

Experiment No.1

- **Aim:** Installation and Configuration of Flutter Environment.

- **Theory:**

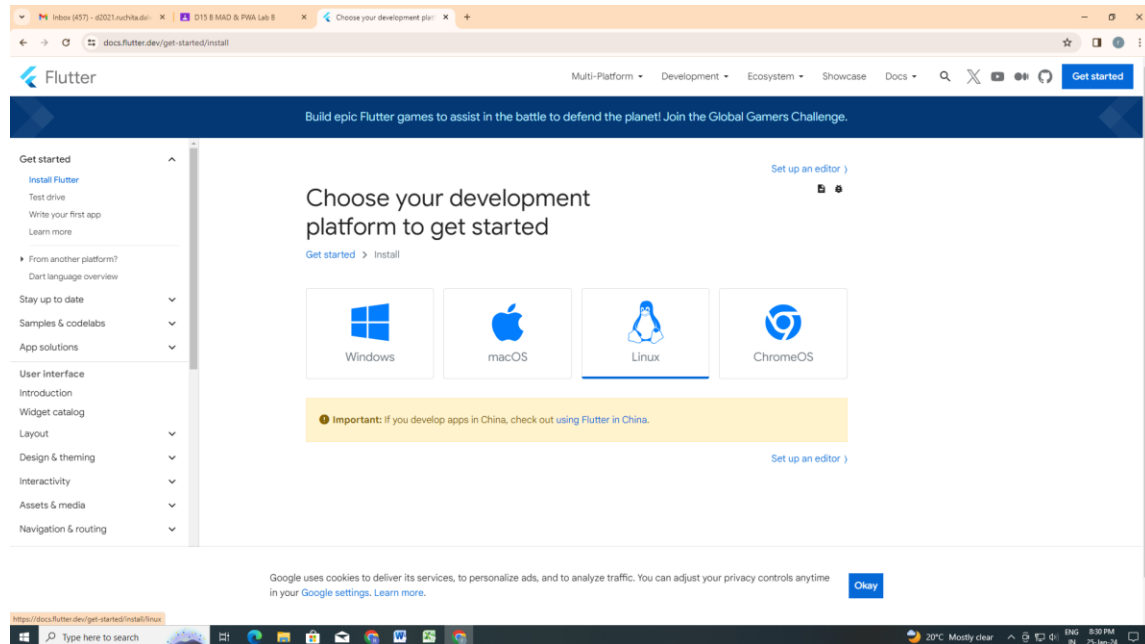
Flutter is an open-source UI software development toolkit created by Google. It is used to build natively compiled applications for mobile, web, and desktop from a single codebase. Flutter allows developers to use a single codebase to create high-quality, high-performance applications for multiple platforms, eliminating the need to write separate code for iOS and Android.

Key features of Flutter include:

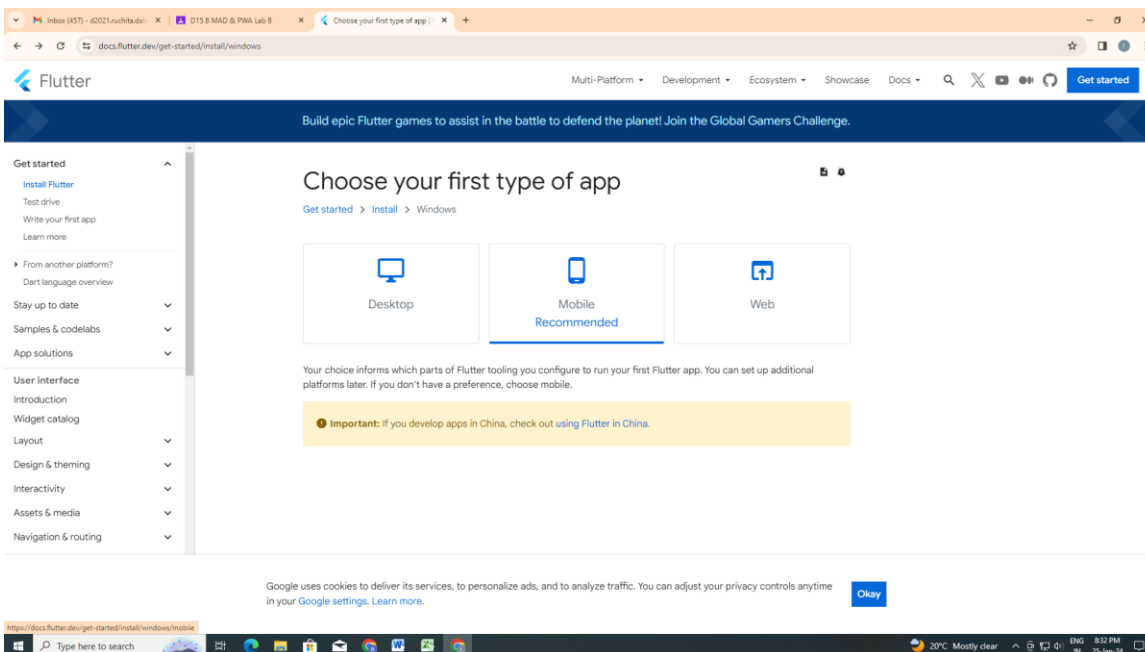
- **Dart Programming Language:** Flutter apps are written in Dart, a modern, object-oriented programming language also developed by Google.
- **Widget-based Framework:** Flutter uses a widget-based framework where everything in the UI is a widget. Widgets are combined to create complex UIs, and the framework provides a rich set of pre-designed widgets for common interface elements.
- **Hot Reload:** One of the standout features of Flutter is its Hot Reload capability, which allows developers to see the results of code changes instantly, without restarting the application. This greatly speeds up the development process and enhances productivity.
- **Expressive UI:** Flutter provides a rich set of customizable widgets that allow developers to create expressive and visually appealing user interfaces.
- **Single Codebase:** Developers can write code once and run it on multiple platforms, including iOS, Android, web, and desktop. This helps in reducing development time and maintenance efforts.
- **Performance:** Flutter apps are compiled to native machine code, resulting in high performance and smooth animations.
- **Community and Ecosystem:** Flutter has a growing and active community, and it has gained popularity for mobile app development. The ecosystem includes various plugins and packages that developers can use to extend the functionality of their applications.

- **Install the Flutter SDK:**

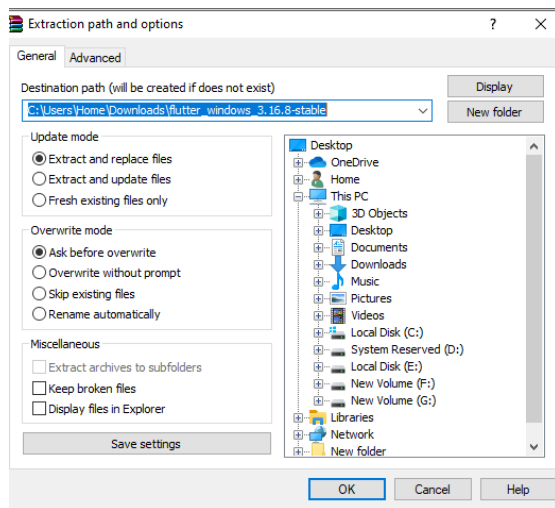
Step: 1 Visit the official Flutter Software Development Kit website at <https://docs.flutter.dev/get-started/install> and click on windows.



Step: 2 Click on mobile , where you'll discover the SDK download link.

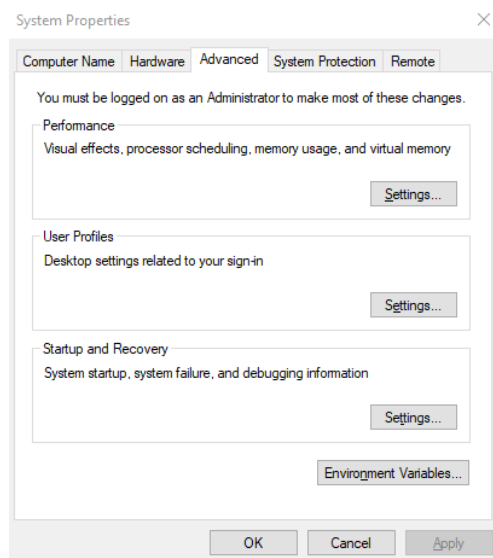


Step: 3 After downloading, unzip the file.

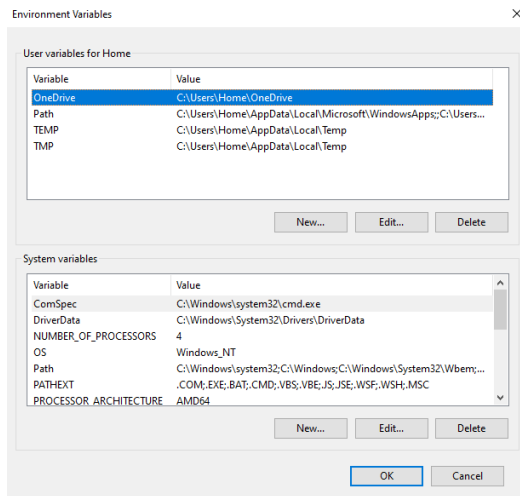


Step 4: Updating the system path on a regular Windows console to include the Flutter bin directory is necessary for running Flutter commands. To achieve this, follow the steps outlined below:

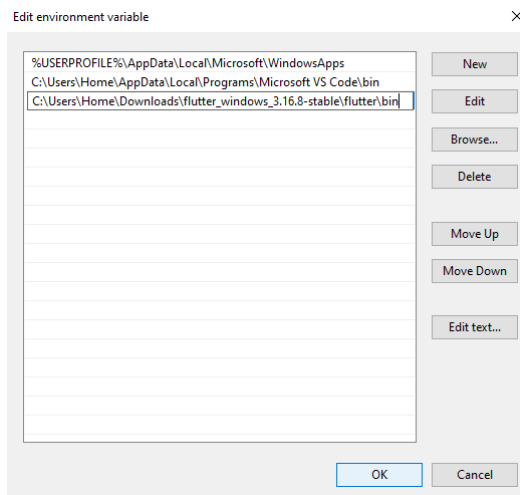
Step 4.1: Go to system properties.



Step 4.2: Go to environment variables. Choose the "Edit" option after selecting the path, and you will be directed to the ensuing screen.



Step 4.3: Select New option in the current window, then input the path of the Flutter bin folder in the Variable Value field. Click on OK.



Step 5: Execute the command \$ flutter in the command prompt.

```
Command Prompt - flutter
Microsoft Windows [Version 10.0.19045.3930]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Home>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
                        target device id or name (prefixes allowed).
-d, --device-id       Reports the version of this tool.
                        Enable telemetry reporting each time a flutter or dart command runs.
                        --enable-analytics
                        Disable telemetry reporting each time a flutter or dart command runs, until it is
                        re-enabled.
                        --disable-analytics
                        Suppress analytics reporting for the current CLI invocation.
                        --suppress-analytics

Available commands:

Flutter SDK
bash-completion      Output command line shell completion setup scripts.
channel              List or switch Flutter channels.
config               Configure Flutter settings.
doctor               Show information about the installed tooling.
downgrade             Downgrade Flutter to the last active version for the current channel.
precache              Populate the Flutter tool's cache of binary artifacts.
upgrade              Upgrade your copy of Flutter.

Project
analyze              Analyze the project's Dart code.
assemble             Assemble and build Flutter resources.
build                Build an executable app or install bundle.
clean                Delete the build/ and .dart_tool/ directories.
create               Create a new Flutter project.
drive                Run integration tests for the project on an attached device or emulator.
gen-l10n              Generate localizations for the current project.
pub                  Commands for managing Flutter packages.
run                  Run your Flutter app on an attached device.
test                 Run Flutter unit tests for the current project.

Tools & Devices
attach               Attach to a running app.
custom-devices       List, reset, add and delete custom devices.
devices              List all connected devices.
emulators             List, launch and create emulators.
install              Install a Flutter app on an attached device.
logs                  Show log output for running Flutter apps.
screenshot            Take a screenshot from a connected device.
symbolize             Symbolize a stack trace from an AOT-compiled Flutter app.

Run "flutter help <command>" for more information about a command.
Run "flutter help -v" for verbose help output, including less commonly used options.
```

Step 6: 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\Home>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 3.16.8, on Microsoft Windows [Version 10.0.19045.3930], locale en-US)
[✓] 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
[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 (not installed)
[✓] VS Code (version 1.85.2)
[✓] Connected device (3 available)
[✓] Network resources

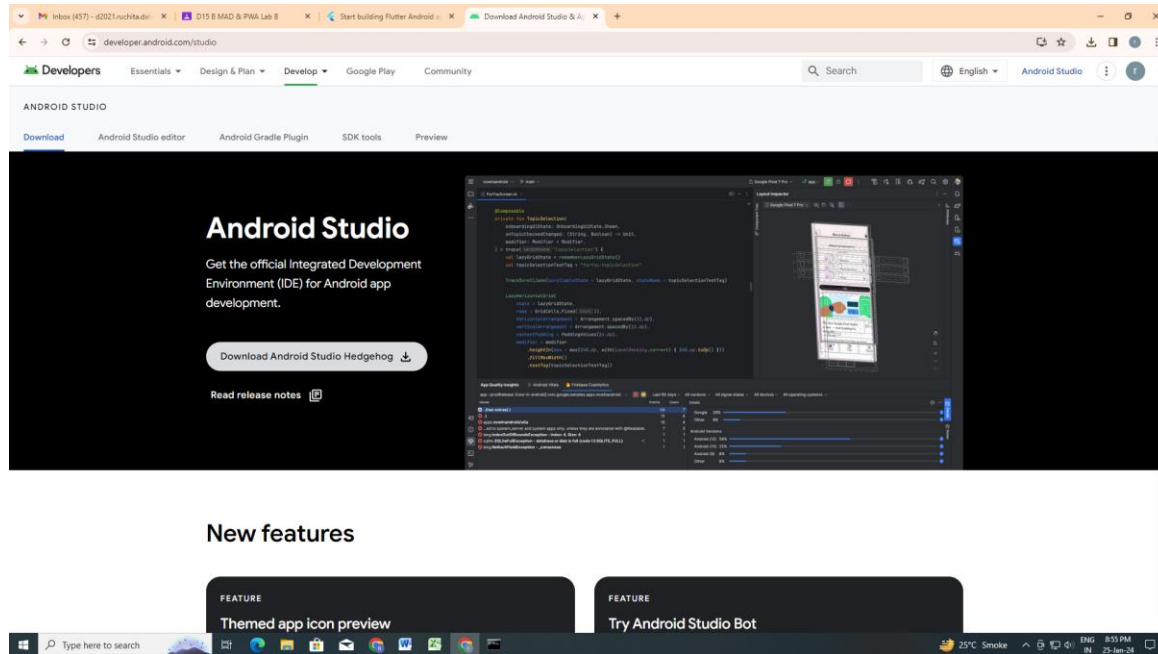
! Doctor found issues in 3 categories.

C:\Users\Home>
```

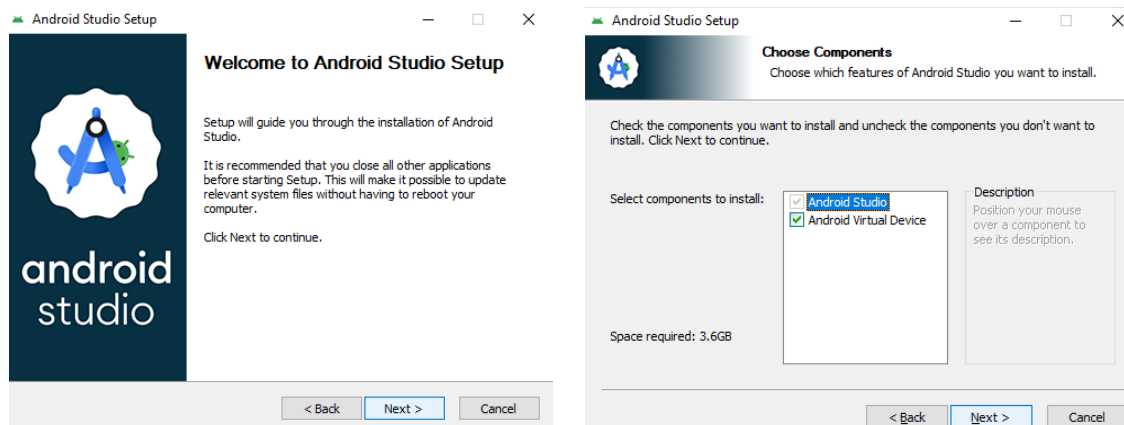
When you execute the provided command, it will conduct a system analysis and generate a report, displaying information about missing tools essential for running Flutter. The report will also outline available development tools that are not currently linked with the device. This information is presented in a detailed format, as illustrated in the accompanying image.

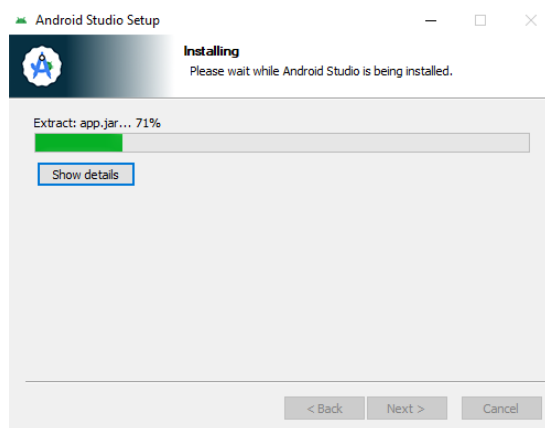
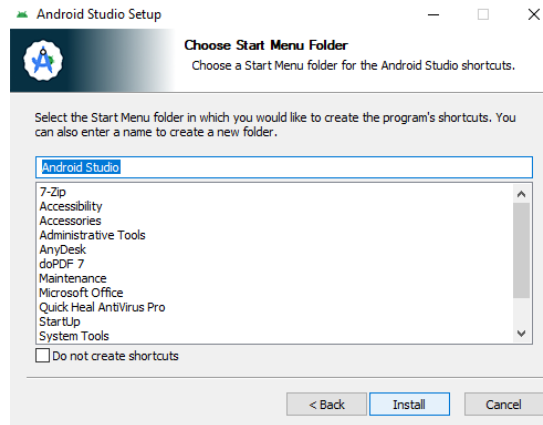
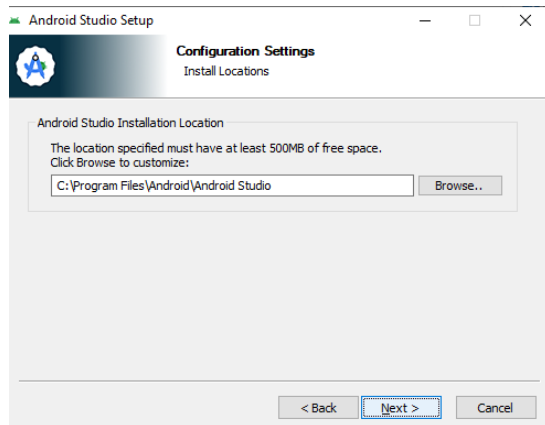
Step 7: To set up the Android SDK, install the Android Studio IDE if the flutter doctor command doesn't detect the Android SDK tool on your system. Follow these steps to install the Android Studio IDE.

Step 7.1: Download the latest Android Studio executable or zip file from the official site (<https://developer.android.com/studio>).

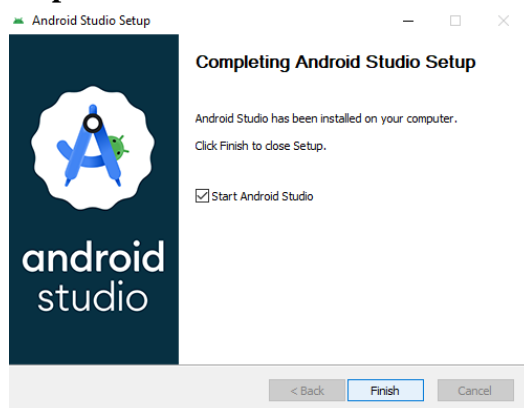


Step 7.2: Upon completion of the download, proceed to open and run the .exe file. A dialog box will then appear go on following the steps of the installation wizard.

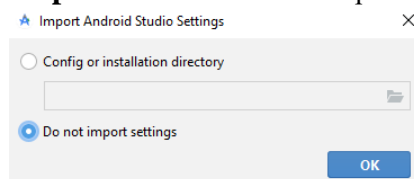




Step 7.3: Once the installation wizard completes, you will get the following screen click on finish.



Step 7.4: Choose '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.

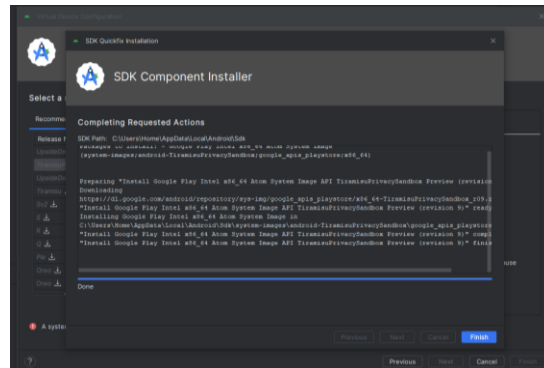
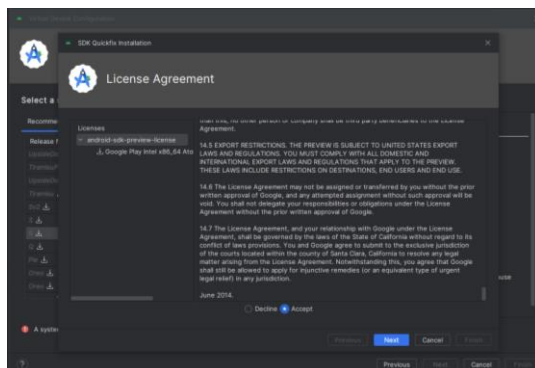
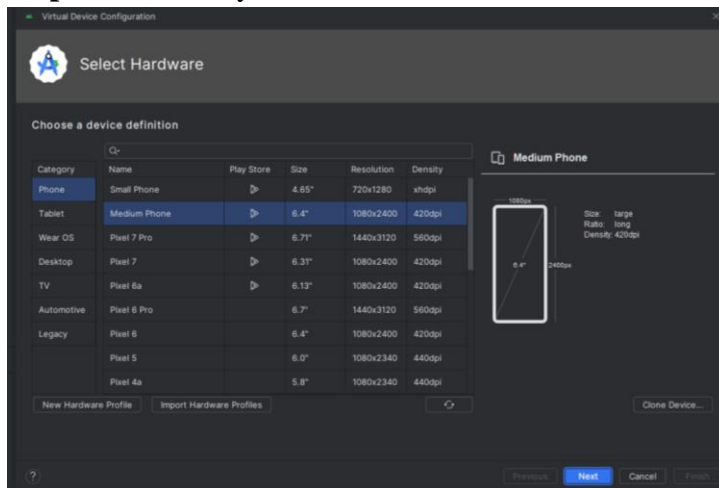
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[X] Visual Studio - develop Windows apps
    X Visual Studio not installed; this is necessary to develop Windows apps.
      Download at https://visualstudio.microsoft.com/downloads/.
      Please install the "Desktop development with C++" workload, including all of its default components
[✓] Android Studio (version 2023.1)
[✓] VS Code (version 1.85.2)
[✓] Connected device (3 available)
[✓] Network resources

! Doctor found issues in 2 categories.
```

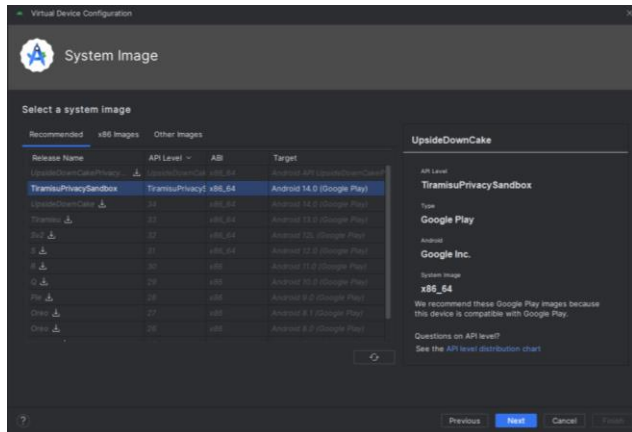
Step 8: Set up an Android emulator..

Step 8.1: Generate a virtual Android emulator by going to Android Studio, then choosing Tools > Android > AVD Manager. Alternatively, you can access it by navigating to Help -> Find Action, and entering "Emulator" in the search box to access the relevant screen.

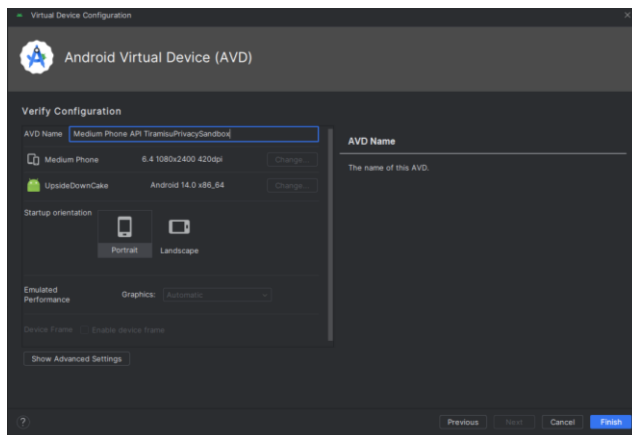
Step 8.2: Choose your device definition and click on Next and accept the agreement.



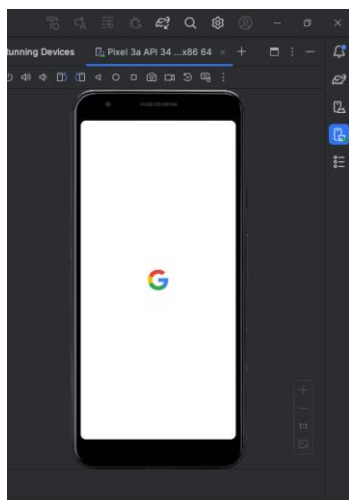
Step 8.3: Select the system image for the latest Android version and click on Next.



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

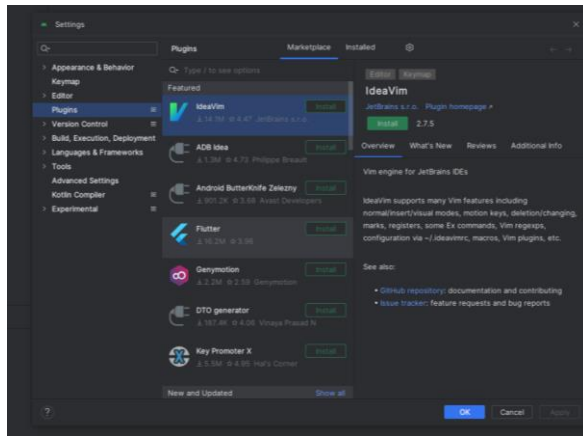


Step 8.5: After running the created virtual device, The Android emulator is displayed as below screen.

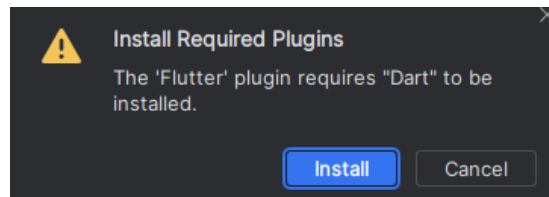
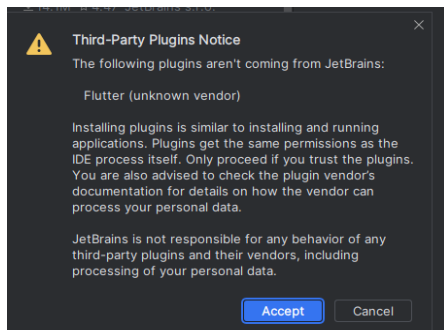


Step 9: configure the Flutter and Dart plugins for Android Studio to facilitate the development of Flutter applications. Follow these steps:

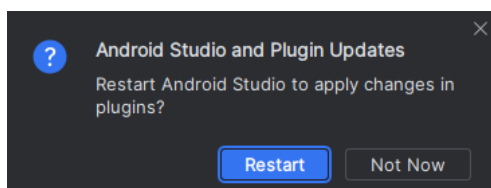
Step 9.1: In Android Studio and then go to File and then click on Settings there you will find Plugins.



Step 9.2: Accept agreement and click on install.



Step 9.2: Restart IDE.



- **Conclusion:**

Therefore, we now have a grasp of the steps involved in installing and configuring the Flutter environment. This includes installing the Flutter SDK, configuring Android Studio, and completing the setup by creating and integrating a virtual device within Android Studio.