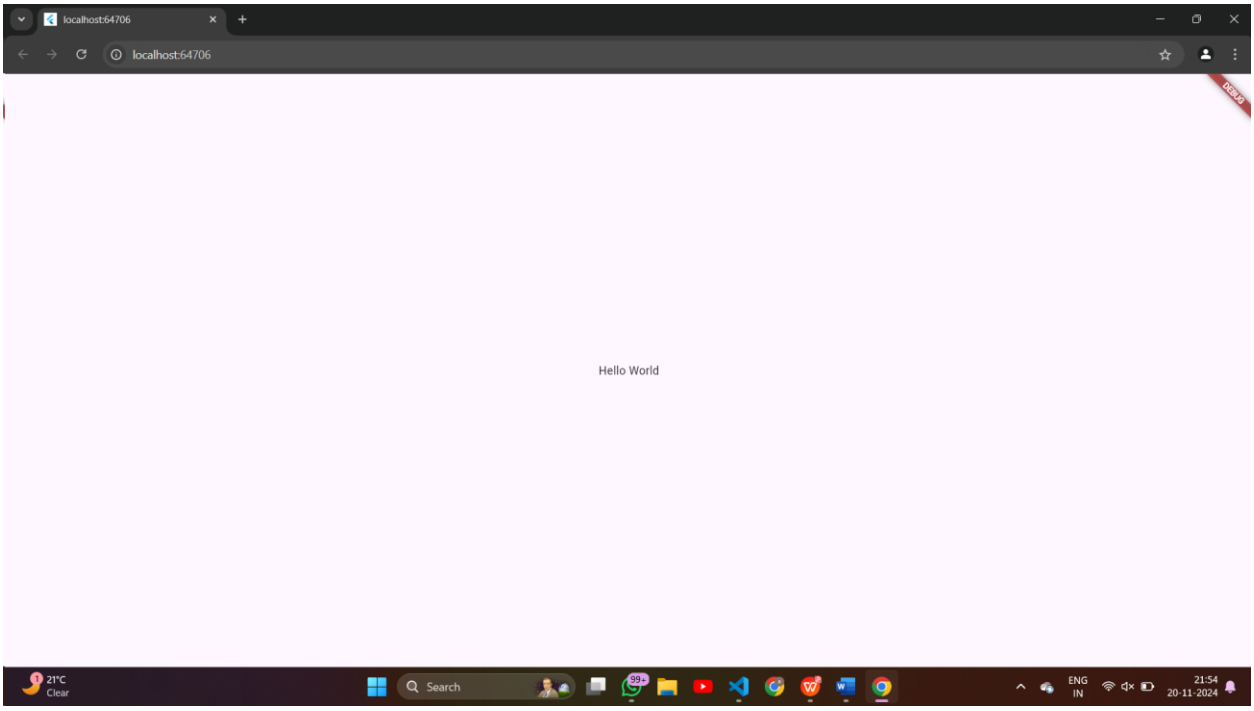
## 1b) Write a simple Dart program to understand the language basics.

```
import 'package:flutter/material.dart';
 void main() {
  runApp(const MyApp());
 }
 class MyApp extends StatelessWidget {
  const MyApp({super.key});
  @override
  Widget build(BuildContext context) {
    return const MaterialApp(
      home: Scaffold(
        body: Center(
          child: Text('Hello World'),
        ),
      ),
    );
  }
 }
```

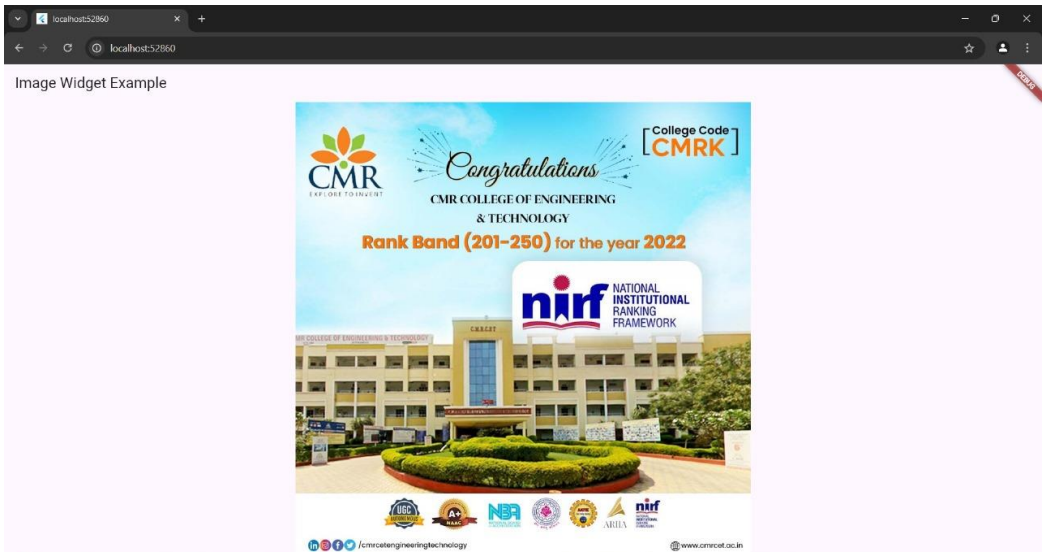


## 2a) Explore various Flutter widgets (Text, Image, Container, etc.).

```
import 'package:flutter/material.dart';
void main() {
  runApp(const MyApp());
}
class MyApp extends StatelessWidget {
  const MyApp({Key? key}) : super(key: key);
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: Scaffold(
        appBar: AppBar(
          title: const Text("Text Widget Example"),
        ),
        body: const Center(
          child: Text(
            "Hello, Flutter!",
            style: TextStyle(fontSize: 24, fontWeight: FontWeight.bold),
          ),
        ),
      ),
    );
  }
}
```

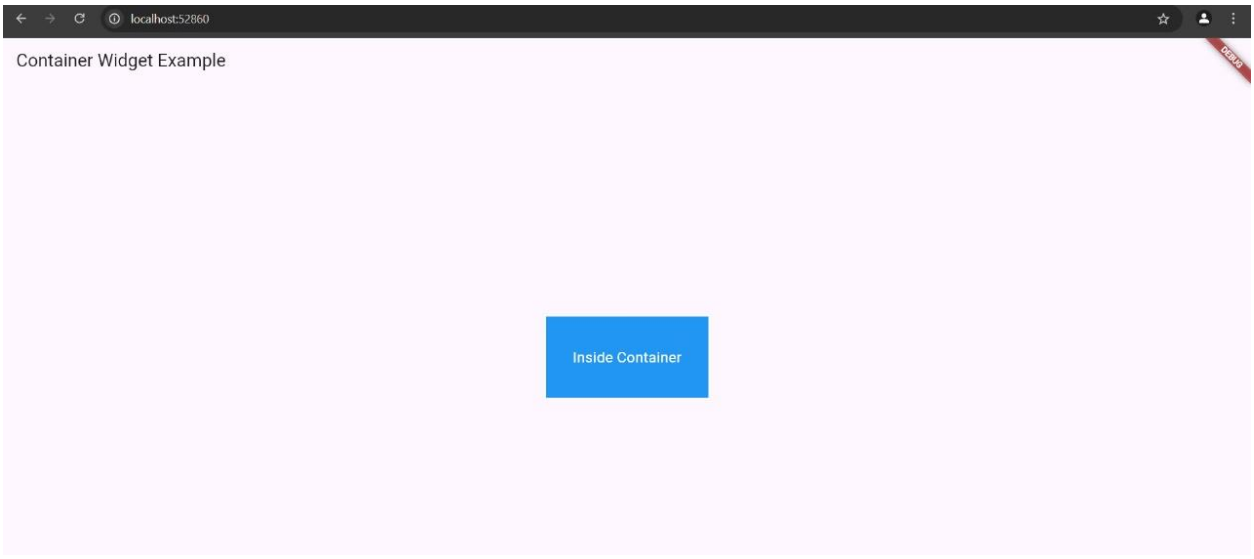
## Image

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

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

class MyApp extends StatelessWidget {
  const MyApp({Key? key}) : super(key: key);

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: Scaffold(
        appBar: AppBar(
          title: const Text("Image Widget Example"),
        ),
        body: const Center(
          child: Image(
            image: NetworkImage('https://pbs.twimg.com/media/FXs0p-KakAckz1x.jpg'),  // Replace with a valid image URL
          ),
        ),
      ),
    );
  }
}
```



## Container

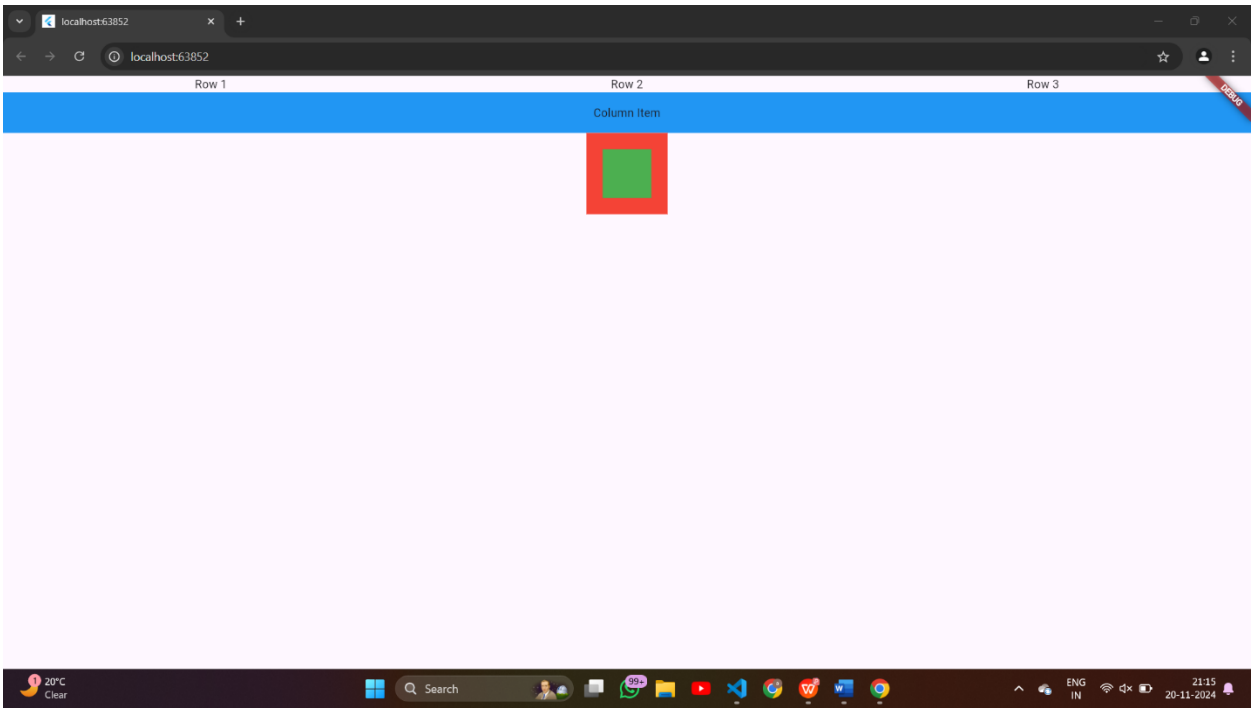
```
import 'package:flutter/material.dart';

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

class MyApp extends StatelessWidget {
  const MyApp({Key? key}) : super(key: key);

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: Scaffold(
        appBar: AppBar(
          title: const Text("Container Widget Example"),
        ),
        body: Center(
          child: Container(
            width: 200,          // Width of the container
            height: 100,         // Height of the container
            color: Colors.blue,   // Background color of the container
            alignment: Alignment.center,  // Aligning the text inside the container
            child: const Text(
              "Inside Container",   // Text inside the container
              style: TextStyle(color: Colors.white, fontSize: 18),
            ),
          ),
        ),
      ),
    );
  }
}
```




## 2b) Implement different layout structures using Row, Column, and Stack widgets.

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

void main() => runApp(MaterialApp(home: Scaffold(body: MyApp())));

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Column(
      children: [
        Row(
            mainAxisAlignment: MainAxisAlignment.spaceAround,
            children: [Text("Row 1"), Text("Row 2"), Text("Row 3")]),
        Container(
            color: Colors.blue,
            height: 50,
            width: double.infinity,
            child: Center(child: Text("Column Item"))),
        Stack(children: [
          Container(color: Colors.red, height: 100, width: 100),
          Positioned(
              top: 20,
```

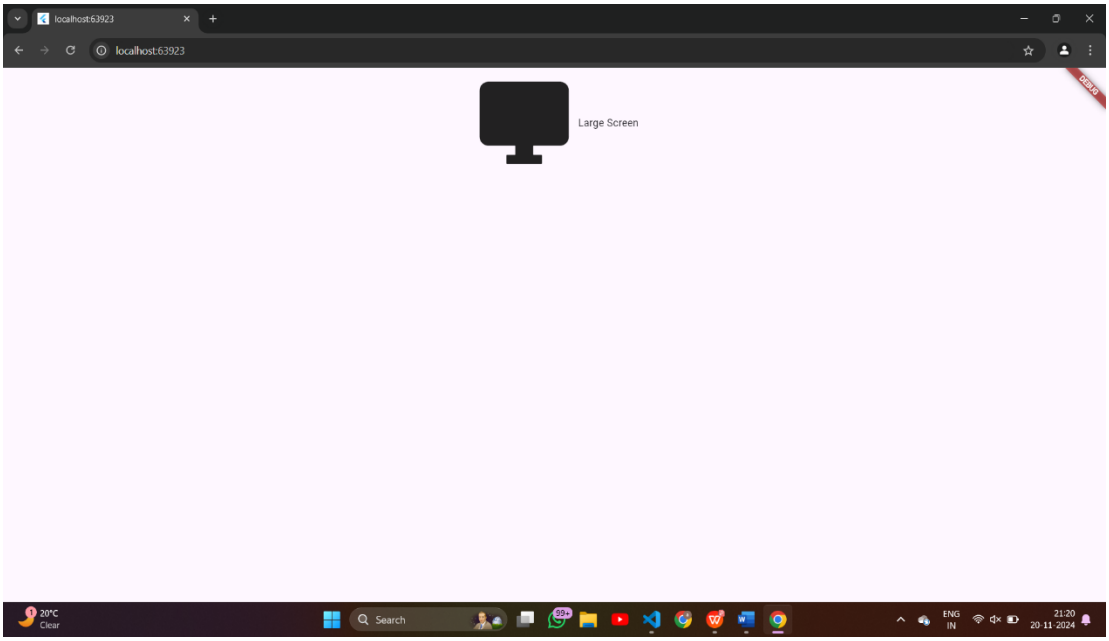
```
            left: 20,
            child: Container(color: Colors.green, height: 60, width: 60)),
        ]),
      ],
    );
  }
}
```

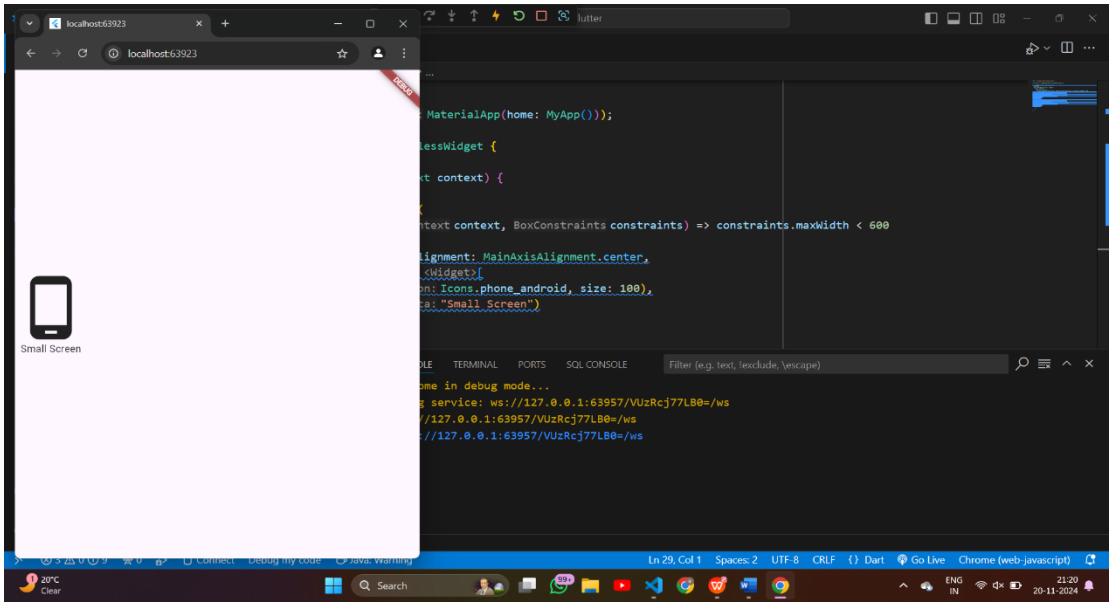



## 3a) Design a responsive UI that adapts to different screen sizes.

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

void main() => runApp(MaterialApp(home: MyApp()));

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      body: LayoutBuilder(
        builder: (context, constraints) => constraints.maxWidth < 600
            ? Column(
                mainAxisAlignment: MainAxisAlignment.center,
```

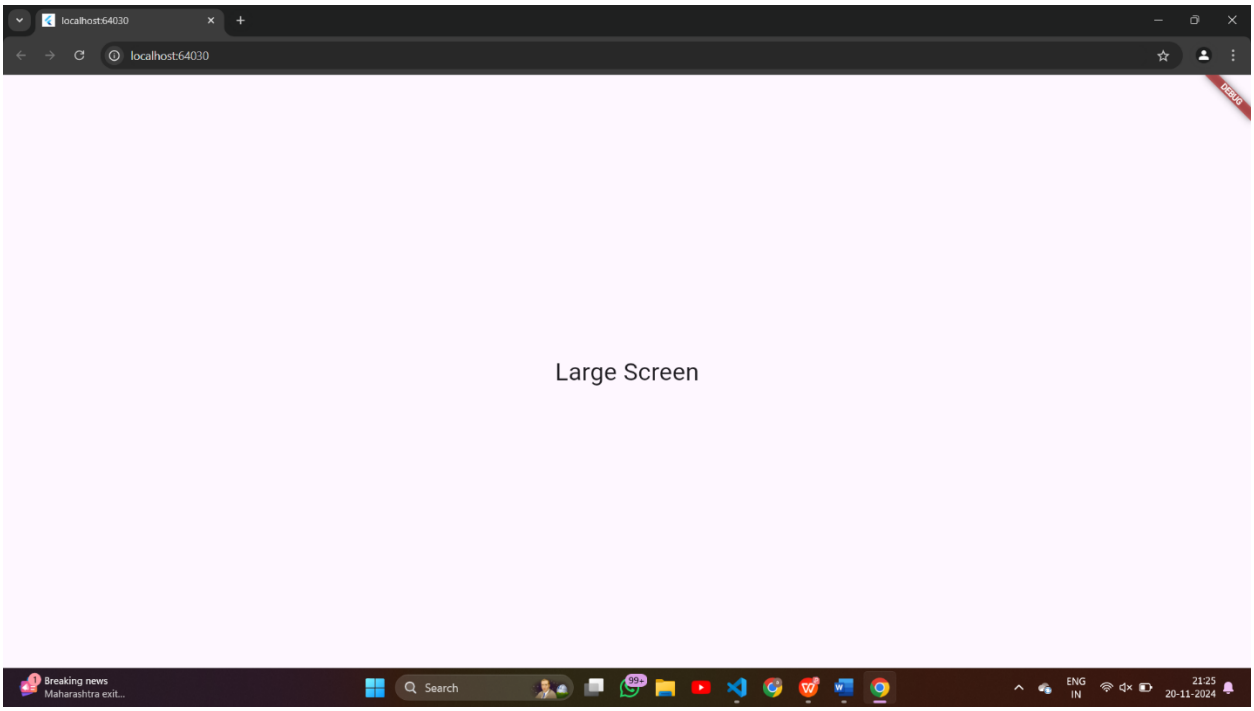
```
            children: [Icon(Icons.phone_android, size: 100), Text("Small Screen")],
          )
        : Row(
            mainAxisAlignment: MainAxisAlignment.center,
            children: [Icon(Icons.desktop_windows, size: 150), Text("Large Screen")],
          ),
    ),
  );
 }
}
```

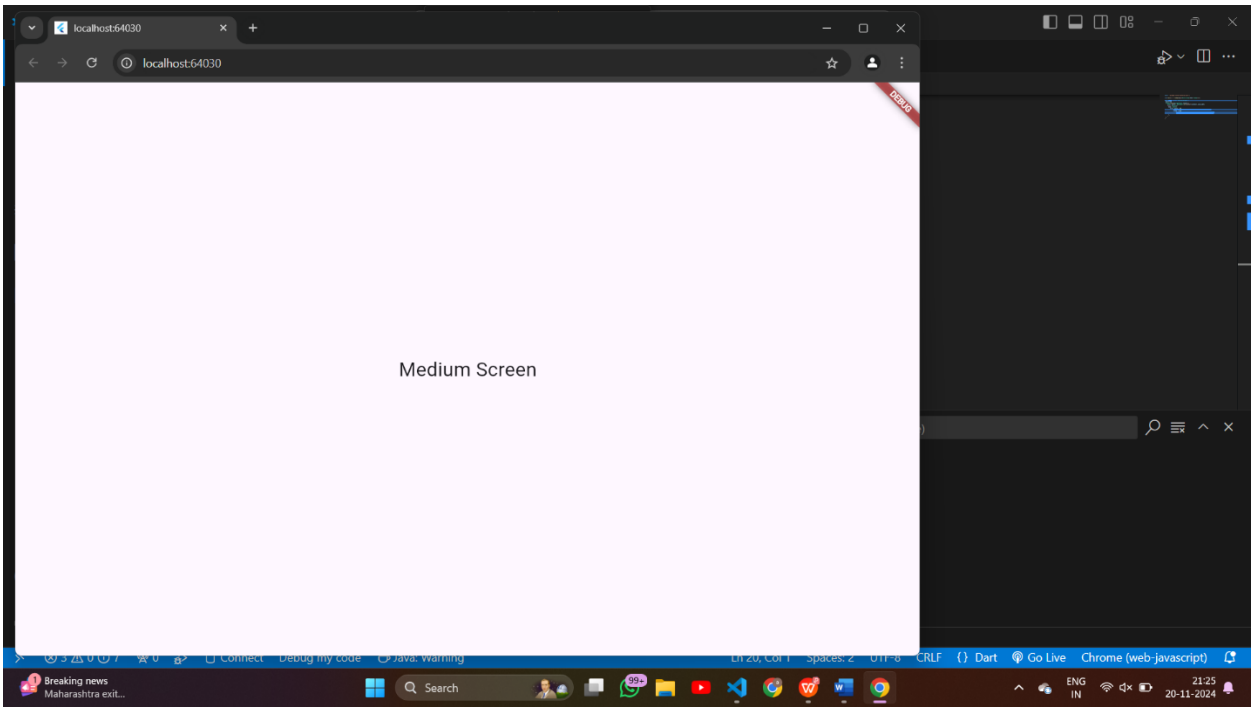


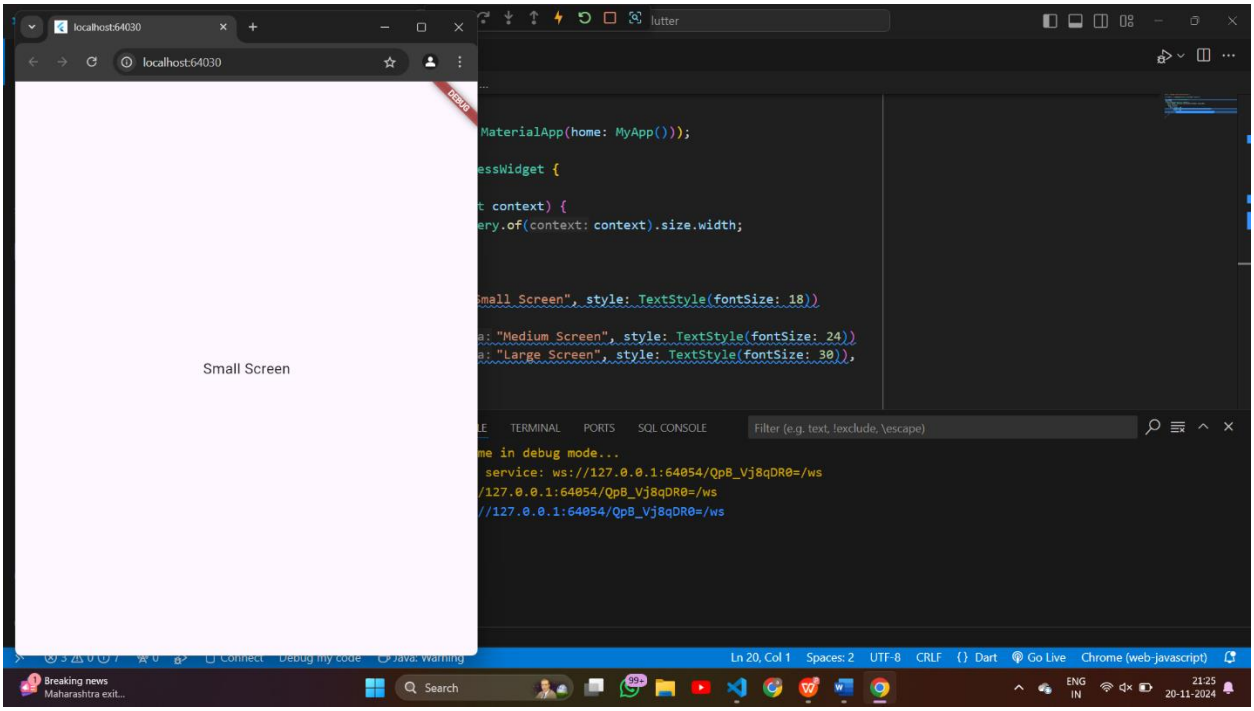



## 3b) Implement media queries and breakpoints for responsiveness.

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

void main() => runApp(MaterialApp(home: MyApp()));

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    double width = MediaQuery.of(context).size.width;
    return Scaffold(
      body: Center(
        child: width < 600
            ? Text("Small Screen", style: TextStyle(fontSize: 18))
            : width < 1200
                ? Text("Medium Screen", style: TextStyle(fontSize: 24))
                : Text("Large Screen", style: TextStyle(fontSize: 30)),
      ),
    );
  }
}
```

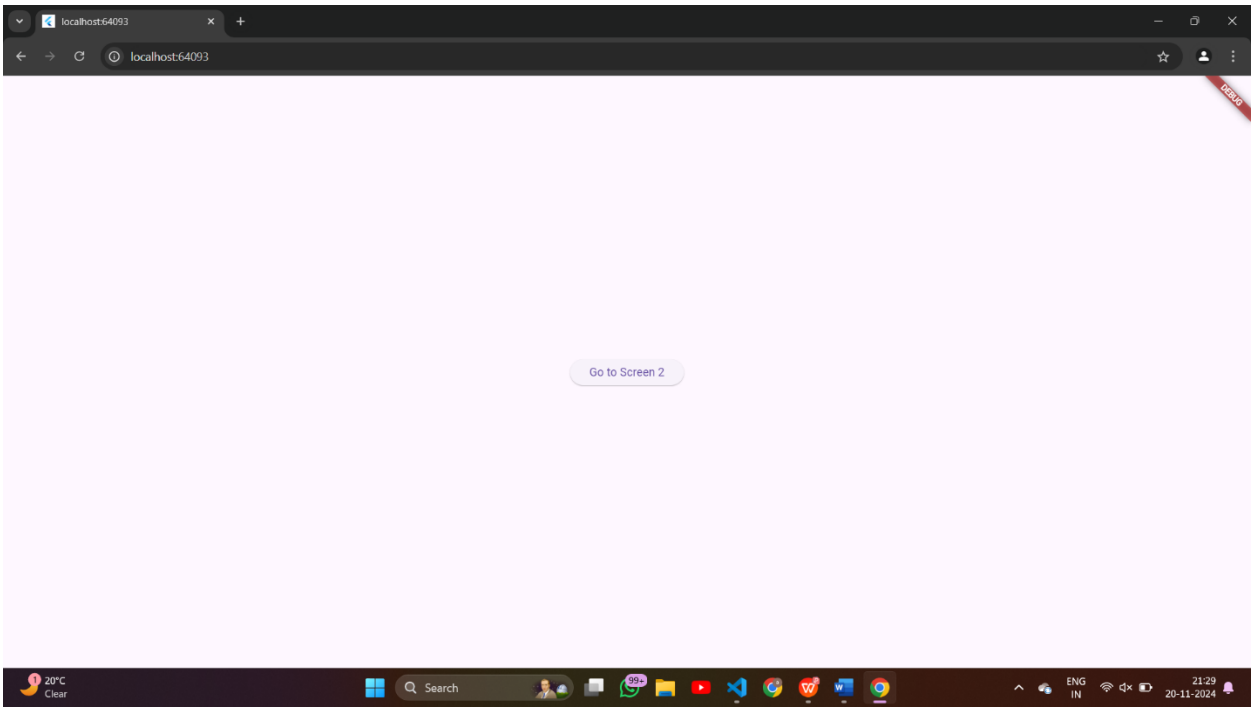


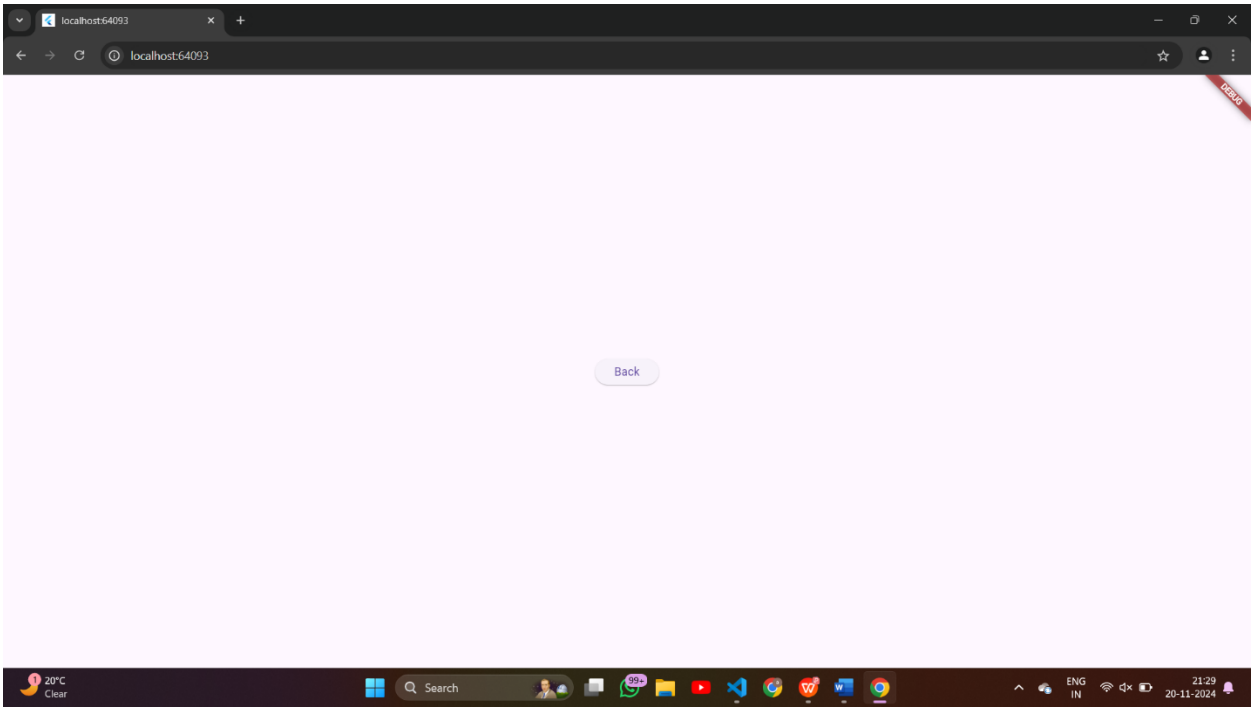

localhost:64030
Medium Screen
DEBUG


localhost:64030
Small Screen
DEBUG
MaterialApp(home: MyApp()));
TERMINAL
PORTS
SQL CONSOLE
Ln 20, Col 1
Spaces: 2
UTF-8
CRLF
Dart
Go Live
Chrome (web-javascript)

## 4a) Set up navigation between different screens using Navigator.

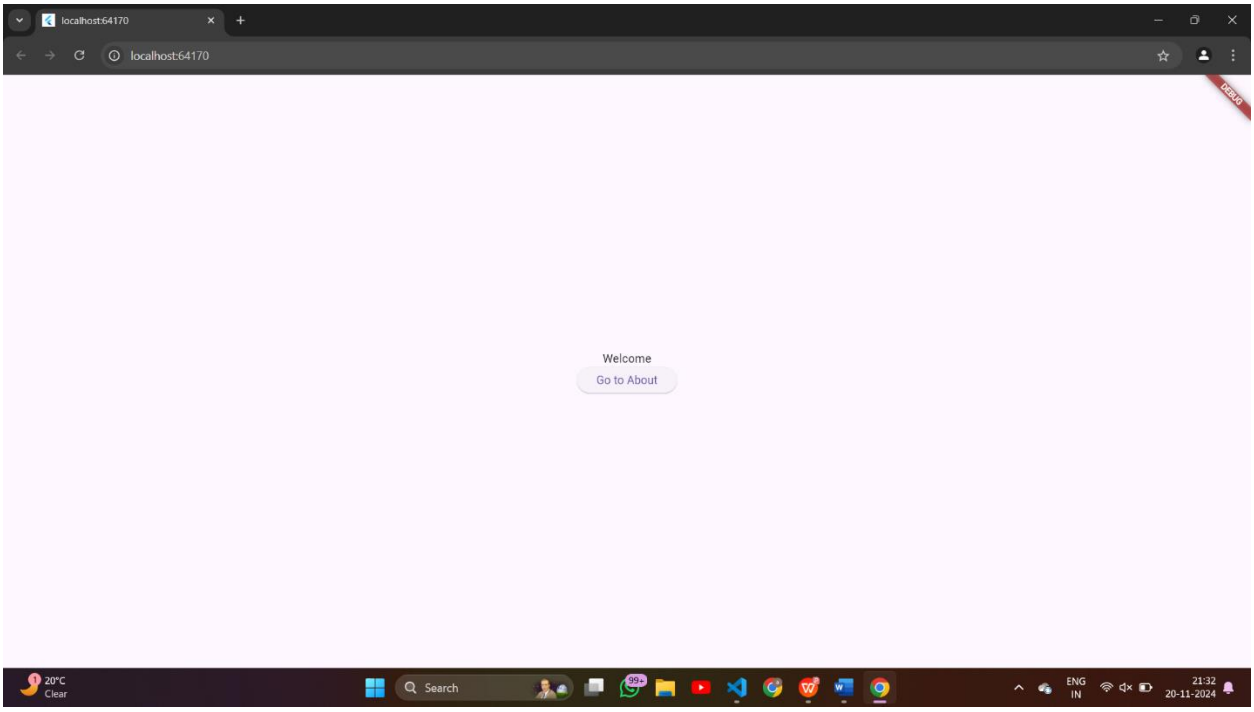
```
import 'package:flutter/material.dart';

void main() => runApp(MaterialApp(home: Screen1()));

class Screen1 extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      body: Center(
        child: ElevatedButton(
          onPressed: () => Navigator.push(
              context, MaterialPageRoute(builder: (_) => Screen2())),
          child: Text("Go to Screen 2"),
        ),
      ),
    );
  }
}

class Screen2 extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      body: Center(
        child: ElevatedButton(
          onPressed: () => Navigator.pop(context),
          child: Text("Back"),
        ),
      ),
    );
  }
}
```

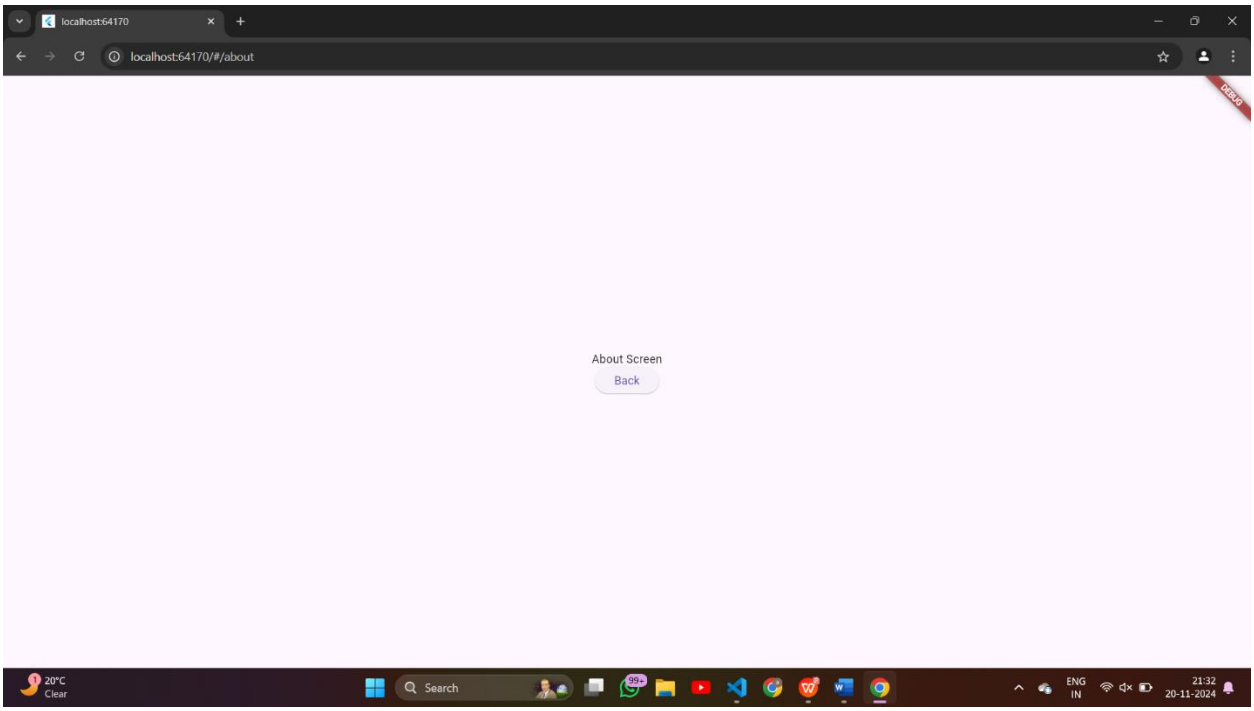

localhost:64093
localhost:64093
DEBUG
Go to Screen 2
20°C
Clear
Search
ENG
IN
21:29
20-11-2024


localhost:64093
localhost:64093
DEBUG
Back
20°C
Clear
Search
ENG
IN
21:29
20-11-2024

## 4b) Implement navigation with named routes.

```
import 'package:flutter/material.dart';
void main() => runApp(MaterialApp(initialRoute: '/',
 routes: {
  '/': (context) => HomeScreen(),
  '/about': (context) => AboutScreen()}));

class HomeScreen extends StatelessWidget {
  @override
  Widget build(BuildContext context) => Scaffold(
    body: Center(child: Column(mainAxisAlignment: MainAxisAlignment.center,
    children: [Text("Welcome"),
    ElevatedButton(onPressed: () =>
    Navigator.pushNamed(context, '/about'),
     child: Text("Go to About"))])));
}
class AboutScreen extends StatelessWidget {
  @override
  Widget build(BuildContext context) => Scaffold(body: Center
  (child: Column(mainAxisAlignment: MainAxisAlignment.center,
   children: [Text("About Screen"),
   ElevatedButton(onPressed: () => Navigator.pop(context),
   child: Text("Back"))])));
   }
```

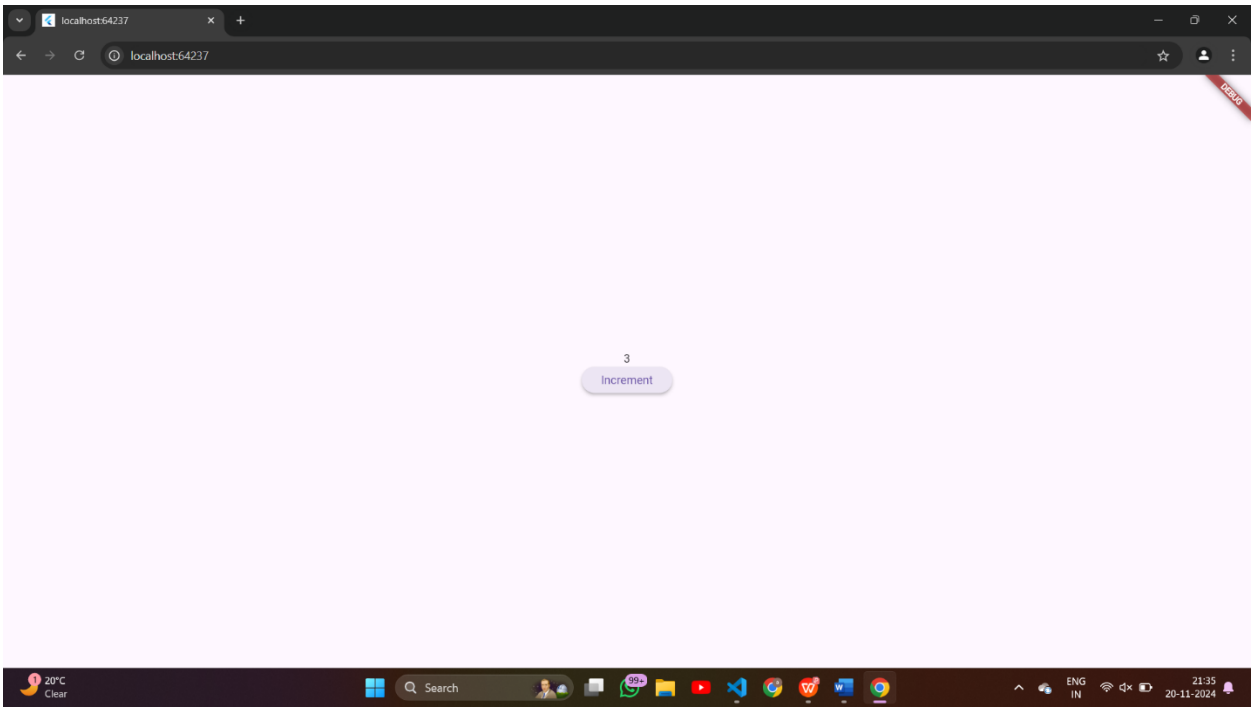





## 5a) Learn about stateful and stateless widgets.

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

void main() => runApp(MaterialApp(home: StatefulExample()));

class StatelessExample extends StatelessWidget {
  @override
  Widget build(BuildContext context) => Scaffold(body: Center(child: Text("Stateless")));
}

class StatefulExample extends StatefulWidget {
  @override
  _StatefulExampleState createState() => _StatefulExampleState();
}

class _StatefulExampleState extends State<StatefulExample> {
  int counter = 0;
  @override
  Widget build(BuildContext context) => Scaffold(
```

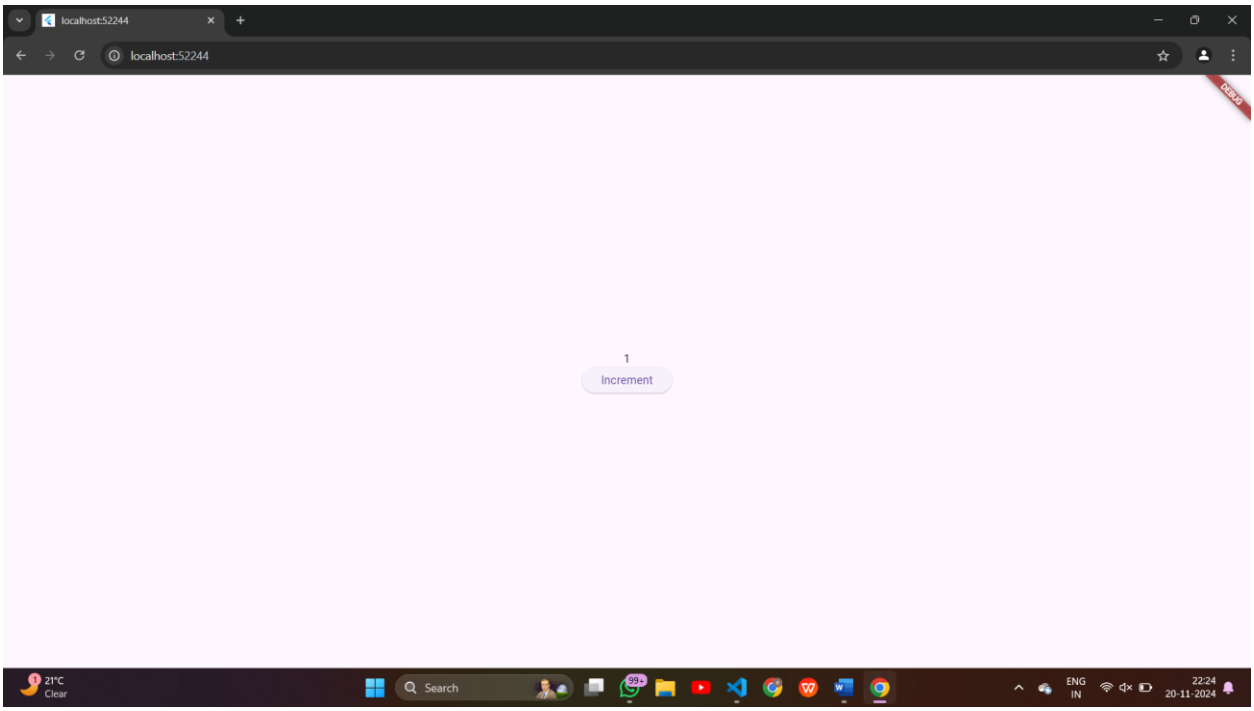
```
    body: Center(child: Column(mainAxisAlignment: MainAxisAlignment.center, children:
[Text("$counter"), ElevatedButton(onPressed: () => setState(() => counter++), child:
Text("Increment"))])),
  );
}
```




## 5b) Implement state management using set State and Provider.

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

void main() => runApp(MaterialApp(home: ChangeNotifierProvider(
  create: (_) => Counter(),
  child: MyApp())));

class Counter extends ChangeNotifier {
  int _count = 0;
  int get count => _count;
  void increment() {
    _count++; notifyListeners(); }}

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) => Scaffold(
```

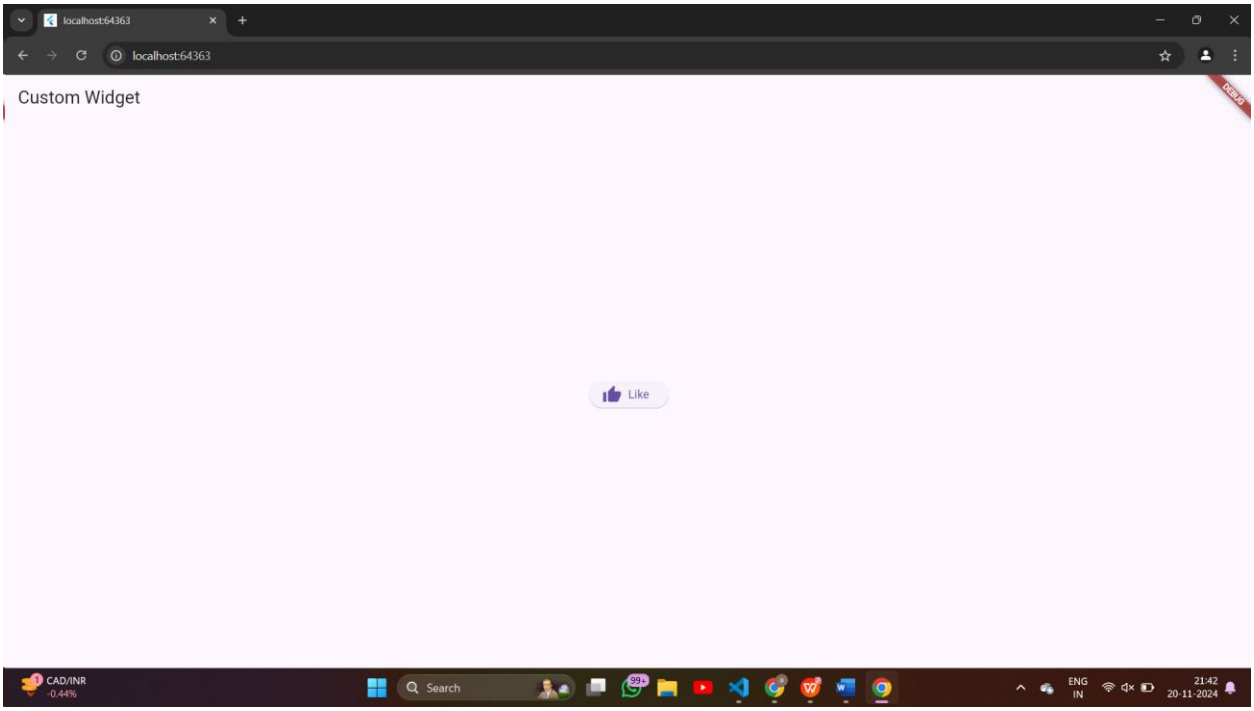
```
    body: Center(child: Column(mainAxisAlignment: MainAxisAlignment.center,
    children: [Text("${context.watch<Counter>().count}"),
     ElevatedButton(onPressed: () => context.read<Counter>().increment(),
     child: Text("Increment"))])));
}
```




## 6a) Create custom widgets for specific UI elements.

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

void main() => runApp(MaterialApp(home: MyApp()));

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: Text("Custom Widget")),
      body: Center(child: CustomButton(text: "Like", icon: Icons.thumb_up, onPressed: () {})),
    );
  }
}
```

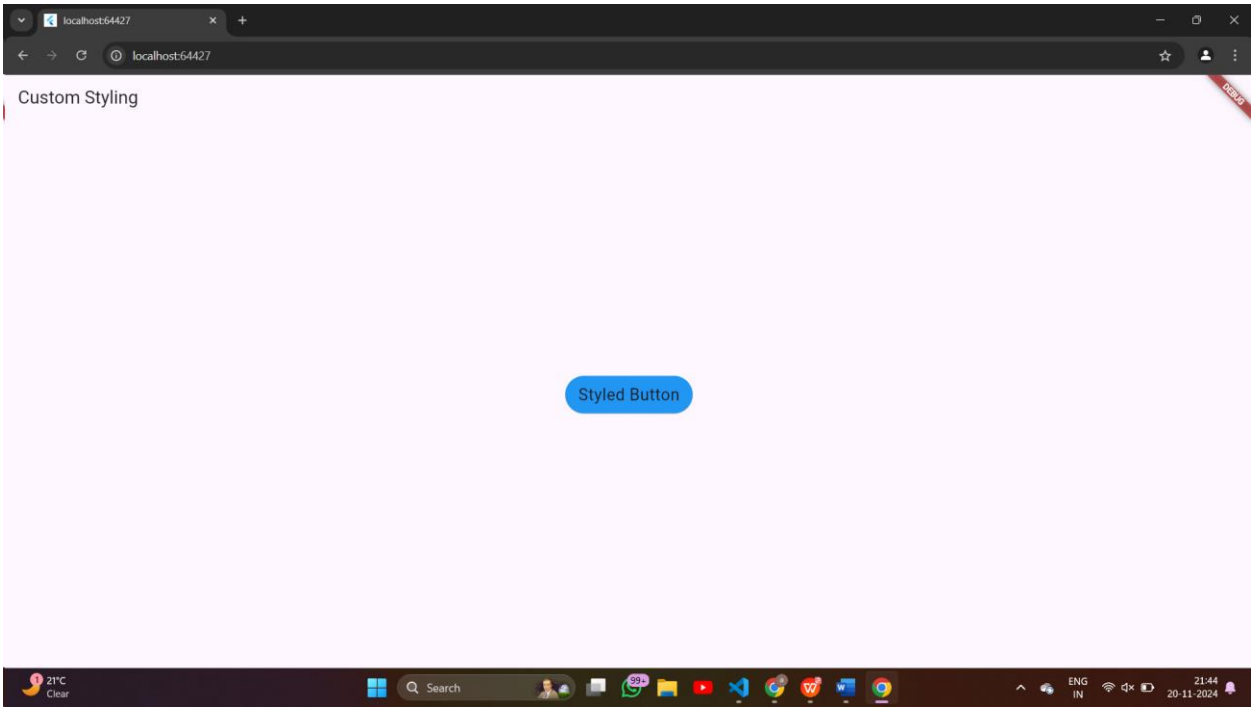
```
class CustomButton extends StatelessWidget {
  final String text;
  final IconData icon;
  final VoidCallback onPressed;
  CustomButton({required this.text, required this.icon, required this.onPressed});
  @override
  Widget build(BuildContext context) => ElevatedButton.icon(onPressed: onPressed, icon:
Icon(icon), label: Text(text));
}
```




## 6b) Apply styling using themes and custom styles.

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

void main() => runApp(MaterialApp(
  theme: ThemeData(primaryColor: Colors.blue, textTheme: TextTheme(bodyLarge:
TextStyle(fontSize: 20))),
  home: MyApp(),
));

class MyApp extends StatelessWidget {
  @override
```

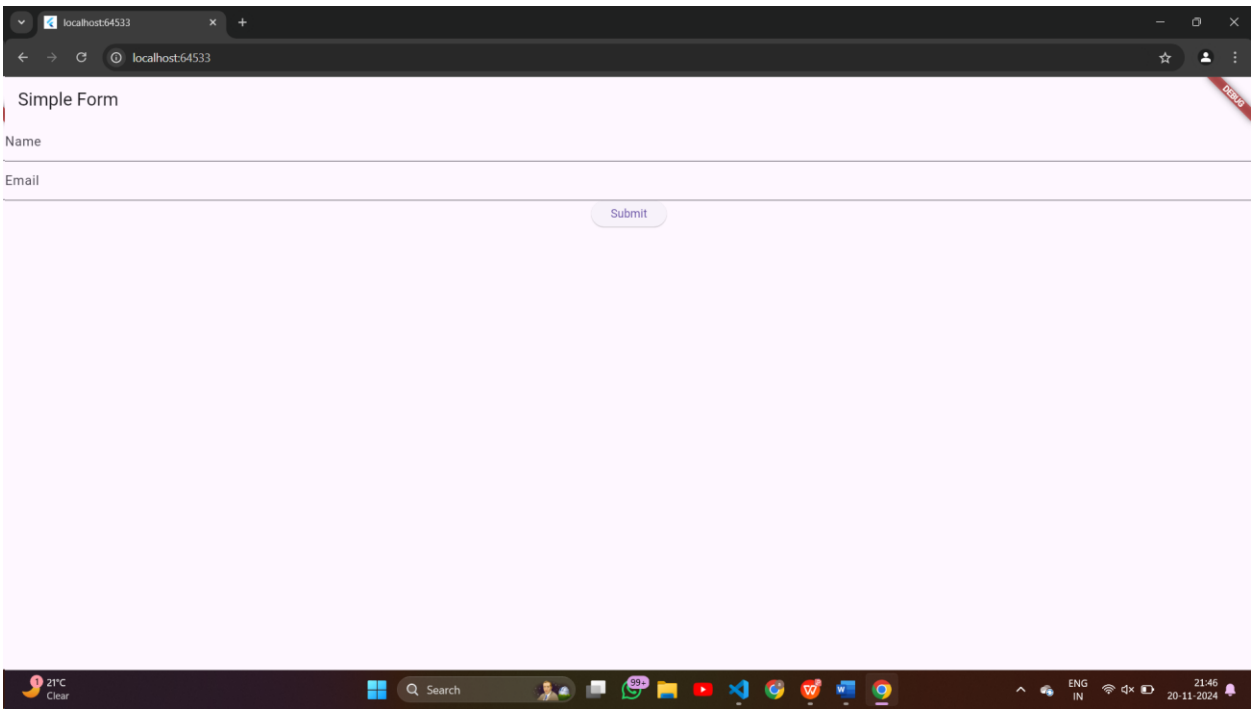
```
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: Text("Custom Styling")),
      body: Center(
        child: ElevatedButton(
          style: ElevatedButton.styleFrom(backgroundColor: Colors.blue, padding:
EdgeInsets.all(16)),
          onPressed: () {},
          child: Text("Styled Button", style: Theme.of(context).textTheme.bodyLarge),
        ),
      ),
    );
  }
}
```




## 7a) Design a form with various input fields.

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

void main() => runApp(MaterialApp(home: MyForm()));

class MyForm extends StatelessWidget {
```

```
  final _formKey = GlobalKey<FormState>();
  final nameController = TextEditingController(), emailController = TextEditingController();
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: Text("Simple Form")),
      body: Form(
        key: _formKey,
        child: Column(
          children: [
            TextFormField(controller: nameController, decoration: InputDecoration(labelText:
'Name')),
            TextFormField(controller: emailController, decoration: InputDecoration(labelText:
'Email')),
            ElevatedButton(onPressed: () => _formKey.currentState?.validate(), child:
Text('Submit')),
          ],
        ),
      ),
    );
  }
}
```



## 7b) Implement form validation and error handling.

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

void main() => runApp(MaterialApp(home: MyForm()));

class MyForm extends StatelessWidget {
  final _formKey = GlobalKey<FormState>();
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: Text("Form Validation")),
      body: Form(
        key: _formKey,
        child: Column(
          children: [
            TextFormField(decoration: InputDecoration(labelText: 'Name'),validator: (value) =>
value!.isEmpty ? 'Name required' : null),
            TextFormField(decoration: InputDecoration(labelText: 'email'),validator: (value) =>
value!.isEmpty || !value.contains('@') ? 'Valid email required' : null),
            ElevatedButton(onPressed: () => _formKey.currentState!.validate(), child:
Text('Submit')),
          ],
        ),
      ),
    );
  }
}
```