Practica; No: - 01

Flutter program using layout widgets
   a. **Container Demo**
   b. **Listview demo**
   c. **Checkbox Demo**
   d. **Layout Demo Create contact List**
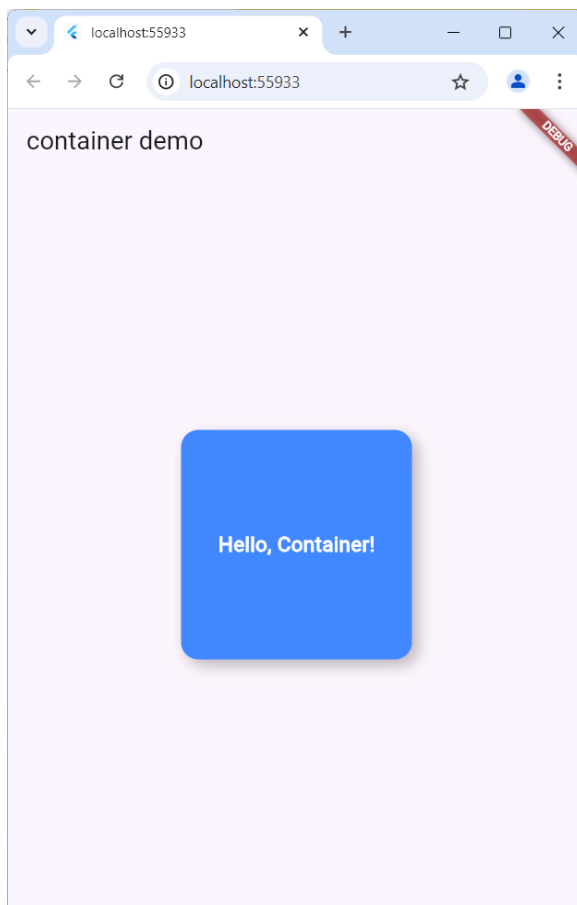   e. **Flutter BottomNavigationBar Example**

A. Container Demo
   Main.dart: -

```
import 'package:flutter/material.dart';
void main() {
  runApp(MyApp());
}
class MyApp extends StatelessWidget {
  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home:Scaffold(
        appBar: AppBar(
          title: Text("container demo"),
        ),
        body:Center(
          child:Container(
            width: 200,
            height: 200,
            decoration: BoxDecoration(
              color: Colors.blueAccent,
              borderRadius: BorderRadius.circular(15),
              boxShadow: [
                BoxShadow(
                  color:Colors.black26,
                  blurRadius: 10,
                  offset: Offset(5,5)
                ),
              ],
```

```
            ),
          child: Center(
            child: Text(
              'Hello, Container!',
              style: TextStyle(
                color: Colors.white,
                fontSize: 18,
                fontWeight: FontWeight.bold,
              ),
            ),
          ),
        ),
      ),
    ),
  );
}
}
```

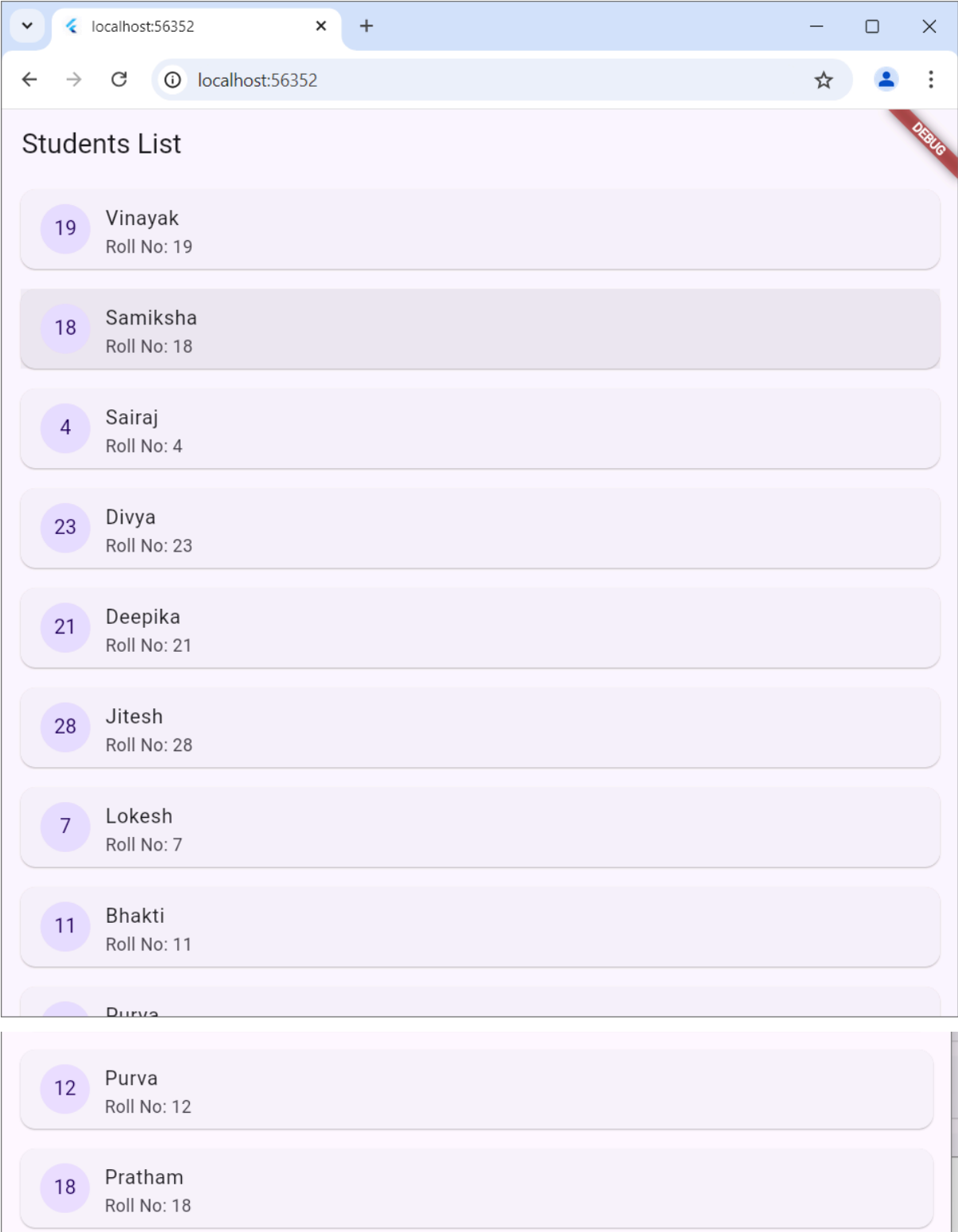**Output: -**

B. ListView Demo

Main.dart: -

```dart
import 'package:flutter/material.dart';
void main() {
  runApp(MyApp());
}
// Student model to represent each student's data
class Student {
  final String name;
  final int rollNo;
  Student({required this.name, required this.rollNo});
}
class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: Scaffold(
        appBar: AppBar(
          title: Text('Students List'),
        ),
        body: StudentListView(),
      ),
    );
  }
}
class StudentListView extends StatelessWidget {
  // List of students
  final List<Student> students = [
    Student(name: "Vinayak", rollNo: 19),
    Student(name: "Samiksha", rollNo: 18),
    Student(name: "Sairaj", rollNo: 04),
    Student(name: "Divya", rollNo: 23),
    Student(name: "Deepika", rollNo: 21),
    Student(name: "Jitesh", rollNo: 28),
    Student(name: "Lokesh", rollNo: 07),
    Student(name: "Bhakti", rollNo: 11),
    Student(name: "Purva", rollNo: 12),
```

```dart
      Student(name: "Pratham", rollNo: 18),
    ];
    @override
    Widget build(BuildContext context) {
     return ListView.builder(
       itemCount: students.length,
       itemBuilder: (context, index) {
        final student = students[index];
        return Card(
          margin: EdgeInsets.symmetric(vertical: 8, horizontal: 15),
          child: ListTile(
            leading: CircleAvatar(
              child: Text(student.rollNo.toString()),  // Show roll number inside
a circle
            ),
            title: Text(student.name),
            subtitle: Text("Roll No: ${student.rollNo}"),
            onTap: () {
              ScaffoldMessenger.of(context).showSnackBar(
                SnackBar(content: Text("Selected: ${student.name}, Roll No:
${student.rollNo}")),
              );
            },
          ),
        );
       },
     );
    }
}
```

Output: -

C. Checkbox Demo
Main.dart: -

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

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

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      home: Scaffold(
        appBar: AppBar(
          title: Text('Checkbox Demo'),
        ),
        body: CheckboxDemo(),
      ),
    );
  }
}

class CheckboxDemo extends StatefulWidget {
  @override
  _CheckboxDemoState createState() => _CheckboxDemoState();
}

class _CheckboxDemoState extends State<CheckboxDemo> {
  // State variables for the checkboxes
  bool isChecked1 = false;
  bool isChecked2 = false;
  bool isChecked3 = false;

  @override
  Widget build(BuildContext context) {
    return Padding(
      padding: const EdgeInsets.all(16.0),
```

```dart
  child: Column(
    children: [
      CheckboxListTile(
        title: Text('Option 1'),
        subtitle: Text('Check this box if you choose Option 1'),
        value: isChecked1,
        onChanged: (bool? value) {
          setState(() {
            isChecked1 = value!;
          });
        },
      ),
      CheckboxListTile(
        title: Text('Option 2'),
        subtitle: Text('Check this box if you choose Option 2'),
        value: isChecked2,
        onChanged: (bool? value) {
          setState(() {
            isChecked2 = value!;
          });
        },
      ),
      CheckboxListTile(
        title: Text('Option 3'),
        subtitle: Text('Check this box if you choose Option 3'),
        value: isChecked3,
        onChanged: (bool? value) {
          setState(() {
            isChecked3 = value!;
          });
        },
      ),
      SizedBox(height: 20),
      ElevatedButton(
        onPressed: () {
          // Display selected options
          showDialog(
```

```dart
          context: context,
          builder: (BuildContext context) {
           return AlertDialog(
             title: Text('Selected Options'),
             content: Text(
                 'Option 1: ${isChecked1 ? "Selected" : "Not Selected"}\n'
                    'Option 2: ${isChecked2 ? "Selected" : "Not Selected"}\n'
                    'Option 3: ${isChecked3 ? "Selected" : "Not Selected"}'),
             actions: [
               TextButton(
                 child: Text('OK'),
                 onPressed: () {
                   Navigator.of(context).pop();
                 },
               ),
             ],
           );
          },
          child: Text('Show Selected Options'),
        ),
      ],
    ),
  );
 }
}
```
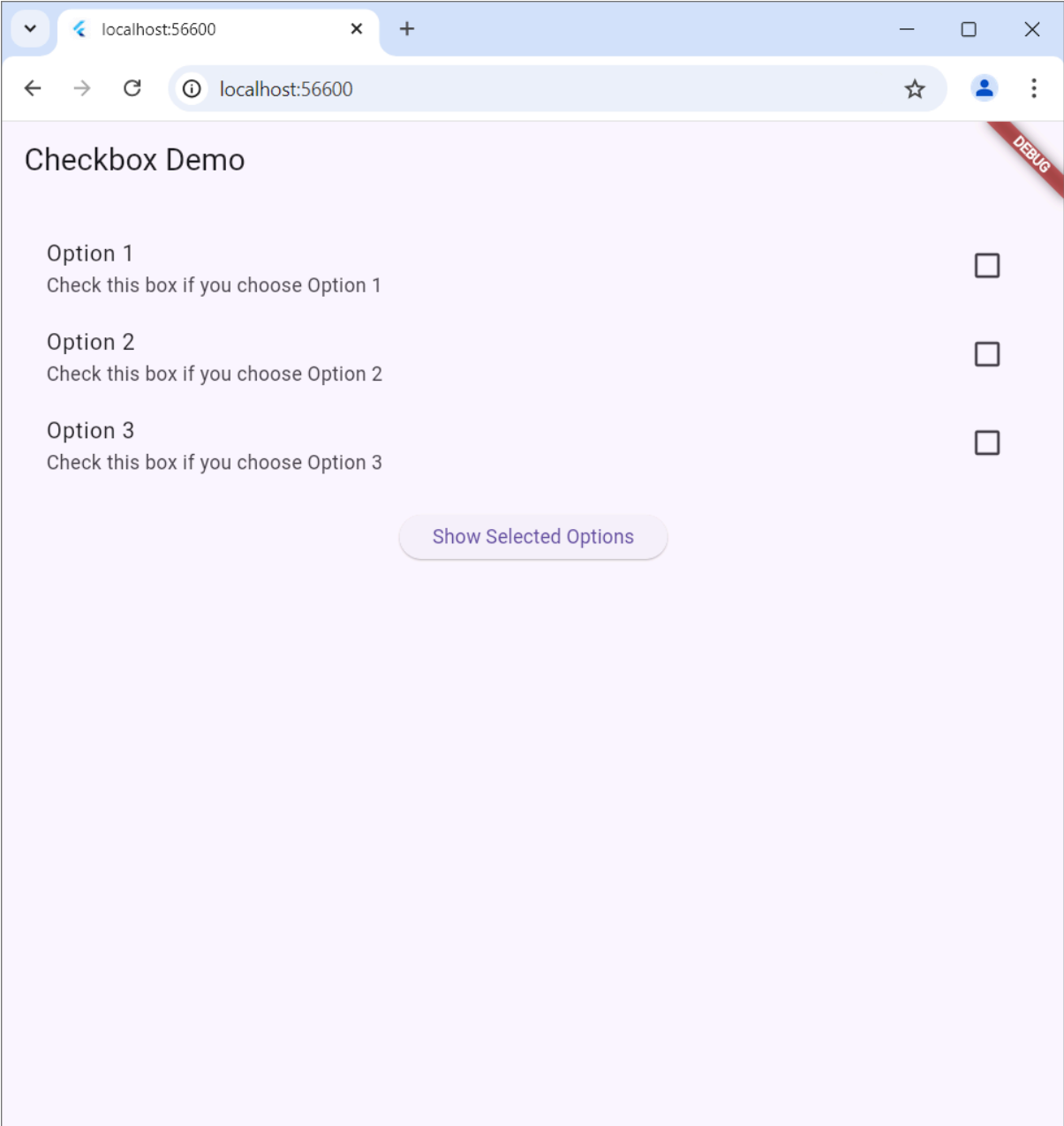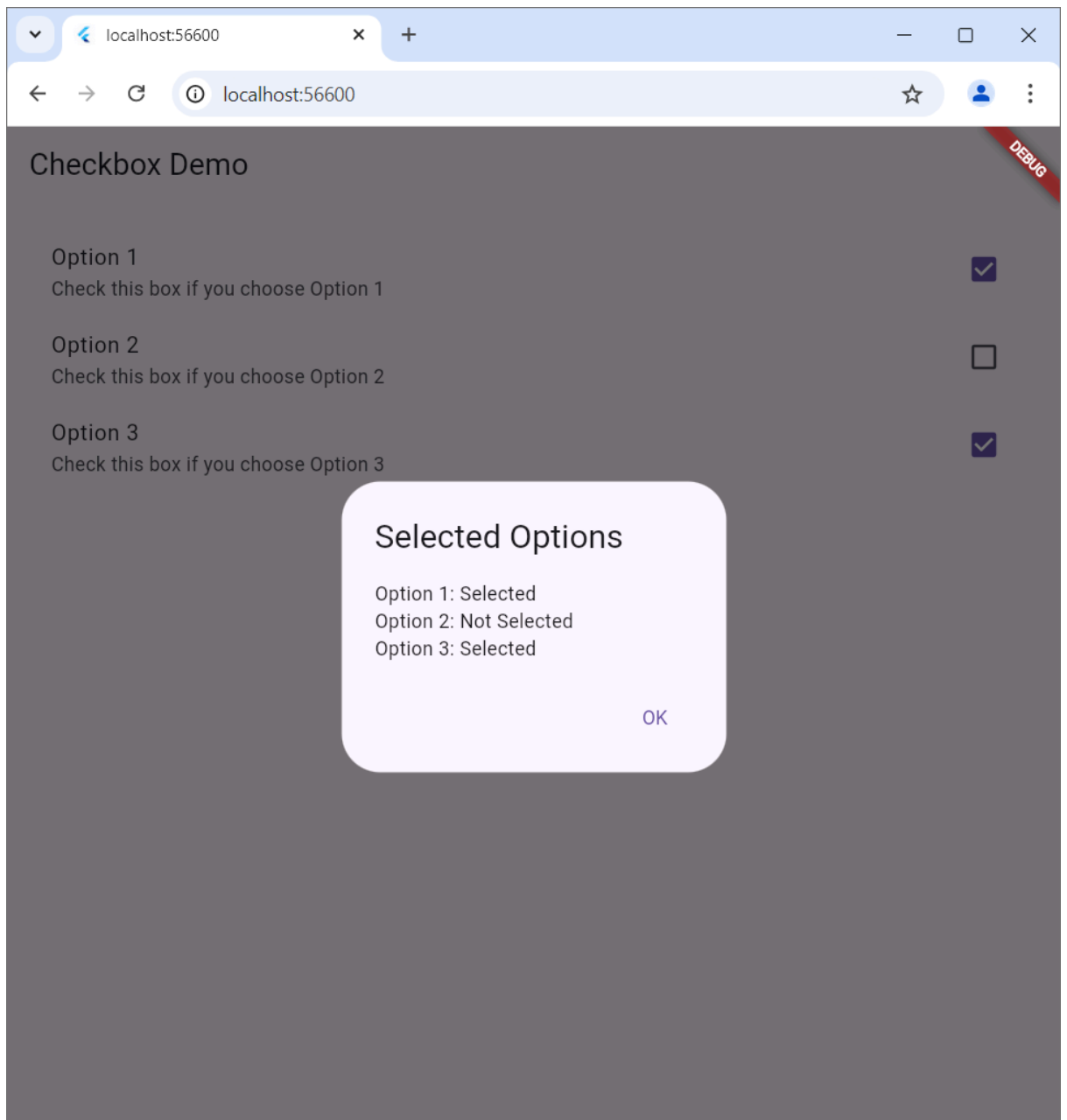
Output: -

localhost:56600

Checkbox Demo

DEBUG

Option 1
Check this box if you choose Option 1 ☑

Option 2
Check this box if you choose Option 2 ☐

Option 3
Check this box if you choose Option 3 ☑

Selected Options

Option 1: Selected
Option 2: Not Selected
Option 3: Selected

OK

D. Layout Demo (Create contact List)
Main.dart: -

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

void main() {
  runApp(ContactListApp());
}

class ContactListApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Contact List Demo',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: ContactListScreen(),
    );
  }
}

class ContactListScreen extends StatelessWidget {
  // Define a list of contacts
  final List<String> contacts = [
    'Vinayak',
    'Samiksha',
    'Sairaj',
    'Divya',
    'Deepika',
    'Jitesh',
    'Lokesh',
    'Pratham',
    'Bhakti',
    'Purva'
  ];

  @override
```
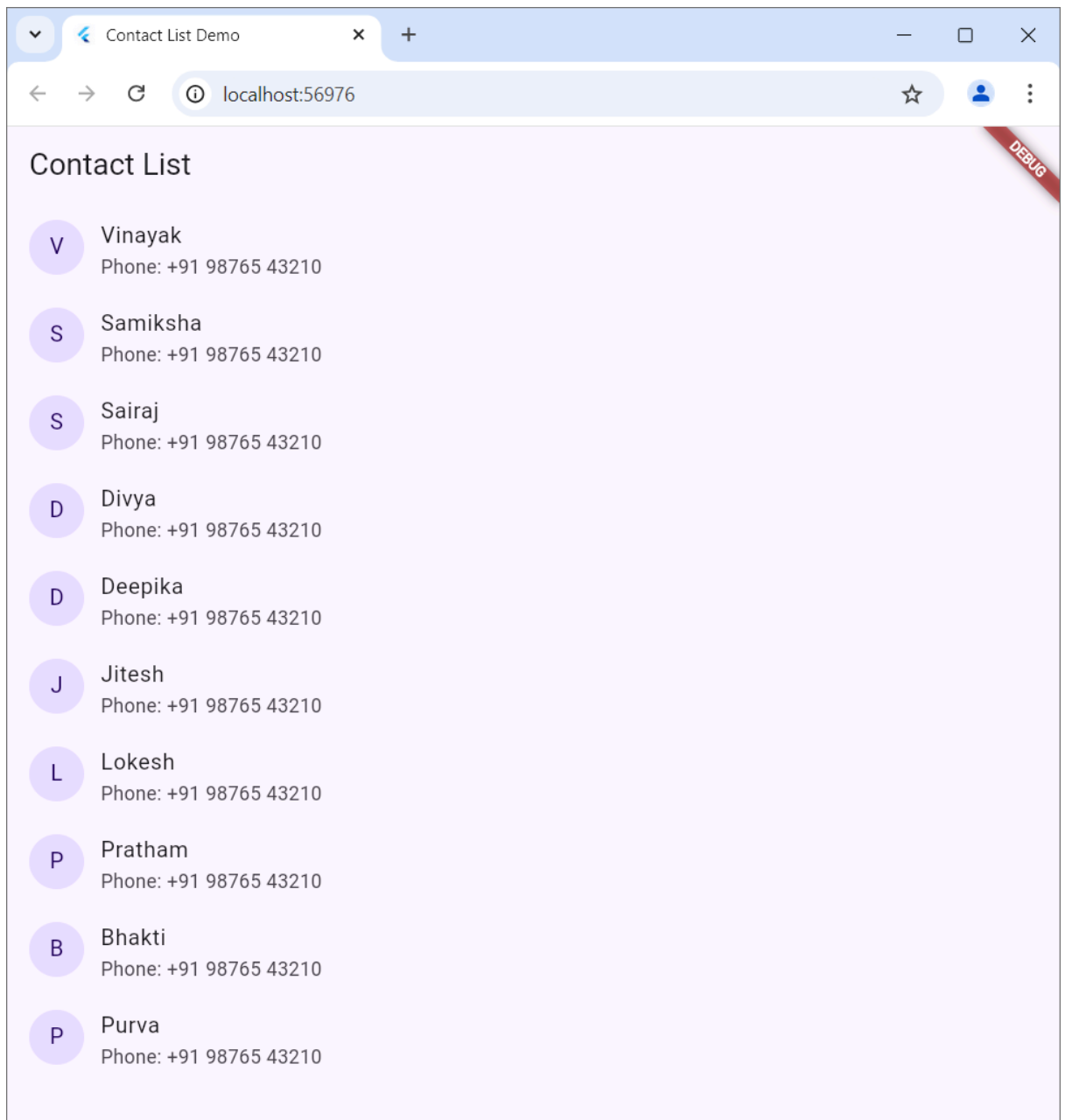
```
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text('Contact List'),
    ),
    body: ListView.builder(
      itemCount: contacts.length,
      itemBuilder: (context, index) {
        return ListTile(
          leading: CircleAvatar(
            child: Text(contacts[index][0]), // Display first letter of name
          ),
          title: Text(contacts[index]),
          subtitle: Text('Phone: +91 98765 43210'), // Dummy phone number
        );
      },
    ),
  );
}
}
```

Output: -

E. Flutter Bottom NavigationBar Example
Main.dart: -

```dart
import 'package:flutter/material.dart';
void main() {
  runApp(MyApp());
}
class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Bottom Navigation Example',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: HomeScreen(),
    );
  }
}
class HomeScreen extends StatefulWidget {
  @override
  _HomeScreenState createState() => _HomeScreenState();
}
class _HomeScreenState extends State<HomeScreen> {
  int _currentIndex = 0;

  final List<Widget> _children = [
    HomeTab(),
    SearchTab(),
    ProfileTab(),
  ];
  void onTabTapped(int index) {
    setState(() {
      _currentIndex = index;
    });
  }
  @override
  Widget build(BuildContext context) {
```

```dart
    return Scaffold(
      appBar: AppBar(
        title: Text('Bottom Navigation Example'),
      ),
      body: _children[_currentIndex],
      bottomNavigationBar: BottomNavigationBar(
        onTap: onTabTapped,
        currentIndex: _currentIndex,
        items: [
          BottomNavigationBarItem(
            icon: Icon(Icons.home),
            label: 'Home',
          ),
          BottomNavigationBarItem(
            icon: Icon(Icons.search),
            label: 'Search',
          ),
          BottomNavigationBarItem(
            icon: Icon(Icons.person),
            label: 'Profile',
          ),
        ],
      ),
    );
  }
}
class HomeTab extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Center(
      child: Text('Home Tab'),
    );
  }
}
class SearchTab extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
```
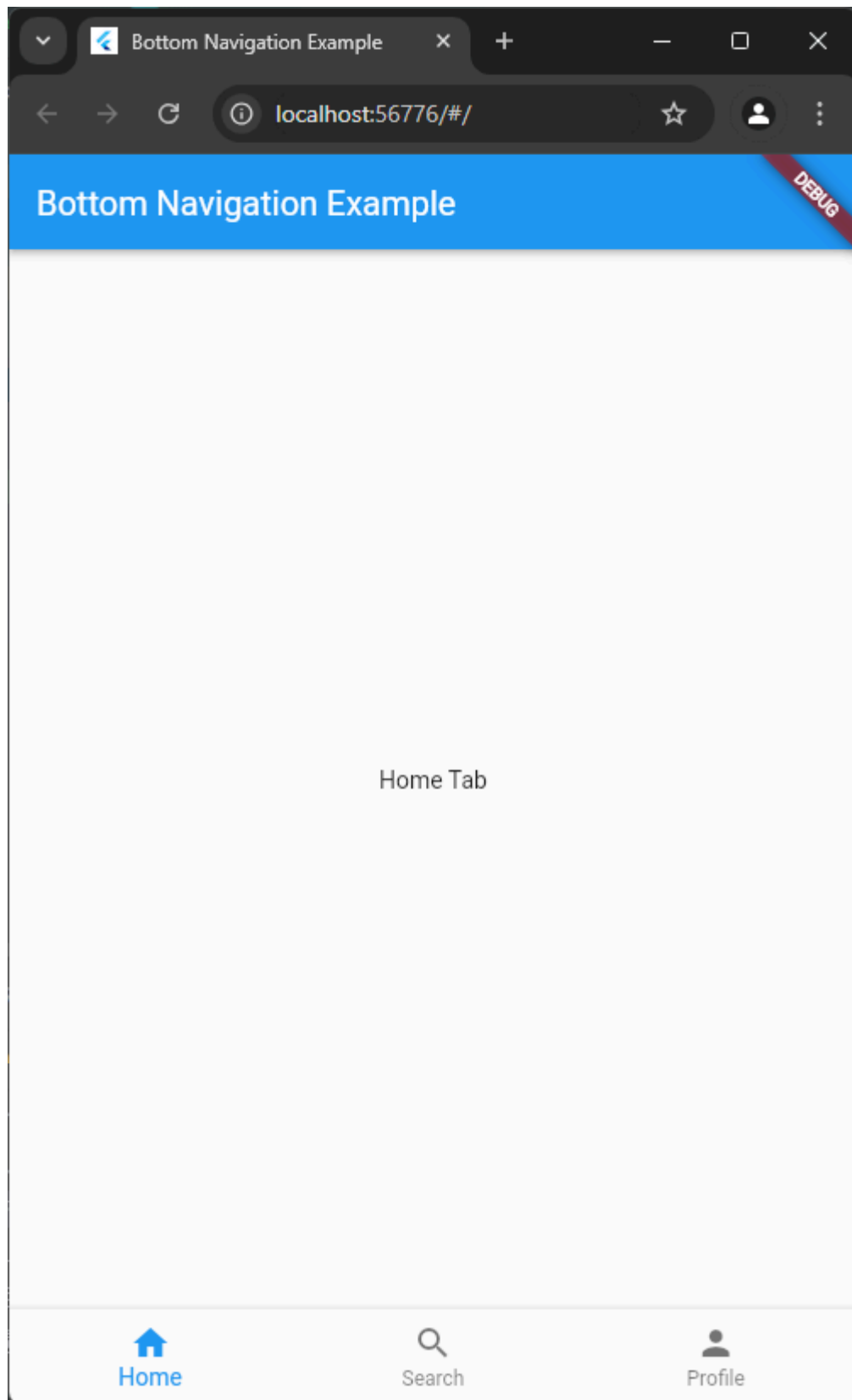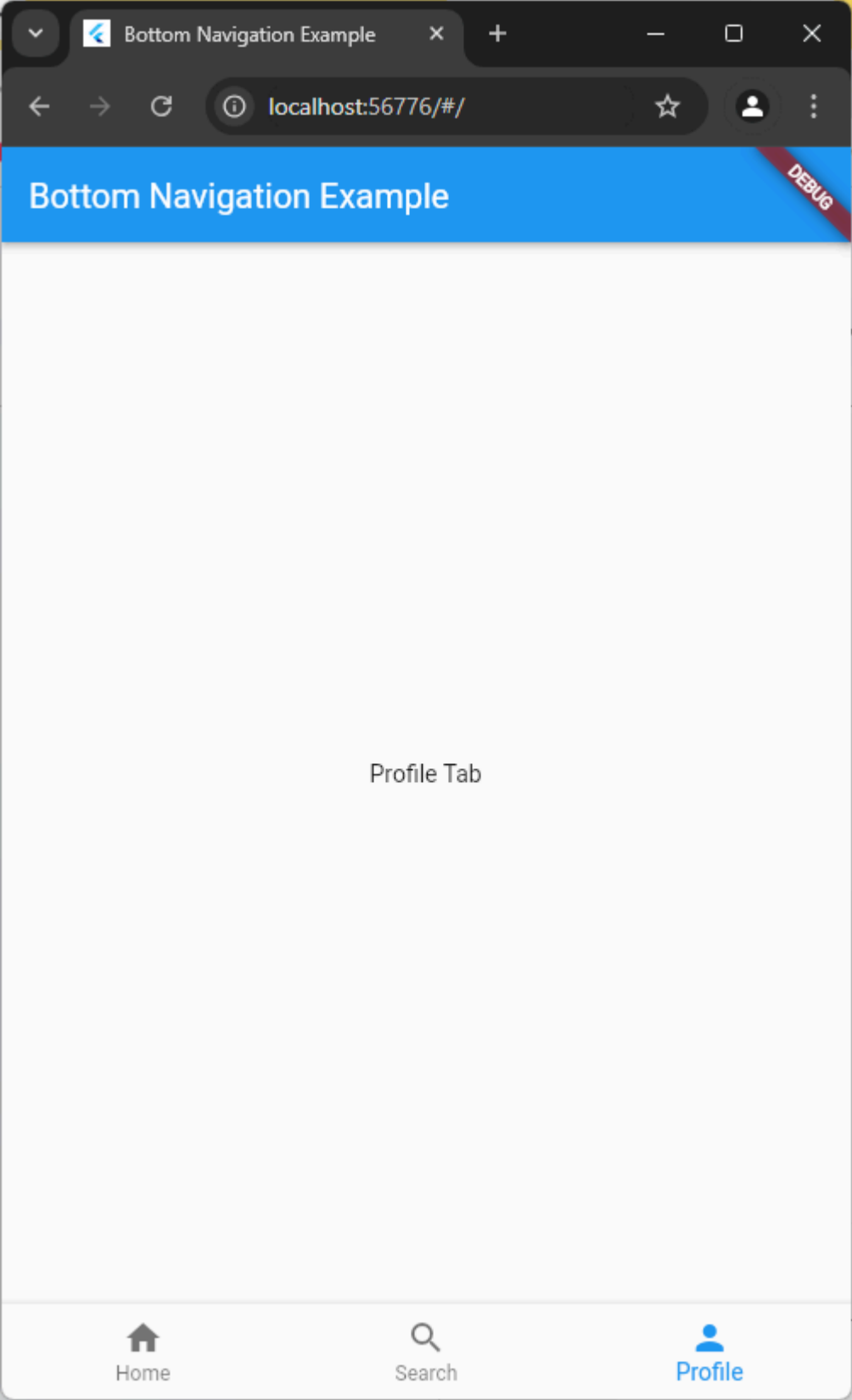
```
    return Center(
      child: Text('Search Tab'),
    );
  }
}
class ProfileTab extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Center(
      child: Text('Profile Tab'),
    );
  }
}
```

Output: -

Bottom Navigation Example

DEBUG

Profile Tab

Home Search Profile

Practical No: - 02

Flutter program using form

Main.dart: -

```dart
import 'package:flutter/material.dart';
void main() {
  runApp(MyApp());
}
class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Form Example',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: FormPage(),
    );
  }
}
class FormPage extends StatefulWidget {
  @override
  _FormPageState createState() => _FormPageState();
}
class _FormPageState extends State<FormPage> {
  final _formKey = GlobalKey<FormState>();
  String? name, email, phone, dob;
  List<String> courses = ['Mobile Computing', 'Ethical Hacking', 'AI/ML'];
  List<bool> selectedCourses = [false, false, false];
  String? gender;
  void _submitForm() {
    if (_formKey.currentState!.validate()) {
      _formKey.currentState!.save();
      // Show a success message
      showDialog(
        context: context,
        builder: (context) {
          return AlertDialog(
```

```dart
        title: Text('Success'),
        content: Text('Form submitted successfully!'),
        actions: [
          TextButton(
            child: Text('OK'),
            onPressed: () {
              Navigator.of(context).pop();
            },
          ),
        ],
      );
    },
  );
}
}
@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text('Form Example'),
    ),
    body: Padding(
      padding: EdgeInsets.all(16.0),
      child: Form(
        key: _formKey,
        child: Column(
          children: [
            TextFormField(
              decoration: InputDecoration(
                hintText: 'Enter your name',
                labelText: 'Name',
              ),
              validator: (value) {
                if (value == null || value.isEmpty) {
                  return 'Please enter your name';
                }
                return null;
```

```dart
        },
        onSaved: (value) => name = value,
      ),
      TextFormField(
        decoration: InputDecoration(
          hintText: 'Enter your email',
          labelText: 'Email',
        ),
        validator: (value) {
          if (value == null || value.isEmpty ||
!RegExp(r'\S+@\S+\.\S+').hasMatch(value)) {
            return 'Please enter a valid email';
          }
          return null;
        },
        onSaved: (value) => email = value,
      ),
      TextFormField(
        decoration: InputDecoration(
          hintText: 'Enter your phone number',
          labelText: 'Phone',
        ),
        validator: (value) {
          if (value == null || value.isEmpty) {
            return 'Please enter your phone number';
          }
          return null;
        },
        onSaved: (value) => phone = value,
      ),
      TextFormField(
        decoration: InputDecoration(
          hintText: 'Enter your date of birth',
          labelText: 'Date of Birth',
        ),
        validator: (value) {
          if (value == null || value.isEmpty) {
```

```dart
        return 'Please enter your date of birth';
      }
      return null;
    },
    onSaved: (value) => dob = value,
),
SizedBox(height: 20),
Text('Select Subjects:'),
Column(
  children: List<Widget>.generate(courses.length, (index) {
    return CheckboxListTile(
      title: Text(courses[index]),
      value: selectedCourses[index],
      onChanged: (bool? value) {
        setState(() {
          selectedCourses[index] = value!;
        });
      },
    );
  }),
),
SizedBox(height: 20),
Text('Gender:'),
Row(
  mainAxisAlignment: MainAxisAlignment.start,
  children: [
    Expanded(
      child: RadioListTile<String>(
        title: Text('Male'),
        value: 'Male',
        groupValue: gender,
        onChanged: (value) {
          setState(() {
            gender = value;
          });
        },
      ),
```

```dart
          ),
          Expanded(
            child: RadioListTile<String>(
              title: Text('Female'),
              value: 'Female',
              groupValue: gender,
              onChanged: (value) {
                setState(() {
                  gender = value;
                });
              },
            ),
          ),
        ],
      ),
      SizedBox(height: 20),
      ElevatedButton(
        onPressed: _submitForm,
        child: Text('Submit'),
      ),
    ],
      ),
    ),
   ),
  );
 }
}
```

Output: -

Success

Form submitted successfully!

OK

Practical No: - 03
Flutter program using state management
Main.dart: -
```
import 'package:flutter/material.dart';
import 'package:provider/provider.dart';
import 'package:statemanagement/settings_screen_notifier.dart';
import 'settings_screen.dart';
void main() {
  runApp(const MyApp());
}
class MyApp extends StatelessWidget {
  const MyApp({Key? key}) : super(key: key);
  @override
  Widget build(BuildContext context) {
    return ChangeNotifierProvider(
      create: (context) => SettingsScreenNotifier(),
      child: Consumer<SettingsScreenNotifier>(
        builder: (context, provider, child) {
          return MaterialApp(
            title: 'State Management Flutter Demo',
            theme: ThemeData(
              primarySwatch: Colors.blue,
            ),
            darkTheme: ThemeData.dark(),
            themeMode: provider.isDarkModeEnabled ? ThemeMode.dark :
ThemeMode.light,
            home: const MyHomePage(title: 'State Example'),
          );
        },
      ),
    );
  }
}

class MyHomePage extends StatefulWidget {
  const MyHomePage({Key? key, required this.title}) : super(key: key);
  final String title;
```

```dart
  @override
  State<MyHomePage> createState() => _MyHomePageState();
}
class _MyHomePageState extends State<MyHomePage> {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Text(widget.title),
        actions: [
          IconButton(
            icon: const Icon(
              Icons.settings,
              color: Colors.white,
            ),
            onPressed: () {
              Navigator.push(
                context,
                MaterialPageRoute(builder: (context) => const SettingsScreen()),
              );
            },
          ),
        ],
      ),
      body: Center(
        child: Column(
          mainAxisAlignment: MainAxisAlignment.center,
          children: <Widget>[
            Text(
              'State Example',
              style: Theme.of(context).textTheme.headlineMedium,
            ),
          ],
        ),
      ),
    );
```

```dart
    }
}


```

Settings_screen_notifier.dart: -
```dart
import 'package:flutter/material.dart';
class SettingsScreenNotifier extends ChangeNotifier {
  bool _isDarkModeEnabled = false;
  bool get isDarkModeEnabled => _isDarkModeEnabled;
  void toggleApplicationTheme(bool darkModeEnabled) {
    _isDarkModeEnabled = darkModeEnabled;
    notifyListeners();
  }
}
```
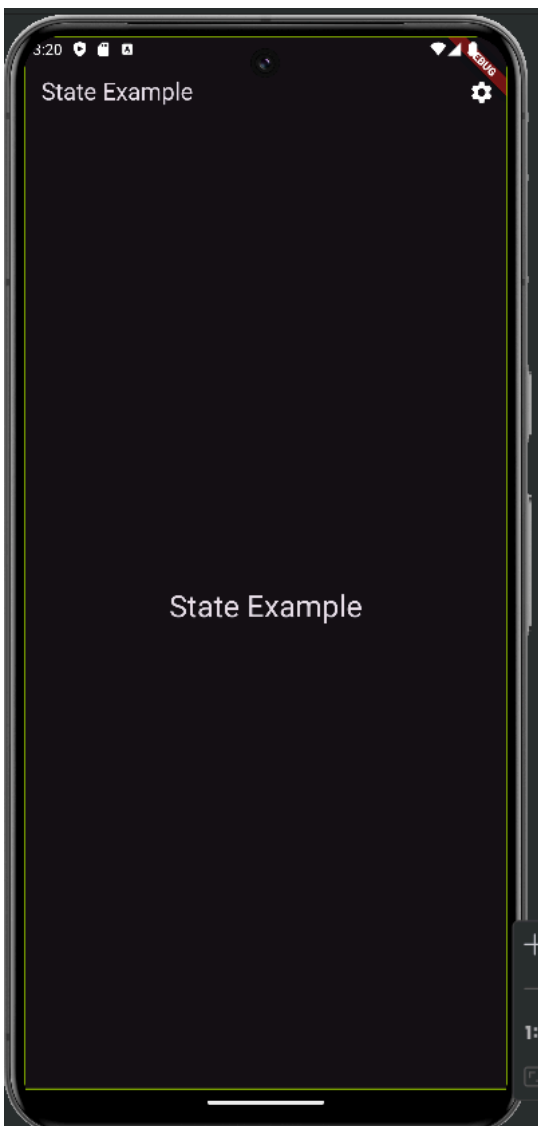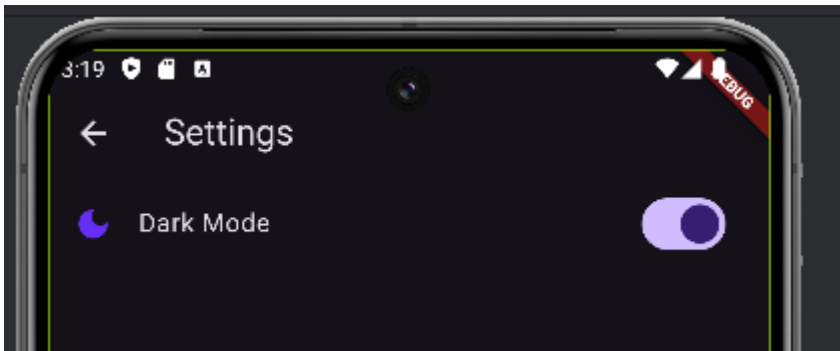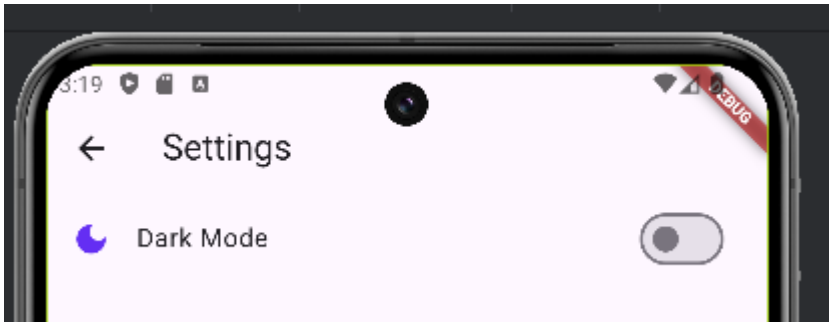
Settings_screen.dart: -
```dart
import 'package:flutter/material.dart';
import 'package:provider/provider.dart';
import 'package:statemanagement/settings_screen_notifier.dart';
class SettingsScreen extends StatelessWidget {
  const SettingsScreen({Key? key}) : super(key: key);
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: const Text("Settings"),
      ),
      body: Column(
        mainAxisAlignment: MainAxisAlignment.start,
        children: [
          Consumer<SettingsScreenNotifier>(
            builder: (context, notifier, child) {
              return SwitchListTile(
                title: const Text('Dark Mode'),
                value: notifier.isDarkModeEnabled,
                secondary: const Icon(
                  Icons.dark_mode,
                  color: Color(0xFF642ef3),
```

```
              ),
              onChanged: (bool value) {
                notifier.toggleApplicationTheme(value);
              },
            );
          },
        ),
      ],
    ),
  );
}
}
```

Output: -

Main.dart: -

```dart
import 'package:flutter/material.dart';
void main() {
  runApp(MyApp());
}
class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Counter App',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: CounterPage(),
    );
  }
}
class CounterPage extends StatefulWidget {
  @override
  _CounterPageState createState() => _CounterPageState();
}
class _CounterPageState extends State<CounterPage> {
  int _counter = 0;
  void _incrementCounter() {
    setState(() {
      _counter++;
    });
  }
  void _decrementCounter() {
    setState(() {
      if (_counter > 0) {
        _counter--;
      }
    });
  }
  @override
  Widget build(BuildContext context) {
```

```dart
    return Scaffold(
      appBar: AppBar(
        title: Text('Counter App'),
      ),
      body: Center(
        child: Column(
          mainAxisAlignment: MainAxisAlignment.center,
          children: [
            Text(
              'Counter: $_counter',
              style: TextStyle(fontSize: 24),
            ),
            SizedBox(height: 20),
            Row(
              mainAxisAlignment: MainAxisAlignment.center,
              children: [
                ElevatedButton(
                  onPressed: _incrementCounter,
                  child: Text('Add'),
                ),
                SizedBox(width: 20),
                ElevatedButton(
                  onPressed: _decrementCounter,
                  child: Text('Subtract'),
                ),
              ],
            ),
          ],
        ),
      ),
    );
  }
}
```

Output: -

Counter App

Counter: 9

Add   Subtract