Vivekanand Education Society's Institute of Technology

An Autonomous Institute Affiliated to University of Mumbai
Hashu Advani Memorial Complex, Collector Colony, Chembur East, Mumbai - 400074.

Department of Information Technology

CERTIFICATE

This is to certify that **Shravani Anil Patil** of **D15A** semester **VI,** have successfully completed necessary experiments in the **MAD & PWA Lab** under my supervision in **VES Institute of Technology** during the academic year **2024-2025.**

Lab Assistant

Subject Teacher

Mrs. Kajal Joseph

Principal

Head of Department

Dr. Mrs. Shalu Chopra

Name of the Course : MAD & PWA Lab

Course Code : ITL604

Project Title: **Roll No.**

Year/Sem/Class **:** D15A/D15B **A.Y.:** 24-25

Faculty Incharge : Mrs. Kajal Joseph.

Lab Teachers **:** Mrs. Kajal Joseph.

Email **:** kajal.jewani@ves.ac.in

Programme Outcomes: The graduate will be able to:

PO1) Basic Engineering knowledge: An ability to apply the fundamental knowledge in mathematics, science and engineering to solve problems in Computer engineering.

PO2) Problem Analysis: Identify, formulate, research literature and analyze computer engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and computer engineering and sciences.

PO3) Design/ Development of Solutions: Design solutions for complex computer engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

PO4) Conduct investigations of complex engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5) Modern Tool Usage: Create, select and apply appropriate techniques, resources and modern computer engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6) The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to computer engineering practice.

PO7) Environment and Sustainability: Understand the impact of professional computer engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

PO8) Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of computer engineering practice.

PO9) Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

PO10) Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11) Project Management and Finance: Demonstrate knowledge and understanding of computer engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12) Life-long Learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program specific Outcomes

PSO1) An ability to manage and analyze data / information effectively for making better decisions.

PSO2) Demonstrate the ability to use state of the art technologies and tools including Free and Open Source Software (FOSS) tools in developing software.

Project Title: **Roll No.**

Lab Objectives:

Sr. No.	Lab Objectives
The Lab experiments aims:	
1	Learn the basics of the Flutter framework.
2	Develop the App UI by incorporating widgets, layouts, gestures and animation
3	Create a production ready Flutter App by including files and firebase backend service.
4	Learn the Essential technologies, and Concepts of PWAs to get started as quickly and efficiently as possible
5	Develop responsive web applications by combining AJAX development techniques with the jQuery JavaScript library.
6	Understand how service workers operate and also learn to Test and Deploy PWA.

Lab Outcomes:

Sr. No.	Lab Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
On Completion of the course the learner/student should be able to:		
1	Understand cross platform mobile application development using Flutter framework	L1, L2
2	Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation	L3
3	Analyze and Build production ready Flutter App by incorporating backend services and deploying on Android / iOS	L3, L4
4	Understand various PWA frameworks and their requirements	L1, L2
5	Design and Develop a responsive User Interface by applying PWA Design techniques	L3
6	Develop and Analyse PWA Features and deploy it over app hosting solutions	L3, L4

Project Title: **Roll No.**

Index

Sr. No	Experiment Title	LO	DOP	DOS	Grade
1.	To install and configure the Flutter Environment	LO1			
2.	To design Flutter UI by including common widgets.	LO2			
3.	To include icons, images, fonts in Flutter app	LO2			
4.	To create an interactive Form using form widget	LO2			
5.	To apply navigation, routing and gestures in Flutter App	LO2			
6.	To Connect Flutter UI with fireBase database	LO3			
7.	To write meta data of your Ecommerce PWA in a Web app manifest file to enable “add to homescreen feature”.	LO4			
8.	To code and register a service worker, and complete the install and activation process for a new service worker for the E-commerce PWA	LO5			
9.	To implement Service worker events like fetch, sync and push for E-commerce PWA	LO5			
10.	To study and implement deployment of Ecommerce PWA to GitHub Pages.	LO5			
11.	To use google Lighthouse PWA Analysis Tool to test the PWA functioning.	LO6			
12.	Assignment-1	LO1,LO2 ,LO3			
13.	Assignment-2	LO4,LO5 ,LO6			

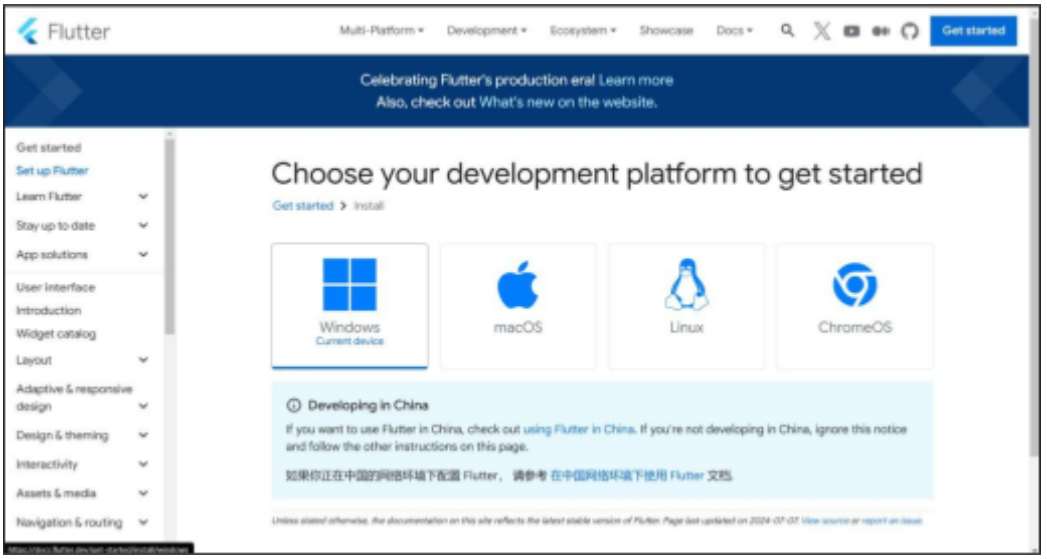
MAD & PWA Lab Journal

Experiment No.	01
Experiment Title.	To install and configure the Flutter Environment
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO1: Understand cross platform mobile application development using Flutter framework
Grade:	

AIM : Installation and Configuration of Flutter Environment.

Step 1: Install Flutter : Download Flutter SDK:

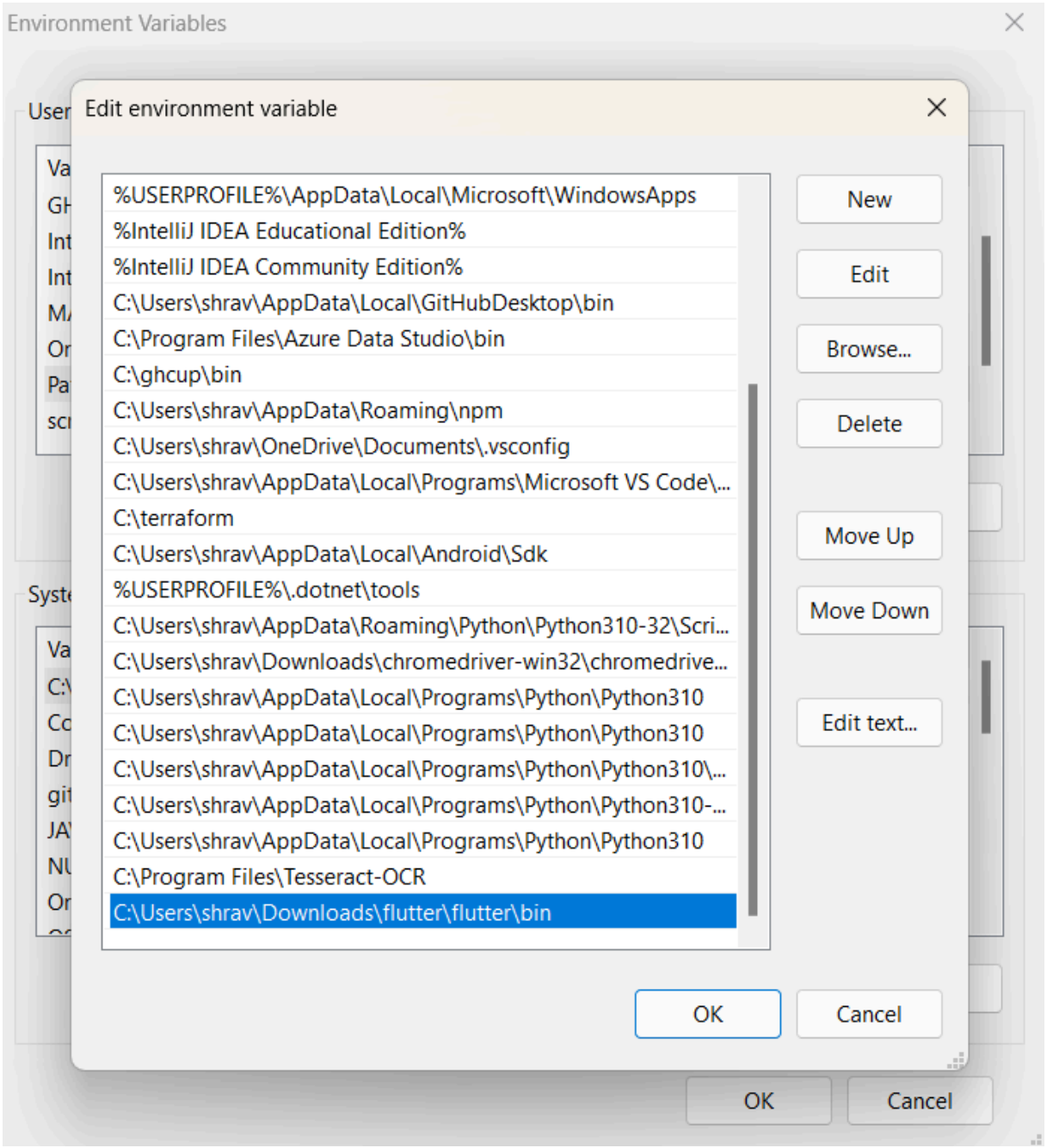
- Go to the Flutter website.
- Download the Flutter SDK for your operating system



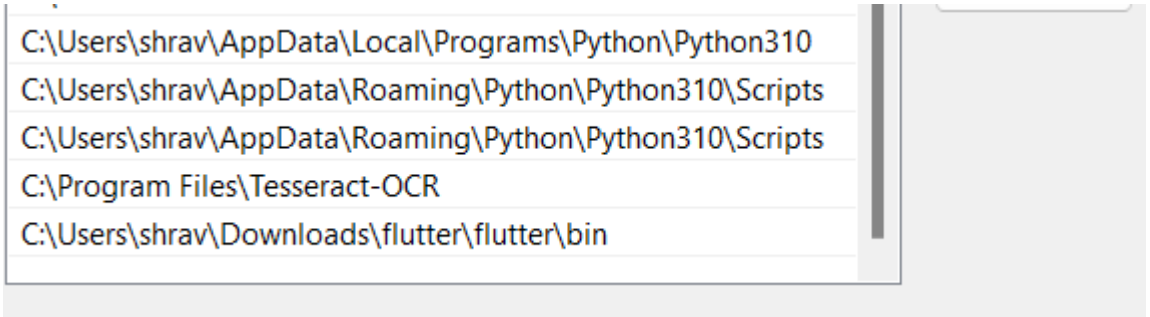
Step 2: Extract Flutter SDK: Extract the downloaded .zip file to your desired directory

Step 3: Add Flutter to PATH

- Search for "Environment Variables" in the Start menu.
- Under System Properties → Advanced → Environment Variables, find the Path variable under "System Variables."
- Add the Flutter SDK's bin directory (e.g., C:\flutter\bin) to the PATH.

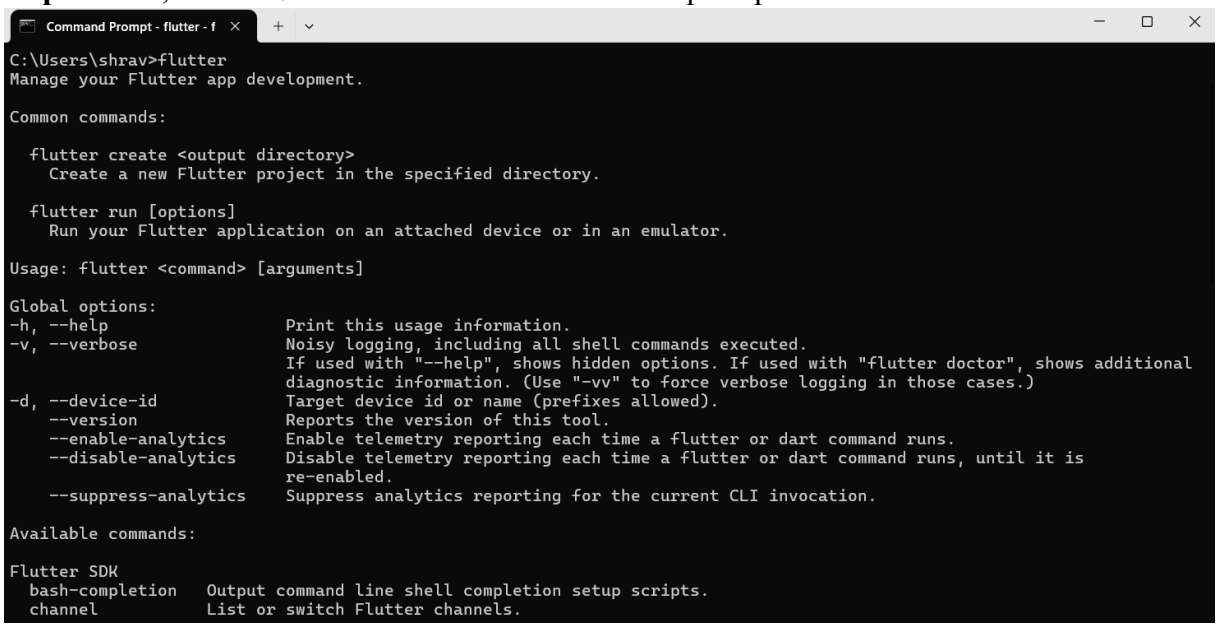

Environment Variables
Edit environment variable
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
%IntelliJ IDEA Educational Edition%
%IntelliJ IDEA Community Edition%
C:\Users\shrav\AppData\Local\GitHubDesktop\bin
C:\Program Files\Azure Data Studio\bin
C:\ghcup\bin
C:\Users\shrav\AppData\Roaming\npm
C:\Users\shrav\OneDrive\Documents\.vsconfig
C:\Users\shrav\AppData\Local\Programs\Microsoft VS Code\...
C:\terraform
C:\Users\shrav\AppData\Local\Android\Sdk
%USERPROFILE%\.dotnet\tools
C:\Users\shrav\AppData\Roaming\Python\Python310-32\Scri...
C:\Users\shrav\Downloads\chromedriver-win32\chromedrive...
C:\Users\shrav\AppData\Local\Programs\Python\Python310
C:\Users\shrav\AppData\Local\Programs\Python\Python310
C:\Users\shrav\AppData\Local\Programs\Python\Python310\...
C:\Users\shrav\AppData\Local\Programs\Python\Python310-...
C:\Users\shrav\AppData\Local\Programs\Python\Python310
C:\Program Files\Tesseract-OCR
C:\Users\shrav\Downloads\flutter\flutter\bin
New
Edit
Browse...
Delete
Move Up
Move Down
Edit text...
OK
Cancel
OK
Cancel

Now, select path -> click on edit. The following screen appears



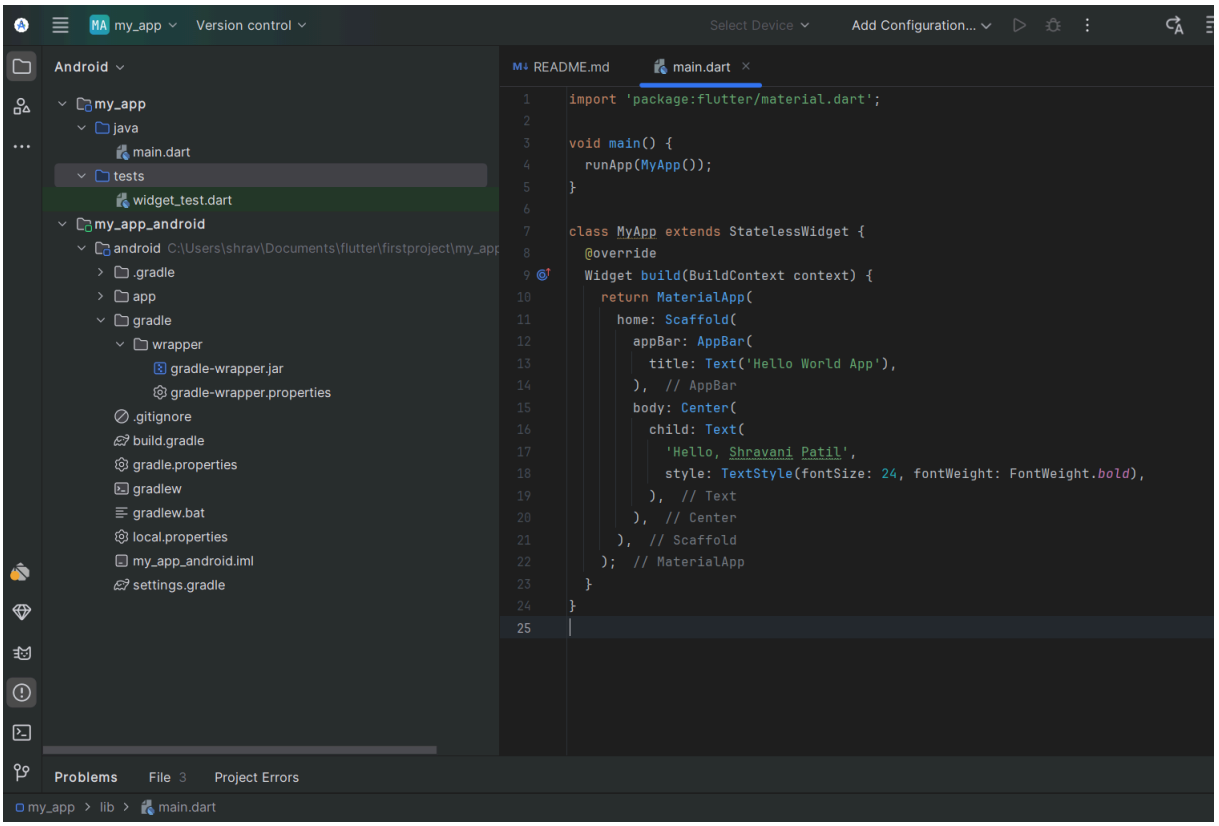
In the above window, click on New->write path of Flutter bin folder in variable value -> ok -> ok -> ok.

Step 4: Now, run the $ flutter command in command prompt.



Flutter is installed successfully.

Step 5: Install the Android SDK. If the flutter doctor command does not find the Android SDK tool in your system, then you need first to install the Android Studio IDE.

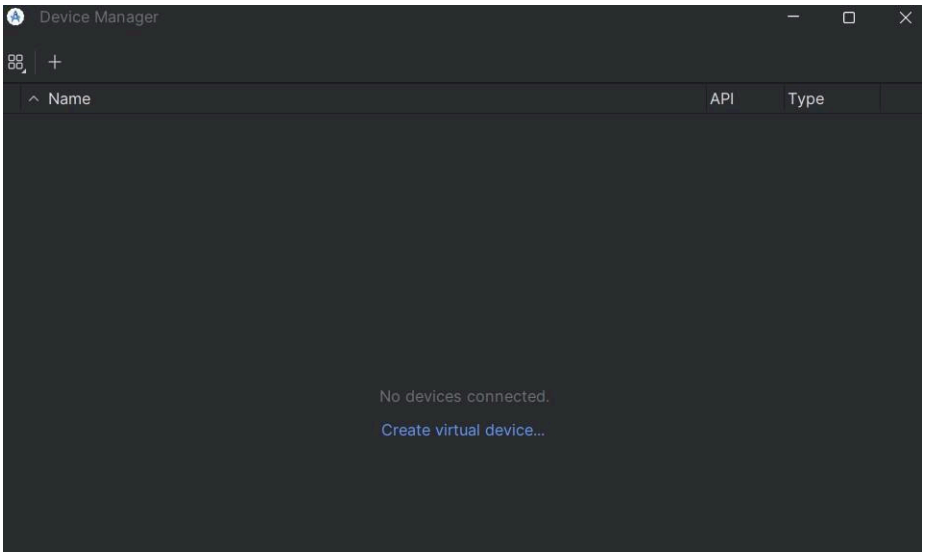


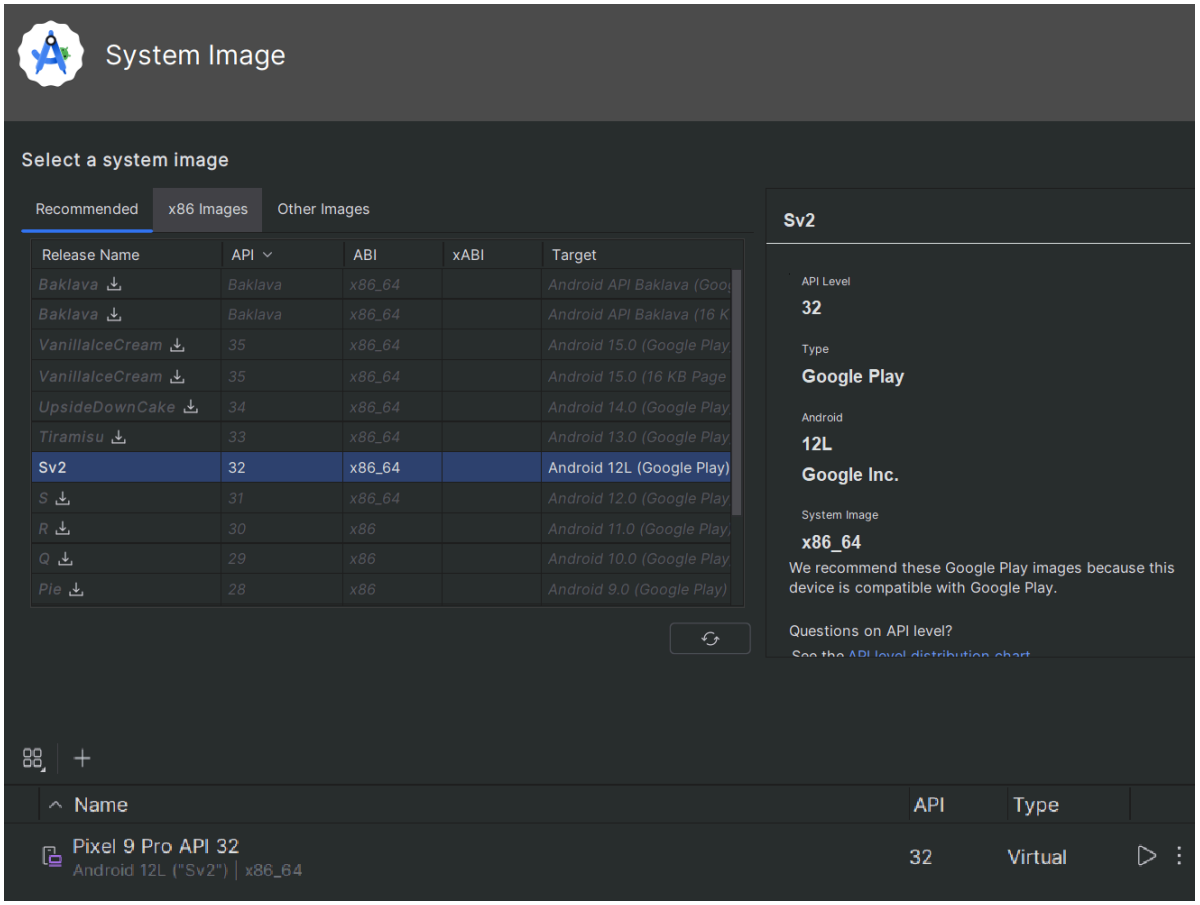
Step 6: Run Flutter Doctor command

```
C:\Users\shrav>flutter doctor
Doctor summary (to see all details, run flutter doctor -v):
[√] Flutter (Channel stable, 3.27.3, on Microsoft Windows [Version 10.0.22631.4751], locale en-IN)
[√] Windows Version (Installed version of Windows is version 10 or higher)
[√] Android toolchain - develop for Android devices (Android SDK version 35.0.0)
[√] Chrome - develop for the web
[√] Visual Studio - develop Windows apps (Visual Studio Build Tools 2022 17.12.3)
[√] Android Studio (version 2024.1)
[√] VS Code (version 1.96.4)
[√] Connected device (3 available)
[√] Network resources

• No issues found!

C:\Users\shrav>
```

Step 7: Create a new virtual device

Choose your device definition and click on Next.
Select the system image for the latest Android version and click on Next.
Now, verify the all AVD configuration. If it is correct, click on Finish. The following screen appears.

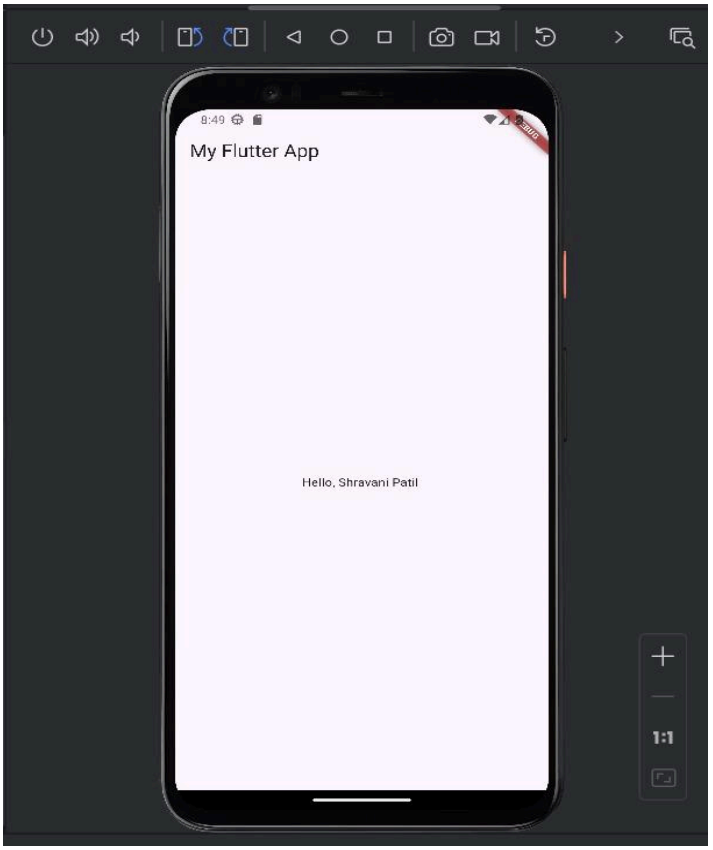

Device Manager
Name
API
Type
No devices connected.
Create virtual device...


System Image
Select a system image
Recommended
x86 Images
Other Images
Release Name
API
ABI
xABI
Target
Baklava
Baklava
x86_64
Android API Baklava (Goo
Baklava
Baklava
x86_64
Android API Baklava (16 K
VanillaIceCream
35
x86_64
Android 15.0 (Google Play
VanillaIceCream
35
x86_64
Android 15.0 (16 KB Page
UpsideDownCake
34
x86_64
Android 14.0 (Google Play
Tiramisu
33
x86_64
Android 13.0 (Google Play
Sv2
32
x86_64
Android 12L (Google Play)
S
31
x86_64
Android 12.0 (Google Play
R
30
x86
Android 11.0 (Google Play
Q
29
x86
Android 10.0 (Google Play
Pie
28
x86
Android 9.0 (Google Play)
Sv2
API Level
32
Type
Google Play
Android
12L
Google Inc.
System Image
x86_64
We recommend these Google Play images because this device is compatible with Google Play.
Questions on API level?
Name
API
Type
Pixel 9 Pro API 32
Android 12L ("Sv2") | x86_64
32
Virtual

Virtual device created.

Creating a hello world program in flutter:

```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('Hello World App'),
       ),
       body: Center(
         child: Text(
           'Hello, Shravani Patil',
           style: TextStyle(fontSize: 24, fontWeight: FontWeight.bold),
         ),
       ),
     ),
   );
 }
}
```



MAD & PWA Lab
Journal

Experiment No.	02
Experiment Title.	To design Flutter UI by including common widgets.
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO2: Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation
Grade:	

Shravani Anil Patil **D15A-37**

EXPERIMENT NO:02

Aim: To design Flutter UI by including common widgets.

Theory:

Flutter Widgets Overview

Each element on the screen of a Flutter app is a **widget**. The UI of the app is built by combining and nesting these widgets, forming a widget tree. The structure and behavior of an app depend on the choice and sequence of widgets used.

When any modification is made to the code, Flutter's widget system rebuilds the widget tree by computing the difference between the previous and current widget states. This ensures that only the necessary parts of the UI are updated efficiently, improving performance and responsiveness.

Types of Widgets

1.Single-Child Layout Widgets

Single-child layout widgets can contain only one child widget inside a parent layout. These widgets often include specific layout functionalities, which help in structuring the UI efficiently. Flutter provides a variety of single-child widgets that enhance readability and maintainability of the code.

2.Multiple-Child Layout Widgets

Multiple-child layout widgets allow more than one child inside a parent widget. Their layouts vary based on how they arrange children. Examples include:

- **Row** – Arranges child widgets horizontally.
- **Column** – Arranges child widgets vertically.
- **Stack** – Overlaps child widgets, useful for layered UI designs.

By combining **Row** and **Column**, complex UI structures can be created efficiently.

3.StatefulWidget

A **StatefulWidget** maintains state information that can change over the widget's lifecycle. It consists of two primary classes:

1. **The widget class**
2. **The state class**

Instead of a `build()` method, a `StatefulWidget` has a `createState()` method that returns a class extending Flutter's `State` class. Common examples of **StatefulWidgets** include:

- **Checkbox**
- **Radio**
- **Slider**
- **InkWell**
- **Form**
- **TextField**

4.StatelessWidget

A **StatelessWidget** does not hold any state and remains static throughout its lifecycle. It only rebuilds when its parent widget triggers an update. Examples include:

- **Text**
- **Row**
- **Column**
- **Container**

Commonly Used Widgets in Flutter

- **Container** – A box widget used for layout styling with padding, margins, borders, colors, and size constraints.
- **Row & Column** – Arranges widgets horizontally (**Row**) or vertically (**Column**) with spacing and alignment control.
- **Stack** – Allows widgets to overlap, useful for banners, floating elements, or layered designs.
- **Text** – Displays customizable text with various font styles, colors, and alignments.
- **Image** – Loads and displays images from assets, network, or memory with scaling and fit options.
- **Scaffold** – Provides a structural layout with an app bar, body, floating action button, and bottom navigation.

- **ListView** – A scrollable list that efficiently handles large dynamic content, supporting both vertical and horizontal scrolling.
- **GridView** – Displays widgets in a grid format, ideal for galleries, product lists, and dashboards.
- **SizedBox** – Creates space between widgets or defines fixed dimensions.
- **ElevatedButton** – A button with an elevation effect, customizable in color, shape, and actions.
- **TextField** – A user input field for text entry, supporting validation and keyboard configurations.
- **AppBar** – A top navigation bar with a title, actions, and menu icons.
- **BottomNavigationBar** – A bottom navigation bar with icons and labels for switching between app sections.
- **Drawer** – A slide-out navigation panel for quick access to menus and settings.
- **Card** – A Material Design component that organizes content inside an elevated box.

Flutter's extensive widget system enables developers to create visually appealing, efficient, and responsive applications by structuring UI elements in a modular way.

Code:

Main.dart:

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

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

class MyApp extends
 StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      home: SplashScreen(),
    );
  }
}

class SplashScreen
 extends StatefulWidget {
  @override
  _SplashScreenState createState() => _
SplashScreenState();
}

class _SplashScreenState extends
State<SplashScreen> {
  @override
  void initState() {
    super.initState();
    Future.delayed(Duration(
seconds: 7), () {
      Navigator.pushReplacement(
        context,
        MaterialPageRoute(builder:
(context) => LoginSignupPage()),
      );
```

```
    });
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.red,
      body: Center(
        child: Image.asset(
          'assets/logo.png',
          width: 150,
          height: 150,
        ),
      ),
    );
  }
}

class LoginSignupPage extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.white,
      appBar: AppBar(
        backgroundColor: Colors.white,
        elevation: 0,
        actions: [
          TextButton(
            onPressed: () {},
            child: Text(
              "SKIP",
              style:
TextStyle(color: Colors.black, fontSize: 16),
            ),
          ),
        ],
      ),
      body: Padding(
        padding:
const EdgeInsets.symmetric(horizontal: 20),
```

```
child: Column(
  mainAxisAlignment: MainAxisAlignment.center,
  children: [
    Image.asset('assets/logo.png', width: 120, height: 120),
    SizedBox(height: 10),
    Text(
      "Enjoy faster show booking through our recommendations tailored for you.",
      textAlign: TextAlign.center,
      style: TextStyle(fontSize: 14, color: Colors.black54),
    ),
    SizedBox(height: 30),

    // Google Sign-in Button
    ElevatedButton.icon(
      onPressed: () {
        // Navigate to HomePage on Google Sign-in click
        Navigator.push(
          context,
          MaterialPageRoute(builder: (context) => LoginPage()),
        );
      },
      icon: Image.asset('assets/Google.png', width: 24, height: 24),
      label: Text("Login"),
      style: ElevatedButton.styleFrom(
        backgroundColor: Colors.white,
        foregroundColor: Colors.black,
        minimumSize: Size(double.infinity, 50),
        side: BorderSide(color: Colors.black26),
      ),
    ),
    SizedBox(height: 15),

    // Email Sign-in Button
    ElevatedButton.icon(
      onPressed: () {},
      icon: Icon(Icons.email, color: Colors.black),
      label: Text("Sign Up"),
      style: ElevatedButton.styleFrom(
        backgroundColor: Colors.white,
        foregroundColor: Colors.black,
```

```
    minimumSize: Size(double.infinity, 50),
    side: BorderSide(color: Colors.black26),
  ),
),
SizedBox(height: 20),

// Mobile Number Input Field
Container(
  padding: EdgeInsets.symmetric(horizontal: 10),
  decoration: BoxDecoration(
    border: Border.all(color: Colors.black26),
    borderRadius: BorderRadius.circular(8),
  ),
  child: Row(
    children: [
      Image.asset(
        'assets/flag.png', // Use an Indian flag asset
        width: 24,
        height: 24,
      ),
      SizedBox(width: 10),
      Text("+91", style: TextStyle(fontSize: 16, color: Colors.black)),
      SizedBox(width: 10),
      Expanded(
        child: TextField(
          keyboardType: TextInputType.phone,
          decoration: InputDecoration(
            hintText: "Enter mobile number",
            border: InputBorder.none,
          ),
        ),
      ),
    ],
  ),
),

Spacer(),

// Terms & Conditions
Text.rich(
```

```
            TextSpan(
              text: "I agree to the ",
              style: TextStyle(fontSize: 12, color: Colors.black54),
              children: [
                TextSpan(
                  text: "Terms & Conditions",
                  style: TextStyle(color: Colors.blue, decoration: TextDecoration.underline),
                ),
                TextSpan(text: " and "),
                TextSpan(
                  text: "Privacy Policy",
                  style: TextStyle(color: Colors.blue, decoration: TextDecoration.underline),
                ),
              ],
            ),
            textAlign: TextAlign.center,
          ),
          SizedBox(height: 20),
        ],
      ),
    ),
  );
 }
}
```

Login.dart:

```
import 'package:flutter/material.dart';
import 'home.dart'; // Import the HomePage file

class LoginPage extends StatelessWidget {
 final TextEditingController emailController = TextEditingController();
 final TextEditingController passwordController = TextEditingController();

 @override
 Widget build(BuildContext context) {
  return Scaffold(
   backgroundColor: Colors.white,
   appBar: AppBar(
    backgroundColor: Colors.white,
    elevation: 0,
```

```
  leading: IconButton(
    icon: Icon(Icons.arrow_back, color: Colors.black),
    onPressed: () {
      Navigator.pop(context);
    },
  ),
),
body: Padding(
  padding: const EdgeInsets.symmetric(horizontal: 20),
  child: Column(
    mainAxisAlignment: MainAxisAlignment.center,
    children: [
      Image.asset('assets/logo.png', width: 120, height: 120),
      SizedBox(height: 20),
      Text(
        "Welcome Back!",
        style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold),
      ),
      SizedBox(height: 10),
      Text(
        "Login to continue",
        style: TextStyle(fontSize: 14, color: Colors.black54),
      ),
      SizedBox(height: 30),
      TextField(
        controller: emailController,
        decoration: InputDecoration(
          labelText: "Email",
          border: OutlineInputBorder(),
        ),
      ),
      SizedBox(height: 15),
      TextField(
        controller: passwordController,
        obscureText: true,
        decoration: InputDecoration(
          labelText: "Password",
          border: OutlineInputBorder(),
        ),
      ),
```

```
SizedBox(height: 20),
ElevatedButton(
  onPressed: () {
    String email = emailController.text;
    String password = passwordController.text;

    if (email.isNotEmpty && password.isNotEmpty) {
      Navigator.pushReplacement(
        context,
        MaterialPageRoute(builder: (context) => HomePage()),
      );
    } else {
      ScaffoldMessenger.of(context).showSnackBar(
        SnackBar(content: Text("Please enter email and password")),
      );
    }
  },
  child: Text("Login"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.red,
    foregroundColor: Colors.white,
    minimumSize: Size(double.infinity, 50),
  ),
),
SizedBox(height: 15),
TextButton(
  onPressed: () {},
  child: Text(
    "Forgot Password?",
    style: TextStyle(color: Colors.red),
  ),
),
SizedBox(height: 20),
Text("Or login with"),
SizedBox(height: 10),
ElevatedButton.icon(
  onPressed: () {},
  icon: Image.asset('assets/Google.png', width: 24, height: 24),
  label: Text("Login with Google"),
  style: ElevatedButton.styleFrom(
```

```
            backgroundColor: Colors.white,
            foregroundColor: Colors.black,
            minimumSize: Size(double.infinity, 50),
            side: BorderSide(color: Colors.black26),
          ),
        ),
      ],
    ),
  ),
 );
 }
}
```

Home.dart:

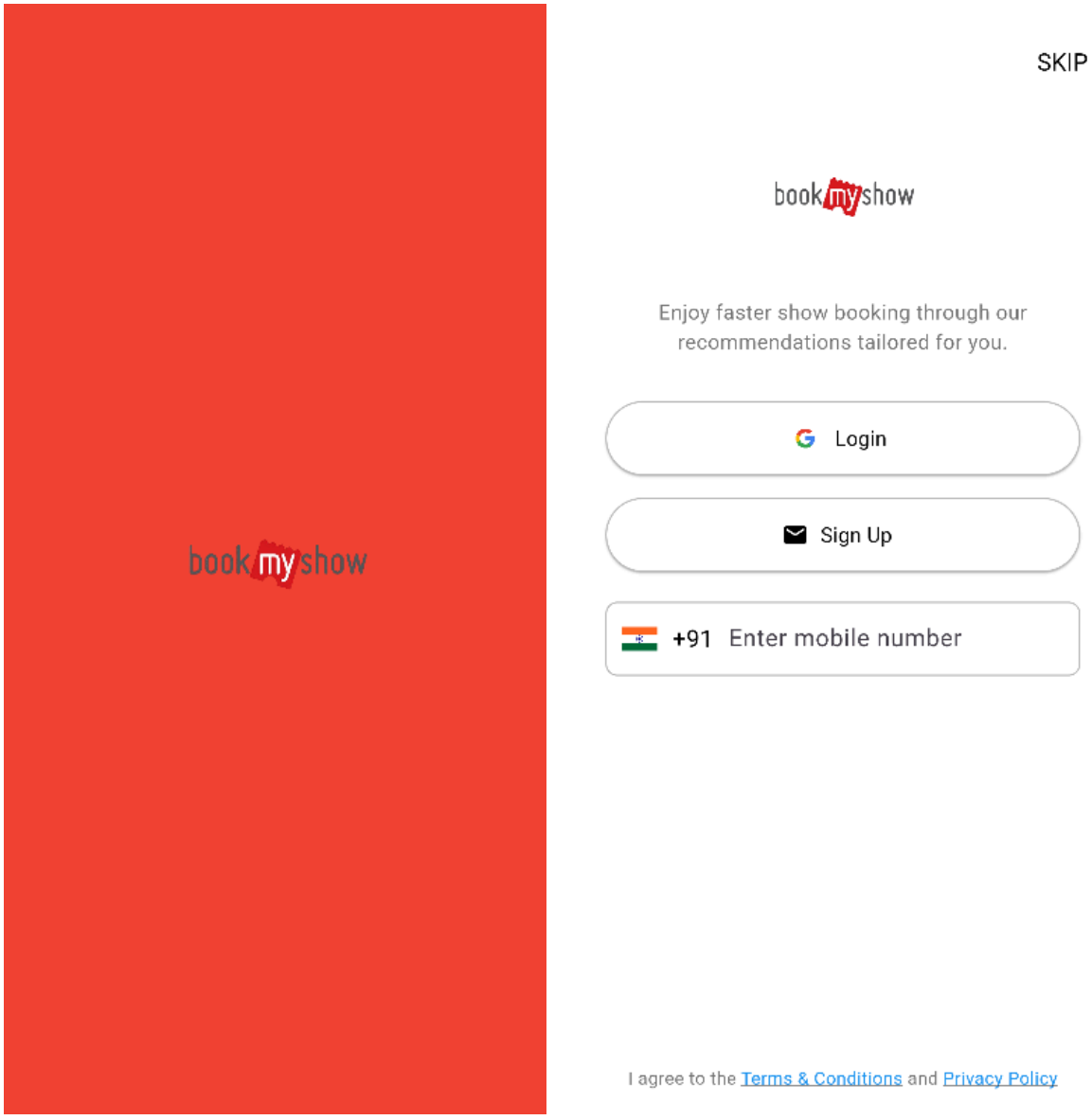
```
mport 'package:flutter/material.dart';

class HomePage extends StatelessWidget {
 @override
 Widget build(BuildContext context) {
  return Scaffold(
   appBar: AppBar(
    title: Text('Welcome Guest!'),
    actions: [
     IconButton(icon: Icon(Icons.search), onPressed: () {}),
     IconButton(icon: Icon(Icons.qr_code), onPressed: () {}),
    ],
   ),
   body: SingleChildScrollView(
    child: Column(
     crossAxisAlignment: CrossAxisAlignment.start,
     children: [
      // Location Bar
      Padding(
       padding: const EdgeInsets.symmetric(horizontal: 15, vertical: 5),
       child: Text("Navi Mumbai", style: TextStyle(color: Colors.red)),
      ),

      // Location Enable Bar
      Container(
```

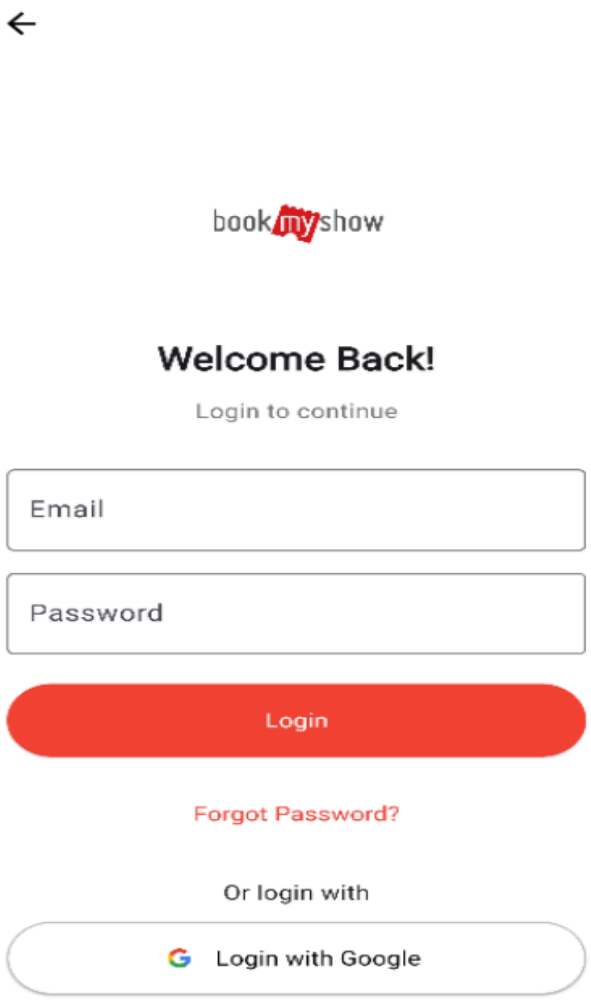
```
  width: double.infinity,
  color: Colors.blue,
  padding: EdgeInsets.all(10),
  child: Text(
    "Enable location to discover nearby events, movies, and more.",
    style: TextStyle(color: Colors.white),
    textAlign: TextAlign.center,
  ),
),

SizedBox(height: 10),

// Categories (Movies, Music Shows, etc.)
SingleChildScrollView(
  scrollDirection: Axis.horizontal,
  padding: EdgeInsets.symmetric(horizontal: 10),
  child: Row(
    children: [
      _categoryIcon(Icons.movie, "Movies"),
      _categoryIcon(Icons.music_note, "Music Shows"),
      _categoryIcon(Icons.theater_comedy, "Comedy Shows"),
      _categoryIcon(Icons.event, "Plays"),
    ],
  ),
),

SizedBox(height: 20),
Padding(
  padding: const EdgeInsets.symmetric(horizontal: 10),
  child: Row(
    children: [
      Expanded(child: Image.asset('assets/event1.jpg', fit: BoxFit.cover)),
      SizedBox(width: 10),
      Expanded(child: Image.asset('assets/event2.jpg', fit: BoxFit.cover)),
    ],
  ),
),


// Recommended Movies Section
```

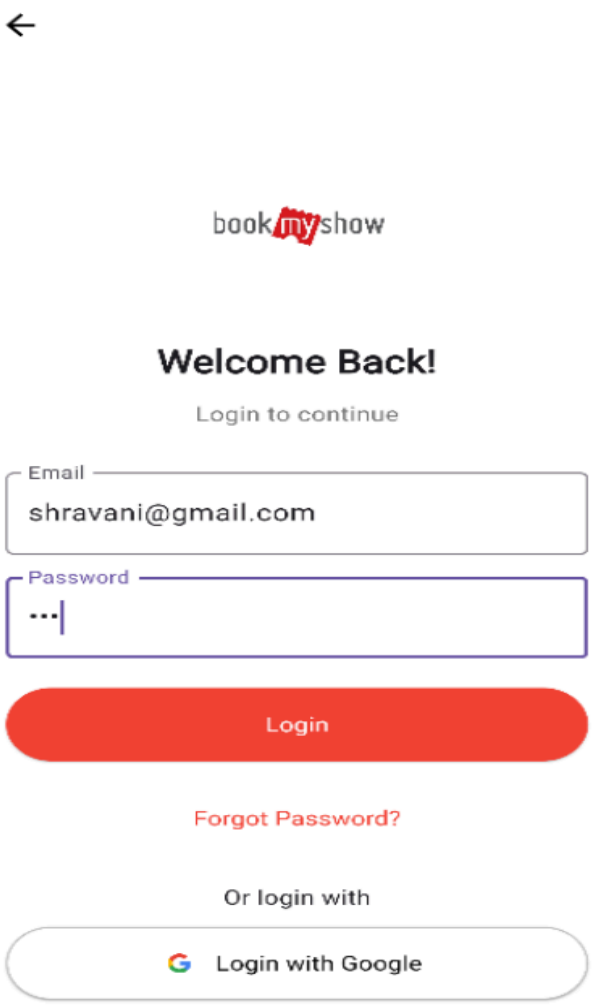
```
          Padding(
            padding: const EdgeInsets.symmetric(horizontal: 15),
            child: Row(
              mainAxisAlignment: MainAxisAlignment.spaceBetween,
              children: [
                Text("Recommended Movies", style: TextStyle(fontSize: 18, fontWeight:
FontWeight.bold)),
                Text("See All >", style: TextStyle(color: Colors.red)),
              ],
            ),
          ),

          SizedBox(height: 10),
          SingleChildScrollView(
            scrollDirection: Axis.horizontal,
            padding: EdgeInsets.symmetric(horizontal: 10),
            child: Row(
              children: [
                _movieCard('assets/movie1.jpg', 'PROMOTED'),
                _movieCard('assets/movie2.jpg', ''),
                _movieCard('assets/movie3.jpg', ''),
              ],
            ),
          ),
        ],
      ),
    ),
    bottomNavigationBar: BottomNavigationBar(
      selectedItemColor: Colors.red,
      unselectedItemColor: Colors.black54,
      items: [
        BottomNavigationBarItem(icon: Icon(Icons.home), label: "Home"),
        BottomNavigationBarItem(icon: Icon(Icons.movie), label: "Movies"),
        BottomNavigationBarItem(icon: Icon(Icons.event), label: "Live Events"),
        BottomNavigationBarItem(icon: Icon(Icons.person), label: "Profile"),
      ],
    ),
  );
 }
```

```
  Widget _categoryIcon(IconData icon, String label) {
    return Column(
      children: [
        Icon(icon, size: 40),
        SizedBox(height: 5),
        Text(label, style: TextStyle(fontSize: 14)),
      ],
    );
  }
}
Widget _movieCard(String imagePath, String tag) {
  return Padding(
    padding: const EdgeInsets.only(right: 10),
    child: Column(
      children: [
        Stack(
          children: [
            Image.asset(imagePath, width: 100, height: 150),
            if (tag.isNotEmpty)
              Positioned(
                top: 5,
                left: 5,
                child: Container(
                  color: Colors.red,
                  padding: EdgeInsets.symmetric(horizontal: 5, vertical: 2),
                  child: Text(tag, style: TextStyle(color: Colors.white, fontSize: 10)),
                ),
              ),
          ],
        ),
      ],
    ),
  );
}
```

OUTPUT:


bookmyshow
SKIP
bookmyshow
Enjoy faster show booking through our recommendations tailored for you.
Login
Sign Up
+91 Enter mobile number
I agree to the Terms & Conditions and Privacy Policy


bookmyshow
Welcome Back!
Login to continue
Email
Password
Login
Forgot Password?
Or login with
Login with Google


bookmyshow
Welcome Back!
Login to continue
Email
shravani@gmail.com
Password
Login
Forgot Password?
Or login with
Login with Google

Welcome Guest!

Navi Mumbai

Enable location to discover nearby events, movies, and more.

Movies Music Shows Comedy Shows Plays

Recommended Movies

See All >

Home

MAD & PWA Lab
Journal

Experiment No.	03
Experiment Title.	To include icons, images, fonts in Flutter app
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO2: Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation
Grade:	

Experiment:03

AIM : To include image, fonts and icons in flutter app.

THEORY:

Including Images, Fonts, and Icons in a Flutter App (Theory)

Flutter allows developers to **enhance UI/UX** by including **images, custom fonts, and icons** efficiently. Below is an overview of how each of these assets can be integrated into a Flutter application.

1. Adding Images in Flutter

Flutter supports **both local and network images** for UI components.

Local Images

- Images can be stored in the **assets** folder of the project.
- The pubspec.yaml file needs to be updated to include the images.
- Supported formats: **PNG, JPG, GIF, SVG** (with additional packages like flutter_svg).

Network Images

- Images can be loaded from the internet using URLs.
- Cached network images can be used for better performance.

2. Adding Custom Fonts in Flutter

Custom fonts improve branding and UI aesthetics.

- **Download and store** font files in the **assets/fonts/** directory.
- Declare them in pubspec.yaml under the fonts section.
- Assign the font to specific text styles using the TextStyle widget.

3. Using Icons in Flutter

Icons enhance UI clarity and usability. Flutter supports **built-in icons and custom**

icons. **Built-in Icons (Material Icons)**

- Flutter provides a rich set of **Material Icons** through the Icons class.
- These icons do not require additional setup.

Custom Icons (SVG, PNG, Font Icons)

- Icons can be added as **SVG** (using flutter_svg package) or **PNG** images.
- Font-based icon sets like **FontAwesome** or **Custom Icon Fonts** can be integrated.

PROGRAM:

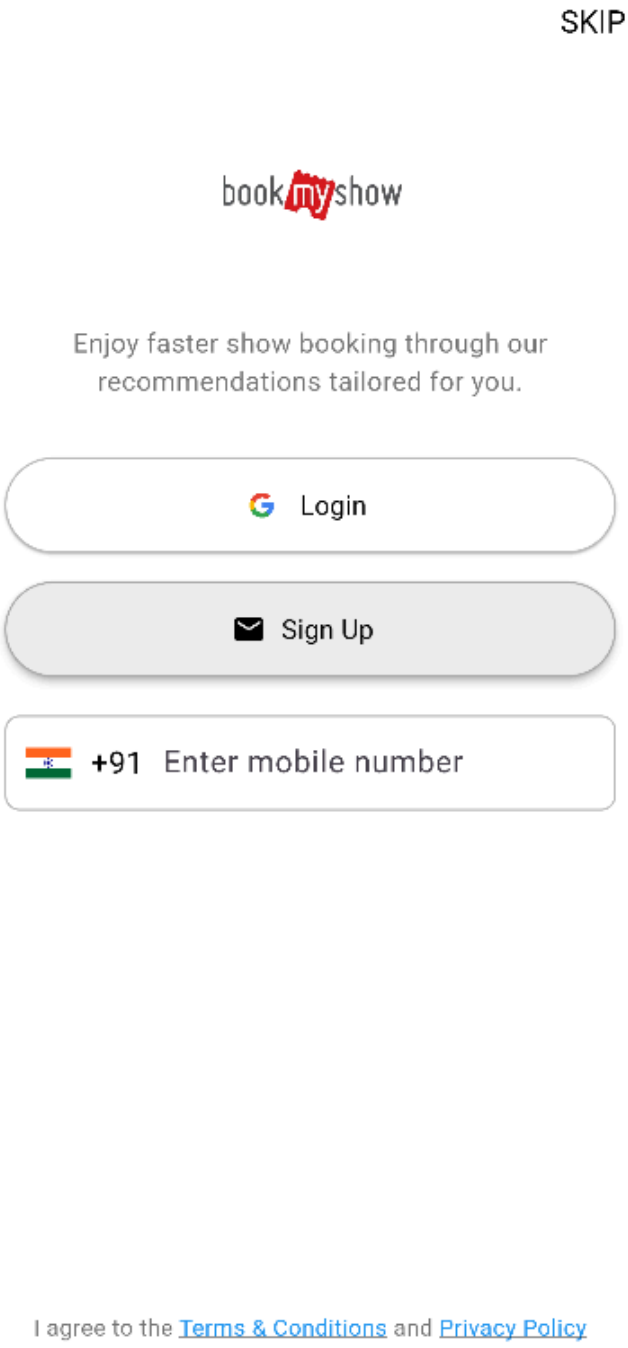
main.dart

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

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

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      home: SplashScreen(),
    );
  }
}

class SplashScreen extends StatefulWidget {
  @override
  _SplashScreenState createState() => _SplashScreenState();
}

class _SplashScreenState extends State<SplashScreen> {
  @override
  void initState() {
    super.initState();
    Future.delayed(Duration(seconds: 7), () {
      Navigator.pushReplacement(
        context,
        MaterialPageRoute(builder: (context) => LoginSignupPage()),
      );
    });
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.red,
      body: Center(
        child: Image.asset(
          'assets/logo.png',
          width: 150,
          height: 150,
        ),
      ),
    );
  }
}

class LoginSignupPage extends StatelessWidget {
```

```
@override
Widget build(BuildContext context) {
 return Scaffold(
  backgroundColor: Colors.white,
  appBar: AppBar(
   backgroundColor: Colors.white,
   elevation: 0,
   actions: [
    TextButton(
     onPressed: () {},
     child: Text(
      "SKIP",
      style: TextStyle(color: Colors.black, fontSize: 16),
     ),
    ),
   ],
  ),
  body: Padding(
   padding: const EdgeInsets.symmetric(horizontal: 20),
   child: Column(
    mainAxisAlignment: MainAxisAlignment.center,
    children: [
     Image.asset('assets/logo.png', width: 120, height: 120),
     SizedBox(height: 10),
     Text(
      "Enjoy faster show booking through our recommendations tailored for you.",
      textAlign: TextAlign.center,
      style: TextStyle(fontSize: 14, color: Colors.black54),
     ),
     SizedBox(height: 30),

     // Google Sign-in Button
     ElevatedButton.icon(
      onPressed: () {
       // Navigate to HomePage on Google Sign-in click
       Navigator.push(
        context,
        MaterialPageRoute(builder: (context) => LoginPage()),
       );
      },
      icon: Image.asset('assets/Google.png', width: 24, height: 24),
      label: Text("Login"),
      style: ElevatedButton.styleFrom(
       backgroundColor: Colors.white,
       foregroundColor: Colors.black,
       minimumSize: Size(double.infinity, 50),
       side: BorderSide(color: Colors.black26),
      ),
     ),
     SizedBox(height: 15),

     // Email Sign-in Button
```

```
ElevatedButton.icon(
  onPressed: () {},
  icon: Icon(Icons.email, color: Colors.black),
  label: Text("Sign Up"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.white,
    foregroundColor: Colors.black,
    minimumSize: Size(double.infinity, 50),
    side: BorderSide(color: Colors.black26),
  ),
),
SizedBox(height: 20),

// Mobile Number Input Field
Container(
  padding: EdgeInsets.symmetric(horizontal: 10),
  decoration: BoxDecoration(
    border: Border.all(color: Colors.black26),
    borderRadius: BorderRadius.circular(8),
  ),
  child: Row(
    children: [
      Image.asset(
        'assets/flag.png', // Use an Indian flag asset
        width: 24,
        height: 24,
      ),
      SizedBox(width: 10),
      Text("+91", style: TextStyle(fontSize: 16, color: Colors.black)),
      SizedBox(width: 10),
      Expanded(
        child: TextField(
          keyboardType: TextInputType.phone,
          decoration: InputDecoration(
            hintText: "Enter mobile number",
            border: InputBorder.none,
          ),
        ),
      ),
    ],
  ),
),

Spacer(),

// Terms & Conditions
Text.rich(
  TextSpan(
    text: "I agree to the ",
    style: TextStyle(fontSize: 12, color: Colors.black54),
    children: [
      TextSpan(
```

```
                text: "Terms & Conditions",
                style: TextStyle(color: Colors.blue, decoration: TextDecoration.underline),
              ),
              TextSpan(text: " and "),
              TextSpan(
                text: "Privacy Policy",
                style: TextStyle(color: Colors.blue, decoration: TextDecoration.underline),
              ),
            ],
          ),
          textAlign: TextAlign.center,
        ),
        SizedBox(height: 20),
      ],
    ),
  ),
 );
 }
}
```

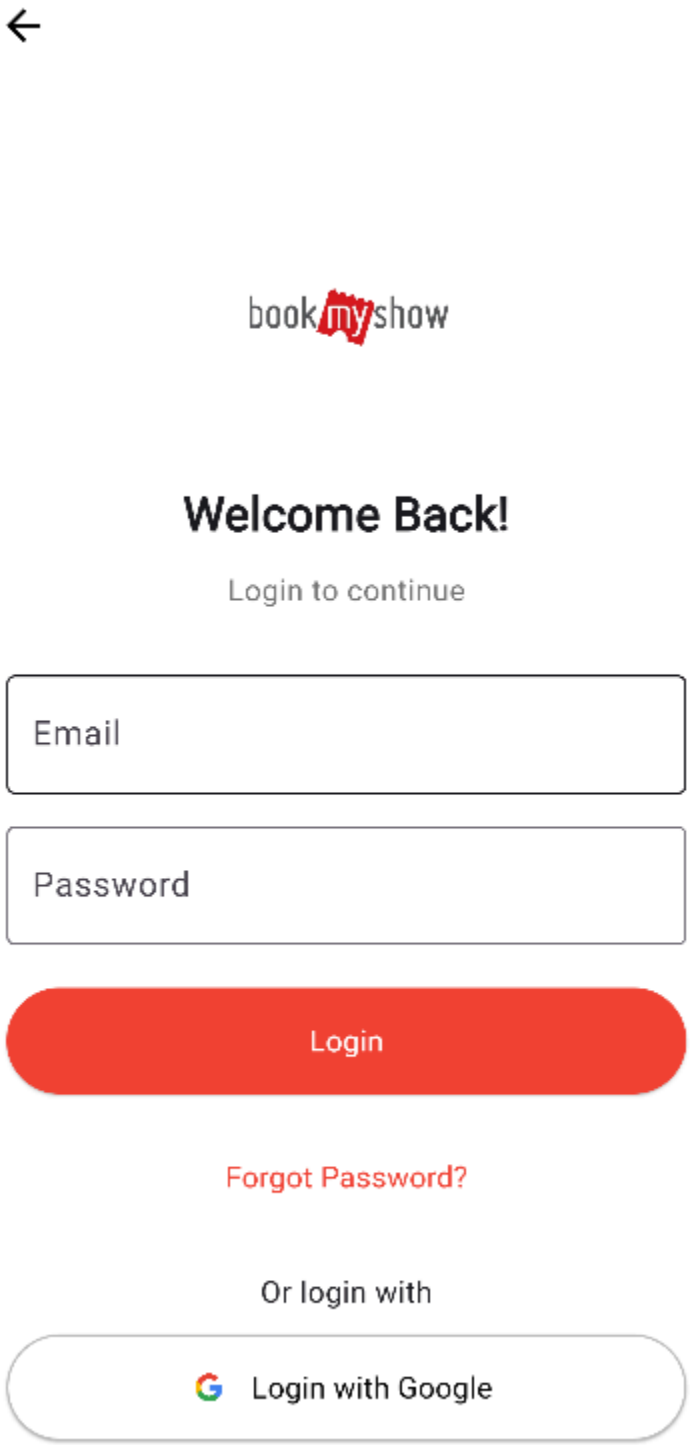


Login.dart

```
import 'package:flutter/material.dart';
import 'home.dart'; // Import the HomePage file

class LoginPage extends StatelessWidget {
  final TextEditingController emailController = TextEditingController();
  final TextEditingController passwordController = TextEditingController();

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.white,
      appBar: AppBar(
        backgroundColor: Colors.white,
```

```
  elevation: 0,
  leading: IconButton(
    icon: Icon(Icons.arrow_back, color: Colors.black),
    onPressed: () {
      Navigator.pop(context);
    },
  ),
),
body: Padding(
  padding: const EdgeInsets.symmetric(horizontal: 20),
  child: Column(
    mainAxisAlignment: MainAxisAlignment.center,
    children: [
      Image.asset('assets/logo.png', width: 120, height: 120),
      SizedBox(height: 20),
      Text(
        "Welcome Back!",
        style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold),
      ),
      SizedBox(height: 10),
      Text(
        "Login to continue",
        style: TextStyle(fontSize: 14, color: Colors.black54),
      ),
      SizedBox(height: 30),
      TextField(
        controller: emailController,
        decoration: InputDecoration(
          labelText: "Email",
          border: OutlineInputBorder(),
        ),
      ),
      SizedBox(height: 15),
      TextField(
        controller: passwordController,
        obscureText: true,
        decoration: InputDecoration(
          labelText: "Password",
          border: OutlineInputBorder(),
        ),
      ),
      SizedBox(height: 20),
      ElevatedButton(
        onPressed: () {
          String email = emailController.text;
          String password = passwordController.text;

          if (email.isNotEmpty && password.isNotEmpty) {
            Navigator.pushReplacement(
              context,
              MaterialPageRoute(builder: (context) => HomePage()),
            );
```

```
            } else {
              ScaffoldMessenger.of(context).showSnackBar(
                SnackBar(content: Text("Please enter email and password")),
              );
            }
          },
          child: Text("Login"),
          style: ElevatedButton.styleFrom(
            backgroundColor: Colors.red,
            foregroundColor: Colors.white,
            minimumSize: Size(double.infinity, 50),
          ),
        ),
        SizedBox(height: 15),
        TextButton(
          onPressed: () {},
          child: Text(
            "Forgot Password?",
            style: TextStyle(color: Colors.red),
          ),
        ),
        SizedBox(height: 20),
        Text("Or login with"),
        SizedBox(height: 10),
        ElevatedButton.icon(
          onPressed: () {},
          icon: Image.asset('assets/Google.png', width: 24, height: 24),
          label: Text("Login with Google"),
          style: ElevatedButton.styleFrom(
            backgroundColor: Colors.white,
            foregroundColor: Colors.black,
            minimumSize: Size(double.infinity, 50),
            side: BorderSide(color: Colors.black26),
          ),
        ),
      ],
    ),
  ),
 );
 }
}
```



Home.dart

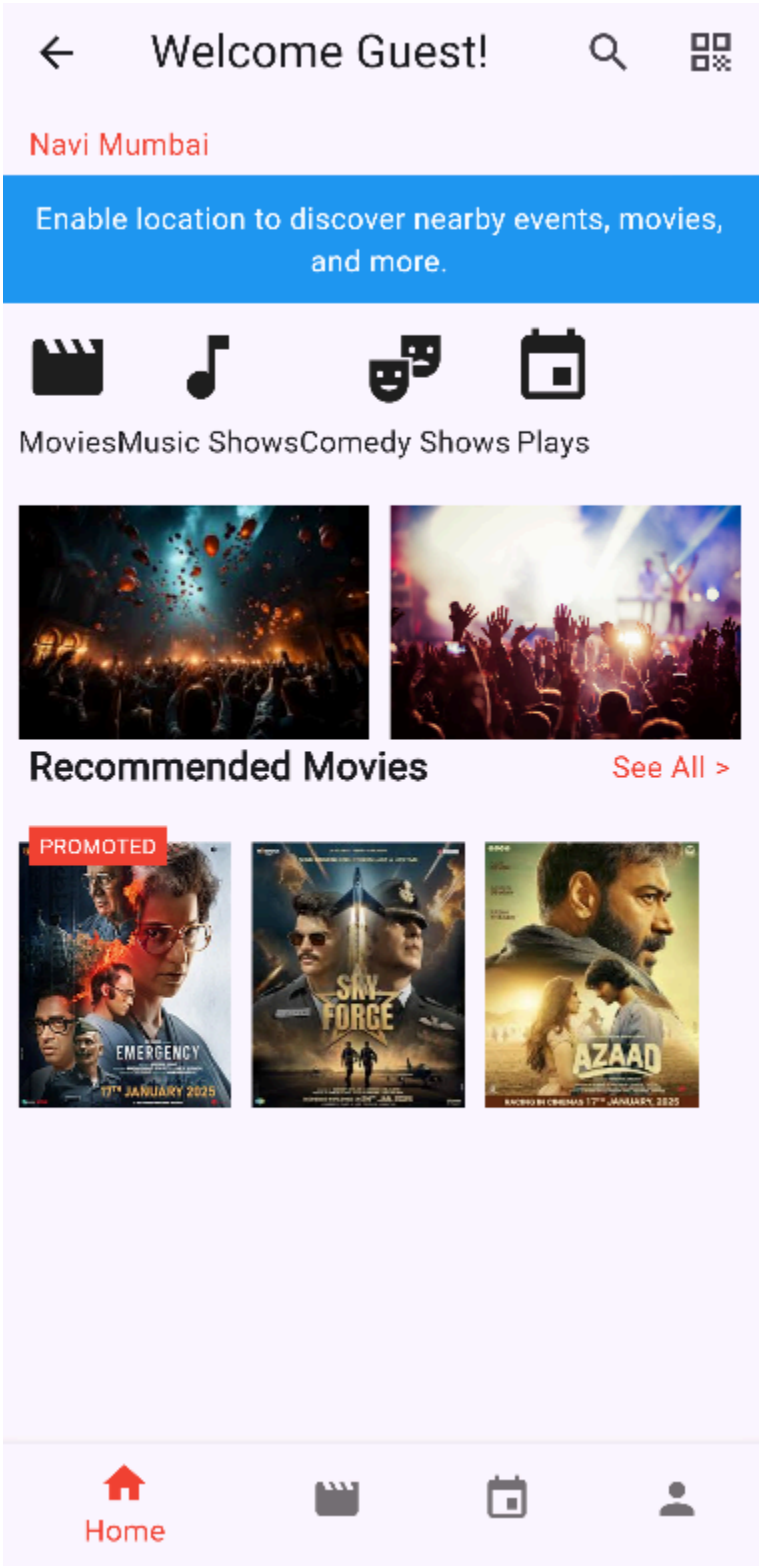
```
import 'package:flutter/material.dart';
import 'details.dart';

class HomePage extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
```

```
return Scaffold(
  appBar: AppBar(
    title: Text('Welcome Guest!'),
    actions: [
      IconButton(icon: Icon(Icons.search), onPressed: () {}),
      IconButton(icon: Icon(Icons.qr_code), onPressed: () {}),
    ],
  ),
  body: SingleChildScrollView(
    child: Column(
      crossAxisAlignment: CrossAxisAlignment.start,
      children: [
        // Location Bar
        Padding(
          padding: const EdgeInsets.symmetric(horizontal: 15, vertical: 5),
          child: Text("Navi Mumbai", style: TextStyle(color: Colors.red)),
        ),

        // Location Enable Bar
        Container(
          width: double.infinity,
          color: Colors.blue,
          padding: EdgeInsets.all(10),
          child: Text(
            "Enable location to discover nearby events, movies, and more.",
            style: TextStyle(color: Colors.white),
            textAlign: TextAlign.center,
          ),
        ),

        SizedBox(height: 10),

        // Categories (Movies, Music Shows, etc.)
        SingleChildScrollView(
          scrollDirection: Axis.horizontal,
          padding: EdgeInsets.symmetric(horizontal: 10),
          child: Row(
            children: [
              _categoryIcon(Icons.movie, "Movies"),
              _categoryIcon(Icons.music_note, "Music Shows"),
              _categoryIcon(Icons.theater_comedy, "Comedy Shows"),
              _categoryIcon(Icons.event, "Plays"),
            ],
          ),
        ),
```

```
        SizedBox(height: 20),
        Padding(
          padding: const EdgeInsets.symmetric(horizontal: 10),
          child: Row(
            children: [
              Expanded(child: Image.asset('assets/event1.jpg', fit: BoxFit.cover)),
              SizedBox(width: 10),
              Expanded(child: Image.asset('assets/event2.jpg', fit: BoxFit.cover)),
            ],
          ),
        ),


        // Recommended Movies Section
        Padding(
          padding: const EdgeInsets.symmetric(horizontal: 15),
          child: Row(
            mainAxisAlignment: MainAxisAlignment.spaceBetween,
            children: [
              Text("Recommended Movies", style: TextStyle(fontSize: 18, fontWeight:
FontWeight.bold)),
              Text("See All >", style: TextStyle(color: Colors.red)),
            ],
          ),
        ),

        SizedBox(height: 10),
        SingleChildScrollView(
          scrollDirection: Axis.horizontal,
          padding: EdgeInsets.symmetric(horizontal: 10),
          child: Row(
            children: [
              _movieCard('assets/movie1.jpg', 'PROMOTED', context),
              _movieCard('assets/movie2.jpg', '', context),
              _movieCard('assets/movie3.jpg', '', context),
            ],
          ),
        ),

      ],
    ),
  ),
  bottomNavigationBar: BottomNavigationBar(
    selectedItemColor: Colors.red,
    unselectedItemColor: Colors.black54,
```

```
      items: [
        BottomNavigationBarItem(icon: Icon(Icons.home), label: "Home"),
        BottomNavigationBarItem(icon: Icon(Icons.movie), label: "Movies"),
        BottomNavigationBarItem(icon: Icon(Icons.event), label: "Live Events"),
        BottomNavigationBarItem(icon: Icon(Icons.person), label: "Profile"),
      ],
    ),
  );
 }

 Widget _categoryIcon(IconData icon, String label) {
  return Column(
    children: [
      Icon(icon, size: 40),
      SizedBox(height: 5),
      Text(label, style: TextStyle(fontSize: 14)),
    ],
  );
 }
}
Widget _movieCard(String imagePath, String tag, BuildContext context) {
 return GestureDetector(
  onTap: () {
    Navigator.push(
      context,
      MaterialPageRoute(builder: (context) => DetailsPage()),
    );
  },
  child: Padding(
    padding: const EdgeInsets.only(right: 10),
    child: Column(
      children: [
        Stack(
          children: [
            Image.asset(imagePath, width: 100, height: 150),
            if (tag.isNotEmpty)
              Positioned(
                top: 5,
                left: 5,
                child: Container(
                  color: Colors.red,
                  padding: EdgeInsets.symmetric(horizontal: 5, vertical: 2),
                  child: Text(tag, style: TextStyle(color: Colors.white, fontSize: 10)),
                ),
              ),
```

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


Welcome Guest!
Navi Mumbai
Enable location to discover nearby events, movies, and more.
MoviesMusic ShowsComedy Shows Plays
Recommended Movies
See All >
PROMOTED
EMERGENCY
17TH JANUARY 2025
SKY FORCE
AZAAD
Home

details.dart

```
import 'package:flutter/material.dart';
import 'package:google_fonts/google_fonts.dart';
import 'booking_page.dart'; // Import the BookingPage

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

class MyApp extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'Movie Details',
      theme: ThemeData(
        primarySwatch: Colors.blue,
      ),
      home: DetailsPage(),
    );
  }
}

class DetailsPage extends StatelessWidget {
  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.white,
      appBar: AppBar(
        title: Text("Emergency"),
        leading: IconButton(
          icon: Icon(Icons.arrow_back),
          onPressed: () => Navigator.pop(context),
        ),
        actions: [
          Icon(Icons.share),
          SizedBox(width: 10),
          Icon(Icons.more_vert),
          SizedBox(width: 10),
        ],
        elevation: 0,
      ),
      body: SingleChildScrollView(
        child: Padding(
          padding: EdgeInsets.all(12.0),
          child: Column(
            crossAxisAlignment: CrossAxisAlignment.start,
            children: [
              // Movie Banner
              Stack(
                children: [
```

```
    ClipRRect(
      borderRadius: BorderRadius.circular(10),
      child: Image.asset(
        "assets/banner1.jpg",
        height: 180,
        width: double.infinity,
        fit: BoxFit.cover,
      ),
    ),
    Positioned(
      top: 70,
      left: 140,
      child: Column(
        children: [
          Icon(Icons.play_circle_fill, color: Colors.white, size: 60),
          SizedBox(height: 5),
          Text(
            "Trailers (4)",
            style: GoogleFonts.roboto(color: Colors.white, fontSize: 14),
          ),
        ],
      ),
    ),
  ],
),
SizedBox(height: 10),

// Rating Section
Row(
  children: [
    Icon(Icons.star, color: Colors.redAccent, size: 24),
    SizedBox(width: 5),
    Text(
      "8.2/10 ",
      style: GoogleFonts.roboto(fontSize: 18, fontWeight: FontWeight.bold),
    ),
    Text("(7.8K Votes)", style: GoogleFonts.roboto(fontSize: 14, color: Colors.grey)),
    Spacer(),
    ElevatedButton(
      onPressed: () {},
      style: ElevatedButton.styleFrom(
        backgroundColor: Colors.pink.shade100,
        shape: RoundedRectangleBorder(borderRadius: BorderRadius.circular(10)),
      ),
      child: Text("Rate now", style: TextStyle(color: Colors.redAccent)),
    ),
  ],
),
SizedBox(height: 10),

// Movie Info
Row(
```

```
            children: [
              Container(
                padding: EdgeInsets.symmetric(horizontal: 8, vertical: 4),
                decoration: BoxDecoration(
                  color: Colors.grey.shade300,
                  borderRadius: BorderRadius.circular(5),
                ),
                child: Text("2D", style: GoogleFonts.roboto(fontWeight: FontWeight.bold)),
              ),
              SizedBox(width: 8),
              Text("HINDI", style: GoogleFonts.roboto(fontSize: 16, fontWeight: FontWeight.bold)),
            ],
          ),
          SizedBox(height: 5),
          Text(
            "2h 27m • Drama, Historical • UA • 17 Jan, 2025",
            style: GoogleFonts.roboto(fontSize: 14, color: Colors.grey.shade600),
          ),
          SizedBox(height: 8),
          Text(
            "Emergency is based on true events that unfolded in 1975. The film chronicles incidents that took pla...",
            style: GoogleFonts.roboto(fontSize: 14, color: Colors.black),
          ),
          SizedBox(height: 8),

          // Trending Section
          Container(
            padding: EdgeInsets.all(10),
            decoration: BoxDecoration(
              color: Colors.blue.shade50,
              borderRadius: BorderRadius.circular(8),
            ),
            child: Row(
              children: [
                Icon(Icons.trending_up, color: Colors.blue),
                SizedBox(width: 8),
                Text("Trending", style: GoogleFonts.roboto(fontSize: 14, fontWeight: FontWeight.bold, color: Colors.blue)),
                Spacer(),
                Text("18.28K tickets booked in last 24 hours", style: GoogleFonts.roboto(fontSize: 14)),
              ],
            ),
          ),
          SizedBox(height: 15),

          // Ads Banner
          ClipRRect(
            borderRadius: BorderRadius.circular(8),
            child: Image.asset(
              "assets/prime.jpg",
              height: 100,
```

```
                width: double.infinity,
                fit: BoxFit.cover,
              ),
            ),
            SizedBox(height: 15),

            // Book Tickets Button
            Center(
              child: ElevatedButton(
                onPressed: () {
                  Navigator.push(
                    context,
                    MaterialPageRoute(builder: (context) => BookingPage()),
                  );
                },
                style: ElevatedButton.styleFrom(
                  backgroundColor: Colors.pinkAccent,
                  shape: RoundedRectangleBorder(borderRadius: BorderRadius.circular(8)),
                  padding: EdgeInsets.symmetric(vertical: 12, horizontal: 100),
                ),
                child: Text("Book tickets", style: TextStyle(fontSize: 16, color: Colors.white)),
              ),
            ),
          ],
        ),
      ),
    ),
  );
 }
}
```

Emergency

8.2/10 (7.8K Votes) Rate now

2D **HINDI**

2h 27m • Drama, Historical • UA • 17 Jan, 2025

Emergency is based on true events that unfolded in 1975. The film chronicles incidents that took pla...

Trending 18.28K tickets booked in last 24 hours

Book tickets

MAD & PWA Lab
Journal

Experiment No.	04
Experiment Title.	To create an interactive Form using form widget
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO2: Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation
Grade:	

Shravani Anil Patil **D15A-37**

EXPERIMENT NO:04

Aim: To create an interactive Form using form widget.

Theory:

Understanding Forms in Flutter:

A **Form** in Flutter is a structured container used to collect user input through various fields like **text fields, dropdowns, checkboxes, and buttons**. Forms play a crucial role in applications that require user data entry, such as **login pages, registration forms, and feedback submissions**. Flutter provides the **Form** widget, which works alongside **TextFormField** and other input elements to handle:

- **Validation** – Ensuring data accuracy before submission.
- **State management** – Storing and retrieving user input.
- **Error handling** – Displaying validation errors when needed.

By implementing form validation techniques, developers can improve data reliability and enhance the overall user experience.

Creating a Form in Flutter

When creating a form in Flutter, several essential components come into play:

1. The Form Widget

- The **Form** widget acts as a **container** for grouping multiple form fields and managing their validation.

2. GlobalKey for Identification

- A **GlobalKey<FormState>** is required to uniquely identify the form and enable operations like validation and data retrieval.

3. TextFormField for User Input

- The **TextFormField** widget allows users to enter data such as names, phone numbers, and email addresses.
- It renders a material design text field and provides validation error messages when necessary.

4. Customizing Input Fields with InputDecoration

- The **InputDecoration** property enhances usability by customizing:
    - Labels
    - Icons
    - Borders
    - Hint text

5. Implementing Form Validation

- The **validator** property ensures user input meets specific criteria before submission.
- Different input types require appropriate keyboard settings, such as:
    - **TextInputType.number** for numeric fields.
    - **TextInputType.emailAddress** for email fields.

6. Managing State Efficiently

- Proper **state management** is required to store and process user input accurately.

7. Adding a Submit Button

- A **submit button** is essential to trigger form validation and process the collected data.

Key Properties of the Form Widget

1. **key** – A **GlobalKey** that uniquely identifies the form, enabling operations like validation, resetting, and saving.
2. **child** – Contains the form fields, typically wrapped in a **Column** or **ListView** for structured layout.
3. **autovalidateMode** – Controls when the form fields should be automatically validated.

Important Methods of the Form Widget

1. **validate()**
    - Checks if all form fields are valid.
    - Returns **true** if valid, otherwise **false**.
    - Useful for ensuring form correctness before submission.
2. **save()**
    - Saves the current values of all form fields.
    - Calls the **onSaved** callback for each field.
    - Typically used after successful validation.
3. **reset()**
    - Resets the form to its **initial state**, clearing user-entered data.
4. **currentState**
    - Returns the current **FormState** associated with the form, allowing interaction with form elements.
    -

Login.dart:

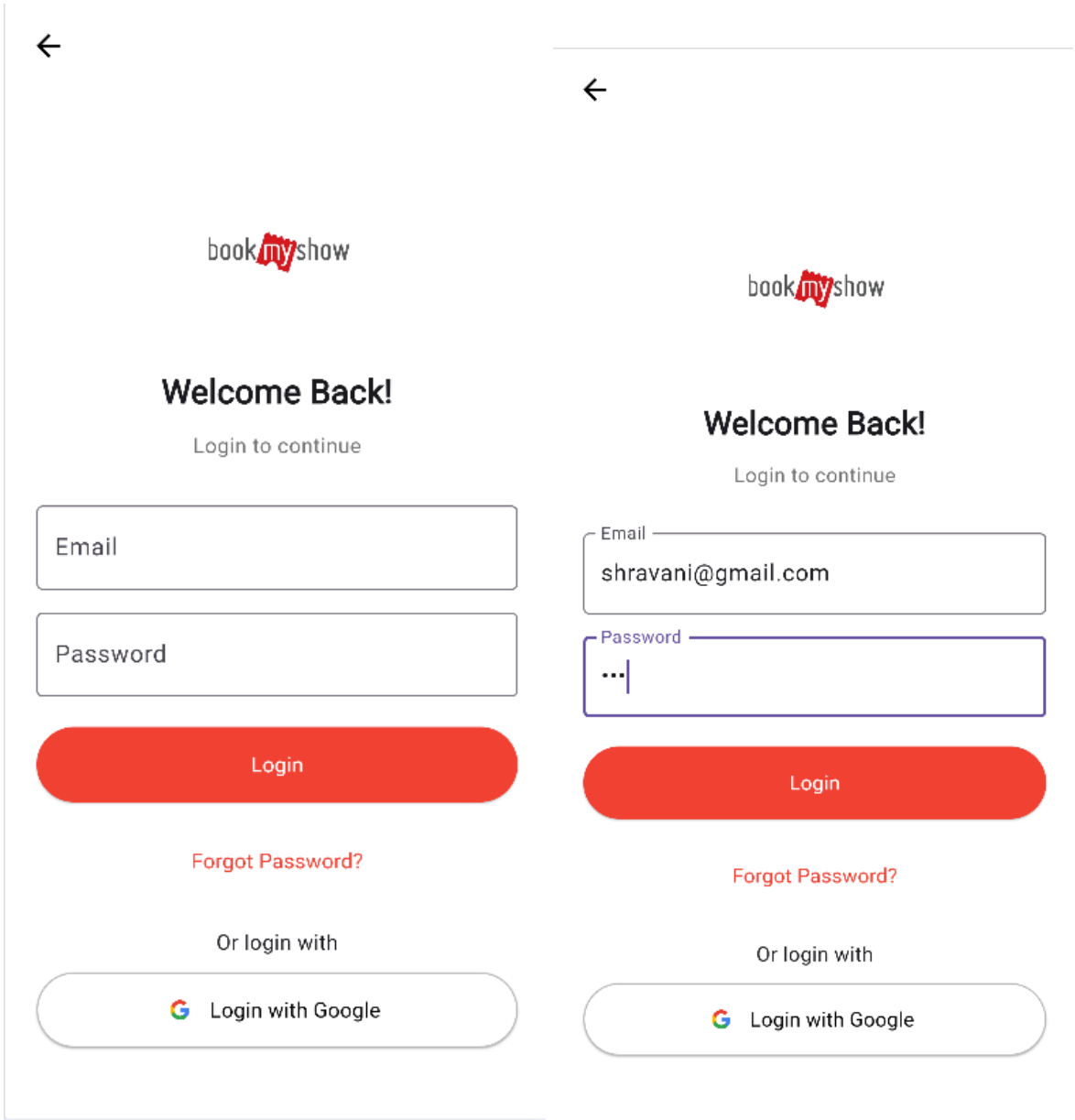
```
import 'package:flutter/material.dart';
import 'home.dart'; // Import the HomePage file

class LoginPage extends StatelessWidget {
  final TextEditingController emailController = TextEditingController();
  final TextEditingController passwordController = TextEditingController();

  @override
  Widget build(BuildContext context) {
   return Scaffold(
     backgroundColor: Colors.white,
     appBar: AppBar(
       backgroundColor: Colors.white,
       elevation: 0,
       leading: IconButton(
```

```
    icon: Icon(Icons.arrow_back, color: Colors.black),
    onPressed: () {
      Navigator.pop(context);
    },
  ),
),
body: Padding(
  padding: const EdgeInsets.symmetric(horizontal: 20),
  child: Column(
    mainAxisAlignment: MainAxisAlignment.center,
    children: [
      Image.asset('assets/logo.png', width: 120, height: 120),
      SizedBox(height: 20),
      Text(
        "Welcome Back!",
        style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold),
      ),
      SizedBox(height: 10),
      Text(
        "Login to continue",
        style: TextStyle(fontSize: 14, color: Colors.black54),
      ),
      SizedBox(height: 30),
      TextField(
        controller: emailController,
        decoration: InputDecoration(
          labelText: "Email",
          border: OutlineInputBorder(),
        ),
      ),
      SizedBox(height: 15),
      TextField(
        controller: passwordController,
        obscureText: true,
        decoration: InputDecoration(
          labelText: "Password",
        border: OutlineInputBorder(),
        ),
      ),
      SizedBox(height: 20),
```

```
ElevatedButton(
  onPressed: () {
    String email = emailController.text;
    String password = passwordController.text;

    if (email.isNotEmpty && password.isNotEmpty) {
      Navigator.pushReplacement(
        context,
        MaterialPageRoute(builder: (context) => HomePage()),
      );
    } else {
      ScaffoldMessenger.of(context).showSnackBar(
        SnackBar(content: Text("Please enter email and password")),
      );
    }
  },
  child: Text("Login"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.red,
    foregroundColor: Colors.white,
    minimumSize: Size(double.infinity, 50),
  ),
),
SizedBox(height: 15),
TextButton(
  onPressed: () {},
  child: Text(
    "Forgot Password?",
    style: TextStyle(color: Colors.red),
  ),
),
SizedBox(height: 20),
Text("Or login with"),
SizedBox(height: 10),
ElevatedButton.icon(
  onPressed: () {},
  icon: Image.asset('assets/Google.png', width: 24, height: 24),
  label: Text("Login with Google"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.white,
```

```
        foregroundColor: Colors.black,
        minimumSize: Size(double.infinity, 50),
        side: BorderSide(color: Colors.black26),
      ),
    ),
  ],
```

OUTPUT:



MAD & PWA Lab
Journal

Experiment No.	05
Experiment Title.	To apply navigation, routing and gestures in Flutter App
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO2: Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation
Grade:	

Shravani Anil Patil **D15A-37**

EXPERIMENT NO:05

Aim: To apply navigation, routing and gestures in Flutter App

Theory:

Navigation, Routing, and Gestures in Flutter App Development

Flutter provides a powerful and flexible way to manage navigation, routing, and user gestures in mobile applications. Understanding these concepts is crucial for creating smooth, user-friendly, and efficient applications. Below is a detailed explanation of each aspec

Navigation in Flutter

Navigation in Flutter refers to moving from one screen (or page) to another within the application. Flutter uses the concept of a **Navigator** and **Routes** to handle navigation.

Navigator Class

Flutter provides various methods for navigation:

The Navigator class manages a stack of routes (screens) and allows transitioning between them. Flutter uses a stack-based approach where each new screen is pushed onto the stack, and when you go back, it is popped from the stack.

Basic Navigation Methods

- **push()**: Adds a new route to the navigation stack.
- **pop()**: Removes the current route and returns to the previous screen.
- **pushReplacement()**: Replaces the current route with a new route.
- **pushAndRemoveUntil()**: Pushes a new route and removes all previous routes until a condition is met.

\

Code:

Login.dart:

```
import 'package:flutter/material.dart';
import 'home.dart'; // Import the HomePage file

class LoginPage extends StatelessWidget {
  final TextEditingController emailController = TextEditingController();
  final TextEditingController passwordController = TextEditingController();

  @override
  Widget build(BuildContext context) {
   return Scaffold(
     backgroundColor: Colors.white,
     appBar: AppBar(
       backgroundColor: Colors.white,
       elevation: 0,
       leading: IconButton(
         icon: Icon(Icons.arrow_back, color: Colors.black),
         onPressed: () {
           Navigator.pop(context);
         },
       ),
     ),
     body: Padding(
       padding: const EdgeInsets.symmetric(horizontal: 20),
       child: Column(
         mainAxisAlignment: MainAxisAlignment.center,
         children: [
           Image.asset('assets/logo.png', width: 120, height: 120),
           SizedBox(height: 20),
           Text(
             "Welcome Back!",
             style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold),
           ),
           SizedBox(height: 10),
           Text(
             "Login to continue",
             style: TextStyle(fontSize: 14, color: Colors.black54),
           ),
           SizedBox(height: 30),
```

```
TextField(
  controller: emailController,
  decoration: InputDecoration(
    labelText: "Email",
    border: OutlineInputBorder(),
  ),
),
SizedBox(height: 15),
TextField(
  controller: passwordController,
  obscureText: true,
  decoration: InputDecoration(
    labelText: "Password",
    border: OutlineInputBorder(),
  ),
),
SizedBox(height: 20),
ElevatedButton(
  onPressed: () {
    String email = emailController.text;
    String password = passwordController.text;

    if (email.isNotEmpty && password.isNotEmpty) {
      Navigator.pushReplacement(
        context,
        MaterialPageRoute(builder: (context) => HomePage()),
      );
    } else {
      ScaffoldMessenger.of(context).showSnackBar(
        SnackBar(content: Text("Please enter email and password")),
      );
    }
  },
  child: Text("Login"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.red,
    foregroundColor: Colors.white,
    minimumSize: Size(double.infinity, 50),
  ),
),
```

```
          SizedBox(height: 15),
          TextButton(
            onPressed: () {},
            child: Text(
              "Forgot Password?",
              style: TextStyle(color: Colors.red),
            ),
          ),
          SizedBox(height: 20),
          Text("Or login with"),
          SizedBox(height: 10),
          ElevatedButton.icon(
            onPressed: () {},
            icon: Image.asset('assets/Google.png', width: 24, height: 24),
            label: Text("Login with Google"),
            style: ElevatedButton.styleFrom(
              backgroundColor: Colors.white,
              foregroundColor: Colors.black,
              minimumSize: Size(double.infinity, 50),
              side: BorderSide(color: Colors.black26),
            ),
          ),
        ],
      ),
    ),
  );
 }
}
```

After clicking on login button , it will navigate to BookMyShow Home Page

Home.dart:

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

class HomePage extends StatelessWidget {
 @override
 Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(
      title: Text('Welcome Guest!'),
```

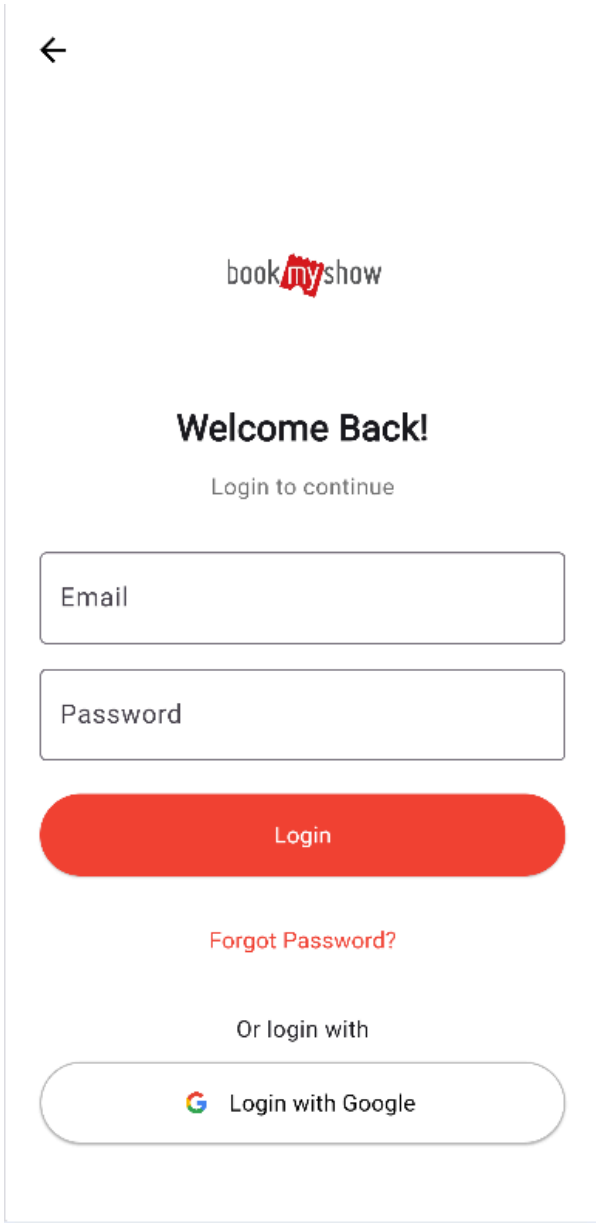
```
  actions: [
    IconButton(icon: Icon(Icons.search), onPressed: () {}),
    IconButton(icon: Icon(Icons.qr_code), onPressed: () {}),
  ],
),
body: SingleChildScrollView(
  child: Column(
    crossAxisAlignment: CrossAxisAlignment.start,
    children: [
      // Location Bar
      Padding(
        padding: const EdgeInsets.symmetric(horizontal: 15, vertical: 5),
        child: Text("Navi Mumbai", style: TextStyle(color: Colors.red)),
      ),

      // Location Enable Bar
      Container(
        width: double.infinity,
        color: Colors.blue,
        padding: EdgeInsets.all(10),
        child: Text(
          "Enable location to discover nearby events, movies, and more.",
          style: TextStyle(color: Colors.white),
          textAlign: TextAlign.center,
        ),
      ),

      SizedBox(height: 10),

      // Categories (Movies, Music Shows, etc.)
      SingleChildScrollView(
        scrollDirection: Axis.horizontal,
        padding: EdgeInsets.symmetric(horizontal: 10),
        child: Row(
          children: [
            _categoryIcon(Icons.movie, "Movies"),
            _categoryIcon(Icons.music_note, "Music Shows"),
            _categoryIcon(Icons.theater_comedy, "Comedy Shows"),
            _categoryIcon(Icons.event, "Plays"),
          ],
```

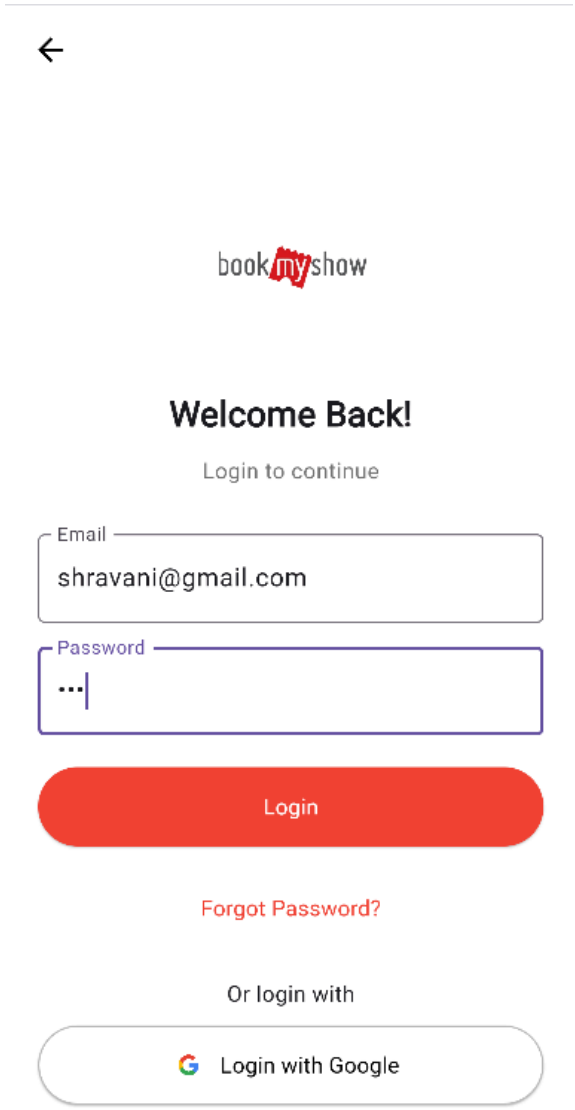
```
          ),
        ),

        SizedBox(height: 20),
        Padding(
          padding: const EdgeInsets.symmetric(horizontal: 10),
          child: Row(
            children: [
              Expanded(child: Image.asset('assets/event1.jpg', fit: BoxFit.cover)),
              SizedBox(width: 10),
              Expanded(child: Image.asset('assets/event2.jpg', fit: BoxFit.cover)),
            ],
          ),
        ),


        // Recommended Movies Section
        Padding(
          padding: const EdgeInsets.symmetric(horizontal: 15),
          child: Row(
            mainAxisAlignment: MainAxisAlignment.spaceBetween,
            children: [
              Text("Recommended Movies", style: TextStyle(fontSize: 18, fontWeight:
FontWeight.bold)),
              Text("See All >", style: TextStyle(color: Colors.red)),
            ],
          ),
        ),

        SizedBox(height: 10),
        SingleChildScrollView(
          scrollDirection: Axis.horizontal,
          padding: EdgeInsets.symmetric(horizontal: 10),
          child: Row(
            children: [
              _movieCard('assets/movie1.jpg', 'PROMOTED'),
              _movieCard('assets/movie2.jpg', ''),
              _movieCard('assets/movie3.jpg', ''),
            ],
          ),
```

```
          ),
        ],
      ),
    ),
    bottomNavigationBar: BottomNavigationBar(
      selectedItemColor: Colors.red,
      unselectedItemColor: Colors.black54,
      items: [
        BottomNavigationBarItem(icon: Icon(Icons.home), label: "Home"),
        BottomNavigationBarItem(icon: Icon(Icons.movie), label: "Movies"),
        BottomNavigationBarItem(icon: Icon(Icons.event), label: "Live Events"),
        BottomNavigationBarItem(icon: Icon(Icons.person), label: "Profile"),
      ],
    ),
  );
}

Widget _categoryIcon(IconData icon, String label) {
  return Column(
    children: [
      Icon(icon, size: 40),
      SizedBox(height: 5),
      Text(label, style: TextStyle(fontSize: 14)),
    ],
  Widget _movieCard(String imagePath, String tag) {
return Padding(
  padding: const EdgeInsets.only(right: 10),
  child: Column(
    children: [
      Stack(
        children: [
          Image.asset(imagePath, width: 100, height: 150),
          if (tag.isNotEmpty)
            Positioned(
              top: 5,
              left: 5,
              child: Container(
                color: Colors.red,
                padding: EdgeInsets.symmetric(horizontal: 5, vertical: 2),
                child: Text(tag, style: TextStyle(color: Colors.white, fontSize: 10)),
```

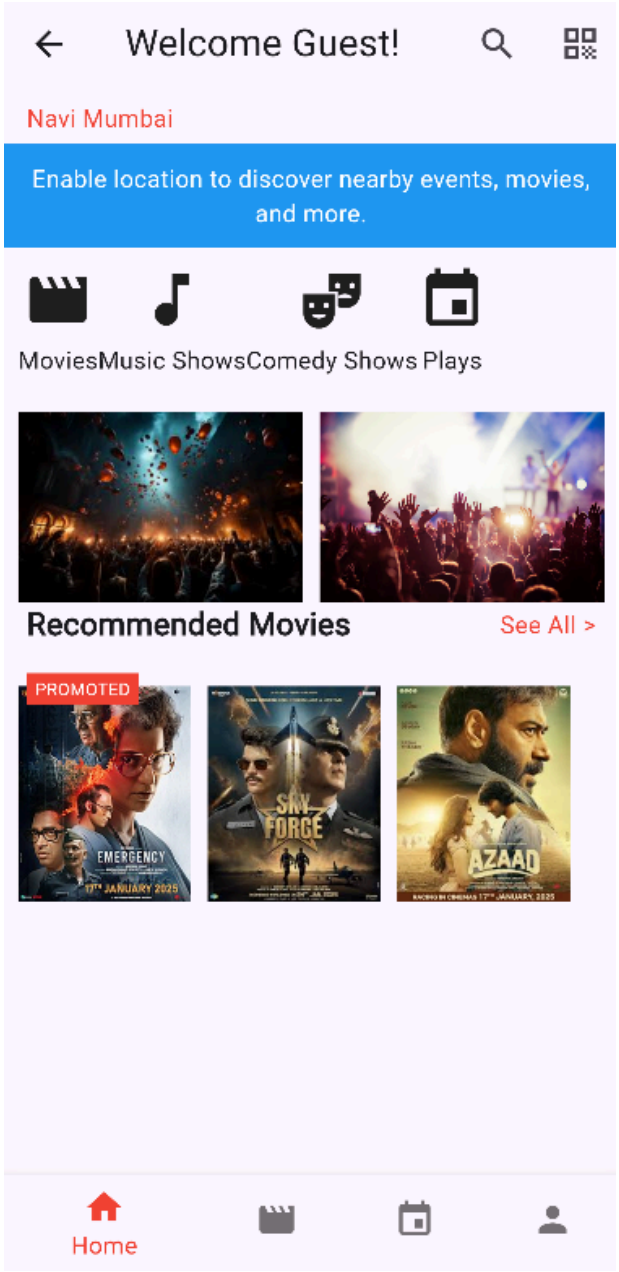
```
            ),
          ),
        ],
      ),
    ],
  ),
 );
}
```

OUTPUT:


bookmyshow
Welcome Back!
Login to continue
Email
Password
Login
Forgot Password?
Or login with
Login with Google


bookmyshow
Welcome Back!
Login to continue
Email
shravani@gmail.com
Password
Login
Forgot Password?
Or login with
Login with Google

Click on Login->Home



MAD & PWA Lab
Journal

Experiment No.	06
Experiment Title.	To Connect Flutter UI with fireBase database
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO3: Analyze and Build production ready Flutter App by incorporating backend services and deploying on Android / iOS
Grade:	

Experiment: 06

AIM : To connect flutter UI with firebase database.

THEORY:

Introduction to Firebase and Flutter Integration

Firebase is a comprehensive platform developed by Google, designed to help developers build high-quality applications for both mobile and web. It provides essential services such as real-time databases, authentication, cloud storage, hosting, and much more. One of the most widely used Firebase services is the Firebase Realtime Database, which is a NoSQL cloud database that allows data to be stored and synced in real-time across all connected devices. Flutter, on the other hand, is an open-source UI software development kit created by Google, which allows developers to build natively compiled applications for mobile, web, and desktop from a single codebase. Its rich set of pre-designed widgets and powerful tools makes Flutter an attractive option for developing visually appealing and performant applications. Integrating Firebase with Flutter allows developers to leverage the full potential of Firebase services in their applications. By using Firebase's Realtime Database, Flutter apps can achieve features such as real-time data synchronization, secure authentication, and cloud-based storage. This combination enables developers to create powerful, scalable, and feature-rich mobile and web applications.

Setting Up Firebase in Flutter :

To connect a Flutter app with Firebase, the following steps are typically followed:

1. Creating a Firebase Project: To start using Firebase with Flutter, the first step is to create a Firebase project in the Firebase Console. Once the project is created, developers can associate their Flutter app with the Firebase project by following the platform-specific instructions for Android or iOS. This usually involves configuring API keys, downloading configuration files, and adding them to the Flutter project.

2. Integrating Firebase SDK in Flutter: After the Firebase project is set up, developers need to integrate Firebase's SDK into the Flutter app. This involves adding the necessary dependencies to the Flutter project's pubspec.yaml file. For Firebase's Realtime Database, the package firebase_database is used. Additionally, Firebase's core SDK (firebase_core) must also be included to initialize Firebase services.

3. Initializing Firebase: Before any Firebase functionality can be used, it is essential to initialize Firebase in the Flutter app. This is done by calling Firebase.initializeApp() in the main entry point of the app (usually in the main.dart file). Firebase needs to be initialized before interacting with any Firebase services, such as the Realtime Database, Cloud Firestore, or Authentication.

Connecting Firebase to a Flutter app enables developers to create robust, scalable, and real-time applications with ease. Firebase's Realtime Database offers a powerful, cloud-based solution for managing data in realtime, while Firebase Authentication ensures secure access control. By integrating Firebase with Flutter, developers can take advantage of real-time data synchronization, offline support, and a wide range of other Firebase features, allowing them to build feature-rich apps that meet modern user expectations.

PROGRAM:

Signup.dart

```
import 'package:flutter/material.dart';
import 'home.dart'; // Import the HomePage file
import 'login.dart'; // Import LoginPage for navigation
import 'package:firebase_auth/firebase_auth.dart'; // Import Firebase Authentication
class SignupPage extends StatelessWidget {
 final TextEditingController nameController = TextEditingController();
 final TextEditingController emailController = TextEditingController();
 final TextEditingController passwordController = TextEditingController();
 void registerUser(BuildContext context) async {
  String name = nameController.text.trim();
  String email = emailController.text.trim();
  String password = passwordController.text.trim();
  if (name.isEmpty || email.isEmpty || password.isEmpty) {
   ScaffoldMessenger.of(context).showSnackBar(
    SnackBar(content: Text("Please fill all fields")),
   );
   return;
  }
  try {
   // Create a new user with Firebase
   UserCredential userCredential = await FirebaseAuth.instance
       .createUserWithEmailAndPassword(email: email, password: password);
   // Optionally update the user's display name
   await userCredential.user?.updateDisplayName(name);
   // Navigate to HomePage after successful registration
   Navigator.pushReplacement(
    context,
    MaterialPageRoute(builder: (context) => HomePage()),
   );
  } catch (e) {
   // Handle errors and show an error message
```

```
    ScaffoldMessenger.of(context).showSnackBar(
      SnackBar(content: Text("Registration failed: ${e.toString()}")),
    );
  }
}
@override
Widget build(BuildContext context) {
  return Scaffold(
    backgroundColor: Colors.white,
    appBar: AppBar(
      backgroundColor: Colors.white,
      elevation: 0,
      leading: IconButton(
        icon: Icon(Icons.arrow_back, color: Colors.black),
        onPressed: () {
          Navigator.pop(context);
        },
      ),
    ),
    body: Padding(
      padding: const EdgeInsets.symmetric(horizontal: 20),
      child: Column(
        mainAxisAlignment: MainAxisAlignment.center,
        children: [
          Image.asset('assets/logo.png', width: 120, height: 120),
          SizedBox(height: 20),
          Text(
            "Create an Account",
            style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold),
          ),
          SizedBox(height: 10),
          Text(
            "Sign up to get started",
            style: TextStyle(fontSize: 14, color: Colors.black54),
          ),
          SizedBox(height: 30),
          // Name Field
          TextField(
            controller: nameController,
            decoration: InputDecoration(
              labelText: "Full Name",
              border: OutlineInputBorder(),
            ),
          ),
          SizedBox(height: 15),
          // Email Field
```

```
TextField(
  controller: emailController,
  decoration: InputDecoration(
    labelText: "Email",
    border: OutlineInputBorder(),
  ),
),
SizedBox(height: 15),
// Password Field
TextField(
  controller: passwordController,
  obscureText: true,
  decoration: InputDecoration(
    labelText: "Password",
    border: OutlineInputBorder(),
  ),
),
SizedBox(height: 20),
// Signup Button
ElevatedButton(
  onPressed: () {
    registerUser(context);
  },
  child: Text("Sign Up"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.red,
    foregroundColor: Colors.white,
    minimumSize: Size(double.infinity, 50),
  ),
),
SizedBox(height: 15),
// Login Redirect
Row(
  mainAxisAlignment: MainAxisAlignment.center,
  children: [
    Text("Already have an account?"),
    TextButton(
      onPressed: () {
        Navigator.pushReplacement(
          context,
          MaterialPageRoute(builder: (context) => LoginPage()),
        );
      },
      child: Text(
        "Login",
        style: TextStyle(color: Colors.red),
```

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

Login.dart

```
import 'package:flutter/material.dart';
import 'package:firebase_auth/firebase_auth.dart';
import 'home.dart'; // Import the HomePage file
class LoginPage extends StatelessWidget {
 final TextEditingController emailController = TextEditingController();
 final TextEditingController passwordController = TextEditingController();
 final FirebaseAuth _auth = FirebaseAuth.instance;
 Future<void> _loginUser(BuildContext context) async {
   String email = emailController.text.trim();
   String password = passwordController.text.trim();
   if (email.isEmpty || password.isEmpty) {
```

```
    // Show error if fields are empty
    ScaffoldMessenger.of(context).showSnackBar(
      SnackBar(content: Text("Please enter email and password")),
    );
    return;
  }
  try {
    // Attempt to sign in using email/password
    UserCredential userCredential = await _auth.signInWithEmailAndPassword(
      email: email,
      password: password,
    );
    // Check if the user is successfully authenticated
    if (userCredential.user != null) {
      // Navigate to HomePage if login is successful
      Navigator.pushReplacement(
        context,
        MaterialPageRoute(builder: (context) => HomePage()),
      );
    }
  } catch (e) {
    // If error occurs (invalid credentials, network issue, etc.)
    ScaffoldMessenger.of(context).showSnackBar(
      SnackBar(content: Text("Invalid email or password")),
    );
  }
}
@override
Widget build(BuildContext context) {
  return Scaffold(
    backgroundColor: Colors.white,
    appBar: AppBar(
      backgroundColor: Colors.white,
      elevation: 0,
      leading: IconButton(
        icon: Icon(Icons.arrow_back, color: Colors.black),
        onPressed: () {
          Navigator.pop(context);
        },
      ),
    ),
    body: Padding(
      padding: const EdgeInsets.symmetric(horizontal: 20),
      child: Column(
        mainAxisAlignment: MainAxisAlignment.center,
        children: [
```

```
Image.asset('assets/logo.png', width: 120, height: 120),
SizedBox(height: 20),
Text(
  "Welcome Back!",
  style: TextStyle(fontSize: 22, fontWeight: FontWeight.bold),
),
SizedBox(height: 10),
Text(
  "Login to continue",
  style: TextStyle(fontSize: 14, color: Colors.black54),
),
SizedBox(height: 30),
TextField(
  controller: emailController,
  decoration: InputDecoration(
    labelText: "Email",
    border: OutlineInputBorder(),
  ),
),
SizedBox(height: 15),
TextField(
  controller: passwordController,
  obscureText: true,
  decoration: InputDecoration(
    labelText: "Password",
    border: OutlineInputBorder(),
  ),
),
SizedBox(height: 20),
ElevatedButton(
  onPressed: () => _loginUser(context), // Firebase login
  child: Text("Login"),
  style: ElevatedButton.styleFrom(
    backgroundColor: Colors.red,
    foregroundColor: Colors.white,
    minimumSize: Size(double.infinity, 50),
  ),
),
SizedBox(height: 15),
TextButton(
  onPressed: () {
    // Navigate to forgot password page if you have one
  },
  child: Text(
    "Forgot Password?",
    style: TextStyle(color: Colors.red),
```

```
            ),
          ),
          SizedBox(height: 20),
          Text("Or login with"),
          SizedBox(height: 10),
          ElevatedButton.icon(
            onPressed: () {
              // Add Google login or other login methods here
            },
            icon: Image.asset('assets/Google.png', width: 24, height: 24),
            label: Text("Login with Google"),
            style: ElevatedButton.styleFrom(
              backgroundColor: Colors.white,
              foregroundColor: Colors.black,
              minimumSize: Size(double.infinity, 50),
              side: BorderSide(color: Colors.black26),
            ),
          ),
        ],
      ),
    ),
  );
 }
}
```

SKIP

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I agree to the Terms & Conditions and Privacy Policy

bookmyshow

Create an Account

Sign up to get started

Full Name
Shweta Patil

Email
sp@gmail.com

Password
••••••

Sign Up

Already have an account? Login

Welcome Back!

Login to continue

Email

kp@gmail.com

Password

.....

Login

Forgot Password?

Or login with

Login with Google

MAD & PWA Lab
Journal

Experiment No.	07
Experiment Title.	To write meta data of your Ecommerce PWA in a Web app manifest file to enable “add to homescreen feature”.
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO4: Understand various PWA frameworks and their requirements
Grade:	

Shravani Patil **D15A-37**

Experiment No. 7
To write meta data of your Ecommerce PWA

Aim:- To write meta data of your Ecommerce PWA in a Web app manifest file to enable “add to homescreen feature”.

Theory:-
Regular Web App
A regular web app is a website that is designed to be accessible on all mobile devices such that the content gets fit as per the device screen. It is designed using a web technology stack (HTML, CSS, JavaScript, Ruby, etc.) and operates via a browser. They offer various native-device features and functionalities. However, it entirely depends on the browser the user is using. In other words, it might be possible that you can access a native-device feature on Chrome but not on Safari or Mozilla Firefox because the browsers are incompatible with that feature.

Progressive Web App
Progressive Web App (PWA) is a regular web app, but some extras enable it to deliver an excellent user experience. It is a perfect blend of desktop and mobile application experience to give both platforms to the end-users.

Difference between PWAs vs. Regular Web Apps:
A Progressive Web is different and better than a Regular Web app with features like:
1. Native Experience
Though a PWA runs on web technologies (HTML, CSS, JavaScript) like a Regular web app, it gives user experience like a native mobile application. It can use most native device features, including push notifications, without relying on the browser or any other entity. It offers a seamless and integrated user experience that it is quite tough for one to differentiate between a PWA and a Native application by considering its look and feel.

2. Ease of Access
Unlike other mobile apps, PWAs do not demand longer download time and make memory space available for installing the applications. The PWAs can be shared and installed by a link, which cuts down the number of steps to install and use. These applications can easily keep an app icon on the user's home screen, making the app easily accessible to the users and helps the brands remain in the users' minds, and improving the chances of interaction.

3. Faster Services
PWAs can cache the data and serve the user with text stylesheets, images, and other web content even before the page loads completely. This lowers the waiting time for the end-users and helps

the brands improve the user engagement and retention rate, which eventually adds value to their business.

4. Engaging Approach
As already shared, the PWAs can employ push notifications and other native device features more efficiently. Their interaction does not depend on the browser user uses. This eventually improves the chances of notifying the user regarding your services, offers, and other options related to your brand and keeping them hooked to your brand. In simpler words, PWAs let you maintain the user engagement and retention rate.

5. Updated Real-Time Data Access
Another plus point of PWAs is that these apps get updated on their own. They do not demand the end-users to go to the App Store or other such platforms to download the update and wait until installed.
In this app type, the web app developers can push the live update from the server, which reaches the apps residing on the user's devices automatically. Therefore, it is easier for the mobile app developer to provide the best of the updated functionalities and services to the end-users without forcing them to update their app.
6. Discoverable
PWAs reside in web browsers. This implies higher chances of optimizing them as per the Search Engine Optimization (SEO) criteria and improving the Google rankings like that in websites and other web apps.

7. Lower Development Cost
Progressive web apps can be installed on the user device like a native device, but it does not demand submission on an App Store. This makes it far more cost-effective than native mobile applications while offering the same set of functionalities.

Pros and cons of the Progressive Web App
The main features are:

Progressive — They work for every user, regardless of the browser chosen because they are built at the base with progressive improvement principles.

Responsive — They adapt to the various screen sizes: desktop, mobile, tablet, or dimensions that can later become available.

App-like — They behave with the user as if they were native apps, in terms of interaction and navigation.

Updated — Information is always up-to-date thanks to the data update process offered by service workers.

Secure — Exposed over HTTPS protocol to prevent the connection from displaying information or altering the contents.

Searchable — They are identified as “applications” and are indexed by search engines.

Reactivable — Make it easy to reactivate the application thanks to capabilities such as web notifications.
Installable — They allow the user to “save” the apps that he considers most useful with the corresponding icon on the screen of his mobile terminal (home screen) without having to face all the steps and problems related to the use of the app store.

Linkable — Easily shared via URL without complex installations.

Offline — Once more it is about putting the user before everything, avoiding the usual error message in case of weak or no connection. The PWA are based on two particularities: first of all the ‘skeleton’ of the app, which recalls the page structure, even if its contents do not respond and its elements include the header, the page layout, as well as an illustration that signals that the page is loading.

Weaknesses refer to:
IOS support from version 11.3 onwards;
Greater use of the device battery;
Not all devices support the full range of PWA features (same speech for iOS and Android operating systems);
It is not possible to establish a strong re-engagement for iOS users (URL scheme, standard web notifications);
Support for offline execution is however limited;
Lack of presence on the stores (there is no possibility to acquire traffic from that channel);
There is no “body” of control (like the stores) and an approval process;
Limited access to some hardware components of the devices;
Little flexibility regarding “special” content for users (eg loyalty programs, loyalty, etc.).

Code:-

```
var staticCacheName = "eyojana1";

self.addEventListener("install", function (e) {
e.waitUntil(
    caches.open(staticCacheName).then(function (cache) {
    return cache.addAll(["/"]);
    })
);
});

self.addEventListener("fetch", function (event) {
console.log(event.request.url);

event.respondWith(
    caches.match(event.request).then(function (response) {
    return response || fetch(event.request);
    })
);
});
```

manifest.json:-

```
{
 "short_name": "React App",
 "name": "Create React App Sample",
 "icons": [
   {
    "src": "favicon.ico",
    "sizes": "64x64",
    "type": "image/x-icon"
   },
   {
    "src": "logo1.png",
    "type": "image/png",
    "sizes": "192x192"
   },
   {
    "src": "logo2.png",
    "type": "image/png",
    "sizes": "512x512"
   }
 ],
 "start_url": ".",
```

```
 "display": "standalone",
 "theme_color": "#000000",
 "background_color": "#ffffff"
}
```

Add the link tag to link to the manifest.json file

```
<html>
   <head>
      <link rel="manifest" href="manifest.json">
      <script src="myscript.js"></script>
      <title>Eyojana</title>
      <style>
```

Output:-

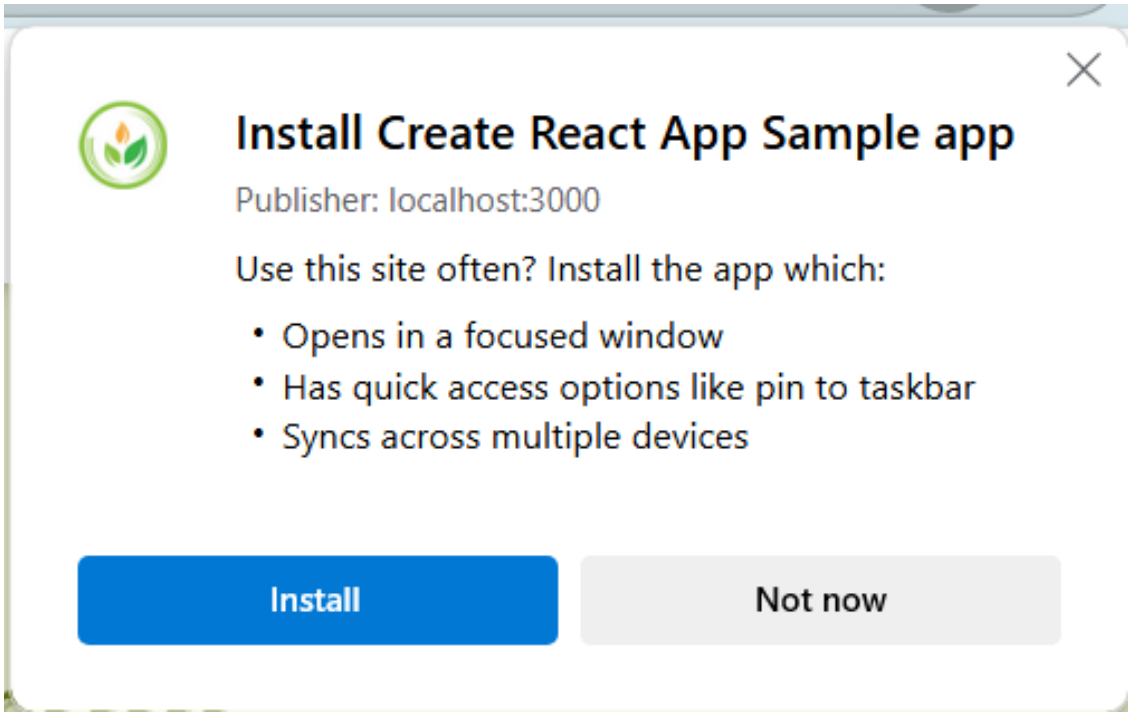
Install nodejs

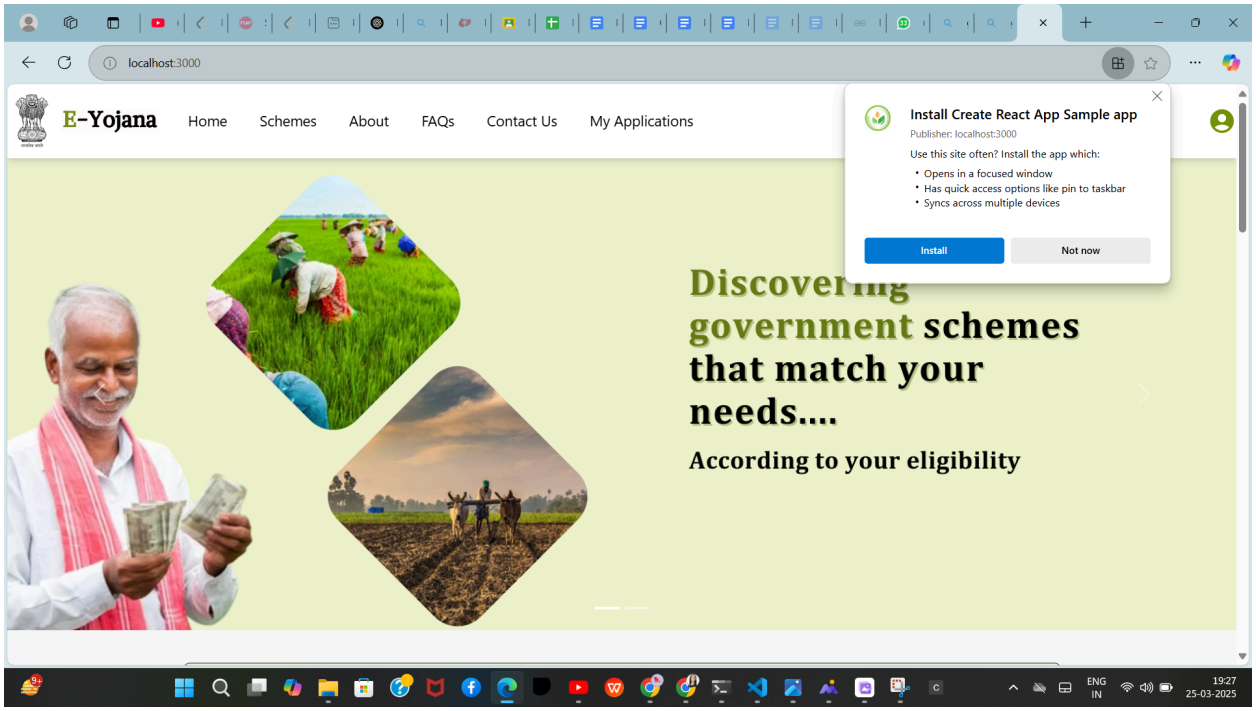
https://nodejs.org/en/download/

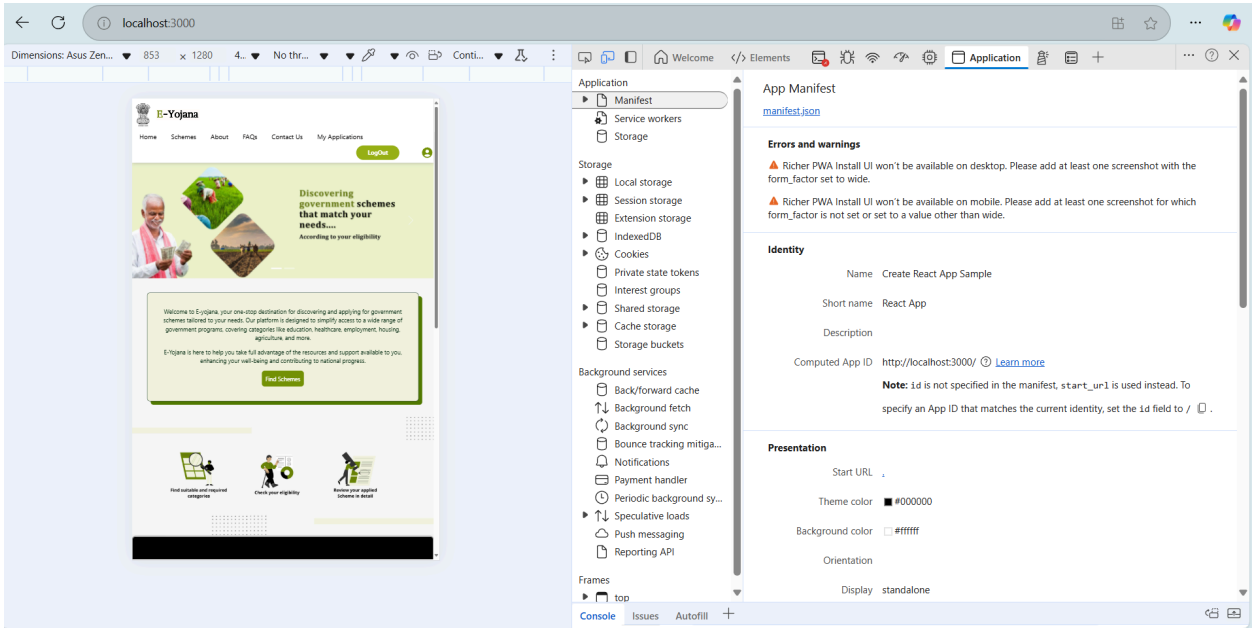
In cmd

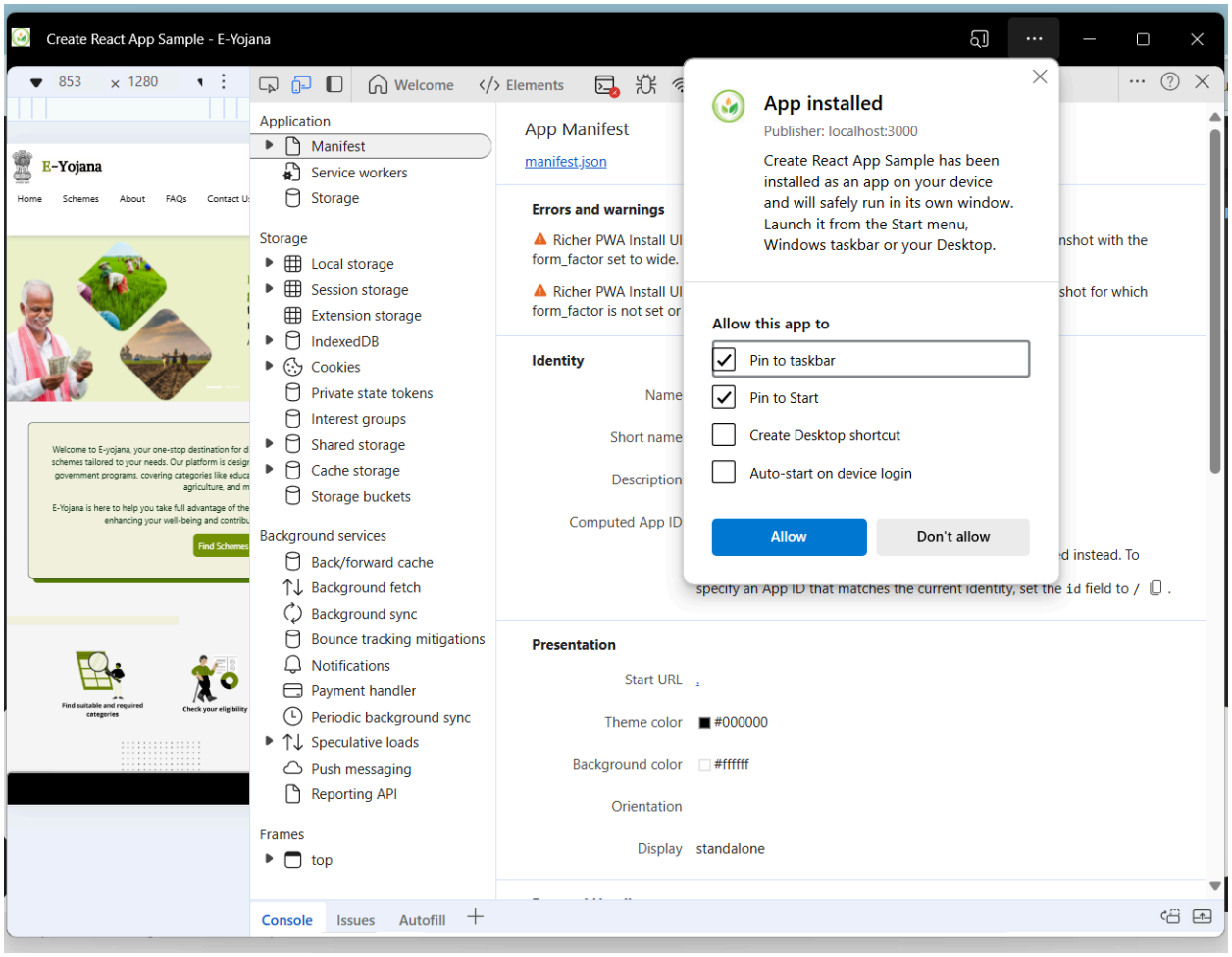
npm -v npm install -g browser-sync

npm install -g live-server


Install Create React App Sample app
Publisher: localhost:3000
Use this site often? Install the app which:
• Opens in a focused window
• Has quick access options like pin to taskbar
• Syncs across multiple devices
Install
Not now


localhost:3000
E-Yojana
Home
Schemes
About
FAQs
Contact Us
My Applications
Install Create React App Sample app
Publisher: localhost:3000
Use this site often? Install the app which:
• Opens in a focused window
• Has quick access options like pin to taskbar
• Syncs across multiple devices
Install
Not now
government schemes that match your needs....
According to your eligibility
ENG
IN
19:27
25-03-2025


localhost:3000
E-Yojana
Home
Schemes
About
FAQs
Contact Us
My Applications
LogOut
Discovering government schemes that match your needs....
According to your eligibility
Welcome to E-yojana, your one-stop destination for discovering and applying for government schemes tailored to your needs. Our platform is designed to simplify access to a wide range of government programs, covering categories like education, healthcare, employment, housing, agriculture, and more.
E-Yojana is here to help you take full advantage of the resources and support available to you, enhancing your well-being and contributing to national progress.
Find Schemes
Welcome
Elements
Application
Application
Manifest
Service workers
Storage
Storage
Local storage
Session storage
Extension storage
IndexedDB
Cookies
Private state tokens
Interest groups
Shared storage
Cache storage
Storage buckets
Background services
Back/forward cache
Background fetch
Background sync
Bounce tracking mitiga...
Notifications
Payment handler
Periodic background sy...
Speculative loads
Push messaging
Reporting API
Frames
top
App Manifest
manifest.json
Errors and warnings
Richer PWA Install UI won't be available on desktop. Please add at least one screenshot with the form_factor set to wide.
Richer PWA Install UI won't be available on mobile. Please add at least one screenshot for which form_factor is not set or set to a value other than wide.
Identity
Name
Create React App Sample
Short name
React App
Description
Computed App ID
http://localhost:3000/
Learn more
Note: id is not specified in the manifest, start_url is used instead. To specify an App ID that matches the current identity, set the id field to /
Presentation
Start URL
Theme color
#000000
Background color
#ffffff
Orientation
Display
standalone
Console
Issues
Autofill



Conclusion:-

Hence, we learnt how to write a metadata of our E-commerce website PWA in a Web App Manifest File to enable add to homescreen feature.

MAD & PWA Lab
Journal

Experiment No.	08
Experiment Title.	To code and register a service worker, and complete the install and activation process for a new service worker for the E-commerce PWA
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO5: Design and Develop a responsive User Interface by applying PWA Design techniques
Grade:	

Shravani Patil
D15A-37

Experiment: 08

MAD and PWA ab

Aim: To code and register a service worker, and complete the install and activation process for a new service worker for the E-commerce PWA.

Theory:

Service Worker

Service Worker is a script that works on browser background without user interaction independently. Also, It resembles a proxy that works on the user side. With this script, you can track network traffic of the page, manage push notifications and develop “offline first” web applications with Cache API.

Things to note about Service Worker:

- A service worker is a programmable network proxy that lets you control how network requests from your page are handled.
- Service workers only run over HTTPS. Because service workers can intercept network requests and modify responses, "man-in-the-middle" attacks could be very bad.
- The service worker becomes idle when not in use and restarts when it's next needed. You cannot rely on a global state persisting between events. If there is information that you need to persist and reuse across restarts, you can use IndexedDB databases.

What can we do with Service Workers?

- You can dominate **Network Traffic**
  You can manage all network traffic of the page and do any manipulations. For example, when the page requests a CSS file, you can send plain text as a response or when the page requests an HTML file, you can send a png file as a response. You can also send a true response too.

- You can **Cache**
  You can cache any request/response pair with Service Worker and Cache API and you can access these offline content anytime.

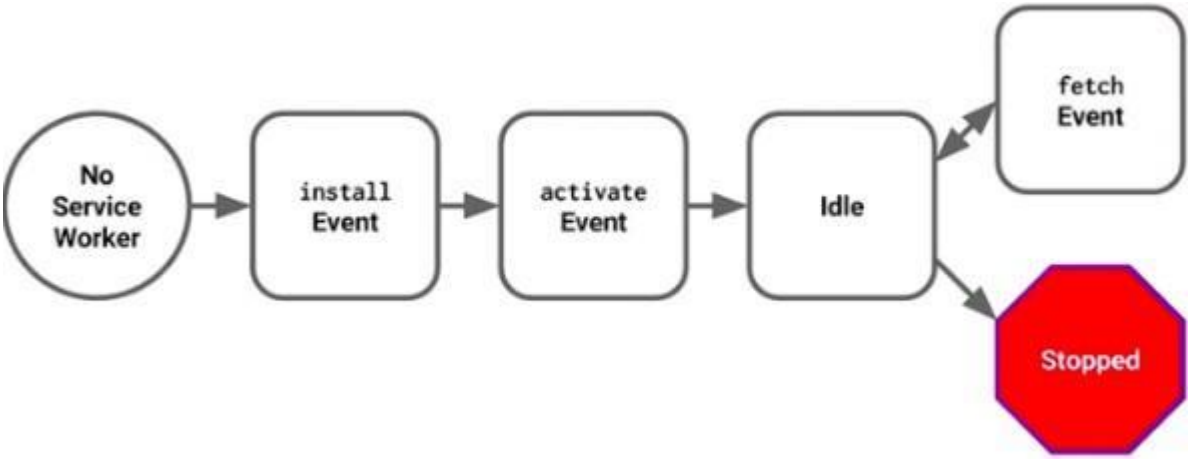
- You can manage **Push Notifications**
  You can manage push notifications with Service Worker and show any information message to the user.
- You can **Continue**
  Although Internet connection is broken, you can start any process with Background Sync of Service Worker.

What can’t we do with Service Workers?

- You can’t access the **Window**
  You can’t access the window, therefore, You can’t manipulate DOM elements. But, you can communicate to the window through post Message and manage processes that you want.

- You can’t work it on **80 Port**
  Service Worker just can work on HTTPS protocol. But you can work on localhost during development.

Service Worker Cycle



A service worker goes through three steps in its life cycle:

- Registration
- Installation
- Activation

Registration

To install a service worker, you need to register it in your main JavaScript code. Registration tells the browser where your service worker is located, and to start installing it in the background. Let's look at an example:

main.js

```
if ('serviceWorker' in navigator) {
  navigator.serviceWorker.register('/service-worker.js')
  .then(function(registration) {
    console.log('Registration successful, scope is:', registration.scope);
  })
  .catch(function(error) {
    console.log('Service worker registration failed, error:', error);
  });
}
```

This code starts by checking for browser support by examining **navigator.serviceWorker**. The service worker is then registered with navigator.serviceWorker.register, which returns a promise that resolves when the service worker has been successfully registered. The scope of the service worker is then logged with registration.scope. If the service worker is already installed, navigator.serviceWorker.register returns the registration object of the currently active service worker.

The scope of the service worker determines which files the service worker controls, in other words, from which path the service worker will intercept requests. The default scope is the location of the service worker file, and extends to all directories below. So if service-worker.js is located in the root directory, the service worker will control requests from all files at this domain.

You can also set an arbitrary scope by passing in an additional parameter when registering. For example:
main.js

```
navigator.serviceWorker.register('/service-worker.js', {
  scope: '/app/'
});
```

In this case we are setting the scope of the service worker to /app/, which means the service worker will control requests from pages like /app/, /app/lower/ and /app/lower/lower, but not from pages like /app or /, which are higher.

If you want the service worker to control higher pages e.g. /app (without the trailing slash) you can indeed change the scope option, but you'll also need to set the Service-Worker-Allowed HTTP Header in your server config for the request serving the service worker script.

main.js

```
navigator.serviceWorker.register('/app/service-worker.js', {
  scope: '/app'
});
```

Installation

Once the browser registers a service worker, installation can be attempted. This occurs if the service worker is considered to be new by the browser, either because the site currently doesn't have a registered service worker, or because there is a byte difference between the new service worker and the previously installed one.

A service worker installation triggers an install event in the installing service worker. We can include an install event listener in the service worker to perform some task when the service worker installs. For instance, during the install, service workers can precache parts of a web app so that it loads instantly the next time a user opens it (see caching the application shell). So, after that first load, you're going to benefit from instant repeat loads and your time to interactivity is going to be even better in those cases. An example of an installation event listener looks like this:

service-worker.js

```
// Listen for install event, set callback
self.addEventListener('install', function(event) {
   // Perform some task
});
```

Activation

Once a service worker has successfully installed, it transitions into the activation stage. If there are any open pages controlled by the previous service worker, the new service worker enters a waiting state. The new service worker only activates when there are no longer any pages loaded that are still using the old service worker. This ensures that only one version of the service worker is running at any given time.

When the new service worker activates, an activate event is triggered in the activating service worker. This event listener is a good place to clean up outdated caches (see the Offline Cookbook for an example).

service-worker.js

```
self.addEventListener('activate', function(event) {
  // Perform some task
});
```

Once activated, the service worker controls all pages that load within its scope, and starts listening for events from those pages. However, pages in your app that were loaded before the service worker activation will not be under service worker control. The new service worker will only take over when you close and reopen your app, or if the service worker calls **clients.claim()**. Until then, requests from this page will not be intercepted by the new service worker. This is intentional as a way to ensure consistency in your site.

Code

sw.js

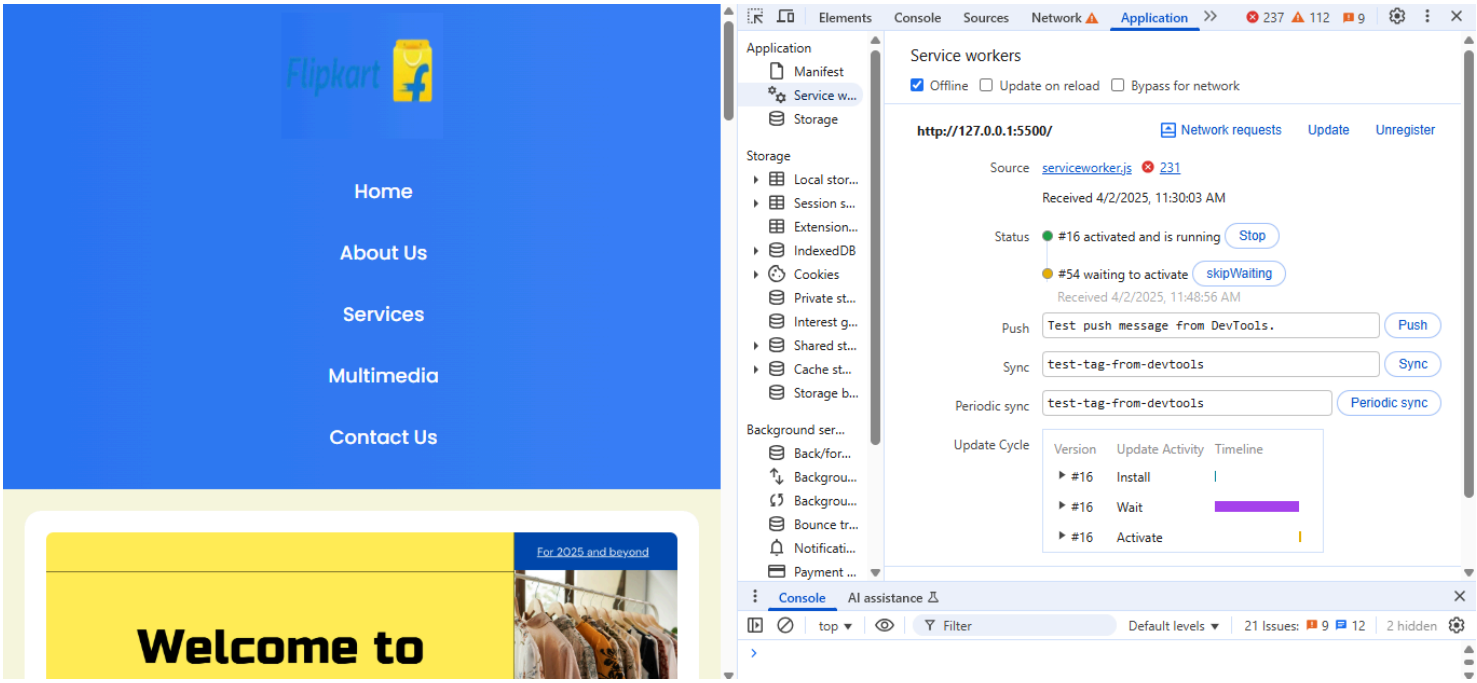
```
const CACHE_NAME = "ecommerce-pwa-cache-v1";
const urlsToCache = [
   "/",            // Root path
   "/index.html",   // Main page
   "/style.css",   // CSS file
   "/index.js",       // Main JavaScript file
   "/flipkart.png",
   "flipkart4.png",
   "/electronics.png",
   "/fashion.png",
   "/home.png",
   "/books.png"
];

// Install event: Cache static assets
self.addEventListener('install', (event) => {
   event.waitUntil(
      caches.open(CACHE_NAME)
         .then(cache => {
            console.log("Opened cache");
            return Promise.all(
               urlsToCache.map(url =>
                  fetch(url) // Try to fetch the file first
                     .then(response => {
                        if (!response.ok) throw new Error(`Failed to fetch ${url}`);
                        return cache.put(url, response);
                     })
                     .catch(err => console.warn(`Skipping ${url}:`, err))
               )
            );
         })
         .catch(err => console.log("Cache install failed:", err))
   );
});
```

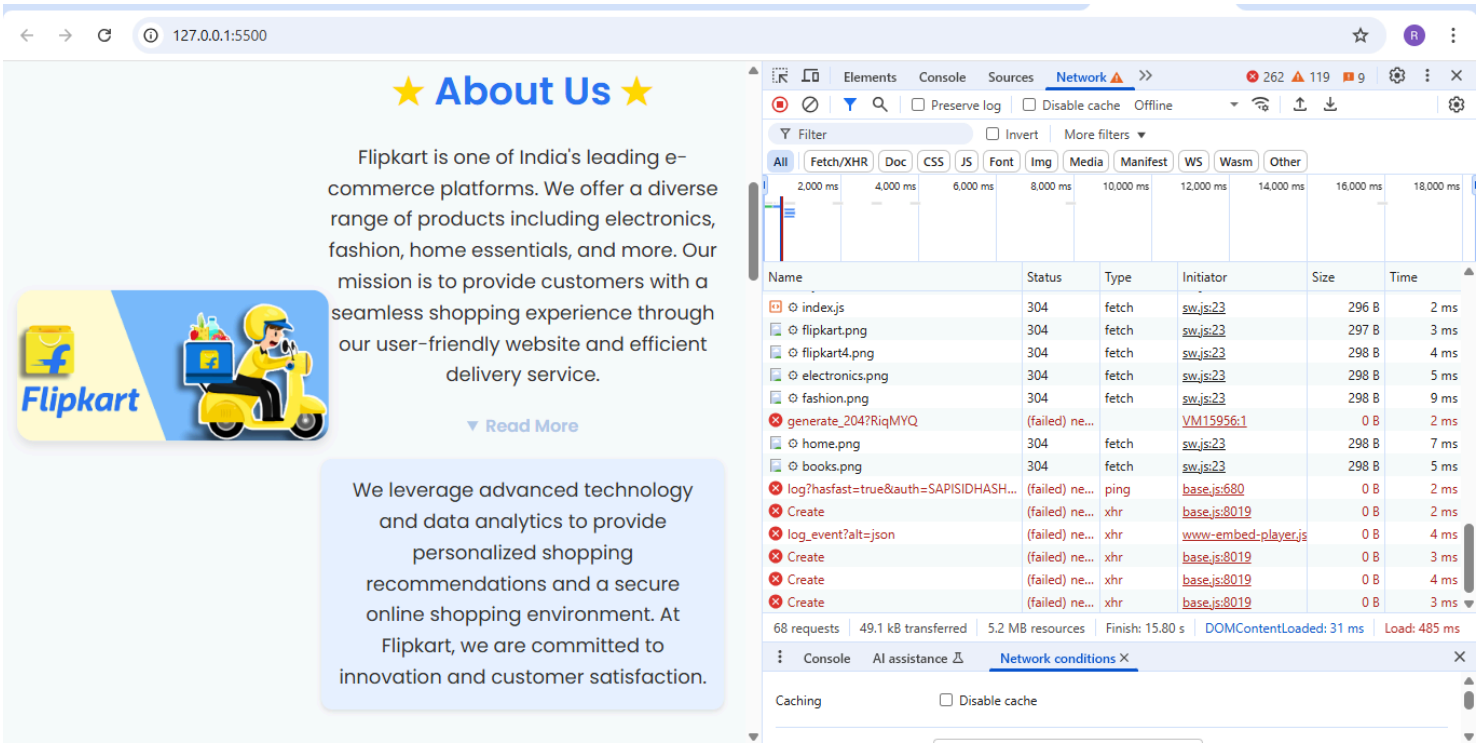
```
// Activate event: Cleanup old caches
self.addEventListener('activate', (event) => {
    event.waitUntil(
        caches.keys().then(cacheNames => {
            return Promise.all(
                cacheNames.map(cache => {
                    if (cache !== CACHE_NAME) {
                        console.log("Deleting old cache:", cache);
                        return caches.delete(cache);
                    }
                })
            );
        })
    );
});

// Fetch event: Serve from cache or fetch new data
self.addEventListener('fetch', (event) => {
    event.respondWith(
        caches.match(event.request)
            .then(response => {
                return response || fetch(event.request);
            })
            .catch(() => {
                if (event.request.destination === 'document') {
                    return caches.match('/index.html');
                }
            })
    );
});
```

index.js

```
if ('serviceWorker' in navigator) {
    window.addEventListener('load', () => {
        navigator.serviceWorker.register('/sw.js')
            .then(reg => console.log('Service Worker registered!', reg))
            .catch(err => console.log('Service Worker registration failed:', err));
    });
```

Output


Flipkart
Home
About Us
Services
Multimedia
Contact Us
For 2025 and beyond
Welcome to
Elements
Console
Sources
Network
Application
Service workers
Offline
Update on reload
Bypass for network
http://127.0.0.1:5500/
Network requests
Update
Unregister
Source
serviceworker.js
231
Received 4/2/2025, 11:30:03 AM
Status
#16 activated and is running
Stop
#54 waiting to activate
skipWaiting
Received 4/2/2025, 11:48:56 AM
Push
Test push message from DevTools.
Push
Sync
test-tag-from-devtools
Sync
Periodic sync
test-tag-from-devtools
Periodic sync
Update Cycle
Version
Update Activity
Timeline
#16 Install
#16 Wait
#16 Activate
Console
AI assistance


127.0.0.1:5500
★ About Us ★
Flipkart is one of India's leading e-commerce platforms. We offer a diverse range of products including electronics, fashion, home essentials, and more. Our mission is to provide customers with a seamless shopping experience through our user-friendly website and efficient delivery service.
▼ Read More
We leverage advanced technology and data analytics to provide personalized shopping recommendations and a secure online shopping environment. At Flipkart, we are committed to innovation and customer satisfaction.
Elements
Console
Sources
Network
Preserve log
Disable cache
Offline
Filter
Invert
More filters
All
Fetch/XHR
Doc
CSS
JS
Font
Img
Media
Manifest
WS
Wasm
Other
Name
Status
Type
Initiator
Size
Time
68 requests
49.1 kB transferred
5.2 MB resources
Finish: 15.80 s
DOMContentLoaded: 31 ms
Load: 485 ms
Console
AI assistance
Network conditions
Caching
Disable cache

MAD & PWA Lab
Journal

Experiment No.	09
Experiment Title.	To implement Service worker events like fetch, sync and push for E-commerce PWA
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO5: Design and Develop a responsive User Interface by applying PWA Design techniques
Grade:	

Shravani Anil Patil
D15A-37

EXPERIMENT NO. 9
MAD and PWA Lab

Aim: To implement Service worker events like fetch, sync and push for E-commerce PWA.

Theory:

Service Worker

Service Worker is a script that works on browser background without user interaction independently. Also, It resembles a proxy that works on the user side. With this script, you can track network traffic of the page, manage push notifications and develop “offline first” web applications with Cache API.

Things to note about Service Worker:

- A service worker is a programmable network proxy that lets you control how network requests from your page are handled.
- Service workers only run over HTTPS. Because service workers can intercept network requests and modify responses, "man-in-the-middle" attacks could be very bad.
- The service worker becomes idle when not in use and restarts when it's next needed. You cannot rely on a global state persisting between events. If there is information that you need to persist and reuse across restarts, you can use IndexedDB databases.
- Service workers make extensive use of promises, so if you're new to promises, then you should stop reading this and check out Promises, an introduction.

Fetch Event

You can track and manage page network traffic with this event. You can check existing cache, manage “cache first” and “network first” requests and return a response that you want.

Of course, you can use many different methods but you can find in the following example a “cache first” and “network first” approach. In this example, if the request’s and current location’s origin are the same (Static content is requested.), this is called “cacheFirst” but if you request a targeted external URL, this is called “networkFirst”.

- **CacheFirst** - In this function, if the received request has cached before, the cached response is returned to the page. But if not, a new response requested from the network.
- **NetworkFirst** - In this function, firstly we can try getting an updated response from the network, if this process completed successfully, the new response will be cached and returned. But if this process fails, we check whether the request has been cached before or not. If a cache exists, it is returned to the page, but if not, this is up to you. You can return dummy content or information messages to the page.

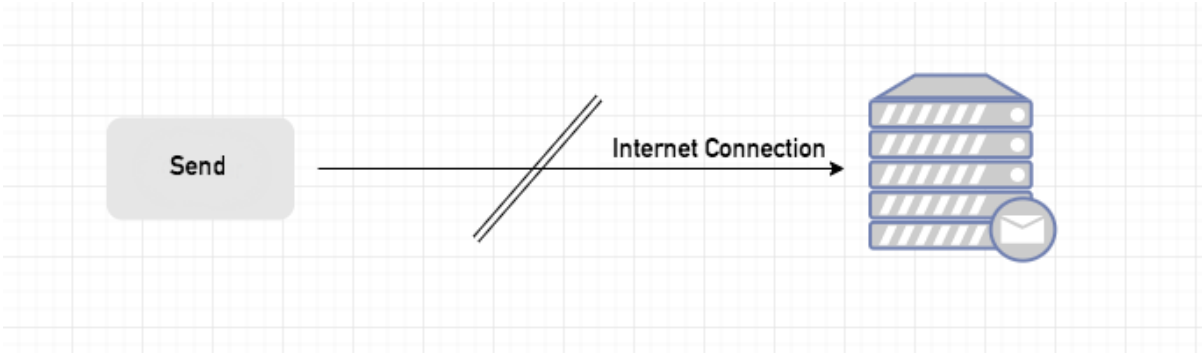
```
self.addEventListener("fetch", function (event) {
    const req = event.request;
    const url = new URL(req.url);

    if (url.origin === location.origin) {
        event.respondWith(cacheFirst(req));
    }
    else {
        event.respondWith(networkFirst(req));
    }
});

async function cacheFirst(req) {
    return await caches.match(req) || fetch(req);
}

async function networkFirst(req) {
    const cache = await caches.open("pwa-dynamic");
    try {
        const res = await fetch(req);
        cache.put(req, res.clone());
        return res;
    } catch (error) {
        const cachedResponse = await cache.match(req);
        return cachedResponse || await caches.match("./noconnection.json");
    }
}
```

Sync Event

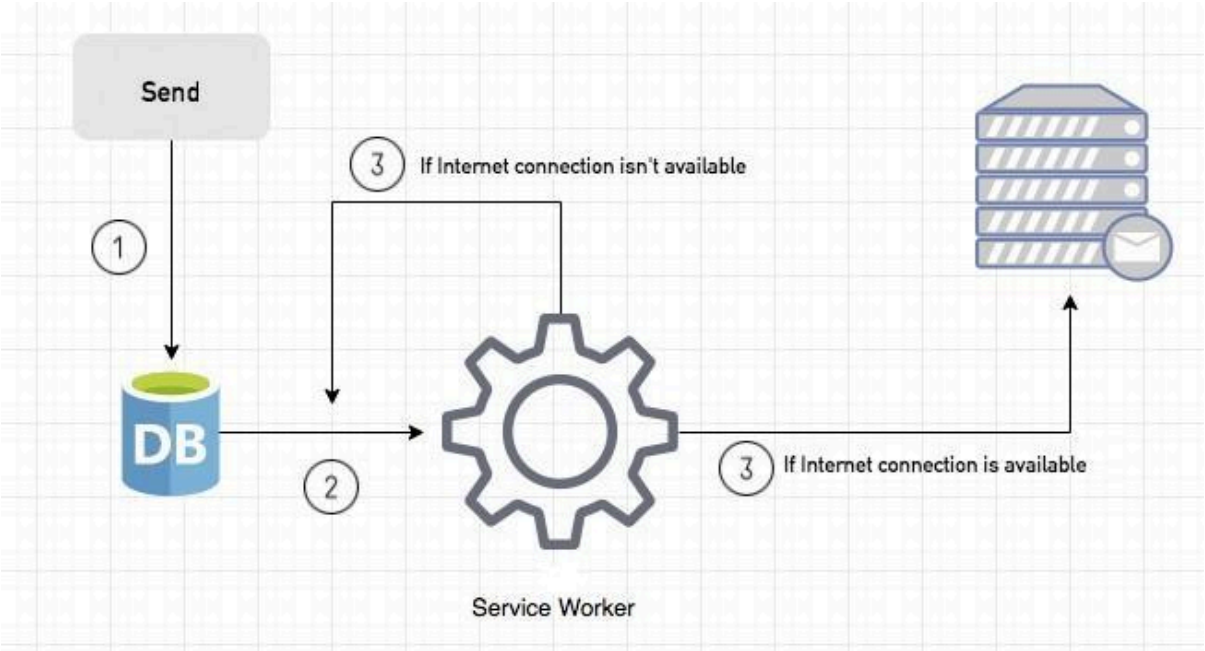
Background Sync is a Web API that is used to delay a process until the Internet connection is stable. We can adapt this definition to the real world; there is an e-mail client application that works on the browser and we want to send an email with this tool. Internet connection is broken while we are writing e-mail content and we didn't realize it. When completing the writing, we click the send button.

Here is a job for the Background Sync.

The following view shows the classical process of sending email to us. If the Internet Connection is broken, we can't send any content to Mail Server.



Here, you can create any scenario for yourself. A sample is in the following for this case.



1. When we click the “send” button, email content will be saved to IndexedDB.
2. Background Sync registration.
3. **If the Internet connection is available**, all email content will be read and sent to Mail Server.
   If the Internet connection is unavailable, the service worker waits until the connection is available even though the window is closed. When it is available, email content will be sent to Mail Server.

   You can see the working process within the following code block.

Event Listener for Background Sync Registration

```
document.querySelector("button").addEventListener("click", async () => {
    var swRegistration = await navigator.serviceWorker.register("sw.js");
    swRegistration.sync.register("helloSync").then(function () {
        console.log("helloSync success [main.js]");
    });
});
```

Event Listener for sw.js

```
self.addEventListener('sync', event => {
    if (event.tag == 'helloSync') {
        console.log("helloSync [sw.js]");
    }
});
```

Push Event

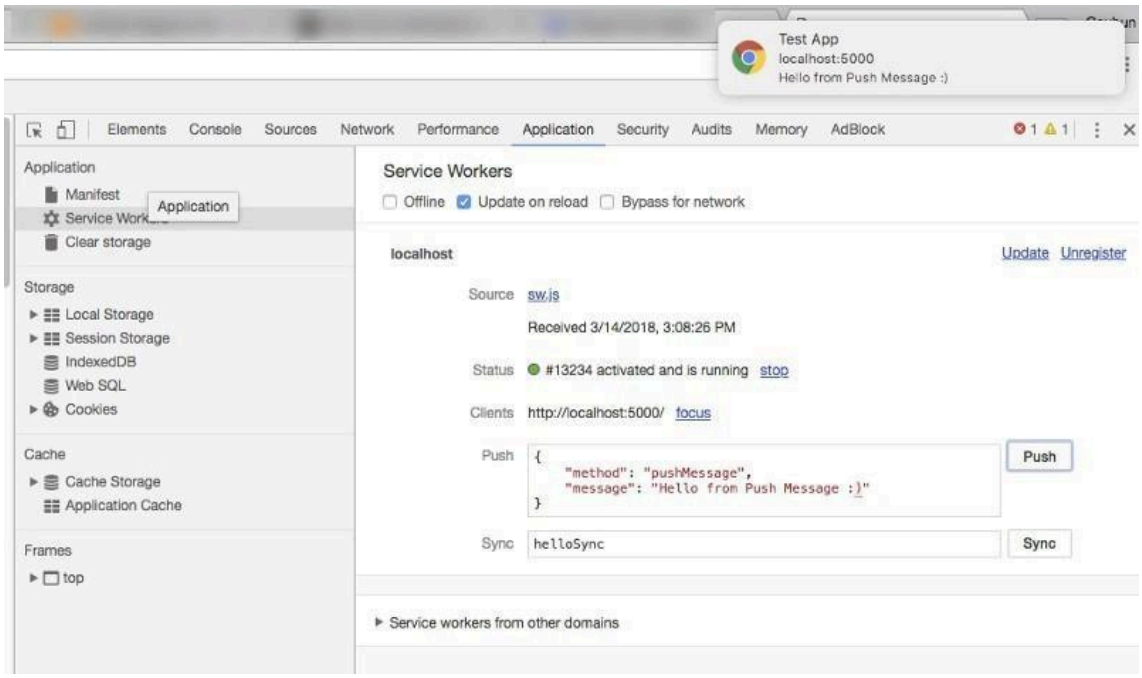
This is the event that handles push notifications that are received from the server. You can apply any method with received data.

We can check in the following example.
“Notification.requestPermission();” is the necessary line to show notification to the user. If you don’t want to show any notification, you don’t need this line.

In the following code block is in sw.js file. You can handle push notifications with this event. In this example, I kept it simple. We send an object that has “method” and “message” properties. If the method value is “pushMessage”, we open the information notification with the “message” property.

```
self.addEventListener('push', event => {
    if (event && event.data) {
        var data = event.data.json();
        if (data.method === "pushMessage") {
            event.waitUntil(self.registration.showNotification("Test App", {
                body: data.message
            }));
        }
    }
});
```

You can use Application Tab from Chrome Developer Tools for testing push notification.



Code
:
sw.js

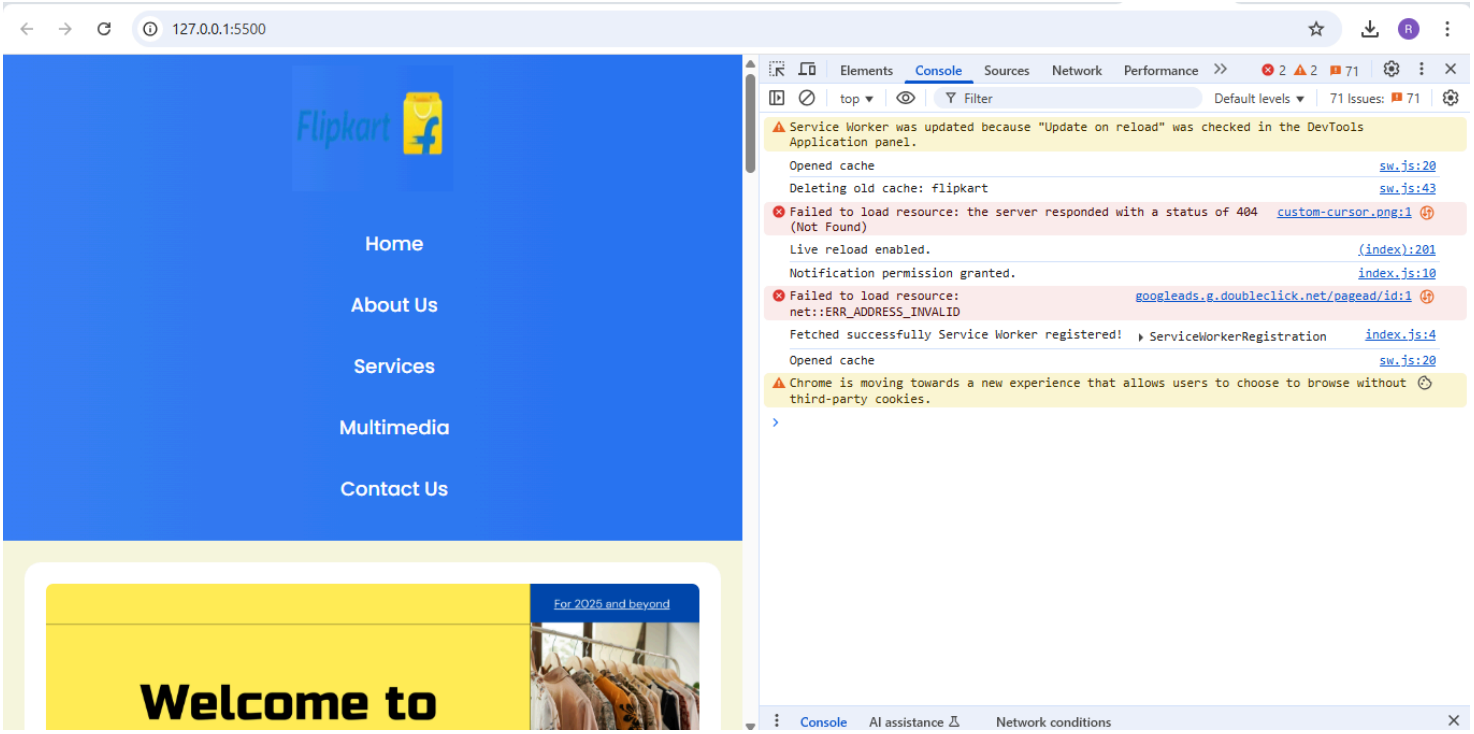
```
self.addEventListener("install", function (event) {
    event.waitUntil(preLoad());
});

self.addEventListener("fetch", function (event) {
    event.respondWith(checkResponse(event.request).catch(function () {
console.log("Fetch from cache successful!") return
        returnFromCache(event.request);
}));
console.log("Fetch successful!") event.waitUntil(addToCache(event.request));
});

self.addEventListener('sync', event => { if
    (event.tag === 'syncMessage') {
```

```
      console.log("Sync successful!")
   }
});

self.addEventListener('push', function   (event)
   { if (event && event.data) {
      var data = event.data.json();
      if (data.method == "pushMessage") {
         console.log("Push notification sent");
         event.waitUntil(self.registration.showNotification("Omkar Sweets Corner",
            { body: data.message
         }))
      }
   }
})


var filesToCache =
   [ '/',
   '/menu',
   '/contactUs',
   '/offline.html',
];

var preLoad = function () {
   return   caches.open("offline").then(function   (cache)   {
      // caching index and important routes
      return cache.addAll(filesToCache);
   });
};

var checkResponse =   function   (request)   {
   return new Promise(function (fulfill, reject) {
      fetch(request).then(function    (response)
         { if (response.status !== 404) {
            fulfill(response);
         } else {
            reject();
```

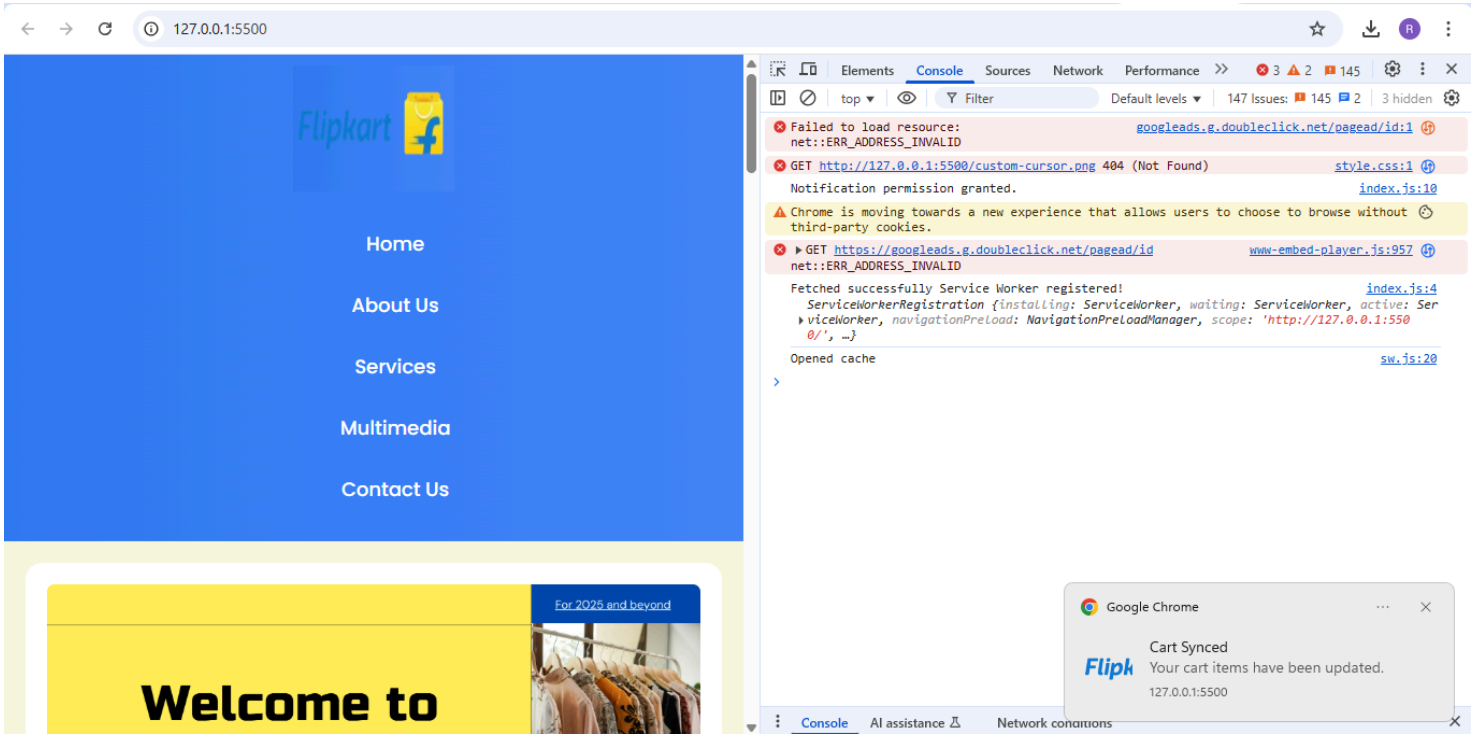
```
}
}, reject);
});
};

var addToCache = function (request) {
    return caches.open("offline").then(function (cache)
       { return fetch(request).then(function (response) {
return cache.put(request, response);
});
});
};

var returnFromCache = function (request) {
    return  caches.open("offline").then(function   (cache)   {
       return cache.match(request).then(function (matching) {
          if (!matching || matching.status == 404) {
             return cache.match("offline.html");
} else {
return matching;
       }
    });
});
};
```

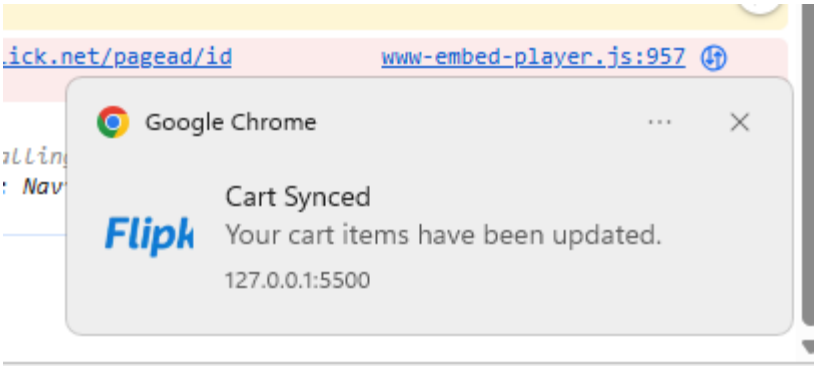
Output:

Fetch event

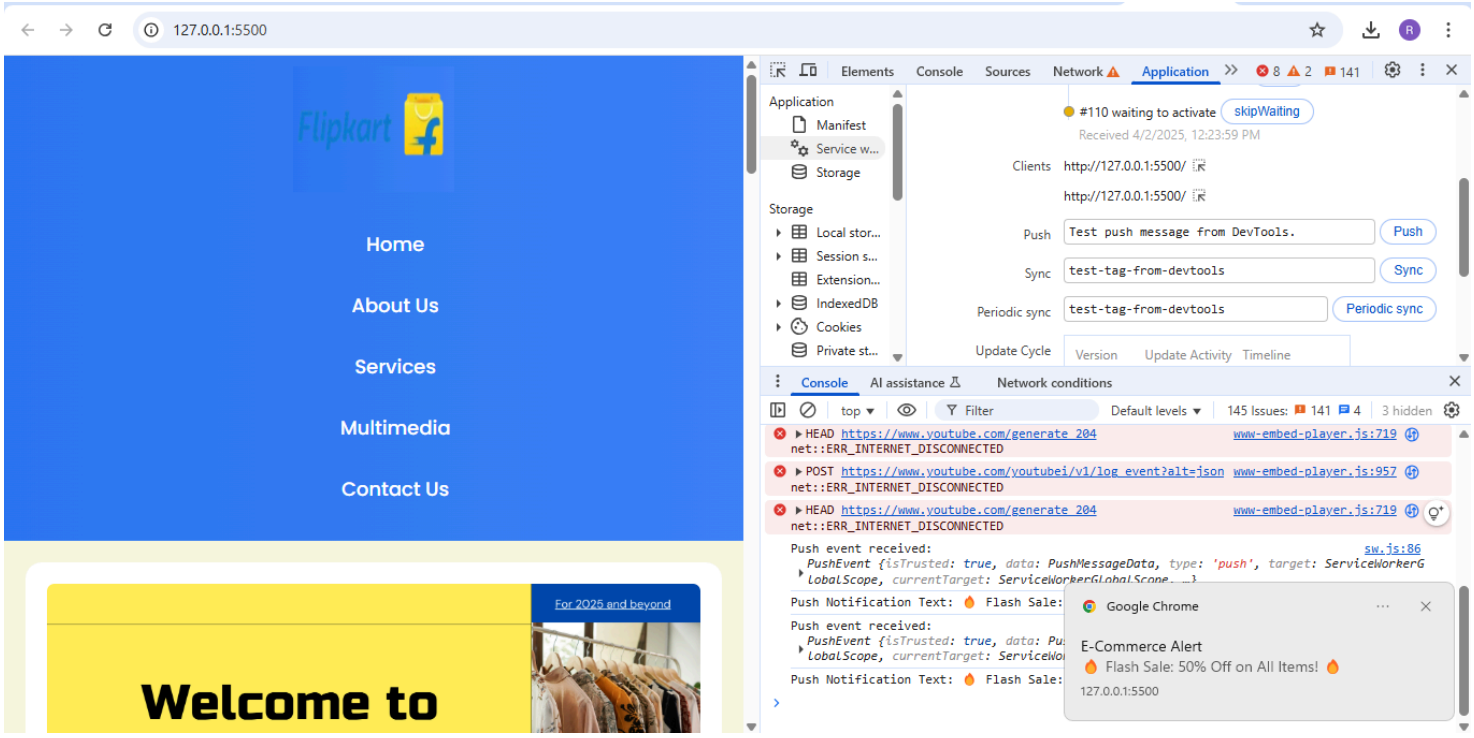

127.0.0.1:5500
Flipkart
Home
About Us
Services
Multimedia
Contact Us
For 2025 and beyond
Welcome to
Elements
Console
Sources
Network
Performance
Service Worker was updated because "Update on reload" was checked in the DevTools Application panel.
Opened cache
sw.js:20
Deleting old cache: flipkart
sw.js:43
Failed to load resource: the server responded with a status of 404 (Not Found)
custom-cursor.png:1
Live reload enabled.
(index):201
Notification permission granted.
index.js:10
Failed to load resource: net::ERR_ADDRESS_INVALID
googleads.g.doubleclick.net/pagead/id:1
Fetched successfully Service Worker registered!
ServiceWorkerRegistration
index.js:4
Chrome is moving towards a new experience that allows users to choose to browse without third-party cookies.
Console
AI assistance
Network conditions

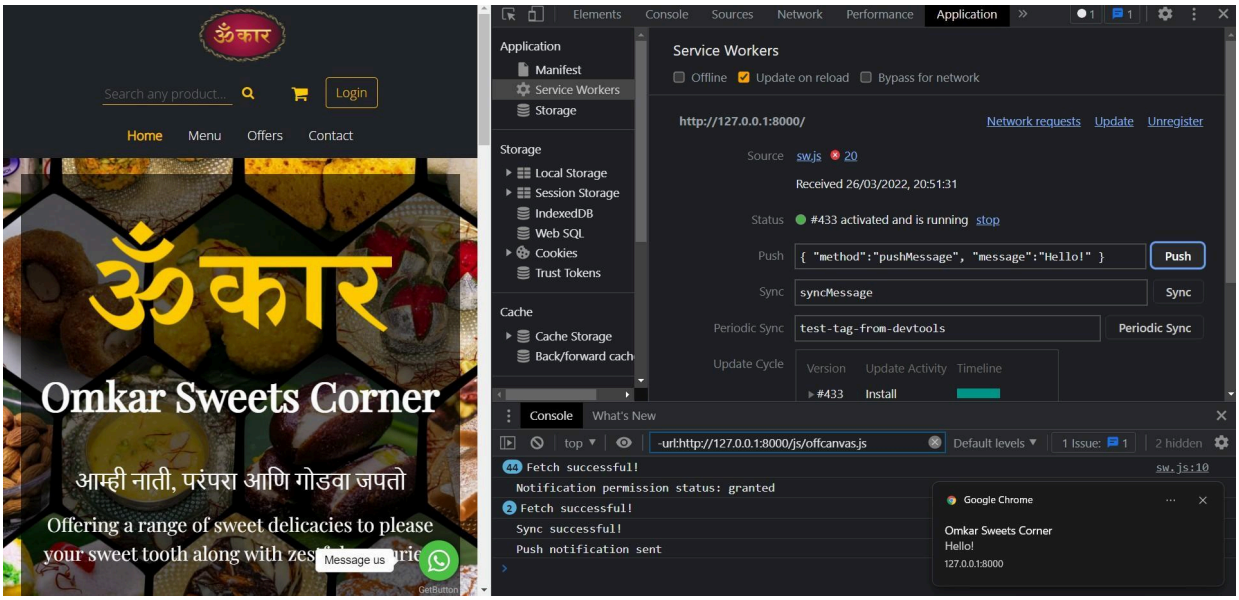
Sync event


127.0.0.1:5500
Flipkart
Home
About Us
Services
Multimedia
Contact Us
For 2025 and beyond
Welcome to
Elements
Console
Sources
Network
Performance
Failed to load resource: net::ERR_ADDRESS_INVALID
googleads.g.doubleclick.net/pagead/id:1
GET http://127.0.0.1:5500/custom-cursor.png 404 (Not Found)
style.css:1
Notification permission granted.
index.js:10
Chrome is moving towards a new experience that allows users to choose to browse without third-party cookies.
GET https://googleads.g.doubleclick.net/pagead/id net::ERR_ADDRESS_INVALID
www-embed-player.js:957
Fetched successfully Service Worker registered!
index.js:4
Opened cache
sw.js:20
Google Chrome
Cart Synced
Your cart items have been updated.
127.0.0.1:5500
Console
AI assistance
Network conditions


ick.net/pagead/id
www-embed-player.js:957
Google Chrome
Cart Synced
Your cart items have been updated.
127.0.0.1:5500

Push event


127.0.0.1:5500
Flipkart
Home
About Us
Services
Multimedia
Contact Us
For 2025 and beyond
Welcome to
Elements
Console
Sources
Network
Application
Application
Manifest
Service w...
Storage
Storage
Local stor...
Session s...
Extension...
IndexedDB
Cookies
Private st...
#110 waiting to activate
skipWaiting
Received 4/2/2025, 12:23:59 PM
Clients
http://127.0.0.1:5500/
http://127.0.0.1:5500/
Push
Test push message from DevTools.
Push
Sync
test-tag-from-devtools
Sync
Periodic sync
test-tag-from-devtools
Periodic sync
Update Cycle
Version
Update Activity
Timeline
Console
AI assistance
Network conditions
top
Filter
Default levels
145 Issues: 141 4
3 hidden
HEAD https://www.youtube.com/generate_204 www-embed-player.js:719
net::ERR_INTERNET_DISCONNECTED
POST https://www.youtube.com/youtubei/v1/log_event?alt=json www-embed-player.js:957
net::ERR_INTERNET_DISCONNECTED
HEAD https://www.youtube.com/generate_204 www-embed-player.js:719
net::ERR_INTERNET_DISCONNECTED
Push event received:
sw.js:86
PushEvent {isTrusted: true, data: PushMessageData, type: 'push', target: ServiceWorkerG
lobalScope, currentTarget: ServiceWorkerGlobalScope, ...}
Push Notification Text: Flash Sale:
Push event received:
PushEvent {isTrusted: true, data: Pu
lobalScope, currentTarget: ServiceWo
Push Notification Text: Flash Sale:
Google Chrome
E-Commerce Alert
Flash Sale: 50% Off on All Items!
127.0.0.1:5500


ॐकार
Search any product...
Login
Home
Menu
Offers
Contact
ॐकार
Omkar Sweets Corner
आम्ही नाती, परंपरा आणि गोडवा जपतो
Offering a range of sweet delicacies to please
Message us
Elements
Console
Sources
Network
Performance
Application
Application
Manifest
Service Workers
Storage
Storage
Local Storage
Session Storage
IndexedDB
Web SQL
Cookies
Trust Tokens
Cache
Cache Storage
Back/forward cach
Service Workers
Offline
Update on reload
Bypass for network
http://127.0.0.1:8000/
Network requests
Update
Unregister
Source
sw.js
20
Received 26/03/2022, 20:51:31
Status
#433 activated and is running
stop
Push
{ "method":"pushMessage", "message":"Hello!" }
Push
Sync
syncMessage
Sync
Periodic Sync
test-tag-from-devtools
Periodic Sync
Update Cycle
Version
Update Activity
Timeline
#433
Install
Console
What's New
top
-url:http://127.0.0.1:8000/js/offcanvas.js
Default levels
1 Issue: 1
2 hidden
44 Fetch successful!
sw.js:10
Notification permission status: granted
2 Fetch successful!
Sync successful!
Push notification sent
Google Chrome
Omkar Sweets Corner
Hello!
127.0.0.1:8000

MAD & PWA Lab
Journal

Experiment No.	10
Experiment Title.	To study and implement deployment of Ecommerce PWA to GitHub Pages.
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO5: Design and Develop a responsive User Interface by applying PWA Design techniques
Grade:	

Shravani Anil Patil
D15A-37

Experiment No.10
MAD & PWA Lab

Aim:
To study and implement deployment of Ecommerce PWA to GitHub Pages.

Theory:

GitHub Pages

Public web pages are freely hosted and easily published. Public webpages hosted directly from your GitHub repository. Just edit, push, and your changes are live.

GitHub Pages provides the following key features:

1. Blogging with Jekyll
2. Custom URL
3. Automatic Page Generator

Reasons for favoring this over Firebase:

1. Free to use
2. Right out of github
3. Quick to set up

GitHub Pages is used by Lyft, CircleCI, and HubSpot.
GitHub Pages is listed in 775 company stacks and 4401 developer stacks.

Pros

1. Very familiar interface if you are already using GitHub for your projects.
2. Easy to set up. Just push your static website to the gh-pages branch and your website is ready.
3. Supports Jekyll out of the box.
4. Supports custom domains. Just add a file called CNAME to the root of your site, add an A record in the site's DNS configuration, and you are done.

Cons

1. The code of your website will be public, unless you pay for a private repository.
2. Currently, there is no support for HTTPS for custom domains. It's probably coming soon though.
3. Although Jekyll is supported, plug-in support is rather spotty.

Firebase

The Realtime App Platform. Firebase is a cloud service designed to power real-time, collaborative applications. Simply add the Firebase library to your application to gain access to a shared data structure; any changes you make to that data are automatically synchronized with the Firebase cloud and with other clients within milliseconds.

Some of the features offered by Firebase are:

1. Add the Firebase library to your app and get access to a shared data structure. Any changes made to that data are automatically synchronized with the Firebase cloud and with other clients within milliseconds.
2. Firebase apps can be written entirely with client-side code, update in real-time out-of-the-box, interoperate well with existing services, scale automatically, and provide strong data security.
3. Data Accessibility- Data is stored as JSON in Firebase. Every piece of data has its own URL which can be used in Firebase's client libraries and as a REST endpoint. These URLs can also be entered into a browser to view the data and watch it update in real-time.

Reasons for favoring over GitHub Pages:

1. Realtime backend made easy
2. Fast and responsive

Instacart, 9GAG, and Twitch are some of the popular companies that use Firebase
Firebase has a broader approval, being mentioned in 1215 company stacks & 4651 developers stacks

Pros

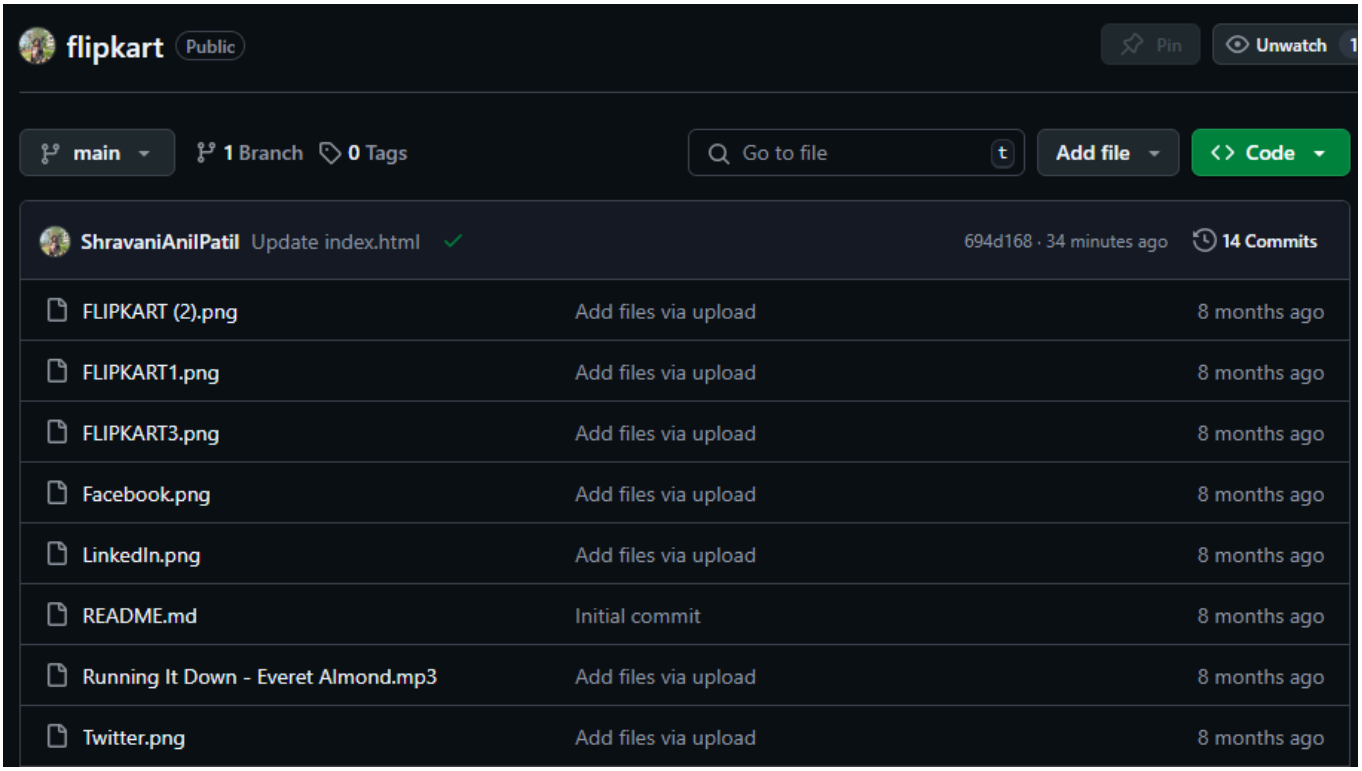
1. Hosted by Google. Enough said.
2. Authentication, Cloud Messaging, and a whole lot of other handy services will be available to you.
3. A real-time database will be available to you, which can store 1 GB of data.
4. You'll also have access to a blob store, which can store another 1 GB of data.
5. Support for HTTPS. A free certificate will be provisioned for your custom domain within 24 hours.

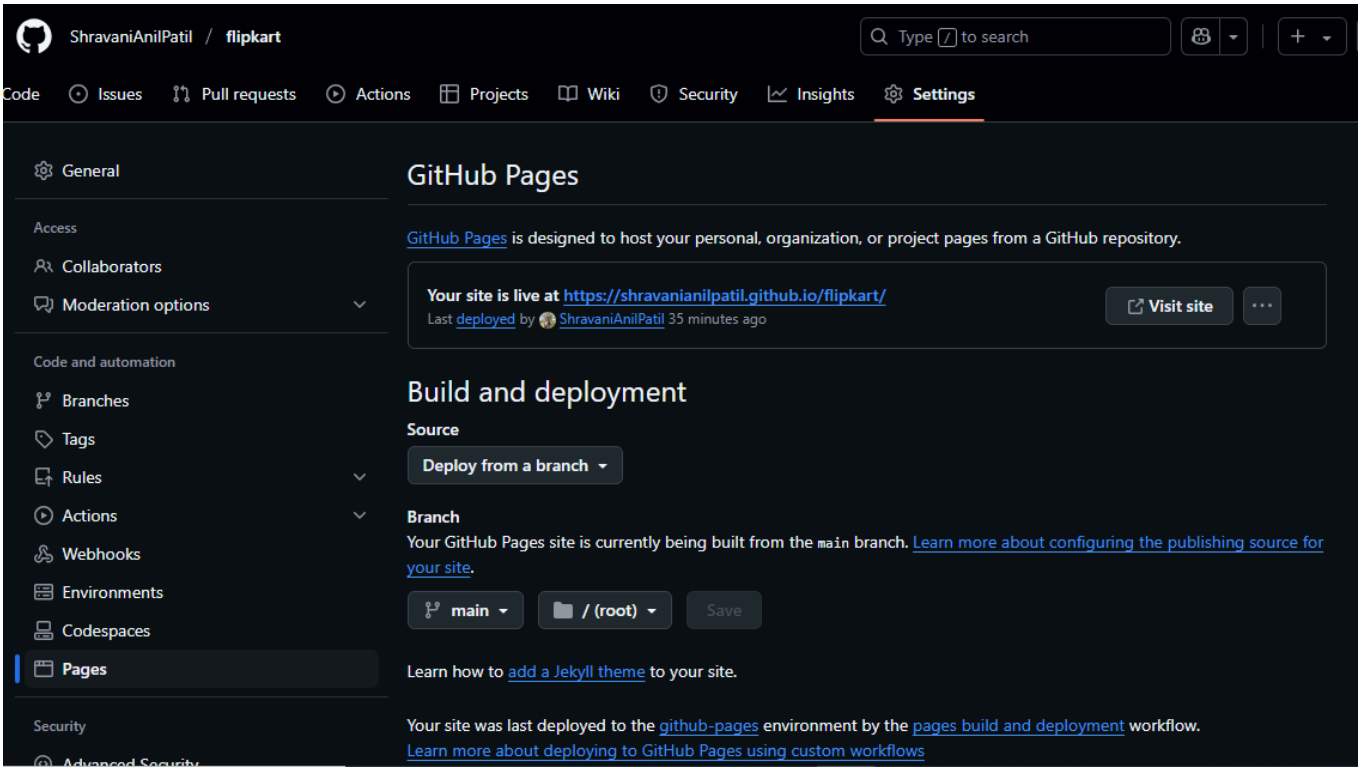
Cons

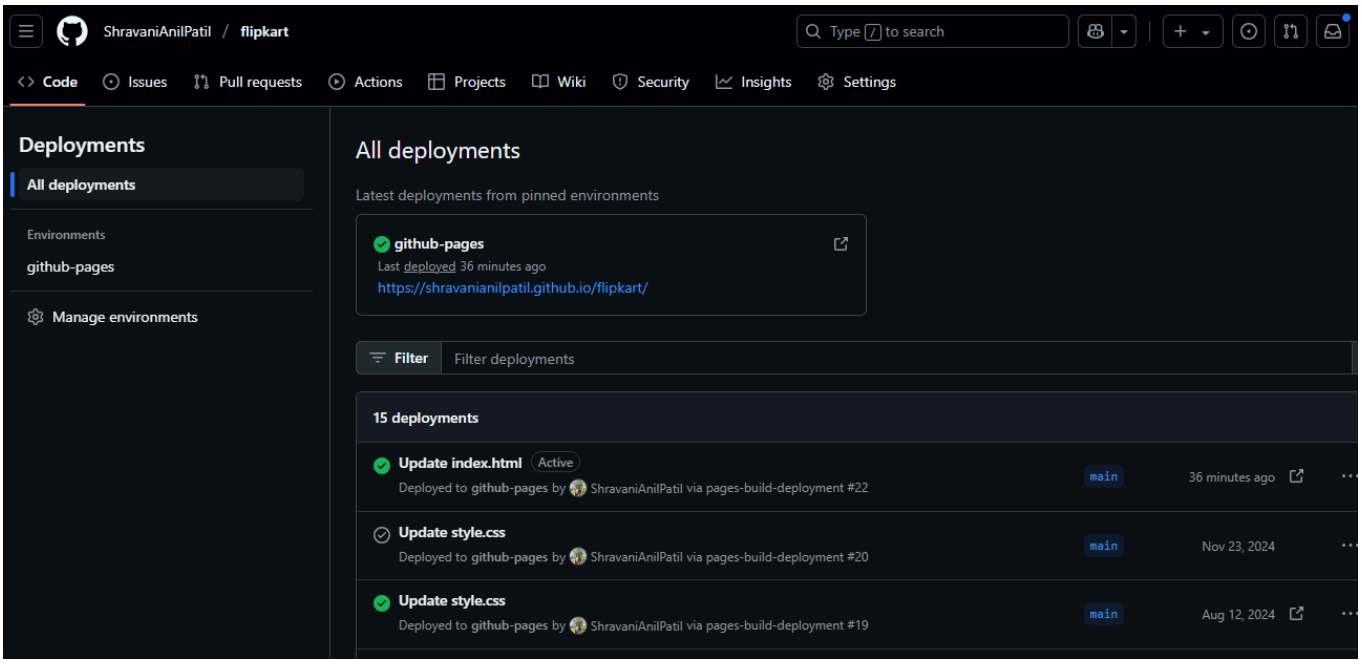
1. Only 10 GB of data transfer is allowed per month. But this is not really a big problem, if you use a CDN or AMP.
2. Command-line interface only.
3. No in-built support for any static site generator.

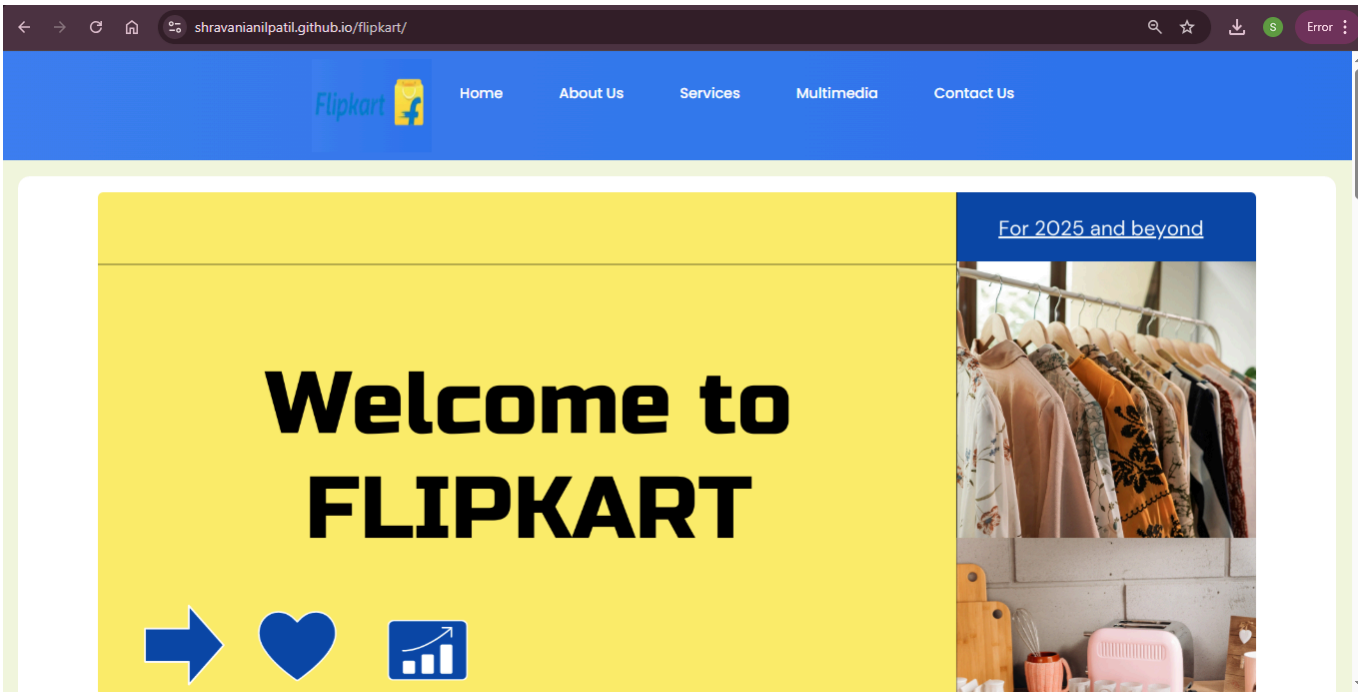
Link to our GitHub repository: https://github.com/ShravaniAnilPatil/flipkart

Github Screenshot:









Deployed Link: https://shravanianilpatil.github.io/flipkart/

MAD & PWA Lab
Journal

Experiment No.	11
Experiment Title.	To use google Lighthouse PWA Analysis Tool to test the PWA functioning.
Roll No.	37
Name	Shravani Anil Patil
Class	D15A
Subject	MAD & PWA Lab
Lab Outcome	LO6: Develop and Analyze PWA Features and deploy it over app hosting solution
Grade:	

Shravani Patil **D15A-37**

Experiment 11

Aim : To use google Lighthouse PWA Analysis Tool to test the PWA functioning.

Theory :

What is Google Lighthouse?
Google Lighthouse is an open-source automated tool designed to improve the quality, performance, accessibility, SEO, and best practices of web applications. It is commonly used by developers and website owners to audit their websites and identify areas for optimization.

Key Features of Google Lighthouse

Lighthouse provides a detailed report in five key categories:

1. Performance:
   Measures page speed, load time, and responsiveness.
   Includes metrics like First Contentful Paint (FCP), Largest Contentful Paint (LCP), Cumulative Layout Shift (CLS), and Time to Interactive (TTI).

2. Accessibility:
   Evaluates how easily users (especially those with disabilities) can interact with a webpage.
   Checks for proper contrast ratios, alt text, ARIA attributes, keyboard navigability, and screen reader compatibility.

3. Best Practices:
   Ensures the website follows modern web development standards.
   Checks for HTTPS security, proper image formats, JavaScript errors, and vulnerabilities.

4. SEO (Search Engine Optimization):
   Analyzes on-page SEO elements to improve search engine ranking.
   Checks for meta descriptions, mobile-friendliness, structured data, and canonical tags.

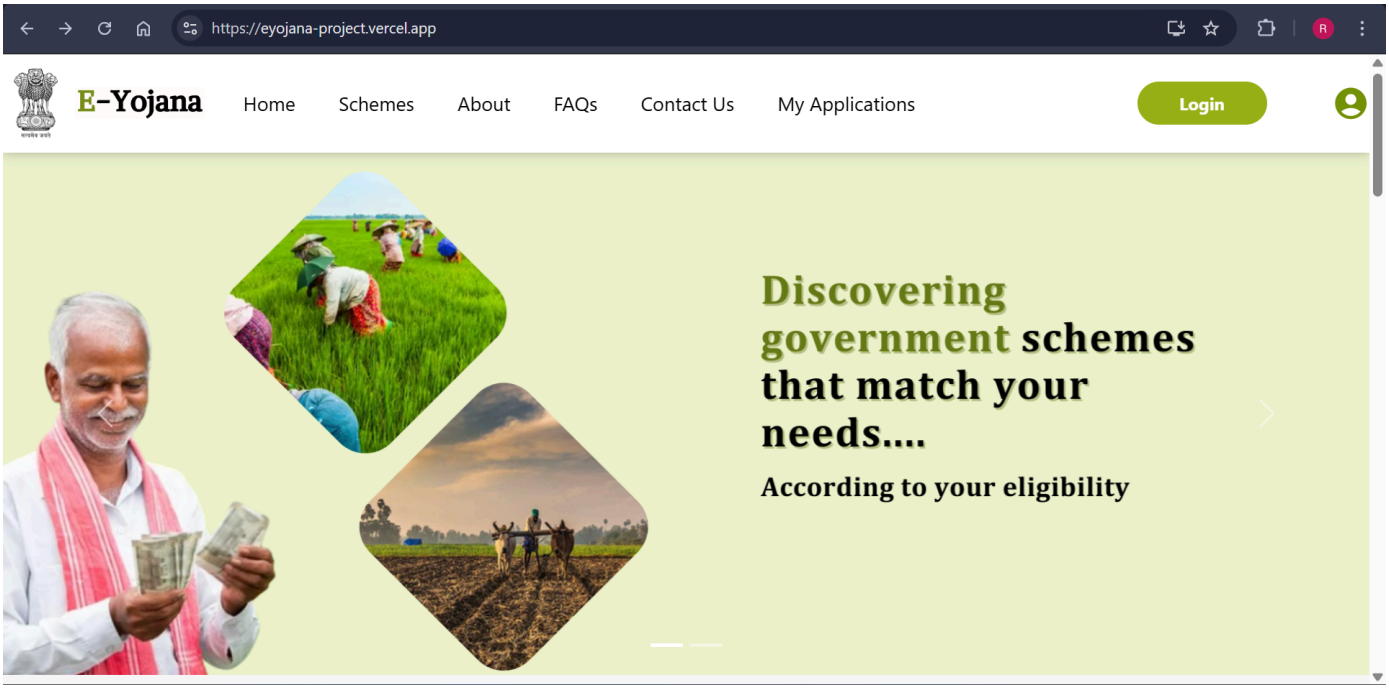
5. Progressive Web App (PWA):
   Evaluates if a website meets PWA standards, allowing it to function like a native app.
   Checks for service workers, offline capabilities, and fast load times.

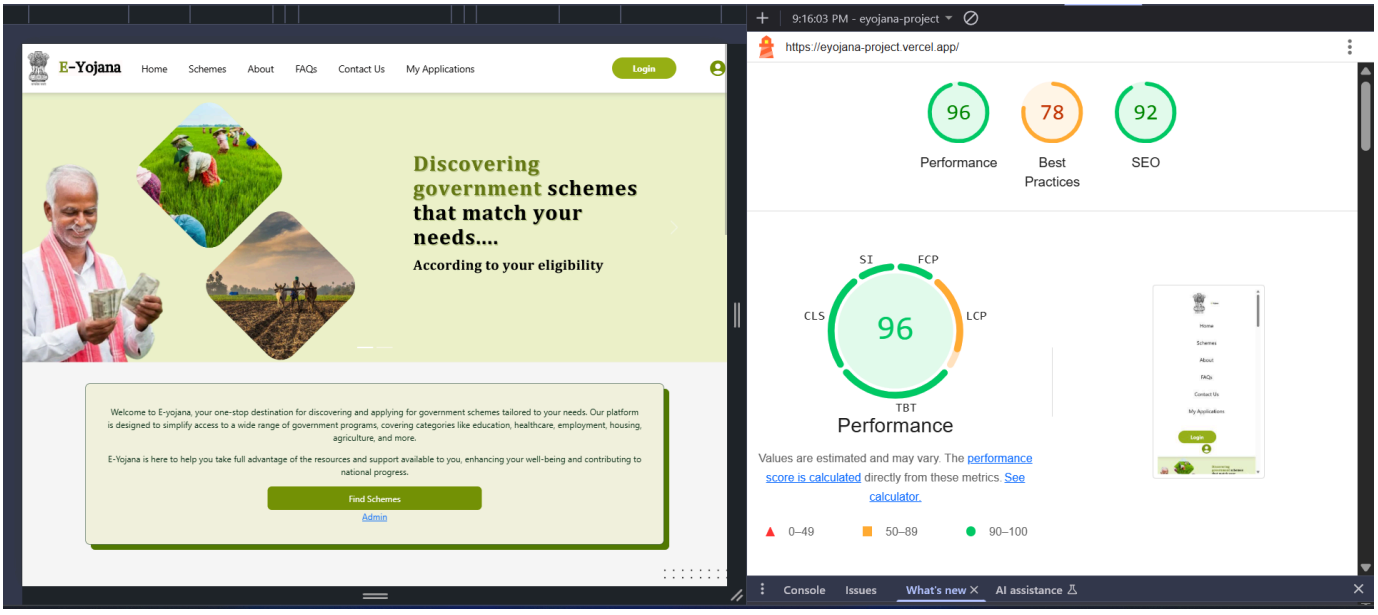
How Lighthouse Scores Are Calculated
Lighthouse assigns scores between 0 and 100 based on various metrics.

- 90-100: Excellent
- 50-89: Needs improvement
- 0-49: Poor

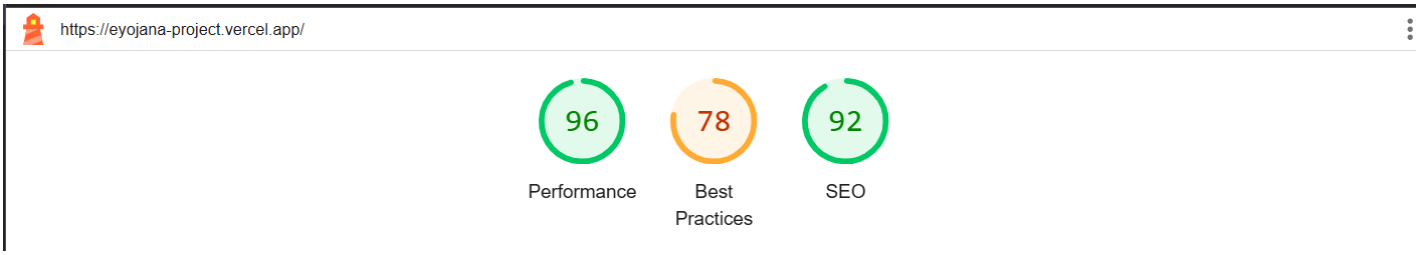
Each score is based on real-world performance data and lab tests.

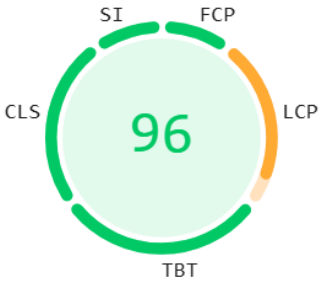
Deployed website:





Lighthouse Report:





Performance

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

▲ 0–49 ■ 50–89 ● 90–100

METRICS

● First Contentful Paint 0.6 s	■ Largest Contentful Paint 1.3 s
● Total Blocking Time 0 ms	● Cumulative Layout Shift 0.007
● Speed Index 0.6 s	

DIAGNOSTICS

- ▲ Serve images in next-gen formats — Potential savings of 1,113 KiB
- ▲ Properly size images — Potential savings of 916 KiB
- ▲ Preload Largest Contentful Paint image — Potential savings of 40 ms
- ▲ Reduce unused JavaScript — Potential savings of 267 KiB
- ▲ Largest Contentful Paint element — 1,320 ms
- ▲ Reduce unused CSS — Potential savings of 33 KiB
- ▲ Eliminate render-blocking resources — Potential savings of 250 ms
- ■ Image elements do not have explicit `width` and `height`
- ■ Minify JavaScript — Potential savings of 25 KiB

Conclusion: Thus we successfully used google Lighthouse PWA Analysis Tool for testing the PWA functioning.