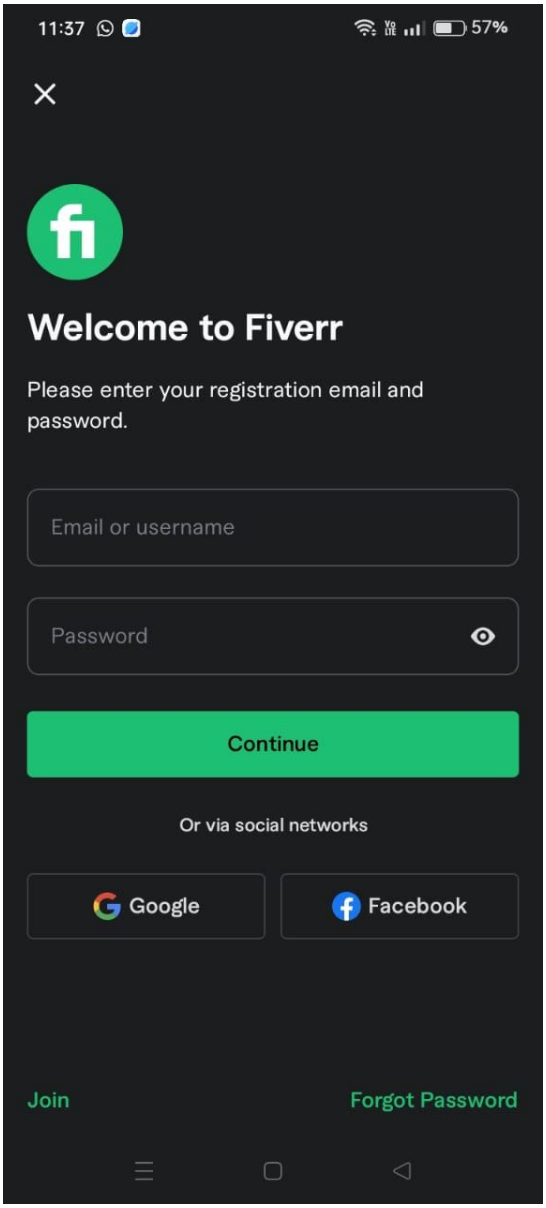
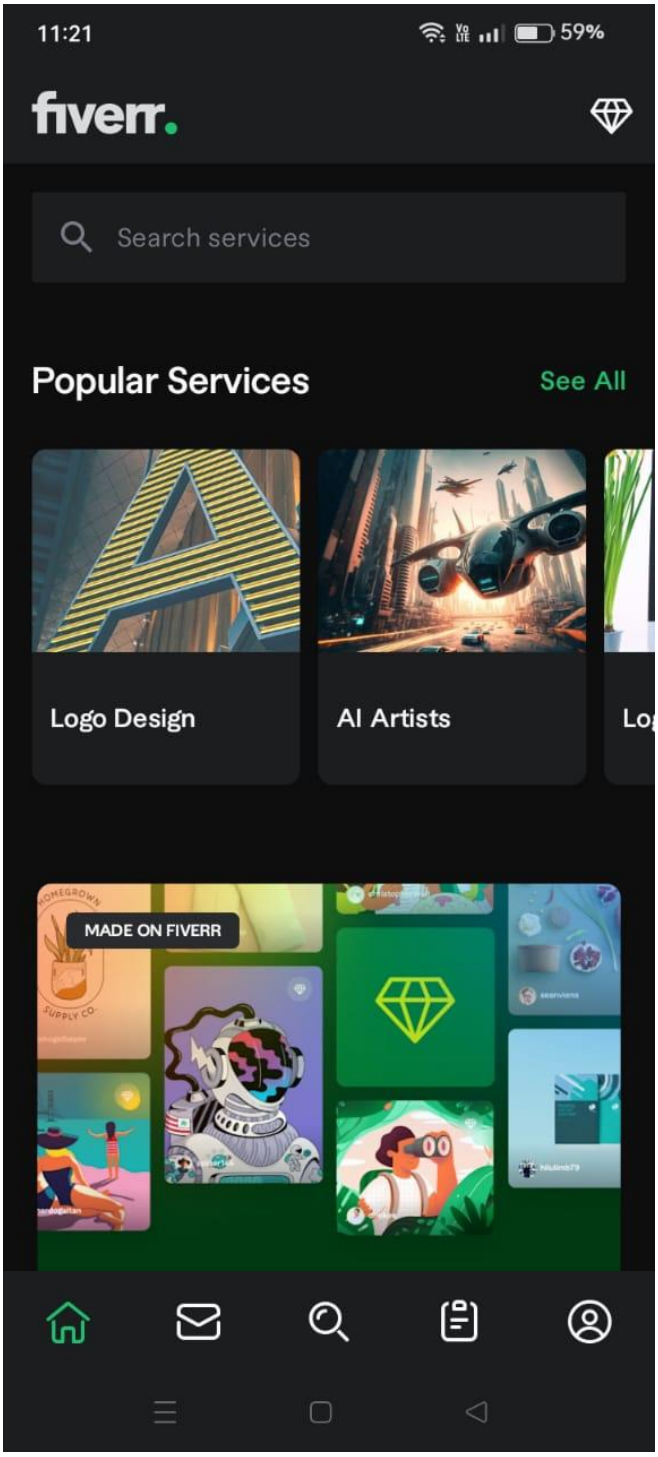
MAD and PWA LAB

Aim: Selecting features for application development, the features should comprise of:

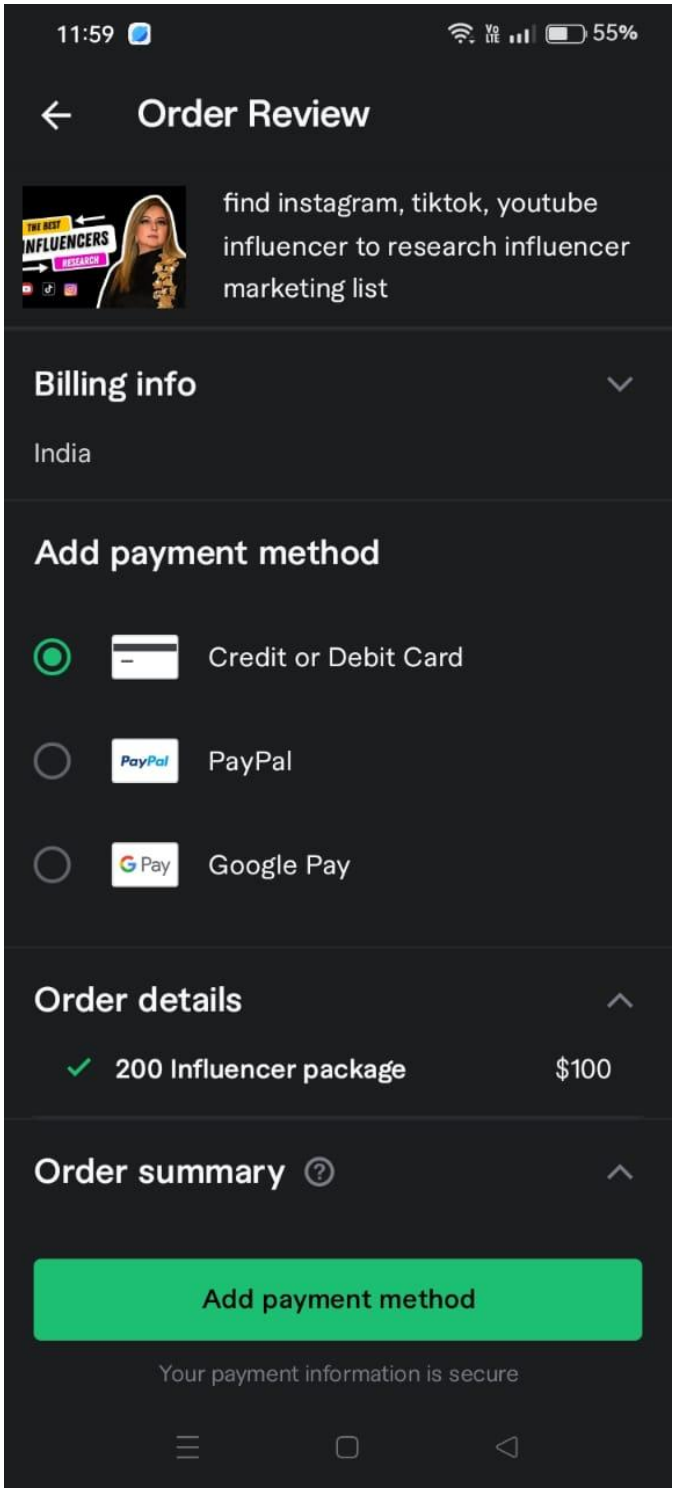
1. Common widgets
2. Should include icons, images, charts etc.
3. Should have an interactive Form
4. Should apply navigation, routing and gestures
5. Should connect with FireBase database

Screenshot	Features
	**Landing Page** 1. Sign in using email (Firebase Authentication). 2. Firebase integration to store and retrieve user data (e.g., name, email). 3. Google and Facebook sign in option



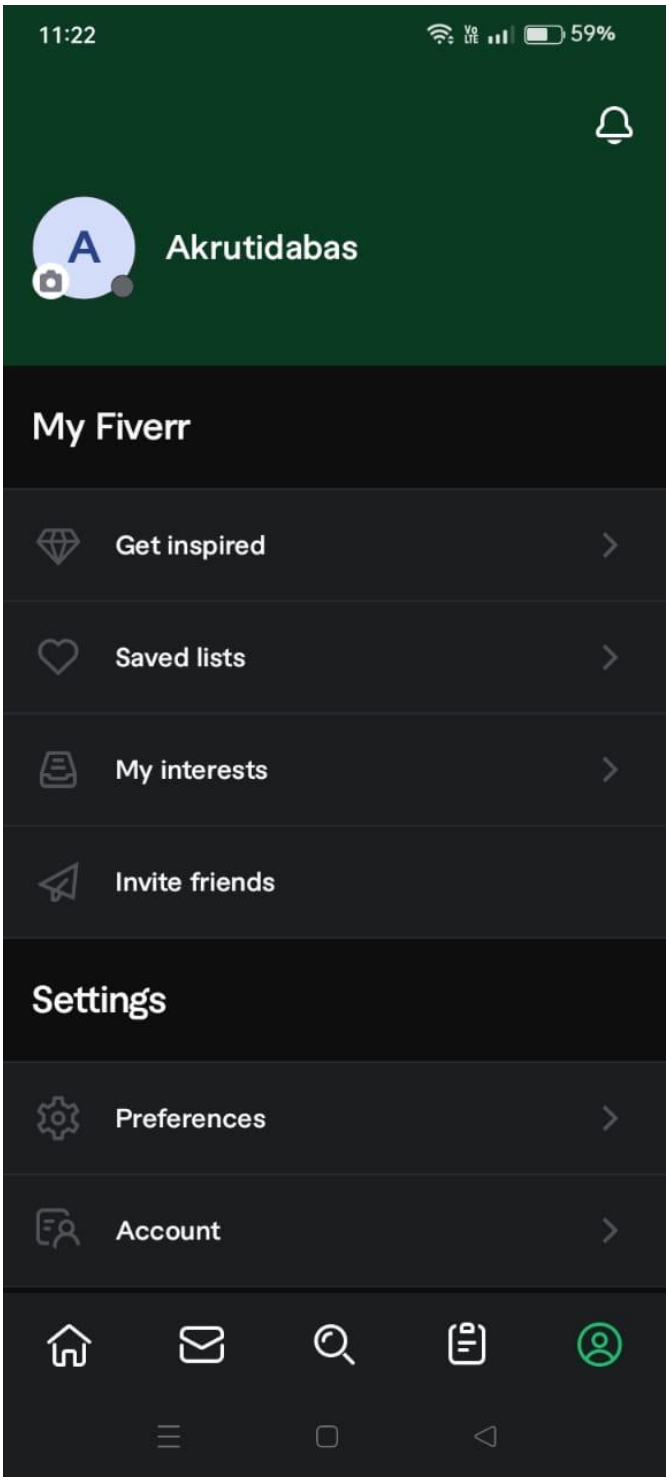
Homepage:

1. Display a staggered grid of services fetched from Firestore.
2. Navigation icons for Home, Favorites, Search, and Profile.
3. Each service widget includes icons for "Save," "Share," and "Like."
4. Search bar to search new services.



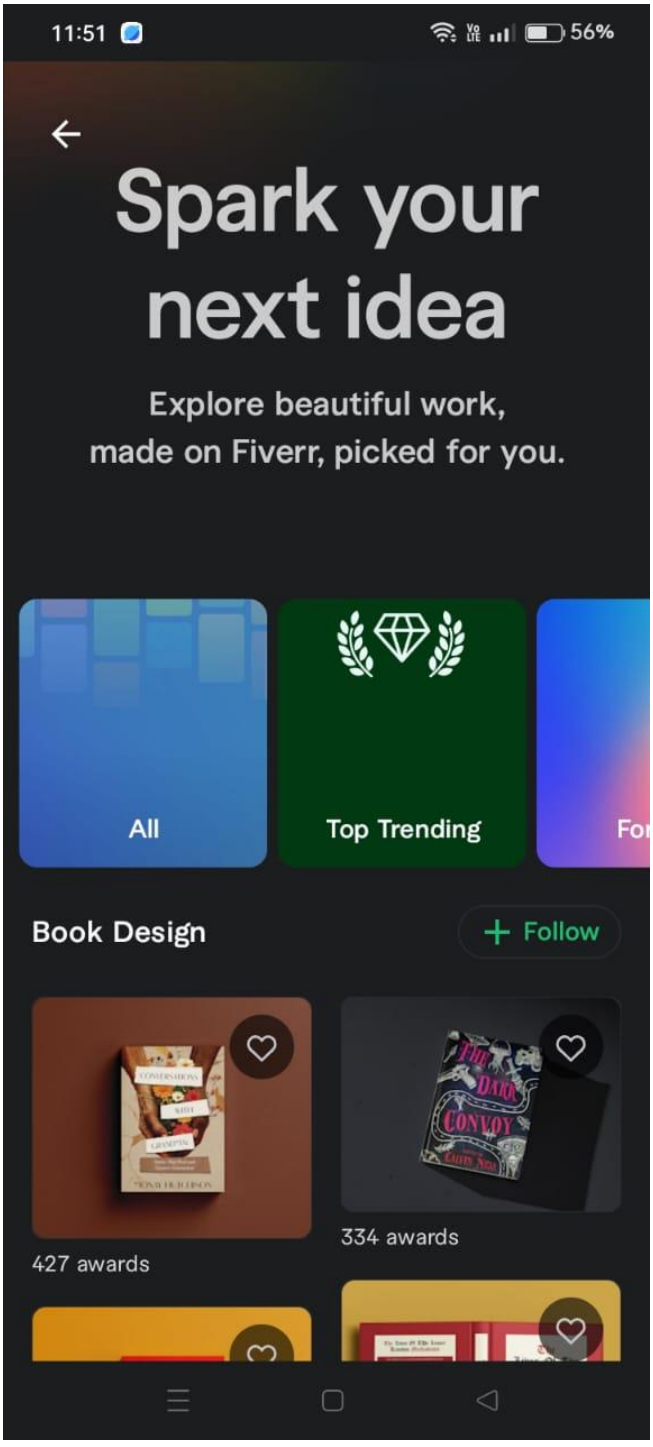
Billing Page:

1. The interactive form to fill in the payment details.
2. Options to choose from to make the payment.
3. Validation of details before initiating the payment.



User Profile Page:

1. Display user's name, email, and profile picture.
2. Tabs for viewing saved lists, intersts and inspiration.
3. Button to edit profile details.



Inspiration Section

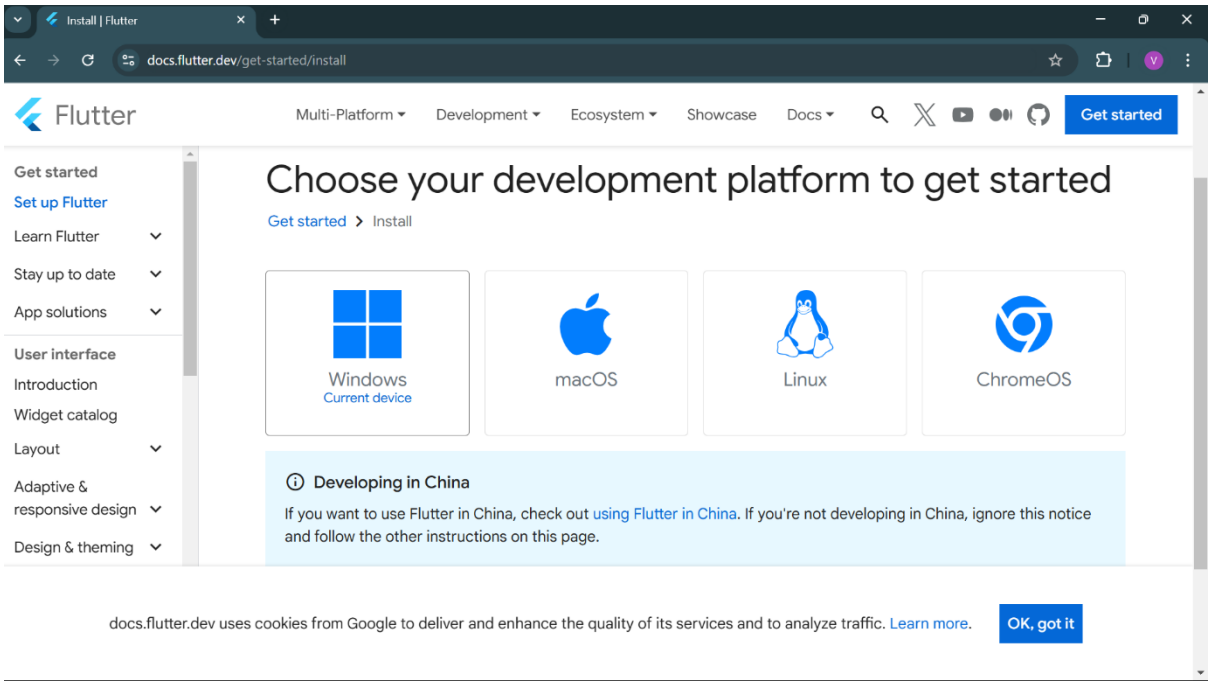
1. Display of new inspirations to start anew.
2. Option to organize images into custom boards.
3. Gesture controls for long-press to delete or drag to reorder.
4. Option to follow favorite page.

EXPERIMENT NO: - 01

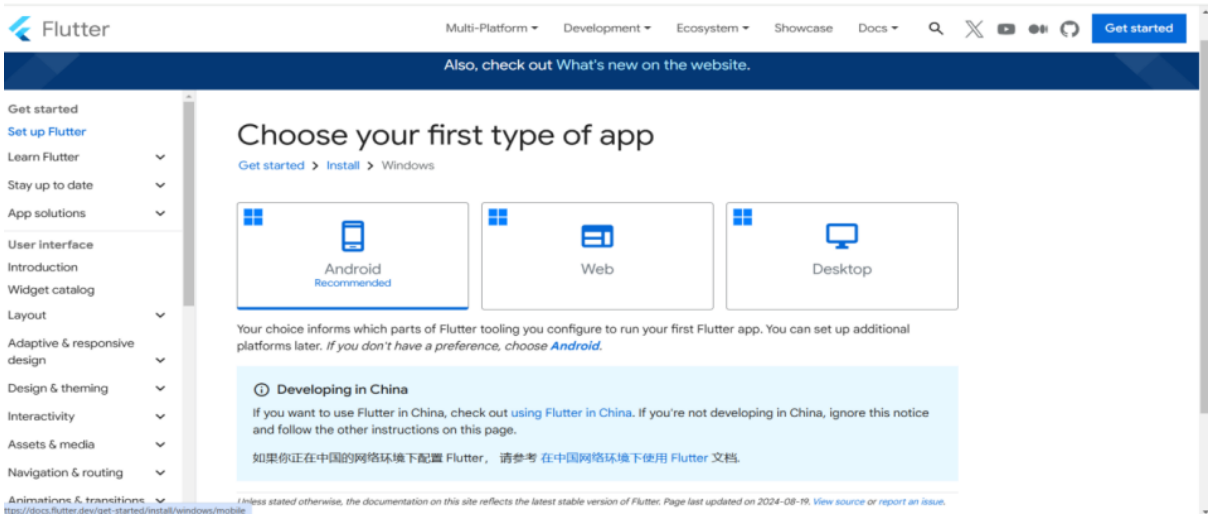
Name:- Akruti Dabas Class:- D15A Roll:No: - 11

AIM: - Installation and Configuration of Flutter Environment.

Step 1: Go to the official Flutter website: https://docs.flutter.dev/get-started/install

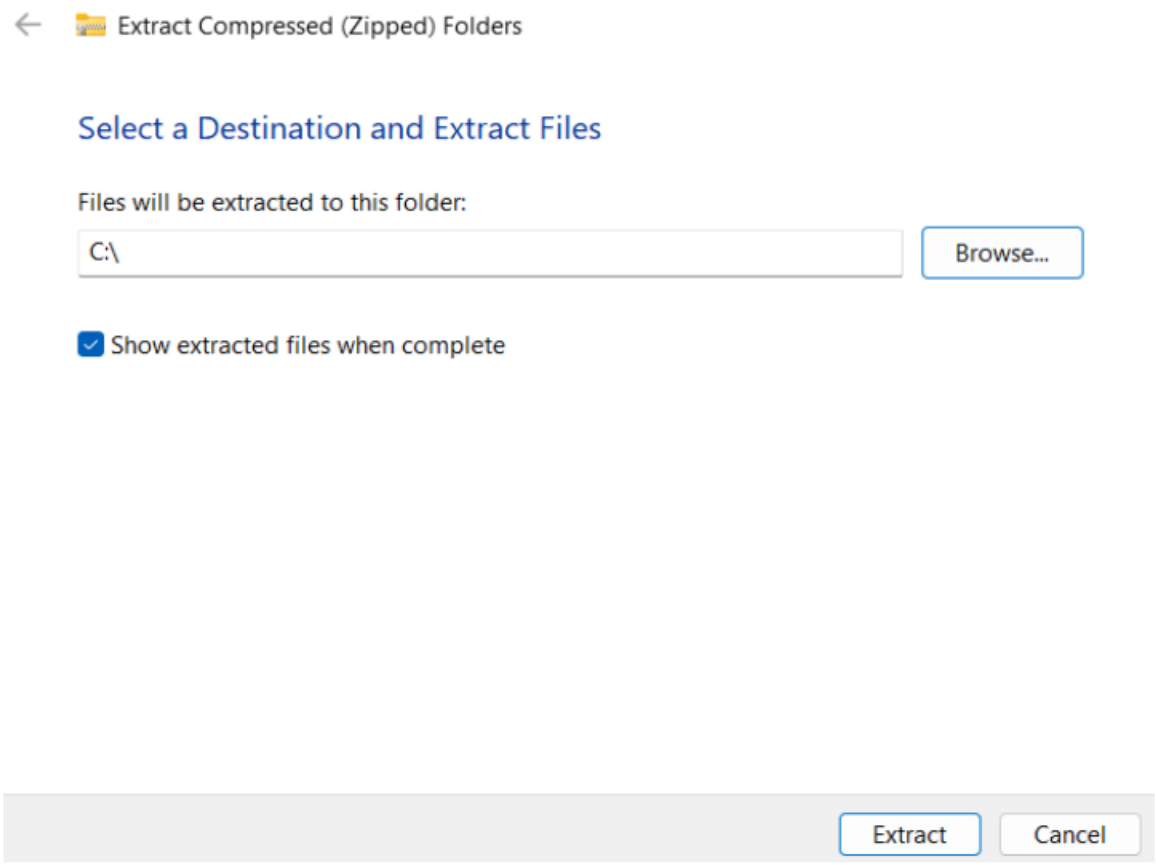


Step 2: To download the latest Flutter SDK, click on the Windows icon > Android

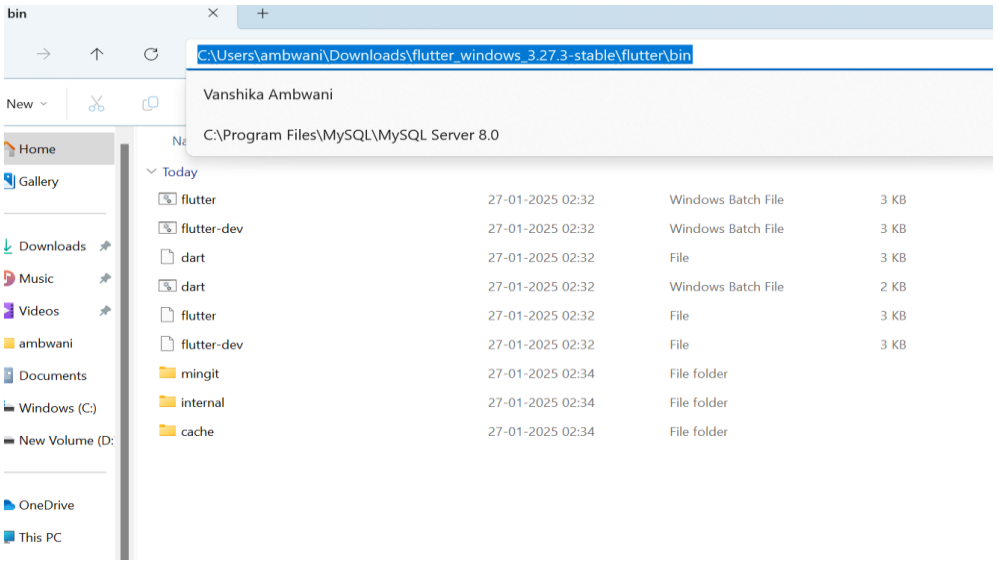


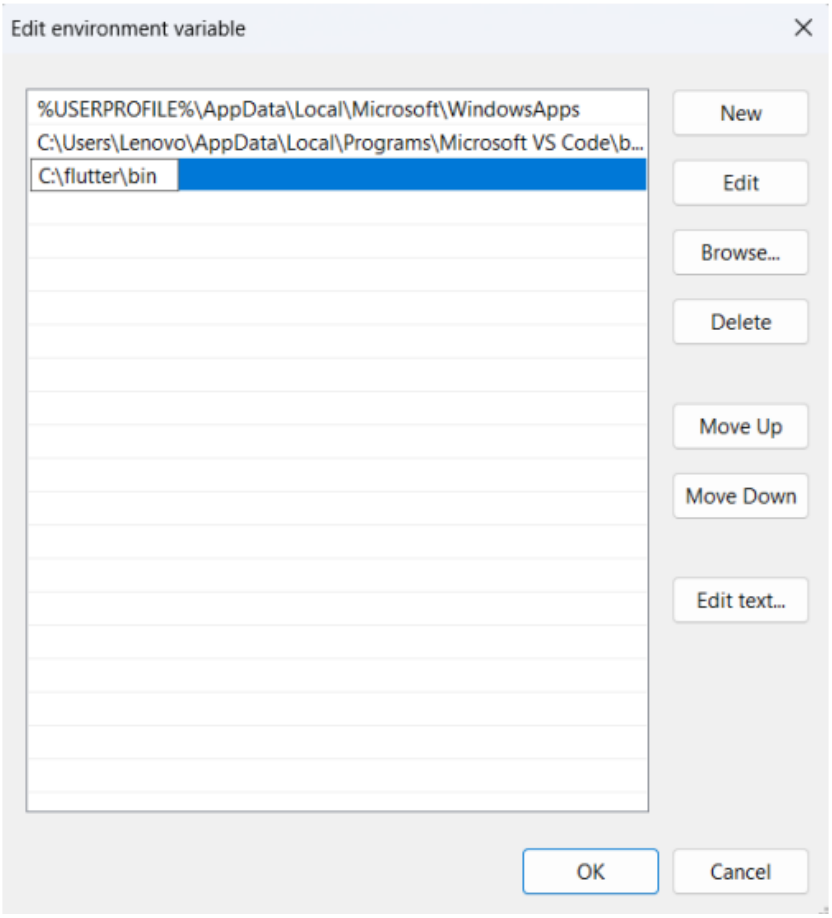
Step 3: For Windows, download the stable release (a .zip file).

Step 4: Extract the ZIP file to a folder (e.g., C:\flutter)



Step 5 :- Add Flutter to System PATH Right-click on the Start Menu > System > Advanced system settings > Environment Variables. Under System Variables, find Path and click Edit. Add the full path to the flutter/bin directory (e.g., C:\flutter\bin).





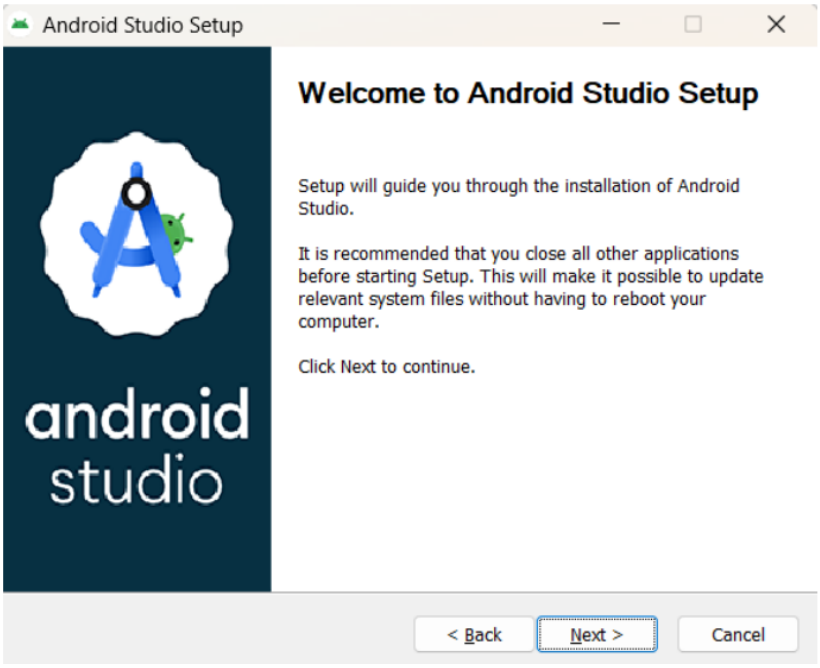
Step 6 : - Now, run the $ flutter command in command prompt

```
  install           Install a Flutter app on an attached device.
  logs              Show log output for running Flutter apps.
  screenshot        Take a screenshot from a connected device.
  symbolize         Symbolize a stack trace from an AOT-compiled Flutter app.

Run "flutter help <command>" for more information about a command.
Run "flutter help -v" for verbose help output, including less commonly used options.

                Welcome to Flutter! - https://flutter.dev

The Flutter tool uses Google Analytics to anonymously report feature usage
statistics and basic crash reports. This data is used to help improve
Flutter tools over time.

Flutter tool analytics are not sent on the very first run. To disable
reporting, type 'flutter config --no-analytics'. To display the current
setting, type 'flutter config'. If you opt out of analytics, an opt-out
event will be sent, and then no further information will be sent by the
Flutter tool.

By downloading the Flutter SDK, you agree to the Google Terms of Service.
The Google Privacy Policy describes how data is handled in this service.

Moreover, Flutter includes the Dart SDK, which may send usage metrics and
crash reports to Google.

Read about data we send with crash reports:
https://flutter.dev/to/crash-reporting

See Google's privacy policy:
```

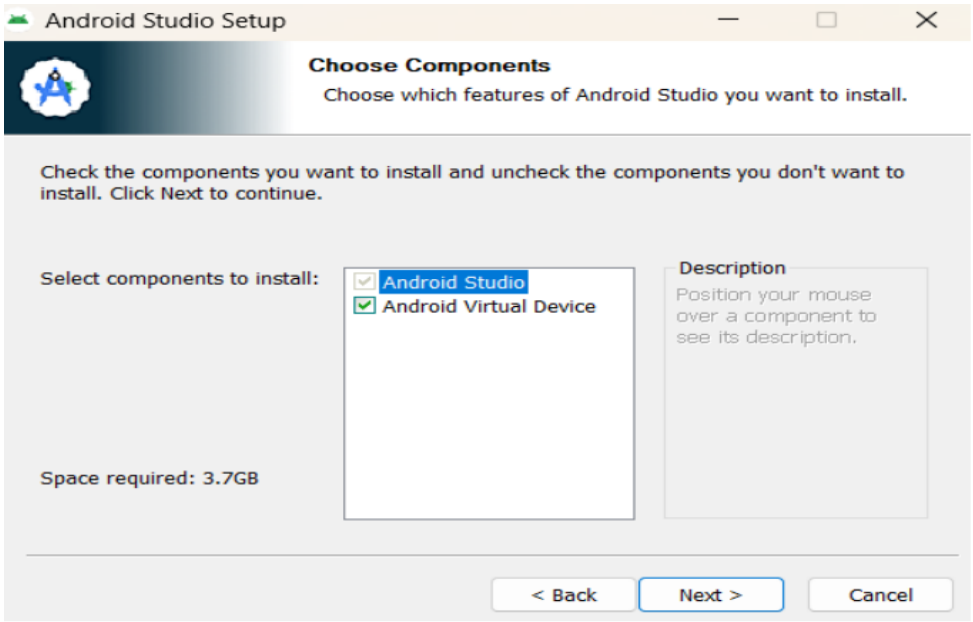
Step 7:- Run the $ flutter doctor command. This command checks for all the requirements of Flutter app development and displays a report of the status of your Flutter installation

Step 8 : - Go to Android Studio and download the installer

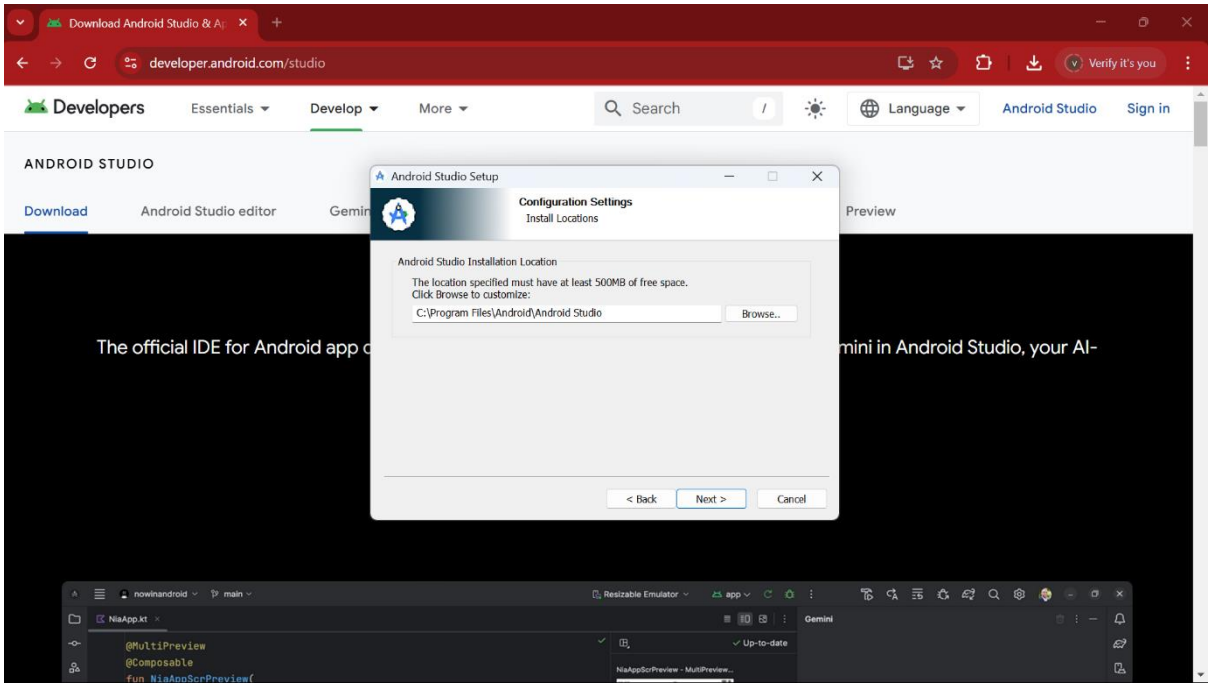
Step 8.1: - When the download is complete, open the .exe file and run it. You will get the following dialog box



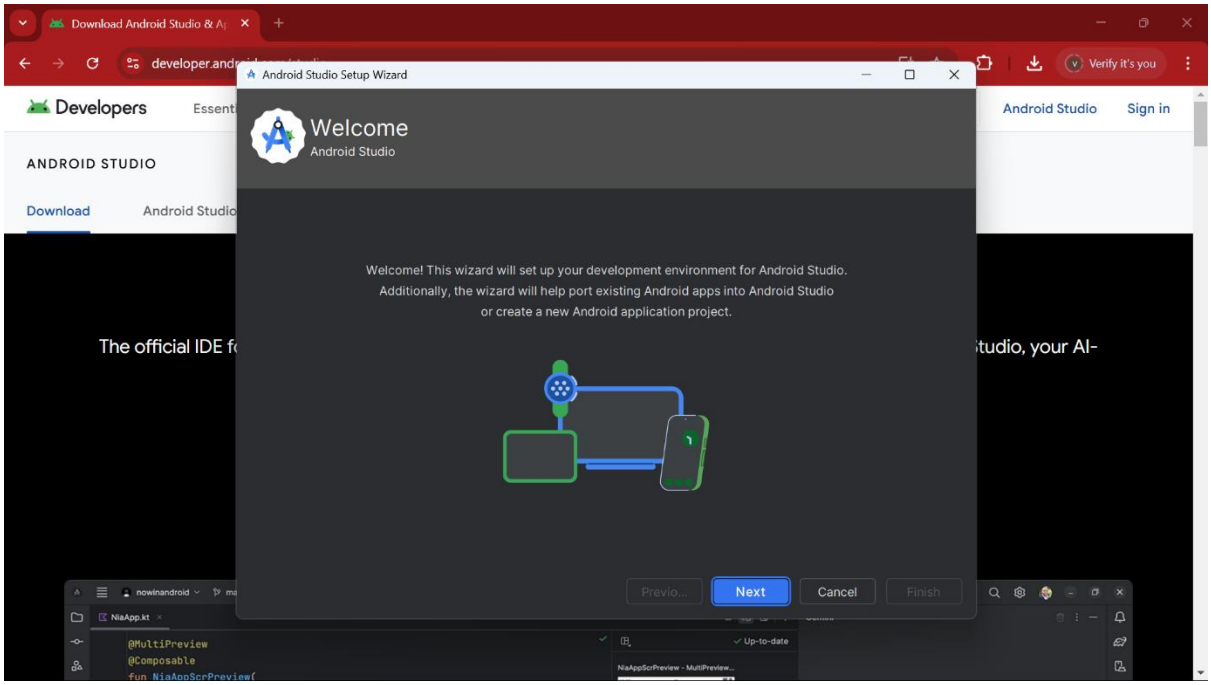
Step 8.2: - Select all the Checkboxes and Click on ‘Next’ Button.

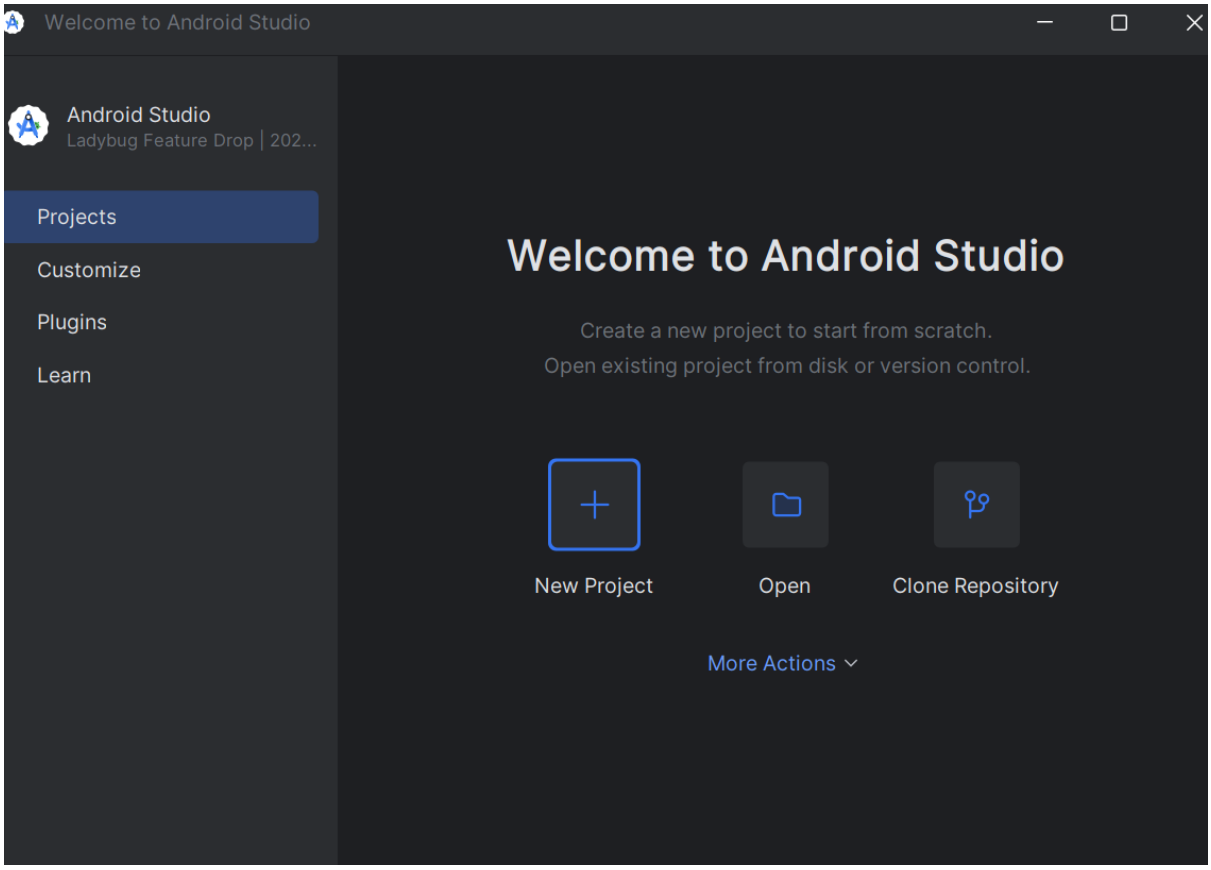


Step 8.3: - Change the destination as per your convenience and click on ‘Next’ Button.



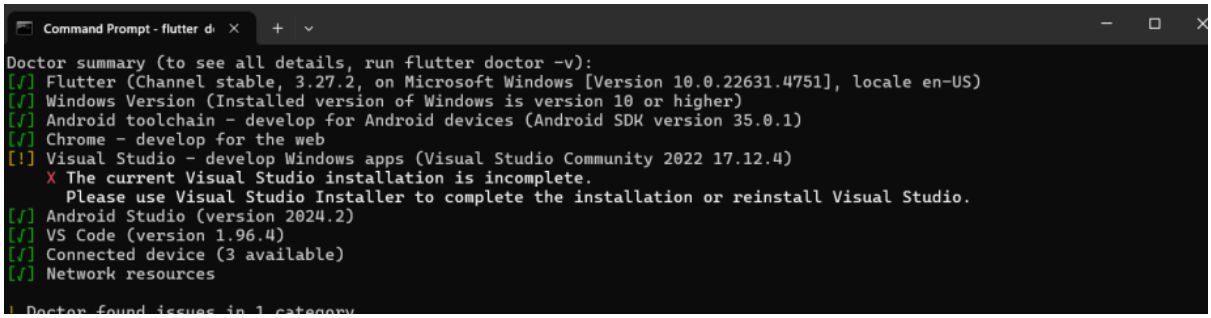
Step 8.4: - Follow the steps of the installation wizard. Once the installation wizard completes, you will get the following screen.

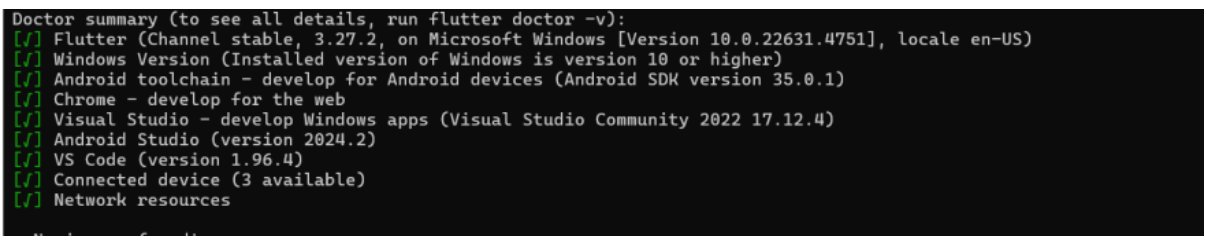




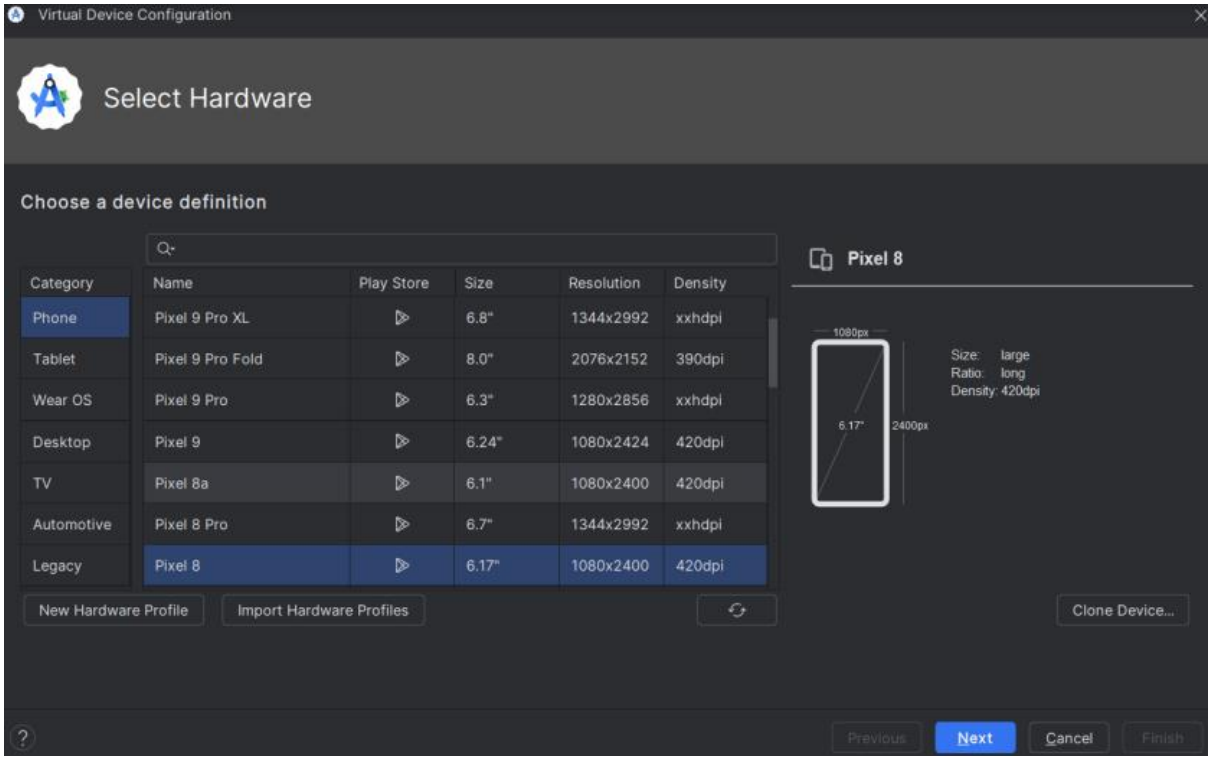
Step 8.5: - Go to Preferences > Appearance & Behavior > System Settings > Android SDK. Select the SDK Tools tab and check Android SDK Command-line Tools and Install it.

Step 9: - Open a terminal and run the following command

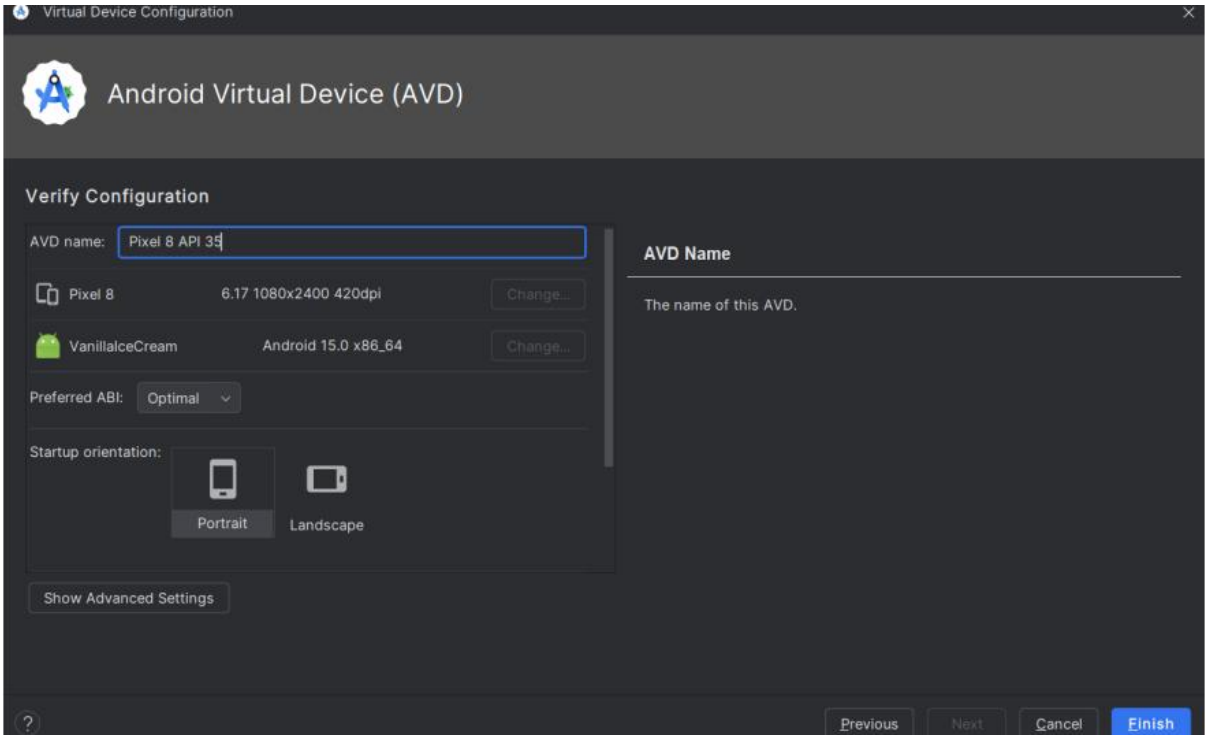




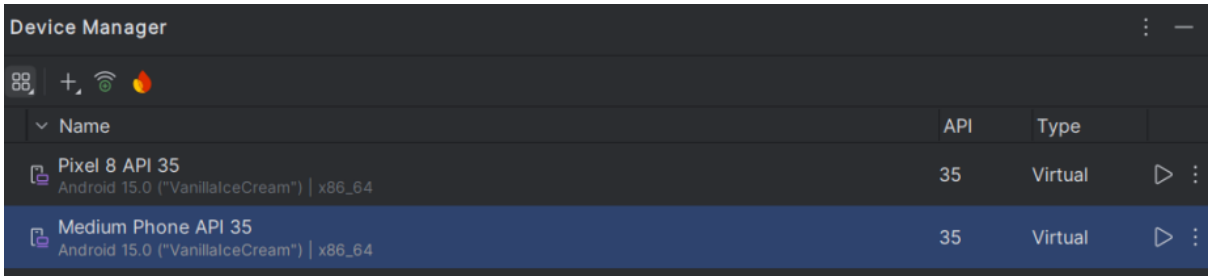
Step 10: - Next, you need to set up an Android emulator. It is responsible for running and testing the Flutter application

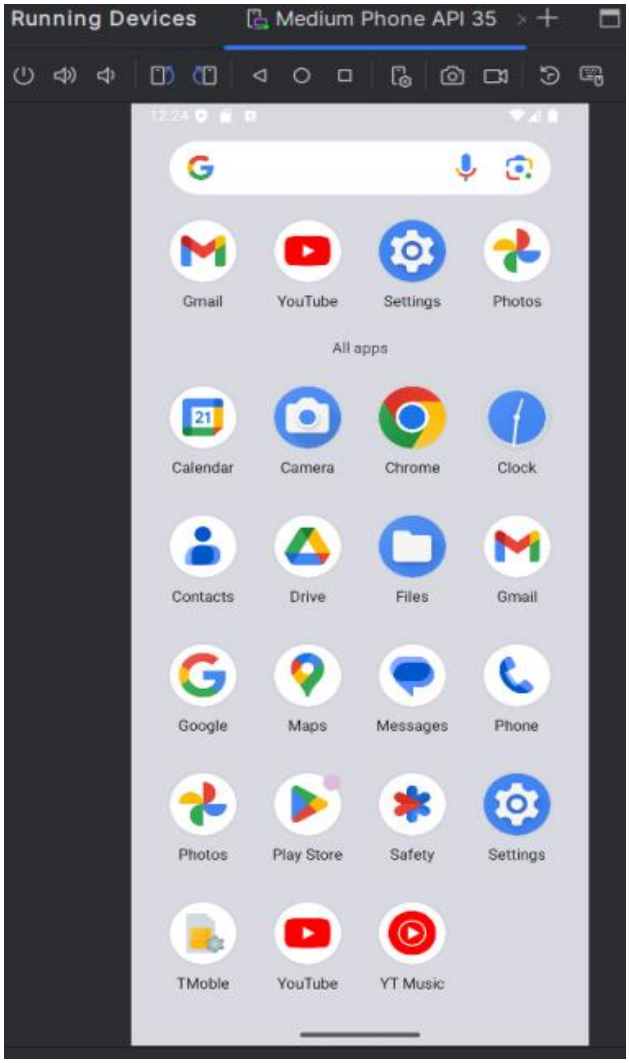


Step 10.1: - Open Android Studio and go to Tools > AVD Manager. Create a new virtual device.



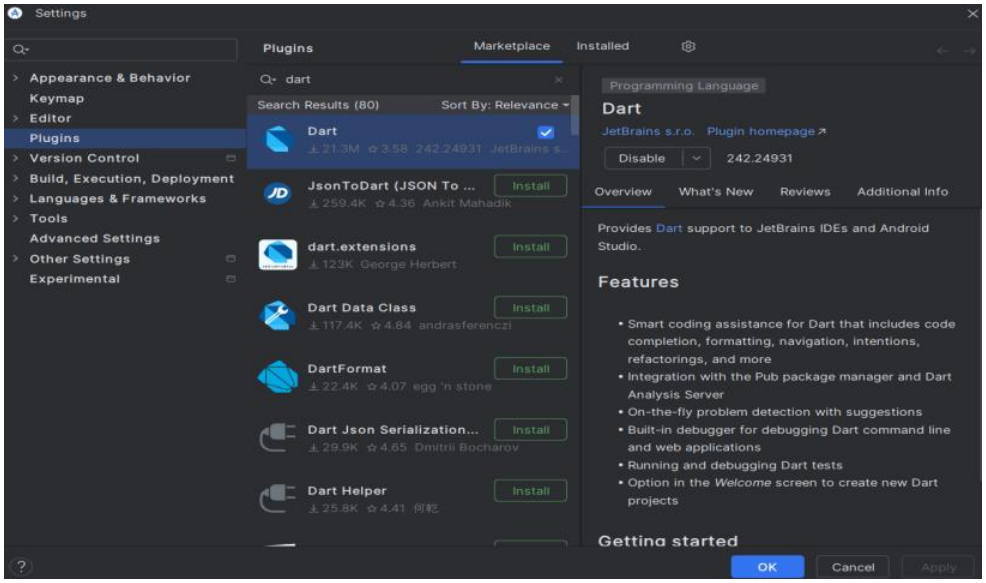
Step 10.2: - Click on the icon pointed into the red color rectangle. The Android emulator displayed as below screen





Step 11: - Now, install Flutter and Dart plugin for building Flutter application in Android Studio. These plugins provide a template to create a Flutter application, give an option to run and debug Flutter application in the Android Studio itself

Step 11.1: - Open the Android Studio and then go to File->Settings->Plugins. Now, search the Flutter plugin. If found, select Flutter plugin and click install



Step 11.2: - Restart the Android Studio

Step 12: - Go to File > New Project > Create Flutter Project, then select the project name and location, and click Next to proceed.

EXPERIMENT NO: - 02

Name:- Akruti Dabas Class:- D15A Roll:No: - 11

AIM:

To design Flutter UI by including common widgets.

THEORY:

Each element on the screen of the Flutter app is a widget. The view of the screen completely depends upon the choice and sequence of the widgets used to build the apps. And the structure of the code of apps is a tree of widgets. When you made any alteration in the code, the widget rebuilds its description by calculating the difference of previous and current widget to determine the minimal changes for rendering in UI of the app.Widgets are nested with each other to build the app. It means the root of your app is itself a widget, and all the way down is a widget also. For example, a widget can display something, can define design, can handle interaction, etc. The single child layout widget is a type of widget, which can have only one child widget inside the parent layout widget. These widgets can also contain special layout functionality. Flutter provides us many single child widgets to make the app UI attractive. If we use these widgets appropriately, it can save our time and makes the app code more readable. The multiple child widgets are a type of widget, which contains more than one child widget, and the layout of these widgets are unique. For example, Row widget laying out of its child widget in a horizontal direction, and Column widget laying out of its child widget in a vertical direction. If we combine the Row and Column widget, then it can build any level of the complex widget.

Type of Widgets

➢ StatefulWidget

A StatefulWidget has state information. It contains mainly two classes: the state object and the widget. It is dynamic because it can change the inner data during the widget lifetime. This widget does not have a build() method. It has createState() method, which returns a class that extends the Flutters State Class. The examples of the StatefulWidget are Checkbox, Radio, Slider, InkWell, Form, and TextField.

➢ StatelessWidget

The StatelessWidget does not have any state information. It remains static throughout its lifecycle. The examples of the StatelessWidget are Text, Row, Column, Container, etc.

AKRUTI DABAS/ D15A/ 11

Some of the commonly used widgets

Container – A box widget used for styling with padding, margins, colors, borders, and constraints. It helps in layout structuring and positioning.

Row & Column – Used to arrange widgets in horizontal (Row) or vertical (Column) orientation. They manage spacing, alignment, and distribution of child widgets.

Stack – Overlaps widgets on top of each other, useful for creating layered UIs like banners, tooltips, or floating elements.

Text – Displays text on the screen with customizable font size, color, alignment, and styling options

Image – Loads and displays images from assets, network, or memory with scaling, fit, properties.

Scaffold – Provides a basic layout structure with an app bar, body, floating action button, and bottom navigation.

ListView – A scrollable list widget that efficiently renders large amounts of dynamic content. Supports both vertical and horizontal scrolling.

GridView – Displays widgets in a grid format, useful for galleries, product listings, or dashboards. It supports dynamic column adjustments.

SizedBox – Used to create space between widgets or define fixed width and height for layout adjustments.

ElevatedButton – A button with elevation that provides a raised effect, customizable with color, shape, and click actions.

TextField – A user input field that supports text entry, keyboard configurations, validation.

AppBar – A top navigation bar that includes a title, actions, and menu icons, commonly used in Scaffold.

BottomNavigationBar – A bar at the bottom of the screen used for navigation between different app sections with icons and labels.

Drawer – A side navigation panel that slides out from the left, typically used for app menus and quick navigation.

Card – A material design component that displays content inside a box with elevation.

AKRUTI DABAS/ D15A/ 11

CODE:

CUSTOM_TEXT_FIELD.DART

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


class CustomTextField extends StatelessWidget {
 final String hint;
 final IconData icon;
 final bool obscureText;
 final IconData? suffixIcon;
 final TextEditingController? controller; // Add this line


 const CustomTextField({
  Key? key,
  required this.hint,
  required this.icon,
  required this.obscureText,
  this.suffixIcon,
  this.controller, // Add this line
 }) : super(key: key);


 @override
 Widget build(BuildContext context) {
  return TextField(
   controller: controller, // Use the controller here
   obscureText: obscureText,
   style: const TextStyle(color: Colors.white),
   decoration: InputDecoration(
    hintText: hint,
    hintStyle: const TextStyle(color: Colors.grey),
```

```
      filled: true,
      fillColor: Colors.grey[900],
      prefixIcon: Icon(icon, color: Colors.white),
      suffixIcon:
        suffixIcon != null ? Icon(suffixIcon, color: Colors.white) : null,
      border: OutlineInputBorder(
       borderRadius: BorderRadius.circular(8),
       borderSide: BorderSide.none,
      ),
     ),
    );
  }
}
```

INSPIRATION.DART

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

class InspirationScreen extends StatelessWidget {
  const InspirationScreen({Key? key}) : super(key: key);
  @override
  Widget build(BuildContext context) {
    return Scaffold(
     backgroundColor: Colors.grey[900],
     appBar: AppBar(
      backgroundColor: Colors.transparent,
      elevation: 0,
      leading: IconButton(
       icon: const Icon(Icons.arrow_back, color: Colors.white),
       onPressed: () => Navigator.pop(context),
      ),
```

```
    ),
    body: Padding(
      padding: const EdgeInsets.all(16.0),
      child: Column(
        crossAxisAlignment: CrossAxisAlignment.start,
        children: [
          const Text(
            'Spark your\nnext idea',
            style: TextStyle(
              color: Colors.white,
              fontSize: 28,
              fontWeight: FontWeight.bold,
            ),
          ),
          const SizedBox(height: 16),
          const Text(
            'Explore beautiful work,\nmade on Fiverr, picked for you.',
            style: TextStyle(color: Colors.grey, fontSize: 16),
          ),
          const SizedBox(height: 24),
          SizedBox(
            height: 100,
            child: ListView(
              scrollDirection: Axis.horizontal,
              children: [
                _buildCategoryCard('All', const Color(0xFF4A64FE)),
                const SizedBox(width: 12),
                _buildCategoryCard('Top Trending', Colors.green),
                const SizedBox(width: 12),
```

```
        _buildCategoryCard('For You', const Color(0xFFE068A8)),
      ],
    ),
  ),
  const SizedBox(height: 24),
  Row(
    mainAxisAlignment: MainAxisAlignment.spaceBetween,
    children: [
      const Text(
        'Book Design',
        style: TextStyle(
          color: Colors.white,
          fontSize: 18,
          fontWeight: FontWeight.bold,
        ),
      ),
      ElevatedButton.icon(
        onPressed: () {},
        icon: const Icon(Icons.add, color: Colors.white),
        label: const Text('Follow',
            style: TextStyle(color: Colors.white)),
        style: ElevatedButton.styleFrom(
          backgroundColor: Colors.green,
          shape: RoundedRectangleBorder(
            borderRadius: BorderRadius.circular(8),
          ),
        ),
      ),
    ],
```

```
          ),
          const SizedBox(height: 16),
          Expanded(
           child: GridView.count(
             crossAxisCount: 2,
             crossAxisSpacing: 12,
             mainAxisSpacing: 12,
             childAspectRatio: 0.75,
             children: [
               _buildBookCard('assets/images/book_design_1.jpg', 427),
               _buildBookCard('assets/images/book_design_2.jpg', 334),
               _buildBookCard('assets/images/book_design_1.jpg', 427),
               _buildBookCard('assets/images/book_design_2.jpg', 334),
             ],
           ),
          ),
        ],
      ),
    ),
  );
}

 Widget _buildCategoryCard(String title, Color color) {
  return Container(
    width: 120,
    decoration: BoxDecoration(
      color: color,
      borderRadius: BorderRadius.circular(12),
    ),
```

```
    child: Center(
      child: Text(
        title,
        style: const TextStyle(
          color: Colors.white,
          fontSize: 16,
          fontWeight: FontWeight.bold,
        ),
      ),
    ),
  );
}

Widget _buildBookCard(String imagePath, int awards) {
  return Container(
    decoration: BoxDecoration(
      color: Colors.grey[800],
      borderRadius: BorderRadius.circular(12),
    ),
    child: Column(
      crossAxisAlignment: CrossAxisAlignment.start,
      children: [
        Expanded(
          child: ClipRRect(
            borderRadius: const BorderRadius.only(
              topLeft: Radius.circular(12),
              topRight: Radius.circular(12),
            ),
            child: Image.asset(
```

```
            imagePath,
            width: double.infinity,
            fit: BoxFit.cover,
          ),
        ),
      ),
      Padding(
        padding: const EdgeInsets.all(8.0),
        child: Row(
          mainAxisAlignment: MainAxisAlignment.spaceBetween,
          children: [
            Text(
              '$awards awards',
              style: const TextStyle(color: Colors.grey, fontSize: 12),
            ),
            const Icon(Icons.favorite_border, color: Colors.white),
          ],
        ),
      ),
    ],
  ),
 );
 }
}
```

HOME_PAGE.DART

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

class HomeScreen extends StatefulWidget {
  const HomeScreen({Key? key}) : super(key: key);
```

```
  @override
  _HomeScreenState createState() => _HomeScreenState();
}

class _HomeScreenState extends State<HomeScreen> {
  int _selectedIndex = 0;

  void _onItemTapped(int index) {
    setState(() {
      _selectedIndex = index;
      if (index == 4) {
        // Index 4 is the profile icon
        Navigator.pushNamed(context, '/profile');
      }
      if (index == 1) {
        // Index 4 is the profile icon
        Navigator.pushNamed(context, '/inbox');
      }
    });
  }

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

```
      title: Row(
        children: [
          const Text(
            'fiverr.',
            style: TextStyle(
              color: Colors.green,
              fontSize: 24,
              fontWeight: FontWeight.bold,
            ),
          ),
          const Spacer(),
          IconButton(
            icon: const Icon(Icons.diamond_outlined, color: Colors.white),
            onPressed: () {},
          ),
        ],
      ),
    ),
    body: Padding(
      padding: const EdgeInsets.all(16.0),
      child: Column(
        crossAxisAlignment: CrossAxisAlignment.start,
        children: [
          // Search Bar
          Container(
            decoration: BoxDecoration(
              color: Colors.grey[900],
              borderRadius: BorderRadius.circular(8),
            ),
```

```
          child: const TextField(
            style: TextStyle(color: Colors.white),
            decoration: InputDecoration(
              hintText: 'Search services',
              hintStyle: TextStyle(color: Colors.grey),
              prefixIcon: Icon(Icons.search, color: Colors.grey),
              border: InputBorder.none,
              contentPadding: EdgeInsets.all(12),
            ),
          ),
        ),
        const SizedBox(height: 20),

        // Popular Services
        Row(
          mainAxisAlignment: MainAxisAlignment.spaceBetween,
          children: [
            const Text(
              'Popular Services',
              style: TextStyle(
                color: Colors.white,
                fontSize: 18,
                fontWeight: FontWeight.bold,
              ),
            ),
            TextButton(
              onPressed: () {},
              child: const Text(
                'See All',
```

```
            style: TextStyle(color: Colors.green),
          ),
        ),
      ],
    ),
    const SizedBox(height: 10),

    // Grid of Services
    SizedBox(
      height: 160, //Adjusted Height
      child: ListView(
        scrollDirection: Axis.horizontal,
        children: [
          _buildServiceCard(
            'Logo Design',
            'assets/images/logo_design.jpg',
          ),
          const SizedBox(width: 10),
          _buildServiceCard(
            'AI Artists',
            'assets/images/ai_artists.jpg',
          ),
          const SizedBox(width: 10),
          _buildServiceCard(
            'Logo Design',
            'assets/images/logo_design.jpg', //Sample
          ),
        ],
      ),
```

```
        ),

        const SizedBox(height: 20),

        // Made on Fiverr Section
        const Text(
          'Made on Fiverr',
          style: TextStyle(
            color: Colors.white,
            fontSize: 18,
            fontWeight: FontWeight.bold,
          ),
        ),
        const SizedBox(height: 10),

        // Second Grid
        SizedBox(
          height: 190, //Adjusted height
          child: GridView.count(
            crossAxisCount: 3,
            crossAxisSpacing: 8,
            mainAxisSpacing: 8,
            childAspectRatio: 1, // Keep aspect ratio 1:1
            physics:
                const NeverScrollableScrollPhysics(), // Disable scrolling within the grid
            children: List.generate(6, (index) {
              return Container(
                decoration: BoxDecoration(
                  borderRadius: BorderRadius.circular(8),
```

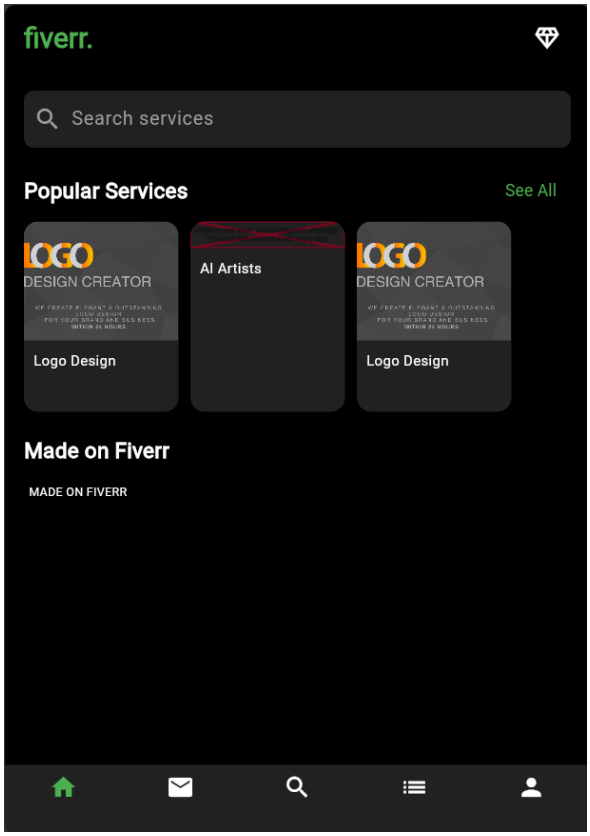
```
            image: DecorationImage(
              image: AssetImage(
                'assets/images/made_on_fiverr_${index + 1}.jpg',
              ), // Example: made_on_fiverr_1.jpg
              fit: BoxFit.cover,
            ),
          ),
          child: index == 0
              ? Align(
                  alignment: Alignment.topLeft,
                  child: Container(
                    padding: const EdgeInsets.all(4),
                    decoration: BoxDecoration(
                      color: Colors.black.withOpacity(0.7),
                      borderRadius: const BorderRadius.only(
                        topLeft: Radius.circular(8),
                        bottomRight: Radius.circular(8),
                      ),
                    ),
                    child: const Text(
                      'MADE ON FIVERR',
                      style: TextStyle(
                        color: Colors.white,
                        fontSize: 10,
                      ),
                    ),
                  ),
                )
              : null, // Show "MADE ON FIVERR" on the first item
```

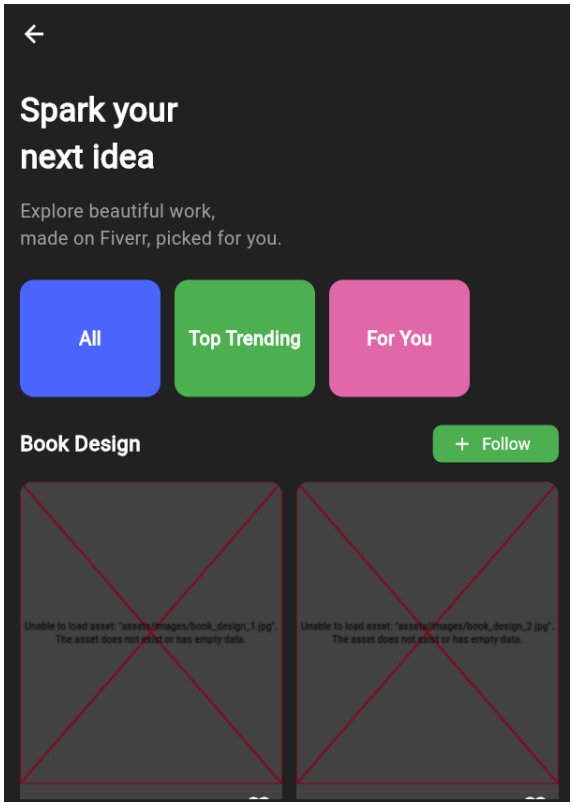
```
                );
              }),
            ),
          ),
        ],
      ),
    ),
    bottomNavigationBar: BottomNavigationBar(
      backgroundColor: Colors.grey[900],
      selectedItemColor: Colors.green,
      unselectedItemColor: Colors.white,
      items: const [
        BottomNavigationBarItem(icon: Icon(Icons.home), label: ''),
        BottomNavigationBarItem(icon: Icon(Icons.mail), label: ''),
        BottomNavigationBarItem(icon: Icon(Icons.search), label: ''),
        BottomNavigationBarItem(icon: Icon(Icons.list), label: ''),
        BottomNavigationBarItem(icon: Icon(Icons.person), label: ''),
      ],
      type: BottomNavigationBarType.fixed,
      currentIndex: _selectedIndex, // Set current index
      onTap: _onItemTapped, // Call this function when item is tapped
    ),
  );
}
 Widget _buildServiceCard(String title, String imagePath) {
  return Container(
    width: 130, //Adjusted width of card
    decoration: BoxDecoration(
      color: Colors.grey[900],
```

```
        borderRadius: BorderRadius.circular(12), // Adjusted radius
      ),
      child: Column(
        crossAxisAlignment: CrossAxisAlignment.start,
        children: [
          ClipRRect(
            borderRadius: const BorderRadius.only(
              topLeft: Radius.circular(12),
              topRight: Radius.circular(12),
            ),
            child: Image.asset(
              imagePath,
              height: 100, // Adjusted Height
              width: double.infinity,
              fit: BoxFit.cover,
            ),
          ),
          Padding(
            padding: const EdgeInsets.all(8.0),
            child: Text(
              title,
              style: const TextStyle(color: Colors.white, fontSize: 12),
            ),
          ),
        ],
      ),
    );
  }
}
```

AKRUTI DABAS/ D15A/ 11

OUTPUT:





EXPERIMENT NO: - 03

Name:- Akruti Dabas Class:- D15A Roll:No: - 11

AIM:

To include icons, images, fonts in Flutter app.

THEORY:

Flutter is a versatile open-source UI framework , which allows developers to build natively compiled applications for mobile, web, and desktop platforms from a single codebase. One of the key strengths of Flutter is its flexibility in creating highly customizable UIs. This practical focuses on incorporating essential visual elements—icons, images, and custom fonts—into a Flutter application. These elements enhance the visual appeal and usability of the app, providing an engaging experience for users. A flutter app when built has both assets (resources) and code. Assets are available and deployed during runtime. The asset is a file that can include static data, configuration files, icons, and images. The Flutter app supports many image formats, such as JPEG, WebP, PNG, GIF, animated WebP/GIF, BMP, and WBMP. Visual elements play a significant role in app development.

•**Enhanced User Experience:** Images and icons make your app visually appealing and user friendly.

• **Information Conveyance:** They convey information quickly and intuitively. A well chosen icon can replace lengthy text.

•**Branding:** Custom icons and images reinforce your app's branding, making it memorable.

➢ Adding Icons in Flutter

Flutter provides built-in material design icons through the Icons class. Custom icons can also be added using third-party packages such as flutter_launcher_icons and font_awesome_flutter. Icon(Icons.home, size: 40,);

➢ Adding Images in Flutter

Flutter supports images from three sources:

1. Assets (Stored locally in the project)

• Place the image inside the assets/images folder in the project.

• Declare the image in pubspec.yaml flutter: assets: - assets/images/sample.png

• Display the image in the app Image.asset('assets/images/sample.png');

2. Network (Fetched from the internet) Displaying images from the internet or network is very simple. Flutter provides a built-in method Image.network to work with images from a URL. The Image.network method also allows you to use some optional properties, such as height, width, color, fit, and many more. Image.network('https://example.com/sample.jpg');
3. Memory or File (Stored on the device)

➢ Adding Custom Fonts in Flutter By default, Flutter uses the Roboto font, but custom fonts can be added for a unique UI.

• Download the font and place it in the assets/fonts/ folder.

• Declare the font in pubspec.yaml

• Use the font in the app Text('Custom Font Example', style: TextStyle(fontFamily: 'CustomFont', fontSize: 24),);

CODE:

CUSTOM_TEXT_FIELD.DART

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


class CustomTextField extends StatelessWidget {
  final String hint;
  final IconData icon;
  final bool obscureText;
  final IconData? suffixIcon;
  final TextEditingController? controller; // Add this line


  const CustomTextField({
    Key? key,
    required this.hint,
    required this.icon,
    required this.obscureText,
    this.suffixIcon,
    this.controller, // Add this line
  }) : super(key: key);
```

```
  @override
  Widget build(BuildContext context) {
    return TextField(
      controller: controller, // Use the controller here
      obscureText: obscureText,
      style: const TextStyle(color: Colors.white),
      decoration: InputDecoration(
        hintText: hint,
        hintStyle: const TextStyle(color: Colors.grey),
        filled: true,
        fillColor: Colors.grey[900],
        prefixIcon: Icon(icon, color: Colors.white),
        suffixIcon:
            suffixIcon != null ? Icon(suffixIcon, color: Colors.white) : null,
        border: OutlineInputBorder(
          borderRadius: BorderRadius.circular(8),
          borderSide: BorderSide.none,
        ),
      ),
    );
  }
}
```

INSPIRATION.DART

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

class InspirationScreen extends StatelessWidget {
  const InspirationScreen({Key? key}) : super(key: key);
  @override
  Widget build(BuildContext context) {
```

```
  return Scaffold(
    backgroundColor: Colors.grey[900],
    appBar: AppBar(
      backgroundColor: Colors.transparent,
      elevation: 0,
      leading: IconButton(
        icon: const Icon(Icons.arrow_back, color: Colors.white),
        onPressed: () => Navigator.pop(context),
      ),
    ),
    body: Padding(
      padding: const EdgeInsets.all(16.0),
      child: Column(
        crossAxisAlignment: CrossAxisAlignment.start,
        children: [
          const Text(
            'Spark your\nnext idea',
            style: TextStyle(
              color: Colors.white,
              fontSize: 28,
              fontWeight: FontWeight.bold,
            ),
          ),
          const SizedBox(height: 16),
          const Text(
            'Explore beautiful work,\nmade on Fiverr, picked for you.',
            style: TextStyle(color: Colors.grey, fontSize: 16),
          ),
          const SizedBox(height: 24),
```

```
SizedBox(
  height: 100,
  child: ListView(
    scrollDirection: Axis.horizontal,
    children: [
      _buildCategoryCard('All', const Color(0xFF4A64FE)),
      const SizedBox(width: 12),
      _buildCategoryCard('Top Trending', Colors.green),
      const SizedBox(width: 12),
      _buildCategoryCard('For You', const Color(0xFFE068A8)),
    ],
  ),
),
const SizedBox(height: 24),
Row(
  mainAxisAlignment: MainAxisAlignment.spaceBetween,
  children: [
    const Text(
      'Book Design',
      style: TextStyle(
        color: Colors.white,
        fontSize: 18,
        fontWeight: FontWeight.bold,
      ),
    ),
    ElevatedButton.icon(
      onPressed: () {},
      icon: const Icon(Icons.add, color: Colors.white),
      label: const Text('Follow',
```

```
                style: TextStyle(color: Colors.white)),
            style: ElevatedButton.styleFrom(
              backgroundColor: Colors.green,
              shape: RoundedRectangleBorder(
                borderRadius: BorderRadius.circular(8),
              ),
            ),
          ),
        ],
      ),
      const SizedBox(height: 16),
      Expanded(
        child: GridView.count(
          crossAxisCount: 2,
          crossAxisSpacing: 12,
          mainAxisSpacing: 12,
          childAspectRatio: 0.75,
          children: [
            _buildBookCard('assets/images/book_design_1.jpg', 427),
            _buildBookCard('assets/images/book_design_2.jpg', 334),
            _buildBookCard('assets/images/book_design_1.jpg', 427),
            _buildBookCard('assets/images/book_design_2.jpg', 334),
          ],
        ),
      ),
    ],
  ),
),
);
```

```
 }

 Widget _buildCategoryCard(String title, Color color) {
  return Container(
   width: 120,
   decoration: BoxDecoration(
    color: color,
    borderRadius: BorderRadius.circular(12),
   ),
   child: Center(
    child: Text(
     title,
     style: const TextStyle(
      color: Colors.white,
      fontSize: 16,
      fontWeight: FontWeight.bold,
     ),
    ),
   ),
  );
 }

 Widget _buildBookCard(String imagePath, int awards) {
  return Container(
   decoration: BoxDecoration(
    color: Colors.grey[800],
    borderRadius: BorderRadius.circular(12),
   ),
   child: Column(
```

```
crossAxisAlignment: CrossAxisAlignment.start,
children: [
  Expanded(
    child: ClipRRect(
      borderRadius: const BorderRadius.only(
        topLeft: Radius.circular(12),
        topRight: Radius.circular(12),
      ),
      child: Image.asset(
        imagePath,
        width: double.infinity,
        fit: BoxFit.cover,
      ),
    ),
  ),
  Padding(
    padding: const EdgeInsets.all(8.0),
    child: Row(
      mainAxisAlignment: MainAxisAlignment.spaceBetween,
      children: [
        Text(
          '$awards awards',
          style: const TextStyle(color: Colors.grey, fontSize: 12),
        ),
        const Icon(Icons.favorite_border, color: Colors.white),
      ],
    ),
  ),
],
```

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

HOME_PAGE.DART

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

class HomeScreen extends StatefulWidget {
  const HomeScreen({Key? key}) : super(key: key);

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

class _HomeScreenState extends State<HomeScreen> {
  int _selectedIndex = 0;

  void _onItemTapped(int index) {
    setState(() {
      _selectedIndex = index;
      if (index == 4) {
        // Index 4 is the profile icon
        Navigator.pushNamed(context, '/profile');
      }
      if (index == 1) {
        // Index 4 is the profile icon
        Navigator.pushNamed(context, '/inbox');
      }
    });
```

```
 }

 @override
 Widget build(BuildContext context) {
  return Scaffold(
   backgroundColor: Colors.black,
   appBar: AppBar(
    backgroundColor: Colors.black,
    elevation: 0,
    title: Row(
     children: [
      const Text(
       'fiverr.',
       style: TextStyle(
        color: Colors.green,
        fontSize: 24,
        fontWeight: FontWeight.bold,
       ),
      ),
      const Spacer(),
      IconButton(
       icon: const Icon(Icons.diamond_outlined, color: Colors.white),
       onPressed: () {},
      ),
     ],
    ),
   ),
   body: Padding(
    padding: const EdgeInsets.all(16.0),
```

```
child: Column(
 crossAxisAlignment: CrossAxisAlignment.start,
 children: [
  // Search Bar
  Container(
   decoration: BoxDecoration(
    color: Colors.grey[900],
    borderRadius: BorderRadius.circular(8),
   ),
   child: const TextField(
    style: TextStyle(color: Colors.white),
    decoration: InputDecoration(
     hintText: 'Search services',
     hintStyle: TextStyle(color: Colors.grey),
     prefixIcon: Icon(Icons.search, color: Colors.grey),
     border: InputBorder.none,
     contentPadding: EdgeInsets.all(12),
    ),
   ),
  ),
  const SizedBox(height: 20),

  // Popular Services
  Row(
   mainAxisAlignment: MainAxisAlignment.spaceBetween,
   children: [
    const Text(
     'Popular Services',
     style: TextStyle(
```

```
            color: Colors.white,
            fontSize: 18,
            fontWeight: FontWeight.bold,
          ),
        ),
        TextButton(
          onPressed: () {},
          child: const Text(
            'See All',
            style: TextStyle(color: Colors.green),
          ),
        ),
      ],
    ),
    const SizedBox(height: 10),

    // Grid of Services
    SizedBox(
      height: 160, //Adjusted Height
      child: ListView(
        scrollDirection: Axis.horizontal,
        children: [
          _buildServiceCard(
            'Logo Design',
            'assets/images/logo_design.jpg',
          ),
          const SizedBox(width: 10),
          _buildServiceCard(
            'AI Artists',
```

```
            'assets/images/ai_artists.jpg',
          ),
          const SizedBox(width: 10),
          _buildServiceCard(
            'Logo Design',
            'assets/images/logo_design.jpg', //Sample
          ),
        ],
      ),
    ),

    const SizedBox(height: 20),

    // Made on Fiverr Section
    const Text(
      'Made on Fiverr',
      style: TextStyle(
        color: Colors.white,
        fontSize: 18,
        fontWeight: FontWeight.bold,
      ),
    ),
    const SizedBox(height: 10),

    // Second Grid
    SizedBox(
      height: 190, //Adjusted height
      child: GridView.count(
        crossAxisCount: 3,
```

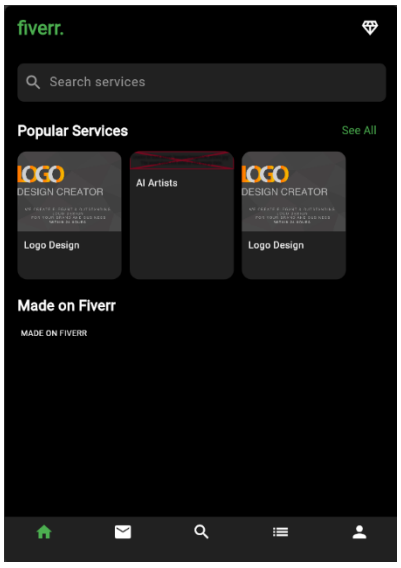
```
crossAxisSpacing: 8,
mainAxisSpacing: 8,
childAspectRatio: 1, // Keep aspect ratio 1:1
physics:
  const NeverScrollableScrollPhysics(), // Disable scrolling within the grid
children: List.generate(6, (index) {
 return Container(
  decoration: BoxDecoration(
   borderRadius: BorderRadius.circular(8),
   image: DecorationImage(
    image: AssetImage(
     'assets/images/made_on_fiverr_${index + 1}.jpg',
    ), // Example: made_on_fiverr_1.jpg
    fit: BoxFit.cover,
   ),
  ),
  child: index == 0
    ? Align(
      alignment: Alignment.topLeft,
      child: Container(
       padding: const EdgeInsets.all(4),
       decoration: BoxDecoration(
        color: Colors.black.withOpacity(0.7),
        borderRadius: const BorderRadius.only(
         topLeft: Radius.circular(8),
         bottomRight: Radius.circular(8),
        ),
       ),
       child: const Text(
```

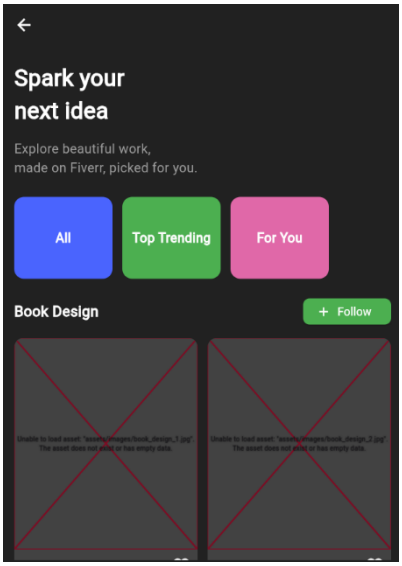
```
                        'MADE ON FIVERR',
                        style: TextStyle(
                          color: Colors.white,
                          fontSize: 10,
                        ),
                      ),
                    ),
                  )
                : null, // Show "MADE ON FIVERR" on the first item
            );
          }),
        ),
      ),
    ],
  ),
),
bottomNavigationBar: BottomNavigationBar(
  backgroundColor: Colors.grey[900],
  selectedItemColor: Colors.green,
  unselectedItemColor: Colors.white,
  items: const [
    BottomNavigationBarItem(icon: Icon(Icons.home), label: ''),
    BottomNavigationBarItem(icon: Icon(Icons.mail), label: ''),
    BottomNavigationBarItem(icon: Icon(Icons.search), label: ''),
    BottomNavigationBarItem(icon: Icon(Icons.list), label: ''),
    BottomNavigationBarItem(icon: Icon(Icons.person), label: ''),
  ],
  type: BottomNavigationBarType.fixed,
  currentIndex: _selectedIndex, // Set current index
```

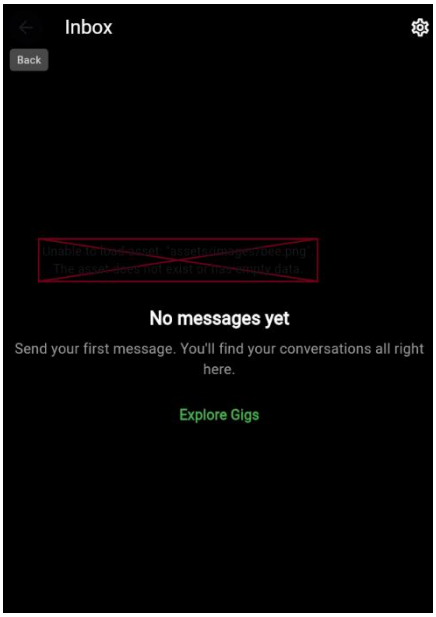
```
      onTap: _onItemTapped, // Call this function when item is tapped
    ),
  );
 }
 Widget _buildServiceCard(String title, String imagePath) {
  return Container(
   width: 130, //Adjusted width of card
   decoration: BoxDecoration(
    color: Colors.grey[900],
    borderRadius: BorderRadius.circular(12), // Adjusted radius
   ),
   child: Column(
    crossAxisAlignment: CrossAxisAlignment.start,
    children: [
     ClipRRect(
      borderRadius: const BorderRadius.only(
       topLeft: Radius.circular(12),
       topRight: Radius.circular(12),
      ),
      child: Image.asset(
       imagePath,
       height: 100, // Adjusted Height
       width: double.infinity,
       fit: BoxFit.cover,
      ),
     ),
     Padding(
      padding: const EdgeInsets.all(8.0),
      child: Text(
```

```
            title,
            style: const TextStyle(color: Colors.white, fontSize: 12),
          ),
        ),
      ],
    ),
  );
 }
}
```

OUTPUT:







EXPERIMENT NO: - 04

Name:- Akruti Dabas Class:- D15A Roll:No: - 11

AIM:

To create an interactive Form using form widget.

THEORY:

A form in Flutter is a structured container that collects user input through various fields like text fields, dropdowns, checkboxes, and buttons. It plays 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 manage validation, state handling, and error messages efficiently. By using form validation techniques, developers can ensure data accuracy and enhance user experience.

When you create a form, it is necessary to provide the GlobalKey. This key uniquely identifies the form and allows you to do any validation in the form fields. The form widget uses child widget TextFormField to provide the users to enter the text field. This widget renders a material design text field and also allows us to display validation errors when they occur.

Creation of a Form

➢ While creating a form in Flutter, the Form widget is essential as it acts as a container for grouping multiple form fields and managing validation.

➢ A GlobalKey is required to uniquely identify the form and enable validation or data retrieval from the form fields.

➢ The TextFormField widget is used to provide input fields where users can enter data such as names, phone numbers, or email addresses.

➢ To enhance the appearance and usability of input fields, InputDecoration is used, allowing customization of labels, icons, borders, and hint text.

➢ Validation plays a crucial role in forms, and the validator property within TextFormField ensures user input meets specific criteria before submission.

➢ Different types of input require appropriate keyboard types, such as TextInputType.number for numeric fields or TextInputType.emailAddress for email fields.

➢ Proper state management is needed to store and retrieve user input, ensuring the form data is processed correctly.

➢ A submit button is necessary to trigger form validation and submit the collected data for further processing. Some Properties of Form Widget

• key: A GlobalKey that uniquely identifies the Form. You can use this key to interact with the form, such as validating, resetting, or saving its state.

• child: The child widget that contains the form fields. Typically, this is a Column, ListView, or another widget that allows you to arrange the form fields vertically.

• autovalidateMode: An enum that specifies when the form should automatically validate its fields. Some Methods of Form Widget

• validate(): This method is used to trigger the validation of all the form fields within the Form. It returns true if all fields are valid, otherwise false. You can use it to check the overall validity of the form before submitting it.

• save(): This method is used to save the current values of all form fields. It invokes the onSaved callback for each field. Typically, this method is called after validation succeeds.

• reset(): Resets the form to its initial state, clearing any user-entered data.

• currentState: A getter that returns the current FormState associated with the Form.

AKRUTI DABAS/ D15A/ 11

CODE:

SIGNIN_PAGE.DART

```
import 'package:flutter/material.dart';
import 'package:font_awesome_flutter/font_awesome_flutter.dart';
import 'package:feverr_clone/screens/home_page.dart'; // Import the Home Screen
import 'package:feverr_clone/widgets/custom_text_field.dart';
import 'package:feverr_clone/widgets/social_button.dart';
import 'package:firebase_auth/firebase_auth.dart';

class SignInScreen extends StatefulWidget {
  const SignInScreen({Key? key}) : super(key: key);

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

class _SignInScreenState extends State<SignInScreen> {
  final _emailController = TextEditingController();
  final _passwordController = TextEditingController();
  bool _isLoading = false;
  String? _errorMessage;

  @override
  void dispose() {
    _emailController.dispose();
    _passwordController.dispose();
    super.dispose();
  }
```

```
 @override
 Widget build(BuildContext context) {
  return Scaffold(
    backgroundColor: Colors.black,
    body: Padding(
      padding: const EdgeInsets.symmetric(horizontal: 24),
      child: Column(
        mainAxisAlignment: MainAxisAlignment.center,
        crossAxisAlignment: CrossAxisAlignment.center,
        children: [
          const CircleAvatar(
            backgroundColor: Colors.green,
            radius: 30,
            child: Text(
              "fi",
              style: TextStyle(
                color: Colors.white,
                fontSize: 26,
                fontWeight: FontWeight.bold,
              ),
            ),
          ),
          const SizedBox(height: 20),
          const Text(
            "Welcome to Fiverr",
            style: TextStyle(
              color: Colors.white,
              fontSize: 22,
              fontWeight: FontWeight.bold,
```

```
  ),
),
const SizedBox(height: 8),
const Text(
  "Please enter your registration email and password.",
  textAlign: TextAlign.center,
  style: TextStyle(
    color: Colors.grey,
    fontSize: 14,
  ),
),
const SizedBox(height: 30),
CustomTextField(
  hint: "Email or username",
  icon: Icons.email,
  obscureText: false,
  controller: _emailController,
),
const SizedBox(height: 16),
CustomTextField(
  hint: "Password",
  icon: Icons.lock,
  obscureText: true,
  suffixIcon: Icons.visibility,
  controller: _passwordController,
),
const SizedBox(height: 24),
ElevatedButton(
  style: ElevatedButton.styleFrom(
```

```
    backgroundColor: Colors.green,
    minimumSize: const Size(double.infinity, 50),
    shape: RoundedRectangleBorder(
     borderRadius: BorderRadius.circular(8),
    ),
   ),
   onPressed: _isLoading
      ? null
      : () async {
         await _signInWithEmailPassword();
        },
   child: _isLoading
      ? const CircularProgressIndicator(color: Colors.white)
      : const Text(
         "Continue",
         style: TextStyle(fontSize: 16, color: Colors.white),
        ),
  ),
  if (_errorMessage != null)
   Text(
    _errorMessage!,
    style: const TextStyle(color: Colors.red),
   ),
  const SizedBox(height: 20),
  const Text(
   "Or via social networks",
   style: TextStyle(color: Colors.grey),
  ),
  const SizedBox(height: 12),
```

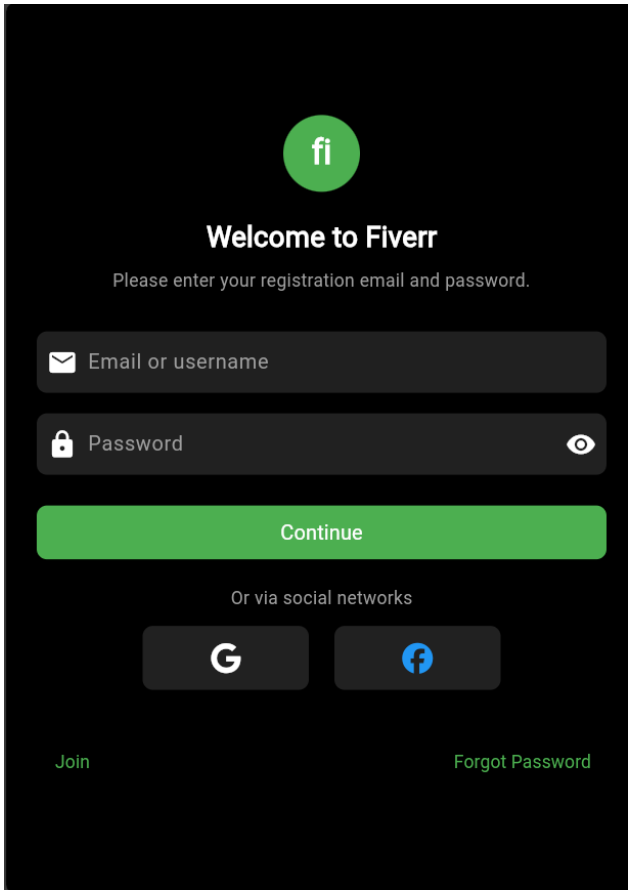
```
        Row(
          mainAxisAlignment: MainAxisAlignment.center,
          children: [
            SocialButton(
              icon: FontAwesomeIcons.google,
              color: Colors.white,
              onPressed: () {
                // Handle Google sign-in
              }),
            const SizedBox(width: 20),
            SocialButton(
              icon: FontAwesomeIcons.facebook,
              color: Colors.blue,
              onPressed: () {
                // Handle Facebook sign-in
              }),
          ],
        ),
        const SizedBox(height: 40),
        Row(
          mainAxisAlignment: MainAxisAlignment.spaceBetween,
          children: [
            _buildTextButton("Join"),
            _buildTextButton("Forgot Password"),
          ],
        ),
      ],
    ),
  ),
```

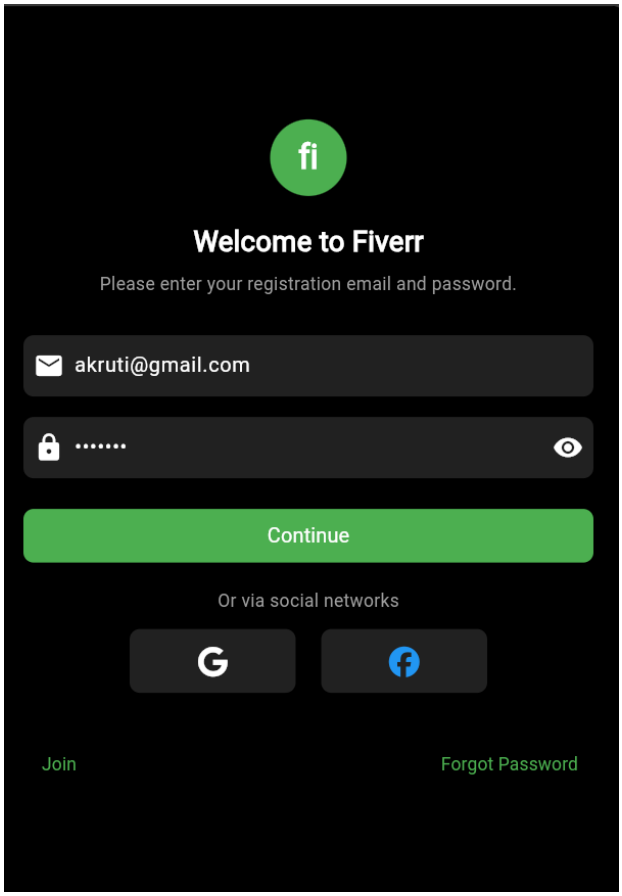
```
  );
 }

 Future<void> _signInWithEmailPassword() async {
  setState(() {
   _isLoading = true;
   _errorMessage = null;
  });

  try {
   UserCredential userCredential =
     await FirebaseAuth.instance.signInWithEmailAndPassword(
    email: _emailController.text.trim(),
    password: _passwordController.text.trim(),
   );

   User? user = userCredential.user;

   if (user != null) {
    Navigator.pushReplacement(
     context,
     MaterialPageRoute(builder: (context) => const HomeScreen()),
    );
   } else {
    setState(() {
     _errorMessage = "User not found. Please check your credentials.";
    });
   }
  } catch (e) {
```

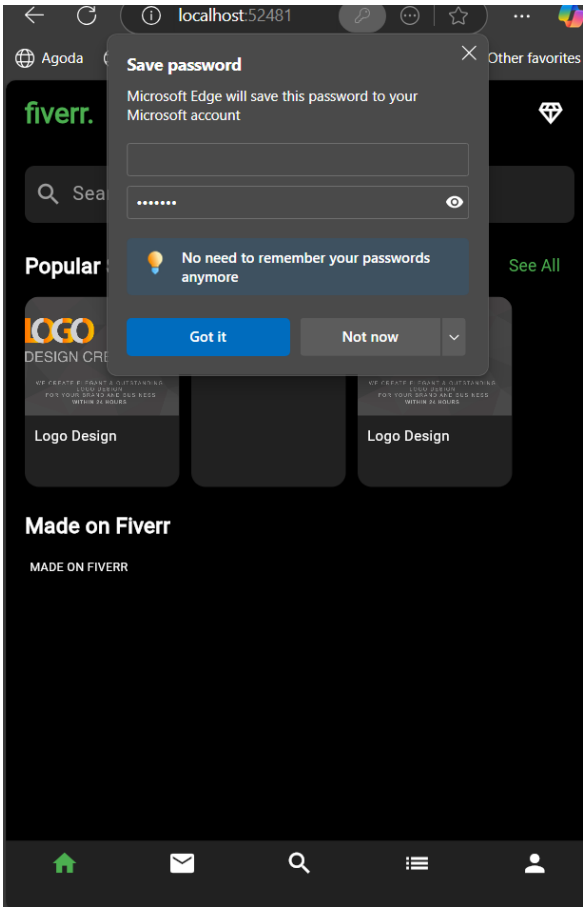
```
      setState(() {
        if (e is FirebaseAuthException) {
          _errorMessage = e.message;
        } else {
          _errorMessage = "An unexpected error occurred: $e";
        }
      });
    } finally {
      setState(() {
        _isLoading = false;
      });
    }
  }

  Widget _buildTextButton(String text) {
    return TextButton(
      onPressed: () {
        // Handle button press
      },
      child: Text(
        text,
        style: const TextStyle(color: Colors.green, fontSize: 14),
      ),
    );
  }
}
```

AKRUTI DABAS/ D15A/ 11

OUTPUT







EXPERIMENT NO: - 05

Name:- Akruti Dabas Class:- D15A Roll:No: - 11

AIM:

To apply navigation, routing and gestures in Flutter App.

THEORY:

In Flutter, the screens and pages are known as routes, and these routes are just a widget. In Android, a route is similar to an Activity.

In any mobile app, navigating to different pages defines the workflow of the application, and the way to handle the navigation is known as routing. Flutter provides a basic routing class MaterialPageRoute and two methods Navigator.push() and Navigator.pop() that shows how to navigate between two routes. The following steps are required to start navigation in your application.

Gestures enable the app to respond to user interactions, making the application more dynamic and responsive.

➢ Navigation and Routing in Flutter

Navigation is the process of moving between different screens or pages in an app. Flutter provides a simple and effective way to handle this through the use of the Navigator widget and routes.

1. Using Navigator Widget

The Navigator widget manages a stack of routes, allowing for pushing and popping routes on the stack.

• Pushing a Route: To navigate to a new screen, use Navigator.push().

• Popping a Route: To go back to the previous screen, use

Navigator.pop(). ElevatedButton(

onPressed: () {

Navigator.push(context, MaterialPageRoute(builder: (context) => SecondScreen()),

);

},

);

2. Named Routes Flutter also allows the use of named routes to navigate, which can make the routing process cleaner, especially in larger applications. MaterialApp(initialRoute: '/', routes: { '/': (context) => HomeScreen(), '/second': (context) => SecondScreen(), },); Navigate to the route using Navigator.pushNamed() Navigator.pushNamed(context, '/second');

Handling Gestures in Flutter

Gestures refer to user interactions with the app, such as taps, swipes, pinches, and drags. Flutter provides several widgets and gesture detectors to handle these interactions.

Tap Gestures

The most common gesture is the tap, which can be handled using the GestureDetector widget or specific buttons like InkWell or ElevatedButton.

Long Press Gesture

For long press gestures, Flutter provides the onLongPress callback in GestureDetector or InkWell.

Swipe and Drag Gestures

Flutter also provides swipe and drag gesture handling. The onHorizontalDragUpdate and onVerticalDragUpdate callbacks are used for dragging gestures.

AKRUTI DABAS/ D15A/ 11

CODE:

PROFILE_SCREEN.DART

```
import 'package:feverr_clone/screens/inspiration_screen.dart';
import 'package:flutter/material.dart';


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


  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.black,
      appBar: AppBar(
        backgroundColor: Colors.green,
        title: const Text('Profile'),
        centerTitle: true,
        actions: const [
          Padding(
            padding: EdgeInsets.only(right: 16.0),
            child: Icon(Icons.notifications_none, color: Colors.white),
          ),
        ],
      ),
      body: Column(
        children: [
          Container(
            color: Colors.green,
            padding: const EdgeInsets.all(16.0),
            child: Row(
```

```
          children: [
            CircleAvatar(
              backgroundColor: Colors.blue[100],
              radius: 30,
              child: const Text(
                'A',
                style: TextStyle(fontSize: 24, fontWeight: FontWeight.bold),
              ),
            ),
            const SizedBox(width: 16),
            const Text(
              'Akrutidabas',
              style: TextStyle(
                color: Colors.white,
                fontSize: 18,
                fontWeight: FontWeight.bold,
              ),
            ),
          ],
        ),
      ),
      Expanded(
        child: Container(
          color: Colors.grey[900],
          child: ListView(
            children: [
              ListTile(
                leading: Icon(Icons.diamond_outlined, color: Colors.white),
                title: Text('Get inspired',
```

```
      style: TextStyle(color: Colors.white)),
  trailing: Icon(Icons.chevron_right, color: Colors.white),
  onTap: () {
   Navigator.push(
    context,
    MaterialPageRoute(
     builder: (context) => const InspirationScreen(),
    ),
   );
  },
),
Divider(color: Colors.grey),
ListTile(
  leading: Icon(Icons.favorite_border, color: Colors.white),
  title: Text('Saved lists',
      style: TextStyle(color: Colors.white)),
  trailing: Icon(Icons.chevron_right, color: Colors.white),
),
Divider(color: Colors.grey),
ListTile(
  leading: Icon(Icons.article_outlined, color: Colors.white),
  title: Text('My interests',
      style: TextStyle(color: Colors.white)),
  trailing: Icon(Icons.chevron_right, color: Colors.white),
),
Divider(color: Colors.grey),
ListTile(
  leading: Icon(Icons.send, color: Colors.white),
  title: Text('Invite friends',
```

```
            style: TextStyle(color: Colors.white)),
        trailing: Icon(Icons.chevron_right, color: Colors.white),
      ),
      SizedBox(height: 20),
      Padding(
        padding: EdgeInsets.only(left: 16.0, bottom: 8.0),
        child: Text('Settings',
            style: TextStyle(
                color: Colors.grey, fontWeight: FontWeight.bold)),
      ),
      ListTile(
        leading: Icon(Icons.settings, color: Colors.white),
        title: Text('Preferences',
            style: TextStyle(color: Colors.white)),
        trailing: Icon(Icons.chevron_right, color: Colors.white),
      ),
      Divider(color: Colors.grey),
      ListTile(
        leading: Icon(Icons.person_outline, color: Colors.white),
        title:
            Text('Account', style: TextStyle(color: Colors.white)),
        trailing: Icon(Icons.chevron_right, color: Colors.white),
      ),
      Divider(color: Colors.grey),
    ],
  ),
 ),
),
],
```

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

INSPIRATION_SCREEN.DART

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

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

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.grey[900],
      appBar: AppBar(
        backgroundColor: Colors.transparent,
        elevation: 0,
        leading: IconButton(
          icon: const Icon(Icons.arrow_back, color: Colors.white),
          onPressed: () => Navigator.pop(context),
        ),
      ),
      body: Padding(
        padding: const EdgeInsets.all(16.0),
        child: Column(
          crossAxisAlignment: CrossAxisAlignment.start,
          children: [
            const Text(
```

```
  'Spark your\nnext idea',
  style: TextStyle(
    color: Colors.white,
    fontSize: 28,
    fontWeight: FontWeight.bold,
  ),
),
const SizedBox(height: 16),
const Text(
  'Explore beautiful work,\nmade on Fiverr, picked for you.',
  style: TextStyle(color: Colors.grey, fontSize: 16),
),
const SizedBox(height: 24),
SizedBox(
  height: 100,
  child: ListView(
    scrollDirection: Axis.horizontal,
    children: [
      _buildCategoryCard('All', const Color(0xFF4A64FE)),
      const SizedBox(width: 12),
      _buildCategoryCard('Top Trending', Colors.green),
      const SizedBox(width: 12),
      _buildCategoryCard('For You', const Color(0xFFE068A8)),
    ],
  ),
),
const SizedBox(height: 24),
Row(
  mainAxisAlignment: MainAxisAlignment.spaceBetween,
```

```
          children: [
            const Text(
              'Book Design',
              style: TextStyle(
                color: Colors.white,
                fontSize: 18,
                fontWeight: FontWeight.bold,
              ),
            ),
            ElevatedButton.icon(
              onPressed: () {},
              icon: const Icon(Icons.add, color: Colors.white),
              label: const Text('Follow',
                  style: TextStyle(color: Colors.white)),
              style: ElevatedButton.styleFrom(
                backgroundColor: Colors.green,
                shape: RoundedRectangleBorder(
                  borderRadius: BorderRadius.circular(8),
                ),
              ),
            ),
          ],
        ),
        const SizedBox(height: 16),
        Expanded(
          child: GridView.count(
            crossAxisCount: 2,
            crossAxisSpacing: 12,
            mainAxisSpacing: 12,
```

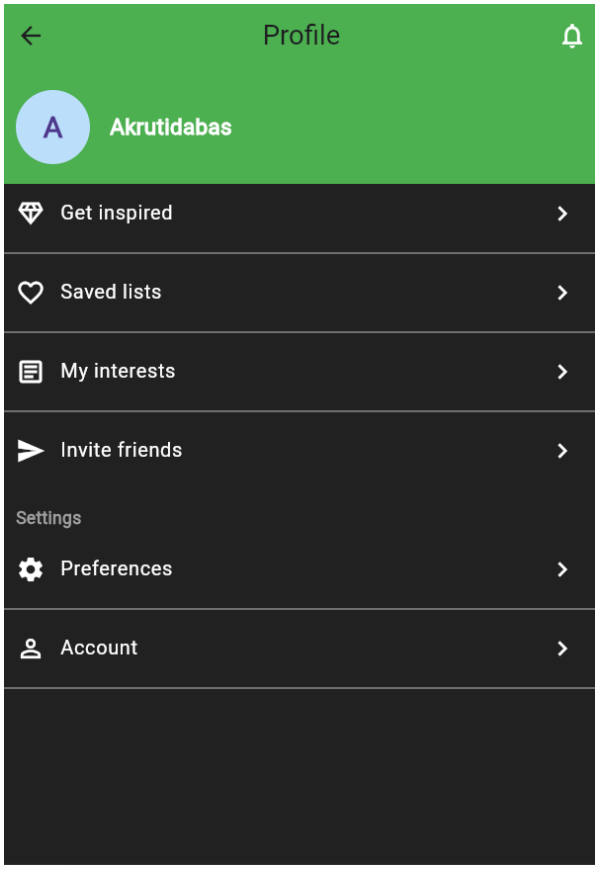
```
            childAspectRatio: 0.75,
            children: [
              _buildBookCard('assets/images/book_design_1.jpg', 427),
              _buildBookCard('assets/images/book_design_2.jpg', 334),
              _buildBookCard('assets/images/book_design_1.jpg', 427),
              _buildBookCard('assets/images/book_design_2.jpg', 334),
            ],
          ),
        ),
      ],
    ),
  ),
 );
}

 Widget _buildCategoryCard(String title, Color color) {
  return Container(
   width: 120,
   decoration: BoxDecoration(
    color: color,
    borderRadius: BorderRadius.circular(12),
   ),
   child: Center(
    child: Text(
     title,
     style: const TextStyle(
      color: Colors.white,
      fontSize: 16,
      fontWeight: FontWeight.bold,
```

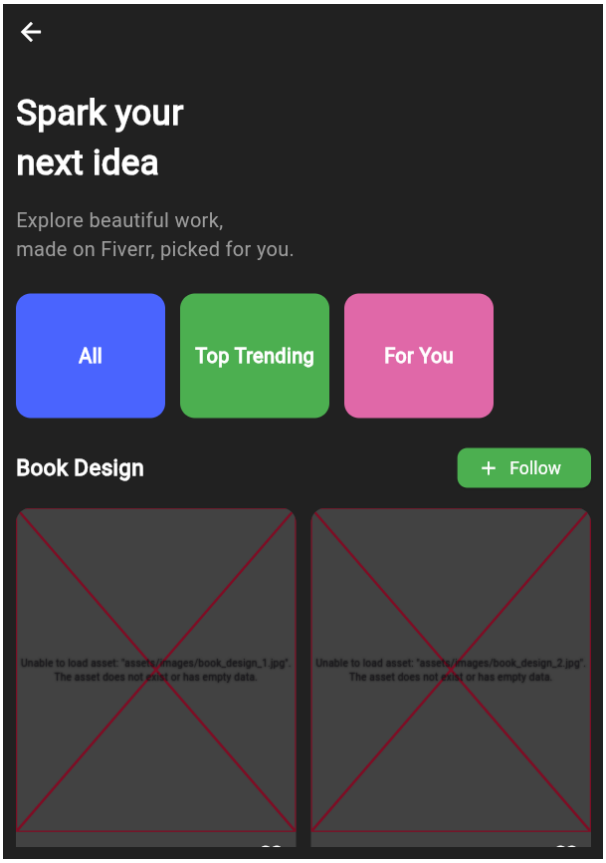
```
        ),
      ),
    ),
  );
}

Widget _buildBookCard(String imagePath, int awards) {
  return Container(
    decoration: BoxDecoration(
      color: Colors.grey[800],
      borderRadius: BorderRadius.circular(12),
    ),
    child: Column(
      crossAxisAlignment: CrossAxisAlignment.start,
      children: [
        Expanded(
          child: ClipRRect(
            borderRadius: const BorderRadius.only(
              topLeft: Radius.circular(12),
              topRight: Radius.circular(12),
            ),
            child: Image.asset(
              imagePath,
              width: double.infinity,
              fit: BoxFit.cover,
            ),
          ),
        ),
        Padding(
```

```
          padding: const EdgeInsets.all(8.0),
          child: Row(
            mainAxisAlignment: MainAxisAlignment.spaceBetween,
            children: [
              Text(
                '$awards awards',
                style: const TextStyle(color: Colors.grey, fontSize: 12),
              ),
              const Icon(Icons.favorite_border, color: Colors.white),
            ],
          ),
        ),
      ],
    ),
  );
 }
}
```

AKRUTI DABAS/ D15A/ 11

OUTPUT





EXPERIMENT NO: - 05

Name:- Akruti Dabas Class:- D15A Roll:No: - 11

AIM:

To apply navigation, routing and gestures in Flutter App.

THEORY:

What is Firebase?

Firebase is a comprehensive set of cloud-based tools and services provided by Google, designed to help developers build, deploy, and scale mobile and web applications efficiently. It offers a variety of features, including **Authentication**, **Realtime Database**, **Cloud Messaging**, **Crashlytics**, **Performance Monitoring**, and **Test Lab**2.

Firebase Authentication

Firebase Authentication is a service that provides an end-to-end identity solution for apps, allowing users to sign in using various methods such as email and password, phone numbers, and federated identity providers like Google, Facebook, and Twitter34. It integrates well with other Firebase services and supports industry standards like OAuth 2.0 and OpenID Connect. This makes it easy to implement secure authentication systems without extensive backend coding.

Key Features of Firebase Authentication:

- **Multi-Platform Support**: Works seamlessly across mobile and web platforms.
- **Easy Integration**: Can be set up with minimal code.
- **Security**: Leverages Google's expertise in managing large account databases.
- **Customizable UI**: FirebaseUI provides a customizable drop-in auth solution.

Firebase Storage

Firebase Storage is a service that allows developers to store and serve user-generated content, such as images and videos, in a scalable and secure manner. It uses Google Cloud Storage buckets, which can be accessed from both Google Cloud and Firebase platforms. This service integrates well with Firebase Authentication, enabling developers to manage access to stored files based on user identity16.

Key Features of Firebase Storage:

- **Scalability**: Automatically scales to meet storage needs.

- **Security**: Integrates with Firebase Authentication for access control.
- **Ease of Use**: No server-side coding required for basic operations.
- **Complex Operations**: Supports advanced operations via Google Cloud Storage APIs.

Using Firebase for Both Authentication and Storage

1. **Authentication Setup**: Implement Firebase Authentication to manage user identities and access control.
2. **Storage Integration**: Use Firebase Storage to store user-generated content.
3. **Access Control**: Configure security rules to restrict access to stored files based on user authentication status.

This combination allows developers to build applications where users can securely upload, manage, and access their content, all while leveraging Firebase's scalable and secure infrastructur

CODE:

In Pub.ysml

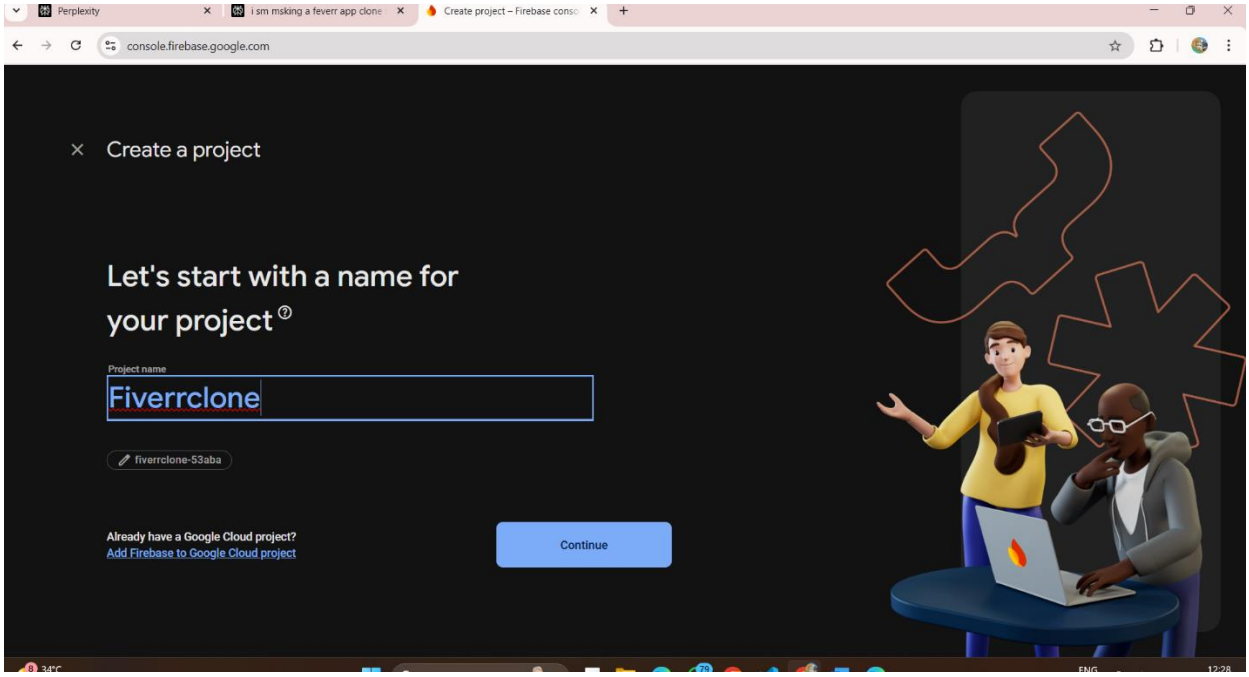
```yaml
dependencies:
  flutter:
    sdk: flutter

  # The following adds the Cupertino Icons font to your application.
  # Use with the CupertinoIcons class for iOS style icons.
  cupertino_icons: ^1.0.8
  font_awesome_flutter: ^10.8.0
  firebase_core: ^3.12.0
  cloud_firestore: ^5.6.3
  firebase_auth: ^5.5.0
```

```
Future<void> _signInWithEmailPassword() async {
  setState(() {
    _isLoading = true;
    _errorMessage = null;
  });

  try {
    UserCredential userCredential =
        await FirebaseAuth.instance.signInWithEmailAndPassword(
      email: _emailController.text.trim(),
```

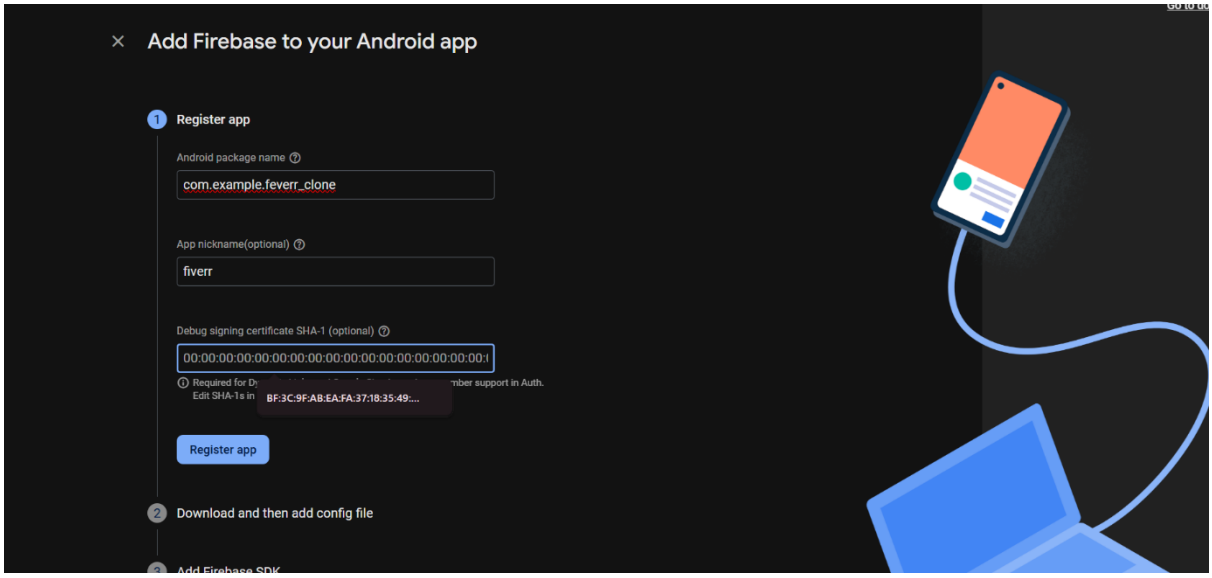
```
        password: _passwordController.text.trim(),
      );

      User? user = userCredential.user;

      if (user != null) {
        Navigator.pushReplacement(
          context,
          MaterialPageRoute(builder: (context) => const HomeScreen()),
        );
      } else {
        setState(() {
          _errorMessage = "User not found. Please check your credentials.";
        });
      }
    } catch (e) {
      setState(() {
        if (e is FirebaseAuthException) {
          _errorMessage = e.message;
        } else {
          _errorMessage = "An unexpected error occurred: $e";
        }
      });
    } finally {
      setState(() {
        _isLoading = false;
      });
    }
  }
```

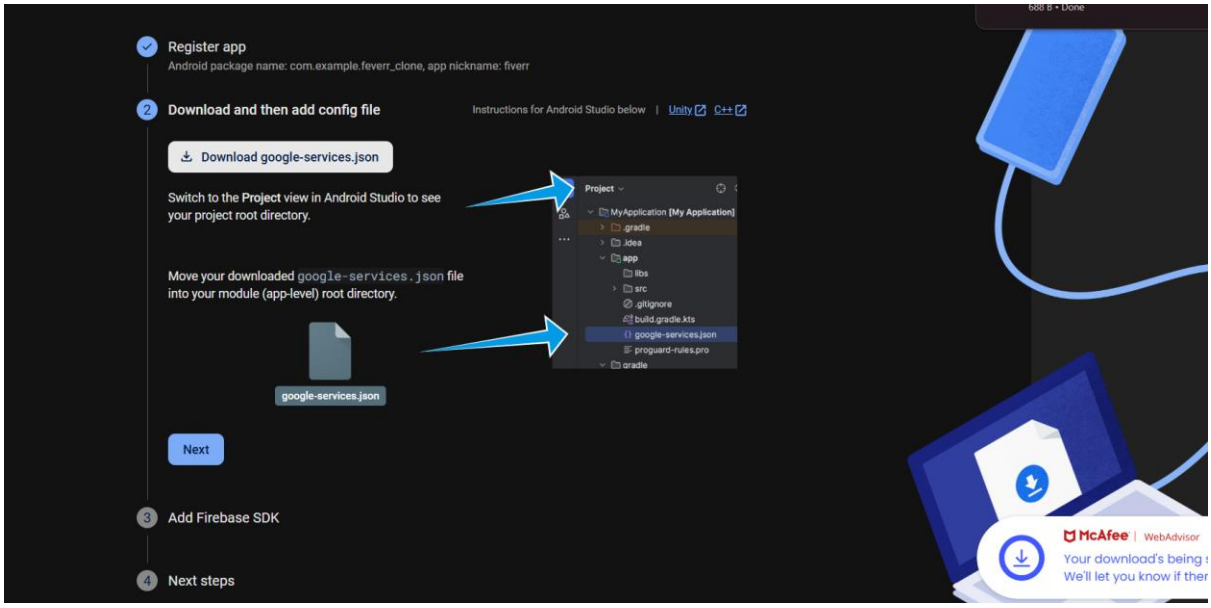
```
Widget _buildTextButton(String text) {
  return TextButton(
    onPressed: () {
      // Handle button press
    },
    child: Text(
      text,
      style: const TextStyle(color: Colors.green, fontSize: 14),
    ),
  );
 }
}
```

SCREENSHOTS

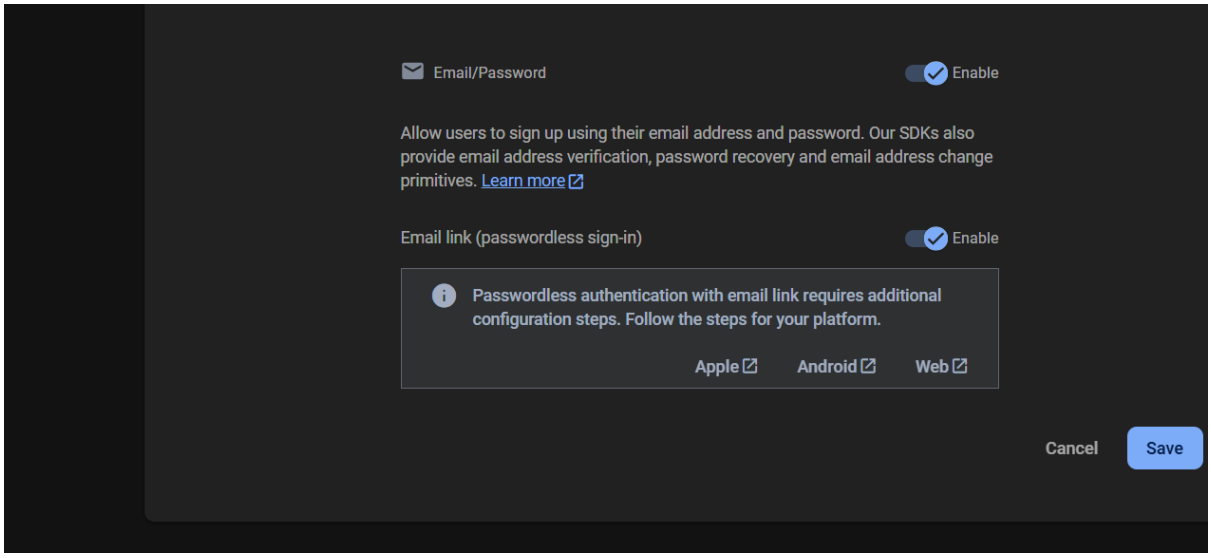


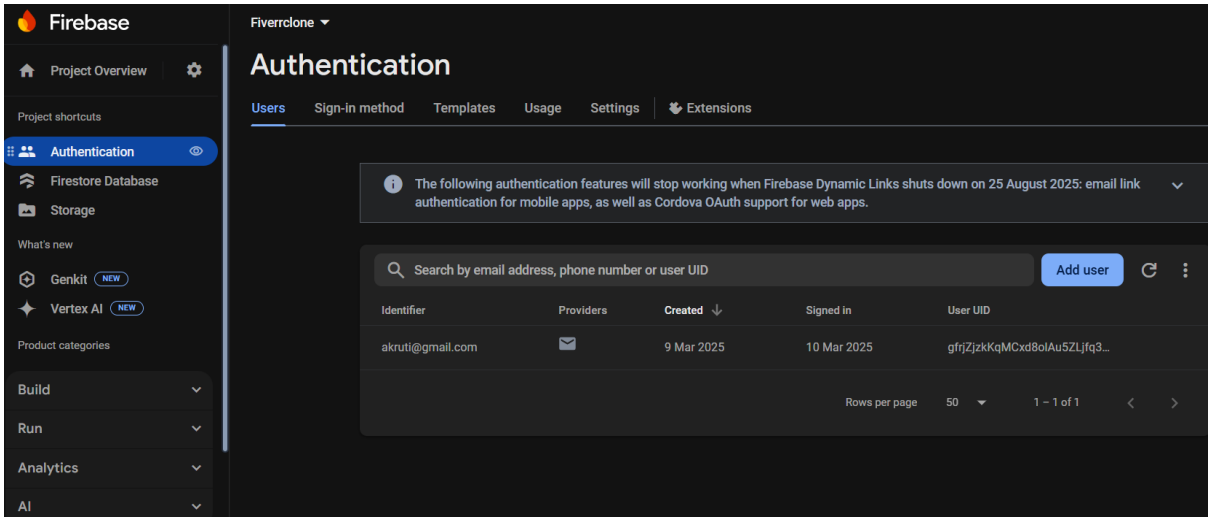
AKRUTI DABAS/ D15A/ 11





AKRUTI DABAS/ D15A/ 11





Experiment No. 7

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:**

  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.

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.

- **The main features are:**

1. Progressive — They work for every user, regardless of the browser chosen because they are built at the base with progressive improvement principles.
2. Responsive — They adapt to the various screen sizes: desktop, mobile, tablet, or dimensions that can later become available.
3. Updated — Information is always up-to-date thanks to the data update process offered by service workers.
4. Secure — Exposed over HTTPS protocol to prevent the connection from displaying information or altering the contents.
5. Searchable — They are identified as “applications” and are indexed by search engines.
6. Reactivable — Make it easy to reactivate the application thanks to capabilities such as web notifications.
7. 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.
8. Linkable — Easily shared via URL without complex installations.
9. 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.

Code:

1. **Manifest.json**

```
{
  "name": "Shopping App",
  "short_name": "MyApp",
  "description": "An online shopping platform with a wide range of
products.",
  "start_url": "/",
  "scope": "/",
  "display": "standalone",
  "background_color": "#ffffff",
  "theme_color": "#ff6600",
  "icons": [
    {
      "src": "assets/images/banner-1.png",
      "sizes": "192x192",
      "type": "image/png",
      "purpose": "any maskable"
    },
    {
      "src": "assets/images/banner-2.png",
      "sizes": "512x512",
      "type": "image/png",
      "purpose": "any maskable"
    }
  ],
  "shortcuts": [
    {
      "name": "Shop Now",
      "short_name": "Shop",
      "description": "Go directly to shopping",
      "url": "/index.html",
      "icons": [
        {
          "src": "assets/images/shortcut-icon.png",
          "sizes": "96x96",
          "type": "image/png"
        }
      ]
    }
  ]
}
```

2. Service-worker.js

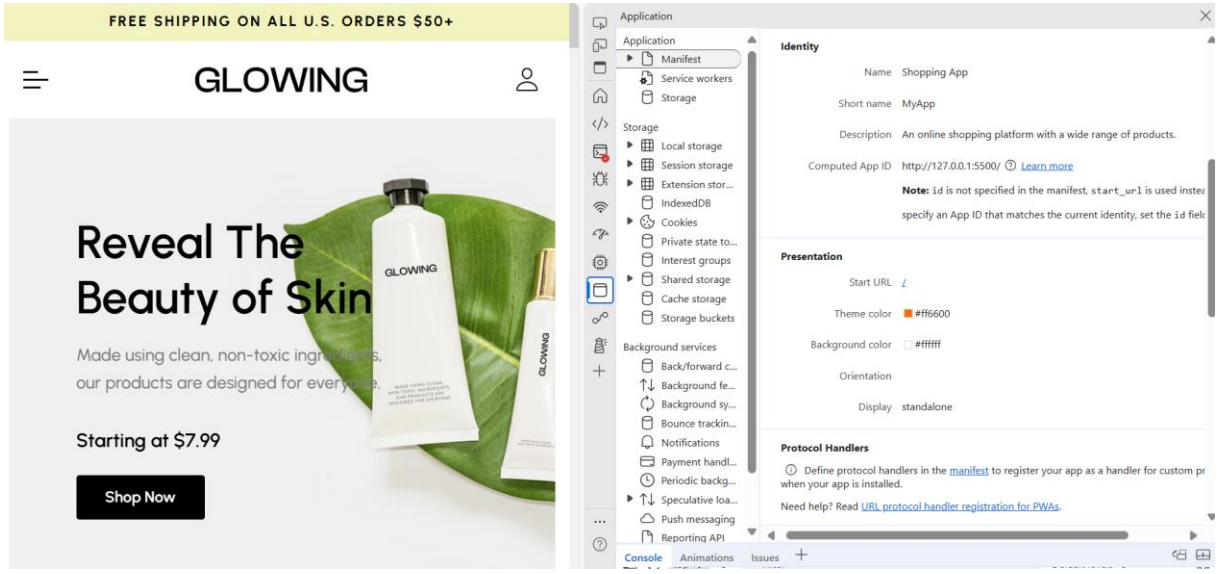
```
self.addEventListener("install", (event) => {
    console.log("Service Worker Installed");
  });

  self.addEventListener("fetch", (event) => {
    event.respondWith(fetch(event.request));
  });
```

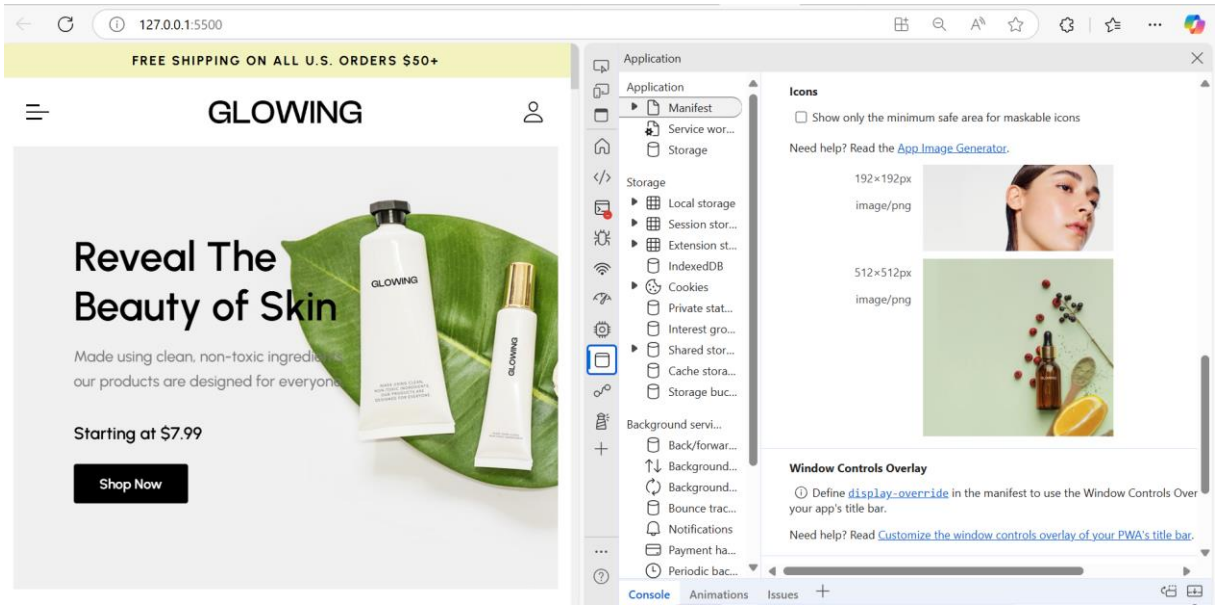
3. Script.js file:

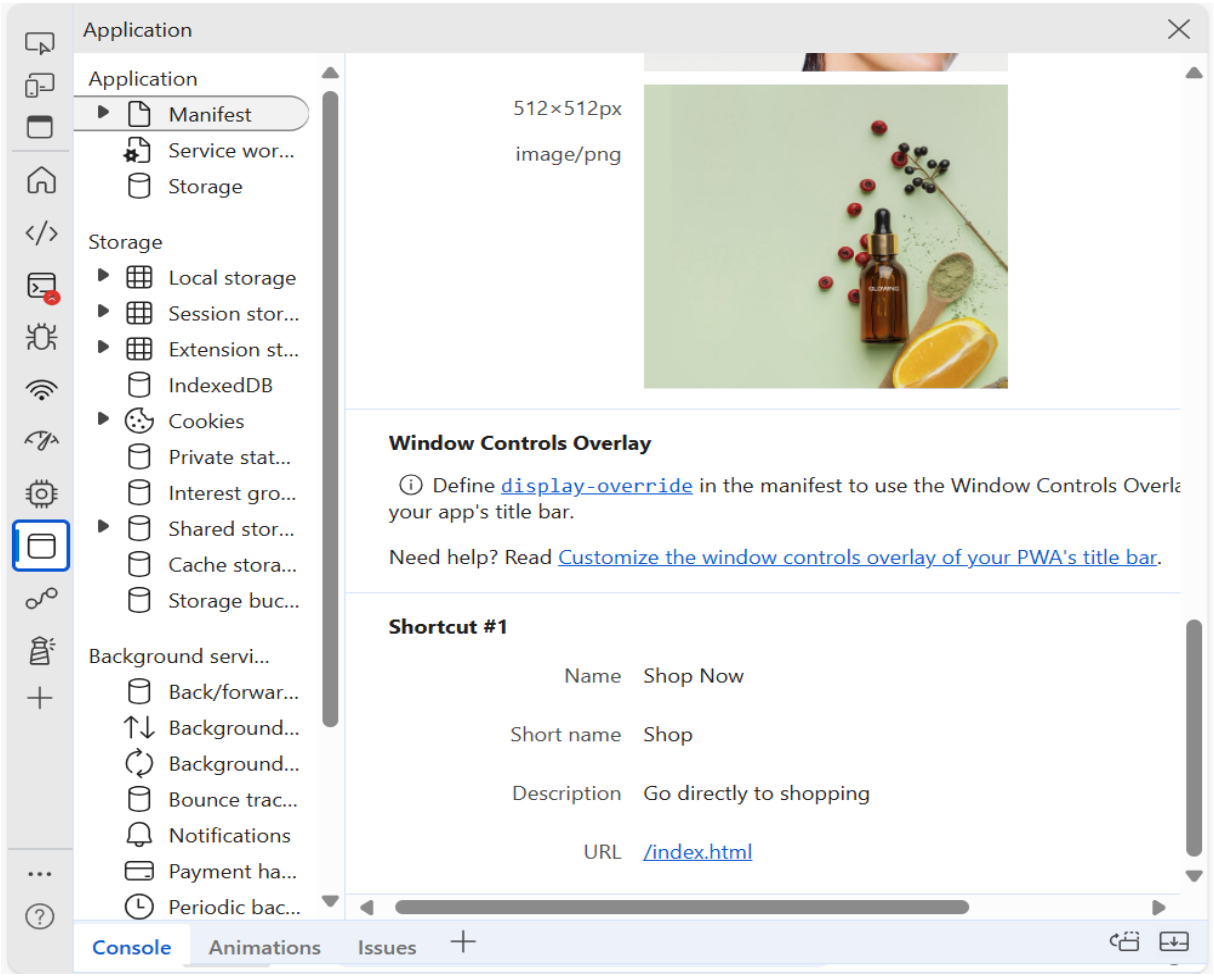
```
'use strict';

/**
 * add event on element
 */

const addEventOnElem = function (elem, type, callback) {
  if (elem.length > 1) {
    for (let i = 0; i < elem.length; i++) {
      elem[i].addEventListener(type, callback);
    }
  } else {
    elem.addEventListener(type, callback);
  }
}


/**
 * navbar toggle
 */

const navTogglers = document.querySelectorAll("[data-nav-toggler]");
const navbar = document.querySelector("[data-navbar]");
const navbarLinks = document.querySelectorAll("[data-nav-link]");
const overlay = document.querySelector("[data-overlay]");

const toggleNavbar = function () {
  navbar.classList.toggle("active");
  overlay.classList.toggle("active");
}

addEventOnElem(navTogglers, "click", toggleNavbar);

const closeNavbar = function () {
  navbar.classList.remove("active");
  overlay.classList.remove("active");
}

addEventOnElem(navbarLinks, "click", closeNavbar);
```

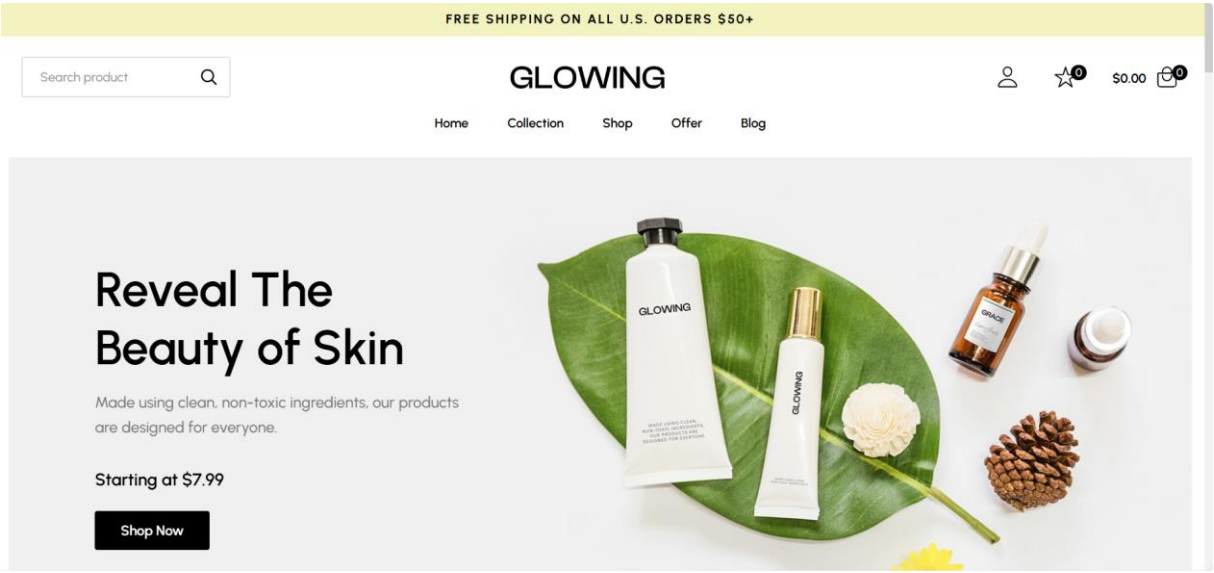
```
/**
 * header sticky & back top btn active
 */

const header = document.querySelector("[data-header]");
const backTopBtn = document.querySelector("[data-back-top-btn]");

const headerActive = function () {
  if (window.scrollY > 150) {
    header.classList.add("active");
    backTopBtn.classList.add("active");
  } else {
    header.classList.remove("active");
    backTopBtn.classList.remove("active");
  }
}

addEventOnElem(window, "scroll", headerActive);

let lastScrolledPos = 0;

const headerSticky = function () {
  if (lastScrolledPos >= window.scrollY) {
    header.classList.remove("header-hide");
  } else {
    header.classList.add("header-hide");
  }

  lastScrolledPos = window.scrollY;
}

addEventOnElem(window, "scroll", headerSticky);


/**
 * scroll reveal effect
 */

const sections = document.querySelectorAll("[data-section]");

const scrollReveal = function () {
  for (let i = 0; i < sections.length; i++) {
    if (sections[i].getBoundingClientRect().top < window.innerHeight / 2) {
      sections[i].classList.add("active");
    }
  }
}

scrollReveal();

addEventOnElem(window, "scroll", scrollReveal);
```

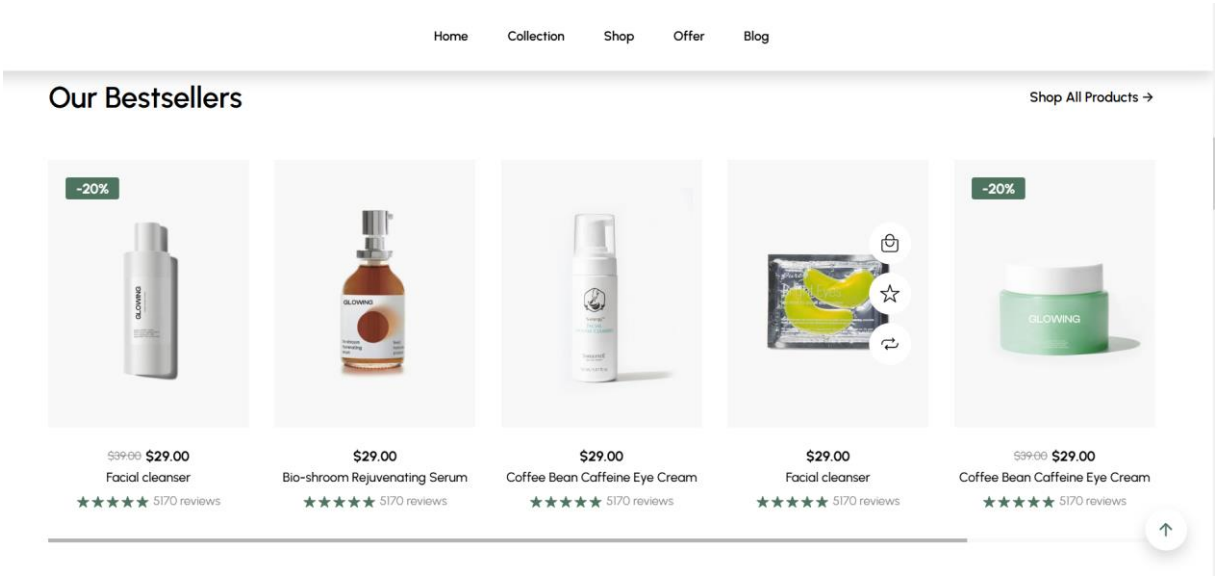
Output:


FREE SHIPPING ON ALL U.S. ORDERS $50+
GLOWING
Reveal The Beauty of Skin
Made using clean, non-toxic ingredients,
our products are designed for everyone.
Starting at $7.99
Shop Now
Application
Manifest
Service workers
Storage
Identity
Name Shopping App
Short name MyApp
Description An online shopping platform with a wide range of products.
Presentation
Start URL /
Theme color #ff6600
Background color #ffffff
Orientation
Display standalone
Protocol Handlers
Console
Animations
Issues


127.0.0.1:5500
FREE SHIPPING ON ALL U.S. ORDERS $50+
GLOWING
Reveal The Beauty of Skin
Starting at $7.99
Shop Now
Application
Manifest
Storage
Icons
Show only the minimum safe area for maskable icons
Need help? Read the App Image Generator.
192×192px
image/png
512×512px
image/png
Window Controls Overlay
Console
Animations
Issues


Application
Application
Manifest
Service wor...
Storage
Storage
Local storage
Session stor...
Extension st...
IndexedDB
Cookies
Private stat...
Interest gro...
Shared stor...
Cache stora...
Storage buc...
Background servi...
Back/forwar...
Background...
Background...
Bounce trac...
Notifications
Payment ha...
Periodic bac...
512×512px
image/png
Window Controls Overlay
Define display-override in the manifest to use the Window Controls Overla your app's title bar.
Need help? Read Customize the window controls overlay of your PWA's title bar.
Shortcut #1
Name Shop Now
Short name Shop
Description Go directly to shopping
URL /index.html
Console
Animations
Issues


FREE SHIPPING ON ALL U.S. ORDERS $50+
Search product
GLOWING
$0.00
Home
Collection
Shop
Offer
Blog
Reveal The Beauty of Skin
Made using clean, non-toxic ingredients, our products are designed for everyone.
Starting at $7.99
Shop Now


Home
Collection
Shop
Offer
Blog
Our Bestsellers
Shop All Products →
-20%
GLOWING
$39.00 $29.00
Facial cleanser
★★★★★ 5170 reviews
$29.00
Bio-shroom Rejuvenating Serum
★★★★★ 5170 reviews
$29.00
Coffee Bean Caffeine Eye Cream
★★★★★ 5170 reviews
$29.00
Facial cleanser
★★★★★ 5170 reviews
-20%
GLOWING
$39.00 $29.00
Coffee Bean Caffeine Eye Cream
★★★★★ 5170 reviews

Vanshika Ambwani (02), Gunjan Chandnani (06), Akruti Dabas (11)

Experiment number
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.

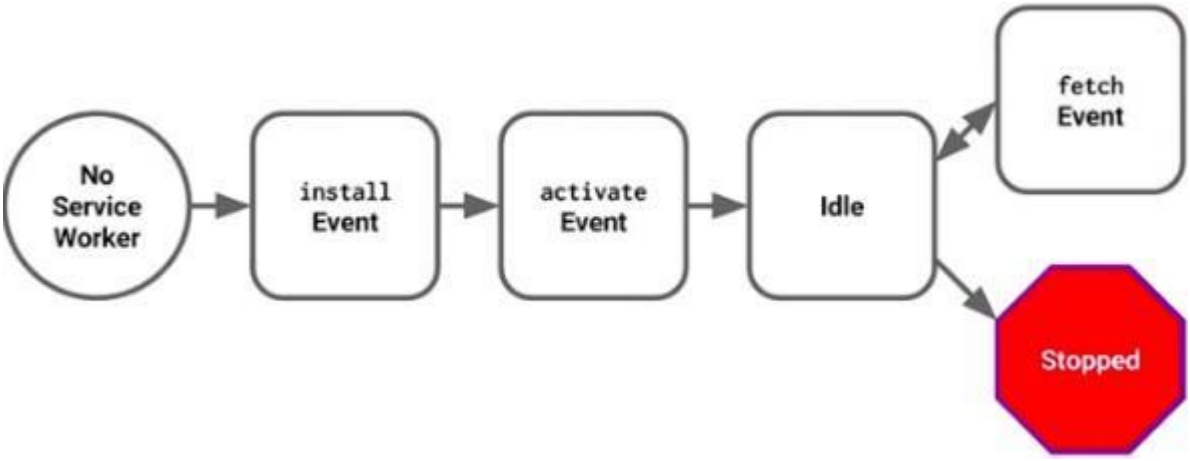
- You can manage **Push Notifications**
  You can manage push notifications with Service Worker and show any information message to the user.
- You can **Continue**
  Although Internet connection is broken, you can start any process with Background Sync of Service Worker.

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).

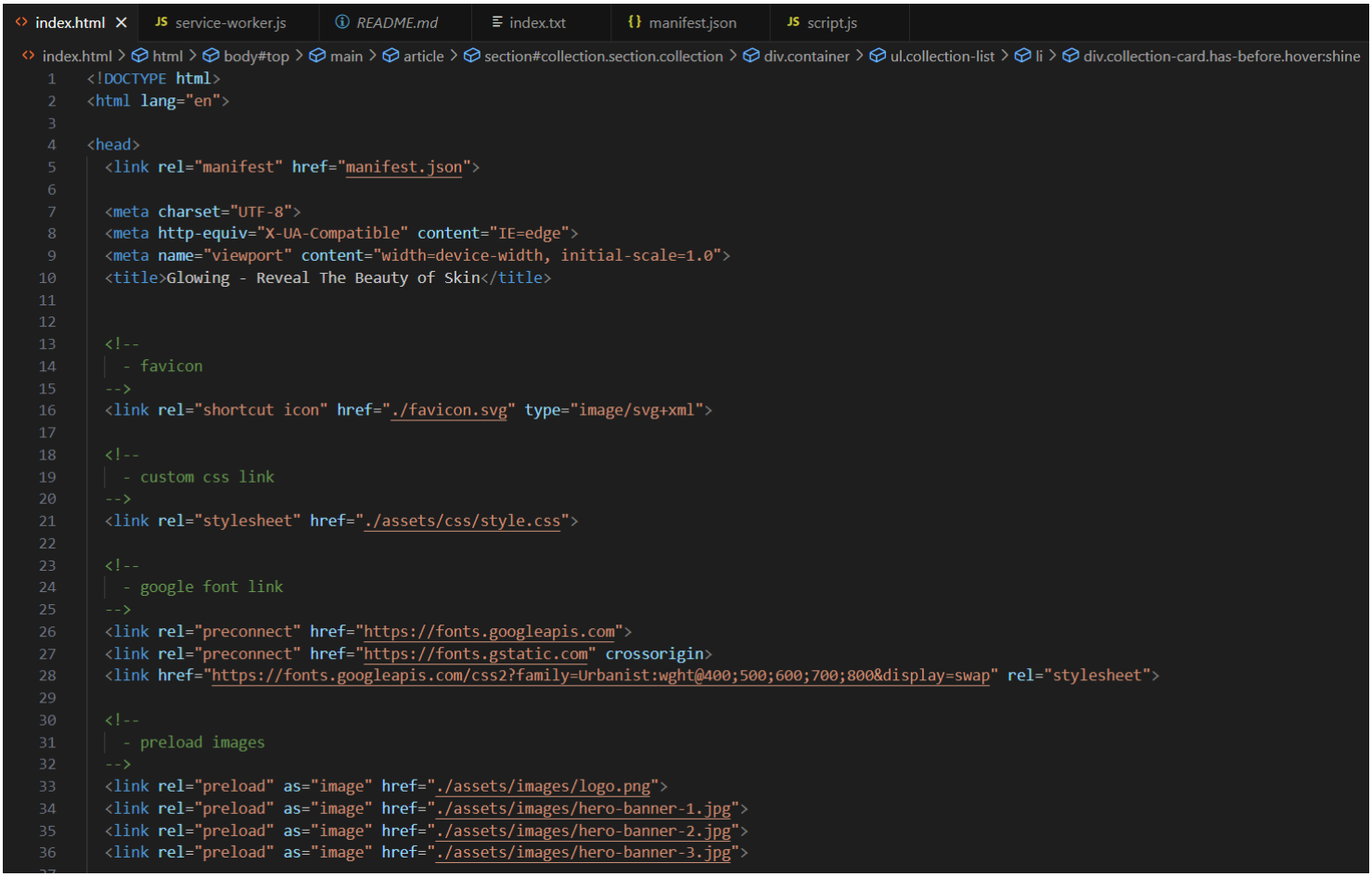
service-worker.js

```
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

index.html



```
<!DOCTYPE html>
<html lang="en">

<head>
  <link rel="manifest" href="manifest.json">

  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Glowing - Reveal The Beauty of Skin</title>


  <!--
    - favicon
  -->
  <link rel="shortcut icon" href="./favicon.svg" type="image/svg+xml">

  <!--
    - custom css link
  -->
  <link rel="stylesheet" href="./assets/css/style.css">

  <!--
    - google font link
  -->
  <link rel="preconnect" href="https://fonts.googleapis.com">
  <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin>
  <link href="https://fonts.googleapis.com/css2?family=Urbanist:wght@400;500;600;700;800&display=swap" rel="stylesheet">

  <!--
    - preload images
  -->
  <link rel="preload" as="image" href="./assets/images/logo.png">
  <link rel="preload" as="image" href="./assets/images/hero-banner-1.jpg">
  <link rel="preload" as="image" href="./assets/images/hero-banner-2.jpg">
  <link rel="preload" as="image" href="./assets/images/hero-banner-3.jpg">
```

service-worker.js

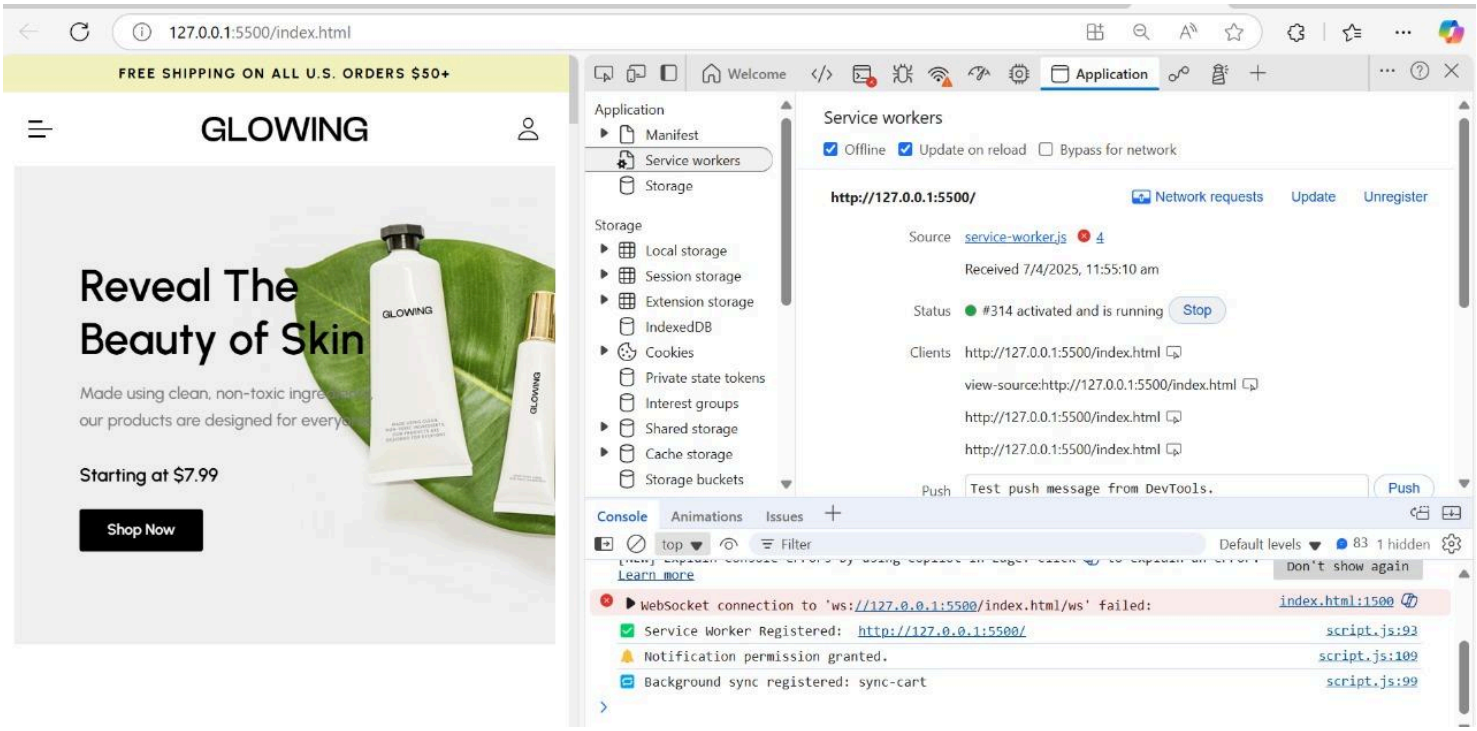
```
self.addEventListener("install", (event) => {
    console.log("Service Worker Installed");
  });

  self.addEventListener("fetch", (event) => {
    event.respondWith(fetch(event.request));
  });
```

Vanshika Ambwani (02), Gunjan Chandnani (06), Akruti Dabas (11)

manifest.json

```
{
  "name": "Shopping App",
  "short_name": "MyApp",
  "description": "An online shopping platform with a wide range of products.",
  "start_url": "/",
  "scope": "/",
  "display": "standalone",
  "background_color": "#ffffff",
  "theme_color": "#ff6600",
  "icons": [
    {
      "src": "assets/images/banner-1.png",
      "sizes": "192x192",
      "type": "image/png",
      "purpose": "any maskable"
    },
    {
      "src": "assets/images/banner-2.png",
      "sizes": "512x512",
      "type": "image/png",
      "purpose": "any maskable"
    }
  ],
  "shortcuts": [
    {
      "name": "Shop Now",
      "short_name": "Shop",
      "description": "Go directly to shopping",
      "url": "/index.html",
      "icons": [
        {
          "src": "assets/images/shortcut-icon.png",
          "sizes": "96x96",
          "type": "image/png"
        }
      ]
    }
  ]
}
```

Vanshika Ambwani (02), Gunjan Chandnani (06), Akruti Dabas (11)



EXPERIMENT NO. 9

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.

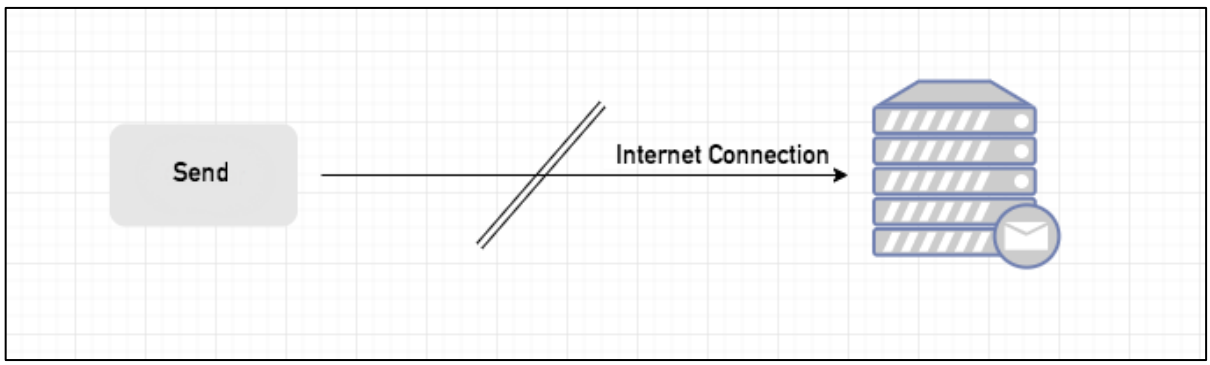
```
self.addEventListener("fetch", function (event) {
    const req = event.request;
    const url = new URL(req.url);

    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

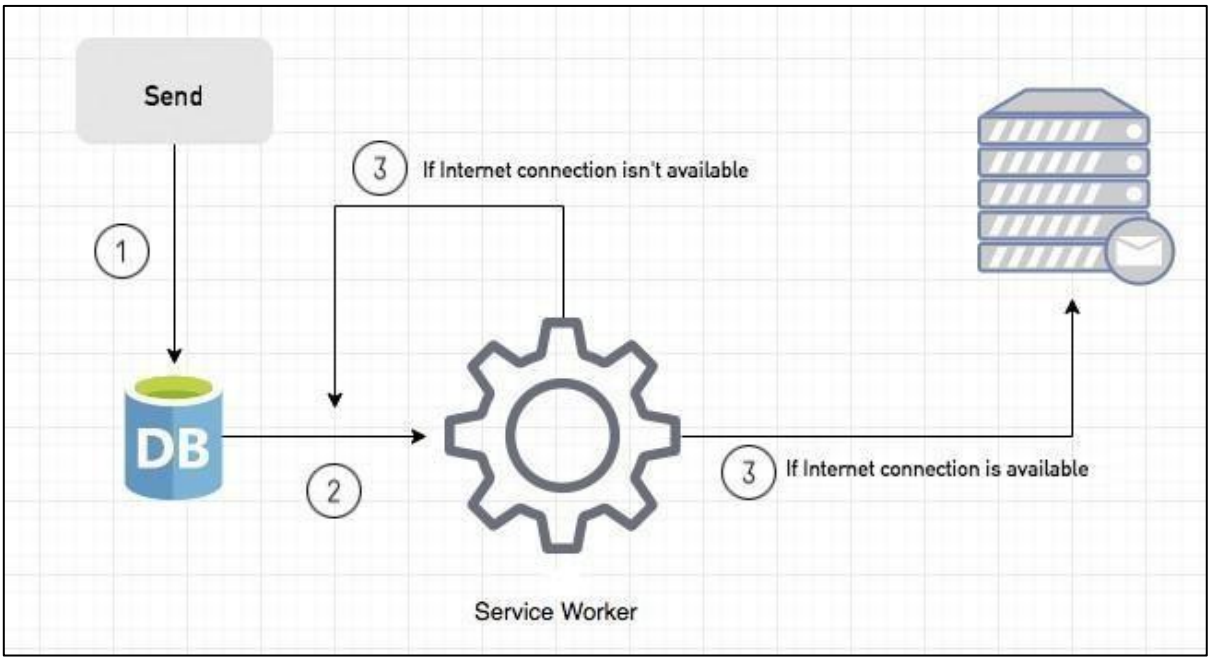
Background Sync is a Web API that is used to delay a process until the Internet connection is stable. We can adapt this definition to the real world; there is an e-mail client application that works on the browser and we want to send an email with this tool. Internet connection is broken while we are 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:

1. Push Notification code:

```
self.addEventListener("install", (event) => {
  console.log("✅ Service Worker Installed");
});

self.addEventListener("fetch", (event) => {
  event.respondWith(fetch(event.request));
});

// ✅ Background Sync Event
self.addEventListener("sync", (event) => {
  console.log("🔁 Sync Event Triggered:", event.tag);
  if (event.tag === "sync-cart") {
    event.waitUntil(syncCartData());
  }
});

async function syncCartData() {
  try {
    console.log("🛒 Syncing cart data...");
    // Add your actual sync logic here
  } catch (err) {
    console.error("❌ Failed to sync cart data:", err);
  }
}

self.addEventListener("message", (event) => {
  if (event.data && event.data.type === "trigger-push") {
    const { title, body } = event.data;
    if (Notification.permission === "granted") {
      self.registration.showNotification(title, {
        body,
        icon: "/images/banner-1.png",
        badge: "/images/"
      });
    }
  }
});

// ✅ Push Notification Event
self.addEventListener("push", (event) => {
  console.log("📲 Push Event Received");

  let data = {};
  if (event.data) {
    data = event.data.json();
  }

  const title = data.title || "New Notification!";
  const options = {
    body: data.body || "You have a new message.",
```

```
    icon: "/images/logo.png",
    badge: "/images/logo.png"
  };

  // Check permission before showing notification
  if (Notification.permission === "granted") {
    event.waitUntil(
      self.registration.showNotification(title, options)
    );
  } else {
    console.warn("⃠ Notification not shown. Permission not granted.");
  }
});
```

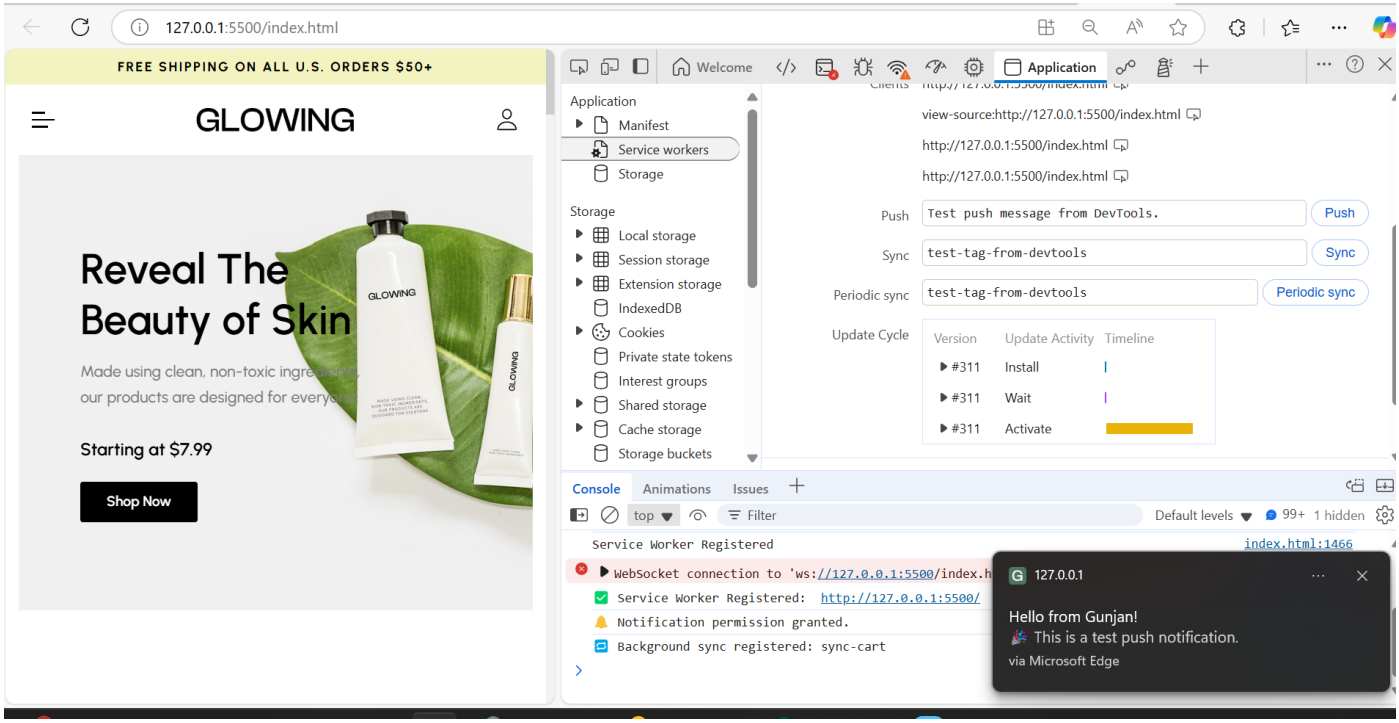
2. **Fetch and Sync Code:**

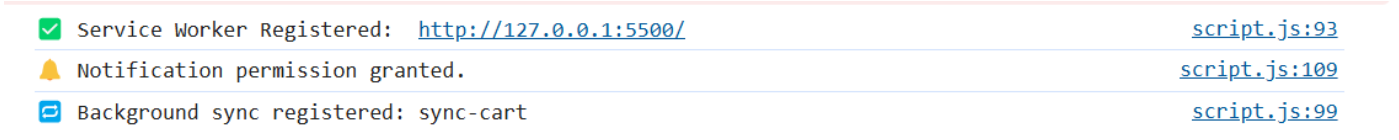
```
'use strict';

/**
 * Add event on element
 */
const addEventOnElem = function (elem, type, callback) {
  if (elem.length > 1) {
    for (let i = 0; i < elem.length; i++) {
      elem[i].addEventListener(type, callback);
    }
  } else {
    elem.addEventListener(type, callback);
  }
};

/**
 * Navbar toggle
 */
const navTogglers = document.querySelectorAll("[data-nav-toggler]");
const navbar = document.querySelector("[data-navbar]");
const navbarLinks = document.querySelectorAll("[data-nav-link]");
const overlay = document.querySelector("[data-overlay]");

const toggleNavbar = function () {
  navbar.classList.toggle("active");
  overlay.classList.toggle("active");
};

addEventOnElem(navTogglers, "click", toggleNavbar);

const closeNavbar = function () {
  navbar.classList.remove("active");
  overlay.classList.remove("active");
};

addEventOnElem(navbarLinks, "click", closeNavbar);

/**
 * Header sticky & back top btn active
 */
const header = document.querySelector("[data-header]");
const backTopBtn = document.querySelector("[data-back-top-btn]");

const headerActive = function () {
  if (window.scrollY > 150) {
    header.classList.add("active");
    backTopBtn.classList.add("active");
  } else {
```

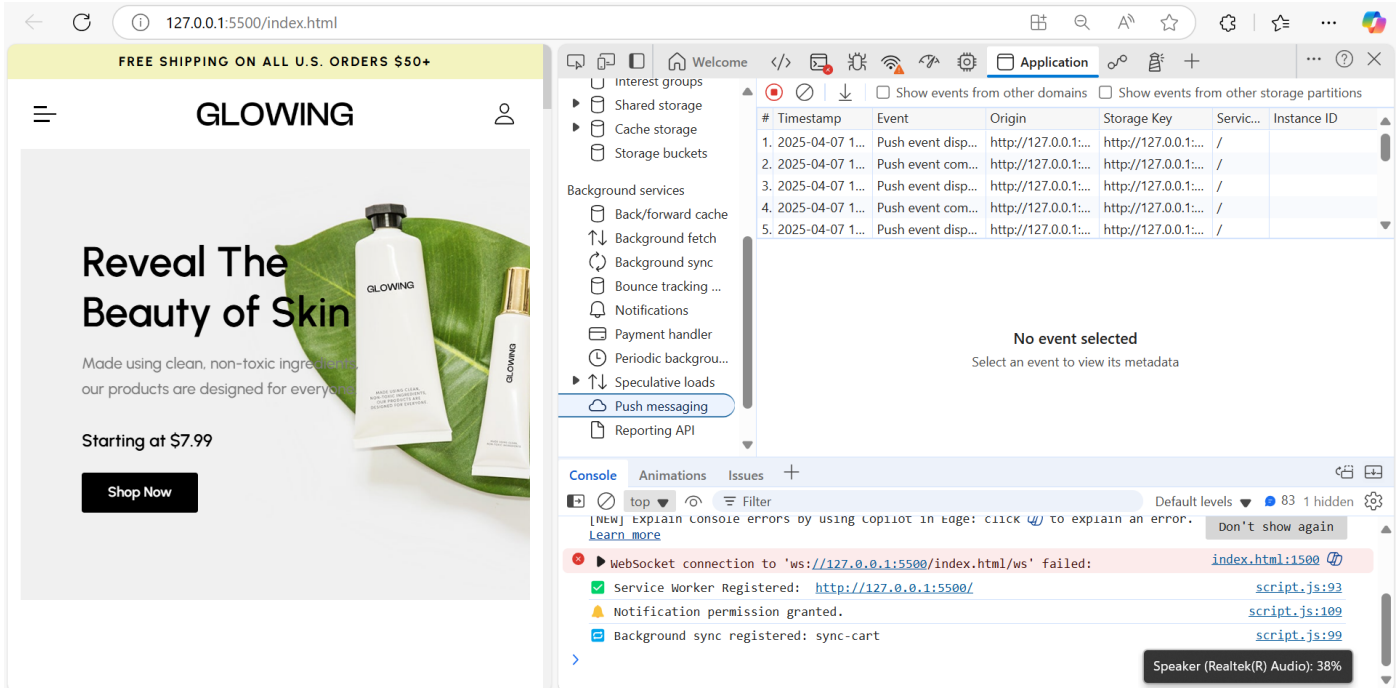
```
    header.classList.remove("active");
    backTopBtn.classList.remove("active");
  }
};

addEventOnElem(window, "scroll", headerActive);

let lastScrolledPos = 0;

const headerSticky = function () {
  if (lastScrolledPos >= window.scrollY) {
    header.classList.remove("header-hide");
  } else {
    header.classList.add("header-hide");
  }

  lastScrolledPos = window.scrollY;
};

addEventOnElem(window, "scroll", headerSticky);

/**
 * Scroll reveal effect
 */
const sections = document.querySelectorAll("[data-section]");

const scrollReveal = function () {
  for (let i = 0; i < sections.length; i++) {
    if (sections[i].getBoundingClientRect().top < window.innerHeight / 2) {
      sections[i].classList.add("active");
    }
  }
};

scrollReveal();
addEventOnElem(window, "scroll", scrollReveal);

/**
 * ✅ Register Service Worker and Notification Permission
 */
if ('serviceWorker' in navigator && 'Notification' in window) {
  window.addEventListener("load", () => {
    navigator.serviceWorker.register('/service-worker.js')
      .then((reg) => {
        console.log("✅ Service Worker Registered: ", reg.scope);

        // Optional: Register background sync
        if ('sync' in reg) {
          reg.sync.register('sync-cart')
            .then(() => {
```

```
              console.log("🔁 Background sync registered: sync-cart");
            })
            .catch((err) => {
              console.error("❌ Sync registration failed:", err);
            });
        }

        // Ask for notification permission
        Notification.requestPermission().then((permission) => {
          if (permission === "granted") {
            console.log("🔔 Notification permission granted.");

            // Optional: Trigger test push manually
            setTimeout(() => {
              reg.active.postMessage({
                type: 'trigger-push',
                title: 'Hello from Gunjan!',
                body: '🎉 This is a test push notification.'
              });
            }, 3000); // Trigger after 3s
          } else {
            console.warn("🔕 Notification permission denied.");
          }
        });
      })
      .catch((err) => {
        console.error("❌ Service Worker registration failed:", err);
      });
  });
}

```

Output:


127.0.0.1:5500/index.html
FREE SHIPPING ON ALL U.S. ORDERS $50+
GLOWING
Reveal The Beauty of Skin
Starting at $7.99
Shop Now
Application
Manifest
Service workers
Storage
Local storage
Session storage
Extension storage
IndexedDB
Cookies
Private state tokens
Interest groups
Shared storage
Cache storage
Storage buckets
Push
Test push message from DevTools.
Sync
test-tag-from-devtools
Periodic sync
Update Cycle
Version
Update Activity
Timeline
#311 Install
#311 Wait
#311 Activate
Console
Animations
Issues
Service Worker Registered
WebSocket connection to 'ws://127.0.0.1:5500/index.h
Service Worker Registered: http://127.0.0.1:5500/
Notification permission granted.
Background sync registered: sync-cart
127.0.0.1
Hello from Gunjan!
This is a test push notification.
via Microsoft Edge


Service Worker Registered: http://127.0.0.1:5500/ script.js:93
Notification permission granted. script.js:109
Background sync registered: sync-cart script.js:99


127.0.0.1:5500/index.html
FREE SHIPPING ON ALL U.S. ORDERS $50+
GLOWING
Reveal The Beauty of Skin
Starting at $7.99
Shop Now
Application
Shared storage
Cache storage
Storage buckets
Background services
Back/forward cache
Background fetch
Background sync
Bounce tracking ...
Notifications
Payment handler
Periodic backgrou...
Speculative loads
Push messaging
Reporting API
Show events from other domains
Show events from other storage partitions
Timestamp
Event
Origin
Storage Key
Instance ID
No event selected
Select an event to view its metadata
Console
Animations
Issues
Don't show again
WebSocket connection to 'ws://127.0.0.1:5500/index.html/ws' failed:
Service Worker Registered: http://127.0.0.1:5500/
Notification permission granted.
Background sync registered: sync-cart
Speaker (Realtek(R) Audio): 38%

EXPERIMENT NO: - 10

Name:- Gunjan Chandnani/ Akruti Dabas/ Vanshika Ambwani **Class:-** D15A

Roll:No: - 06/ 11 /02

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

Theory: -

GitHub Pages: Static Website Hosting Made Simple

GitHub Pages is a free hosting service that allows users to publish **public webpages directly from a GitHub repository**. It is particularly useful for **static websites, project documentation, and blogs**.

Key Features

- **Jekyll Integration**: Built-in support for Jekyll enables easy blogging.
- **Custom Domains**: Allows users to configure their own URLs.
- **Automatic Page Deployment**: Simply push your changes to the repository, and the updates go live.

Why Choose GitHub Pages?

- **Completely Free**: No hosting charges.
- **Seamless GitHub Integration**: Works directly with your repositories.
- **Quick Setup**: Just create a repository, push your files, and your site is live.

Who Uses GitHub Pages?

Companies like **Lyft, CircleCI, and HubSpot** use GitHub Pages for their documentation and static sites. It is widely adopted, appearing in **775 company stacks and 4,401 developer stacks**.

Pros & Cons

Pros

- Familiar interface for GitHub users.

- Simple deployment via the gh-pages branch.
- Supports custom domains with easy DNS configuration.

Cons

- Repositories need to be public unless you have a paid plan.
- Limited HTTPS support for custom domains (expected to improve).
- Jekyll plugins have limited support.

Firebase: A Full-Featured Real-Time Backend

Firebase is a cloud-based **real-time application platform** developed by Google. It enables developers to build **dynamic, collaborative applications** with ease.

Key Features

- **Real-Time Database**: Automatically syncs data across all connected clients.
- **Cloud-Based Storage**: JSON-based storage accessible via REST APIs.
- **Scalable Infrastructure**: Works well with existing services and scales automatically.
- **Authentication & Cloud Messaging**: Secure login and push notifications.

Why Choose Firebase?

- **Instant Backend Setup**: No need to build a separate backend.
- **Fast & Responsive**: Real-time data synchronization.
- **Built-in HTTPS**: Free SSL certificates for custom domains.

Who Uses Firebase?

Companies like **Instacart, 9GAG, and Twitch** rely on Firebase for their backend needs. Firebase is widely adopted, appearing in **1,215 company stacks and 4,651 developer stacks**.

Pros & Cons

Pros

- **Hosted by Google**, ensuring reliability and security.
- **Comes with authentication, messaging, and real-time database services.**
- **Free HTTPS support** for all custom domains.

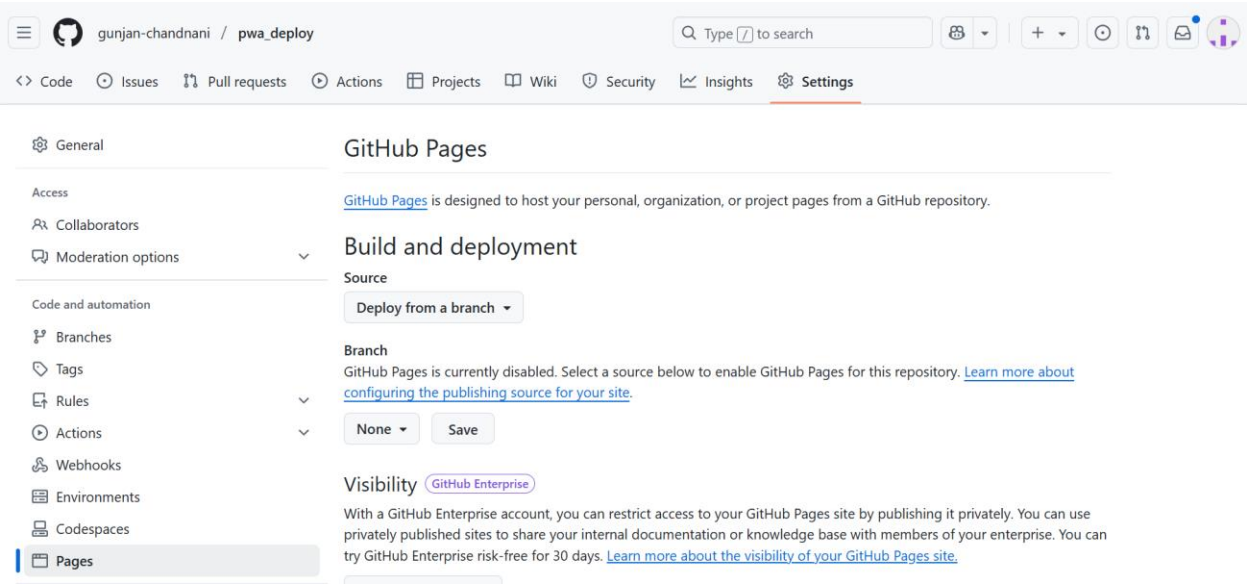
Cons

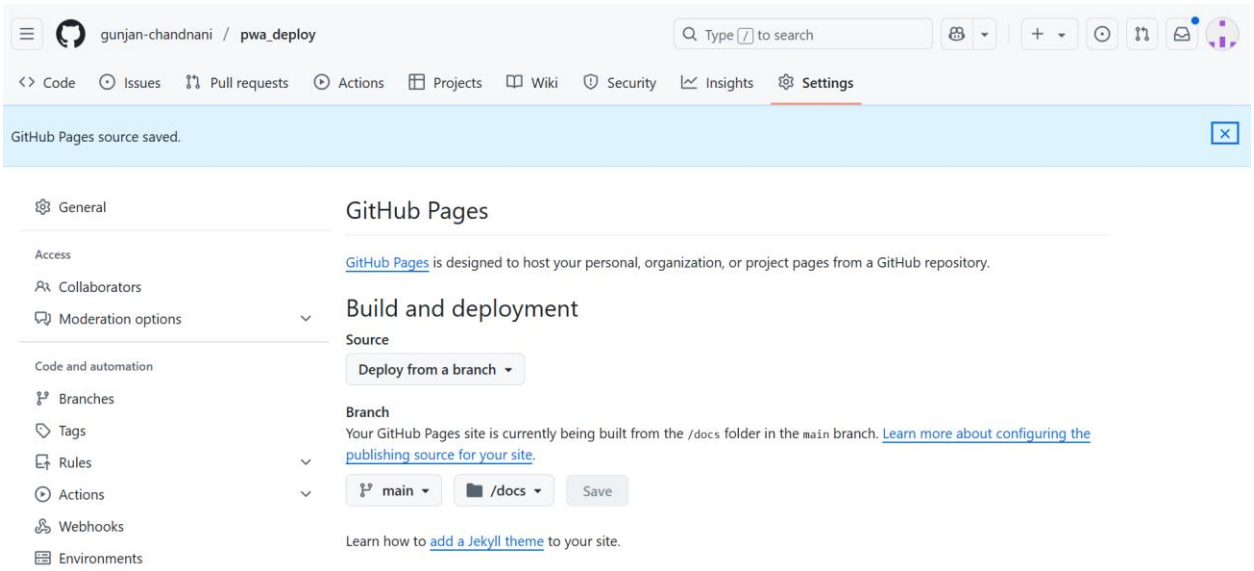
- **Limited Free Plan**: 10 GB of data transfer per month (can be mitigated with a CDN).
- **Command-Line Deployment**: No GUI for hosting.
- **No Built-in Static Site Generator Support**: Unlike GitHub Pages, Firebase doesn't natively support static site generators like Jekyll.

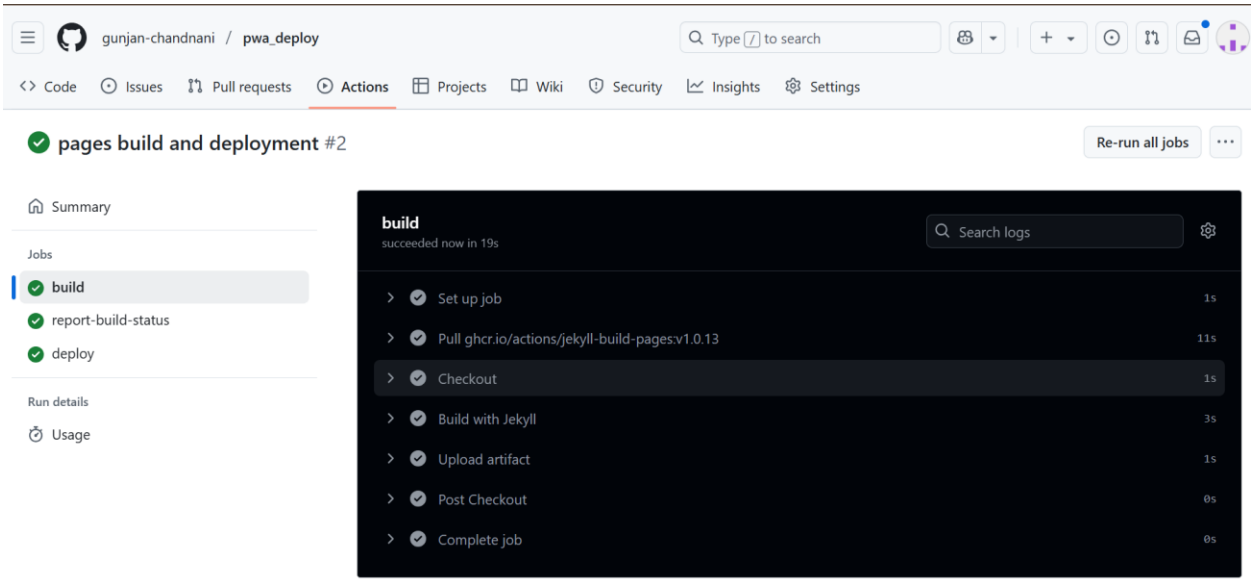
Link to our GitHub repository:

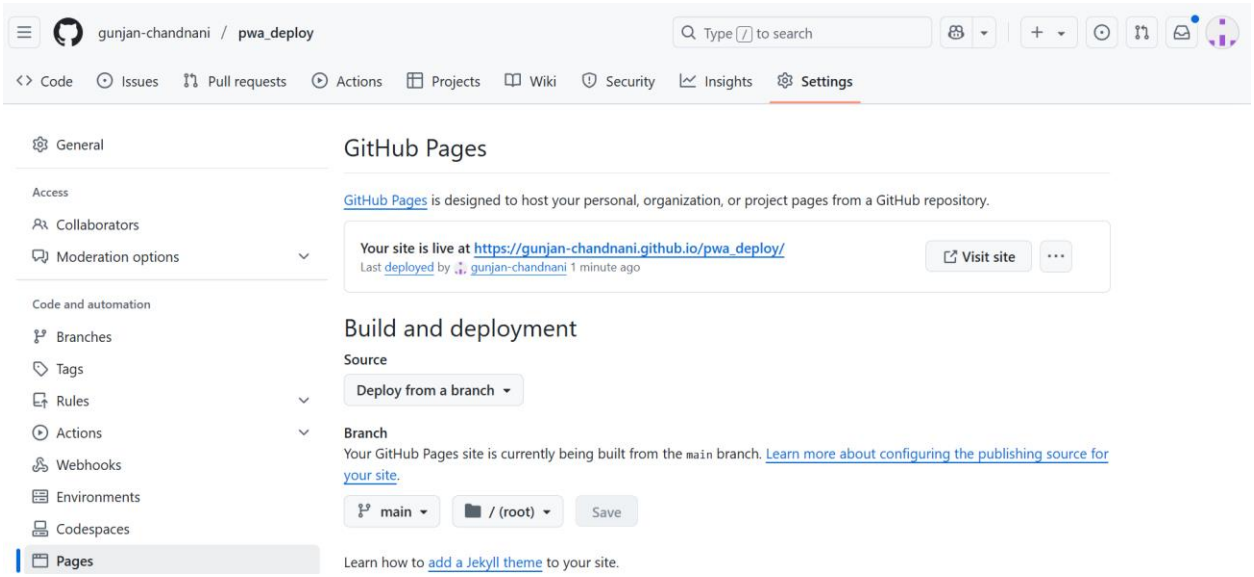
https://gunjan-chandnani.github.io/pwa_deploy/

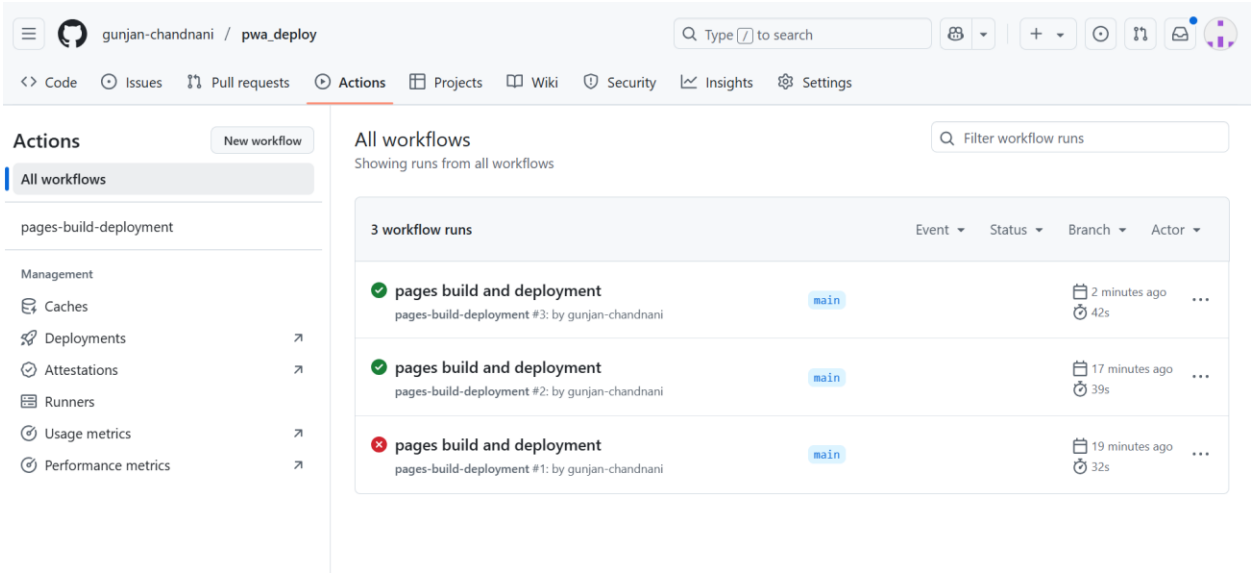
Github Screenshot:

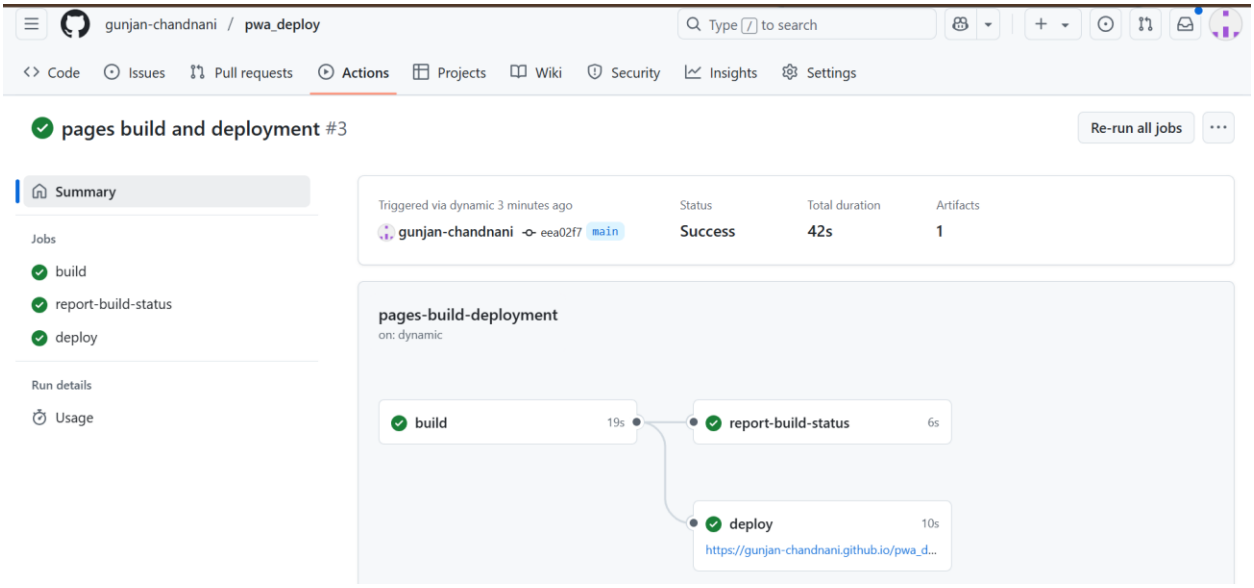


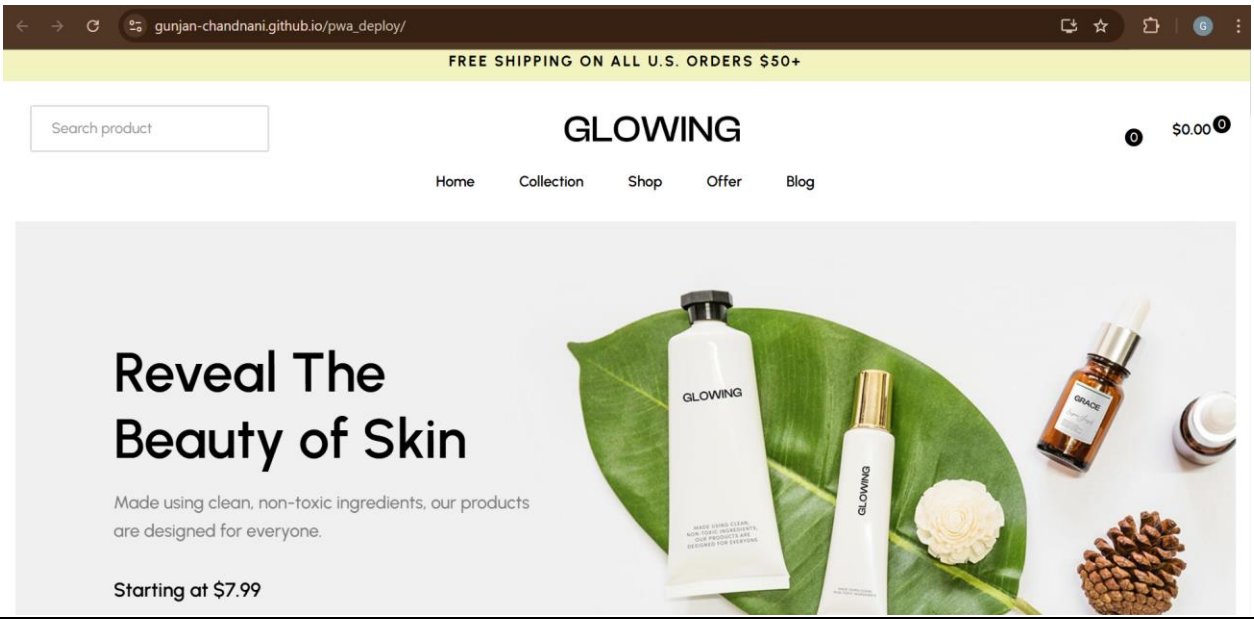

gunjan-chandnani / pwa_deploy
Type / to search
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
GitHub Pages source saved.
General
Access
Collaborators
Moderation options
Code and automation
Branches
Tags
Rules
Actions
Webhooks
Environments
GitHub Pages
GitHub Pages is designed to host your personal, organization, or project pages from a GitHub repository.
Build and deployment
Source
Deploy from a branch
Branch
Your GitHub Pages site is currently being built from the /docs folder in the main branch. Learn more about configuring the publishing source for your site.
main
/docs
Save
Learn how to add a Jekyll theme to your site.


gunjan-chandnani / pwa_deploy
Type / to search
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
pages build and deployment #2
Re-run all jobs
Summary
Jobs
build
report-build-status
deploy
Run details
Usage
build
succeeded now in 19s
Search logs
Set up job 1s
Pull ghcr.io/actions/jekyll-build-pages:v1.0.13 11s
Checkout 1s
Build with Jekyll 3s
Upload artifact 1s
Post Checkout 0s
Complete job 0s


gunjan-chandnani / pwa_deploy
Type / to search
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
General
Access
Collaborators
Moderation options
Code and automation
Branches
Tags
Rules
Actions
Webhooks
Environments
Codespaces
Pages
GitHub Pages
GitHub Pages is designed to host your personal, organization, or project pages from a GitHub repository.
Your site is live at https://gunjan-chandnani.github.io/pwa_deploy/
Last deployed by gunjan-chandnani 1 minute ago
Visit site
Build and deployment
Source
Deploy from a branch
Branch
Your GitHub Pages site is currently being built from the main branch. Learn more about configuring the publishing source for your site.
main
/ (root)
Save
Learn how to add a Jekyll theme to your site.


gunjan-chandnani / pwa_deploy
Type / to search
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
Actions
New workflow
All workflows
pages-build-deployment
Management
Caches
Deployments
Attestations
Runners
Usage metrics
Performance metrics
All workflows
Showing runs from all workflows
Filter workflow runs
3 workflow runs
Event
Status
Branch
Actor
pages build and deployment
pages-build-deployment #3: by gunjan-chandnani
main
2 minutes ago
42s
pages build and deployment
pages-build-deployment #2: by gunjan-chandnani
main
17 minutes ago
39s
pages build and deployment
pages-build-deployment #1: by gunjan-chandnani
main
19 minutes ago
32s


gunjan-chandnani / pwa_deploy
Type / to search
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
pages build and deployment #3
Re-run all jobs
Summary
Jobs
build
report-build-status
deploy
Run details
Usage
Triggered via dynamic 3 minutes ago
gunjan-chandnani eea02f7 main
Status
Success
Total duration
42s
Artifacts
1
pages-build-deployment
on: dynamic
build
19s
report-build-status
6s
deploy
10s
https://gunjan-chandnani.github.io/pwa_d...


gunjan-chandnani.github.io/pwa_deploy/
FREE SHIPPING ON ALL U.S. ORDERS $50+
Search product
GLOWING
$0.00
Home
Collection
Shop
Offer
Blog
Reveal The Beauty of Skin
Made using clean, non-toxic ingredients, our products are designed for everyone.
Starting at $7.99
GLOWING
GLOWING
GRACE

More to Discover

Find a Store

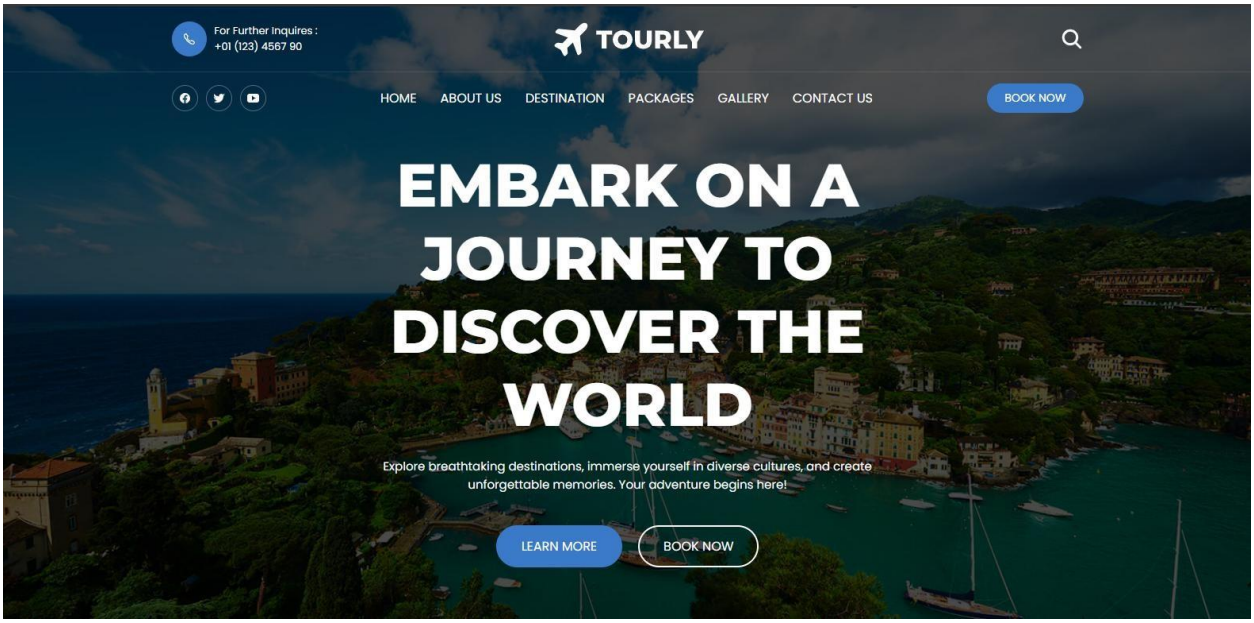
Our Store

From Our Blog

Our Store

Our Story

Our Store


For Further Inquires :
+01 (123) 4567 90
TOURLY
HOME
ABOUT US
DESTINATION
PACKAGES
GALLERY
CONTACT US
BOOK NOW
EMBARK ON A JOURNEY TO DISCOVER THE WORLD
Explore breathtaking destinations, immerse yourself in diverse cultures, and create unforgettable memories. Your adventure begins here!
LEARN MORE
BOOK NOW

EXPERIMENT NO: - 11

Name:- Vanshika, Gunajn, Akruti **Class:-** D15A **Roll:No: -** 2,6,11

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

Theory: -

Google Lighthouse is an open-source tool designed to evaluate and optimize web applications based on multiple key parameters, including performance, accessibility, Progressive Web App (PWA) implementation, and best practices. It provides a detailed automated audit that helps developers improve their websites efficiently. Unlike traditional manual audits that can take days or weeks, Lighthouse generates insights within minutes with minimal setup.

One of Lighthouse's biggest advantages is its ease of use—simply run it on a webpage or provide a URL, and it will generate a comprehensive report. Lighthouse supports audits for both desktop and mobile versions of a website, ensuring an optimal user experience across different devices.

Key Features and Audit Metrics

1. **Performance**

This metric evaluates how efficiently a webpage loads and becomes interactive. It considers several factors, including:

- Page Load Speed – Measures how quickly content appears to users.
- First Contentful Paint (FCP) – Time taken for the first visible content to load.
- Largest Contentful Paint (LCP) – Measures how long the largest visible content takes to fully render.
- Cumulative Layout Shift (CLS) – Ensures content does not shift unexpectedly, improving user experience.
- Time to Interactive (TTI) – The time taken for the webpage to become fully functional.

Lighthouse assigns a performance score from 0 to 100, where:

- 100 → Top 2% of websites (98th percentile)
- 50 → Around the 75th percentile
- Lower scores → Indicate areas needing optimization

2. Progressive Web App (PWA) Score

With the increasing adoption of PWAs, web applications now strive to deliver an app-like experience. Lighthouse evaluates a website's PWA readiness based on Google's Baseline PWA Checklist, which includes:

- Service Worker Implementation – Enables offline functionality and background synchronization.
- App Manifest Compliance – Provides metadata for mobile app-like integration.
- Viewport Configuration – Ensures responsiveness across different screen sizes.
- Performance in Script-Disabled Environments – Verifies that the page functions properly even if JavaScript is disabled.

A high PWA score indicates that the application meets essential criteria for speed, reliability, and mobile usability.

3. Accessibility

This metric determines how well a website supports users with **visual, cognitive, or physical disabilities**. Lighthouse evaluates accessibility based on:

- **ARIA Attributes** – Enhances screen reader support (e.g., aria-required).
- **Text Alternatives for Media** – Ensures images, audio, and video content are accessible.
- **Semantic HTML Usage** – Encourages proper use of elements like <section>, <article>, and <button> for better screen-reader compatibility.

Unlike other metrics, **accessibility follows a pass/fail approach**—missing key features can **significantly impact the overall score**. Improving accessibility ensures **inclusivity for all users**.

4. Best Practices

Lighthouse also assesses whether the website follows **modern web development best practices**, including:

- **Use of HTTPS** – Ensures secure data transmission.
- **Avoiding Deprecated Code** – Prevents the use of outdated elements, directives, and libraries.
- **Secure Password Inputs** – Disables paste-into fields to reduce security risks.
- **User Security Alerts** – Provides notifications for **geo-location access and cookie usage**.

A high **Best Practices score** means the website meets industry standards, leading to better **security, maintainability, and overall performance**.

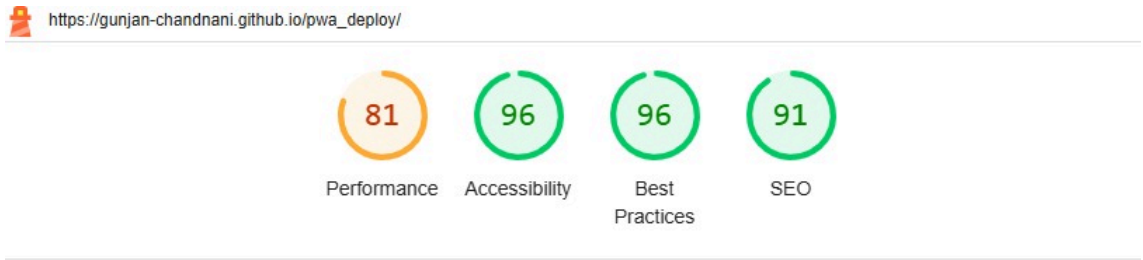
Manifest.json


```
{
  "name": "Shopping App",
  "short_name": "MyApp",
  "description": "An online shopping platform with a wide range of products.",
  "start_url": "/",
  "scope": "/",
  "display": "standalone",
  "background_color": "#ffffff",
  "theme_color": "#ff6600",
  "icons": [
    {
      "src": "assets/images/banner-1.png",
      "sizes": "192x192",
      "type": "image/png",
      "purpose": "any maskable"
    },
    {
      "src": "assets/images/banner-2.png",
      "sizes": "512x512",
      "type": "image/png",
      "purpose": "any maskable"
    }
  ],
  "shortcuts": [
    {
      "name": "Shop Now",
      "short_name": "Shop",
```

```
    "description": "Go directly to shopping",
    "url": "/index.html",
    "icons": [
      {
        "src": "assets/images/shortcut-icon.png",
        "sizes": "96x96",
        "type": "image/png"
      }
    ]
  }
 ]
}
```

Output: -

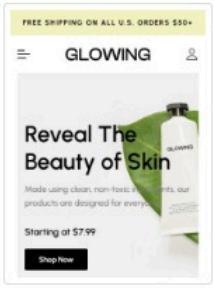
A] For Mobile



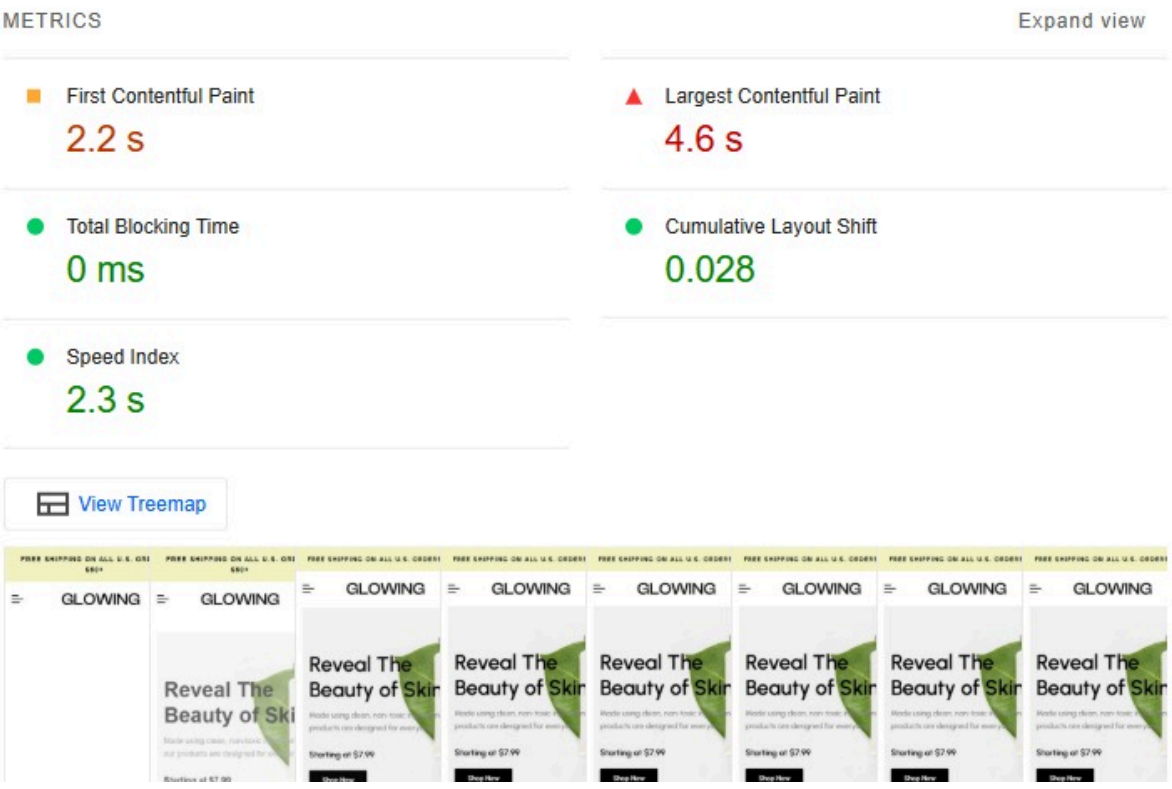
Performance

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

▲ 0–49 ■ 50–89 ● 90–100



METRICS Expand view



DIAGNOSTICS

- Largest Contentful Paint element — 4,610 ms
- Serve images in next-gen formats — Potential savings of 139 KiB
- Enable text compression — Potential savings of 62 KiB
- Use HTTP/2 — 16 requests not served via HTTP/2
- Defer offscreen images — Potential savings of 36 KiB
- Eliminate render-blocking resources — Potential savings of 170 ms
- Minify CSS — Potential savings of 6 KiB
- Serve static assets with an efficient cache policy — 10 resources found
- Avoid an excessive DOM size — 1,071 elements

https://gunjan-chandnani.github.io/pwa_deploy/

Accessibility

These checks highlight opportunities to improve the accessibility of your web app. Automatic detection can only detect a subset of issues and does not guarantee the accessibility of your web app, so manual testing is also encouraged.

ARIA

- Elements use prohibited ARIA attributes

These are opportunities to improve the usage of ARIA in your application which may enhance the experience for users of assistive technology, like a screen reader.

ADDITIONAL ITEMS TO MANUALLY CHECK (10) Show

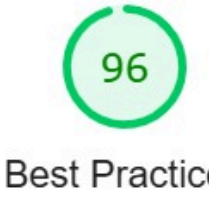
These items address areas which an automated testing tool cannot cover. Learn more in our guide on conducting an accessibility

ADDITIONAL ITEMS TO MANUALLY CHECK (10) Show

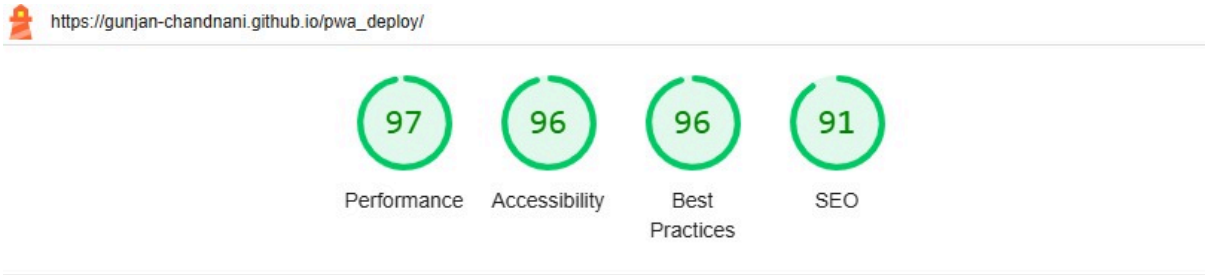
These items address areas which an automated testing tool cannot cover. Learn more in our guide on conducting an accessibility review.

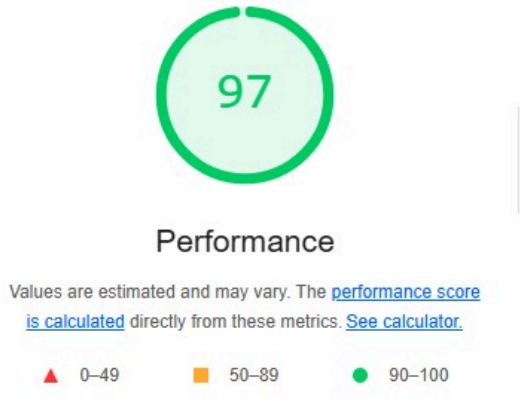
PASSED AUDITS (24) Show

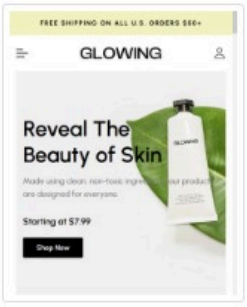
NOT APPLICABLE (32) Show



B]For Desktop





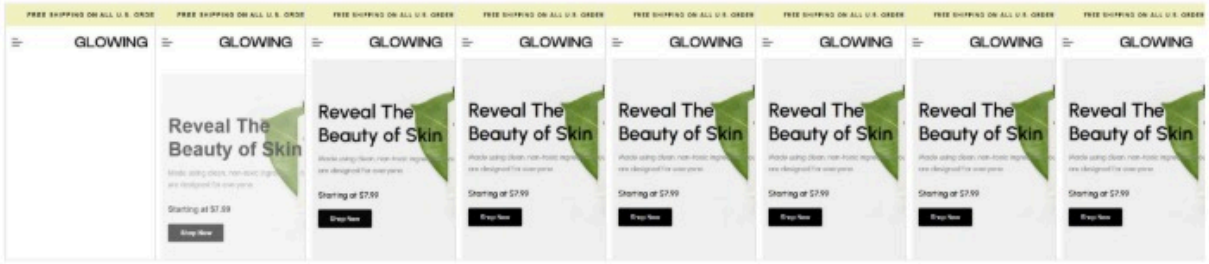


METRICS Expand view

97 96 96 91

- First Contentful Paint
  0.7 s
- Largest Contentful Paint
  1.2 s
- Total Blocking Time
  0 ms
- Cumulative Layout Shift
  0.001
- Speed Index
  0.9 s

View Treemap



Show audits relevant to: All FCP LCP TBT CLS