St. Francis Institute of Technology, Mumbai-400 103
Department of Information Technology

A.Y. 2024-2025
Class: TE-IT A/B, Semester: VI

Subject: **MAD & PWA LAB**

Experiment – 4: Designing the App layout for mobile Apps.

Aim: To design a layout of Flutter App using layout widgets.

Objectives: After study of this experiment, the student will be able to ● Develop the App UI by incorporating form widget.

Outcomes: After study of this experiment, the student will be able to
● Design and Develop an interactive Flutter App by using widgets. (L604.3)

Prerequisite: Dart Programming Language.

Requirements: Android Studio, Flutter framework, Internet Connection.

Pre-Experiment
Exercise: Brief Theory:

For proper UI design, we have to do 5 things.

1. Layout the entire screen (aka scene)
2. Position widgets above and below each other or side by side.
3. Handle extra space in the scene.
4. Handle situations when we run out of space and overflow the scene.
5. Make finer adjustments in positioning.

The Flutter API provides an extensive set of widgets that can be used to layout the design elements on the app screen, in the form of Layout widgets. Using the layout widgets, we can place widgets side by side or above and beneath, making them scrollable, making them wrap, determining the space around widgets so that they don't feel crowded, and so on. The layout widgets are listed in Figure 1.

Align	FittedBox	Padding
AppBar	Flow	PageView
AspectRatio	FractionallySizedBox	Placeholder
Baseline	GridView	Row
BottomSheet	IndexedStack	Scaffold
ButtonBar	IntrinsicHeight	Scrollable
Card	IntrinsicWidth	Scrollbar
Center	LayoutBuilder	SingleChildScrollView
Column	LimitedBox	SizedBox
ConstrainedBox	ListBody	SizedOverflowBox
Container	ListTile	SliverAppBar
CustomMultiChildLayout	ListView	SnackBar
Divider	MediaQuery	Stack
Expanded	NestedScrollview	Table
ExpansionPanel	OverflowBox	Wrap

Figure 1. Layout widgets in Flutter

Laboratory Exercise

A. Program

1. Design the layout of the mobile app by using the following widgets.

Material App, Scaffold, Container, Row, Column, ListView, GridView, Table.

B. Result/Observation

1. Print out of program code and output.

Post-Experiments

Exercise A.

Questions:

Explain the following layout widgets. Scaffold, Container, Row, Column, Expanded, ListView, GridView, Table, Snackbar.

B. Conclusion:

Write what you have learnt in the experiment.

C. References:

1. Beginning App Development with Flutter: Create Cross-Platform Mobile Apps, By Rap Payne, 2019.
2. Google Flutter Mobile Development Quick Start Guide, Packet Publishing, 2019

Name: Vishal Rajesh Mahajan | MAD PWA EXP 04

Class: TE IT A | Roll No: 56

Laboratory Exercise

Q. Design UI for mobile app using the following widgets.
MaterialApp, Scaffold, Container, Row, Column, ListView, GridView,Table.

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

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

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Sci-Fi Explorer',
      theme: ThemeData(
        brightness: Brightness.dark,
        primarySwatch: Colors.deepPurple,
        fontFamily: 'RobotoMono',
      ),
      home: HomeScreen(),
    );
  }
}

class HomeScreen extends StatelessWidget {
  final List<String> spaceTopics = [
    'Galactic Exploration',
    'Interstellar Travel',
    'Black Hole Mysteries',
    'Exoplanets Discovery',
    'Asteroid Mining',
    'Terraforming Planets',
    'Dark Matter & Energy',
    'Alien Life Search',
    'Space-Time Continuum',
    'Cosmic Phenomena',
  ];

  @override
```

```
Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text('Sci-Fi Explorer'),
      backgroundColor: Colors.deepPurpleAccent,
      centerTitle: true, // Aligns the title to the center
    ),
    body: SingleChildScrollView(
      padding: const EdgeInsets.all(16),
      child: Column(
        crossAxisAlignment: CrossAxisAlignment.stretch,
        children: [
          _buildHeader(),
          const SizedBox(height: 24),
          _buildTopicList(),
          const SizedBox(height: 24),
          _buildSpaceGrid(),
          const SizedBox(height: 24),
          _buildSpaceTable(),
        ],
      ),
    ),
    backgroundColor: const Color(0xFF0A001F),
  );
}

Widget _buildHeader() {
  return Container(
    padding: const EdgeInsets.all(16),
    decoration: BoxDecoration(
      gradient: const LinearGradient(
        colors: [Color(0xFF4A148C), Color(0xFF311B92)],
        begin: Alignment.topLeft,
        end: Alignment.bottomRight,
      ),
      borderRadius: BorderRadius.circular(20),
      boxShadow: [
        BoxShadow(
          color: Colors.deepPurple.withOpacity(0.5),
          blurRadius: 15,
          spreadRadius: 3,
        ),
```

```
        ],
      ),
      child: const Text(
        'Explore the Wonders of Space 🌌',
        style: TextStyle(
          fontSize: 20,
          fontWeight: FontWeight.bold,
          color: Colors.white,
          letterSpacing: 1.2,
        ),
        textAlign: TextAlign.center,
      ),
    );
  }

  Widget _buildTopicList() {
    return Container(
      padding: const EdgeInsets.all(16),
      decoration: BoxDecoration(
        color: const Color(0xFF1C003A),
        borderRadius: BorderRadius.circular(20),
        boxShadow: [
          BoxShadow(
            color: Colors.deepPurple.withOpacity(0.3),
            blurRadius: 10,
            spreadRadius: 2,
          ),
        ],
      ),
      child: ListView.builder(
        shrinkWrap: true,
        physics: const NeverScrollableScrollPhysics(),
        itemCount: spaceTopics.length,
        itemBuilder: (context, index) {
          return ListTile(
            leading: const Icon(Icons.star, color: Colors.purpleAccent),
            title: Text(
              spaceTopics[index],
              style: const TextStyle(
                color: Colors.white,
                fontSize: 16,
              ),
```

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

Widget _buildSpaceGrid() {
  return Container(
    padding: const EdgeInsets.all(16),
    decoration: BoxDecoration(
      color: const Color(0xFF1A0036),
      borderRadius: BorderRadius.circular(20),
      boxShadow: [
        BoxShadow(
          color: Colors.deepPurpleAccent.withOpacity(0.3),
          blurRadius: 10,
          spreadRadius: 2,
        ),
      ],
    ),
    child: GridView.builder(
      shrinkWrap: true,
      physics: const NeverScrollableScrollPhysics(),
      gridDelegate: const SliverGridDelegateWithFixedCrossAxisCount(
        crossAxisCount: 2,
        crossAxisSpacing: 12,
        mainAxisSpacing: 12,
      ),
      itemCount: spaceTopics.length,
      itemBuilder: (context, index) {
        return Container(
          decoration: BoxDecoration(
            gradient: const LinearGradient(
              colors: [Color(0xFF6A1B9A), Color(0xFF4A148C)],
              begin: Alignment.topLeft,
              end: Alignment.bottomRight,
            ),
            borderRadius: BorderRadius.circular(15),
            boxShadow: [
              BoxShadow(
                color: Colors.purpleAccent.withOpacity(0.4),
```

```
                blurRadius: 12,
                spreadRadius: 2,
              ),
            ],
          ),
          child: Center(
            child: Text(
              spaceTopics[index],
              style: const TextStyle(
                color: Colors.white,
                fontWeight: FontWeight.bold,
                fontSize: 14,
              ),
              textAlign: TextAlign.center,
            ),
          ),
        );
      },
    ),
  );
}

Widget _buildSpaceTable() {
  return Container(
    padding: const EdgeInsets.all(16),
    decoration: BoxDecoration(
      color: const Color(0xFF140030),
      borderRadius: BorderRadius.circular(20),
      boxShadow: [
        BoxShadow(
          color: Colors.purpleAccent.withOpacity(0.3),
          blurRadius: 10,
          spreadRadius: 2,
        ),
      ],
    ),
    child: Table(
      columnWidths: const {
        0: FlexColumnWidth(2),
        1: FlexColumnWidth(3),
      },
      border: TableBorder.all(
```

```
          color: Colors.deepPurpleAccent,
          width: 1,
        ),
        children: [
          _buildTableRow(['Topic', 'Description'], isHeader: true),
          _buildTableRow(
              ['Galactic Exploration', 'Traveling between galaxies']),
          _buildTableRow(['Terraforming', 'Making planets habitable']),
          _buildTableRow(['Black Hole Mysteries', 'Exploring singularities']),
        ],
      ),
    );
  }

  TableRow _buildTableRow(List<String> cells, {bool isHeader = false}) {
    return TableRow(
      children: cells.map((cell) {
        return Padding(
          padding: const EdgeInsets.all(8),
          child: Text(
            cell,
            textAlign: TextAlign.center,
            style: TextStyle(
              fontSize: 14,
              fontWeight: isHeader ? FontWeight.bold : FontWeight.normal,
              color: isHeader ? Colors.purpleAccent : Colors.white,
            ),
          ),
        );
      }).toList(),
    );
  }
}
```

Name: Vishal Rajesh Mahajan
Class: TE IT A

MAD PWA EXP 04
Roll No: 56