1. Flutter introduction and getting started with flutter.

Flutter is Google's open-source framework for building cross-platform apps with a single codebase for mobile, web, and desktop. It's known for fast performance, expressive UI, and using the **Dart** language.

Getting Started

1. **Install Flutter SDK**:
   - Download from flutter.dev.
   - Add Flutter to your system path.
2. **Set Up an Editor**:
   - Use **VS Code** or **Android Studio** with Flutter and Dart extensions.

   Create a New Project:

   ```
   flutter create my_first_app

   cd my_first_app

   flutter run
   ```

3. **Project Structure**:
   - **`lib/main.dart`**: Main code file.
   - **`pubspec.yaml`**: Project dependencies.

Sample App:

```
import 'package:flutter/material.dart';

void main() => runApp(const MyApp());

class MyApp extends StatelessWidget {

  @override

  Widget build(BuildContext context) {

    return MaterialApp(

      home: Scaffold(

        appBar: AppBar(title: Text('Hello Flutter')),

        body: Center(child: Text('Hello, World!')),

      ),
```

```
    );
  }
}
```

2. Create a hello world app in flutter.

```
import 'package:flutter/material.dart';

void main() {
  runApp(const MyApp());
}

class MyApp extends StatelessWidget {
  const MyApp({super.key});

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Hello World App',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: const MyHomePage(),
    );
  }
}
```

```
class MyHomePage extends StatelessWidget {
  const MyHomePage({super.key});


  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: const Text('Hello World App'),
      ),
      body: const Center(
        child: Text(
          'Hello, World!',
          style: TextStyle(fontSize: 24),
        ),
      ),
    );
  }
}
```

3. Write an application and ask their user for a number to determine whether the number is prime or not in dart.

```
import 'dart:io';

void main() {
  stdout.write('Enter a number: ');
  int number = int.parse(stdin.readLineSync()!);

  if (isPrime(number)) {
```

```
    print('$number is a prime number.');
  } else {
    print('$number is not a prime number.');
  }
}

bool isPrime(int number) {
  if (number <= 1) {
    return false;
  }
  for (int i = 2; i <= number ~/ 2; i++) {
    if (number % i == 0) {
      return false;
    }
  }
  return true;
}
```

4.write a program in dart to find the area of a circle using a user defined function.

```
import 'dart:io';
import 'dart:math'; // for the pi constant

void main() {
  stdout.write('Enter the radius of the circle: ');
  double radius = double.parse(stdin.readLineSync()!);

  double area = calculateAreaOfCircle(radius);

  print('The area of the circle with radius $radius is $area');
}

double calculateAreaOfCircle(double radius) {
  return pi * radius * radius;
}
```

5. write a dart program to create a class laptop with properties [id, name, ram] and create 3 objects of it and print all details.

```
class Laptop {
  int id;
  String name;
  int ram;

  Laptop(this.id, this.name, this.ram);

  void displayDetails() {
```

```
    print('Laptop ID: $id, Name: $name, RAM: ${ram}GB');
  }
}

void main() {
  // Creating 3 objects of the Laptop class
  Laptop laptop1 = Laptop(101, 'Dell Inspiron', 8);
  Laptop laptop2 = Laptop(102, 'HP Pavilion', 16);
  Laptop laptop3 = Laptop(103, 'Apple MacBook Pro', 32);

  // Printing the details of all laptops
  laptop1.displayDetails();
  laptop2.displayDetails();
  laptop3.displayDetails();
}
```

6. create a simple calculator application in flutter.

```
import 'package:flutter/material.dart';

void main() {
  runApp(const CalculatorApp());
}

class CalculatorApp extends StatelessWidget {
  const CalculatorApp({super.key});

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'Simple Calculator',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: const CalculatorHome(),
    );
  }
}

class CalculatorHome extends StatefulWidget {
  const CalculatorHome({super.key});

  @override
  _CalculatorHomeState createState() => _CalculatorHomeState();
}
```

```
class _CalculatorHomeState extends State<CalculatorHome> {
  final TextEditingController _controller1 = TextEditingController();
  final TextEditingController _controller2 = TextEditingController();
  String _result = '';

  void _calculate(String operation) {
    double num1 = double.parse(_controller1.text);
    double num2 = double.parse(_controller2.text);
    double res;

    switch (operation) {
      case '+':
        res = num1 + num2;
        break;
      case '-':
        res = num1 - num2;
        break;
      case '*':
        res = num1 * num2;
        break;
      case '/':
        res = num1 / num2;
        break;
      default:
        res = 0;
    }

    setState(() {
      _result = 'Result: $res';
    });
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: const Text('Simple Calculator'),
      ),
      body: Padding(
        padding: const EdgeInsets.all(16.0),
        child: Column(
          mainAxisAlignment: MainAxisAlignment.center,
          crossAxisAlignment: CrossAxisAlignment.stretch,
          children: [
```

```
            TextField(
              controller: _controller1,
              keyboardType: TextInputType.number,
              decoration: const InputDecoration(labelText: 'Enter first
number'),
            ),
            TextField(
              controller: _controller2,
              keyboardType: TextInputType.number,
              decoration: const InputDecoration(labelText: 'Enter second
number'),
            ),
            const SizedBox(height: 16),
            Row(
              mainAxisAlignment: MainAxisAlignment.spaceEvenly,
              children: [
                ElevatedButton(
                  onPressed: () => _calculate('+'),
                  child: const Text('+'),
                ),
                ElevatedButton(
                  onPressed: () => _calculate('-'),
                  child: const Text('-'),
                ),
                ElevatedButton(
                  onPressed: () => _calculate('*'),
                  child: const Text('*'),
                ),
                ElevatedButton(
                  onPressed: () => _calculate('/'),
                  child: const Text('/'),
                ),
              ],
            ),
            const SizedBox(height: 16),
            Text(
              _result,
              style: const TextStyle(fontSize: 24),
              textAlign: TextAlign.center,
            ),
          ],
        ),
      ),
    );
  }
```

```
}
```

7. Create a simple navigation app.

```
import 'package:flutter/material.dart';

void main() => runApp(const MyApp());

class MyApp extends StatelessWidget {
  const MyApp({super.key});

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'Navigation App',
      theme: ThemeData(primarySwatch: Colors.blue),
      home: const HomePage(),
    );
  }
}

class HomePage extends StatelessWidget {
  const HomePage({super.key});

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: const Text('Home Page')),
      body: Center(
        child: ElevatedButton(
          onPressed: () {
            Navigator.push(
              context,
              MaterialPageRoute(builder: (context) => const
SecondPage()),
            );
          },
          child: const Text('Go to Second Page'),
        ),
      ),
    );
  }
}
```

```
class SecondPage extends StatelessWidget {
  const SecondPage({super.key});

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: const Text('Second Page')),
      body: Center(
        child: ElevatedButton(
          onPressed: () {
            Navigator.pop(context); // Return to Home Page
          },
          child: const Text('Back to Home Page'),
        ),
      ),
    );
  }
}
```