



## EXPERIMENT – 1

**AIM:**

- Install Flutter and Dart SDK.
- Write a simple Dart program to understand the language basics.
- Write a Dart console program that prints your name, checks age with Conditionals, uses a loop to count from 1 to 5, and defines a function to return the sum of two numbers.

**SOLUTION:**

### Experiment - 1(a)

**AIM:** Install Flutter and Dart SDK.

## Install and Configure Flutter SDK on Windows:

Flutter, a revolutionary open-source UI software development kit by Google, is a game-changer in mobile app development. Its cross-platform capabilities enable developers to create high-performance, natively compiled applications for both iOS and Android using a single codebase. This not only accelerates development but also significantly reduces time and costs. With Flutter, developers harness a robust widget library, offering a rich set of pre-designed widgets for creating visually stunning and customized user interfaces. It's hot-reload feature facilitates real-time code changes and immediate feedback, streamlining the development process. In an increasingly competitive app market, Flutter empowers businesses to reach a wider audience efficiently. Its appeal extends to both startups and established enterprises seeking a cost-effective and agile solution for mobile app development.

**System requirements:**

**Operating Systems:** Windows 10 or later (64-bit), x86-64 based.

**Disk Space:** 2.5 GB (does not include disk space for IDE/tools).

**Tools:** Flutter depends on these tools being available in your environment.

- Windows PowerShell 5.0 or newer (this is pre-installed with Windows 10)
- Git for Windows 2.x, with the **Use Git from the Windows Command Prompt** option. If Git for Windows is already installed, make sure you can run git commands from the command prompt or PowerShell.

## Get the Flutter SDK

**Step 1:** Download the following installation bundle to get the latest stable release of the Flutter SDK.  
URL:

[https://storage.googleapis.com/flutter\\_infra\\_release/releases/stable/windows/flutter\\_windows\\_3.13.7-stable.zip](https://storage.googleapis.com/flutter_infra_release/releases/stable/windows/flutter_windows_3.13.7-stable.zip)

**Step 2:** Extract the File: Extract the downloaded zip file and move it to the desired location where you want to install Flutter SDK.

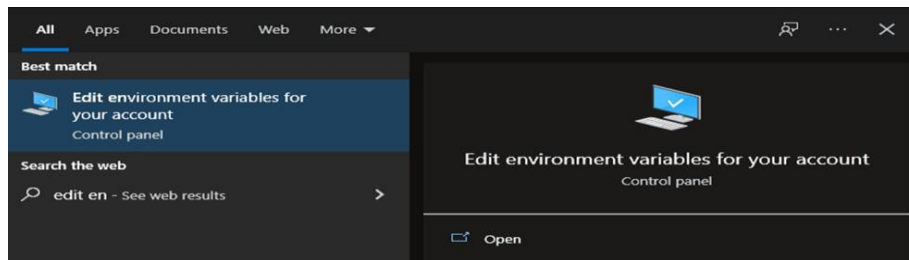
Do not install it in a folder or directory that requires elevated privileges, (such as `C:\Program Files\`) to ensure the program runs properly. For this tutorial, it will be stored in `C:\development\flutter`.

You are now ready to run Flutter commands in the Flutter Console.

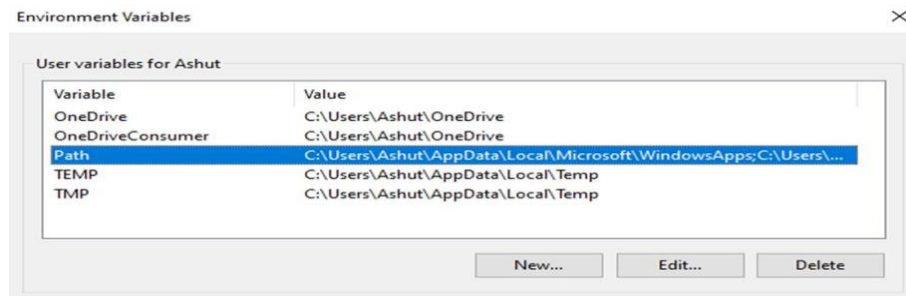
### Step 3: Update Path Variable for Windows PowerShell

If you wish to run Flutter commands in the regular Windows console, take these steps to add Flutter to the PATH environment variable:

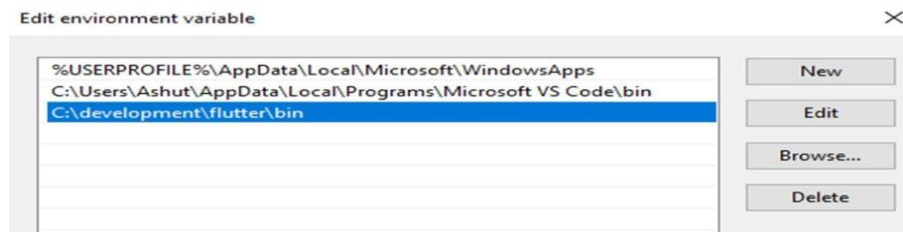
- From the Start search bar, enter 'env' and select Edit environment variables for your account.



- Under **User variables** check if there is an entry called **Path**:
- If the entry exists, append the full path to flutter\bin using ; as a separator from existing values.



On the next screen, click **New** and add the full path to your `flutter\bin` directory. For this guide, it is shown below. Click OK on both windows to enable running Flutter commands in Windows consoles.



If the entry doesn't exist, create a new user variable named `Path` with the full path to `flutter\bin` as its value.

### Step 4: Confirm Installed Tools for Running Flutter

In CMD, run the *flutter doctor* command to confirm the installed tools along with brief descriptions. As visible, several components still need to be installed to complete the installation.

```

C:\Administrator: Flutter Console - flutter doctor

Want to run the "flutter" command from any Command Prompt or PowerShell window?
Add Flutter to your PATH: https://flutter.dev/setup-windows/#update-your-path

=====

C:\Users\Ashut>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 3.13.7, on Microsoft Windows [Version 10.0.19045.3570], 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/windowsandroid-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
    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 1.83.0)
[✓] Connected device (3 available)
[✓] Network resources

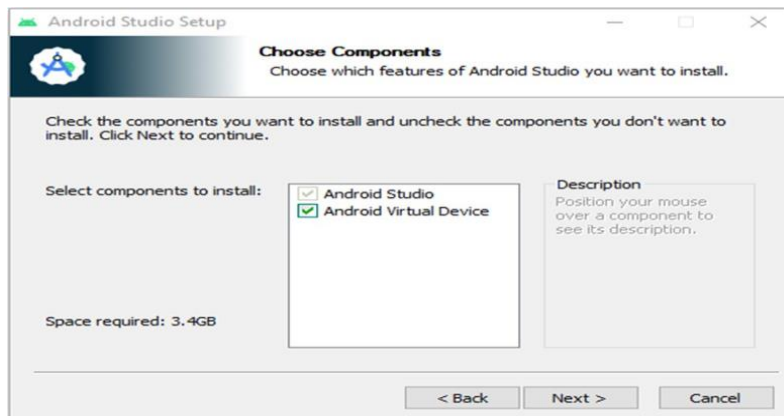
! Doctor found issues in 3 categories.

```

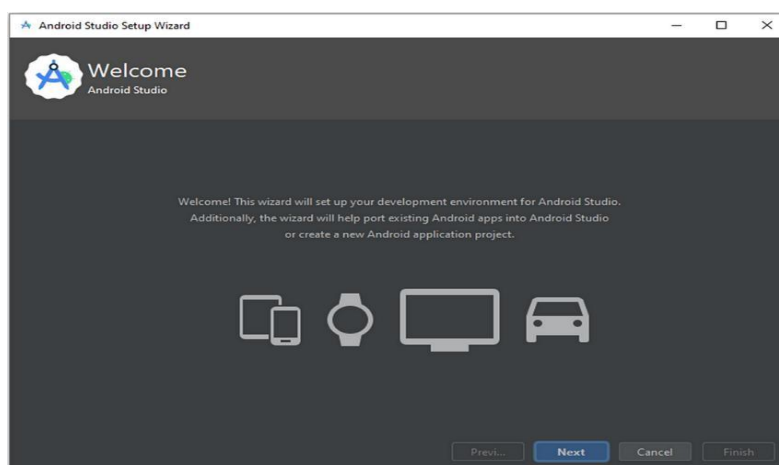
## Step 5: Download and Install Android Studio

Visit the official Android Studio download page at <https://developer.android.com/studio>. Click on the “Download Android Studio” button.

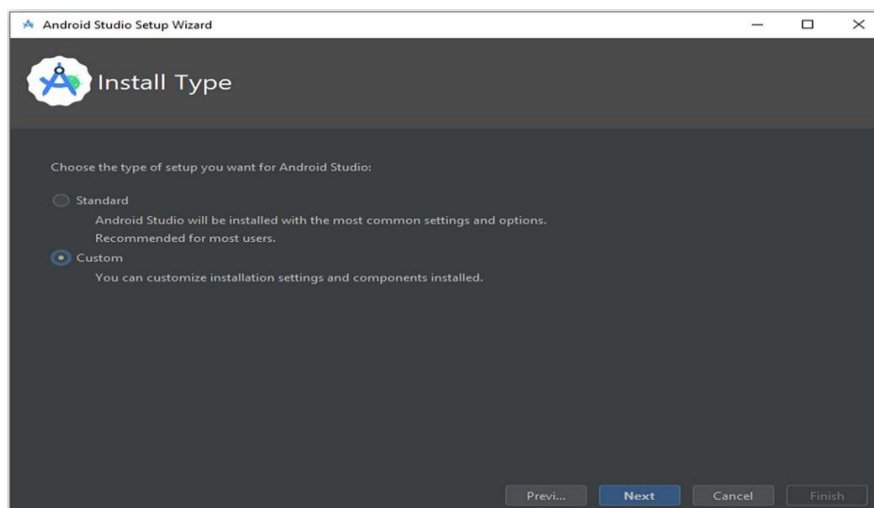
Next, proceed by downloading Android Studio. During the setup, unless you have unique requirements, simply click “Next” on all screens to keep the default settings. On the “Choose Components” screen, be sure to select the “Android Virtual Device” option to enable an Android emulator for your app development needs.



Afterward, The Android Studio Setup Wizard will start and you can proceed by clicking **Next**.

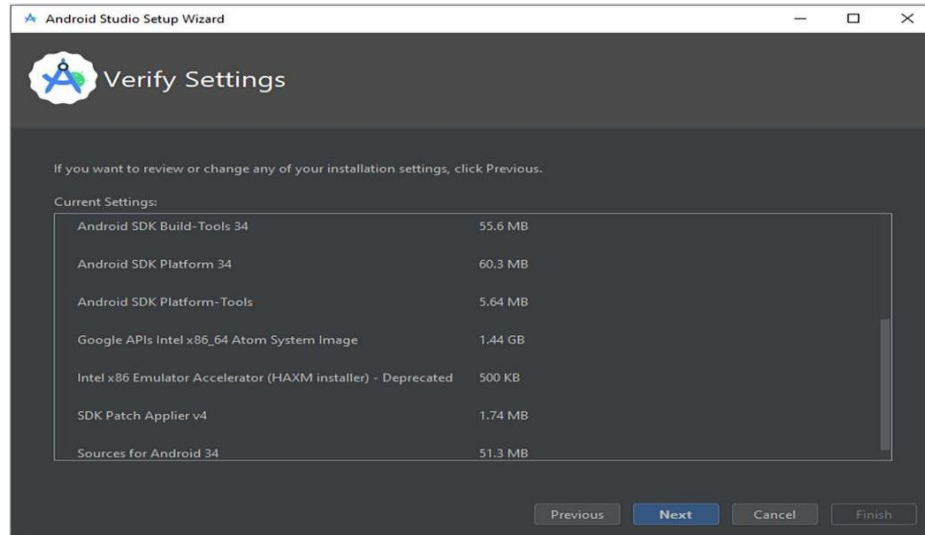


On the Install Type screen, select Custom and click **Next**.

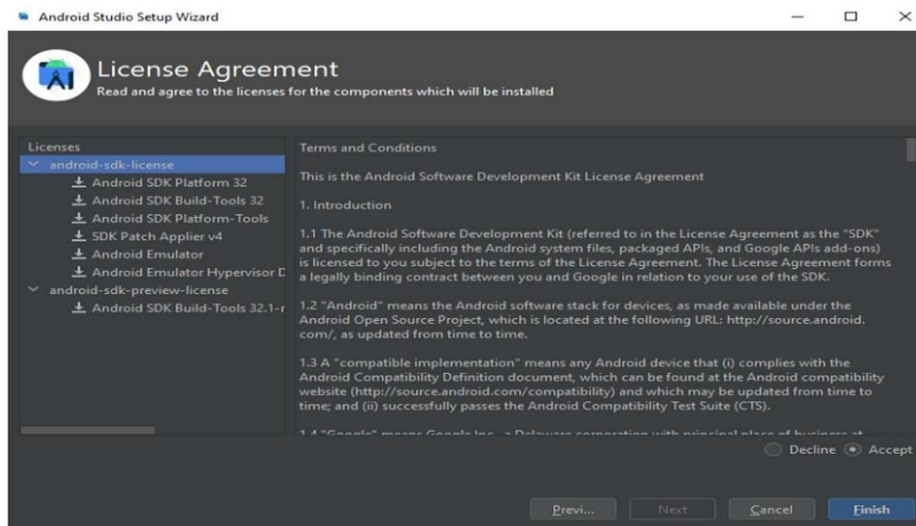




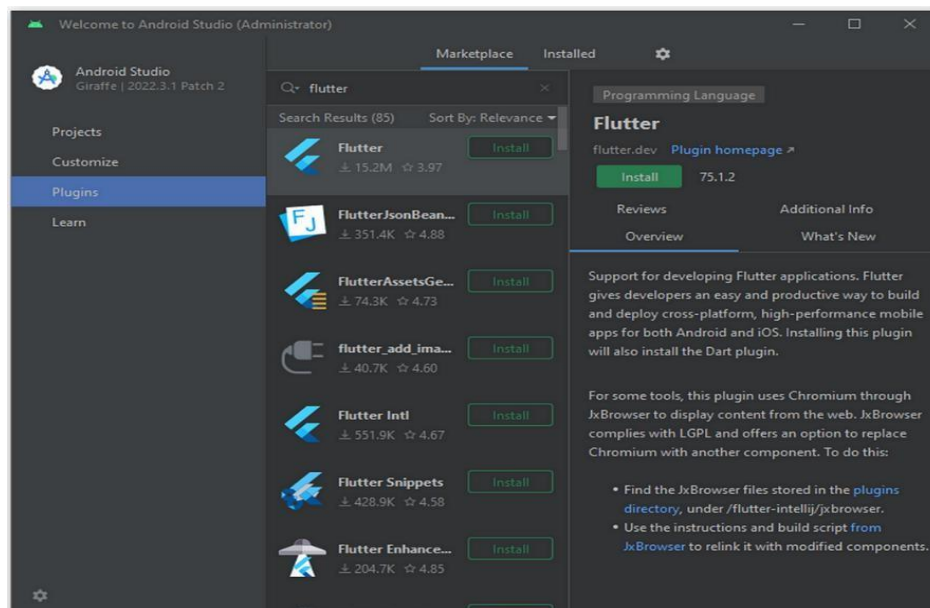
Verify the settings and click **Next**.



On the next screen, accept the License Agreement and click **Finish**.



The download of the components will start and Android Studio install. Once completed, click **Finish**. After the installation, start Android Studio. On the left side, click **Plugins**. Search for Flutter and click **Install** to install the Flutter plugin.









Android Studio was successfully installed; however, it found an issue with Android licenses. This issue is fairly common and is mitigated by running the following command in CMD.

flutter doctor --android-licenses

When asked, input **y** to all prompts, to accept licenses.

```
C:\Users\blup>flutter doctor --android-licenses
```

5 of 7 SDK package licenses not accepted. 100% Computing updates...

Review licenses that have not been accepted (y/N)? y

Running the *Flutter Doctor* command again shows the issue resolved.

```
C:\Users\blup>flutter doctor
```

Doctor summary (to see all details, run flutter doctor -v):

[√] Flutter (Channel stable, 2.10.4, on Microsoft Windows [Version 10.0.19041.746], locale en-US)

```
[√] Android toolchain - develop for Android devices (Android SDK version 32.1.0-rc1)
```

Chrome - develop for the web

[X] Visual Studio - develop for Windows

X Visual Studio not installed; this is necessary for Windows development.

Download at <https://visualstudio.microsoft.com/downloads/>.

Please install the "Desktop development with C++" workload, including all of its default components

[✓] Android Studio (version 2021.1)

[√] Connected device (2 available)

### [√] HTTP Host Availability

! Doctor found issues in 1 category.

## Step 6: Install Visual Studio (Optional)

The above output also shows that Visual Studio is not installed. Visual Studio is not needed unless you want to use Flutter for Windows desktop development.

If you need to use it, you can download Microsoft's Visual Studio 2022 with C++ ( URL: <https://visualstudio.microsoft.com/downloads/> ). Once the *VisualStudioSetup.exe* file is downloaded, open it and proceed with the installation by agreeing to all default installation options.

This installation requires at least 20 GB of free disk space. After the installation completes, run the *flutter doctor* command in CMD to confirm the Visual Studio installation.

```
C:\Users\blup>flutter doctor
```

Doctor summary (to see all details, run flutter doctor -v):

[√] Flutter (Channel stable, 2.10.4, on Microsoft Windows [Version 10.0.19041.746], locale en-US)

```
[✓] Android toolchain - develop for Android devices (Android SDK version 32.1.0-rc1)
```

Chrome - develop for the web

[✓] Visual Studio - develop for Windows (Visual Studio Community 2022 17.1.3)

[✓] Android Studio (version 2021.1)

[√] Connected device (2 available)

[√] HTTP Host Availability

- No issues found!

At this point, all the tools for Flutter projects are ready to be used for the development of Flutter apps. Depending on your needs, you can start your projects in Android Studio or Visual Studio.



### Experiment - 1(b)

**AIM:** Write a simple Dart program to understand the language basics.

**SOLUTION:**

```
// Define a main function, which is the entry point of a Dart program.
```

```
void main()
{
    // Variables and data types
    int myNumber = 10;
    double myDouble = 3.14;
    String myString = 'Hello World';
    bool myBool = true;

    // Printing variables
    print('My number is: $myNumber');
    print('My double is: $myDouble');
    print('My string is: $myString');
    print('My boolean is: $myBool');

    // Basic arithmetic operations
    int result = myNumber + 5;
    print('Result of addition: $result');

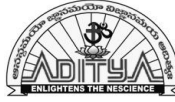
    // Conditional statements
    if (myBool)
    {
        print('myBool is true');
    }
    else
    {
        print('myBool is false');
    }

    // Loops
    for (int i = 0; i < 5; i++)
    {
        print('Iteration $i');
    }

    // Lists
    List numbers = [1, 2, 3, 4, 5];
    print('First element of the list: ${numbers[0]}');
    print('Length of the list: ${numbers.length}');

    // Maps
    Map branch_codes = { 'CSE': 05, 'AIML': 42, 'DS': 44 };
    print('List of Engineering branches with codes: $branch_codes');
    print('List of branches: ${branch_codes.keys}');
    print('List of branch codes: ${branch_codes.values}');
    print('AIML Branch code: ${branch_codes['AIML']}');
}
```





**Output:**

My number is: 10

My double is: 3.14

My string is: Hello World

My boolean is: true

Result of addition: 15

myBool is true

Iteration 0

### Iteration 1

### Iteration 2

### Iteration 3

### Iteration 4

First element of the list: 1

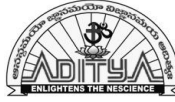
Length of the list: 5

List of Engineering branches with codes: {CSE: 5, AIML: 42, DS: 44}

List of branches: (CSE, AIML, DS)

List of branch codes: (5, 42, 44)

AIML Branch code: 42



### Experiment - 1(c)

**AIM:** Write a Dart console program that prints your name, checks age with conditionals, uses a loop to count from 1 to 5, and defines a function to return the sum of two numbers.

**SOLUTION:**

```
void main()
{
    // 1. Print your name
    String name = "Your Name";
    print("Hello, my name is $name.");

    // 2. Check age with conditionals
    int age = 18;
    if (age >= 18)
    {
        print("You are an adult.");
    }
    else
    {
        print("You are a minor.");
    }

    // 3. Loop to count from 1 to 5
    print("Counting from 1 to 5:");
    for (int i = 1; i <= 5; i++)
    {
        print(i);
    }

    // 4. Function to return the sum of two numbers
    int a = 10;
    int b = 15;
    int result = addNumbers(a, b);
    print("Sum of $a and $b is $result.");
}

// Function definition
int addNumbers(int num1, int num2)
{
    return num1 + num2;
}
```

**OUTPUT:**

Hello, my name is Your Name. You are an adult.

Counting from 1 to 5:

1  
2  
3  
4  
5

Sum of 10 and 15 is 25.