

Flutter Training – Day 1

Flutter is an open source framework by Google for **building beautiful, natively compiled, multi-platform applications from a single codebase.**

Flutter:

- Flutter is a UI tool kit to create applications for any screen. Example like desktop applications, web applications, mobile applications, car touch screens etc.
- Flutter framework uses Dart language; which is a strictly typed language; but Java Script is loosely typed language/scripting language.
- In react we use the word component but in flutter we use the word widget instead of component
- Component means it returns a piece of JSX code which tells what should be rendered on the screen.

JSX stands for JavaScript XML. It is simply **a syntax extension of JavaScript**. It allows us to directly write HTML in React (within JavaScript code). It is easy to create a template using JSX in React, but it is not a simple template language instead it comes with the full power of JavaScript. 03-Jun-2021

Key differences between Flutter and React Native? Both Flutter and React Native are excellent frameworks for developing cross-platform mobile applications, and they have a lot in common. The main difference however is in the programming language: **React Native uses JavaScript, and Flutter uses Dart.** 19-Aug-2022

React Native is **a framework for building native iOS and Android applications using JavaScript**. It's based on the same concepts as React, but uses native components instead of web components to render a user interface (UI).

தமிழ் இல்

In English

Native Components

At runtime, React Native creates the corresponding Android and iOS views for those components. Because React Native components are backed by the same views as Android and iOS, React Native apps look, feel, and perform like any other apps. We call these **platform-backed components** Native Components. 06-Sept-2022



Native rendering **uses native code to render images of native UI components**. Native rendering provides accurate images of native UI components because it uses the same code to create the images that the native UI components use to display themselves.

Flutter Documentation:

Pandiyen Pandiyen is presenting

Flutter training - pandiyen@jam

docs.flutter.dev/development/ui/widgets-intro

Introduction to widgets

Flutter widgets are built using a modern framework that takes inspiration from React. The central idea is that you build your UI out of widgets. Widgets describe what their view should look like given their current configuration and state. When a widget's state changes, the widget rebuilds its description, which the framework diff's against the previous description in order to determine the minimal changes needed in the underlying render tree to transition from one state to the next.

Note: If you would like to become better acquainted with Flutter by diving into some code, check out basic layout, code lab, building layouts, and adding interactivity to your Flutter app.

Hello world

The minimal Flutter app simply calls the `runApp()` function with a widget:

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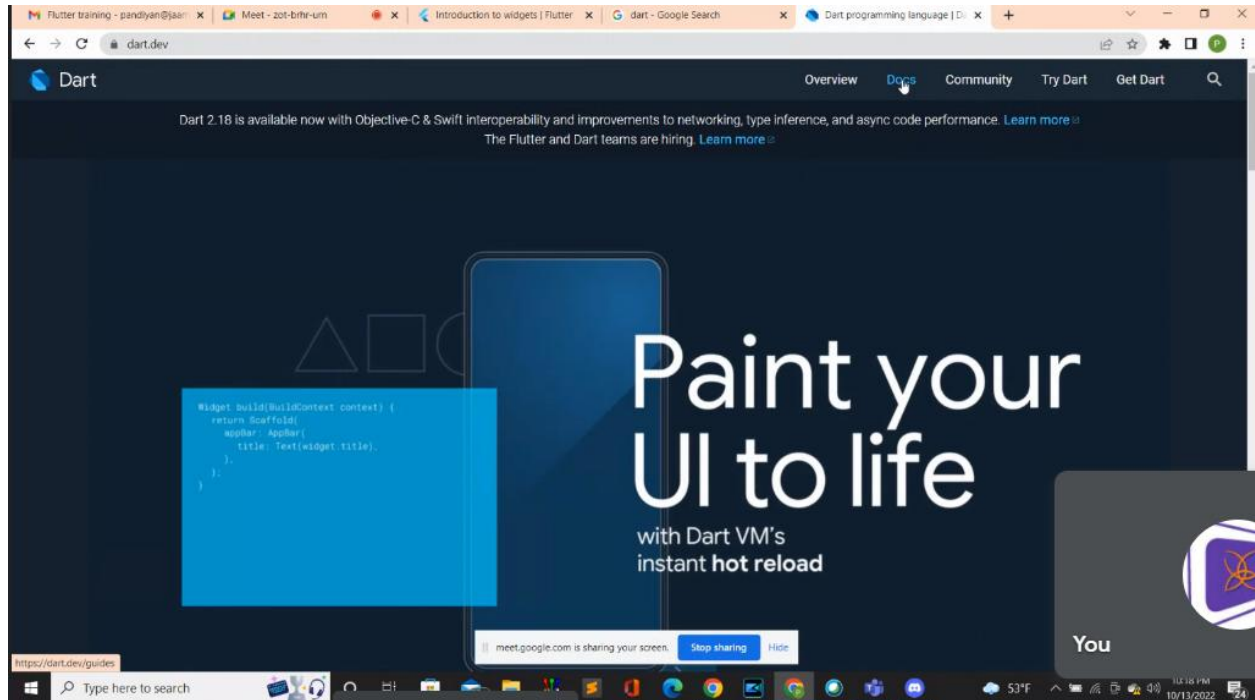
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<https://flutter.dev/>

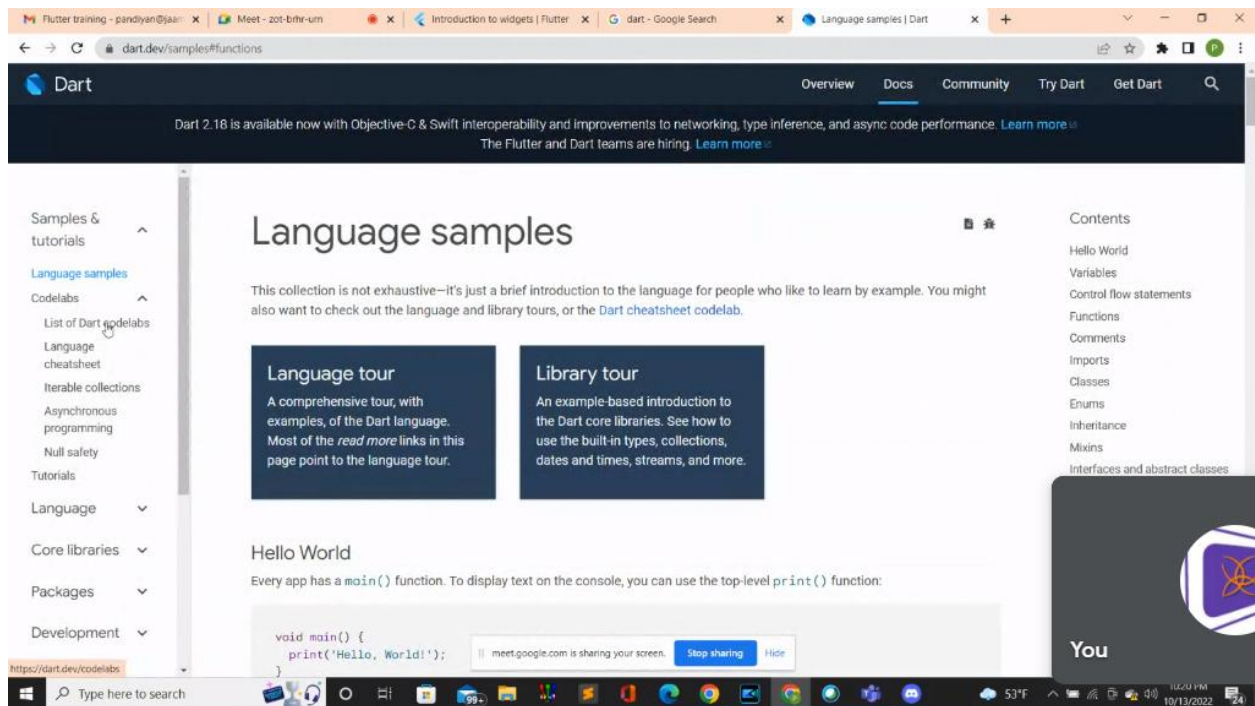
<https://docs.flutter.dev/>

Dart Language Documentation:



<https://dart.dev/>

<https://dart.dev/get-dart>



<https://dart.dev/samples>

The screenshot shows the Dart website's 'Variables' section. The left sidebar contains a navigation menu with categories like 'Samples & tutorials', 'Language samples', 'Codelabs', 'Tutorials', 'Language', 'Core libraries', 'Packages', 'Development', and 'Tools & techniques'. The main content area is titled 'Variables' and explains that in type-safe Dart code, most variables don't need explicit types due to type inference. It includes a code snippet for a variable named 'name' and a list of planets. A 'Read more' link is provided. The right sidebar shows a 'Contents' list with links to 'Hello World', 'Variables', 'Control flow statements', 'Functions', 'Comments', 'Imports', 'Classes', 'Enums', 'Inheritance', 'Mixins', 'Interfaces and abstract classes', 'Async', and 'Exceptions'. A 'You' profile card is visible in the bottom right corner.

Variables

Even in type-safe Dart code, most variables don't need explicit types, thanks to type inference:

```
var name = 'Voyager I';
var year = 1977;
var antennaDiameter = 3.7;
var flybyObjects = ['Jupiter', 'Saturn', 'Uranus', 'Neptune'];
var image = {
  'tags': ['saturn'],
  'url': '/path/to/saturn.jpg'
};
```

[Read more](#) about variables in Dart, including default values, the `final` and `const` keywords, and static types.

Control flow statements

Dart supports the usual control flow statements:

```
if (year >= 2001) {
  print('21st century');
} else if (year >= 1901) {
  print('20th century');
}
```

[Read more](#) about control flow statements in Dart, including `break` and `continue`, `switch` and `case`, and `assert`.

The screenshot shows the Dart website's 'Control flow statements' section. The left sidebar is identical to the previous screenshot. The main content area is titled 'Control flow statements' and explains that Dart supports the usual control flow statements. It includes code snippets for an `if` statement, a `for` loop, a `while` loop, and a `for` loop with a `break` statement. A 'Read more' link is provided. The right sidebar shows a 'Contents' list with links to 'Hello World', 'Variables', 'Control flow statements', 'Functions', 'Comments', 'Imports', 'Classes', 'Enums', 'Inheritance', 'Mixins', 'Interfaces and abstract classes', 'Async', and 'Exceptions'. A 'You' profile card is visible in the bottom right corner.

Control flow statements

Dart supports the usual control flow statements:

```
if (year >= 2001) {
  print('21st century');
} else if (year >= 1901) {
  print('20th century');
}
```

```
for (final object in flybyObjects) {
  print(object);
}
```

```
for (int month = 1; month <= 12; month++) {
  print(month);
}
```

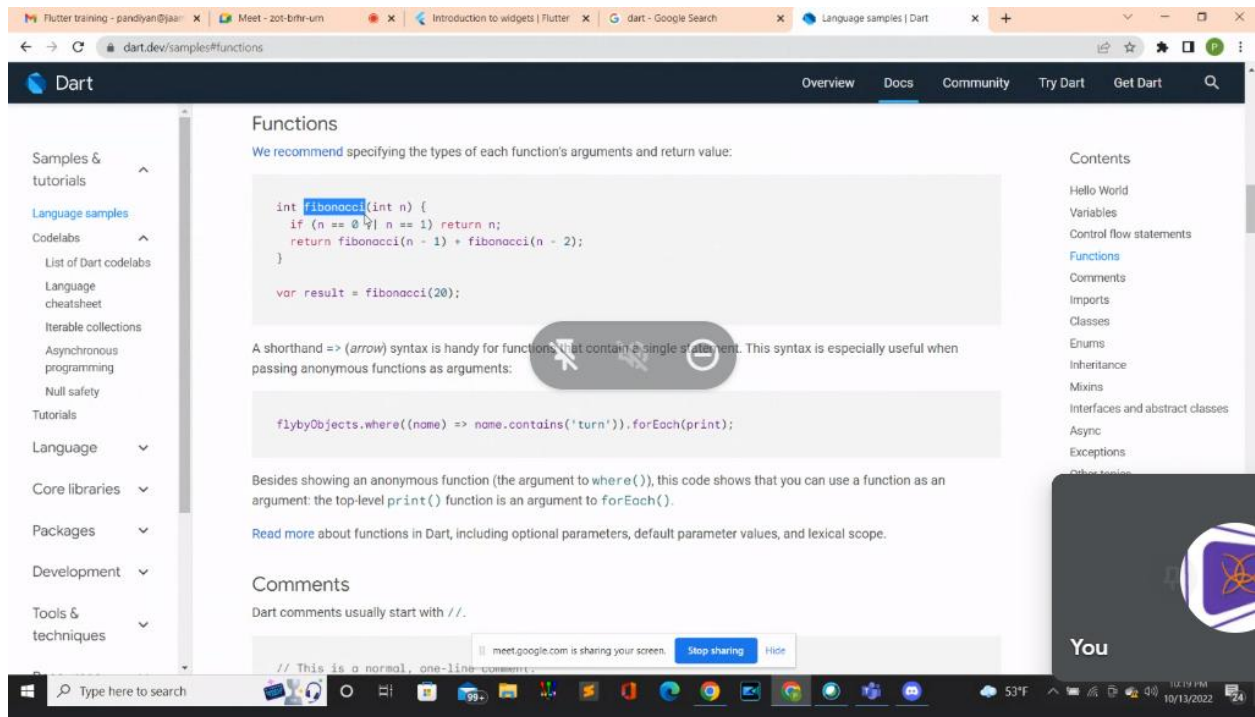
```
while (year < 2016) {
  year += 1;
}
```

[Read more](#) about control flow statements in Dart, including `break` and `continue`, `switch` and `case`, and `assert`.

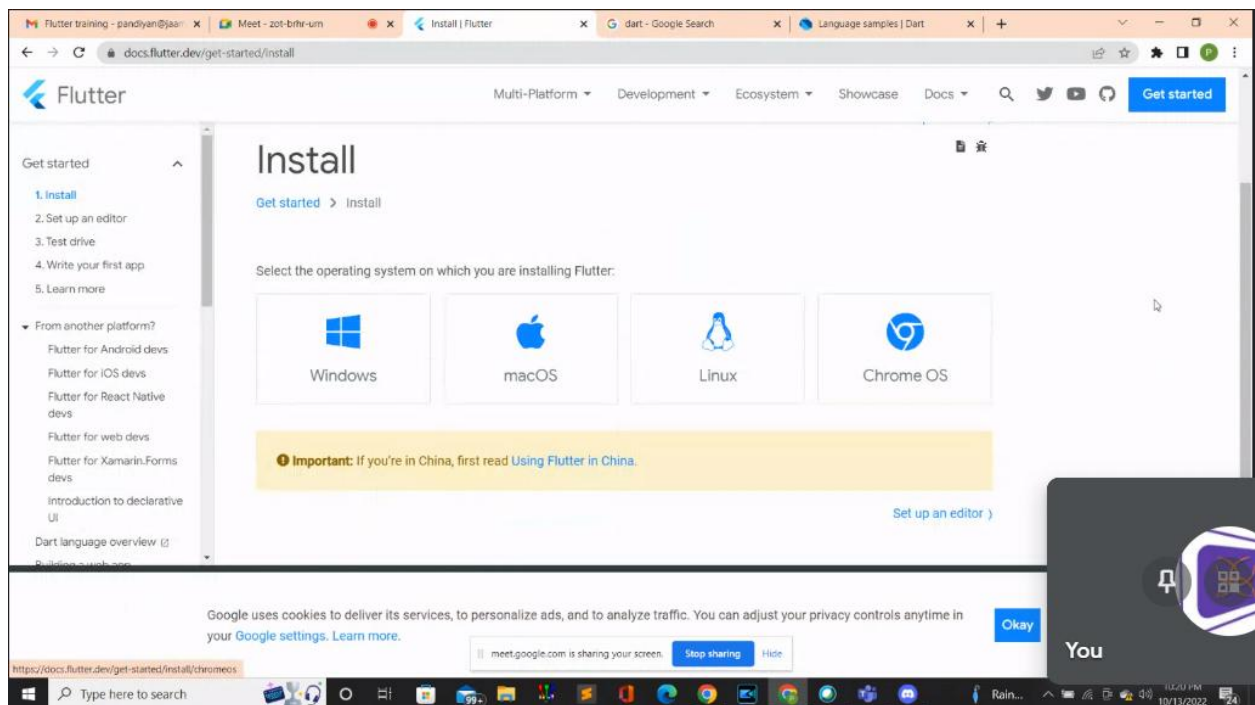
Functions

We recommend specifying the types of each function's arguments and return value:

```
int fibonacci(int n) {
```

Flutter Installation:



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docs.flutter.dev/get-started/install/windows

Flutter Multi-Platform Development Ecosystem Showcase Docs Get started

See What's new in Flutter 3.3 and what's new in the docs. The Flutter and Dart teams are hiring. Learn more

Get started

1. Install
2. Set up an editor
3. Test drive
4. Write your first app
5. Learn more

From another platform?

- Flutter for Android devs
- Flutter for iOS devs
- Flutter for React Native devs
- Flutter for web devs

Windows install

Get started > Install > Windows

System requirements

To install and run Flutter, your development environment must meet these minimum requirements:

- **Operating Systems:** Windows 10 or later (64-bit), x86-64 based.
- **Disk Space:** 1.64 GB (does not include disk space for IDE/tools).

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Get started

1. Install
2. Set up an editor
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4. Write your first app
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From another platform?

- Flutter for Android devs
- Flutter for iOS devs
- Flutter for React Native devs
- Flutter for web devs
- Flutter for Xamarin.Forms devs
- Introduction to declarative UI

Get the Flutter SDK

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

[flutter_windows_3.3.4-stable.zip](#)

For other release channels, and older builds, see the [SDK releases page](#).

2. Extract the zip file and place the contained `flutter` in the desired installation location for the Flutter SDK (for example, `C:\src\flutter`).

Warning: Do not install Flutter to a path that contains special characters or spaces.

Warning: Do not install Flutter in a directory like `C:\Program Files\` that requires elevated privileges.

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https://storage.googleapis.com/flutter_infra_release/releases/stable/windows/flutter_windows_3.3.4-stable.zip

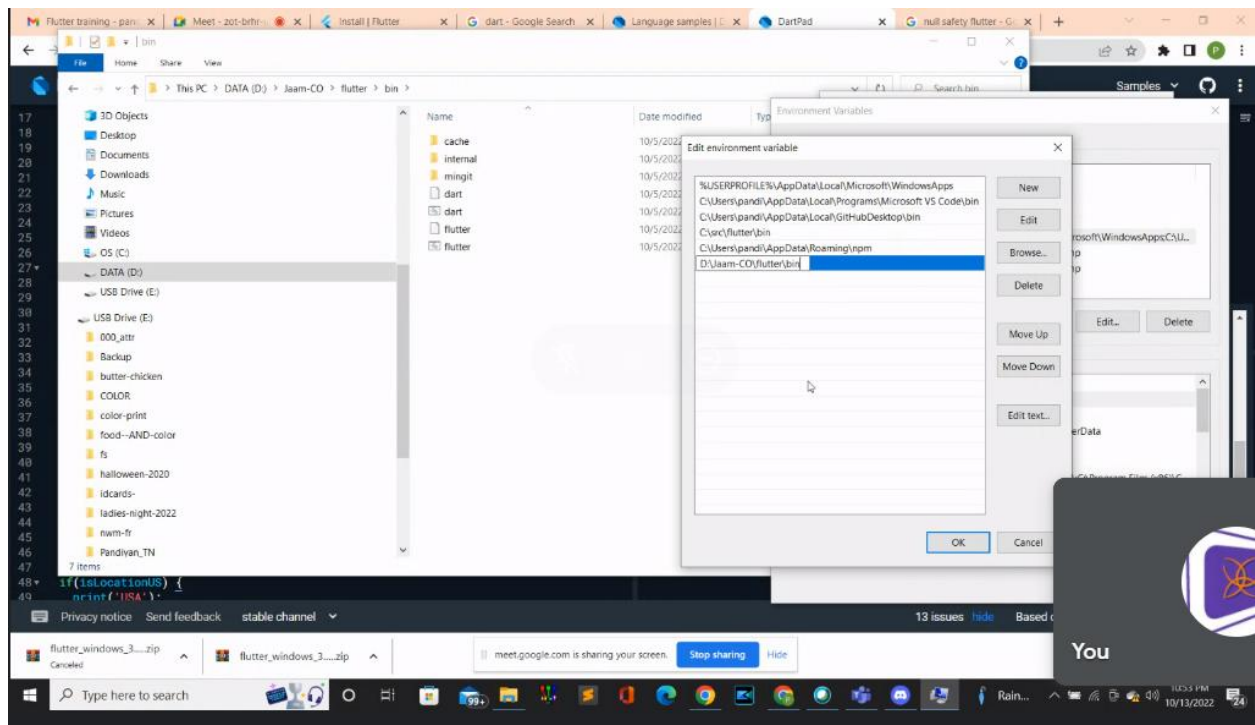
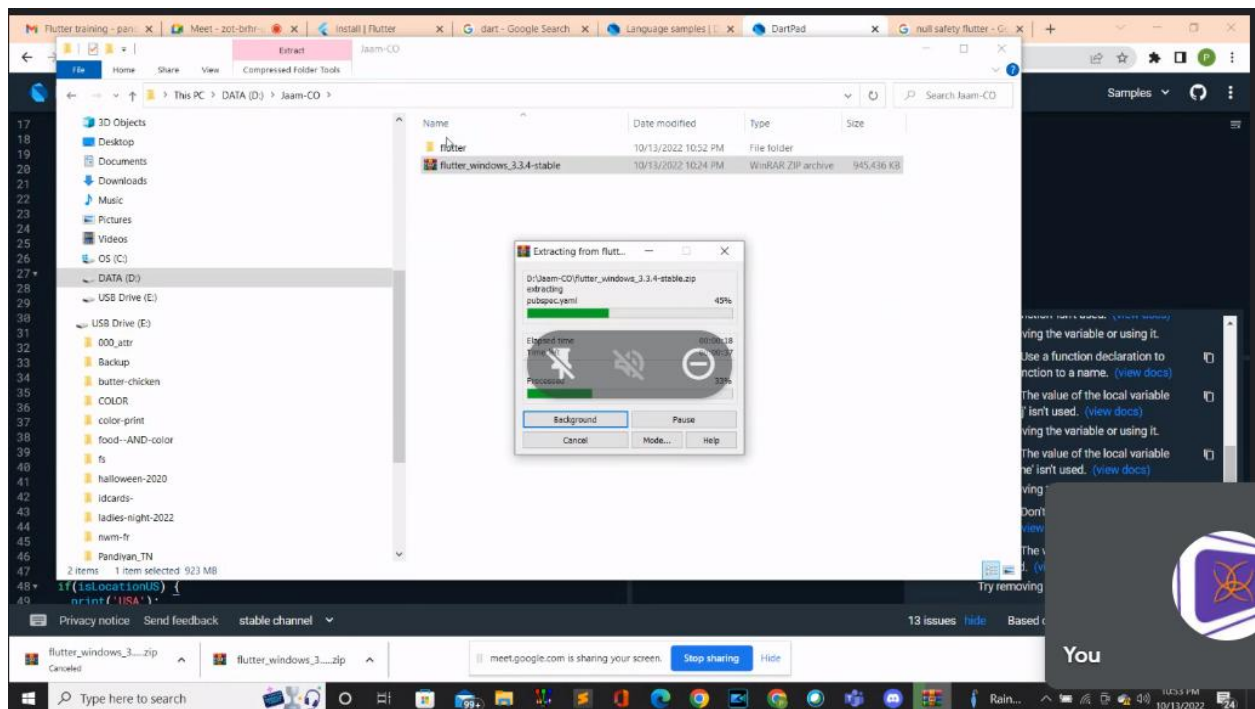
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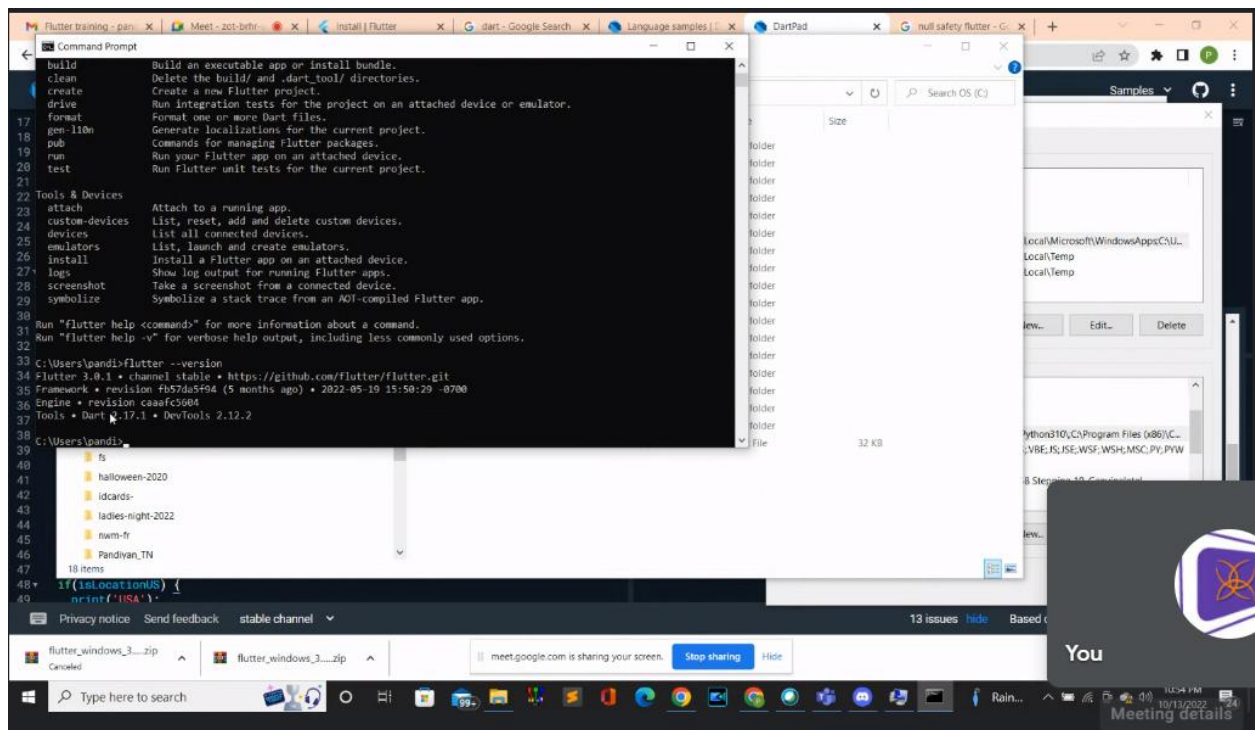
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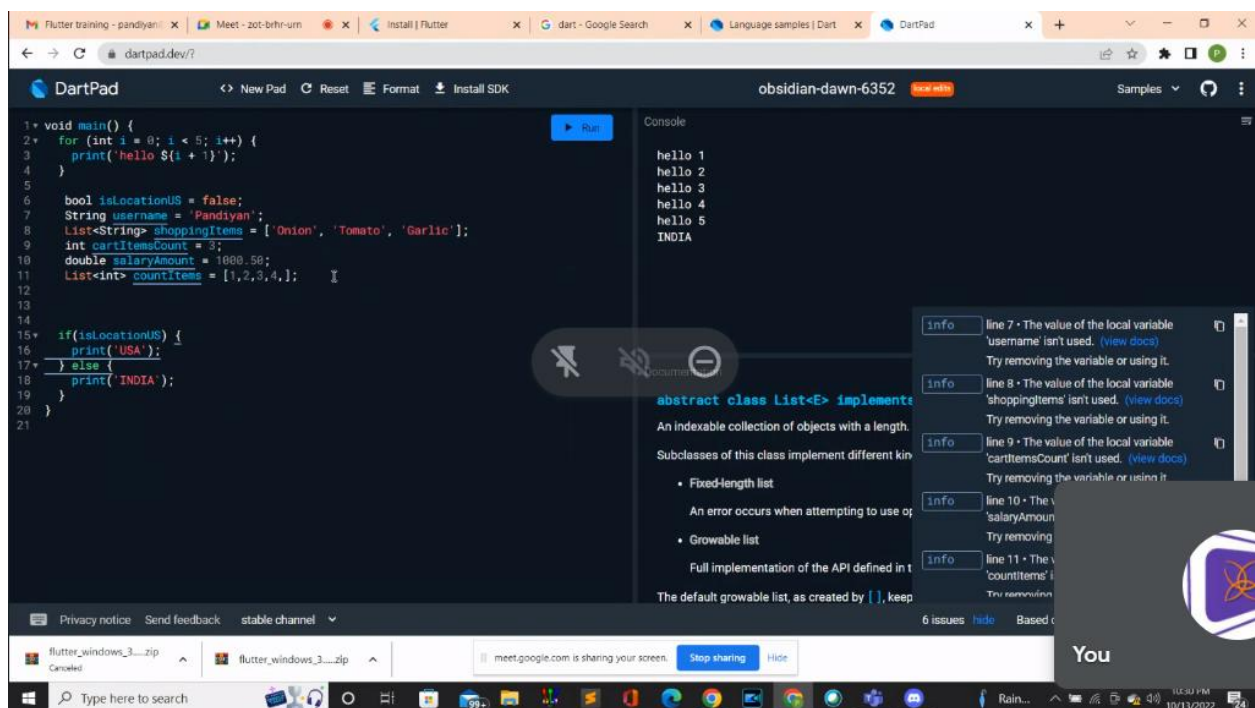
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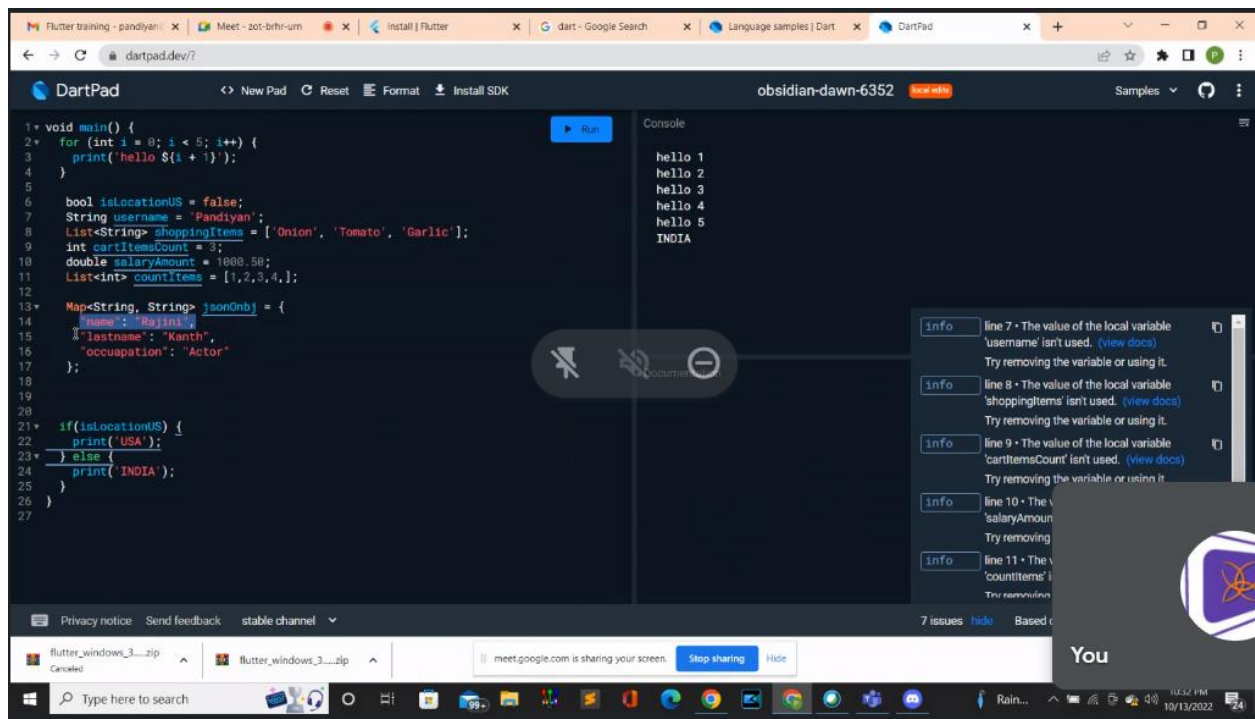


Dart: Data Types

Integer, string, Boolean are same like other typed languages; but for arrays data types we use list to represent the data; either integer list of arrays items or string list of array items etc.



In dart; we say map instead of json which are used for creating key value pairs and for string type keys we can create particular type key or dynamic type keys data.



The screenshot shows the DartPad web interface. The code editor contains the following Dart code:

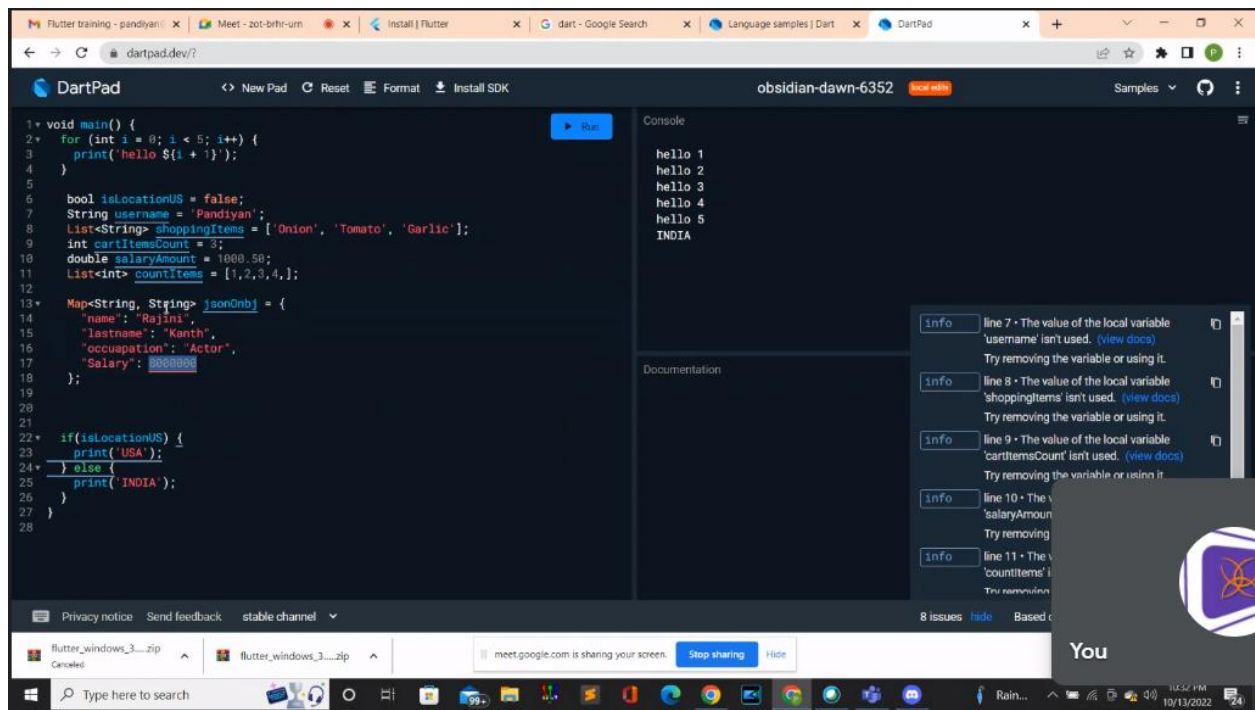
```
1 void main() {  
2   for (int i = 0; i < 5; i++) {  
3     print('hello ${i + 1}');  
4   }  
5  
6   bool isLocationUS = false;  
7   String username = 'Pandiyani';  
8   List<String> shoppingItems = ['Onion', 'Tomato', 'Garlic'];  
9   int cartItemsCount = 3;  
10  double salaryAmount = 1000.50;  
11  List<int> countItems = [1,2,3,4,];  
12  
13  Map<String, String> jsonOnb = {  
14    "name": "Rajini",  
15    "lastname": "Kanth",  
16    "occupation": "Actor",  
17  };  
18  
19  
20  
21  
22  if(isLocationUS) {  
23    print('USA');  
24  } else {  
25    print('INDIA');  
26  }  
27 }
```

The console output shows the following:

```
hello 1  
hello 2  
hello 3  
hello 4  
hello 5  
INDIA
```

On the right side, there is a list of issues:

- line 7 • The value of the local variable 'username' isn't used. (view docs)
Try removing the variable or using it.
- line 8 • The value of the local variable 'shoppingItems' isn't used. (view docs)
Try removing the variable or using it.
- line 9 • The value of the local variable 'cartItemsCount' isn't used. (view docs)
Try removing the variable or using it.
- line 10 • The value of the local variable 'salaryAmount' isn't used. (view docs)
Try removing the variable or using it.
- line 11 • The value of the local variable 'countItems' isn't used. (view docs)
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1 void main() {  
2   for (int i = 0; i < 5; i++) {  
3     print('hello ${i + 1}');  
4   }  
5  
6   bool isLocationUS = false;  
7   String username = 'Pandiyani';  
8   List<String> shoppingItems = ['Onion', 'Tomato', 'Garlic'];  
9   int cartItemsCount = 3;  
10  double salaryAmount = 1000.50;  
11  List<int> countItems = [1,2,3,4,];  
12  
13  Map<String, String> jsonOnb = {  
14    "name": "Rajini",  
15    "lastname": "Kanth",  
16    "occupation": "Actor",  
17    "Salary": 1000000, // Typo: Salary instead of salaryAmount  
18  };  
19  
20  
21  
22  if(isLocationUS) {  
23    print('USA');  
24  } else {  
25    print('INDIA');  
26  }  
27 }
```

The console output shows the following:

```
hello 1  
hello 2  
hello 3  
hello 4  
hello 5  
INDIA
```

On the right side, there is a list of issues:

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dartpad.dev/?

DartPad obsidian-dawn-6352

```
1 void main() {
2   for (int i = 0; i < 5; i++) {
3     print('hello ${i + 1}');
4   }
5
6   bool isLocationUS = false;
7   String username = 'Pandiyan';
8   List<String> shoppingItems = ['Onion', 'Tomato', 'Garlic'];
9   int cartItemsCount = 3;
10  double salaryAmount = 1000.50;
11  List<int> countItems = [1,2,3,4,];
12
13  Map<String, dynamic> jsonOnb = {
14    "name": "Rajini",
15    "lastname": "Kanth",
16    "occupation": "Actor",
17    "Salary": 8000000
18  };
19
20
21
22  if(isLocationUS) {
23    print('USA');
24  } else {
25    print('INDIA');
26  }
27 }
28
```

Console

```
hello 1
hello 2
hello 3
hello 4
hello 5
INDIA
```

Documentation

abstract class String implements

A sequence of UTF-16 code units.

Strings are mainly used to represent text. A character is a sequence of one or two code units. A code unit is a four code units to represent two code points, but that do not support the flag character may show instead becomes the Guadeloupe flag "GP".

A string can be either single or multiline. Single line strings are written using single quotes, and multiline strings are written using triple quotes.

7 issues

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dartpad.dev/?

DartPad obsidian-dawn-6352

```
1 void main() {
2   for (int i = 0; i < 5; i++) {
3     print('hello ${i + 1}');
4   }
5
6   bool isLocationUS = false;
7   String username = 'Pandiyan';
8   List<String> shoppingItems = ['Onion', 'Tomato', 'Garlic'];
9   int cartItemsCount = 3;
10  double salaryAmount = 1000.50;
11  List<int> countItems = [1,2,3,4,];
12
13  Map<String, dynamic> jsonOnb = {
14    "name": "Rajini",
15    "lastname": "Kanth",
16    "occupation": "Actor",
17    "Salary": 8000000.50
18  };
19
20
21
22  if(isLocationUS) {
23    print('USA');
24  } else {
25    print('INDIA');
26  }
27 }
28
```

Console

```
hello 1
hello 2
hello 3
hello 4
hello 5
INDIA
```

Documentation

dynamic

8 issues

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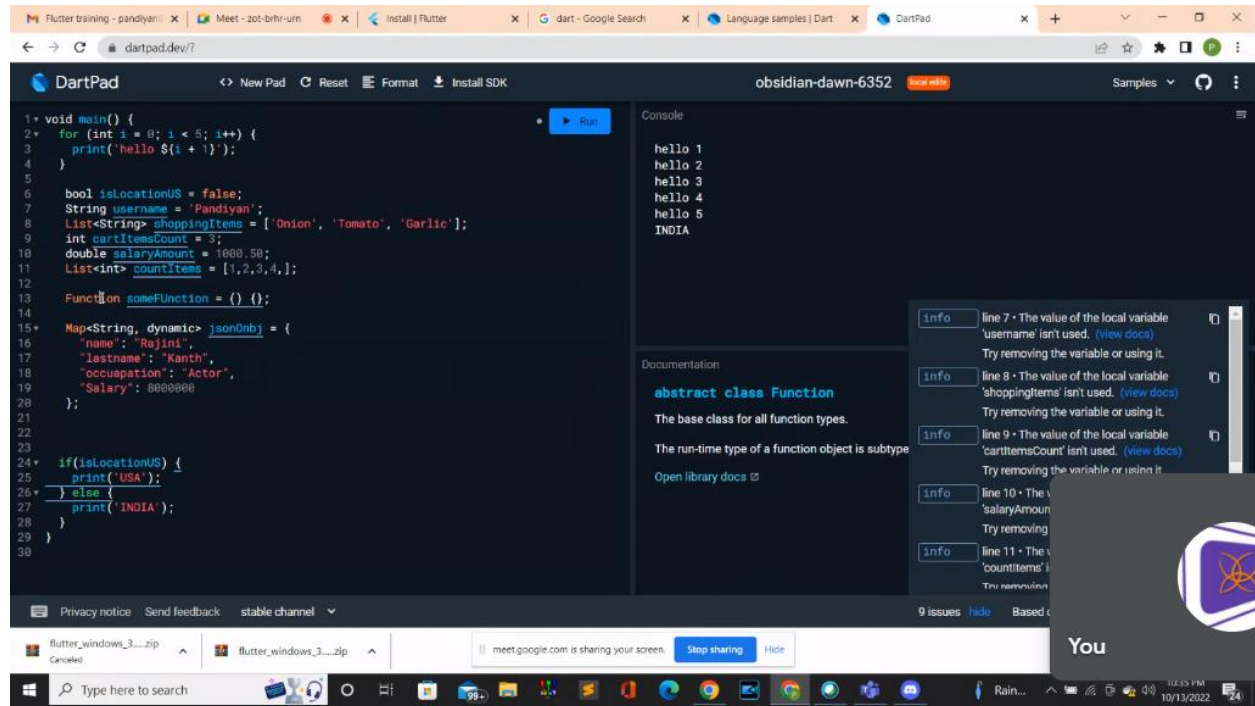
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We use keyword function for function declarations;



The screenshot shows the DartPad web interface. The code editor contains the following Dart code:

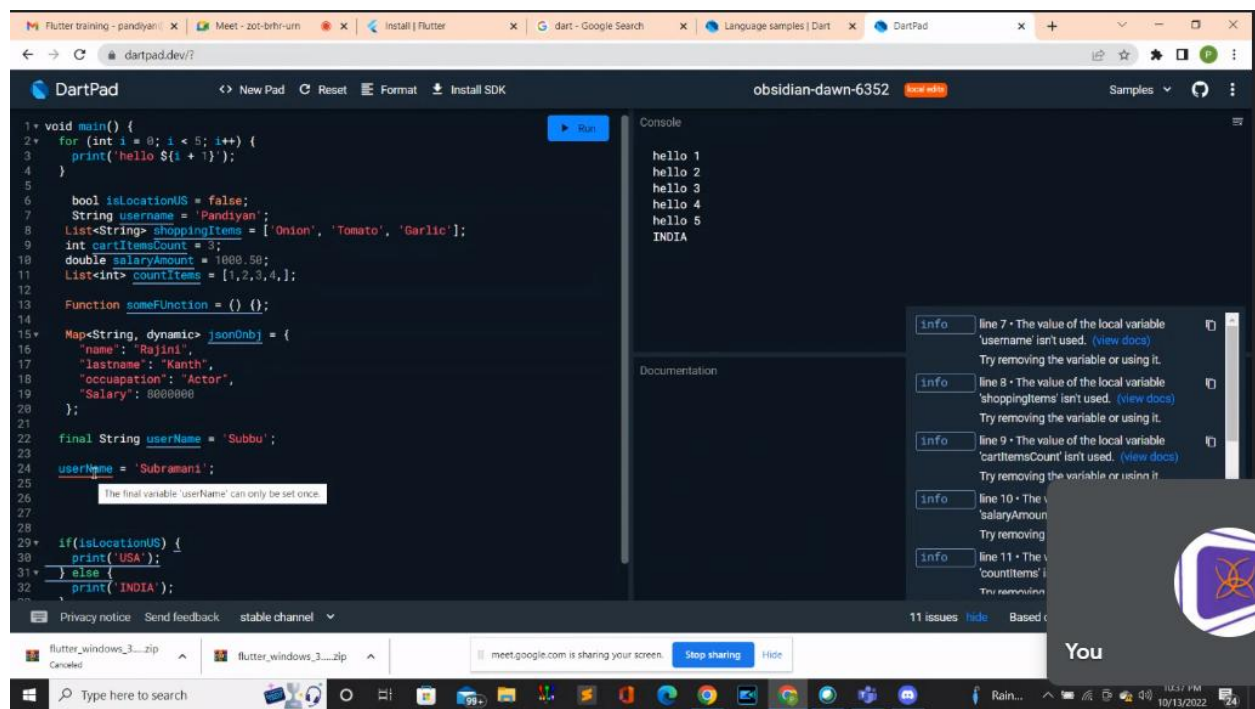
```
1 void main() {  
2   for (int i = 0; i < 5; i++) {  
3     print('hello $i + 1');  
4   }  
5  
6   bool isLocationUS = false;  
7   String username = 'Pandiyan';  
8   List<String> shoppingItems = ['Onion', 'Tomato', 'Garlic'];  
9   int cartItemsCount = 3;  
10  double salaryAmount = 1000.50;  
11  List<int> countItems = [1,2,3,4,];  
12  
13  Function someFunction = () {};  
14  
15  Map<String, dynamic> jsonObj = {  
16    "name": "Rajini",  
17    "lastname": "Kanth",  
18    "occupation": "Actor",  
19    "Salary": 8000000  
20  };  
21  
22  if(isLocationUS) {  
23    print('USA');  
24  } else {  
25    print('INDIA');  
26  }  
27  
28 }  
29  
30
```

The console output shows:

```
hello 1  
hello 2  
hello 3  
hello 4  
hello 5  
INDIA
```

The documentation panel on the right shows the `abstract class Function` documentation. The bottom status bar indicates 9 issues.

Final keyword used to make the data as constant;



The screenshot shows the DartPad web interface. The code editor contains the following Dart code:

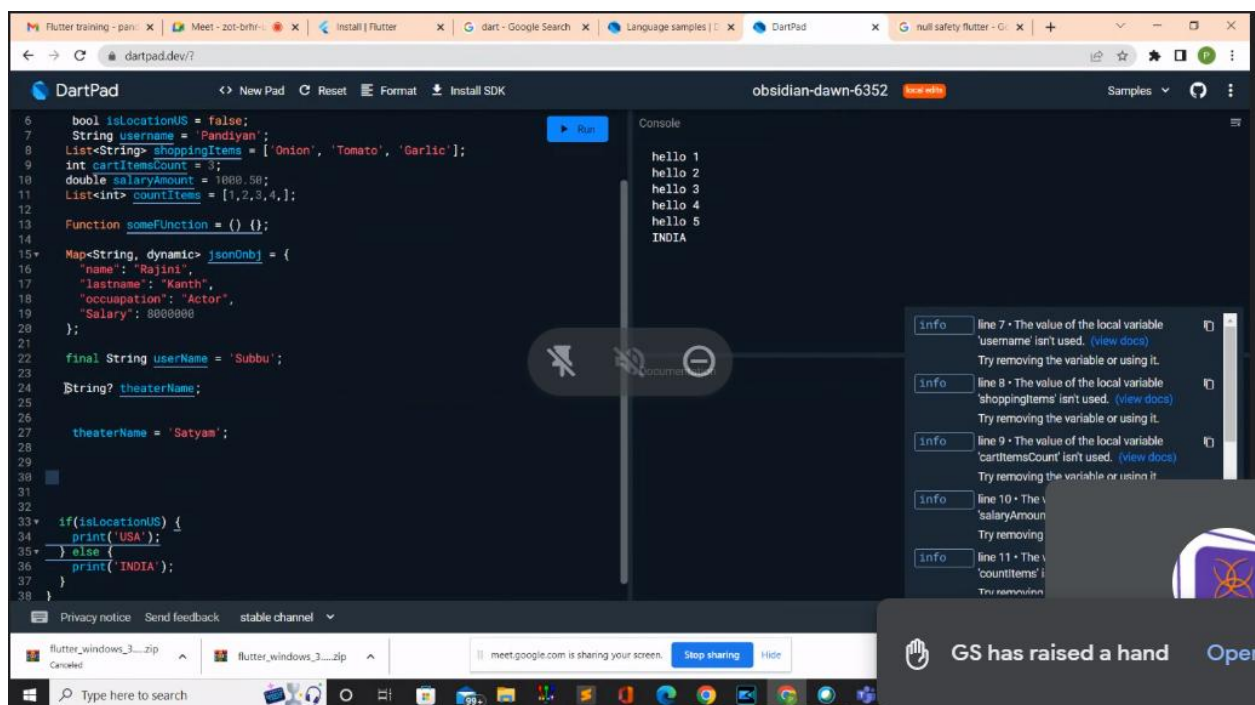
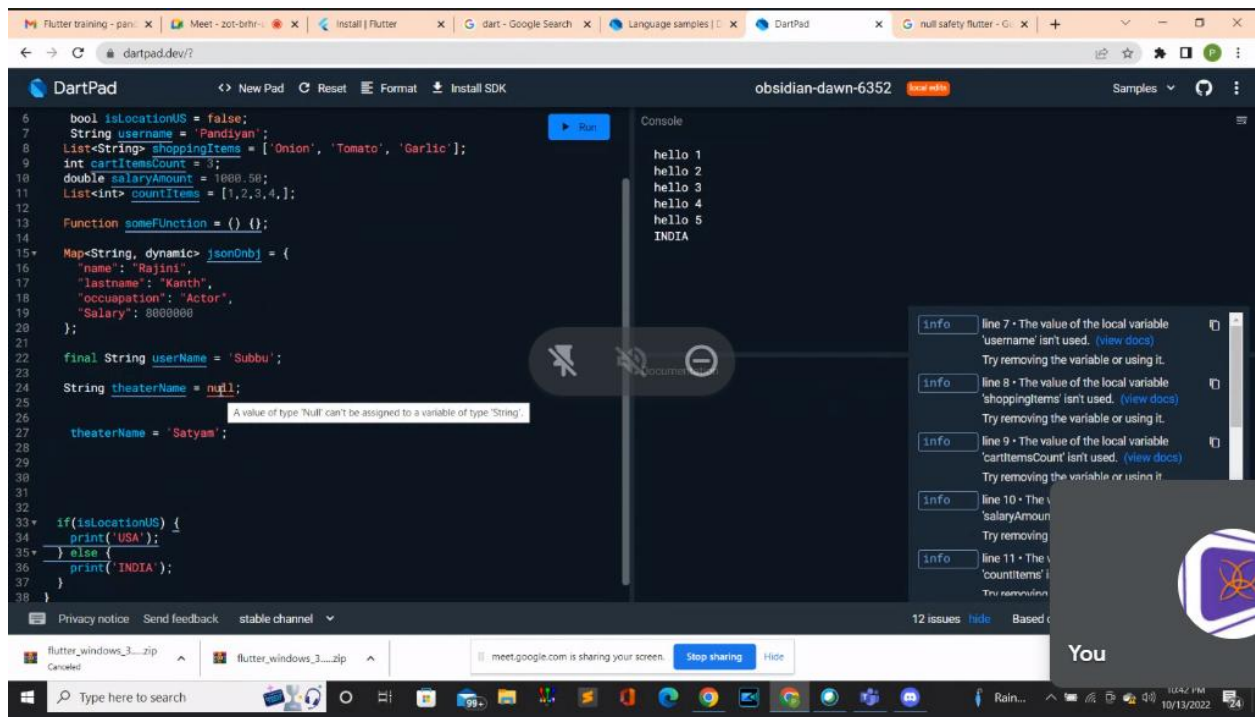
```
1 void main() {  
2   for (int i = 0; i < 5; i++) {  
3     print('hello $i + 1');  
4   }  
5  
6   bool isLocationUS = false;  
7   String username = 'Pandiyan';  
8   List<String> shoppingItems = ['Onion', 'Tomato', 'Garlic'];  
9   int cartItemsCount = 3;  
10  double salaryAmount = 1000.50;  
11  List<int> countItems = [1,2,3,4,];  
12  
13  Function someFunction = () {};  
14  
15  Map<String, dynamic> jsonObj = {  
16    "name": "Rajini",  
17    "lastname": "Kanth",  
18    "occupation": "Actor",  
19    "Salary": 8000000  
20  };  
21  
22  final String userName = 'Subbu';  
23  
24  userName = 'Subramani';  
25  
26  
27  
28  
29  if(isLocationUS) {  
30    print('USA');  
31  } else {  
32    print('INDIA');  
33  }  
34  
35 }
```

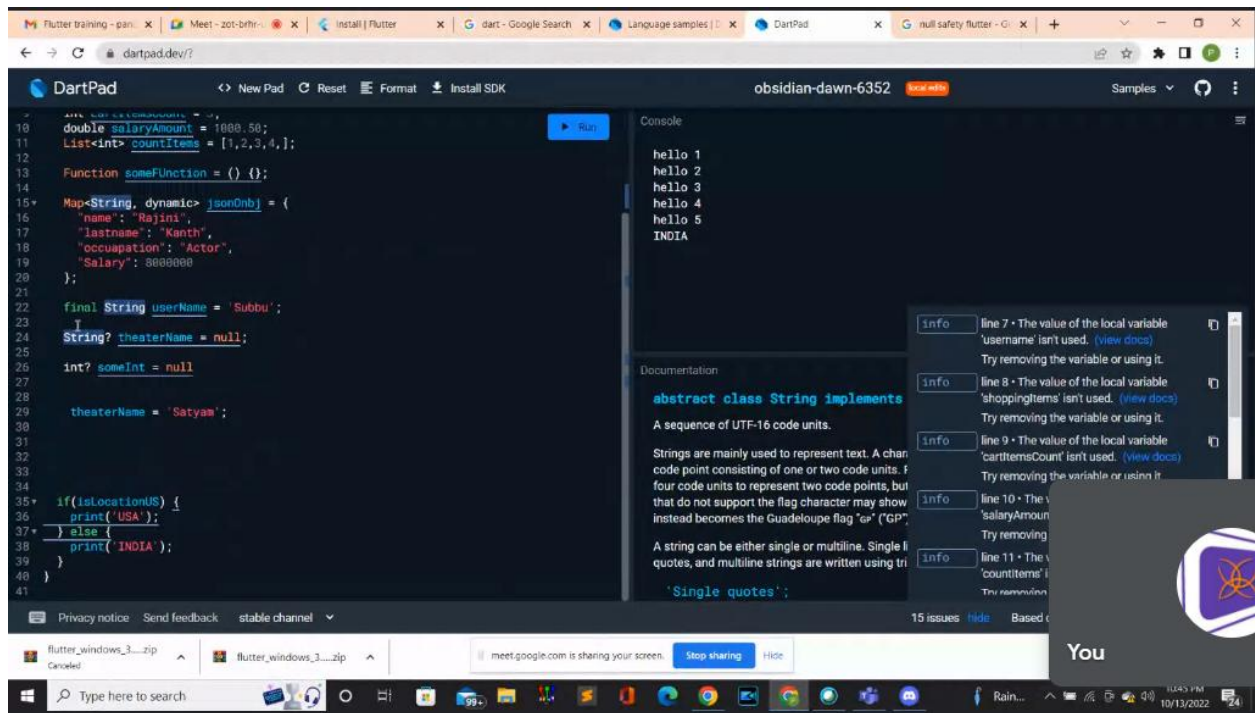
The console output shows:

```
hello 1  
hello 2  
hello 3  
hello 4  
hello 5  
INDIA
```

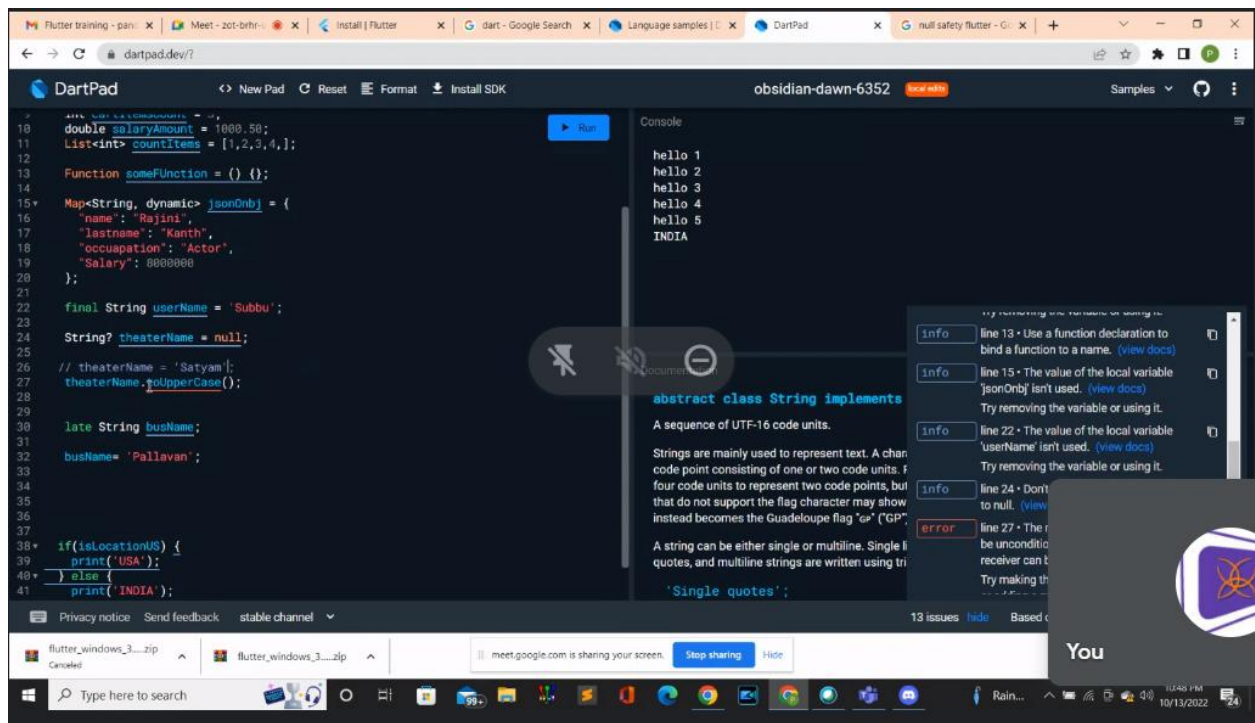
The documentation panel on the right shows the `abstract class Function` documentation. The bottom status bar indicates 11 issues. A red error message is displayed: "The final variable 'userName' can only be set once."

Null type value cannot be assigned to variable of type string;





define the variables after declaration using late keyword;



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```
10 double salaryAmount = 1000.50;
11 List<int> countItems = [1,2,3,4,];
12
13 Function someFunction = () {};
14
15 Map<String, dynamic> jsonObj = {
16   "name": "Rajini",
17   "lastname": "Kanth",
18   "occupation": "Actor",
19   "Salary": 8000000
20 };
21
22 final String userName = 'Subbu';
23
24 String? theaterName = null;
25
26 // theaterName = 'Satyam';
27 theaterName?.toUpperCase();
28
29
30 late String busName;
31 // busName= 'Pallavan';
32
33
34
35
36
37
38 if(isLocationUS) {
39   print('USA');
40 } else {
41   print('INDIA');
```

Console

```
hello 1
hello 2
hello 3
hello 4
hello 5
INDIA
```

12 issues

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```
10 double salaryAmount = 1000.50;
11 List<int> countItems = [1,2,3,4,];
12
13 Function someFunction = () {};
14
15 Map<String, dynamic> jsonObj = {
16   "name": "Rajini",
17   "lastname": "Kanth",
18   "occupation": "Actor",
19   "Salary": 8000000
20 };
21
22 final String userName = 'Subbu';
23
24 String? theaterName = null;
25
26 // theaterName = 'Satyam';
27 if(theaterName != null) {
28   theaterName.toUpperCase();
29 }
30
31
32 late String busName;
33 busName= 'Pallavan';
34 busName.toUpperCase();
35
36
37
38
39
40
41
```

Console

```
hello 1
hello 2
hello 3
hello 4
hello 5
INDIA
```

String? theaterName
local variable

11 issues

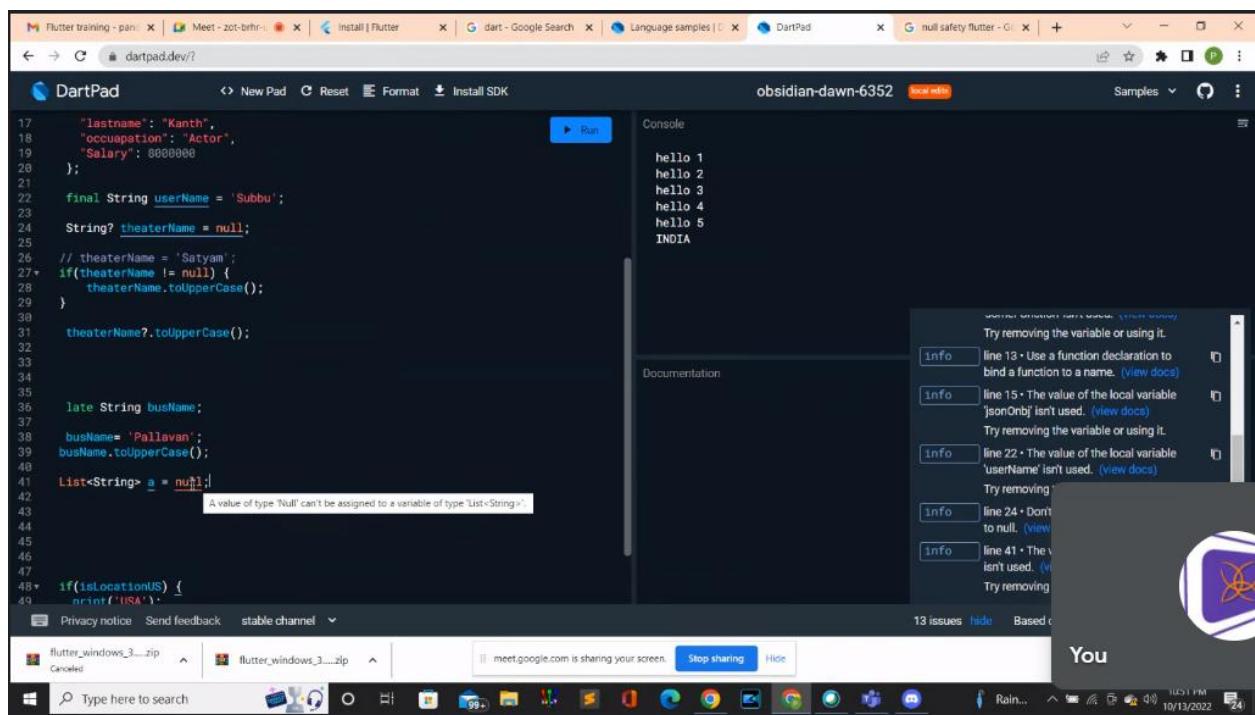
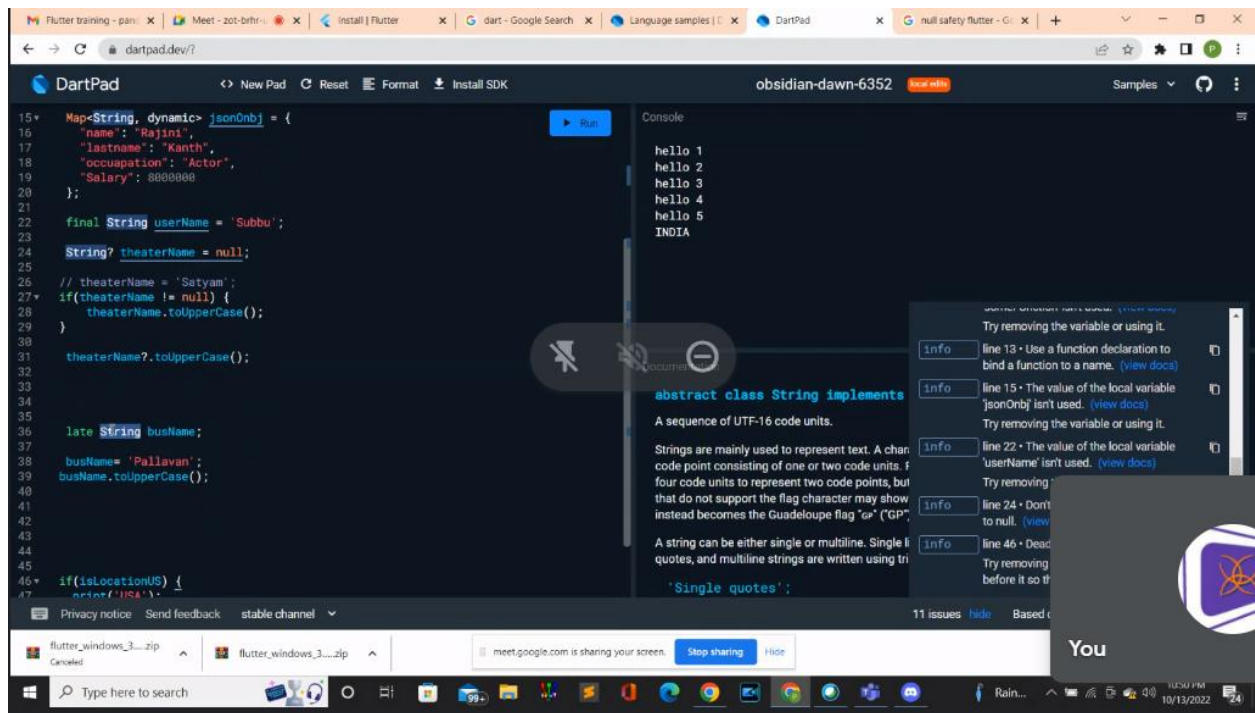
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Online IDE for dart:

<https://dartpad.dev/>