

**PRN: 121A3014**

## **Experiment No.: 1**

**Aim:** To install and configure Flutter Environment in Windows.

### **Theory:**

#### **Cross Platform App/Dev**

Cross-platform application development is about building a single application that can run on various operating systems, instead of developing different app versions for each platform. The driving force for cross-platform application development is to produce software that works well in more than one specific digital environment, with the main purpose of selling it to a wider customer base. When you work on cross-platform app development, you can launch your software quickly on various platforms. The source code is written once for all platforms. This means you don't need to hire a separate software development team for each platform, as it's possible to launch and update the software by using a variety of cross-platform development tools.

It requires the deployment of a single script instead of writing separate scripts for each platform. This significantly speeds up development time and cuts time to market, which benefits everyone, from the dev team all the way to marketing.

Since cross-platform applications are Internet-based, updates are nice and easy. Users don't have to download separate updates, which would require the maintenance and support of multiple app versions. The app is updated automatically for all customers to ensure they always have the most current version of the app, which positively impacts its performance.

#### **What is Flutter?**

Flutter was introduced by Google as an open-source technology for coding and creating native apps for Android and iOS. Flutter is relatively new as it was officially presented in December 2018 as the first stable version 1.0 at the Flutter Live event.

Flutter combines ease of development with performance similar to native performance while maintaining visual consistency between platforms. Flutter's programming language, Dart, was initially intended as a replacement for JavaScript. Most importantly, Flutter is open-source and completely free. As a cross-platform framework, Flutter most closely resembles React Native. Both allow for a reactive and declarative style of programming. Unlike React Native, however, Flutter doesn't need to use a JavaScript bridge, which improves app startup times and overall performance. Dart achieves this by using Ahead-Of-Time (AOT) compilation.



### **What is Dart?**

Dart is an open-source, general-purpose, object-oriented programming language with C- style syntax developed by Google in 2011. The purpose of Dart programming is to create a frontend user interfaces for the web and mobile apps. It is under active development, compiled to native machine code for building mobile apps, inspired by other programming languages such as Java, JavaScript, C#, and is Strongly Typed. Since Dart is a compiled language so you cannot execute your code directly; instead, the compiler parses it and transfer it into machine code.

It supports most of the common concepts of programming languages like classes, interfaces, functions, unlike other programming languages. Dart language does not support arrays directly. It supports collection, which is used to replicate the data structures such as arrays, etc.

**Example:** void main() {  
    for (int i = 0; i < 5; i++) {  
        print('hello \${i + 1}');  
    }  
}

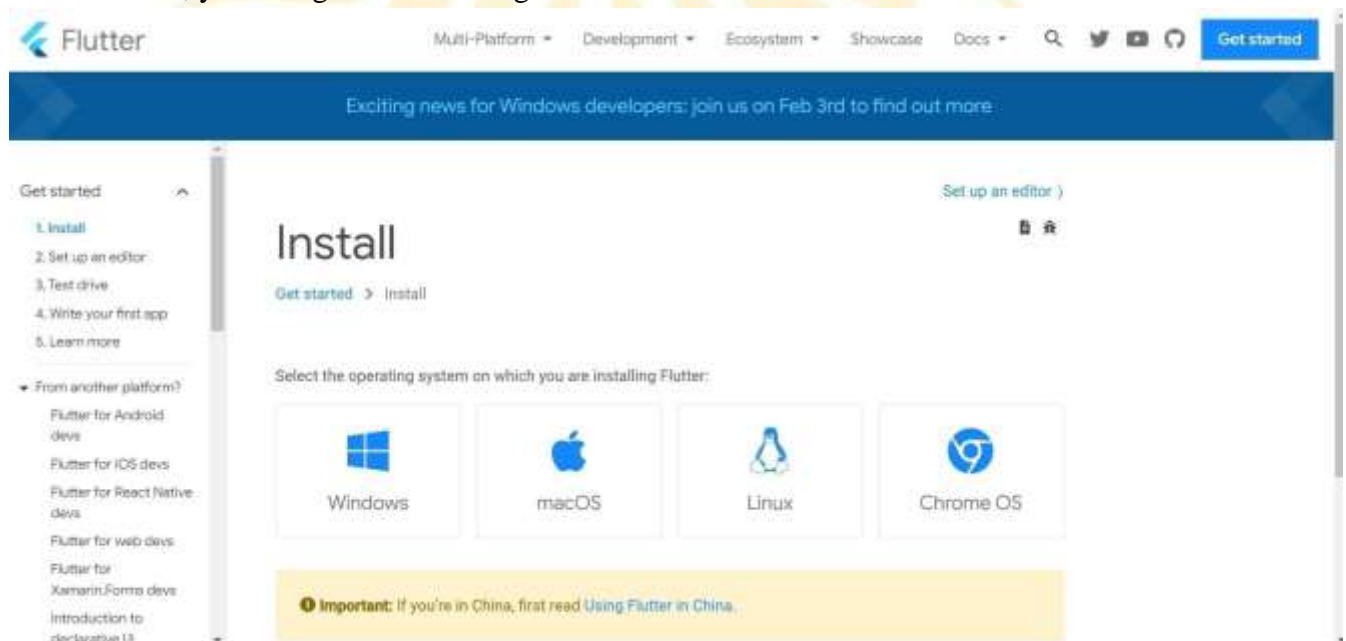
### Features of Flutter-

- **High productivity:** Since Flutter is cross-platform, you can use the same code base for your iOS and Android app. This can definitely save you both time and resources.
- **Great performance:** Dart compiles into native code and there is no need to access OEM widgets as Flutter has its own. This means less mediated communication between the app and the platform.
- **Fast and simple development:** One of the most lauded features of Flutter is *hot reload* which allows you to instantly view the changes made in the code on emulators, simulators and hardware. In less than a second, the changed code is reloaded while the app is running with no need for a restart. This is great not just for building UIs or adding features but also for bug fixing. As far as simplicity is concerned, Flutter claims in its docs that programming with Flutter is so easy that no prior programming knowledge is required.
- **Compatibility:** Since widgets are part of the app and not the platform, you'll likely experience less or no compatibility issues on different OS versions. This in turn means less time spent on testing.
- **Open-source:** Both Flutter and Dart are open-source and free to use, and provide extensive documentation and community support to help out with any issues you may encounter.



### Steps For Installation: VSCode

**Step 1:** Download the installation bundle of the Flutter Software Development Kit for windows. To download Flutter SDK, go to its official [website](https://flutter.dev), click on Get started button, you will get the following screen.



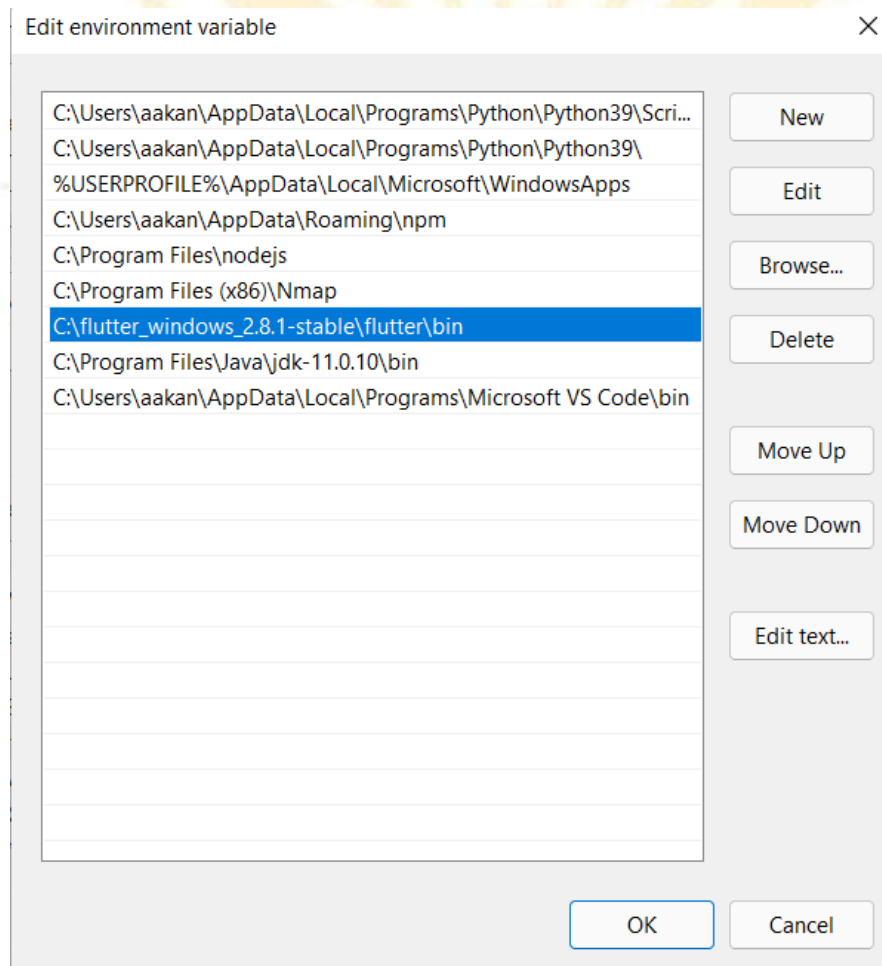
**Step 2:** Next, to download the latest Flutter SDK, click on the Windows icon. Here, you will find the download link for [SDK](#).

**Step 3:** When your download is complete, extract the zip file and place it in the desired installation folder or location, for example, D: /Flutter.required.

**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 My Computer 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 doctor command. This command checks for all the requirements of Flutter app development and displays a report of the status of your Flutter installation.

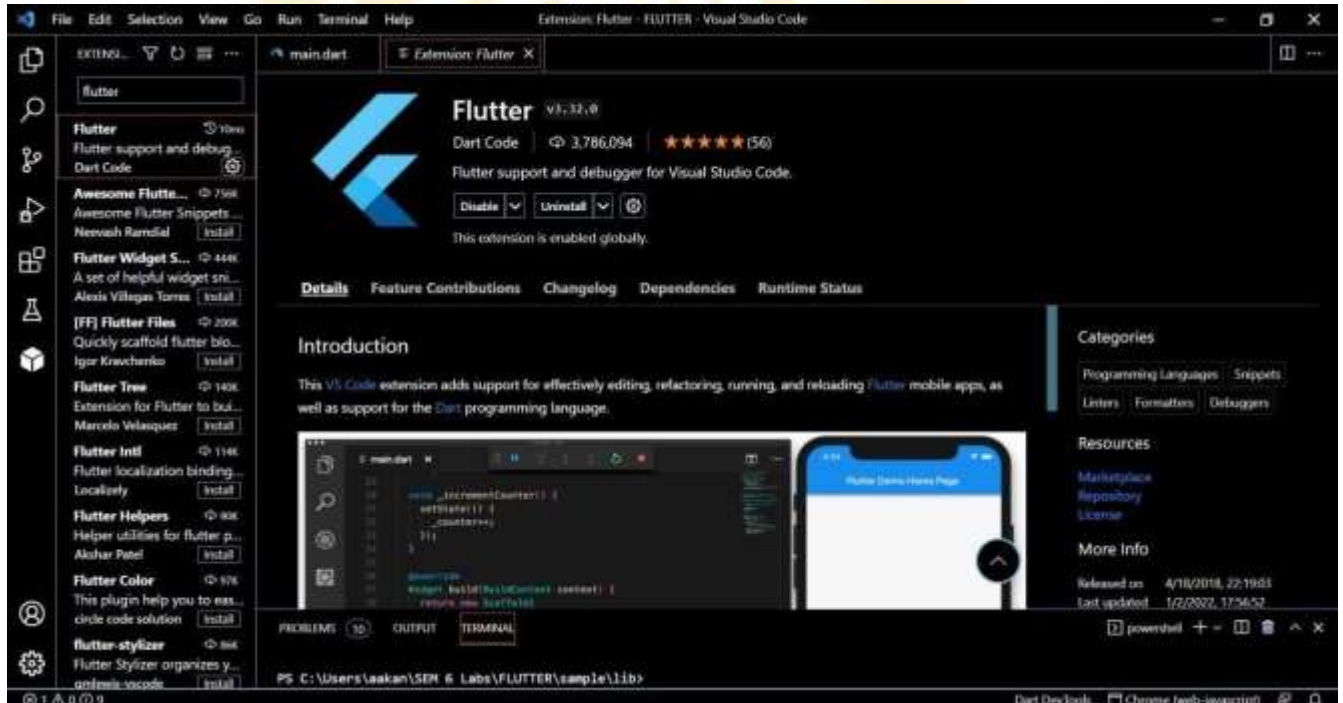
\$ flutter doctor

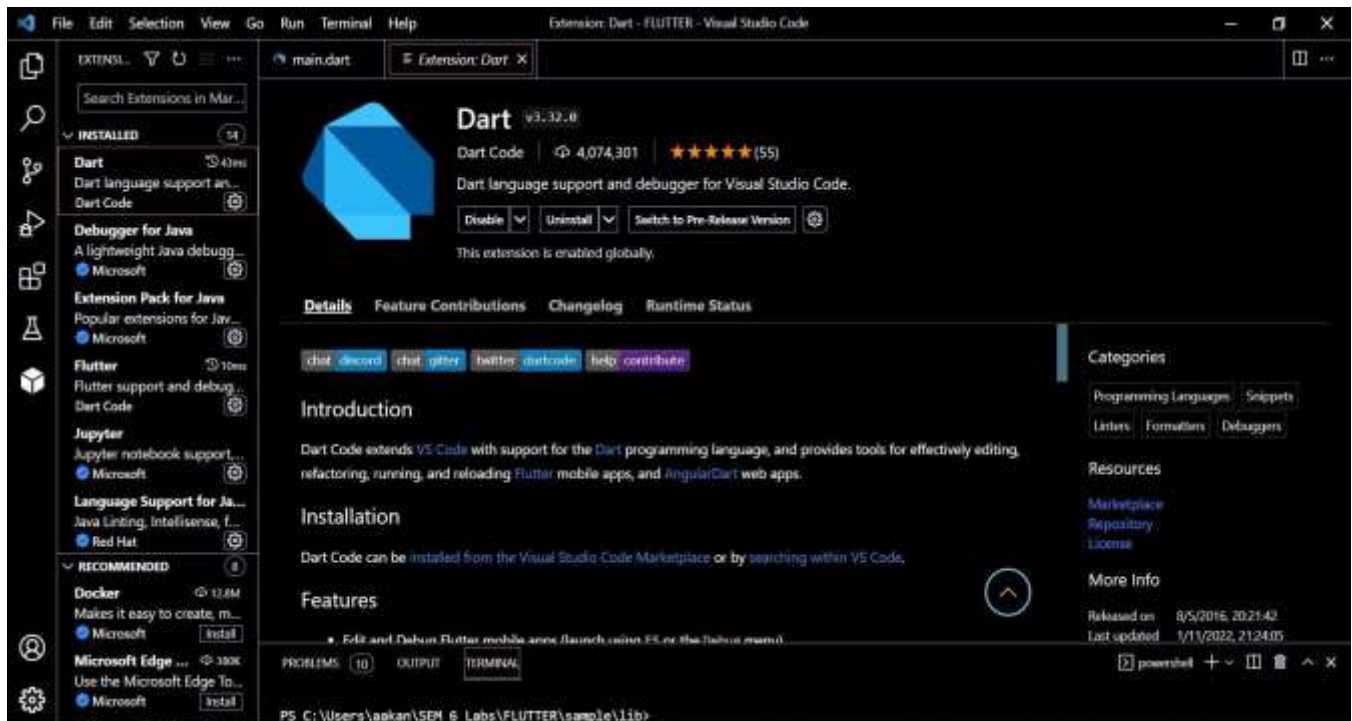
```
Command Prompt
Microsoft Windows [Version 10.0.22000.434]
(c) Microsoft Corporation. All rights reserved.

C:\Users\akaan>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[✓] Flutter (Channel stable, 2.8.1, on Microsoft Windows [Version 10.0.22000.434], locale en-IN)
[✓] Android toolchain - develop for Android devices (Android SDK version 32.0.0)
[✓] Chrome - develop for the web
[✓] Android Studio (version 2020.3)
[✓] VS Code (version 1.63.2)
[✓] Connected device (2 available)

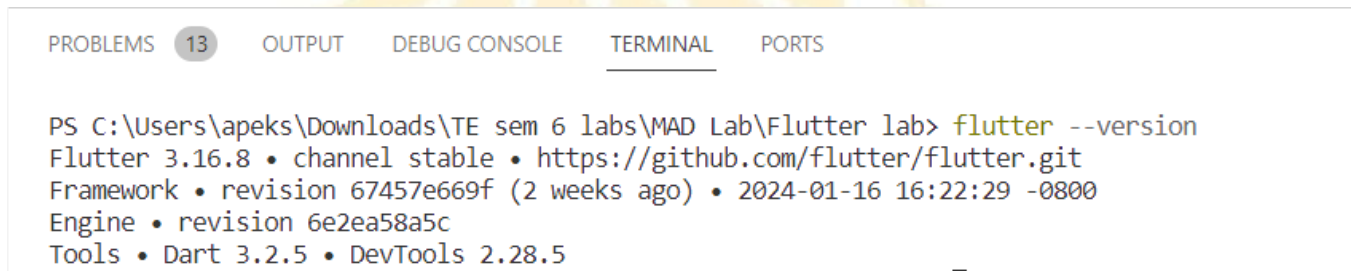
• No issues found!
```

**Step 6:** Installing Flutter in Visual Studio Code



**Step 7:** Now install Dart in Visual Studio Code

**Step 8:** Now we have successfully added Flutter and Dart to the Visual studio code, now let's check if flutter is installed or not. For this we will open a new terminal in Visual Studio Code and type the following “flutter –version”, if everything is fine then it will normally show the version of the installed flutter.



**Step 9:** Now for creating a new flutter project write the following in the visual studio Code terminal, “flutter create sample”. After that project will be created inside the test project directory.

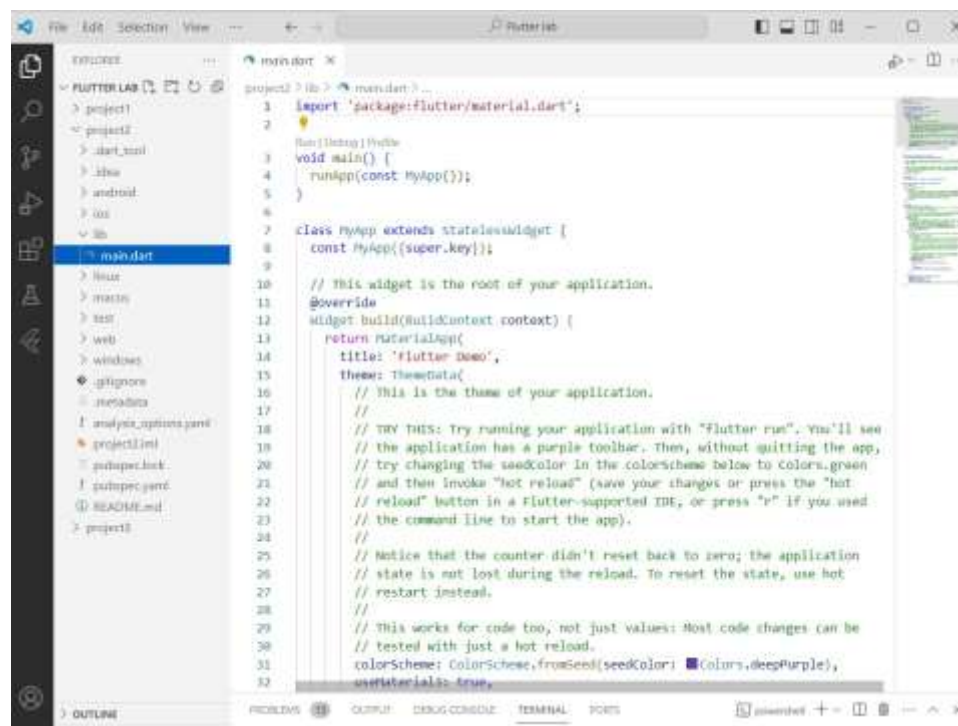
```
PS C:\Users\apeks\Downloads\TE sem 6 labs\MAD Lab\Flutter lab> flutter create project2
Creating project project2...
Resolving dependencies in project2... (2.3s)
Got dependencies in project2.
Wrote 129 files.
```

All done!

You can find general documentation for Flutter at: <https://docs.flutter.dev/>

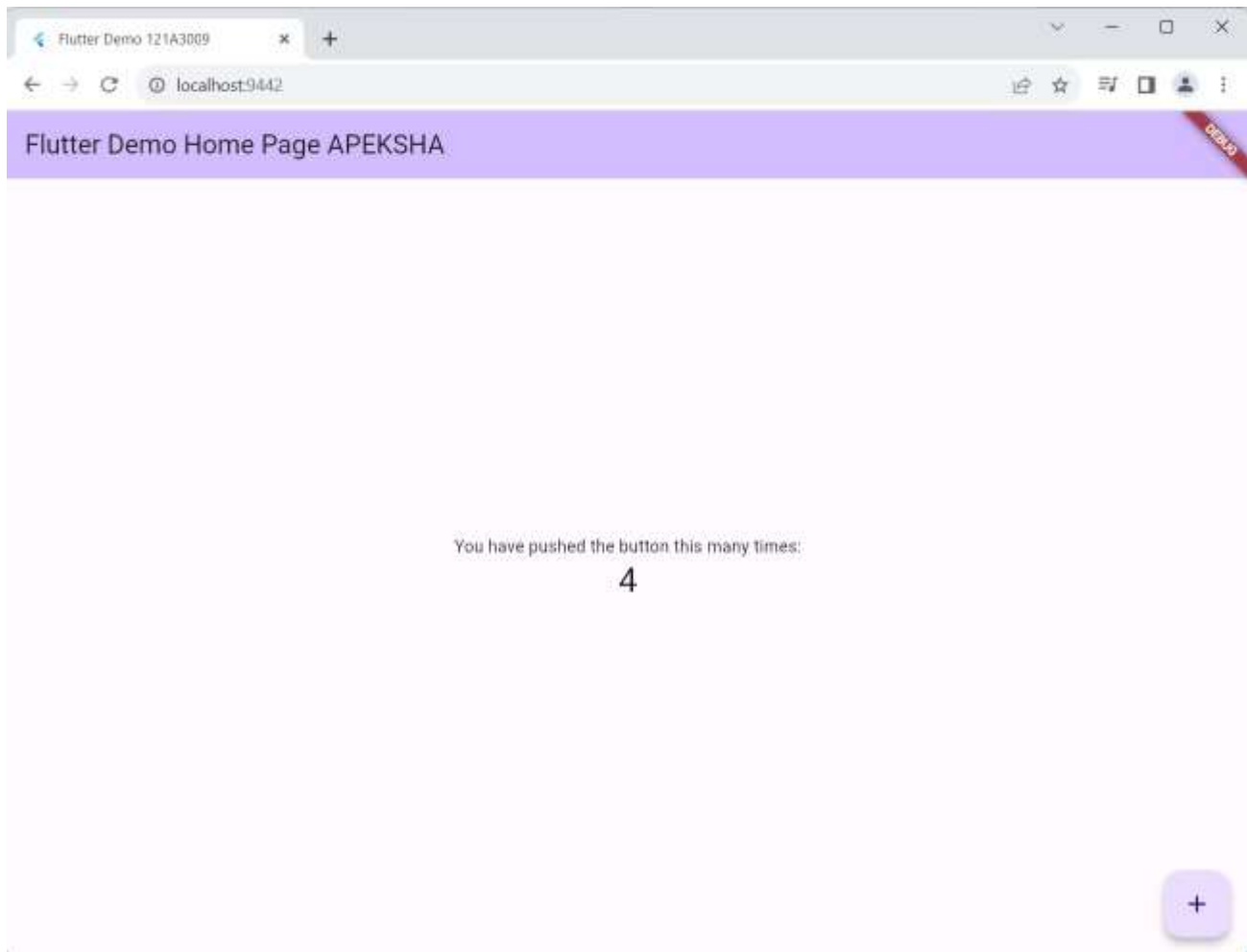
Detailed API documentation is available at: <https://api.flutter.dev/>

If you prefer video documentation, consider: <https://www.youtube.com/c/flutterdev>



Now we are ready to see the output, by default it has a program in which there is a button by clicking on the that a counter will be displayed in the centre.



**Conclusion:**

Hence, we have understood the basics of cross-platform app development, flutter and dart. Flutter is very beneficial in making websites. It is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single code. We also have completed steps for flutter installation in VsCode.