

Unlocking the Power of Dart Macros

Revolutionizing Code Generation

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- Lecturer at Maranatha Christian University
- Content creator:
 - Flutter Tutorial YouTube Channel
 - Online Courses at Udemy
- Flutter Trainer

 **Flutter Tutorial YouTube Channel**
provides **300++** fundamental & tutorial videos
<https://youtube.com/@ericodarmawan>



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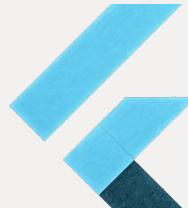


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Flutter is The Most Popular Cross- Platform Framework

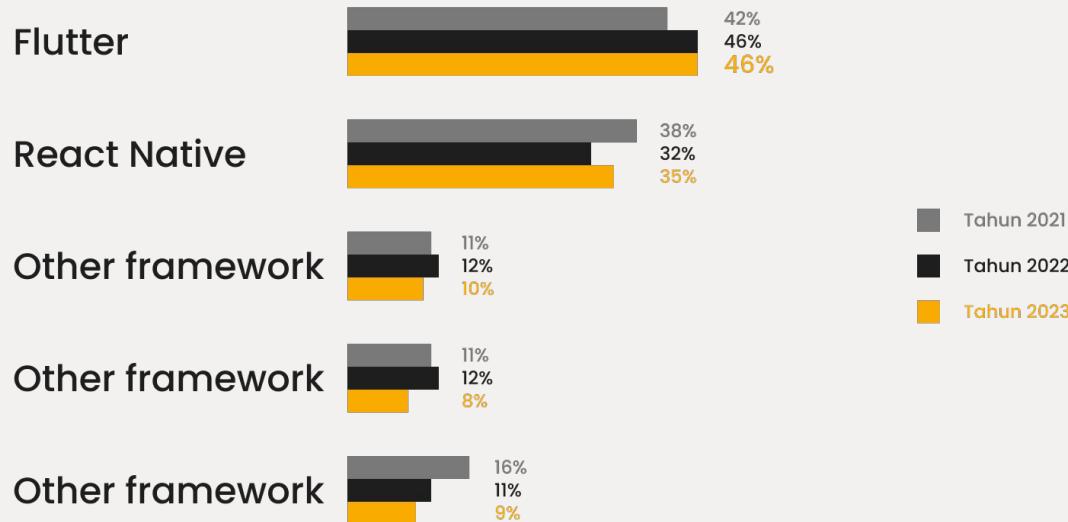


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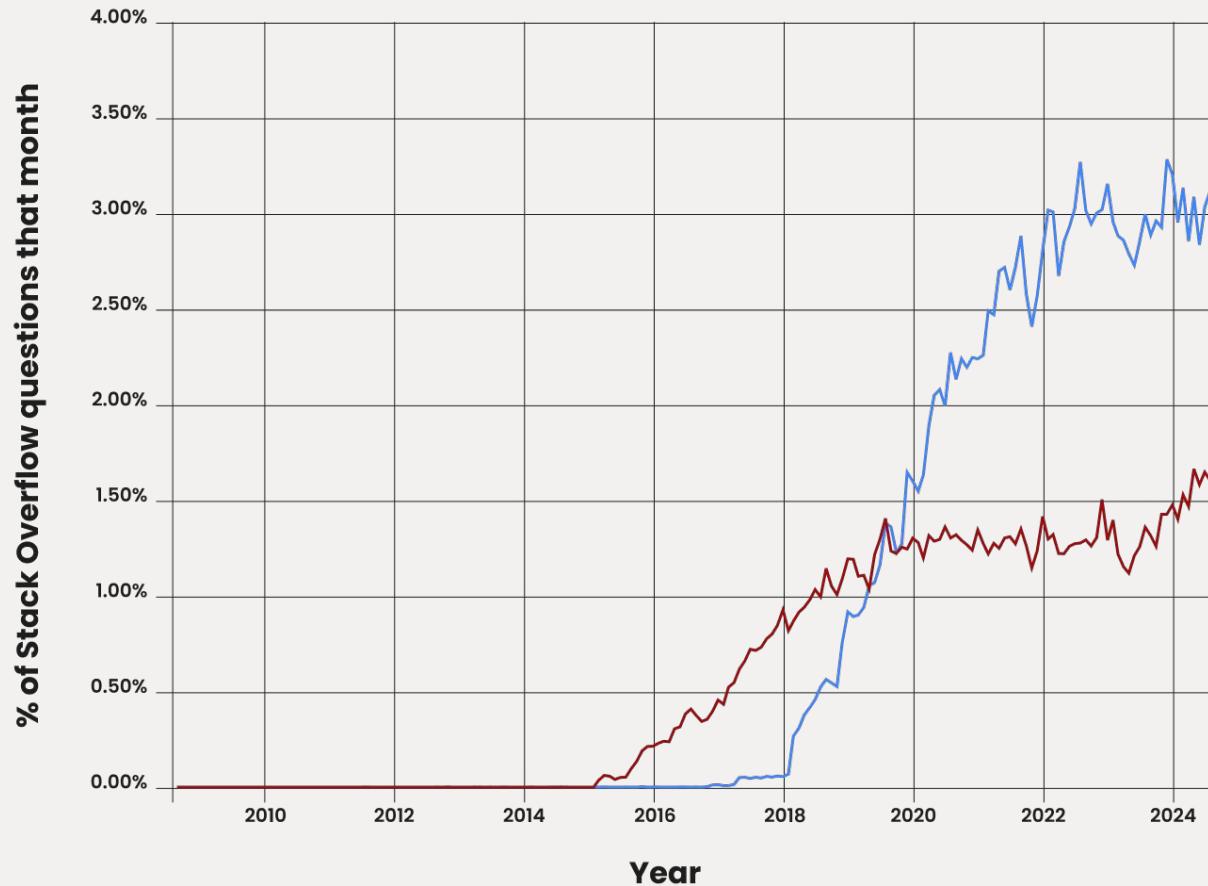
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Which cross-platform mobile frameworks do you use?



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Source: <https://www.jetbrains.com/lp/devecosystem-2023/development>
<https://www.jetbrains.com/lp/devecosystem-2022/miscellaneous>



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Source: <https://trends.stackoverflow.co/?tags=flutter,react-native>



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Top 10 public projects by contributors on GitHub	
Project	Contributor count
home-assistant/core	>21K
microsoft/vscode	>20K
ProvableHQ/leo	>20K
firstcontributions/first-contributions	>13k
flutter/flutter	>10K
NixOS/nixpkgs	>9K
vercel/next.js	>9K
langchain-ai/langchain	>8K
godotengine/godot	>7K
ollama/ollama	>7K

number 5 ➔



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Source:

<https://github.blog/news-insights/octoverse/octoverse-2024/#the-most-popular-programming-languages>



The Most Popular Development SDKs

Type: Development

Category: Apps



App Store



Google Play



Flutter

13%



React Native

13%



Flutter

22%



React Native

17%



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Source: <https://appfigures.com/top-sdks/development/apps>

Is Flutter Stopped by Google



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 Flutter Dihentikan oleh Google?
<https://youtube.com/watch?v=mIlgG7xUXxY>

#FlutterInProduction

Tune in at 11am PT on December 17, 2024

Register:
<https://flutter.dev/events/flutter-in-production>





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Flutter+

Flock is Flutter+ • Flock is a fork of Flutter.

Flock stays up to date with Flutter, and
also adds new community features.



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 Flock = Flutter+

<https://youtu.be/jAHH33e3Nd8>

Why do Mobile Developers Love Flutter?

- Flutter is **platform-agnostic**
- Flutter apps offer an **excellent user interface** and **experience**
 - Flutter's widget system simplifies creating great-looking interfaces and works well across platforms.
 - It doesn't need platform-specific UI components.
- Numerous useful open-source packages.



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Why do Mobile Developers Love Flutter?

- Flutter is **easy to learn**
 - Learning Flutter & Dart is easy for Java, Python, or C# devs due to its familiar syntax.
 - Excellent documentation.



```
public class Person {  
    public String name;  
    public int age;  
  
    public Person(String name, int age) {  
        this.name = name;  
        this.age = age;  
    }  
  
    Person person = new Person("Alice", 30);
```



```
class Person:  
    def __init__(self, name, age):  
        self.name = name  
        self.age = age  
  
person = Person("Alice", 30)
```

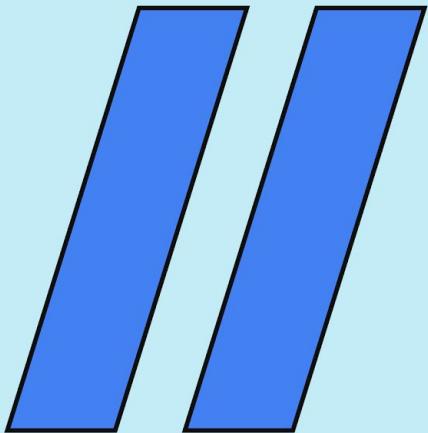


```
class Person {  
    final String name;  
    final int age;  
  
    Person({required this.name, required this.age});  
  
Person person = Person(name: 'Alice', age: 30);
```



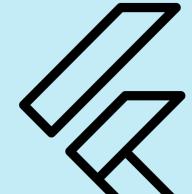
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Evolving Dart



Evolving Dart

- **Null Safety**: prevents null errors by ensuring variables can't be null unless specified.
- **Enhanced enum**: allow enum to have additional features such as fields, methods, and constructors.
- **Dart 3 new class modifiers**: mixin, final, sealed, base, & interface class.



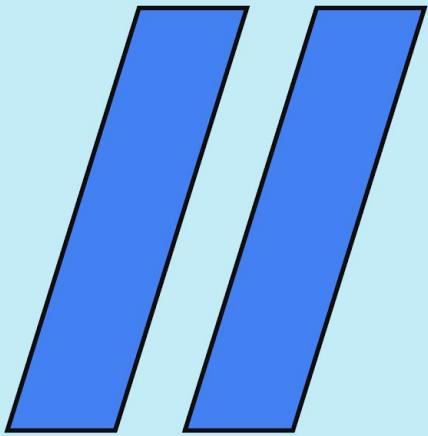
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```
enum Role {  
    admin('Administrator', 'Has full access'),  
    user('User', 'Has limited access'),  
    guest('Guest', 'Has minimal access');  
  
    final String name;  
    final String description;  
  
    const Role(this.name, this.description);  
  
    void describe() {  
        print('$name: $description');  
    }  
}
```



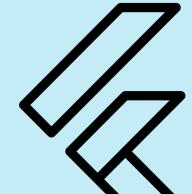
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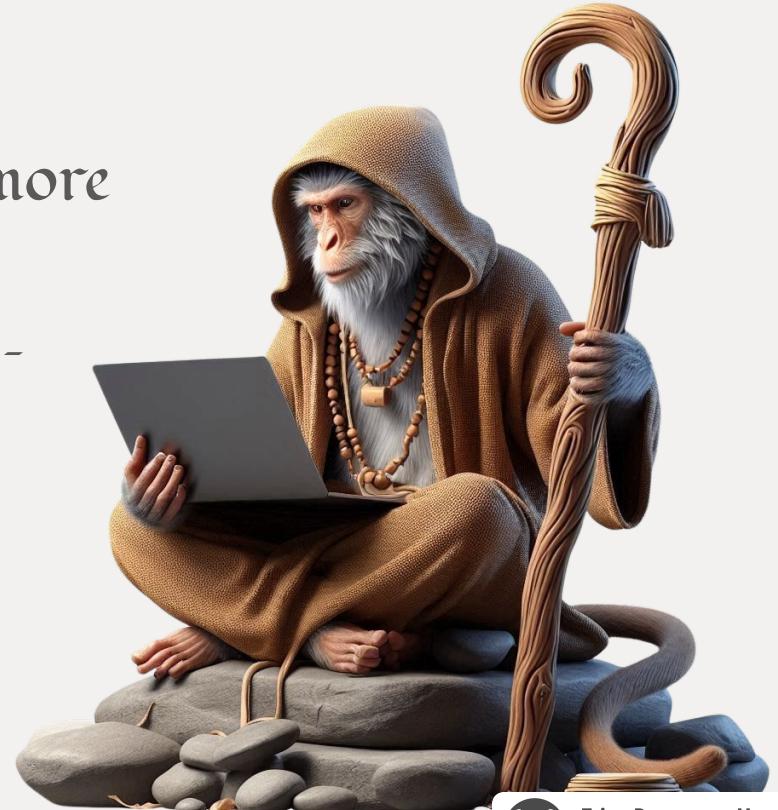
Macros



Remember this my child..

“The more you craft your code, the more errors may whisper in.”

- Mysterious Programming Guru -



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Build Runner Package

Provides a concrete way of generating files using Dart code.



```
import 'package:json_annotation/json_annotation.dart';

part 'person.g.dart';

@JsonSerializable()
class Person {
    final String name;
    final int age;

    Person({required this.name, required this.age});

    Map<String, dynamic> toJson() => _$PersonToJson(this);
    factory Person.fromJson(Map<String, dynamic> json) =>
        _$PersonFromJson(json);
}
```

> dart run build_runner build



```
// // GENERATED CODE - DO NOT MODIFY BY HAND

part of 'person.dart';

Person _$PersonFromJson(Map<String, dynamic> json) => Person(
    name: json['name'] as String,
    age: (json['age'] as num).toInt(),
);

Map<String, dynamic> _$PersonToJson(Person instance) => <String, dynamic>{
    'name': instance.name,
    'age': instance.age,
};
```



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What is Dart Macro?

Dart macro is a **user-definable piece of code** that takes in **other code** as **parameters** and operates on it in **real-time** to **create**, **modify**, or **add declarations**.

```
import 'package:json/json.dart';

@Json Codable()
class Person {
    final String name;
    final int age;

    Person({required this.name, required this.age});
}
```

```
augment library 'file:///Users/ericodh/Dart%20Project/macros_demo/bin/macros_demo.dart';

import 'dart:core' as prefix0;

augment class Person {
    external Person.fromJson(prefix0.Map<prefix0.String, prefix0.Object?> json);
    external prefix0.Map<prefix0.String, prefix0.Object?> toJson();
    augment Person.fromJson(prefix0.Map<prefix0.String, prefix0.Object?> json, )
        : this.name = json[r'name'] as prefix0.String,
          this.age = json[r'age'] as prefix0.int;
    augment prefix0.Map<prefix0.String, prefix0.Object?> toJson() {
        final json = <prefix0.String, prefix0.Object?>{};
        json[r'name'] = this.name;
        json[r'age'] = this.age;
        return json;
    }
}
```



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Another Example

```
Manually
```

```
class Person {  
    const Person({this.name, this.age});  
  
    final String name;  
    final int age;  
  
    @override  
    bool operator ==(Object other) => identical(this, other) ||  
        other is Person && runtimeType == other.runtimeType &&  
        name == other.name && age == other.age;  
  
    @override  
    int get hashCode => Object.hash(runtimeType, name, age);  
  
    Person copyWith(String? name, int? age) =>  
        Person(name: name ?? this.name, age: age ?? this.age);  
  
    @override  
    String toString() => 'Person(name: $name, age: $age)';  
}
```

```
Using freezed package
```

```
import 'package:freezed_annotation/freezed_annotation.dart';  
  
part 'main.freezed.dart';  
  
@freezed  
class Person with _$Person {  
    const factory Person({  
        required String name,  
        required int age,  
    }) = _Person;  
}
```

```
Using data_class macro
```

```
import 'package:data_class/data_class.dart';  
  
@Data()  
class Person {  
    const Person({this.name, this.age});  
  
    final String name;  
    final int age;  
}
```



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How to Use Macro?

1. Switch to the [Flutter master channel](#).
2. Run `dart --version` and make sure you have Dart version [3.5.0-152](#) or later.
3. Edit the [SDK constraint](#) in your pubspec to require the Dart version: `sdk: ^3.5.0-152`.
4. [Add the package json to dependencies](#): `dart pub add json`.

How to Use Macro?

5. Enable the experiment in your package's `analysis_options.yaml` file. file at the root of your project:

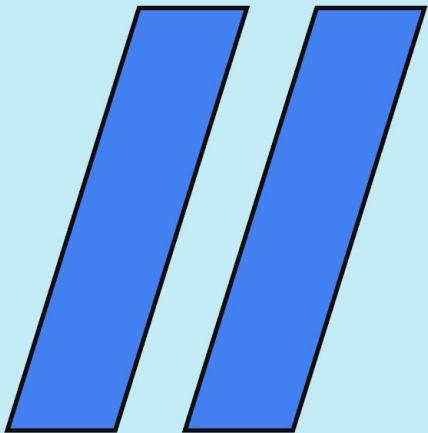


```
analyzer:  
  enable-experiment:  
    - macros
```

6. Run your project with the experimental flag:

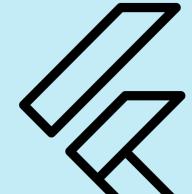
```
dart run --enable-experiment=macros your_file.dart
```

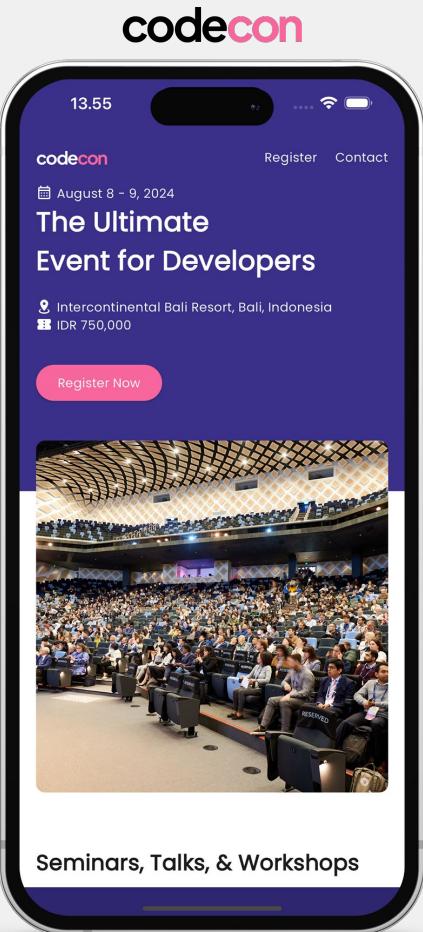
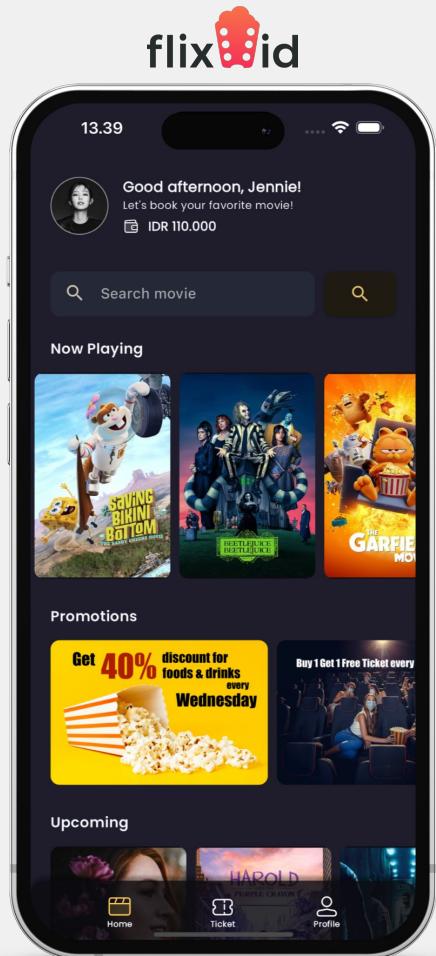
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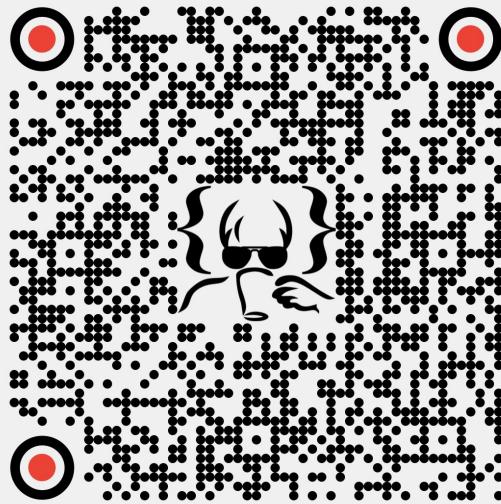
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How to Create Macro (Demo)





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