Practical 1

AIM: Introduction to Android and Create "Custom Message" application. That will display "Custom Message" in the middle of the screen in the Black color with the Yellow background.

Source Code:

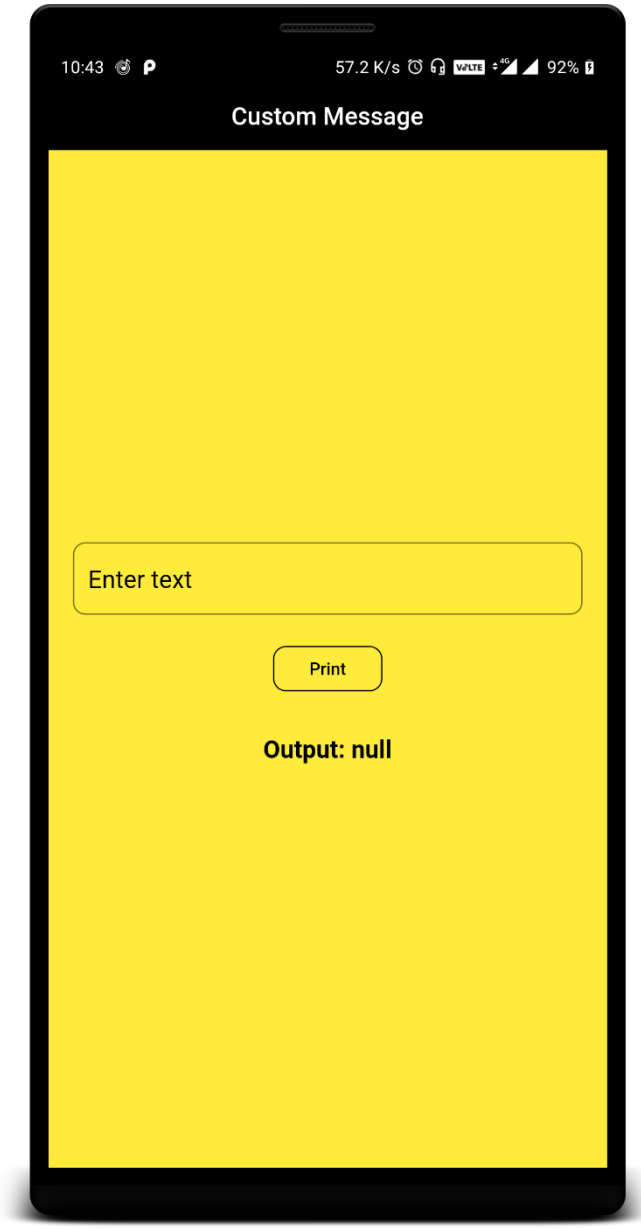
main.dart:

```
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(
      debugShowCheckedModeBanner: false,
      title: 'Custom Message',
      theme: ThemeData(primaryColor: Colors.black, cursorColor: Colors.black),
      home: MyHomePage(),
    );
  }
}

class MyHomePage extends StatefulWidget {
  State createState() => new HomePageState();
}

class HomePageState extends State<MyHomePage> {
  final TextEditingController textEditingController =
      new TextEditingController();
  String statement;
```

```
@override
Widget build(BuildContext context) {
  return Scaffold(
      appBar: new AppBar(
        title:
            new Text("Custom Message", style: TextStyle(color: Colors.black)),
        centerTitle: true,
        elevation: 0.0,
        backgroundColor: Colors.yellow,
      ),
      body: Container(
        color: Colors.yellow,
        child: Column(children: <Widget>[
          Padding(
            padding: EdgeInsets.all(20.0),
            child: TextField(
              keyboardType: TextInputType.text,
              decoration: new InputDecoration(
                labelText: "Enter text",
                labelStyle:
                    new TextStyle(color: Colors.black, fontSize: 20.0),
                border: OutlineInputBorder(
                    borderRadius: new BorderRadius.circular(10.0)),
              ),
              controller: textEditingController,
            ),
          ),
          new OutlineButton(
            child: new Text("Print"),
            borderSide: new BorderSide(color: Colors.black),
            shape: new RoundedRectangleBorder(
                borderRadius: new BorderRadius.circular(10.0)),
            textColor: Colors.black,
```

```
            padding: EdgeInsets.all(10),
            onPressed: doPrint,
          ),
          new Padding(
            padding: EdgeInsets.all(30.0),
            child: Text("Output: $statement",
                style: new TextStyle(
                    fontSize: 20.0,
                    color: Colors.black,
                    fontFamily: 'RobotMono',
                    fontWeight: FontWeight.bold)),
          ),
        ]),
      ));
  }

  void doPrint() {
    setState(() {});
    statement = textEditingController.text;
  }
}
```

Output:-



Conclusion: By performing this experiment, one can have the knowledge of basic widgets of flutter.

Practical 2

AIM: Create an android application to calculate sum of two numbers and gives result in Toast Message.

Source Code:

main.dart

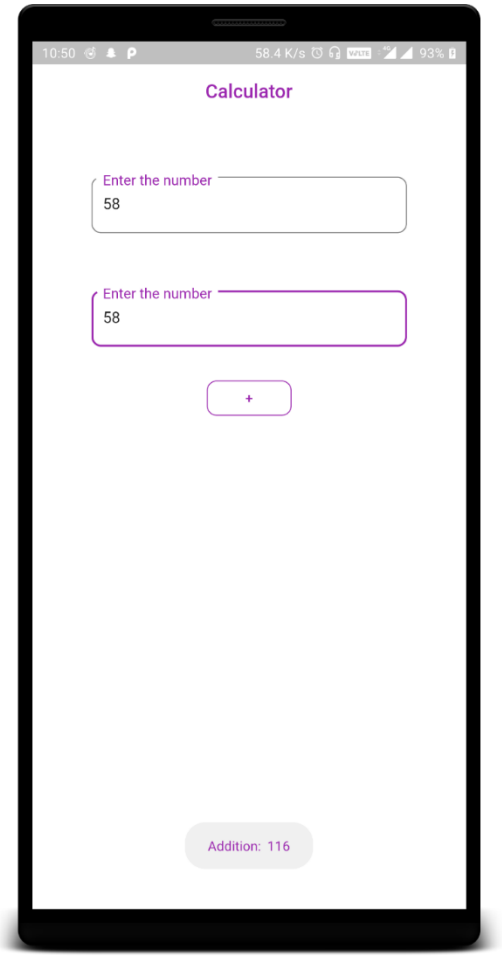
```
import 'package:flutter/material.dart';
import 'package:fluttertoast/fluttertoast.dart';

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

class MyApp extends StatelessWidget {
  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'Flutter Demo',
      theme: ThemeData(primaryColor: Colors.purple, cursorColor: Colors.purple),
      home: MyHomePage(),
    );
  }
}

class MyHomePage extends StatefulWidget {
  @override
  _MyHomePageState createState() => _MyHomePageState();
}

class _MyHomePageState extends State<MyHomePage> {
  final TextEditingController textEditingController =
      new TextEditingController();
  final TextEditingController textEditingControllerOne =
      new TextEditingController();
```

```
int sum, num1, num2;

@override
Widget build(BuildContext context) {
 return Scaffold(
  appBar: new AppBar(
   title: new Text("Calculator", style: TextStyle(color: Colors.purple)),
   centerTitle: true,
   elevation: 0.0,
   backgroundColor: Colors.white,
  ),
  body: new Container(
   color: Colors.white,
   child: new Padding(
    padding: EdgeInsets.all(32.0),
    child: new Column(
     children: <Widget>[
      new Padding(
       padding: EdgeInsets.all(30.0),
       child: new TextField(
        keyboardType: TextInputType.number,
        decoration: new InputDecoration(
         labelText: "Enter the number",
         labelStyle:
             new TextStyle(color: Colors.purple, fontSize: 20.0),
         border: OutlineInputBorder(
             borderRadius: new BorderRadius.circular(10.0)),
        ),
        controller: textEditingController,
       ),
      ),
      new Padding(
       padding: EdgeInsets.all(30.0),
       child: new TextField(
```

```
            keyboardType: TextInputType.number,
            decoration: new InputDecoration(
              labelText: "Enter the number",
              labelStyle:
                  new TextStyle(color: Colors.purple, fontSize: 20.0),
              border: OutlineInputBorder(
                  borderRadius: new BorderRadius.circular(10.0)),
            ),
            controller: textEditingControllerOne,
          ),
        ),
        new Row(
          mainAxisAlignment: MainAxisAlignment.spaceEvenly,
          children: <Widget>[
            new OutlineButton(
              child: new Text("+"),
              borderSide: new BorderSide(color: Colors.purple),
              shape: new RoundedRectangleBorder(
                  borderRadius: new BorderRadius.circular(10.0)),
              textColor: Colors.purple,
              padding: EdgeInsets.all(10),
              onPressed: doAddition,
            ),
          ],
        ),
      ],
    ),
  ),
 );
}

void doAddition() {
  num1 = int.parse(textEditingController.text);
```

```
    num2 = int.parse(textEditingControllerOne.text);
    sum = num1 + num2;
    Fluttertoast.showToast(
        msg: "Addition:  $sum",
        toastLength: Toast.LENGTH_LONG,
        gravity: ToastGravity.BOTTOM,
        backgroundColor: Colors.black,
        textColor: Colors.yellow);
  }
}
```

Output:



Conclusion: By performing this experiment, one can able to implement the basic calculation app in android as well as flutter.

Practical 3

AIM: Create an application that will display Toast (Message) on specific interval of time.Source Code:

main.dart

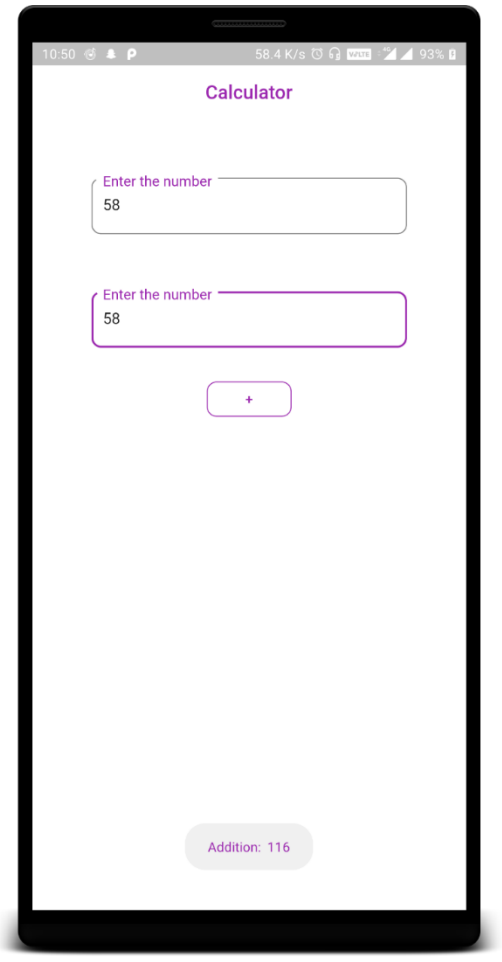
```
import 'package:flutter/material.dart';
import 'package:fluttertoast/fluttertoast.dart';

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

class MyApp extends StatelessWidget {
  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'Flutter Demo',
      theme: ThemeData(primaryColor: Colors.purple, cursorColor: Colors.purple),
      home: MyHomePage(),
    );
  }
}

class MyHomePage extends StatefulWidget {
  @override
  _MyHomePageState createState() => _MyHomePageState();
}

class _MyHomePageState extends State<MyHomePage> {
  final TextEditingController textEditingController =
      new TextEditingController();
  final TextEditingController textEditingControllerOne =
      new TextEditingController();
  int sum, num1, num2;
```

```
@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: new AppBar(
      title: new Text("Calculator", style: TextStyle(color: Colors.purple)),
      centerTitle: true,
      elevation: 0.0,
      backgroundColor: Colors.white,
    ),
    body: new Container(
      color: Colors.white,
      child: new Padding(
        padding: EdgeInsets.all(32.0),
        child: new Column(
          children: <Widget>[
            new Padding(
              padding: EdgeInsets.all(30.0),
              child: new TextField(
                keyboardType: TextInputType.number,
                decoration: new InputDecoration(
                  labelText: "Enter the number",
                  labelStyle:
                      new TextStyle(color: Colors.purple, fontSize: 20.0),
                  border: OutlineInputBorder(
                      borderRadius: new BorderRadius.circular(10.0)),
                ),
                controller: textEditingController,
              ),
            ),
            new Padding(
              padding: EdgeInsets.all(30.0),
              child: new TextField(
                keyboardType: TextInputType.number,
```

```
            decoration: new InputDecoration(
              labelText: "Enter the number",
              labelStyle:
                  new TextStyle(color: Colors.purple, fontSize: 20.0),
              border: OutlineInputBorder(
                  borderRadius: new BorderRadius.circular(10.0)),
            ),
            controller: textEditingControllerOne,
          ),
        ),
        new Row(
          mainAxisAlignment: MainAxisAlignment.spaceEvenly,
          children: <Widget>[
            new OutlineButton(
              child: new Text("+"),
              borderSide: new BorderSide(color: Colors.purple),
              shape: new RoundedRectangleBorder(
                  borderRadius: new BorderRadius.circular(10.0)),
              textColor: Colors.purple,
              padding: EdgeInsets.all(10),
              onPressed: doAddition,
            ),
          ],
        ),
      ],
    ),
  ),
 );
}

void doAddition() {
  num1 = int.parse(textEditingController.text);
  num2 = int.parse(textEditingControllerOne.text);
```

```
    sum = num1 + num2;
    Fluttertoast.showToast(
        msg: "Addition:  $sum",
        toastLength: Toast.LENGTH_LONG,
        gravity: ToastGravity.BOTTOM,
        backgroundColor: Colors.black,
        textColor: Colors.yellow);
  }
}
```

Output:



Conclusion: By performing this experiment, one can able to implement that shows the length of toast with specific interval of time.

Practical 4

AIM: Create a temperature converter Application. (Fahrenheit-Celsius)

Source Code:

main.dart

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

void main() {
  SystemChrome.setSystemUIOverlayStyle(
      SystemUiOverlayStyle(statusBarIconBrightness: Brightness.light));
  runApp(MyApp());
}

class MyApp extends StatelessWidget {
  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'Temperature Convertor',
      theme: ThemeData(
        primaryColor: Colors.white,
        cursorColor: Colors.white,
      ),
      home: MyHomePage(),
    );
  }
}

class MyHomePage extends StatefulWidget {
  @override
  _MyHomePageState createState() => _MyHomePageState();
}
```

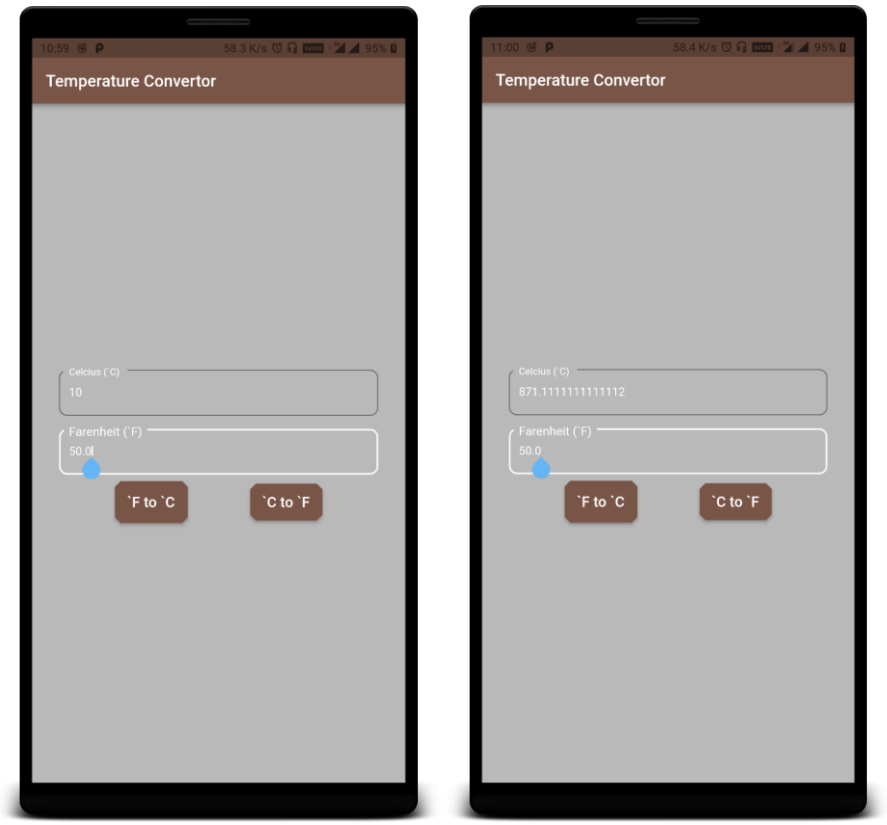
```
class _MyHomePageState extends State<MyHomePage> {
 final TextEditingController textEditingController =
    new TextEditingController();
 final TextEditingController textEditingControllerOne =
    new TextEditingController();
 double celcius, farenheit;
 @override
 Widget build(BuildContext context) {
  return Scaffold(
      appBar: AppBar(
        title: Text(
          "Temperature Convertor",
          style: TextStyle(
            color: Colors.white,
          ),
          textAlign: TextAlign.center,
        ),
        backgroundColor: Colors.brown,
      ),
      body: new Container(
        color: Colors.black26,
        child: Padding(
          padding: EdgeInsets.all(25.0),
          child: Column(
            children: <Widget>[
              Padding(
                padding: EdgeInsets.all(8.0),
                child: TextField(
                  style: TextStyle(color: Colors.white),
                  keyboardType: TextInputType.number,
                  decoration: new InputDecoration(
                    labelText: "Celcius (`C) ",
                    labelStyle: new TextStyle(
```

```
            color: Colors.white, fontStyle: FontStyle.normal),
        border: OutlineInputBorder(
          borderRadius: BorderRadius.circular(10.0),
        ),
      ),
      controller: textEditingController,
    ),
  ),
  Padding(
    padding: EdgeInsets.all(8.0),
    child: TextField(
      style: TextStyle(color: Colors.white),
      keyboardType: TextInputType.number,
      decoration: new InputDecoration(
          labelText: "Farenheit (`F)",
          labelStyle: new TextStyle(
              fontStyle: FontStyle.normal,
              fontSize: 20.0,
              color: Colors.white),
          border: new OutlineInputBorder(
              borderRadius: BorderRadius.circular(10.0))),
      controller: textEditingControllerOne,
    ),
  ),
  Row(
    mainAxisAlignment: MainAxisAlignment.spaceEvenly,
    children: <Widget>[
      RaisedButton(
        onPressed: fareToCel,
        child: Text(
          "`F to `C",
          style: TextStyle(fontSize: 18.0),
        ),
        elevation: 3.0,
```

```
                padding: EdgeInsets.all(15.0),
                color: Colors.brown,
                splashColor: Colors.blueGrey,
                shape: BeveledRectangleBorder(
                    borderRadius: BorderRadius.circular(7.0)),
                textColor: Colors.white,
              ),
              RaisedButton(
                onPressed: celToFare,
                child: Text(
                  "`C to `F",
                  style: TextStyle(fontSize: 18.0),
                ),
                elevation: 3.0,
                shape: BeveledRectangleBorder(
                    borderRadius: BorderRadius.circular(7.0)),
                splashColor: Colors.blueGrey,
                padding: EdgeInsets.all(12.0),
                color: Colors.brown,
                textColor: Colors.white,
              )
            ],
          )
        ],
      ),
    ),
  ));
}

void fareToCel() {
  farenheit = double.parse(textEditingControllerOne.text);
  farenheit = ((32 * farenheit - 32) * (5 / 9));
  setState(() {
    textEditingController.text = farenheit.toString();
```

```
    });
  }

  void celToFare() {
    celcius = double.parse(textEditingController.text);
    celcius = (((9 / 5) * celcius) + 32);
    setState(() {
      textEditingControllerOne.text = celcius.toString();
    });
  }
}
```

Output:



Conclusion: By performing this experiment, one can able to make any formula containing application in android as well as flutter.

Practical 5

AIM: Create a login application with following features:

1. Successful Login message in TextView with Green background if Username & password is correct

2. Failure message in TextView with Red background if Username or password is incorrect.

3. Disable Login Button after three wrong login attempts.

4. Close application if user selects Cancel Button.

Source Code:

main.dart

```
import 'package:flutter/material.dart';
import 'cut_corner_border.dart';
import 'first_screen.dart';
import 'second_screen.dart';
import 'package:flutter/services.dart';

void main() {
  SystemChrome.setPreferredOrientations([
    DeviceOrientation.portraitUp,
  ]);
  runApp(MyApp());
}

class MyApp extends StatelessWidget {
  // This widget is the root of your application.
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
```

```
      title: 'Flutter Demo',
      theme: ThemeData(
          accentColor: Colors.yellowAccent,
          primaryColor: Colors.yellow,
          cursorColor: Colors.yellow,
          errorColor: Colors.yellow),
      home: MyHomePage(title: 'Login'),
      routes: <String, WidgetBuilder>{
        '/first_screen': (context) => new FirstClass('First'),
        '/second_screen': (context) => new SecondClass('Second')
      },
    );
  }
}

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

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

class _MyHomePageState extends State<MyHomePage> {
  final TextEditingController textEditingController =
      new TextEditingController();
  final TextEditingController textEditingControllerOne =
      new TextEditingController();

  final _formKey = GlobalKey<FormState>();

  @override
  Widget build(BuildContext context) {
    return Scaffold(
```

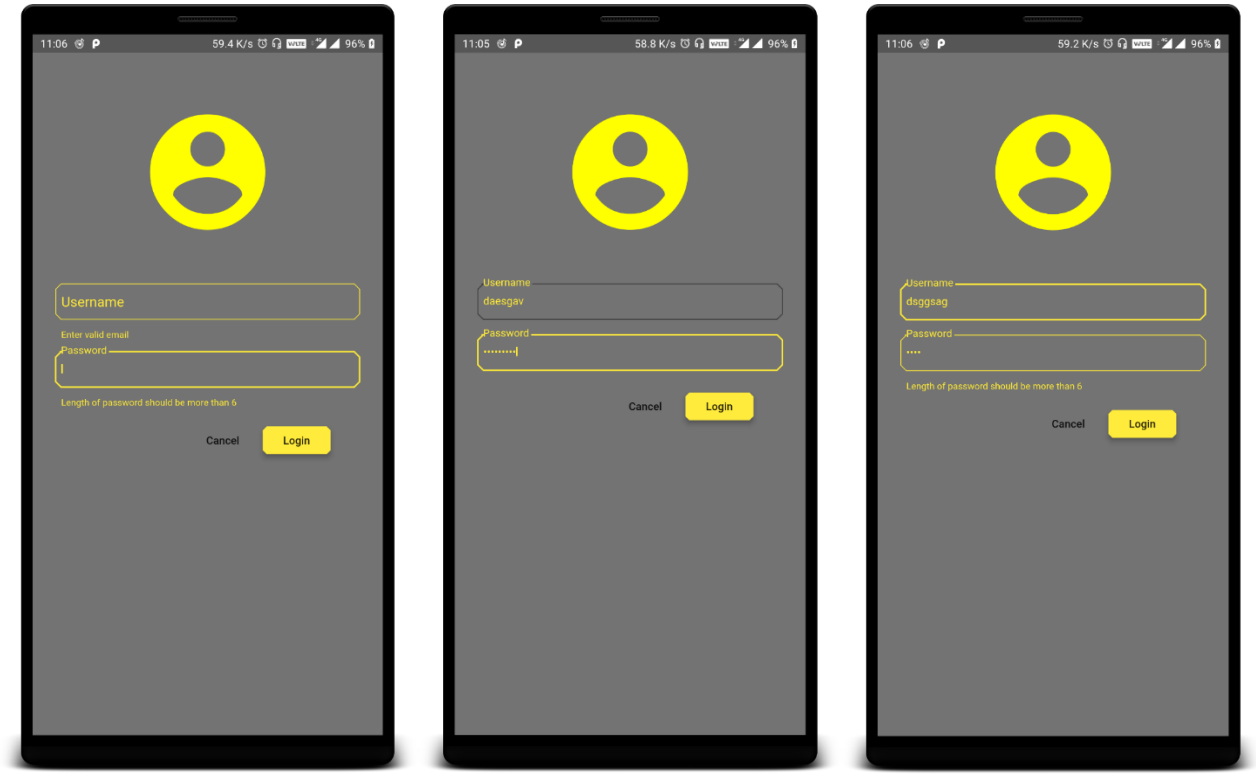
```
body: Container(
  color: Colors.black54,
  child: ListView(
    scrollDirection: Axis.vertical,
    children: <Widget>[
      Padding(
        padding: EdgeInsets.all(15.0),
        child: Form(
          key: _formKey,
          child: Column(
            mainAxisSize: MainAxisSize.max,
            children: <Widget>[
              Padding(
                padding: EdgeInsets.fromLTRB(0, 50, 0, 0),
                child: Icon(Icons.account_circle,
                    color: Colors.yellowAccent, size: 180.0),
              ),
              Padding(
                padding: EdgeInsets.fromLTRB(10, 50, 10, 0),
                child: TextFormField(
                  style: TextStyle(color: Colors.yellow),
                  keyboardType: TextInputType.text,
                  decoration: new InputDecoration(
                    labelText: "Username",
                    labelStyle: new TextStyle(
                        color: Colors.yellow, fontSize: 18.0),
                    border: CutCornersBorder(
                        borderRadius: BorderRadius.circular(5.0)),
                  ),
                  controller: textEditingController,
                  validator: (value) {
                    if (value.isEmpty &&
                        textEditingController.text != "Darshan") {
                      return 'Enter valid email';
```

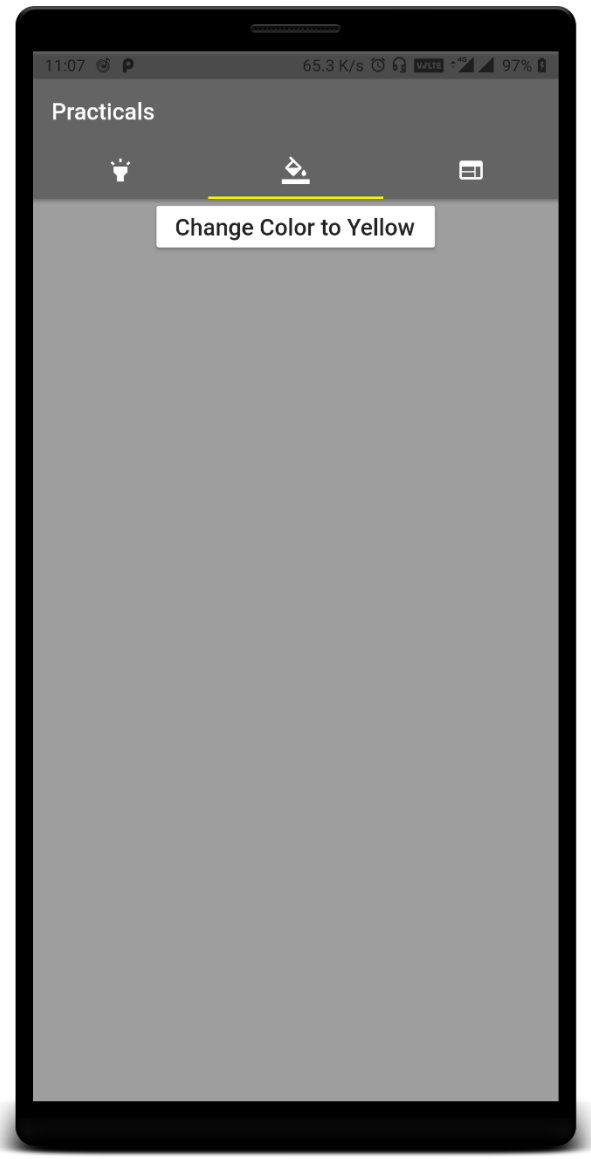
```
        }
      },
    ),
  ),
  Padding(
    padding: EdgeInsets.fromLTRB(10, 10, 10, 0),
    child: TextFormField(
      style: TextStyle(color: Colors.yellow),
      keyboardType: TextInputType.text,
      obscureText: true,
      controller: textEditingControllerOne,
      decoration: new InputDecoration(
          labelText: "Password",
          labelStyle: new TextStyle(
              color: Colors.yellow, fontSize: 18.0),
          border: CutCornersBorder(
              borderRadius: BorderRadius.circular(5.0))),
      validator: (value) {
        if (value.length < 6 &&
            textEditingControllerOne.text != "HelloDarshan") {
          return 'Length of password should be more than 6';
        }
      },
    ),
  ),
  Padding(
    padding: EdgeInsets.fromLTRB(180, 10, 0, 0),
    child: Row(
      children: <Widget>[
        Padding(
          padding: EdgeInsets.all(8.0),
          child: FlatButton(
            child: Text("Cancel"),
            onPressed: () {},
```

```
                    ),
                  ),
                  RaisedButton(
                    child: Text("Login",
                        style: new TextStyle(color: Colors.black87)),
                    color: Colors.yellow,
                    splashColor: Colors.black26,
                    shape: BeveledRectangleBorder(
                        borderRadius:
                            BorderRadius.all(Radius.circular(5.0))),
                    elevation: 5.0,
                    onPressed: () {
                      if (_formKey.currentState.validate()) {
                        if ((textEditingController.text == "Darshan") &&
                            (textEditingControllerOne.text ==
                                "HelloDarshan")) {
                          Navigator.of(context)
                              .pushNamed('/first_screen');
                        }
                      }
                    },
                  )
                ],
              ),
            ),
          ),
        ),
      ],
    ),
  ),
 );
}
```

```
}
```

Output:


11:06 59.4 K/s 96%
Username
Enter valid email
Password
Length of password should be more than 6
Cancel
Login
11:05 58.8 K/s 96%
Username
daesgav
Password
Cancel
Login
11:06 59.2 K/s 96%
Username
dsggsag
Password
Length of password should be more than 6
Cancel
Login



Conclusion: By performing this experiment, one can able to make any login screen with its validation technique using full material design components in android as well as flutter.

Practical 6

AIM: Create an application which turns ON or OFF Torch/Flashlight of Camera.

Source Code:

main.dart

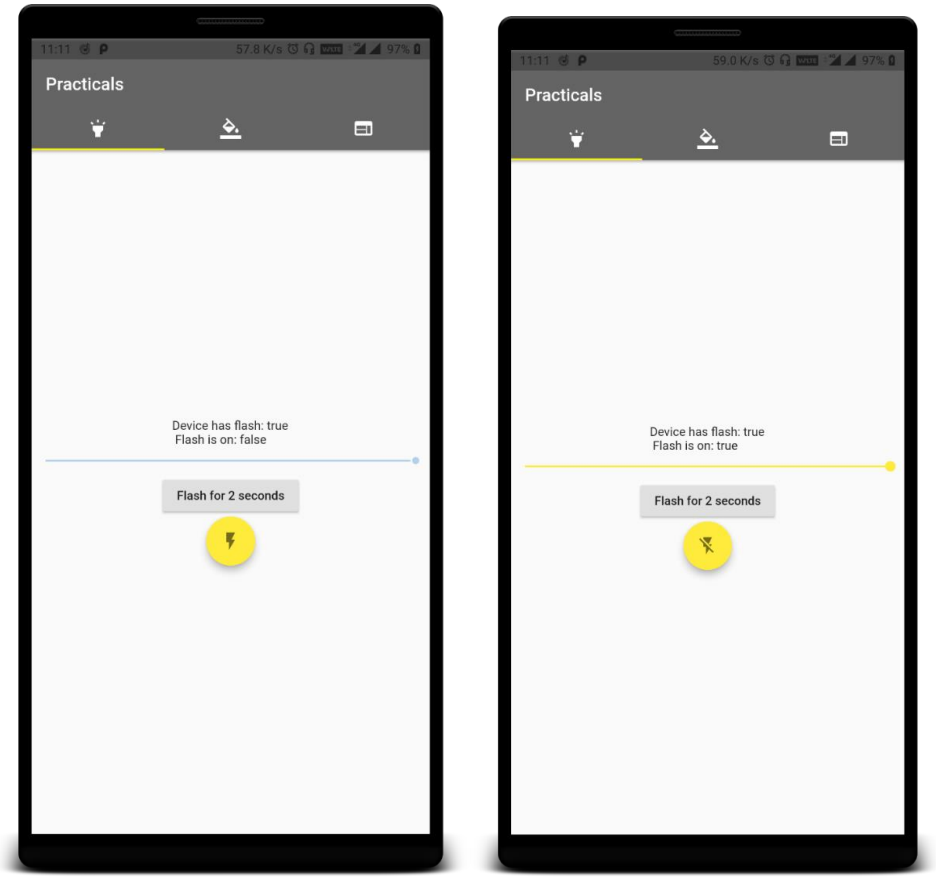
```
import 'package:flutter/material.dart';
import 'package:lamp/lamp.dart';
import 'package:webview_flutter/webview_flutter.dart';
import 'dart:async';

class FirstClass extends StatefulWidget {
  String title;

  @override
  State<StatefulWidget> createState() {
    return FirstPageTest(title);
  }

  FirstClass(String s);
}

class FirstPageTest extends State<FirstClass> {
  bool _hasFlash = false;
  bool _isOn = false;
  double _intensity = 1.0;
  bool pressed = true;
  FirstPageTest(String title);

  @override
  initState() {
    super.initState();
    initPlatformState();
  }
```

```
 initPlatformState() async {
  bool hasFlash = await Lamp.hasLamp;
  print("Device has flash ? $hasFlash");
  setState(() {
   _hasFlash = hasFlash;
  });
 }

 @override
 Widget build(BuildContext context) {
  _intensityChanged(double intensity) {
   Lamp.turnOn(intensity: intensity);
   setState(() {
    _intensity = intensity;
   });
  }

  Future _turnFlash() async {
   _isOn ? Lamp.turnOff() : Lamp.turnOn(intensity: _intensity);
   var f = await Lamp.hasLamp;
   setState(() {
    _hasFlash = f;
    _isOn = !_isOn;
   });
  }

  return DefaultTabController(
   length: 3,
   child: Scaffold(
    appBar: AppBar(
     bottom: TabBar(
      tabs: <Widget>[
       Tab(icon: Icon(Icons.highlight, color: Colors.white)),
       Tab(
```

```
            icon: Icon(
          Icons.format_color_fill,
          color: Colors.white,
        )),
        Tab(
            icon: Icon(
          Icons.web,
          color: Colors.white,
        ))
      ],
    ),
    title: Text("Practicals", style: TextStyle(color: Colors.white)),
    backgroundColor: Colors.black45,
    automaticallyImplyLeading: false,
    elevation: 2.0,
  ),
  body: TabBarView(children: [
    new Container(
      child: Center(
        child: Column(
          mainAxisAlignment: MainAxisAlignment.center,
          children: <Widget>[
            new Text(
                'Device has flash: $_hasFlash\n Flash is on: $_isOn'),
            new Slider(
                value: _intensity,
                onChanged: _isOn ? _intensityChanged : null),
            new RaisedButton(
                onPressed: () async =>
                    await Lamp.flash(new Duration(seconds: 2)),
                child: new Text("Flash for 2 seconds")),
            new FloatingActionButton(
              child: Icon(_isOn ? Icons.flash_off : Icons.flash_on),
              backgroundColor: Colors.yellow,
```

```
                foregroundColor: Colors.black54,
                onPressed: _turnFlash,
              ),
            ],
          ),
        ),
      ),
    ]),
  ),
 );
 }
}
```

Output:



Conclusion: By performing this experiment, one can able to operate the hardware such as flashlight with an app developed in android or flutter.

Practical 7

AIM: Create an application that will change color of the screen, based on selected options from the menu.

Source Code:

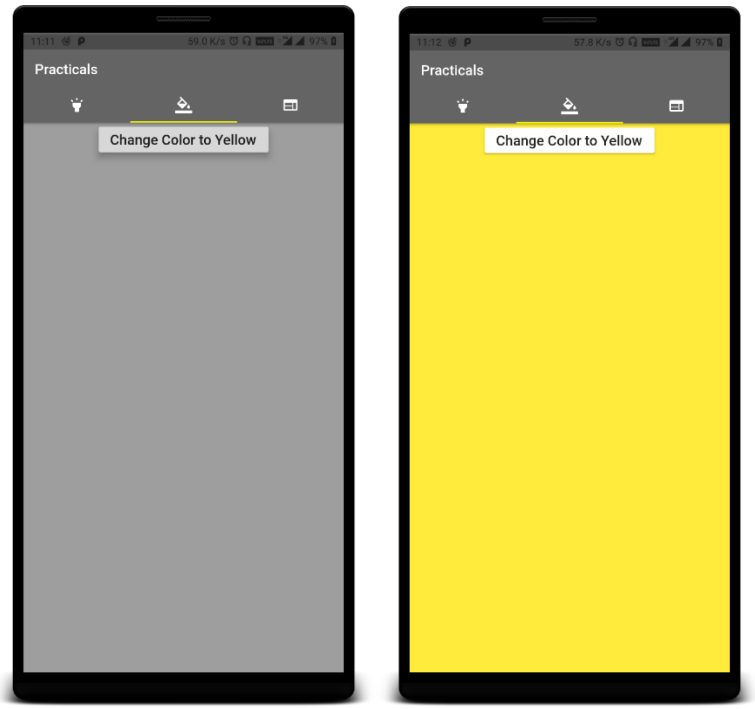
main.dart

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

class FirstClass extends StatefulWidget {
  String title;

  @override
  State<StatefulWidget> createState() {
    return FirstPageTest(title);
  }

  FirstClass(String s);
}

class FirstPageTest extends State<FirstClass> {
  FirstPageTest(String title);

  @override
  Widget build(BuildContext context) {

    return DefaultTabController(
      length: 3,
      child: Scaffold(
        appBar: AppBar(
          bottom: TabBar(
            tabs: <Widget>[
```

```
        Tab(icon: Icon(Icons.highlight, color: Colors.white)),
        Tab(
          icon: Icon(
         Icons.format_color_fill,
         color: Colors.white,
        )),
        Tab(
          icon: Icon(
         Icons.web,
         color: Colors.white,
        ))
       ],
     ),
     title: Text("Practicals", style: TextStyle(color: Colors.white)),
     backgroundColor: Colors.black45,
     automaticallyImplyLeading: false,
     elevation: 2.0,
   ),
   body: TabBarView(children: [
     new Container(
       color: pressed ? Colors.grey : Colors.yellow,
       child: Column(
         children: <Widget>[
           MaterialButton(
             child: Text(
               "Change Color to Yellow",
               style: TextStyle(fontSize: 20.0),
             ),
             color: Colors.white,
             onPressed: () {
               setState(() {
                 pressed = !pressed;
               });
             })
```

```
            ],
          ),
        ),
      ]),
    ),
  );
 }
}
```

Output:



Conclusion: By performing this experiment, one can perform the dynamic layout changes in flutter or an android app.

Practical 8

AIM: Create an application with the help of fragment.

Source Code:

main.dart

```
import 'package:flutter/material.dart';
import 'package:lamp/lamp.dart';
import 'package:webview_flutter/webview_flutter.dart';
import 'dart:async';

class FirstClass extends StatefulWidget {
  String title;

  @override
  State<StatefulWidget> createState() {
    return FirstPageTest(title);
  }

  FirstClass(String s);
}

class FirstPageTest extends State<FirstClass> {
  bool _hasFlash = false;
  bool _isOn = false;
  double _intensity = 1.0;
  bool pressed = true;
  FirstPageTest(String title);

  @override
  initState() {
    super.initState();
    initPlatformState();
```

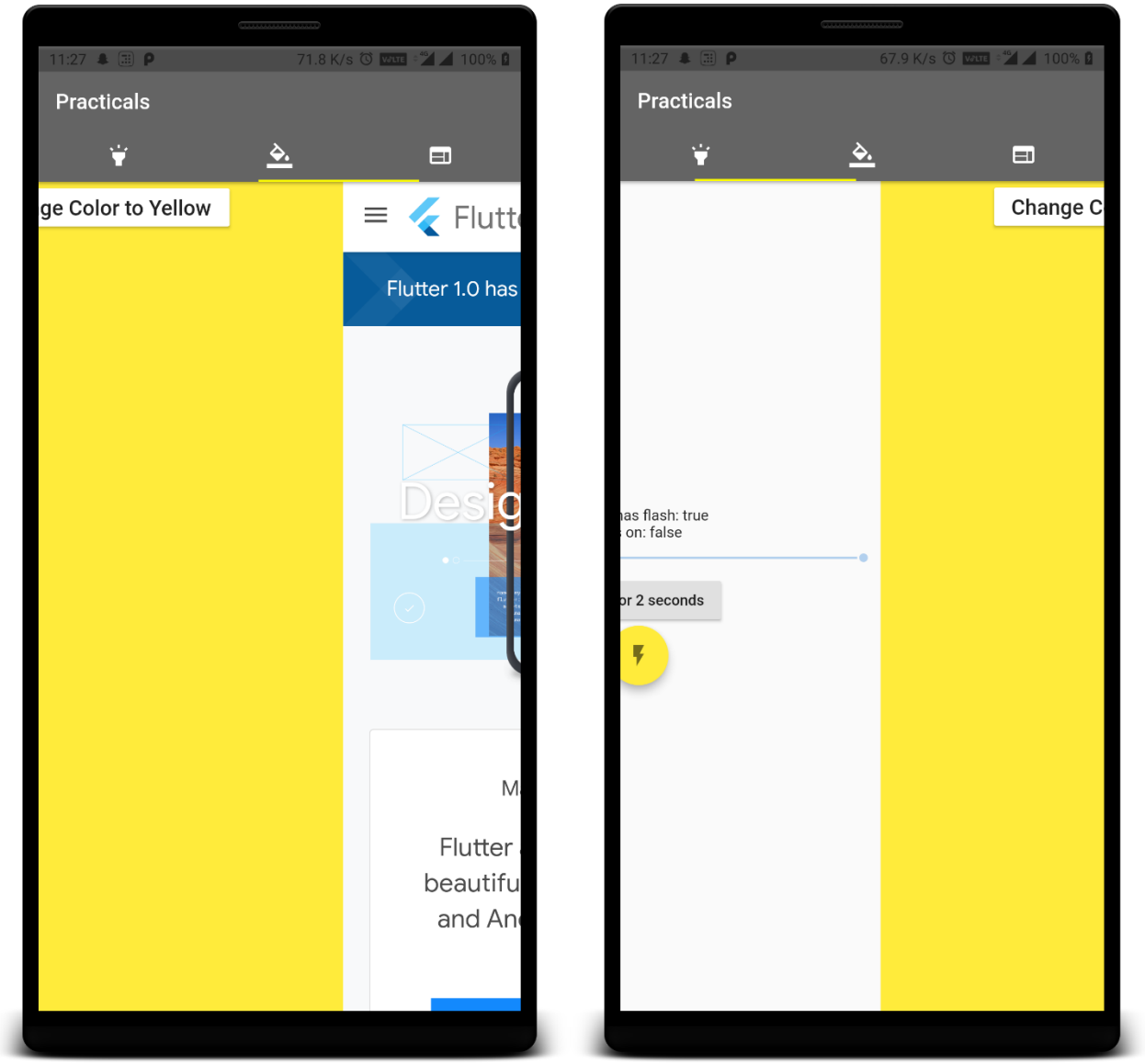
```
 }

 initPlatformState() async {
  bool hasFlash = await Lamp.hasLamp;
  print("Device has flash ? $hasFlash");
  setState(() {
   _hasFlash = hasFlash;
  });
 }

 @override
 Widget build(BuildContext context) {
  _intensityChanged(double intensity) {
   Lamp.turnOn(intensity: intensity);
   setState(() {
    _intensity = intensity;
   });
  }

  Future _turnFlash() async {
   _isOn ? Lamp.turnOff() : Lamp.turnOn(intensity: _intensity);
   var f = await Lamp.hasLamp;
   setState(() {
    _hasFlash = f;
    _isOn = !_isOn;
   });
  }

  return DefaultTabController(
   length: 3,
   child: Scaffold(
    appBar: AppBar(
     bottom: TabBar(
      tabs: <Widget>[
```

```
        Tab(icon: Icon(Icons.highlight, color: Colors.white)),
        Tab(
          icon: Icon(
        Icons.format_color_fill,
        color: Colors.white,
        )),
        Tab(
          icon: Icon(
        Icons.web,
        color: Colors.white,
        ))
      ],
    ),
    title: Text("Practicals", style: TextStyle(color: Colors.white)),
    backgroundColor: Colors.black45,
    automaticallyImplyLeading: false,
    elevation: 2.0,
  ),
  body: TabBarView(children: [
    new Container(
      child: Center(
        child: Column(
          mainAxisAlignment: MainAxisAlignment.center,
          children: <Widget>[
            new Text(
              'Device has flash: $_hasFlash\n Flash is on: $_isOn'),
            new Slider(
              value: _intensity,
              onChanged: _isOn ? _intensityChanged : null),
            new RaisedButton(
              onPressed: () async =>
                  await Lamp.flash(new Duration(seconds: 2)),
              child: new Text("Flash for 2 seconds")),
            new FloatingActionButton(
```

```
            child: Icon(_isOn ? Icons.flash_off : Icons.flash_on),
            backgroundColor: Colors.yellow,
            foregroundColor: Colors.black54,
            onPressed: _turnFlash,
          ),
        ],
      ),
    ),
  ),
  new Container(
    color: pressed ? Colors.grey : Colors.yellow,
    child: Column(
      children: <Widget>[
        MaterialButton(
          child: Text(
            "Change Color to Yellow",
            style: TextStyle(fontSize: 20.0),
          ),
          color: Colors.white,
          onPressed: () {
            setState(() {
              pressed = !pressed;
            });
          })
      ],
    ),
  ),
  new Container(
    child: WebView(
      initialUrl: "https://flutter.io",
    ),
  ),
 ]),
),
```

```
    );
  }
}
```

Output:



Conclusion: By performing this experiment, one can know the concept of the fragments in android and can be able to develop the application that uses the fragment concept.

Practical 9

AIM: Create an application that will change color of the screen, based on selected options from the menu.

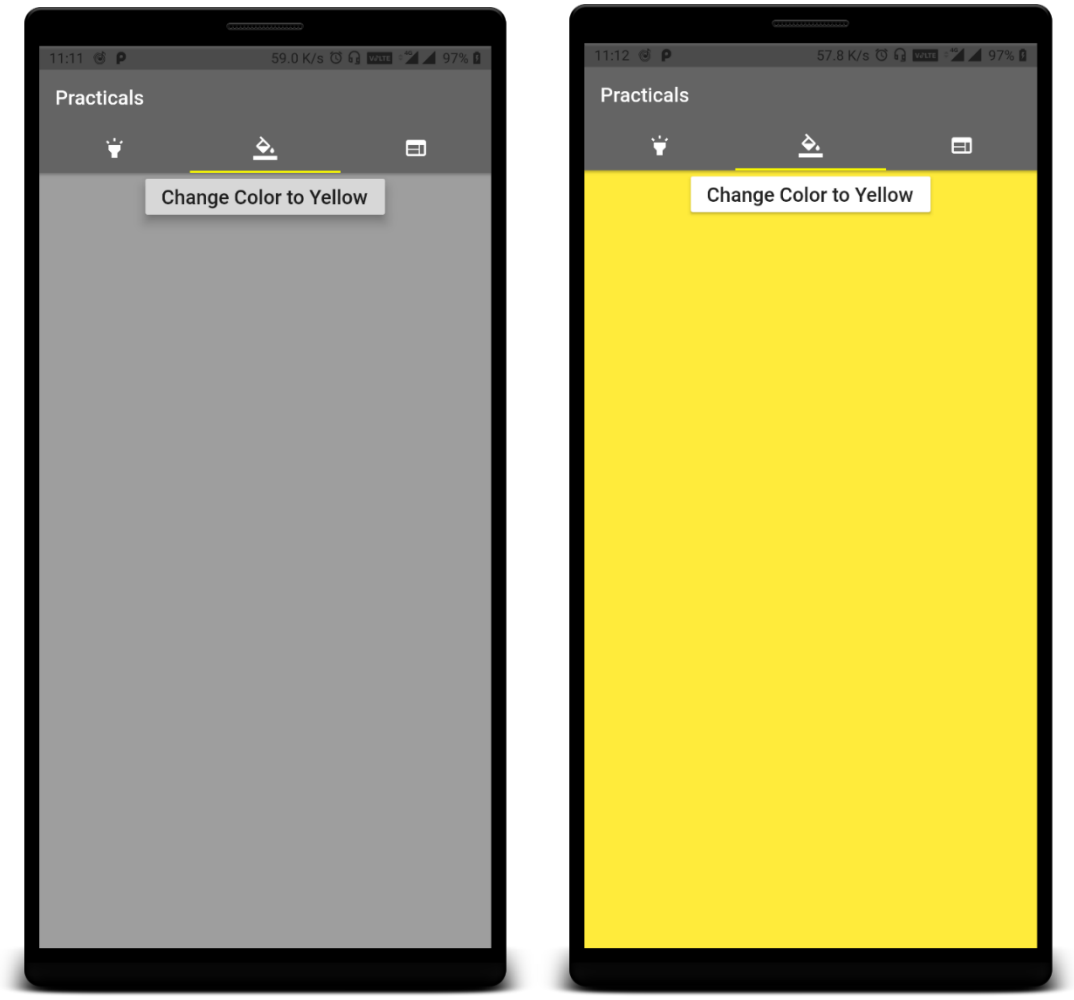
Source Code:

main.dart

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

class FirstClass extends StatefulWidget {
  String title;

  @override
  State<StatefulWidget> createState() {
    return FirstPageTest(title);
  }

  FirstClass(String s);
}

class FirstPageTest extends State<FirstClass> {
  FirstPageTest(String title);

  @override
  Widget build(BuildContext context) {
    return DefaultTabController(
      length: 3,
      child: Scaffold(
        appBar: AppBar(
          bottom: TabBar(
            tabs: <Widget>[
```

```
            Tab(icon: Icon(Icons.highlight, color: Colors.white)),
            Tab(
               icon: Icon(
              Icons.format_color_fill,
              color: Colors.white,
            )),
            Tab(
               icon: Icon(
              Icons.web,
              color: Colors.white,
            ))
          ],
        ),
        title: Text("Practicals", style: TextStyle(color: Colors.white)),
        backgroundColor: Colors.black45,
        automaticallyImplyLeading: false,
        elevation: 2.0,
      ),
      body: TabBarView(children: [
         new Container(
            child: WebView(
               initialUrl: "https://flutter.io",
             ),
          ],
        ),
      ),
    ]),
  ),
 );
 }
}
```

Output:



Conclusion: By performing this experiment, one can perform the dynamic layout changes in flutter or an android app.

Practical 10

AIM: Create an application with the help of database.

Source Code:

main.dart

```
import 'package:flutter/material.dart';
import 'package:flutter_database/pages/home.dart';
import 'package:flutter_database/pages/login/login.dart';

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

final routes = {
  '/login': (BuildContext context) => new LoginPage(),
  '/home': (BuildContext context) => new HomePage(),
  '/': (BuildContext context) => new LoginPage(),
};

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return new MaterialApp(
      title: 'Sqflite App',
      theme: new ThemeData(primarySwatch: Colors.teal),
      routes: routes,
    );
  }
}
```

login.dart

```
import 'package:flutter/material.dart';
import 'package:flutter_database/data/database_helper.dart';
import 'package:flutter_database/model/user.dart';
import 'package:flutter_database/pages/login/login_presenter.dart';
```

```
class LoginPage extends StatefulWidget {
  @override
  _LoginPageState createState() => new _LoginPageState();
}

class _LoginPageState extends State<LoginPage> implements LoginPageContract {
  BuildContext _ctx;
  bool _isLoading = false;
  final formKey = new GlobalKey<FormState>();
  final scaffoldKey = new GlobalKey<ScaffoldState>();

  String _username, _password;

  LoginPagePresenter _presenter;

  _LoginPageState() {
    _presenter = new LoginPagePresenter(this);
  }

  void _submit() {
    final form = formKey.currentState;

    if (form.validate()) {
      setState(() {
        _isLoading = true;
        form.save();
        _presenter.doLogin(_username, _password);
      });
    }
  }

  void _showSnackBar(String text) {
    scaffoldKey.currentState.showSnackBar(new SnackBar(
      content: new Text(text),
```

```
  ));
 }

 @override
 Widget build(BuildContext context) {
  _ctx = context;
  var loginBtn = new RaisedButton(
    onPressed: _submit,
    child: new Text("Login"),
    color: Colors.green,
  );
  var loginForm = new Column(
    crossAxisAlignment: CrossAxisAlignment.center,
    children: <Widget>[
      new Text(
        "Sqflite App Login",
        textScaleFactor: 2.0,
      ),
      new Form(
        key: formKey,
        child: new Column(
          children: <Widget>[
            new Padding(
              padding: const EdgeInsets.all(10.0),
              child: new TextFormField(
                onSaved: (val) => _username = val,
                decoration: new InputDecoration(labelText: "Username"),
              ),
            ),
            new Padding(
              padding: const EdgeInsets.all(10.0),
              child: new TextFormField(
                onSaved: (val) => _password = val,
                decoration: new InputDecoration(labelText: "Password"),
```

```
            ),
          )
        ],
      ),
    ),
    loginBtn
  ],
 );

 return new Scaffold(
  appBar: new AppBar(
   title: new Text("Login Page"),
  ),
  key: scaffoldKey,
  body: new Container(
   child: new Center(
    child: loginForm,
   ),
  ),
 );
}

@override
void onLoginError(String error) {
 // TODO: implement onLoginError
 _showSnackBar(error);
 setState(() {
  _isLoading = false;
 });
}

@override
void onLoginSuccess(User user) async {
 // TODO: implement onLoginSuccess
```

```
    _showSnackBar(user.toString());
    setState(() {
      _isLoading = false;
    });
    var db = new DatabaseHelper();
    await db.saveUser(user);
    Navigator.of(context).pushNamed("/home");
  }
}
```

login_presenter.dart

```
import 'package:flutter_database/data/rest_data.dart';
import 'package:flutter_database/model/user.dart';

abstract class LoginPageContract {
  void onLoginSuccess(User user);
  void onLoginError(String error);
}

class LoginPagePresenter {
  LoginPageContract _view;
  RestData api = new RestData();
  LoginPagePresenter(this._view);

  doLogin(String username, String password) {
    api
        .login(username, password)
        .then((user) => _view.onLoginSuccess(user))
        .catchError((onError) => _view.onLoginError(onError.toString()));
  }
}
```

database_helper.dart

```
import 'dart:io';
```

```
import 'package:flutter_database/model/user.dart';
import 'package:path/path.dart';
import 'dart:async';
import 'package:path_provider/path_provider.dart';
import 'package:sqflite/sqflite.dart';

class DatabaseHelper {
  static final DatabaseHelper _instance = new DatabaseHelper.internal();
  factory DatabaseHelper() => _instance;

  static Database _db;

  Future<Database> get db async {
    if (_db != null) {
      return _db;
    }
    _db = await initDb();
    return _db;
  }

  DatabaseHelper.internal();

  initDb() async {
    Directory documentDirectory = await getApplicationDocumentsDirectory();
    String path = join(documentDirectory.path, "main.db");
    var ourDb = await openDatabase(path, version: 1, onCreate: _onCreate);
    return ourDb;
  }

  void _onCreate(Database db, int version) async {
    await db.execute(
        "CREATE TABLE User(id INTEGER PRIMARY KEY, username TEXT, password
TEXT)");
    print("Table is created");
```

```
  }

//insertion
  Future<int> saveUser(User user) async {
    var dbClient = await db;
    int res = await dbClient.insert("User", user.toMap());
    return res;
  }

  //deletion
  Future<int> deleteUser(User user) async {
    var dbClient = await db;
    int res = await dbClient.delete("User");
    return res;
  }
}
```

rest_data.dart

```
import 'dart:async';

import 'package:flutter_database/model/user.dart';
import 'package:flutter_database/utils/network_util.dart';

class RestData {
  NetworkUtil _netUtil = new NetworkUtil();
  static final BASE_URL = "";
  static final LOGIN_URL = BASE_URL + "/";

  Future<User> login(String username, String password) {
    return new Future.value(new User(username, password));
  }
}
```

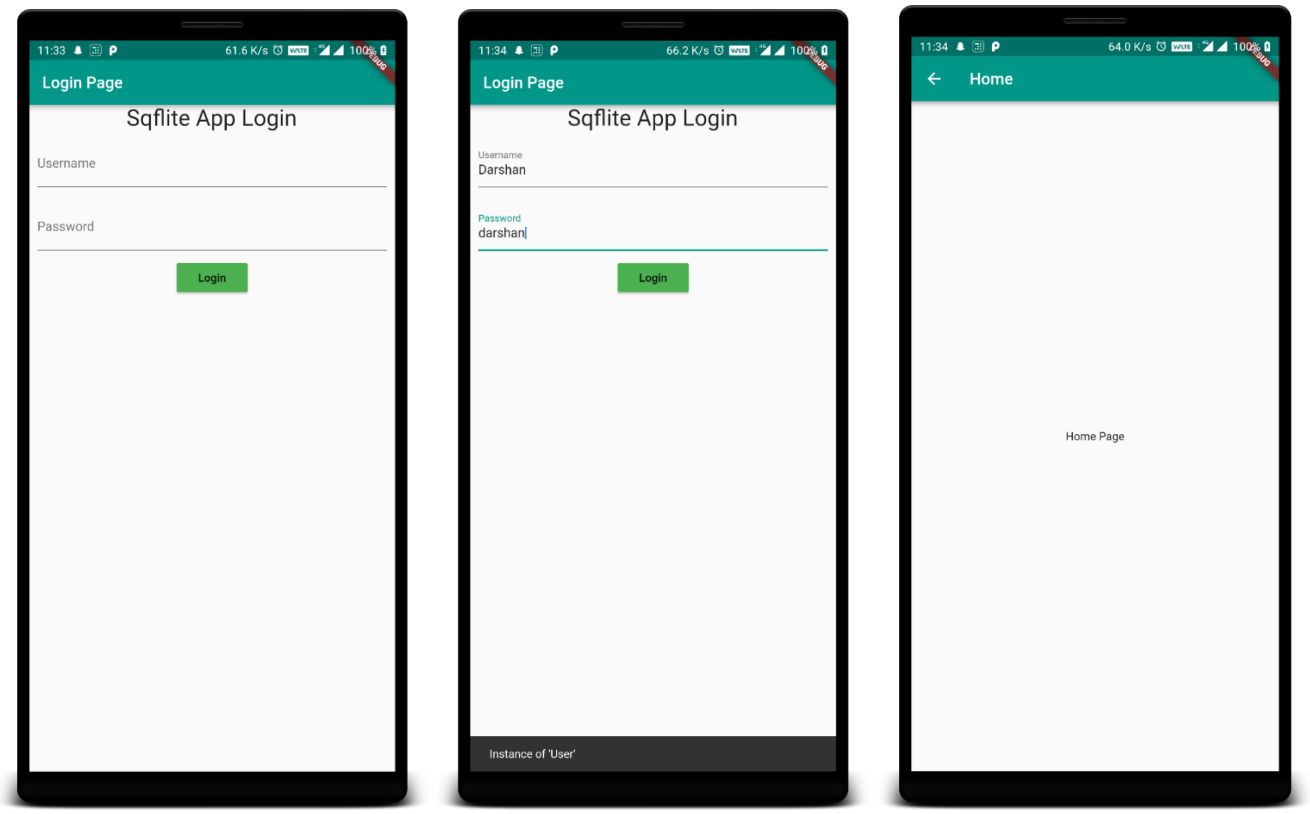
user.dart

```
class User {
  String _username;
  String _password;

  User(this._username, this._password);

  User.map(dynamic obj) {
    this._username = obj['username'];
    this._password = obj['password'];
  }

  String get username => _username;
  String get password => _password;

  Map<String, dynamic> toMap() {
    var map = new Map<String, dynamic>();
    map["username"] = _username;
    map["password"] = _password;
    return map;
  }
}
```

network_util.dart

```
import 'dart:async';

class NetworkUtil {
  static NetworkUtil _instance = new NetworkUtil.internal();
  NetworkUtil.internal();
  factory NetworkUtil() => _instance;

  Future<dynamic> get() {
    return null;
  }
}
```

Output:



Conclusion: By performing above experiment, one can able to create the application using database in android and flutter.

Practical 11

AIM: Create an application that will change color of the screen, based on selected options from the menu.

Source Code:

main.dart

activity_login.xml :

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.appcompat.widget.LinearLayoutCompat
xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:app="http://schemas.android.com/apk/res-auto"
   xmlns:tools="http://schemas.android.com/tools"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical"
   tools:context=".LoginActivity">

   <androidx.appcompat.widget.AppCompatTextView
      android:layout_width="match_parent"
      android:layout_height="0dp"
      android:layout_weight="5"
      android:background="@color/colorAccent"
      android:gravity="center"
      android:text="@string/welcome_to_google_sign_in_demo_text"
      android:textColor="@android:color/white"
      android:textSize="48sp"
      android:textStyle="bold"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintLeft_toLeftOf="parent"
      app:layout_constraintRight_toRightOf="parent"
      app:layout_constraintTop_toTopOf="parent" />
```

```
    <com.google.android.gms.common.SignInButton
        android:id="@+id/login_button"
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="1" />

</androidx.appcompat.widget.LinearLayoutCompat>
```

activity_home.xml :

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.appcompat.widget.LinearLayoutCompat
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@color/colorAccent"
    android:orientation="vertical"
    tools:context=".HomeActivity">

    <androidx.appcompat.widget.AppCompatTextView
        android:id="@+id/display_name_text_view"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center"
        android:textAppearance="?android:textAppearanceLarge"
        android:textColor="@android:color/white"
        android:textStyle="bold"
        tools:text="Hello, Umang" />

</androidx.appcompat.widget.LinearLayoutCompat>
```

Java files :

LoginActivity.java :

```
package com.android.example.practical11;

import android.content.Intent;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Toast;

import com.google.android.gms.auth.api.signin.GoogleSignIn;
import com.google.android.gms.auth.api.signin.GoogleSignInAccount;
import com.google.android.gms.auth.api.signin.GoogleSignInClient;
import com.google.android.gms.auth.api.signin.GoogleSignInOptions;
import com.google.android.gms.common.api.ApiException;
import com.google.android.gms.tasks.OnCompleteListener;
import com.google.android.gms.tasks.Task;
import com.google.firebase.auth.AuthCredential;
import com.google.firebase.auth.AuthResult;
import com.google.firebase.auth.FirebaseAuth;
import com.google.firebase.auth.FirebaseUser;
import com.google.firebase.auth.GoogleAuthProvider;

import java.util.Objects;

import androidx.annotation.NonNull;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;

public class LoginActivity extends AppCompatActivity implements View.OnClickListener {
```

```
    private static final int RC_SIGN_IN = 10;
    private GoogleSignInClient mGoogleSignInClient;
    private FirebaseAuth mAuth;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_login);

        GoogleSignInOptions gso = new
GoogleSignInOptions.Builder(GoogleSignInOptions.DEFAULT_SIGN_IN)
                .requestIdToken(getString(R.string.default_web_client_id))
                .requestEmail()
                .build();

        mGoogleSignInClient = GoogleSignIn.getClient(this, gso);
        mAuth = FirebaseAuth.getInstance();
        findViewById(R.id.login_button).setOnClickListener(this);
    }

    @Override
    protected void onStart() {
        super.onStart();
        // Check for existing Google Sign In account, if the user is already signed in
        // the GoogleSignInAccount will be non-null.
        FirebaseUser currentUser = mAuth.getCurrentUser();
        updateUI(currentUser);
    }

    @Override
    public void onClick(View v) {
        signIn();
    }
```

```
    private void signIn() {
        Intent signInIntent = mGoogleSignInClient.getSignInIntent();
        startActivityForResult(signInIntent, RC_SIGN_IN);
    }

    @Override
    protected void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {
        super.onActivityResult(requestCode, resultCode, data);
        // Result returned from launching the Intent from GoogleSignInApi.getSignInIntent(...);
        if (requestCode == RC_SIGN_IN) {
                                                Task<GoogleSignInAccount>  task  =
GoogleSignIn.getSignedInAccountFromIntent(data);
            try {
                // Google Sign In was successful, authenticate with Firebase
                GoogleSignInAccount account = task.getResult(ApiException.class);
                firebaseAuthWithGoogle(Objects.requireNonNull(account));
            } catch (ApiException e) {
                // Google Sign In failed, update UI appropriately
                Log.e("GSignIn", "Google sign in failed", e);
            }
        }
    }

    private void firebaseAuthWithGoogle(GoogleSignInAccount acct) {
        Log.d("GsignIn", "firebaseAuthWithGoogle:" + acct.getId());

        AuthCredential credential = GoogleAuthProvider.getCredential(acct.getIdToken(), null);
        mAuth.signInWithCredential(credential)
                .addOnCompleteListener(this, new OnCompleteListener<AuthResult>() {
                    @Override
                    public void onComplete(@NonNull Task<AuthResult> task) {
                        if (task.isSuccessful()) {
                            // Sign in success, update UI with the signed-in user's information
                            Log.d("GSignIn", "signInWithCredential:success");
```

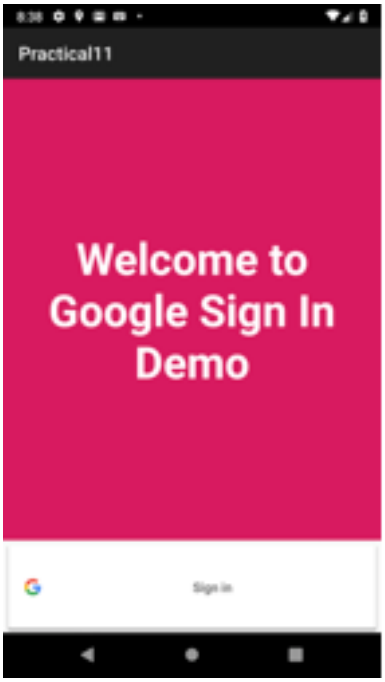
```
                    FirebaseUser user = mAuth.getCurrentUser();
                    updateUI(user);
                } else {
                    // If sign in fails, display a message to the user.
                    Log.e("GSignIn", "signInWithCredential:failure", task.getException());
                            Toast.makeText(LoginActivity.this, "Authentication Failed",
Toast.LENGTH_SHORT).show();
                    updateUI(null);
                }
            }
        });
    }

    private void updateUI(FirebaseUser user) {
        if (user != null) {
            startActivity(HomeActivity.newIntent(LoginActivity.this, user));
            finish();
        }
    }
}
```

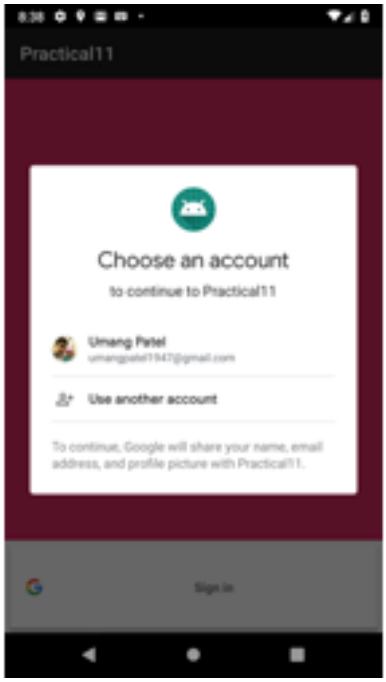
HomeActivity.java :

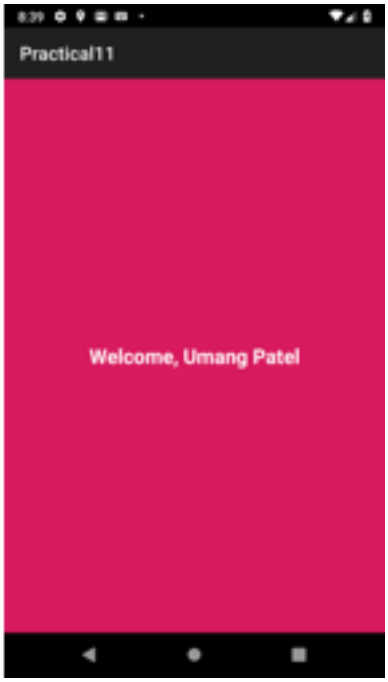
```
package com.android.example.practical11;

import android.content.Context;
import android.content.Intent;
import android.os.Bundle;

import com.google.firebase.auth.FirebaseUser;

import androidx.appcompat.app.AppCompatActivity;
import androidx.appcompat.widget.AppCompatTextView;
```

```
public class HomeActivity extends AppCompatActivity {

    private static final String EXTRA_DISPLAY_NAME = "user_display_name";

    public static Intent newIntent(Context packageContext, FirebaseUser user) {
        Intent intent = new Intent(packageContext, HomeActivity.class);
        String userDisplayName = user.getDisplayName();
        intent.putExtra(EXTRA_DISPLAY_NAME, userDisplayName);
        return intent;
    }

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_home);
        AppCompatTextView displayNameTextView =
findViewById(R.id.display_name_text_view);
        displayNameTextView.setText("Welcome, " +
getIntent().getStringExtra(EXTRA_DISPLAY_NAME));
    }
}
```

Output:







Conclusion :-

Hence, we have successfully demonstrated the use of Google Sign-in functionality while building a great Android app.

Practical 12

AIM: Create an application to handle support voice interaction.

Source Code:

main.dart

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

void main() {
  SystemChrome.setPreferredOrientations([DeviceOrientation.portraitUp]);
  runApp(new MyApp());
}

const languages = const [
  const Language('English', 'en_US'),
];

class Language {
  final String name;
  final String code;

  const Language(this.name, this.code);
}

class MyApp extends StatefulWidget {
  @override
  _MyAppState createState() => new _MyAppState();
}

class _MyAppState extends State<MyApp> {
  SpeechRecognition _speech;

  bool _speechRecognitionAvailable = false;
```

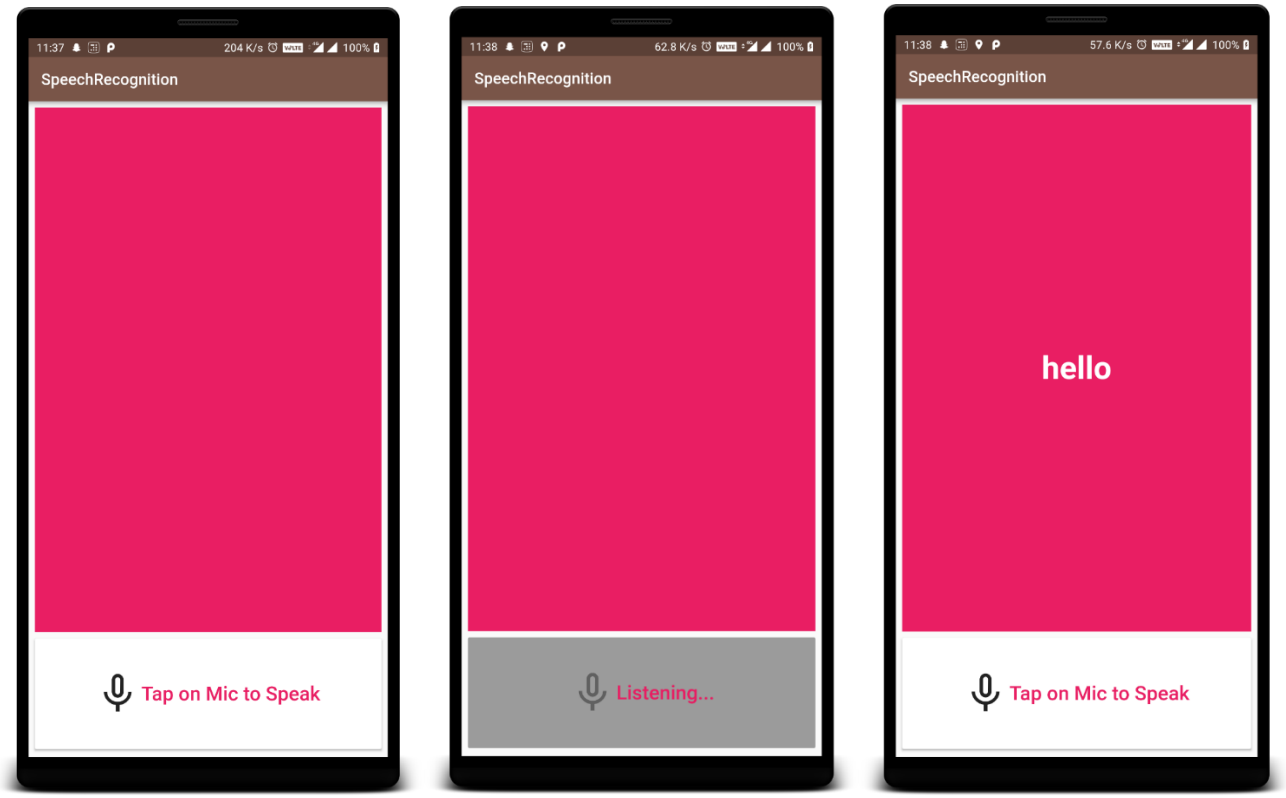
```
bool _isListening = false;

String transcription = '';

//String _currentLocale = 'en_US';
Language selectedLang = languages.first;

@override
initState() {
  super.initState();
  activateSpeechRecognizer();
}

// Platform messages are asynchronous, so we initialize in an async method.
void activateSpeechRecognizer() {
  print('_MyAppState.activateSpeechRecognizer... ');
  _speech = new SpeechRecognition();
  _speech.setAvailabilityHandler(onSpeechAvailability);
  _speech.setCurrentLocaleHandler(onCurrentLocale);
  _speech.setRecognitionStartedHandler(onRecognitionStarted);
  _speech.setRecognitionResultHandler(onRecognitionResult);
  _speech.setRecognitionCompleteHandler(onRecognitionComplete);
  _speech
      .activate()
      .then((res) => setState(() => _speechRecognitionAvailable = res));
}

@override
Widget build(BuildContext context) {
  return new MaterialApp(
    debugShowCheckedModeBanner: false,
    home: new Scaffold(
      appBar: new AppBar(
        title: new Text('SpeechRecognition'),
```

```
      backgroundColor: Colors.brown,
    ),
    body: new Padding(
      padding: new EdgeInsets.all(8.0),
      child: new Center(
        child: new Column(
          mainAxisSize: MainAxisSize.min,
          crossAxisAlignment: CrossAxisAlignment.stretch,
          children: [
            new Expanded(
              child: Container(
            width: 500,
            height: 500,
            color: Colors.pink,
            child: Center(
              child: new Text(transcription,
                style: TextStyle(
                  fontSize: 40.0,
                  color: Colors.white,
                  fontWeight: FontWeight.bold,
                ),
                textAlign: TextAlign.center)),
          )),
          _buildButton(
            onPressed: _speechRecognitionAvailable && !_isListening
                ? () => start()
                : null,
            label:
                _isListening ? 'Listening...' : 'Tap on Mic to Speak',
          ),
        ],
      ),
    )),
  ),
```

```
  );
}

Widget _buildButton({String label, VoidCallback onPressed}) => new Padding(
    padding: new EdgeInsets.only(top: 8, bottom: 2, left: 0, right: 0),
    child: new RaisedButton(
      color: Colors.white,
      onPressed: onPressed,
      padding: EdgeInsets.all(40.0),
      child: Row(
        mainAxisAlignment: MainAxisAlignment.center,
        children: <Widget>[
          Icon(
            Icons.mic_none,
            size: 60.0,
          ),
          Text(
            label,
            style: const TextStyle(color: Colors.pink, fontSize: 25.0),
          ),
        ],
      ),
    ));

void start() => _speech
    .listen(locale: selectedLang.code)
    .then((result) => print('_MyAppState.start => result ${result}'));

void onSpeechAvailability(bool result) =>
    setState(() => _speechRecognitionAvailable = result);

void onCurrentLocale(String locale) {
  print('_MyAppState.onCurrentLocale... $locale');
  setState(
```

```
      () => selectedLang = languages.firstWhere((l) => l.code == locale));
  }

  void onRecognitionStarted() => setState(() => _isListening = true);

  void onRecognitionResult(String text) => setState(() => transcription = text);

  void onRecognitionComplete() => setState(() => _isListening = false);
}
```

Output:



Conclusion: By performing above experiment, one can able to make the voice recognition app in android as well as flutter.

Practical 13

AIM: Create Check-Out application to find the hottest places people are leaving. Use the Google Places API for Android to manage nearby locations and Firebase to store and synchronize data across devices in real time.

Source Code:

activity_main.dart

```
<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent">

    <com.google.android.material.button.MaterialButton
        android:id="@+id/checkout_button"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:onClick="checkOut"
        android:text="@string/check_out" />

    <fragment xmlns:android="http://schemas.android.com/apk/res/android"
        xmlns:tools="http://schemas.android.com/tools"
        android:id="@+id/map"
        android:name="com.google.android.gms.maps.SupportMapFragment"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        tools:context=".MapsActivity" />

</FrameLayout>
```

AndroidManifest.xml :

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:tools="http://schemas.android.com/tools"
   package="com.android.example.practical13">
   <!--
       The ACCESS_COARSE/FINE_LOCATION permissions are not required to use
       Google Maps Android API v2, but you must specify either coarse or fine
       location permissions for the 'MyLocation' functionality.
   -->
   <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />

   <application
      android:allowBackup="true"
      android:icon="@mipmap/ic_launcher"
      android:label="@string/app_name"
      android:roundIcon="@mipmap/ic_launcher_round"
      android:supportsRtl="true"
      android:theme="@style/AppTheme"
      tools:ignore="GoogleAppIndexingWarning">
        <meta-data
          android:name="com.google.android.geo.API_KEY"
          android:value="@string/google_maps_key" />

      <activity
          android:name=".MapsActivity"
          android:label="@string/title_activity_maps">
          <intent-filter>
              <action android:name="android.intent.action.MAIN" />

              <category android:name="android.intent.category.LAUNCHER" />
          </intent-filter>
      </activity>
   </application>
```

```
</manifest>
```

MapsActivity.java

```
package com.android.example.practical13;

import android.app.Activity;
import android.content.Intent;
import android.location.Location;
import android.os.Bundle;
import android.view.View;
import android.view.ViewTreeObserver;
import android.widget.Button;
import android.widget.Toast;

import com.firebase.client.DataSnapshot;
import com.firebase.client.Firebase;
import com.firebase.client.FirebaseError;
import com.firebase.client.ServerValue;
import com.google.android.gms.common.GoogleApiAvailability;
import com.google.android.gms.common.GooglePlayServicesNotAvailableException;
import com.google.android.gms.common.GooglePlayServicesRepairableException;
import com.google.android.gms.common.api.GoogleApiClient;
import com.google.android.gms.common.api.ResultCallback;
import com.google.android.gms.location.places.Place;
import com.google.android.gms.location.places.PlaceBuffer;
import com.google.android.gms.location.places.Places;
import com.google.android.gms.location.places.ui.PlacePicker;
import com.google.android.gms.maps.CameraUpdateFactory;
import com.google.android.gms.maps.GoogleMap;
import com.google.android.gms.maps.OnMapReadyCallback;
import com.google.android.gms.maps.SupportMapFragment;
import com.google.android.gms.maps.model.LatLng;
```

```
import com.google.android.gms.maps.model.LatLngBounds;
import com.google.android.gms.maps.model.MarkerOptions;
import com.google.firebase.database.ChildEventListener;

import java.util.HashMap;
import java.util.Map;

import androidx.fragment.app.FragmentActivity;



public class MapsActivity extends FragmentActivity implements OnMapReadyCallback,
        ChildEventListener {


    private static final String FIREBASE_ROOT_NODE = "checkouts";

    private static final int REQUEST_PLACE_PICKER = 1;

    private GoogleMap mMap;
    private Firebase mFirebase;
    private GoogleApiClient mGoogleApiClient;
    private LatLngBounds.Builder mBounds = new LatLngBounds.Builder();

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_maps);

        // Set up Google Maps
        SupportMapFragment mapFragment = (SupportMapFragment)
                getSupportFragmentManager().findFragmentById(R.id.map);
        mapFragment.getMapAsync(this);

        // Set up the API client for Places API
```

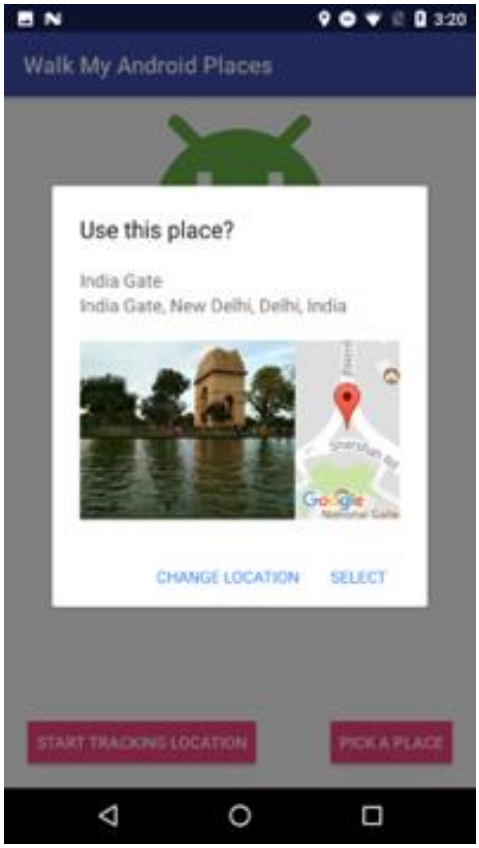
```
    mGoogleApiClient = new GoogleApiClient.Builder(this)
            .addApi(Places.GEO_DATA_API)
            .build();
    mGoogleApiClient.connect();

    // Set up Firebase
    Firebase.setAndroidContext(this);
    mFirebase = new Firebase(FIREBASE_URL);
    mFirebase.child(FIREBASE_ROOT_NODE).addChildEventListener(this);
}

/**
 * Prompt the user to check out of their location. Called when the "Check Out!" button
 * is clicked.
 */
public void checkOut(View view) {
    try {
        PlacePicker.IntentBuilder intentBuilder = new PlacePicker.IntentBuilder();
        Intent intent = intentBuilder.build(this);
        startActivityForResult(intent, REQUEST_PLACE_PICKER);
    } catch (GooglePlayServicesRepairableException e) {
        GoogleApiAvailability.getInstance().getErrorDialog(this, e.getConnectionStatusCode(),
                REQUEST_PLACE_PICKER);
    } catch (GooglePlayServicesNotAvailableException e) {
        Toast.makeText(this, "Please install Google Play Services!", Toast.LENGTH_LONG).show();
    }

}

@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    if (requestCode == REQUEST_PLACE_PICKER) {
        if (resultCode == Activity.RESULT_OK) {
            Place place = PlacePicker.getPlace(data, this);
```

```
            Map<String, Object> checkoutData = new HashMap<>();
            checkoutData.put("time", ServerValue.TIMESTAMP);

            mFirebase.child(FIREBASE_ROOT_NODE).child(place.getId()).setValue(checkoutData);

        } else if (resultCode == PlacePicker.RESULT_ERROR) {
            Toast.makeText(this, "Places API failure! Check the API is enabled for your key",
                    Toast.LENGTH_LONG).show();
        }
    } else {
        super.onActivityResult(requestCode, resultCode, data);
    }
}

/**
 * Map setup. This is called when the GoogleMap is available to manipulate.
 *
 * @param googleMap
 */
@Override
public void onMapReady(GoogleMap googleMap) {
    mMap = googleMap;
    mMap.setMyLocationEnabled(true);
    mMap.setOnMyLocationChangeListener(new GoogleMap.OnMyLocationChangeListener() {
        @Override
        public void onMyLocationChange(Location location) {
            LatLng ll = new LatLng(location.getLatitude(), location.getLongitude());
            addPointToViewPort(ll);
            // we only want to grab the location once, to allow the user to pan and zoom freely.
            mMap.setOnMyLocationChangeListener(null);
        }
    });
```

```
    // Pad the map controls to make room for the button - note that the button may not have
    // been laid out yet.
    final Button button = (Button) findViewById(R.id.checkout_button);
    button.getViewTreeObserver().addOnGlobalLayoutListener(
            new ViewTreeObserver.OnGlobalLayoutListener() {
                @Override
                public void onGlobalLayout() {
                    mMap.setPadding(0, button.getHeight(), 0, 0);
                }
            }
    );
}

/**
 * Act upon new check-outs when they appear.
 */
@Override
public void onChildAdded(DataSnapshot dataSnapshot, String s) {
    String placeId = dataSnapshot.getKey();
    if (placeId != null) {
        Places.GeoDataApi
                .getPlaceById(mGoogleApiClient, placeId)
                .setResultCallback(new ResultCallback<PlaceBuffer>() {
                                       @Override
                                       public void onResult(PlaceBuffer places) {
                                           LatLng location = places.get(0).getLatLng();
                                           addPointToViewPort(location);
                                           mMap.addMarker(new MarkerOptions().position(location));
                                           places.release();
                                       }
                                   }
                );
    }
}
```

```
    @Override
    public void onChildChanged(DataSnapshot dataSnapshot, String s) {
        // TODO
    }

    @Override
    public void onChildRemoved(DataSnapshot dataSnapshot) {
        // TODO
    }

    @Override
    public void onChildMoved(DataSnapshot dataSnapshot, String s) {
        // TODO
    }

    @Override
    public void onCancelled(FirebaseError firebaseError) {
        // TODO
    }

    private void addPointToViewPort(LatLng newPoint) {
        mBounds.include(newPoint);
        mMap.animateCamera(CameraUpdateFactory.newLatLngBounds(mBounds.build(),
                findViewById(R.id.checkout_button).getHeight()));
    }

}
```

Output:



Conclusion: By performing above experiment, one can develop an app in android using GOOGLE CLOUD MAPS API which shows the nearby places.

Practical 14

AIM: Create an application using In-app Billing API to make it easy for users to buy digital products and subscriptions.

Source Code:

activity_main.xml

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<android.support.constraint.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/purchase"/>

</android.support.constraint.ConstraintLayout>
```

MapsActivity.java

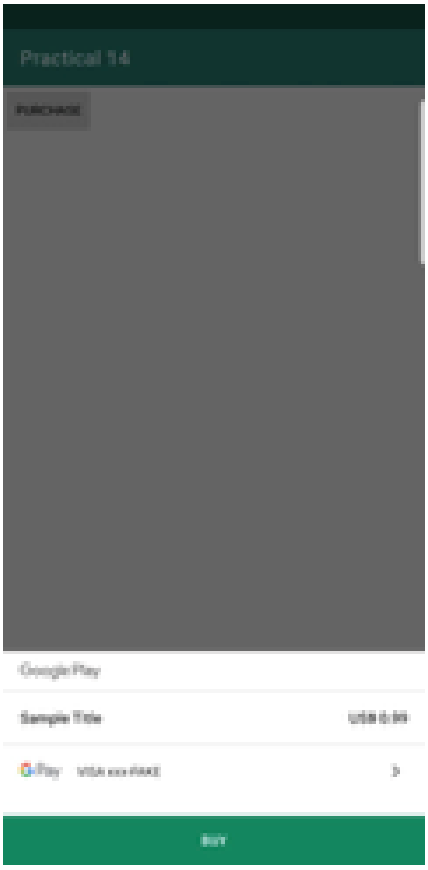
```
package com.example.practical14;

import android.content.Intent;
import android.support.annotation.NonNull;
import android.support.annotation.Nullable;
```

```
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

import com.anjlab.android.iab.v3.BillingProcessor;
import com.anjlab.android.iab.v3.TransactionDetails;

public class MainActivity extends AppCompatActivity implements BillingProcessor.IBillingHandler {
    BillingProcessor bp;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        bp = new BillingProcessor(this, "YOUR LICENSE KEY FROM GOOGLE PLAY CONSOLE
HERE", this);
        bp.initialize();

        Button btnPurchase = findViewById(R.id.button);
        btnPurchase.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                bp.purchase(MainActivity.this,"android.test.purchased");
            }
        });
    }

    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
```

```
        return super.onOptionsItemSelected(item);
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        return super.onCreateOptionsMenu(menu);
    }

    @Override
    public void onProductPurchased(@NonNull String productId, @Nullable TransactionDetails details)
{
        Toast.makeText(this,"You've purchased something",Toast.LENGTH_LONG).show();
    }

    @Override
    public void onPurchaseHistoryRestored() {

    }

    @Override
    public void onBillingError(int errorCode, @Nullable Throwable error) {

    }

    @Override
    public void onBillingInitialized() {

    }

    @Override
    protected void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {
        if(!bp.handleActivityResult(requestCode,resultCode,data)){
            super.onActivityResult(requestCode,resultCode,data);
        }
```

```
    }

    @Override
    protected void onDestroy() {
        if (bp!=null){
            bp.release();
        }
        super.onDestroy();
    }
}
```

Output:



Conclusion: By performing above experiment, one can develop an app in android using GOOGLE CLOUD Billing API which is useful for creating bills and payment gateway.

Practical 15

Aim: Introduction to I-phone & installation of x-code on MAC.

Introduction to I-phone:

iPhones are used to make phone calls and send text messages but they can also be used for accessing the internet to check your emails, surfing the web and much more. An iPhone is a type of smartphone. iPhones are made by Apple. Android phones are made by Samsung, HTC, and other companies. Microsoft manufactures Windows phones.

The difference between each phone is that they have a different operating system developed by the different manufacturers. You can use your fingers to control the touch screen of your phone or you can also use a pencil like device called a stylus which makes it easier to use. You will find a stylus for sale in electronic shops.

A word you will see a lot of: App: Is short for the word application. It is a shortcut that allows you to go directly to the programme or website you wish to access.

Installation of x-code on MAC:

Internet Recovery requires internet access, that may be slightly obvious but it's worth mentioning because if the Mac is unable to connect to a network then it will not be able to download the operating system. Whenever possible, you should back up the Mac with Time Machine before attempting this. You can start the internet recovery reinstall process from either a shutdown Mac, or by rebooting the Mac. This process will be the same on any new Mac, be it an iMac, MacBook Pro, MacBook Air, etc:

1. Immediately after hearing the Mac boot chime, **hold down Command+Option+R** – if you see the Apple logo you waited too long and need to reboot and try again*
2. OPTIONAL: You may or may not see an option to join a wi-fi network, this depends on whether the Mac can access any saved networks from OS X or not
3. When you see a spinning globe icon, Internet Recovery mode has been entered with a message saying it can take a while, a progress bar appears as the recovery functions are downloaded

4. When finished downloading, you'll see the familiar "OS X Utilities" screen, choose "Reinstall OS X" to begin the re-installation process of the Mac operating system

5. Select the destination and complete the re-installation (or installation) of OS X as usual

You'll notice the version of OS X that can be reinstalled this way is shown in the icon or listed under the "Reinstall OS X" option, and that version will match whatever version of OS X came preinstalled on the Mac. For example, if the Mac shipped with OS X Mavericks but is now running OS X Yosemite, then OS X Mavericks would be the version that reinstalls through the Internet Recovery reinstall process.

For Macs that do not currently have an operating system found or installed, the option will show as "Install OS X" rather than "Reinstall OS X".

Installing and re-installing OS X through Internet Recovery is pretty easy, but do be aware that because everything is coming from Apple servers, it can take quite a while as the system restore features are downloaded locally, and then the version of OS X to install are also downloaded locally as well.

When OS X has finished installing on the Mac, it will boot into a fresh install of OS X system software.

Practical 16

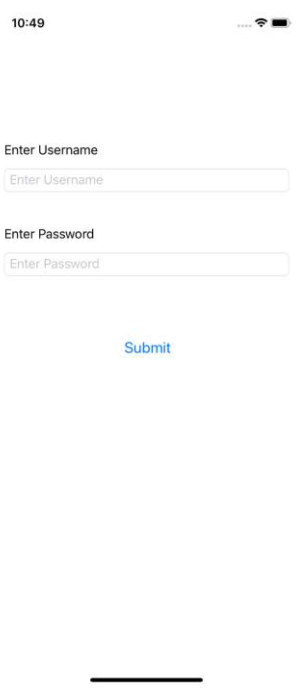
Aim: Develop Login Application using XCode.

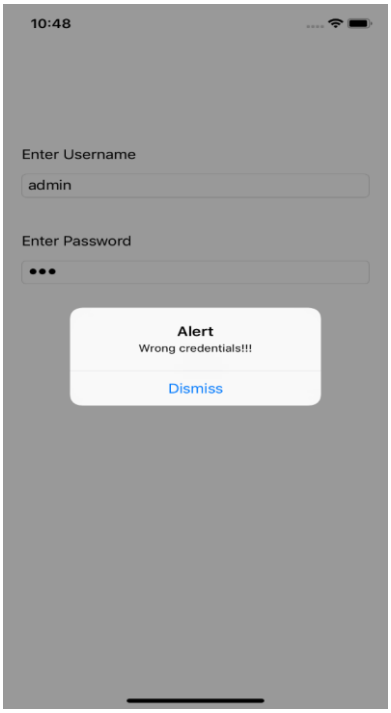
ViewController.Swift

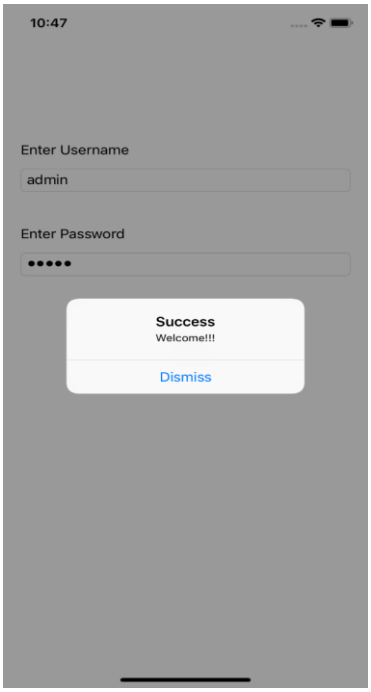
```
import UIKit
class ViewController: UIViewController {

    @IBOutlet weak var username: UITextField!
    @IBOutlet weak var password: UITextField!
    override func viewDidLoad() {
        super.viewDidLoad()
        // Do any additional setup after loading the view.
    }
    @IBAction func loginPressed(_ sender: Any) {
        if (username.text == "admin" && password.text == "admin") {
            let alertController = UIAlertController(title: "Success", message:
                "Welcome!!!", preferredStyle: .alert)
            alertController.addAction(UIAlertAction(title: "Dismiss", style: .default))
            self.present(alertController, animated: true, completion: nil)
        }
        else if(username.text == "" || password.text == ""){
            let alertController = UIAlertController(title: "Alert", message:
                "Username or Password can't be empty!", preferredStyle: .alert)
            alertController.addAction(UIAlertAction(title: "Dismiss", style: .default))
            self.present(alertController, animated: true, completion: nil)
        }
        else{
            let alertController = UIAlertController(title: "Alert", message:
                "Wrong credentials!!!", preferredStyle: .alert)
            alertController.addAction(UIAlertAction(title: "Dismiss", style: .default))
            self.present(alertController, animated: true, completion: nil)
        }
    }
```

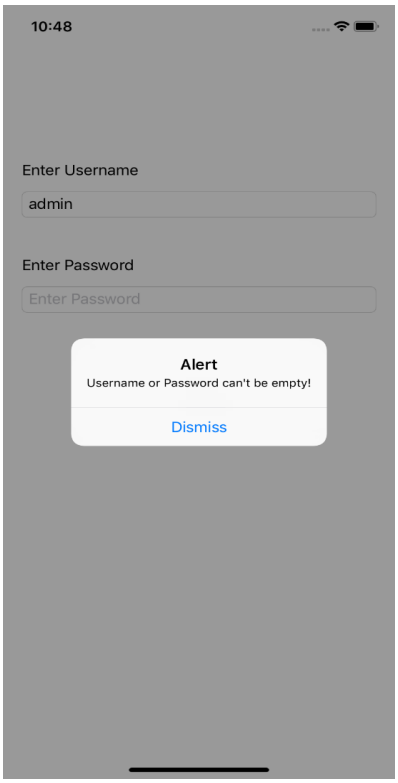
```
}
```

Output:









Conclusion:

Hence, we have successfully learnt to develop Login App on iOS Platform.