in the Android Studio itself. Do the following steps to install these plugins.

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 successful installation and configuration of Flutter ensure a properly set up development environment for building cross-platform applications efficiently. By completing this setup, developers can start coding, testing, and deploying Flutter applications seamlessly.