EX-3 **A Native Calculator Application**

Aim

To develop a native calculator application in flutter.

Definitions

Flutter

Flutter is not a programming language. It's a software development kit (SDK) with prewritten code, consisting of ready-to-use and customizable widgets, as well as libraries, tools, and documentation that together serve to build cross-platform apps.

Flutter plugin

A Flutter plugin is a special kind of package that enables Flutter apps to interact with platform-specific APIs (iOS, Android, web, desktop). Plugins can include Dart code, but crucially, they also contain platform-specific implementation code written in Kotlin/Java for Android and Swift/Obj-C for iOS.

Dart plugin

The Dart plugin adds Dart support to IntelliJ Platform-based IDEs developed by JetBrains. These IDEs provide features unique to specific development technologies. The IDEs recommended for Dart and Flutter development include: IntelliJ IDEA which specializes in JVM-based language development.

Flutter SDK

Flutter is Google's free, open-source software development kit (SDK) for cross-platform mobile application development. Using a single platform-agnostic codebase, Flutter helps developers build high-performance, scalable applications with attractive and functional user interfaces for Android or IOS.

Calculator Application

Basic calculator apps perform arithmetic operations like addition, subtraction, multiplication, and division. They are used by over 80% of smartphone users for everyday calculations, according to a study by Statista. Their purpose is to provide quick solutions for general calculations.

Procedure

1. **Open android studio**
2. **Click 'new flutter project'**
3. **Select 'flutter' at the left side of the window**
4. **Add 'flutter sdk' from the desired location**
5. **Click 'next' and specify the project name and select language 'java', check only Android, Web and Windows under platforms then click 'create'**
6. **Create a new dart file under 'lib' folder in the projects window (right click over lib folder - > new -> dart file -> specify the file name as 'calculator' -> press 'enter'**
7. **Type the following codes in the calculator.dart file**

Calculator.dart

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

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

// Define the CalculatorApp class
class CalculatorApp extends StatelessWidget {
  const CalculatorApp({Key? key}) : super(key: key);

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flutter Demo',
      theme: ThemeData(
        primarySwatch: Colors.blue,
        visualDensity: VisualDensity.adaptivePlatformDensity,
      ),
      home: const Calculator(),
    );
  }
}

// Define the Calculator StatefulWidget
class Calculator extends StatefulWidget {
  const Calculator({Key? key}) : super(key: key);

  @override
  _CalculatorState createState() => _CalculatorState();
}

// The existing _CalculatorState class
```

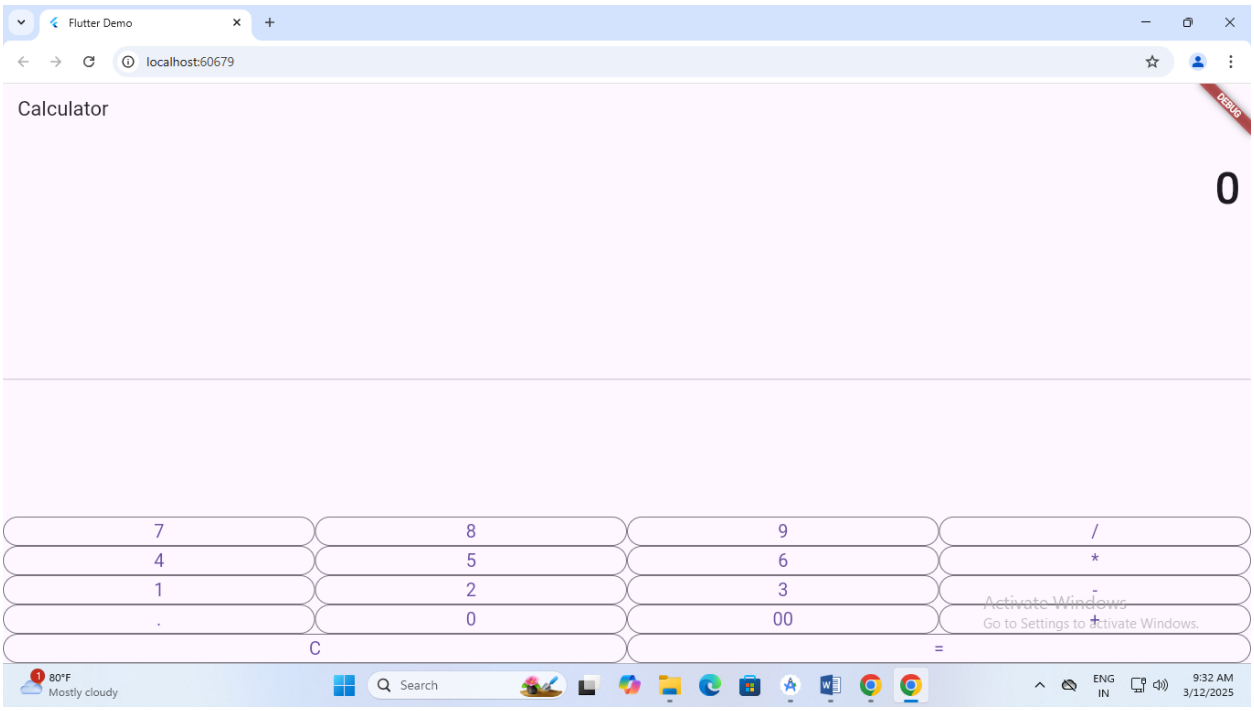
```
class _CalculatorState extends State<Calculator> {
  String _output = "0";
  String _result = "0";
  String _operation = "";
  double num1 = 0.0;
  double num2 = 0.0;

  void buttonPressed(String buttonText) {
    if (buttonText == "C") {
      _output = "0";
      _result = "0";
      num1 = 0.0;
      num2 = 0.0;
      _operation = "";
    } else if (buttonText == "+" || buttonText == "-" || buttonText == "/" || buttonText == "*") {
      num1 = double.tryParse(_output) ?? 0.0;
      _operation = buttonText;
      _output = "0";
    } else if (buttonText == "=") {
      num2 = double.tryParse(_output) ?? 0.0;
      switch (_operation) {
        case "+":
          _result = (num1 + num2).toString();
          break;
        case "-":
          _result = (num1 - num2).toString();
          break;
        case "*":
          _result = (num1 * num2).toString();
          break;
        case "/":
          _result = num2 != 0 ? (num1 / num2).toString() : "Error";
          break;
        default:
          break;
      }
      _output = _result;
      _operation = "";
      num1 = 0.0;
      num2 = 0.0;
    } else {
      // Check if _output is "0" and the button pressed is a number
      if (_output == "0" && buttonText != ".") {
        _output = buttonText;
      } else {
```

```
      _output += buttonText;
    }
  }
  setState(() {
    _output = _output;
  });
}

@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text("Calculator"),
    ),
    body: Column(
      children: <Widget>[
        Container(
          alignment: Alignment.centerRight,
          padding: const EdgeInsets.symmetric(vertical: 24.0, horizontal: 12.0),
          child: Text(
            _output,
            style: const TextStyle(fontSize: 48.0, fontWeight: FontWeight.bold),
          ),
        ),
        const Expanded(child: Divider()),
        ..._buildCalculatorButtons(),
      ],
    ),
  );
}

List<Widget> _buildCalculatorButtons() {
  // This function builds buttons in a more scalable way
  List<List<String>> buttons = [
    ["7", "8", "9", "/"],
    ["4", "5", "6", "*"],
    ["1", "2", "3", "-"],
    [".", "0", "00", "+"],
    ["C", "="]
  ];
  return buttons.map((List<String> row) {
    return Row(
      children: row.map((String buttonText) {
        return buildButton(buttonText);
      }).toList(),
    );
```

```
    }).toList();
  }

  Widget buildButton(String buttonText) {
    return Expanded(
      child: OutlinedButton(
        onPressed: () => buttonPressed(buttonText),
        child: Text(
          buttonText,
          style: const TextStyle(fontSize: 20.0),
        ),
      ),
    );
  }
}
```

8. **Save the file calculator.dart (click main menu -> saveall)**
9. **Select device as 'chrome(web)'**
10. **Click on run/debug configuration -> edit configurations ->specify dart file name (calculator.dart) -> browse and set dart entrypoint as calculator.dart -> click ok -> click run**

Output


Flutter Demo
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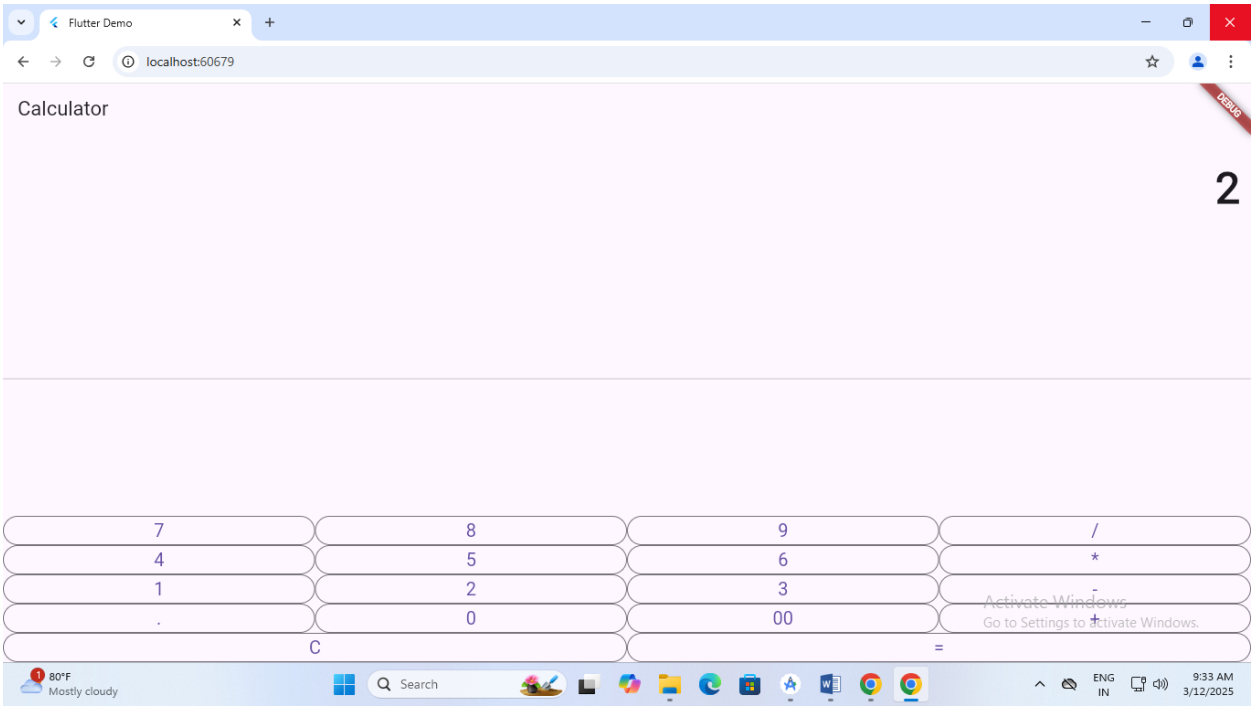
3/12/2025


Flutter Demo
localhost:60679
Calculator
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Result

Thus, a native calculator application has been developed.