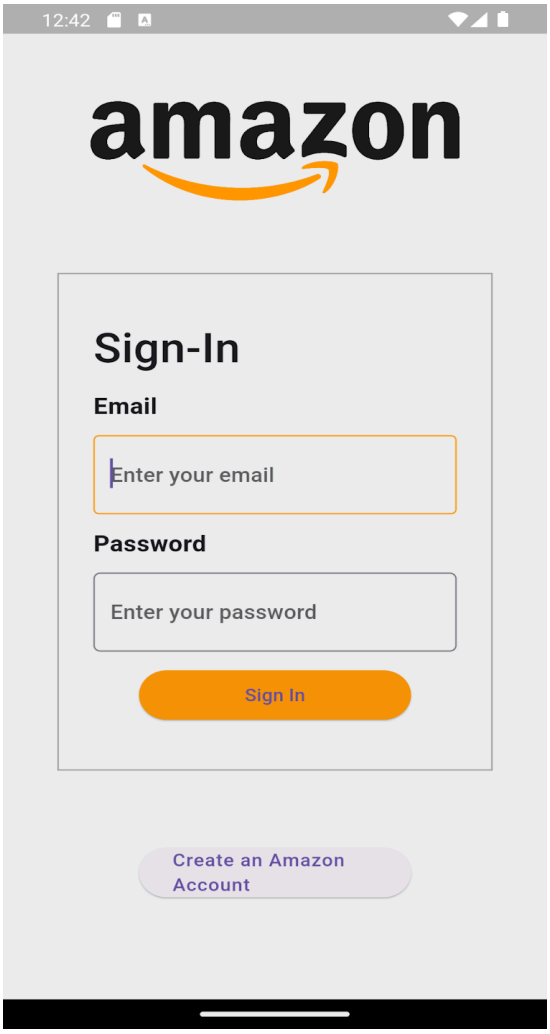
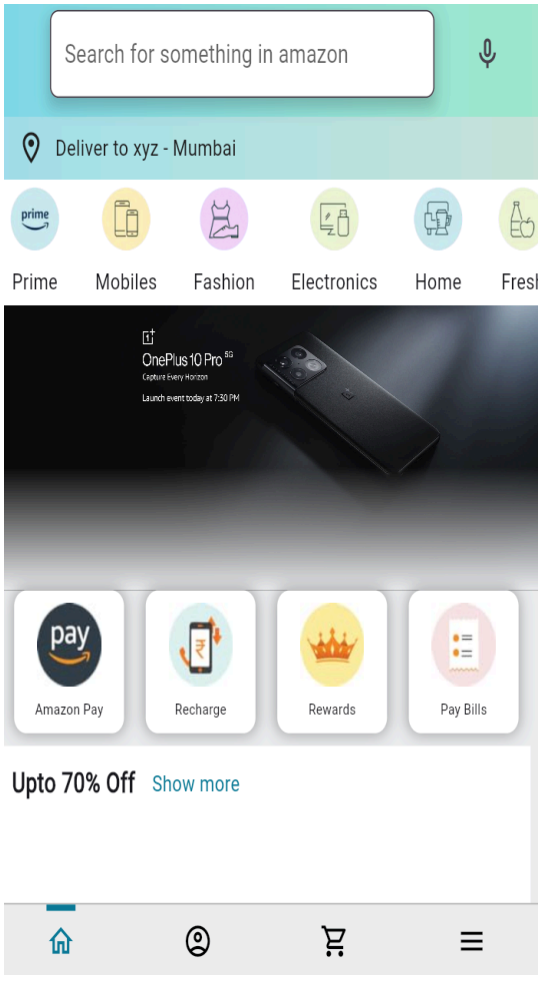
MAD and PWA LAB

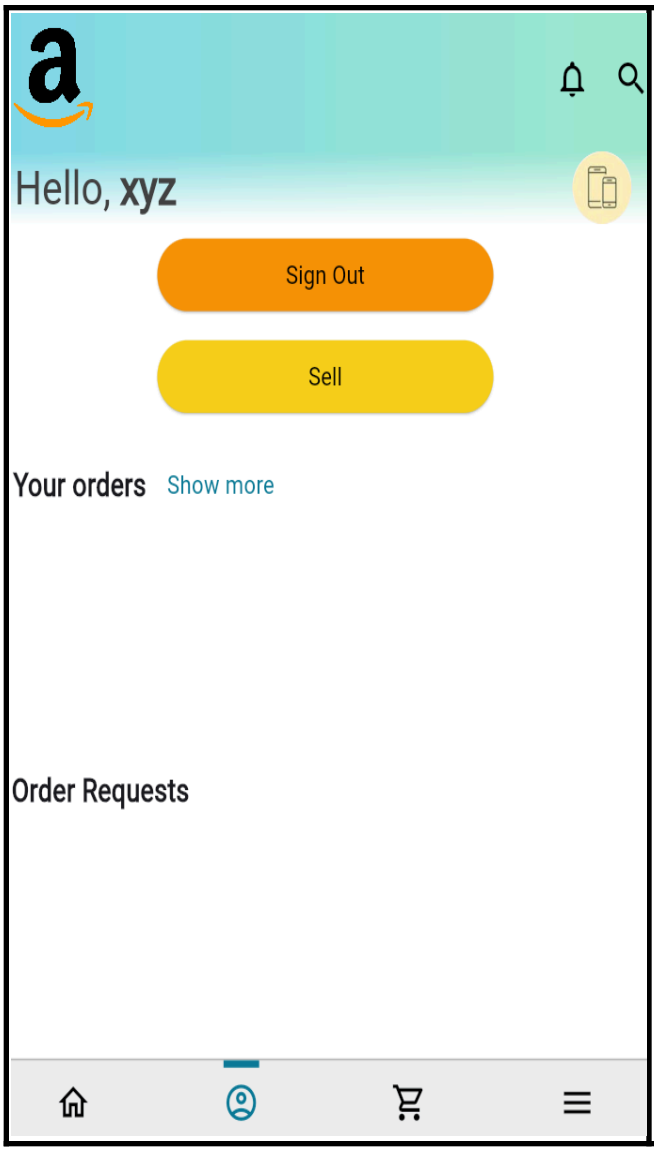
Name: Swarali Dhobale **Class: D15A** **Roll No: 13**

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

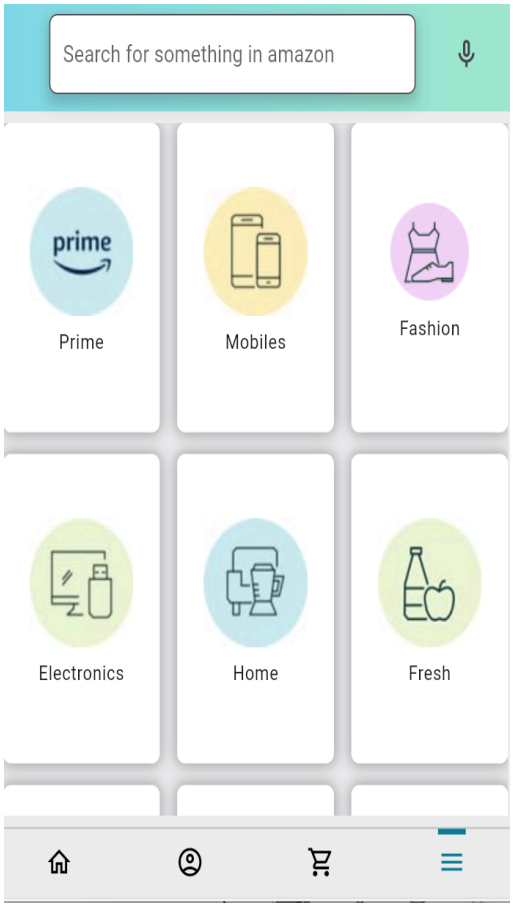
Screen-shot	Features
	**Login/Signup→Home** 1. Multiple widgets like text widgets buttons. 2. Navigation using the buttons **3. Connection with firebase for authentication purposes.**

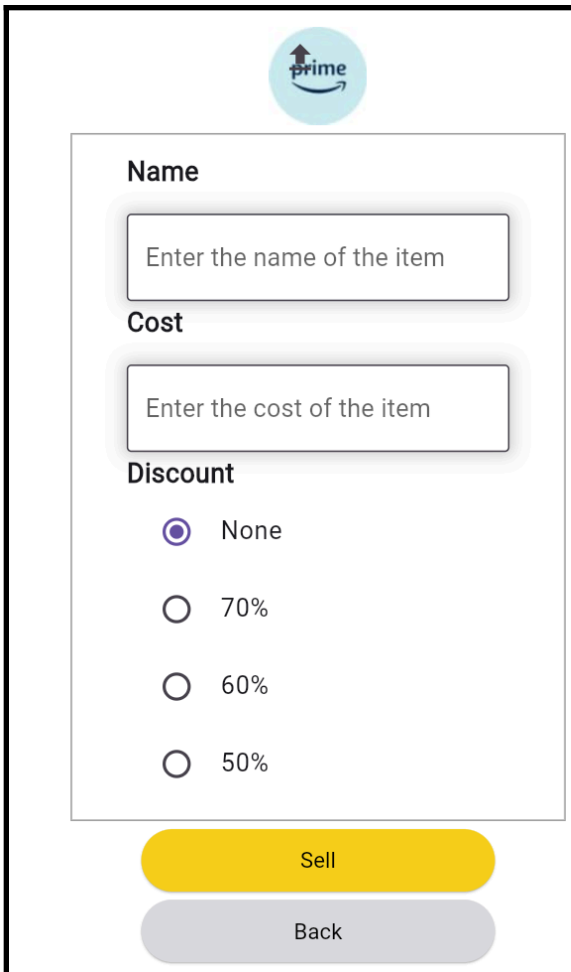
Screenshot	Features
	**Home-screen** 1. Multiple widgets like text widgets,buttons. 2.Navigation using the buttons 3.Home screen for products



Account screen

1. Multiple widgets like text widgets,buttons.
2. Navigation using the buttons.
3. Account screen for users.

Screenshot	Features
	**Sections-screen** 1. Multiple text widgets. 2.Navigation using the buttons 3.Filter out required category.



Sell-screen

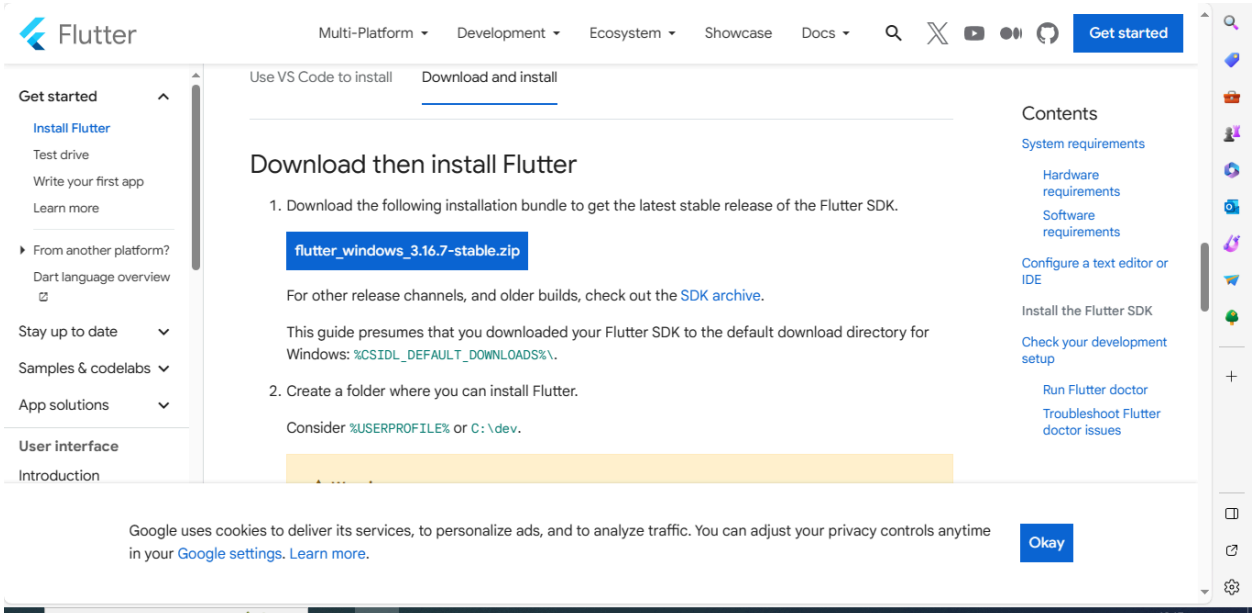
1. Multiple widgets like text widgets,buttons.
2. Navigation using the buttons
3. Update in Firestore database.

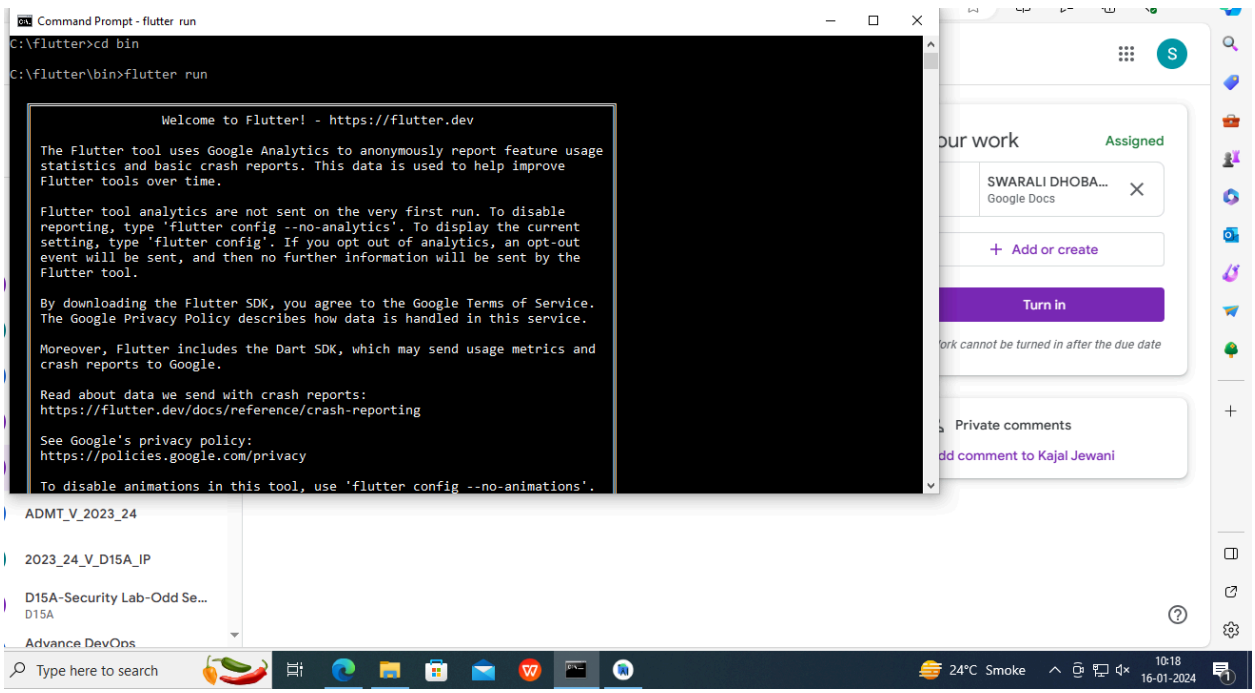
MPL Lab: Experiment No.1

Name: Swarali_Dhobale_D15A_13

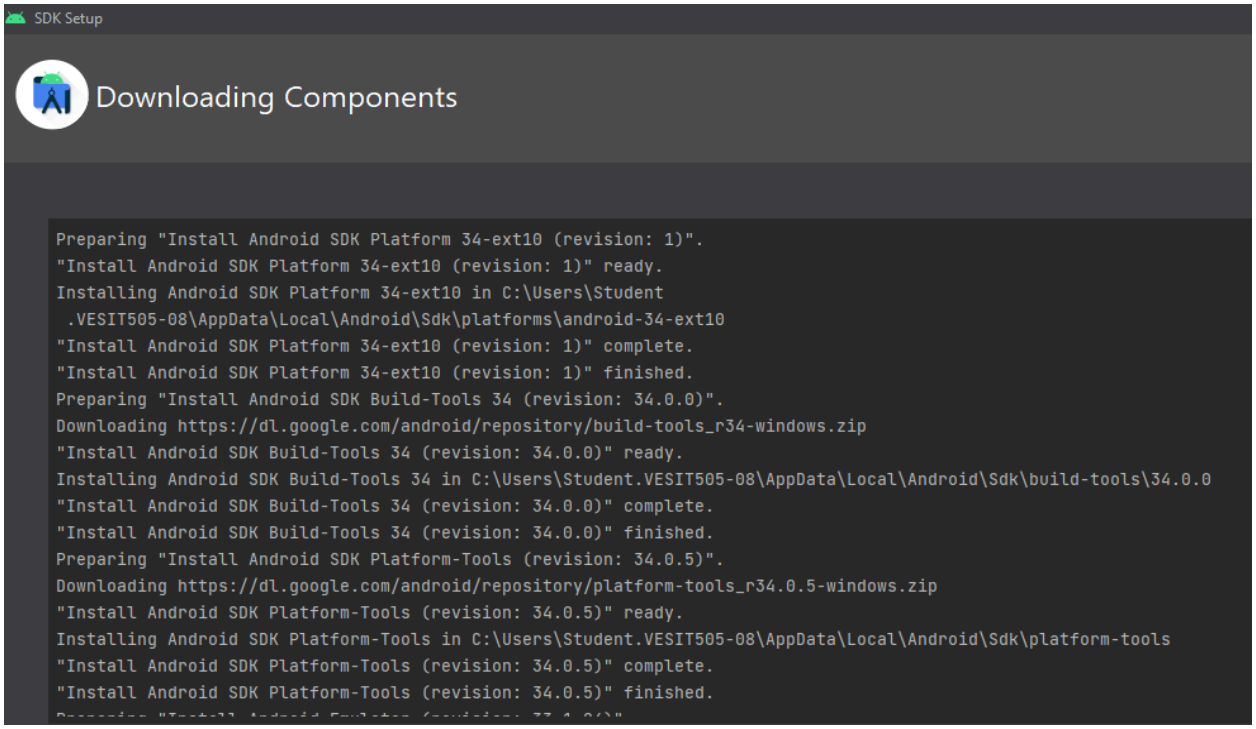
Aim: Installation and Configuration of Flutter Environment.

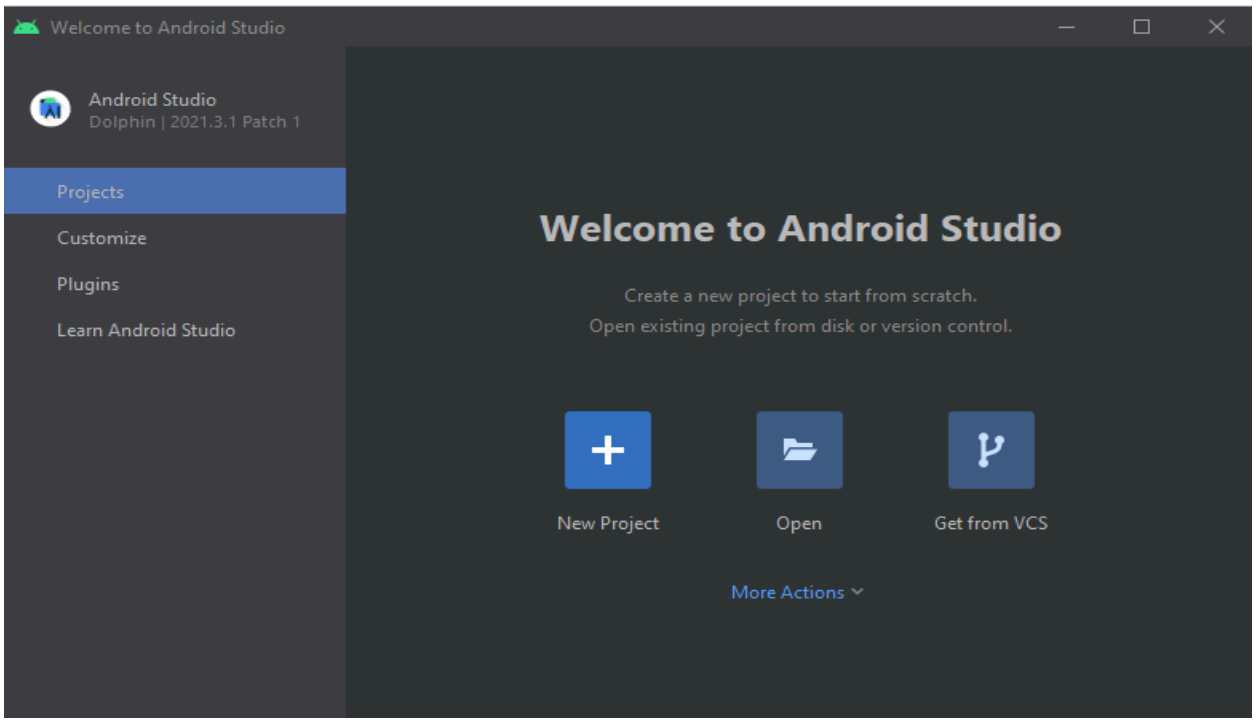
Flutter download and install:



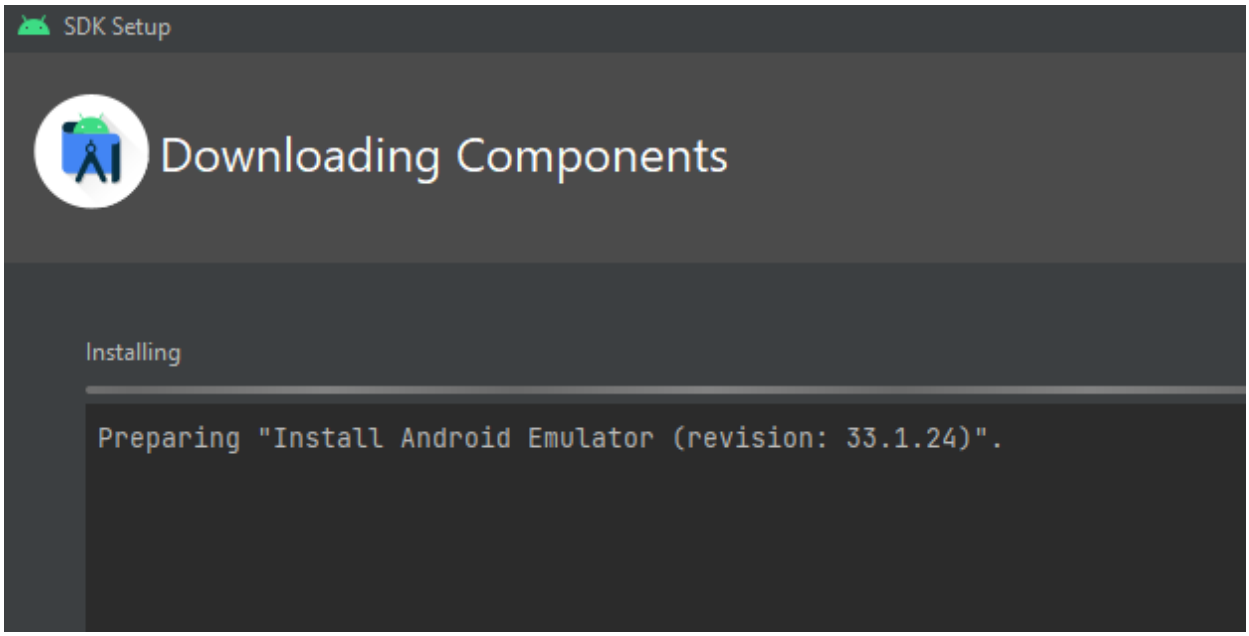


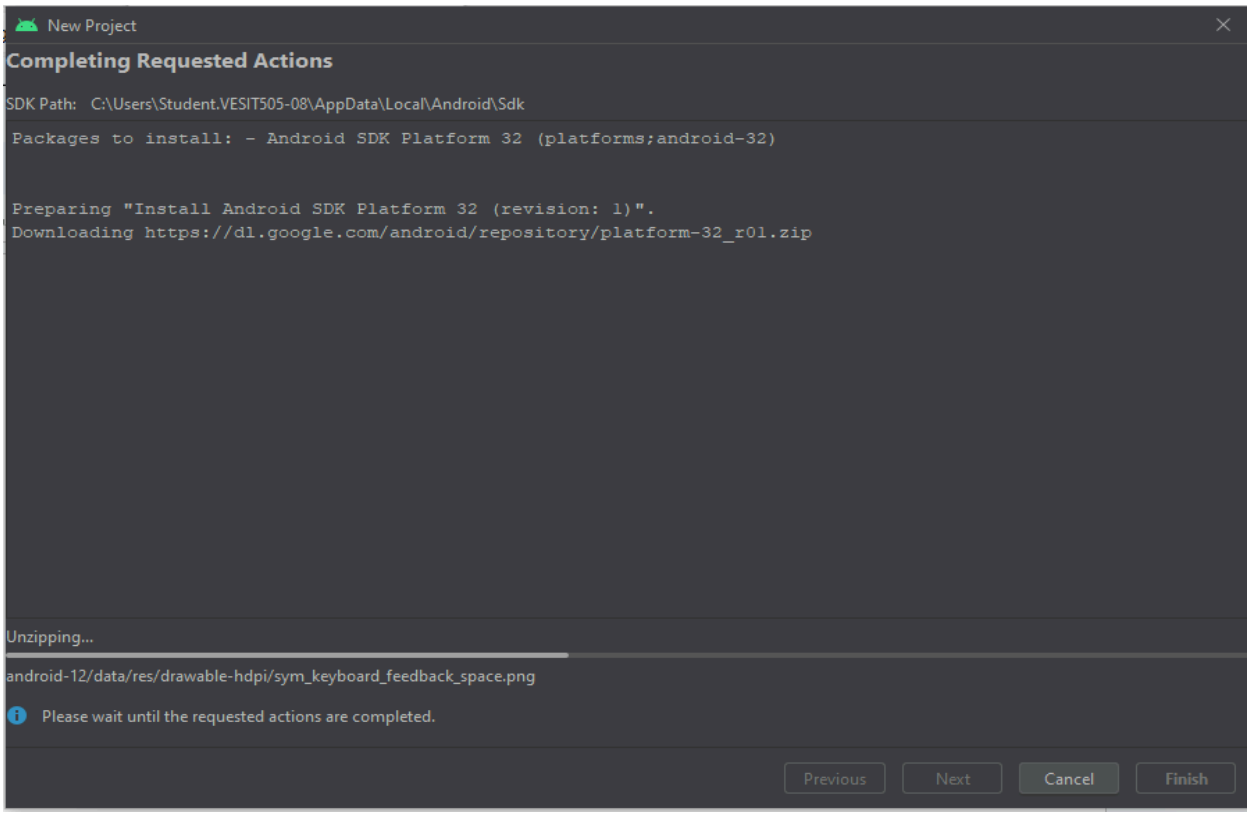
Android Studio installation:





Installation for Android Emulator:


SDK Setup
Downloading Components
Installing
Preparing "Install Android Emulator (revision: 33.1.24)".

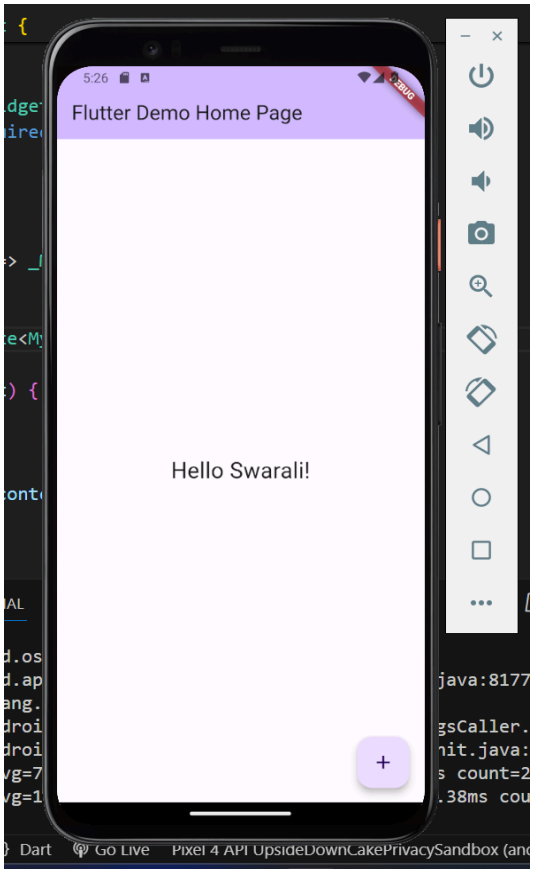

New Project
Completing Requested Actions
SDK Path: C:\Users\Student.VESIT505-08\AppData\Local\Android\Sdk
Packages to install: - Android SDK Platform 32 (platforms;android-32)
Preparing "Install Android SDK Platform 32 (revision: 1)".
Downloading https://dl.google.com/android/repository/platform-32_r01.zip
Unzipping...
android-12/data/res/drawable-hdpi/sym_keyboard_feedback_space.png
Please wait until the requested actions are completed.
Previous
Next
Cancel
Finish

Code:

```
import 'package:flutter/material.dart';
void main() {
  runApp(const MyApp());
}
class MyApp extends StatelessWidget {
  const MyApp({super.key});
  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      title: 'Flutter Demo',
      theme: ThemeData(

        colorScheme: ColorScheme.fromSeed(seedColor: Colors.deepPurple),
        useMaterial3: true,
      ),
      home: const MyHomePage(title: 'Flutter Demo Home Page'),
    );
  }
}
class MyHomePage extends StatefulWidget {
  const MyHomePage({super.key, required this.title});

  final String title;

  @override
  State<MyHomePage> createState() => _MyHomePageState();
}

class _MyHomePageState extends State<MyHomePage> {
  @override
```

```
Widget build(BuildContext context) {

  return Scaffold(
    appBar: AppBar(
      backgroundColor: Theme.of(context).colorScheme.inversePrimary,
      title: Text(widget.title),
    ),
    body: Center(
      child: Column(

        mainAxisAlignment: MainAxisAlignment.center,
        children: <Widget>[
          const Text(
                    'Hello Swarali!',
                  style: TextStyle(
                  fontSize: 24,
                  ),
          ),
    ],
      ),
    ),
  );
 }
}
```

Output:



Conclusion: Flutter and Android Studio have been installed and configured.

MAD LAB EXPT 2

Name:Swarali Dhobale_D15A_13

Aim: To design Flutter UI by including common widgets.

Theory:

Flutter employs a reactive framework, allowing for fast development and expressive, flexible UI designs. Central to Flutter are widgets, which are the building blocks used to construct user interfaces.

Container: A versatile widget used to contain other widgets. It allows you to customize properties such as alignment, padding, margin, color, and more.

Row and Column: Widgets used to arrange child widgets horizontally (Row) or vertically (Column). They automatically size and position their children according to their properties.

Text: Widget used to display text with styling options like font size, color, weight, and alignment.

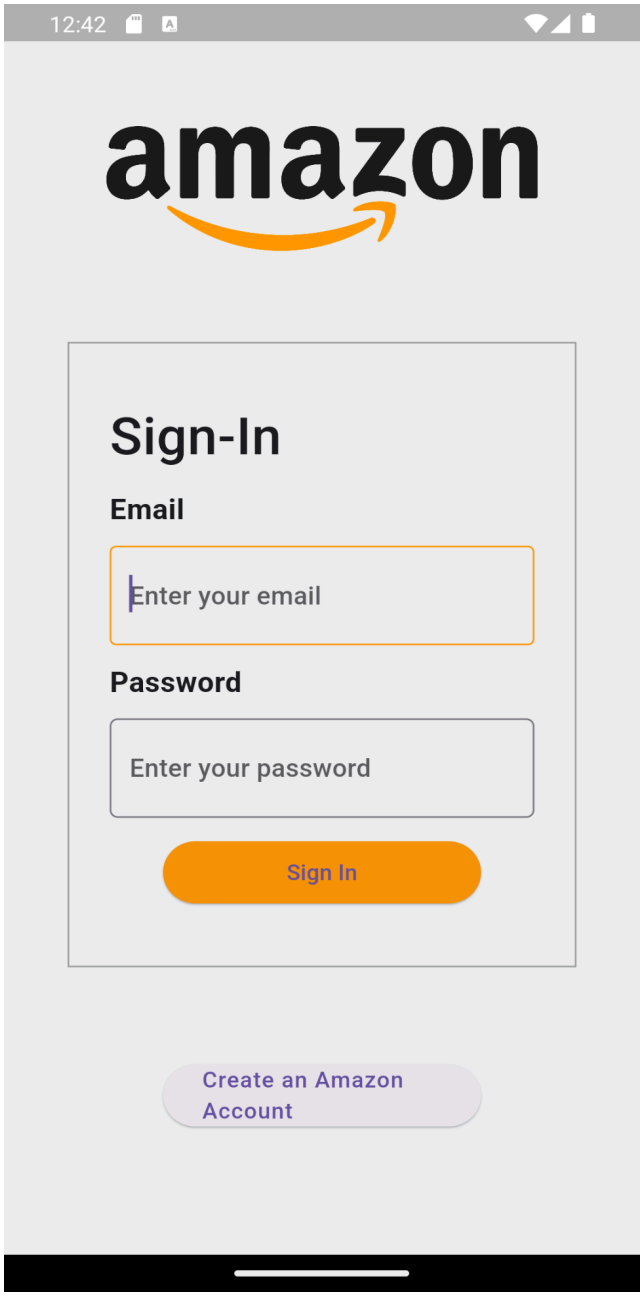
Image: Widget used to display images from various sources such as assets, network, or memory. It supports various image formats and provides options for resizing and scaling.

Icon: Widget used to display icons from the Material Icons or custom icon sets.

Output:

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

class CustomMainButton extends StatelessWidget {
  final Widget child;
  final Color color;
  final bool isLoading;
  final VoidCallback onPressed;
  const CustomMainButton({
    Key? key,
    required this.child,
```

```
    required this.color,
    required this.isLoading,
    required this.onPressed,
  }) : super(key: key);

  @override
  Widget build(BuildContext context) {
    Size screenSize = Utils().getScreenSize();
    return ElevatedButton(
      style: ElevatedButton.styleFrom(
          primary: color,
          fixedSize: Size(
            screenSize.width * 0.5,
            40,
          )),
      onPressed: onPressed,
      child: !isLoading
          ? child
          : const Padding(
              padding: EdgeInsets.symmetric(vertical: 5),
              child: AspectRatio(
                aspectRatio: 1 / 1,
                child: CircularProgressIndicator(
                  color: Colors.white,
                ),
              ),
            ),
    );
  }
}
```



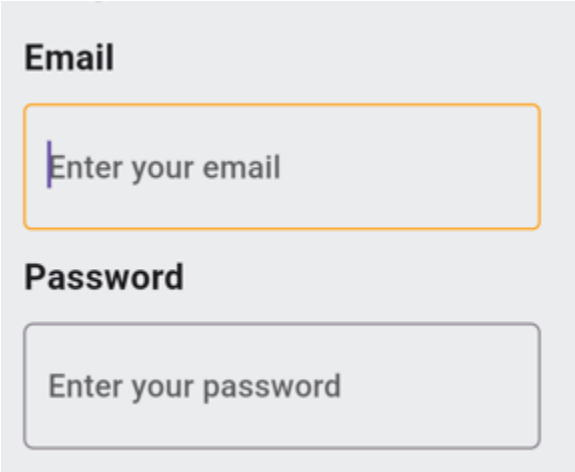
Text field Widget-

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

class TextFieldWidget extends StatefulWidget {
```

```
  final String title;
  final TextEditingController controller;
  final bool obscureText;
  final String hintText;
  const TextFieldWidget({
    Key? key,
    required this.title,
    required this.controller,
    required this.obscureText,
    required this.hintText,
  }) : super(key: key);

  @override
  State<TextFieldWidget> createState() => _TextFieldWidgetState();
}

class _TextFieldWidgetState extends State<TextFieldWidget> {
  late FocusNode focusNode;
  bool isInFocus = false;

  @override
  void initState() {
    super.initState();
    focusNode = FocusNode();

    focusNode.addListener(() {
      if (focusNode.hasFocus) {
        setState(() {
          isInFocus = true;
        });
      } else {
        setState(() {
          isInFocus = false;
        });
      }
    });
  }

  @override
  Widget build(BuildContext context) {
    return Column(
      mainAxisSize: MainAxisSize.min,
      crossAxisAlignment: CrossAxisAlignment.start,
      children: [
```

```
Padding(
  padding: const EdgeInsets.only(bottom: 15),
  child: Text(
    widget.title,
    style: const TextStyle(
      fontWeight: FontWeight.bold,
      fontSize: 17,
    ),
  ),
),
Container(
  decoration: BoxDecoration(boxShadow: [
    isInFocus
        ? BoxShadow(
            color: Colors.orange.withOpacity(0.4),
            blurRadius: 8,
            spreadRadius: 2,
          )
        : BoxShadow(
            color: Colors.black.withOpacity(0.2),
            blurRadius: 8,
            spreadRadius: 2,
          )
  ]),
  child: TextField(
    focusNode: focusNode,
    obscureText: widget.obscureText,
    controller: widget.controller,
    maxLines: 1,
    decoration: InputDecoration(
      fillColor: Colors.white,
      filled: true,
      hintText: widget.hintText,
      border: OutlineInputBorder(
        borderRadius: BorderRadius.circular(3),
        borderSide: const BorderSide(
          color: Colors.grey,
          width: 1,
        ),
      ),
      focusedBorder: const OutlineInputBorder(
        borderSide: BorderSide(
          color: Colors.orange,
          width: 1,
```

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



Conclusion: Common widgets for text and button have been implemented for Flutter application.

MAD LAB EXPT 3

Name:Swarali Dhobale_D15A_13

Aim: To include icons,images,fonts in Flutter app.

Theory:

1.Icons:
Flutter provides the Icon **widget to display icons. Icons in Flutter are based on the material design system, and you can use icons from the Material Icons library or customize your icons.**
Icon(Icons.favorite);

2.Images:
Flutter supports various image formats like JPEG, PNG, GIF, WebP, BMP, and animated WebP/GIF. You can display images from assets or network URLs.
To display an image from assets:
Image.asset('assets/images/my_image.png');
Image.network('http://example.com/my_image.png');

3.Fonts:
You can include custom fonts in your Flutter app to use different typography styles. Flutter supports TrueType (.ttf**) and OpenType (**.otf**) font formats.**

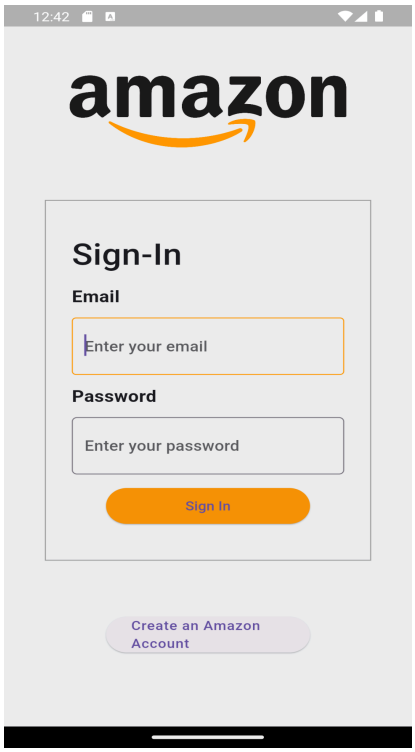
```
Text(
  'Hello, World!',
  style: TextStyle(
    fontFamily: 'MyCustomFont',
    fontSize: 16.0,
  ),
);
```

Output:

```
Widget build(BuildContext context) {
    Size screenSize = Utils().getScreenSize();
    return Scaffold(
      backgroundColor: Colors.white,
      body: SingleChildScrollView(
        child: SizedBox(
          height: screenSize.height,
```

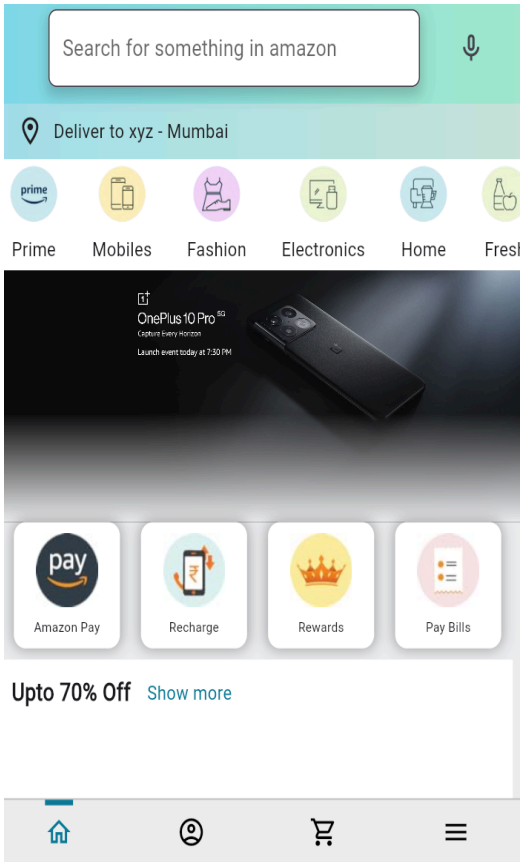
```
width: screenSize.width,
child: Padding(
  padding: const EdgeInsets.symmetric(horizontal: 10, vertical: 20),
  child: Center(
    child: Column(
      mainAxisAlignment: MainAxisAlignment.spaceEvenly,
      crossAxisAlignment: CrossAxisAlignment.center,
      children: [
        Image.network(
          amazonLogo,
          height: screenSize.height * 0.10,
        ),
        SizedBox(
          height: screenSize.height * 0.7,
          child: FittedBox(
            child: Container(
              height: screenSize.height * 0.85,
              width: screenSize.width * 0.8,
              padding: const EdgeInsets.all(25),
              decoration: BoxDecoration(
                border: Border.all(
                  color: Colors.grey,
                  width: 1,
                ),
              ),
              child: Column(
                mainAxisSize: MainAxisSize.min,
                mainAxisAlignment: MainAxisAlignment.spaceBetween,
                crossAxisAlignment: CrossAxisAlignment.start,
                children: [
                  const Text(
                    "Sign-Up",
                    style: TextStyle(
                        fontWeight: FontWeight.w500, fontSize: 33),
                  ),
                  TextFieldWidget(
                    title: "Name",
                    controller: nameController,
                    obscureText: false,
                    hintText: "Enter your name",
                  ),
                  TextFieldWidget(
                    title: "Address",
                    controller: addressController,
```

```
                obscureText: false,
                hintText: "Enter your address",


              ),
```




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

  @override
  State<AdBannerWidget> createState() => _AdBannerWidgetState();
}

class _AdBannerWidgetState extends State<AdBannerWidget> {
  int currentAd = 0;
  @override
  Widget build(BuildContext context) {
    Size screenSize = Utils().getScreenSize();
    double smallAdDimension = screenSize.width / 5;
    //Image and gradient
    return Column(
```

```
children: [
  Stack(
    children: [
      GestureDetector(
        onHorizontalDragEnd: (_) {
          if (currentAd == largeAds.length - 1) {
            setState(() {
              currentAd = 0;
            });
          } else {
            setState(() {
              currentAd++;
            });
          }
        },
        child: SizedBox(
          width: double.infinity,
          child: Image.network(
            largeAds[currentAd],
          ),
        ),
      ),
      Positioned(
        bottom: 0,
        child: Container(
          width: screenSize.width,
          height: screenSize.height / 8,
          decoration: BoxDecoration(
            gradient: LinearGradient(
              colors: [
                backgroundColor,
                backgroundColor.withOpacity(0.000001)
              ],
              begin: Alignment.bottomCenter,
              end: Alignment.topCenter,
            ),
          ),
        ),
      ),
    ],
  ),
```



Conclusion: Added icons,images,fonts in Flutter application.

MAD LAB EXPT 4

Name:Swarali Dhobale_D15A_13

Aim: To make an interactive form using Widgets.

Theory:

Text Input Fields- Use the TextField widget to allow users to input text. You can customize it with properties like decoration, controller, keyboardType, validator, and onChanged callback.

Form Widget- Encapsulate your input fields within a Form widget. The Form widget manages the form state and provides methods for validation and submission.

Form Fields- Wrap each input field within a TextFormField widget. This widget integrates with the Form widget and automatically handles validation.

Validation-Implement validation logic to ensure that the user input meets certain criteria (e.g., required fields, valid email format). You can use the validator property of the TextFormField widget to specify validation functions.

State Management- Maintain the form's state using either StatefulWidget or state management solutions like Provider, Riverpod, or Bloc. When the user interacts with the form (e.g., typing in a text field), update the corresponding state.

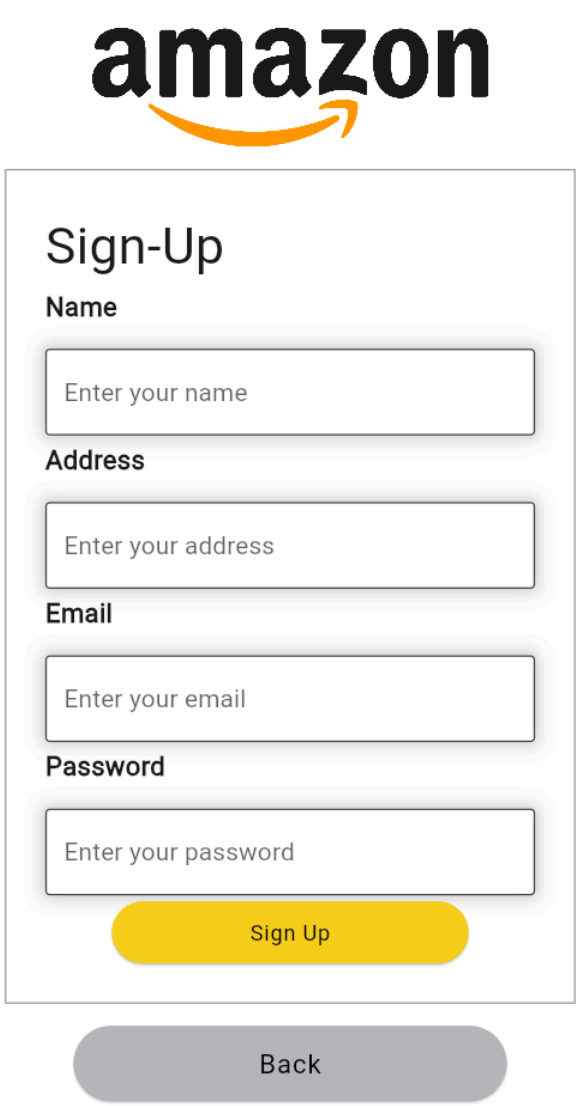
Submit Button- Include a button (e.g., ElevatedButton or TextButton) to allow users to submit the form. Disable the button if the form is invalid.

Handling Form Submission-Define a function to handle form submission. This function should be called when the user taps the submit button. You can access the form data using the FormState object.

Output:

```
import 'dart:math';
import 'dart:typed_data';

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

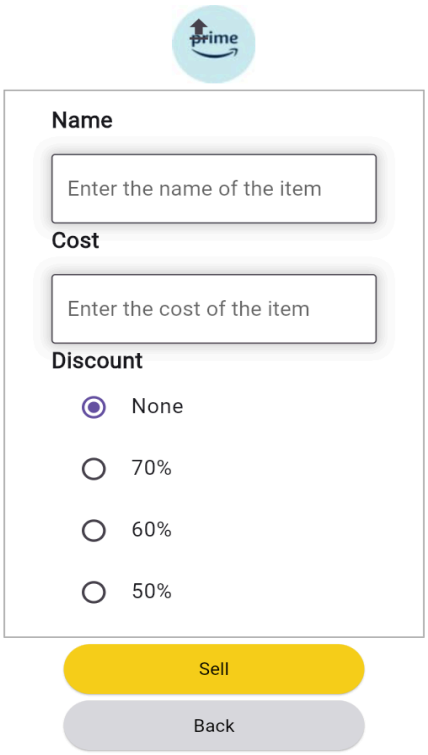
```
class Utils {
  Size getScreenSize() {
    return MediaQueryData.fromWindow(WidgetsBinding.instance!.window).size;
  }

  showSnackBar({required BuildContext context, required String content}) {
    ScaffoldMessenger.of(context).showSnackBar(
      SnackBar(
        backgroundColor: Colors.orange,
        shape: const RoundedRectangleBorder(
          borderRadius: BorderRadius.only(
            topLeft: Radius.circular(10),
            topRight: Radius.circular(10),
          ),
        ),
        content: SizedBox(
          width: getScreenSize().width,
          child: Row(
            mainAxisAlignment: MainAxisAlignment.center,
            children: [
              Text(
                content,
                maxLines: 2,
                overflow: TextOverflow.ellipsis,
              ),
            ],
          ),
        ),
      ),
    );
  }

  Future<Uint8List?> pickImage() async {
    ImagePicker picker = ImagePicker();
    XFile? file = await picker.pickImage(source: ImageSource.gallery);
    return file!.readAsBytes();
  }

  String getUid() {
    return (100000 + Random().nextInt(10000)).toString();
  }
}
```




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

  @override
  State<HomeScreen> createState() => _HomeScreenState();
}

class _HomeScreenState extends State<HomeScreen> {
  ScrollController controller = ScrollController();
  double offset = 0;
  List<Widget>? discount70;
  List<Widget>? discount60;
  List<Widget>? discount50;
  List<Widget>? discount0;
```

```
@override
void initState() {
  super.initState();
  getData();
  controller.addListener(() {
    setState(() {
      offset = controller.position.pixels;
    });
  });
}

@override
void dispose() {
  super.dispose();
  controller.dispose();
}

void getData() async {
  List<Widget> temp70 =
      await CloudFirestoreClass().getProductsFromDiscount(70);
  List<Widget> temp60 =
      await CloudFirestoreClass().getProductsFromDiscount(60);
  List<Widget> temp50 =
      await CloudFirestoreClass().getProductsFromDiscount(50);
  List<Widget> temp0 = await CloudFirestoreClass().getProductsFromDiscount(0);
  print("everything is done");
  setState(() {
    discount70 = temp70;
    discount60 = temp60;
    discount50 = temp50;
    discount0 = temp0;
  });
}

@override
Widget build(BuildContext context) {
  return Scaffold(
    appBar: SearchBarWidget(
      isReadOnly: true,
      hasBackButton: false,
    ),
    body: discount70 != null &&
          discount60 != null &&
```

```
          discount50 != null &&
          discount0 != null
        ? Stack(
          children: [
            SingleChildScrollView(
              controller: controller,
              child: Column(
                children: [
                  SizedBox(
                    height: kAppBarHeight / 2,
                  ),
                  CategoriesHorizontalListViewBar(),
                  AdBannerWidget(),
                  ProductsShowcaseListView(
                      title: "Upto 70% Off", children: discount70!),
                  ProductsShowcaseListView(
                      title: "Upto 60% Off", children: discount60!),
                  ProductsShowcaseListView(
                      title: "Upto 50% Off", children: discount50!),
                  ProductsShowcaseListView(
                      title: "Explore", children: discount0!),
                ],
              ),
            ),
            UserDetailsBar(
              offset: offset,
            ),
          ],
        )
        : const LoadingWidget(),
    );
  }}
```



Conclusion: An interactive form using Widgets has been created in Flutter application.

MAD LAB EXPT 5

Name:Swarali Dhobale_D15A_13

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

Theory:

In Flutter, navigation, routing, and gestures are essential concepts for creating interactive and navigable user interfaces.

Navigation: Navigation refers to the process of moving between different screens or pages within a Flutter app. Flutter provides the Navigator widget for managing navigation and routing.

Routing:Routing is the mechanism used to define the paths or routes between different screens in your app. Each route typically corresponds to a different widget or screen in your app.

Gesture Detection:Gestures allow users to interact with the app by tapping, dragging, swiping, or performing other touch-based actions. Flutter provides various gesture detection widgets to handle user input.

```
GestureDetector(
  onTap: () {
    print('Container tapped');
  },
  child: Container(
    width: 200,
    height: 200,
    color: Colors.blue,
    child: Center(
      child: Text('Tap Me'),
    ),
  ),
)
```

Output:

```
import 'package:amazon_clone/resources/authentication_methods.dart';
import 'package:amazon_clone/screens/sign_up_screen.dart';
import 'package:amazon_clone/utils/color_themes.dart';
import 'package:amazon_clone/utils/constants.dart';
import 'package:amazon_clone/utils/utils.dart';
import 'package:amazon_clone/widgets/custom_main_button.dart';
import 'package:amazon_clone/widgets/text_field_widget.dart';
import 'package:firebase_auth/firebase_auth.dart';
import 'package:flutter/material.dart';

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

  @override
  State<SignInScreen> createState() => _SignInScreenState();
}

class _SignInScreenState extends State<SignInScreen> {
  TextEditingController emailController = TextEditingController();
  TextEditingController passwordController = TextEditingController();
  AuthenticationMethods authenticationMethods = AuthenticationMethods();
  bool isLoading = false;

  @override
  void dispose() {
    super.dispose();
    emailController.dispose();
    passwordController.dispose();
  }

  @override
  Widget build(BuildContext context) {
    Size screenSize = Utils().getScreenSize();
    return Scaffold(
      backgroundColor: Colors.white,
      body: SingleChildScrollView(
        child: SizedBox(
          height: screenSize.height,
          width: screenSize.width,
          child: Padding(
            padding: const EdgeInsets.symmetric(horizontal: 10, vertical: 20),
            child: Center(
```

```
child: Column(
  mainAxisAlignment: MainAxisAlignment.spaceEvenly,
  crossAxisAlignment: CrossAxisAlignment.center,
  children: [
    Image.network(
      amazonLogo,
      height: screenSize.height * 0.10,
    ),
    Container(
      height: screenSize.height * 0.6,
      width: screenSize.width * 0.8,
      padding: const EdgeInsets.all(25),
      decoration: BoxDecoration(
        border: Border.all(
          color: Colors.grey,
          width: 1,
        ),
      ),
      child: Column(
        mainAxisSize: MainAxisSize.min,
        mainAxisAlignment: MainAxisAlignment.spaceBetween,
        crossAxisAlignment: CrossAxisAlignment.start,
        children: [
          const Text(
            "Sign-In",
            style: TextStyle(
                fontWeight: FontWeight.w500, fontSize: 33),
          ),
          TextFieldWidget(
            title: "Email",
            controller: emailController,
            obscureText: false,
            hintText: "Enter your email",
          ),
          TextFieldWidget(
            title: "Password",
            controller: passwordController,
            obscureText: true,
            hintText: "Enter your password",
          ),
          Align(
            alignment: Alignment.center,
            child: CustomMainButton(
                child: const Text(
```

```
            "Sign In",
            style: TextStyle(
                letterSpacing: 0.6, color: Colors.black),
          ),
          color: yellowColor,
          isLoading: isLoading,
          onPressed: () async {
            setState(() {
              isLoading = true;
            });

            String output =
                await authenticationMethods.signInUser(
                    email: emailController.text,
                    password: passwordController.text);
            setState(() {
              isLoading = false;
            });
            if (output == "success") {
              //functions
            } else {
              //error
              Utils().showSnackBar(
                  context: context, content: output);
            }
          }),
    )
  ],
 ),
),
Row(
 children: [
  Expanded(
   child: Container(
    height: 1,
    color: Colors.grey,
   ),
  ),
  const Padding(
   padding: EdgeInsets.symmetric(horizontal: 10),
   child: Text(
    "New to Amazon?",
    style: TextStyle(color: Colors.grey),
   ),
```

```
                ),
                Expanded(
                  child: Container(
                    height: 1,
                    color: Colors.grey,
                  ),
                ),
              ],
            ),
            CustomMainButton(
                child: const Text(
                  "Create an Amazon Account",
                  style: TextStyle(
                    letterSpacing: 0.6,
                    color: Colors.black,
                  ),
                ),
                color: Colors.grey[400]!,
                isLoading: false,
                onPressed: () {
                  Navigator.pushReplacement(context,
                      MaterialPageRoute(builder: (context) {
                    return const SignUpScreen();
                  }));
                })
          ],
        ),
      ),
    ),
  ),
 );
 }
}
```

```
class UserDetailsBar extends StatelessWidget {
  final double offset;
  const UserDetailsBar({
    Key? key,
    required this.offset,
  }) : super(key: key);
```

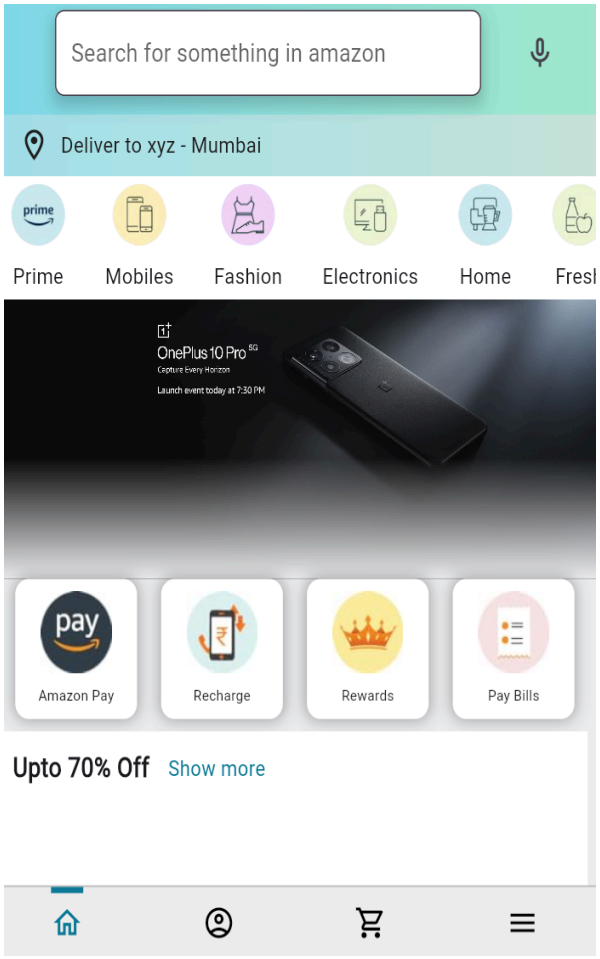
```
@override
Widget build(BuildContext context) {
  Size screenSize = Utils().getScreenSize();
  UserDetailsModel userDetails =
      Provider.of<UserDetailsProvider>(context).userDetails;
  return Positioned(
    top: -offset / 3,
    child: Container(
      height: kAppBarHeight / 2,
      width: screenSize.width,
      decoration: const BoxDecoration(
        gradient: LinearGradient(
          colors: lightBackgroundaGradient,
          begin: Alignment.centerLeft,
          end: Alignment.centerRight,
        ),
      ),
      child: Padding(
        padding: const EdgeInsets.symmetric(
          vertical: 3,
          horizontal: 20,
        ),
        child: Row(
          children: [
            Padding(
              padding: const EdgeInsets.only(right: 8.0),
              child: Icon(
                Icons.location_on_outlined,
                color: Colors.grey[900],
              ),
            ),
            SizedBox(
              width: screenSize.width * 0.7,
              child: Text(
                "Deliver to ${userDetails.name} - ${userDetails.address} ",
                maxLines: 1,
                overflow: TextOverflow.ellipsis,
                style: TextStyle(
                  color: Colors.grey[900],
                ),
              ),
            )
          ],
```

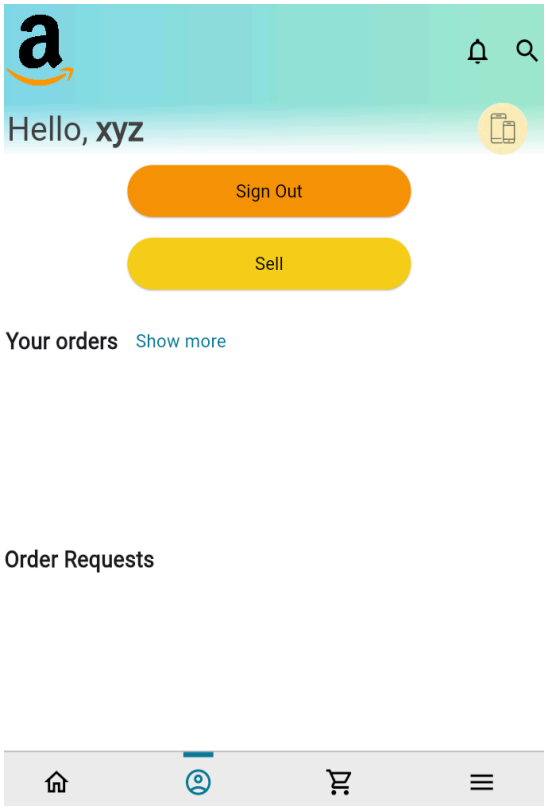
```
          ),
        ),
      ),
    );
  }
}
```

SIGN OUT-

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

  @override
  State<AccountScreen> createState() => _AccountScreenState();
}

class _AccountScreenState extends State<AccountScreen> {
  @override
  Widget build(BuildContext context) {
    Size screenSize = Utils().getScreenSize();

    return Scaffold(
      backgroundColor: Colors.white,
      appBar: AccountScreenAppBar(),
      body: SingleChildScrollView(
        child: SizedBox(
          height: screenSize.height,
          width: screenSize.width,
          child: Column(
            children: [
              IntroductionWidgetAccountScreen(),
              Padding(
                padding: const EdgeInsets.all(8.0),
                child: CustomMainButton(
                    child: const Text(
                      "Sign Out",
                      style: TextStyle(color: Colors.black),
                    ),
                    color: Colors.orange,
                    isLoading: false,
                    onPressed: () {
                      FirebaseAuth.instance.signOut();
                    }),
              ),
```

```
Padding(
  padding: const EdgeInsets.all(8.0),
  child: CustomMainButton(
      child: const Text("Sell",
          style: TextStyle(color: Colors.black)),
      color: yellowColor,
      isLoading: false,
      onPressed: () {
        Navigator.push(
            context,
            MaterialPageRoute(
                builder: (context) => const SellScreen()));
      }),
),
FutureBuilder(
    future: FirebaseFirestore.instance
        .collection("users")
        .doc(FirebaseAuth.instance.currentUser!.uid)
        .collection("orders")
        .get(),
    builder: (context,
        AsyncSnapshot<QuerySnapshot<Map<String, dynamic>>>
            snapshot) {
      if (snapshot.connectionState == ConnectionState.waiting) {
        return Container();
      } else {
        List<Widget> children = [];
        for (int i = 0; i < snapshot.data!.docs.length; i++) {
          ProductModel model = ProductModel.getModelFromJson(
              json: snapshot.data!.docs[i].data());
          children.add(SimpleProductWidget(productModel: model));
        }
        return ProductsShowcaseListView(
            title: "Your orders", children: children);
      }
    }),
```


Search for something in amazon
Deliver to xyz - Mumbai
Prime
Mobiles
Fashion
Electronics
Home
Fresl
OnePlus 10 Pro 5G
Capture Every Horizon
Launch event today at 7:30 PM
Amazon Pay
Recharge
Rewards
Pay Bills
Upto 70% Off
Show more



Conclusion: Navigation,routing and gestures have been applied in Flutter Application.

MAD LAB EXPT 6

Name:Swarali Dhobale_D15A_13

Aim: To connect Flutter UI with Firebase.

Theory:

Step1:
Go to the Firebase Console (https://console.firebase.google.com/) and create a new project.Follow the instructions to add your app to the Firebase project. You'll need to provide your app's package name (Android) or bundle identifier (iOS).

Step 2:
Add the Firebase SDK dependencies to your Flutter app's pubspec.yaml file. These dependencies vary depending on the Firebase services you want to use (e.g., Firebase Authentication, Firestore, Realtime Database, Cloud Storage).
Run flutter pub get to install the dependencies.

Step 3:
In your Flutter app, initialize Firebase by calling Firebase.initializeApp() in the main() function or at the entry point of your app.
This initialization step is crucial and should be done before accessing any Firebase services.

Step 4:
Once Firebase is initialized, you can start using Firebase services like Firestore (NoSQL database), Realtime Database (JSON database), Cloud Storage (file storage), Cloud Functions (serverless functions), etc.
You'll typically use Firebase APIs to read and write data, handle user authentication, and perform other tasks.

Step 5:
Use Firebase listeners to listen for real-time updates to your data. For example, in Firestore, you can set up listeners to receive updates whenever the data in a collection or document changes.

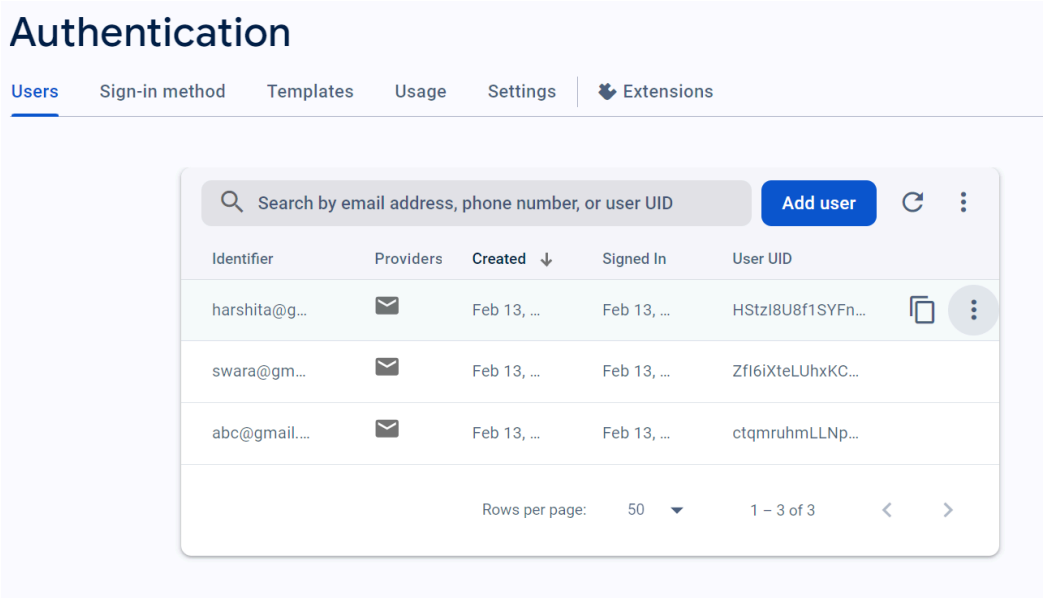
Step 6:
Implement error handling logic to handle exceptions and errors that may occur when interacting with Firebase services.

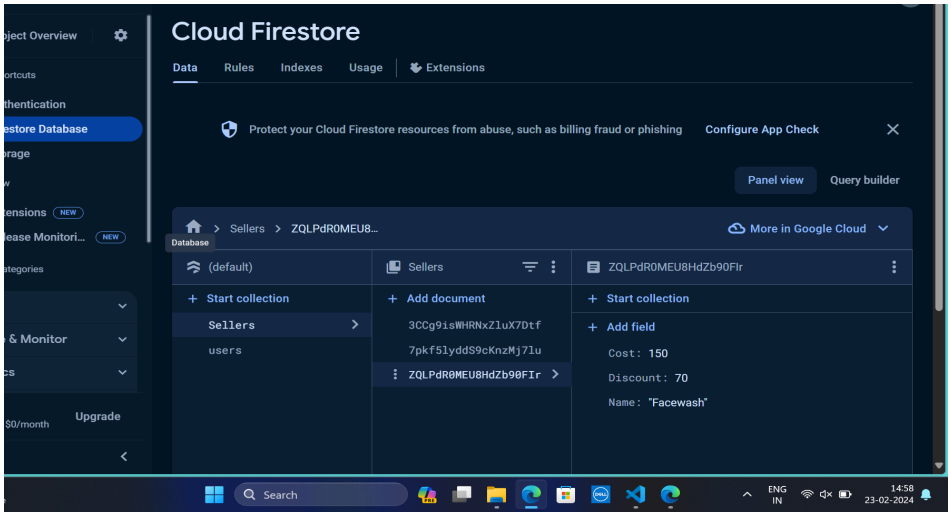
Output:

```
import 'package:amazon_clone/layout/screen_layout.dart';
import 'package:amazon_clone/model/product_model.dart';
import 'package:amazon_clone/providers/user_details_provider.dart';
import 'package:amazon_clone/screens/product_screen.dart';
import 'package:amazon_clone/screens/results_screen.dart';
import 'package:amazon_clone/screens/sell_screen.dart';
import 'package:amazon_clone/screens/sign_in_screen.dart';
import 'package:amazon_clone/utils/color_themes.dart';
import 'package:firebase_auth/firebase_auth.dart';
import 'package:firebase_core/firebase_core.dart';
import 'package:flutter/foundation.dart';
import 'package:flutter/material.dart';
import 'package:provider/provider.dart';

void main() async {
  WidgetsFlutterBinding.ensureInitialized();
  if (kIsWeb) {
    await Firebase.initializeApp(
        options: const FirebaseOptions(
            apiKey: "AIzaSyDvpZFXdfmjxwc0x2oClDw01sNoMrLoF4c",
            authDomain: "clone-12f8a.firebaseapp.com",
            projectId: "clone-12f8a",
            storageBucket: "clone-12f8a.appspot.com",
            messagingSenderId: "413818422314",
            appId: "1:413818422314:web:f7981d7db247b565732f53"));
  } else {
    await Firebase.initializeApp();
  }
  runApp(const AmazonClone());
}

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

  @override
  Widget build(BuildContext context) {
    return MultiProvider(
      providers: [ChangeNotifierProvider(create: (_) => UserDetailsProvider())],
      child: MaterialApp(
        title: "Amazon Clone",
        debugShowCheckedModeBanner: false,
        theme: ThemeData.light().copyWith(
```

```
        scaffoldBackgroundColor: backgroundColor,
      ),
      home: StreamBuilder(
        stream: FirebaseAuth.instance.authStateChanges(),
        builder: (context, AsyncSnapshot<User?> user) {
          if (user.connectionState == ConnectionState.waiting) {
            return const Center(
              child: CircularProgressIndicator(
                color: Colors.orange,
              ),
            );
          } else if (user.hasData) {
            return const ScreenLayout();
            //return const SellScreen();
          } else {
            return const SignInScreen();
          }
        }),
    ),
  );
 }
}
```

Connected with firebase.





Conclusion: Firebase has been connected to the Flutter application for user authentication purposes.

PWA EXPT-07

Name: Swarali Dhobale
Class:D15A-13

Aim: Write meta data of your Ecommerce PWA in a Web app manifest file to enable add to homescreen feature.

Theory:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Linkable — Easily shared via URL without complex installations.

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

Code and Output:

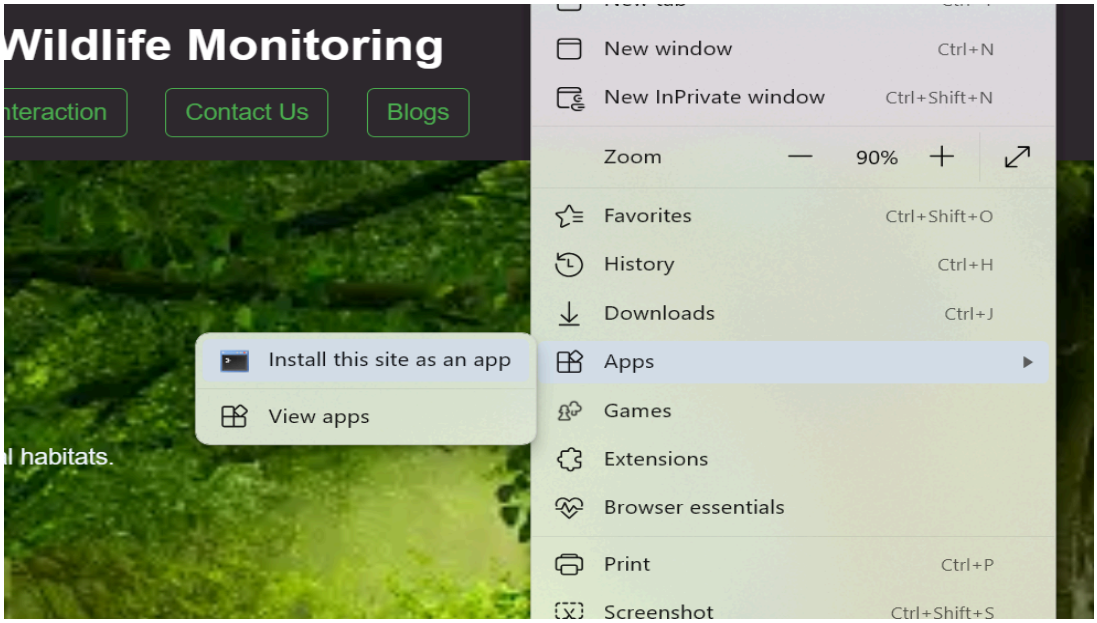
```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Wildlife Monitoring</title>
   <style>
            body {
          font-family: Arial, sans-serif;
          margin: 0;
          padding: 0;
          background:
url("https://media.istockphoto.com/id/537389352/photo/tropical-rainforest.webp?b=1&s=170667
a&w=0&k=20&c=rPxzpapBr16QF47PWJ474qVXE1SjaRImJvt6pClavew=") no-repeat fixed;
          background-size: cover;
       }

       header {
          background-color: #2f292f;
          color: white;
          padding: 9px;
          text-align: center;
       }
```

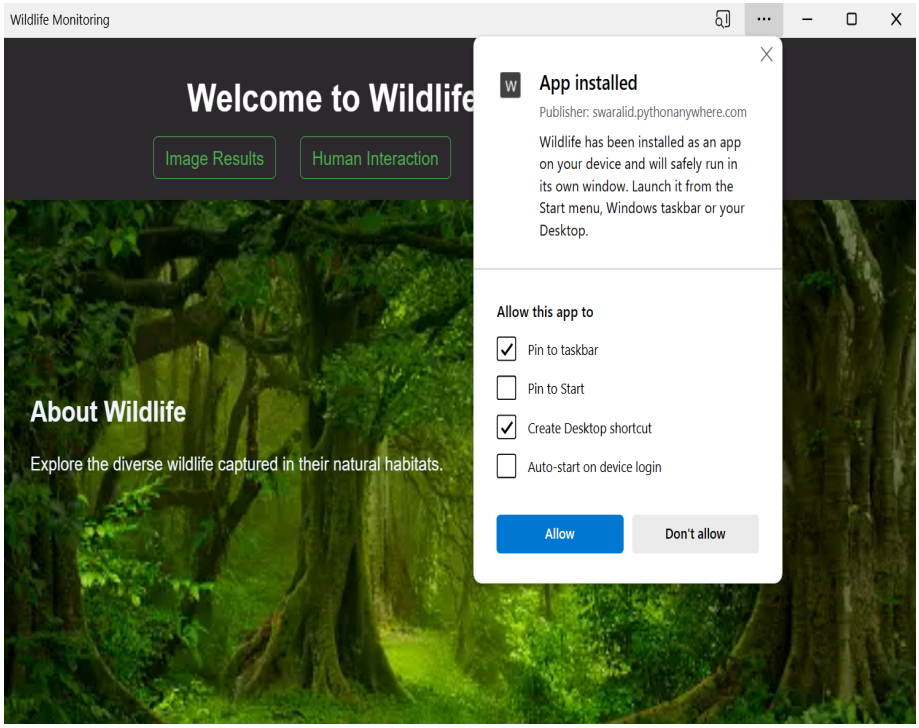
```
nav ul {
    list-style-type: none;
    padding: 0;
}
nav li {
    display: inline;
    margin-right: 20px;
}
.main-content {
    max-width: 800px;
    margin: 120px auto;
    padding: 20px;
    color: aliceblue;
    border-radius: 10px;
}

.predicted-image {
    border: 2px solid red;
    max-width: 100%;
}

footer {
    background-color: #2f292f;
    color: white;
    text-align: center;
    padding: 10px;
    position: fixed;
    bottom: 0;
    width: 100%;
}

nav a {
    text-decoration: none;
    padding: 8px 12px;
    border: 1px solid #4CAF50;
    color: #4CAF50;
    border-radius: 5px;
    transition: background-color 0.3s;
}

nav a:hover {
    background-color: #4CAF50;
    color: white;
}
```

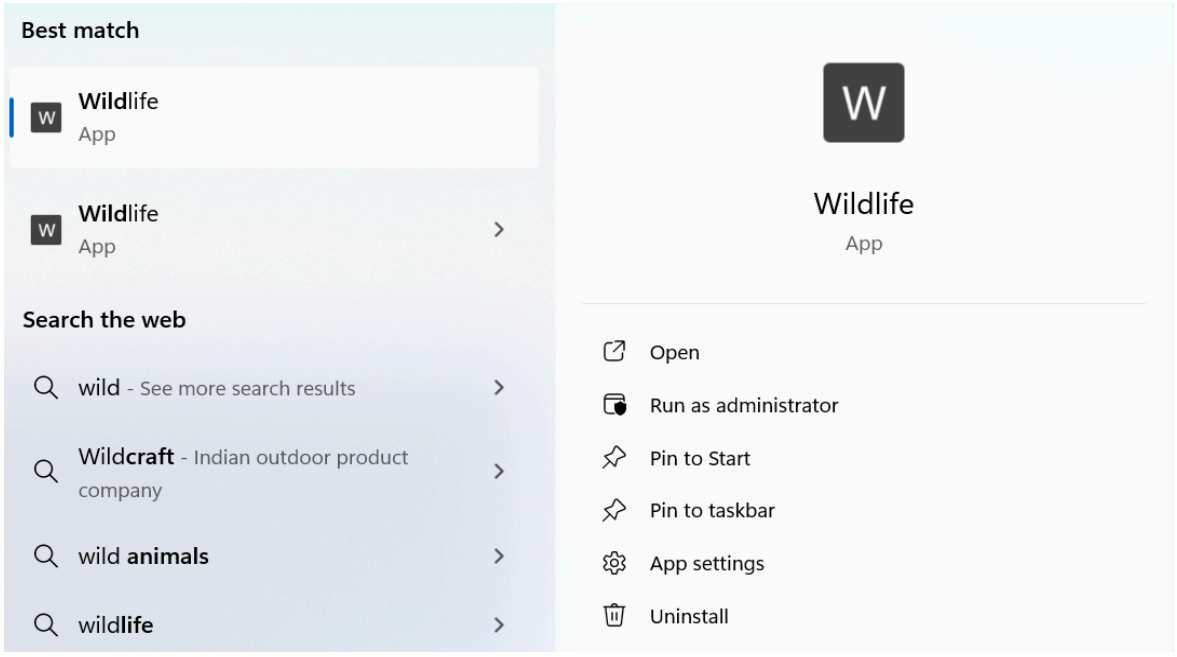
```
        .loading-message-text {
            color: yellow;
            font-size: 18px;
        }
        @media (max-width: 600px) {
            nav ul {
                text-align: center;
            }

            nav li {
                display: block;
                margin: 30px 0;
            }
        }
    </style>
<script>
    document.addEventListener("DOMContentLoaded", function () {
        var imageResultsBtn = document.getElementById("image-results-btn");
        var loadingMessage = document.getElementById("loading-message");

        imageResultsBtn.addEventListener("click", function () {
            loadingMessage.innerHTML = '<p class="loading-message-text">Hang on! Your content
is being loaded...</p>';
            setTimeout(function () {
                loadingMessage.innerHTML = '';

            }, 30000);
        });
    });
</script>
</head>
<body>
<header>
    <h1>Welcome to Wildlife Monitoring</h1>
    <nav>
        <ul>
            <li><a id="image-results-btn" href="/results">Image Results</a></li>
            <li><a href="/human">Human Interaction</a></li>
            <li><a href="/contact">Contact Us</a></li>
            <li><a href="/blogs">Blogs</a></li>
        </ul>
    </nav>
</header>
```

```
<section class="main-content">
    <div id="loading-message"></div>
    <h2>About Wildlife</h2>
    <p>Explore the diverse wildlife captured in their natural habitats.</p></section>
</body>
```

Output:







Conclusion: Created a progressive web app and installed it on the desktop successfully.

PWA EXPT-08

Name: Swarali Dhobale
Class:D15A-13

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.

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.

Code and Output:

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Wildlife Monitoring</title>
   <style>
          body {
        font-family: Arial, sans-serif;
        margin: 0;
        padding: 0;
        background:
url("https://media.istockphoto.com/id/537389352/photo/tropical-rainforest.webp?b=1&s=170667
a&w=0&k=20&c=rPxzpapBr16QF47PWJ474qVXE1SjaRImJvt6pClavew=") no-repeat fixed;
        background-size: cover;
      }

      header {
        background-color: #2f292f;
        color: white;
        padding: 9px;
        text-align: center;
      }
      nav ul {
        list-style-type: none;
        padding: 0;
      }
      nav li {
        display: inline;
        margin-right: 20px;
```

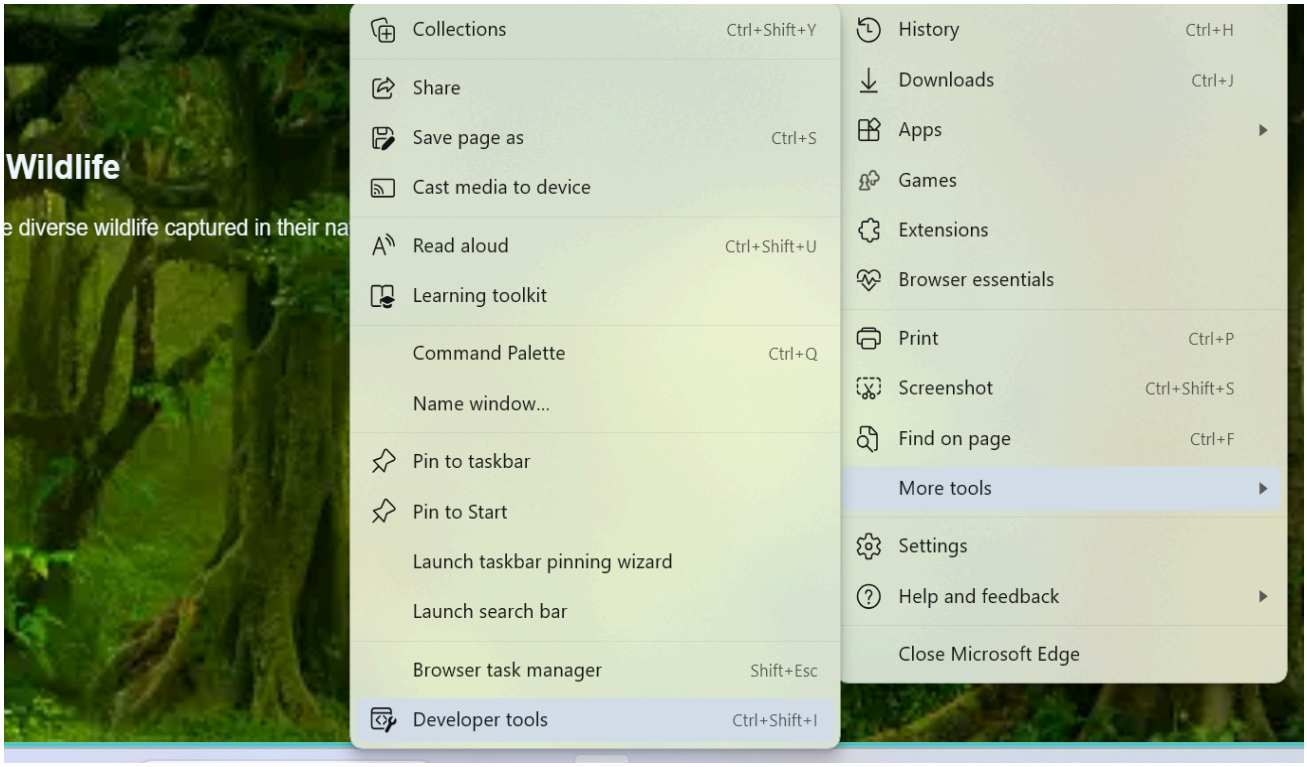
```
}
.main-content {
    max-width: 800px;
    margin: 120px auto;
    padding: 20px;
    color: aliceblue;
    border-radius: 10px;
}

.predicted-image {
    border: 2px solid red;
    max-width: 100%;
}

footer {
    background-color: #2f292f;
    color: white;
    text-align: center;
    padding: 10px;
    position: fixed;
    bottom: 0;
    width: 100%;
}

nav a {
    text-decoration: none;
    padding: 8px 12px;
    border: 1px solid #4CAF50;
    color: #4CAF50;
    border-radius: 5px;
    transition: background-color 0.3s;
}

nav a:hover {
    background-color: #4CAF50;
    color: white;
}

.loading-message-text {
    color: yellow;
    font-size: 18px;
}
@media (max-width: 600px) {
    nav ul {
```

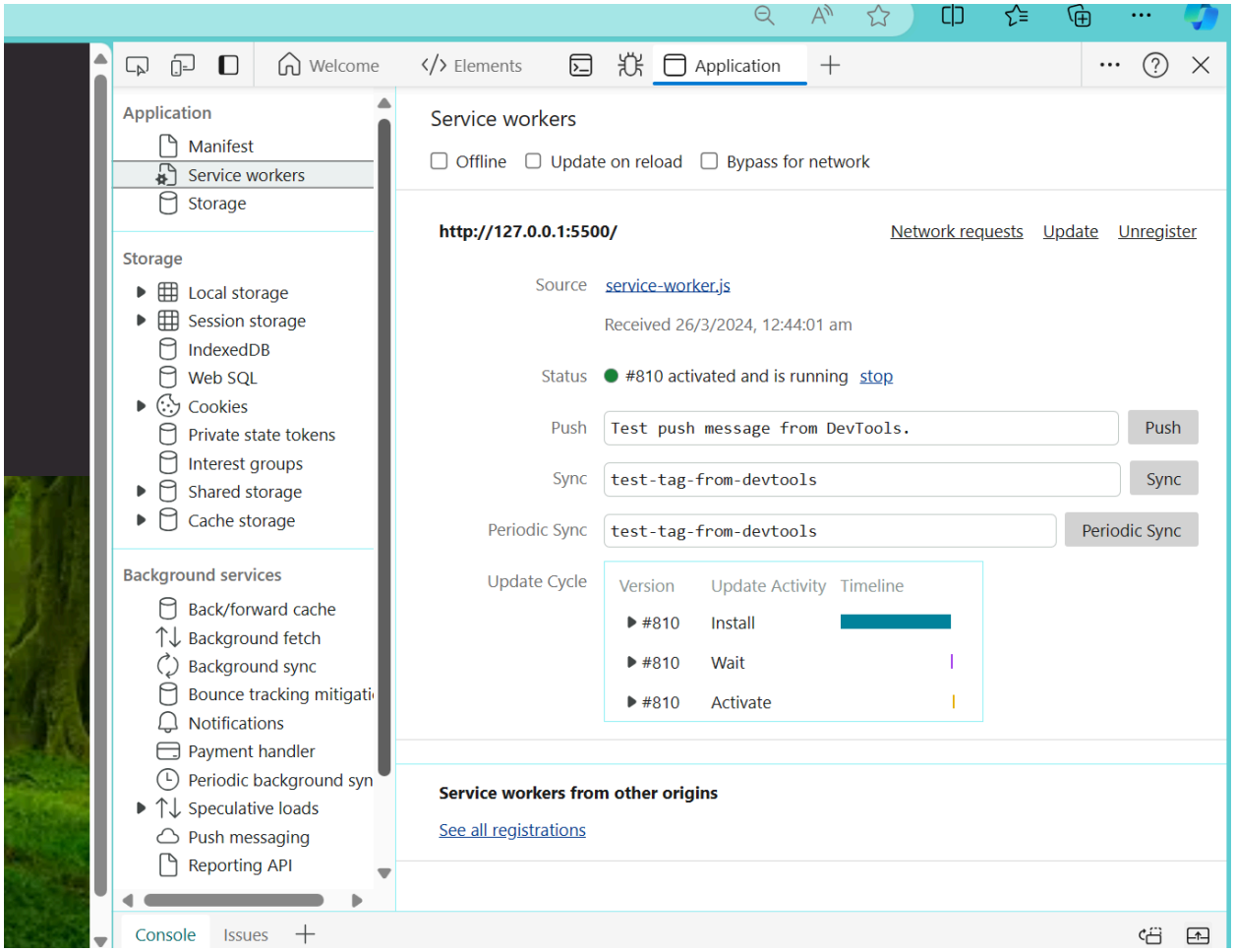
```
            text-align: center;
        }

        nav li {
            display: block;
            margin: 30px 0;
        }
    }
</style>
<script>
    document.addEventListener("DOMContentLoaded", function () {
        var imageResultsBtn = document.getElementById("image-results-btn");
        var loadingMessage = document.getElementById("loading-message");

        imageResultsBtn.addEventListener("click", function () {
            loadingMessage.innerHTML = '<p class="loading-message-text">Hang on! Your content
is being loaded...</p>';
            setTimeout(function () {
                loadingMessage.innerHTML = '';

            }, 30000);
        });
    });
</script>
</head>
<body>
<header>
    <h1>Welcome to Wildlife Monitoring</h1>
    <nav>
        <ul>
            <li><a id="image-results-btn" href="/results">Image Results</a></li>
            <li><a href="/human">Human Interaction</a></li>
            <li><a href="/contact">Contact Us</a></li>
            <li><a href="/blogs">Blogs</a></li>
        </ul>
    </nav>
</header>
<section class="main-content">
    <div id="loading-message"></div>
    <h2>About Wildlife</h2>
    <p>Explore the diverse wildlife captured in their natural habitats.</p></section>
<script src="app.js"></script>
</body>
```

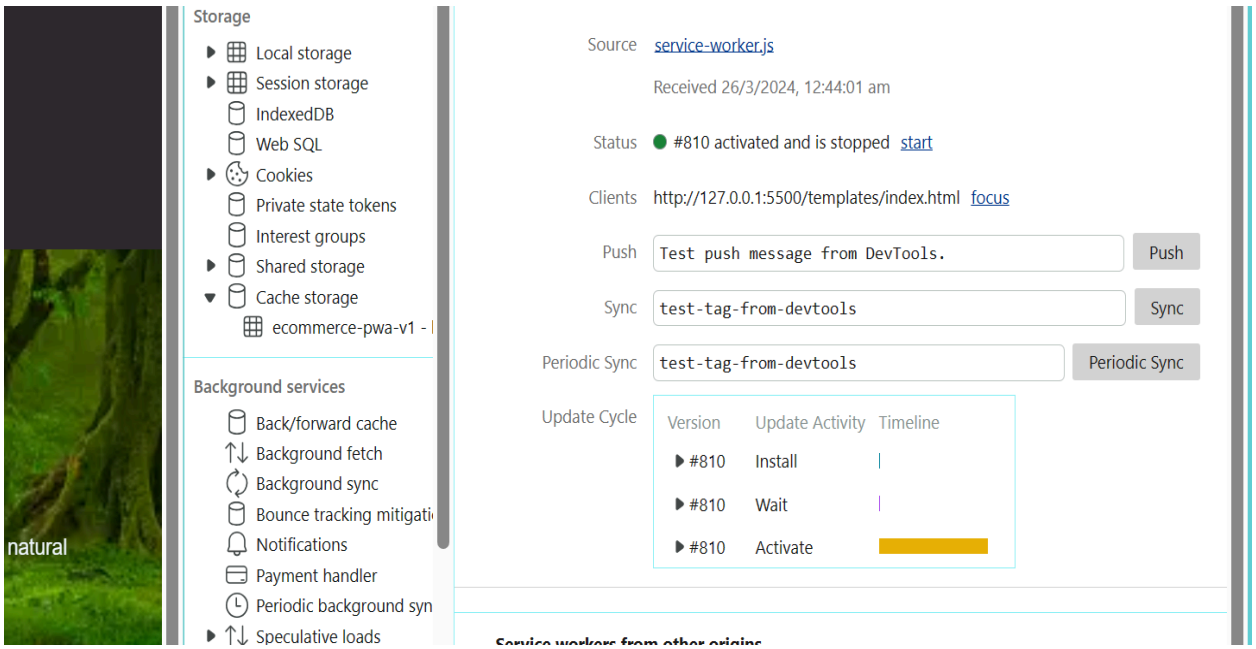
app.js

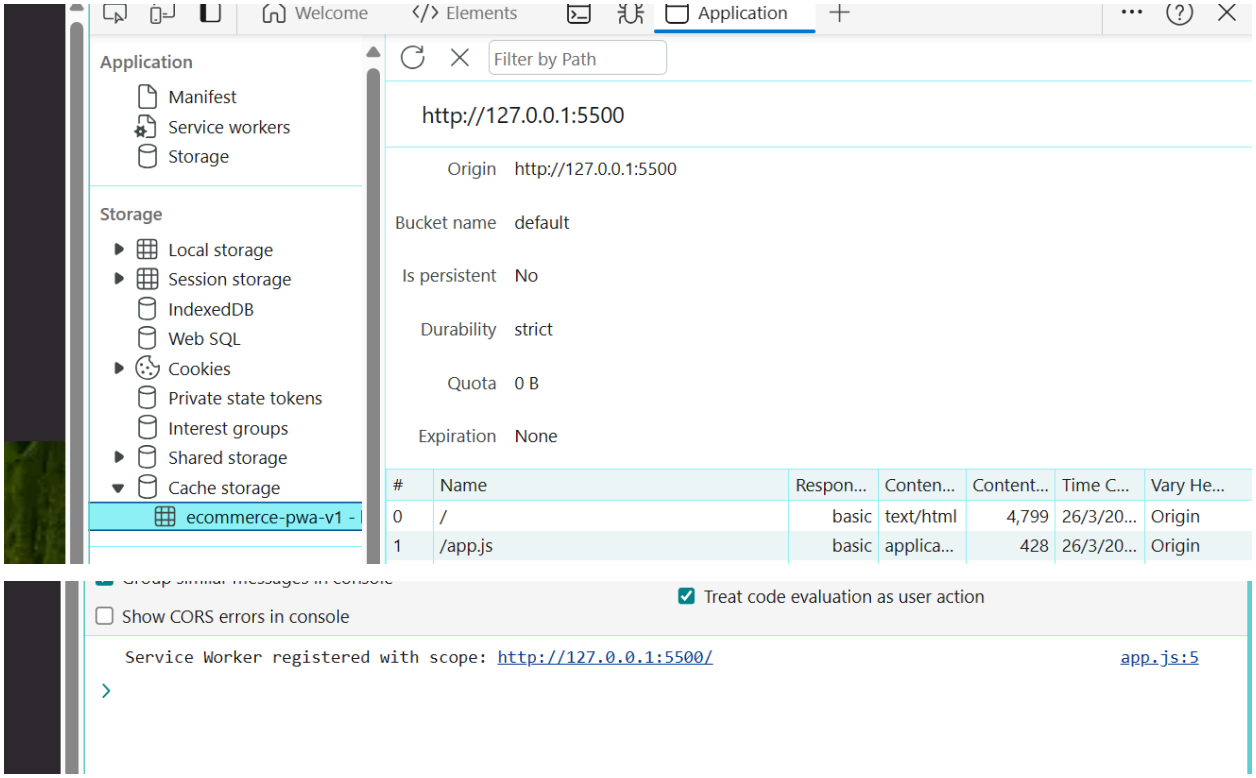
```
if ('serviceWorker' in navigator) {
  window.addEventListener('load', () => {
    navigator.serviceWorker.register('/service-worker.js')
      .then(registration => {
        console.log('Service Worker registered with scope:', registration.scope);
      })
      .catch(error => {
        console.error('Service Worker registration failed:', error);
      });
  });
}
```

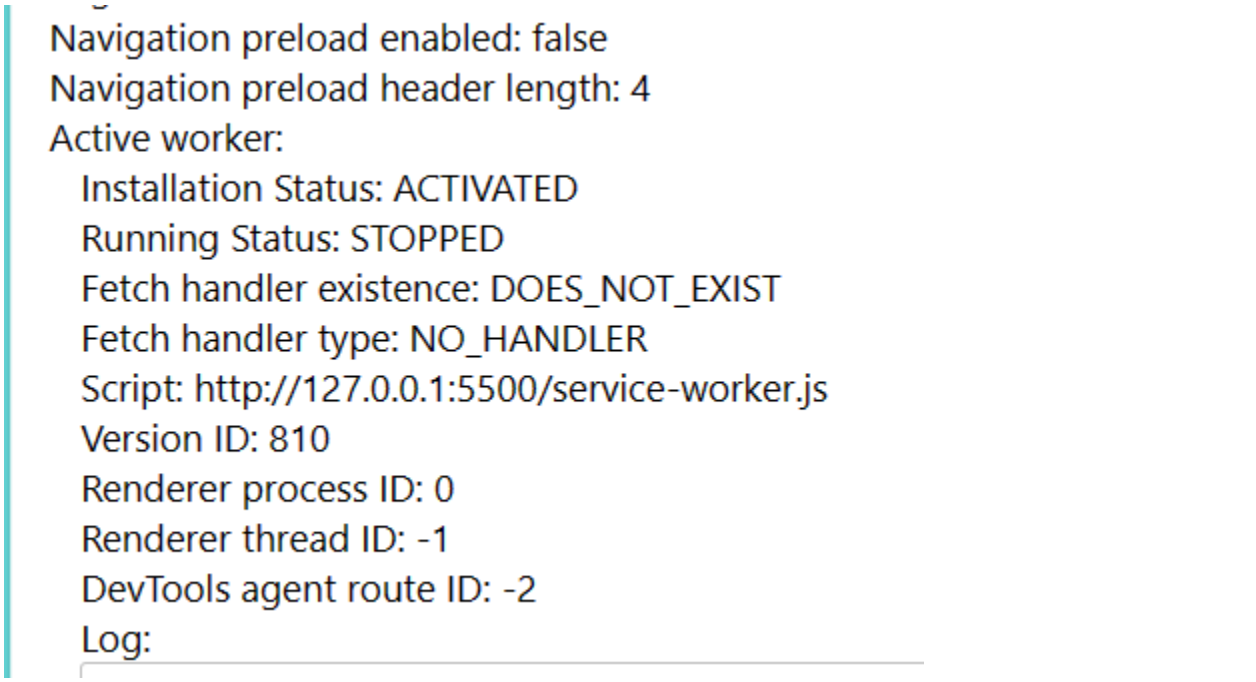
Output:




Welcome
Elements
Application
Application
Manifest
Service workers
Storage
Storage
Local storage
Session storage
IndexedDB
Web SQL
Cookies
Private state tokens
Interest groups
Shared storage
Cache storage
Background services
Back/forward cache
Background fetch
Background sync
Bounce tracking mitigati
Notifications
Payment handler
Periodic background syn
Speculative loads
Push messaging
Reporting API
Service workers
Offline
Update on reload
Bypass for network
http://127.0.0.1:5500/
Network requests
Update
Unregister
Source
service-worker.js
Received 26/3/2024, 12:44:01 am
Status
#810 activated and is running
stop
Push
Test push message from DevTools.
Push
Sync
test-tag-from-devtools
Sync
Periodic Sync
test-tag-from-devtools
Periodic Sync
Update Cycle
Version
Update Activity
Timeline
#810
Install
#810
Wait
#810
Activate
Service workers from other origins
See all registrations
Console
Issues


Storage
Local storage
Session storage
IndexedDB
Web SQL
Cookies
Private state tokens
Interest groups
Shared storage
Cache storage
ecommerce-pwa-v1 -
Background services
Back/forward cache
Background fetch
Background sync
Bounce tracking mitigati
Notifications
Payment handler
Periodic background syn
Speculative loads
Source
service-worker.js
Received 26/3/2024, 12:44:01 am
Status
#810 activated and is stopped
start
Clients
http://127.0.0.1:5500/templates/index.html
focus
Push
Test push message from DevTools.
Push
Sync
test-tag-from-devtools
Sync
Periodic Sync
test-tag-from-devtools
Periodic Sync
Update Cycle
Version
Update Activity
Timeline
#810
Install
#810
Wait
#810
Activate
natural





<u>Conclusion</u>: Registered a service worker, and completed the installation and activation process for a new service worker for the PWA.

PWA EXPT-09

Name: Swarali Dhobale
Class:D15A_13

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");
    }
}
```

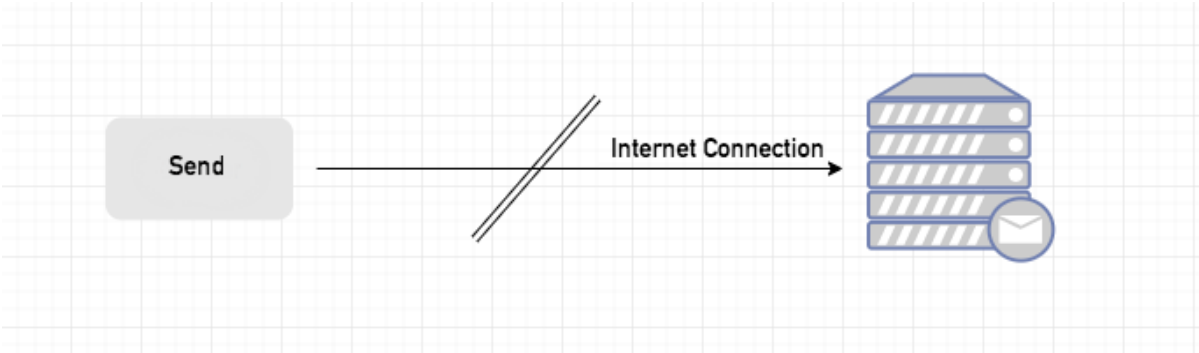
Sync Event

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.

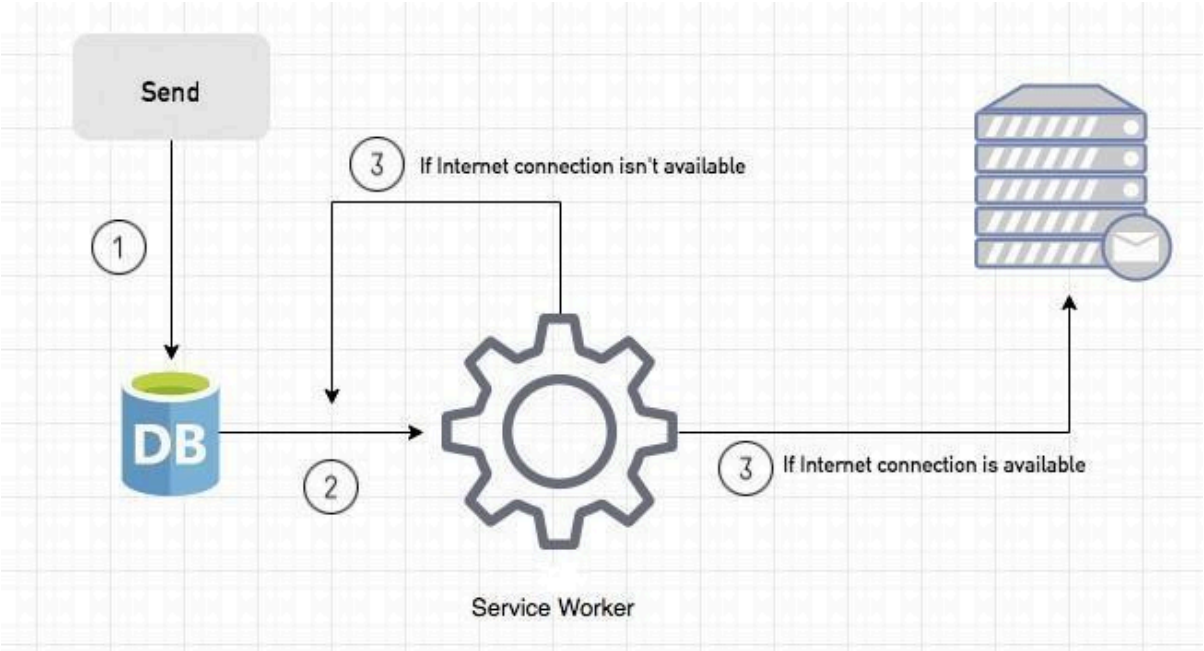
Here is a job for the Background Sync.

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.

Push Event

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

“Notification.requestPermission();” is the necessary line to show notification to the user.

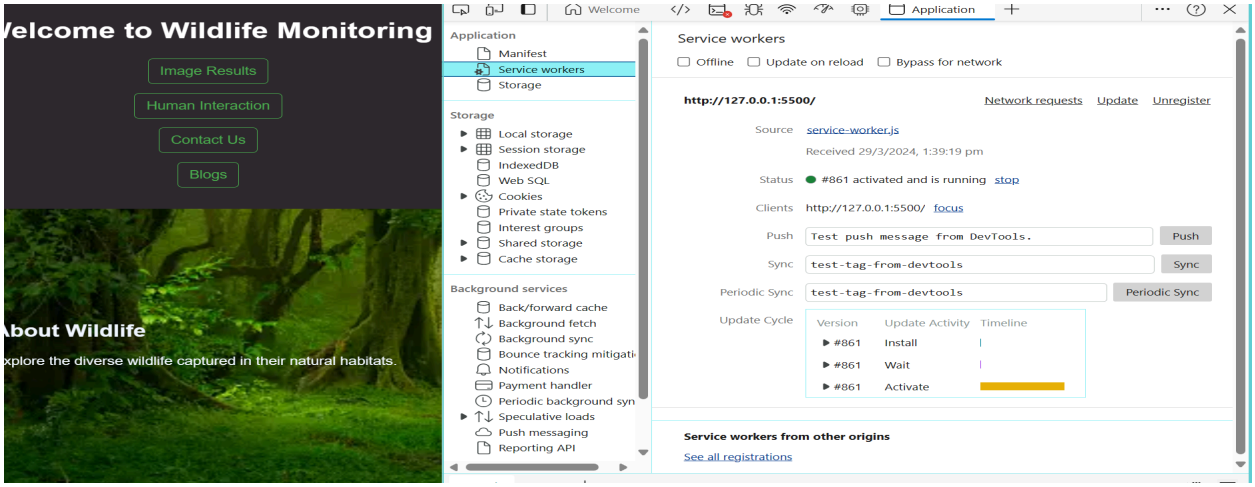
Service Worker Code:-

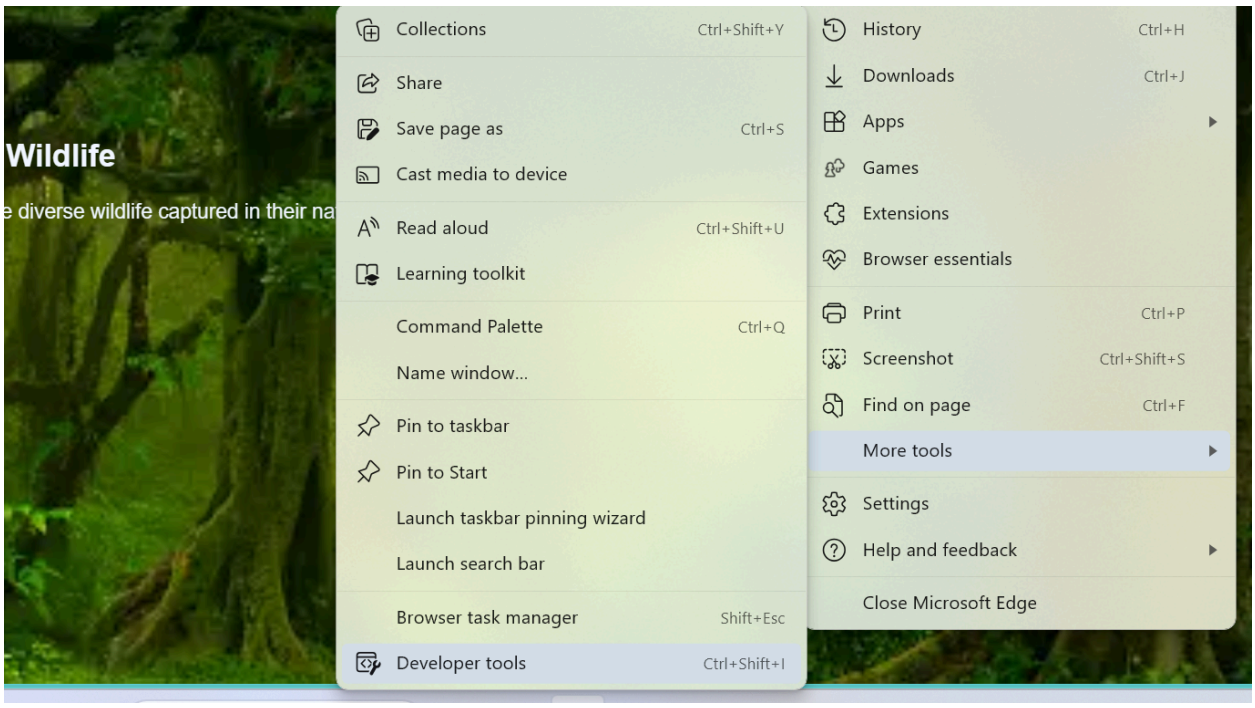
```
// Service Worker Installation
self.addEventListener("install", function (event) {
    event.waitUntil(preLoad());
});
// Fetch Event Listener
self.addEventListener("fetch", function (event) {
    event.respondWith(
        checkResponse(event.request)
            .catch(function () {
                console.log("Fetch from cache successful!");
                return returnFromCache(event.request);
            })
    );
    console.log("Fetch successful!");
    event.waitUntil(addToCache(event.request));
});
// Sync Event Listener
self.addEventListener("sync", (event) => {
    if (event.tag === "syncMessage") {
        console.log("Sync successful!");
    }
});
self.addEventListener("push", function (event) {
    if (event && event.data) {
        try {
            var data = event.data.json(); // Attempt to parse JSON data
            console.log("Push notification data:", data); // Log the received data
            if (data && data.method === "pushMessage")
```

```
    console.log("Push notification sent");
            self.registration.showNotification("New Notification", {
                body: data.message,
                icon: 'img.png',
            }).catch(function(error) {
                console.error("Error displaying notification:", error);
            });
        }
    } catch (error) {
        console.error("Error parsing push data:", error);
    }
  } else {
    console.error("Push event does not contain data.");
  }
});
// Preload Function
function preLoad() {
  return caches.open("offline").then(function (cache) {
    return cache.addAll([
      '/index.html',
      '/manifest.json',
      '/service-worker.js',
      '/app.js'
    ]);
  });
}

// Check Response Function
var checkResponse = function (request) {
```

```
    return new Promise(function (fulfill, reject) {
        fetch(request)
            .then(function (response) {
                if (response.status !== 404) {
                    fulfill(response);
                } else {
                    reject(new Error("Response not found"));
                }
            })
            .catch(function (error) {
                reject(error);
            });
    });
};

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

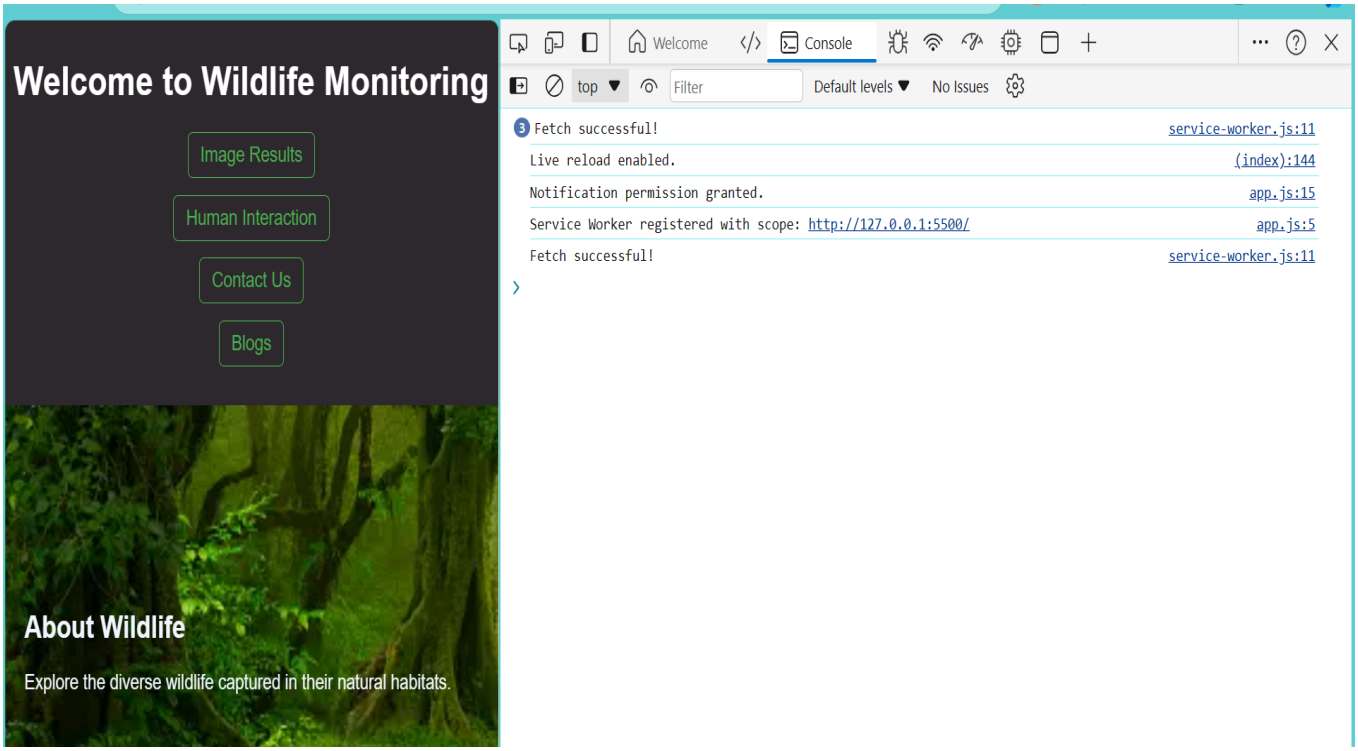
```
        return fetch(request).then(function (response) {
            cache.put(request, response.clone());
            return response;
        });
    });
};
```

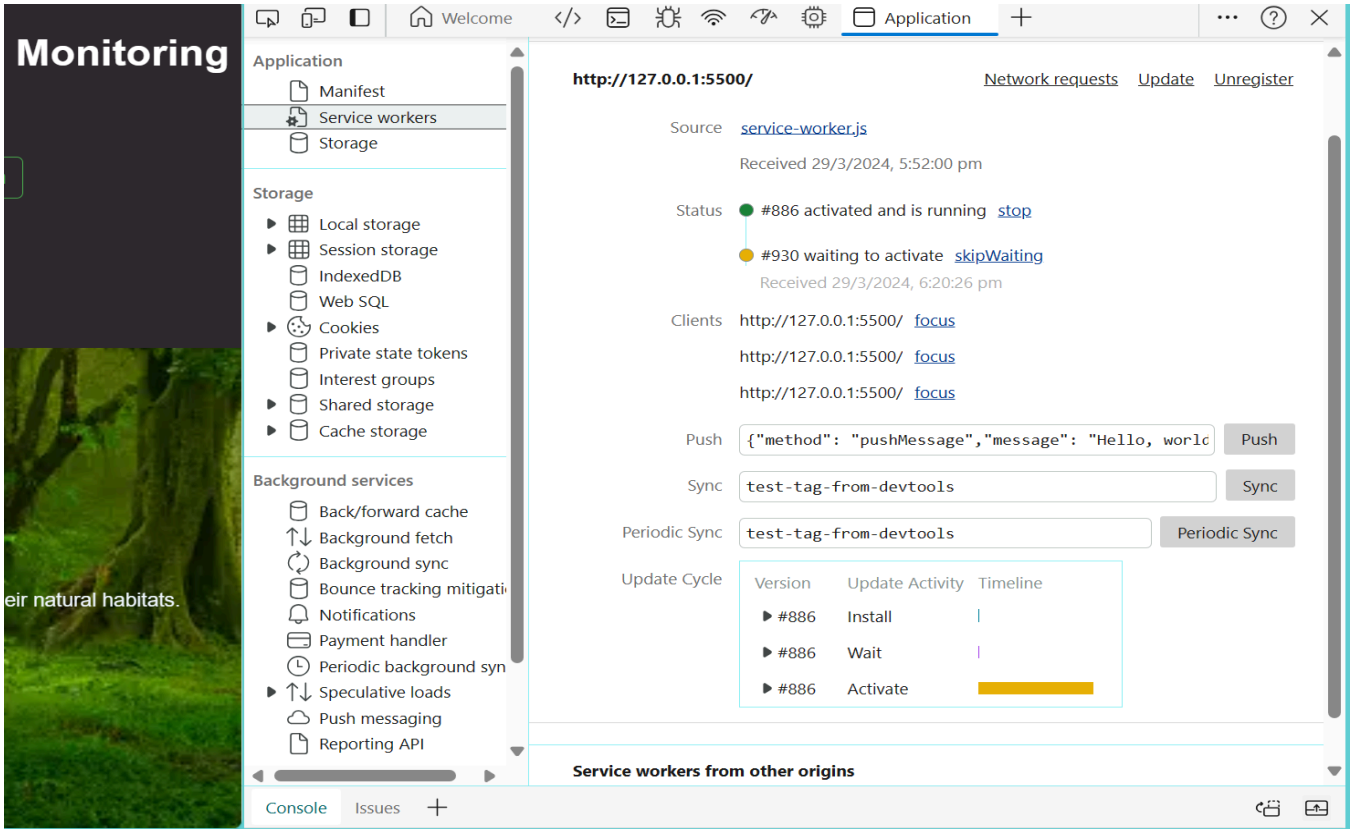





```
[NEW] Explain Console errors by using Copilot in Edge: click to explain an error. Learn more
Don't show again
Push notification sent                                  service-worker.js:27
```

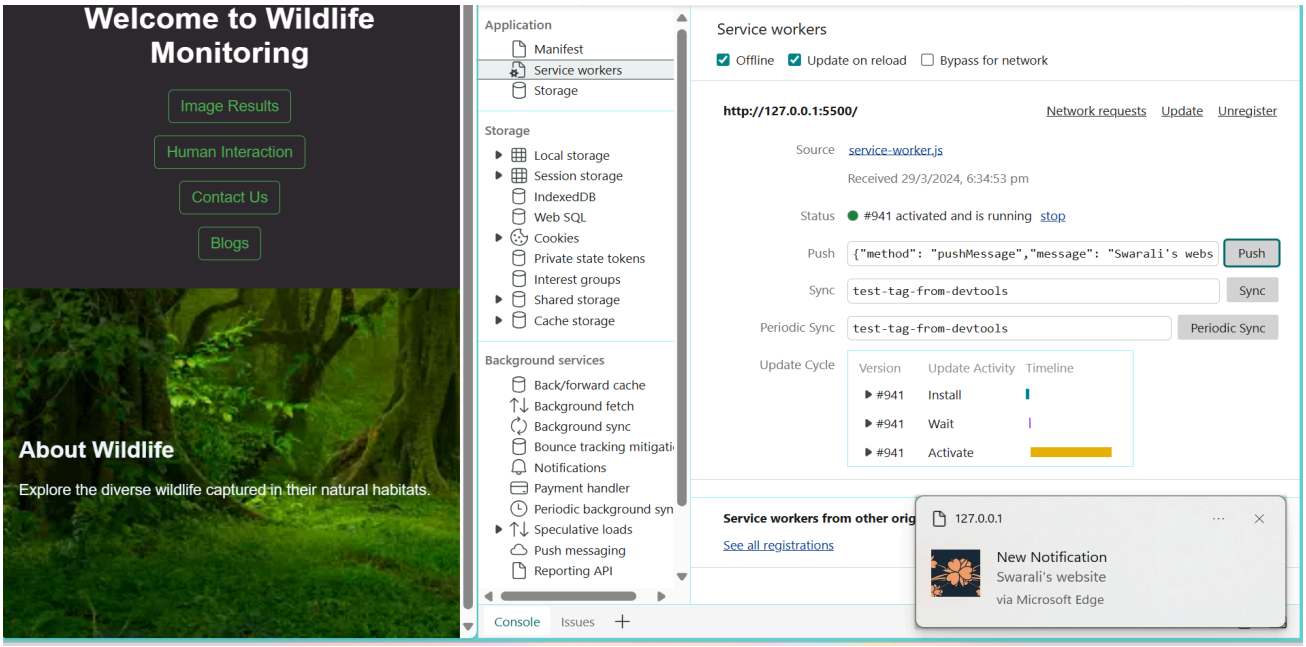
Fetch successful-

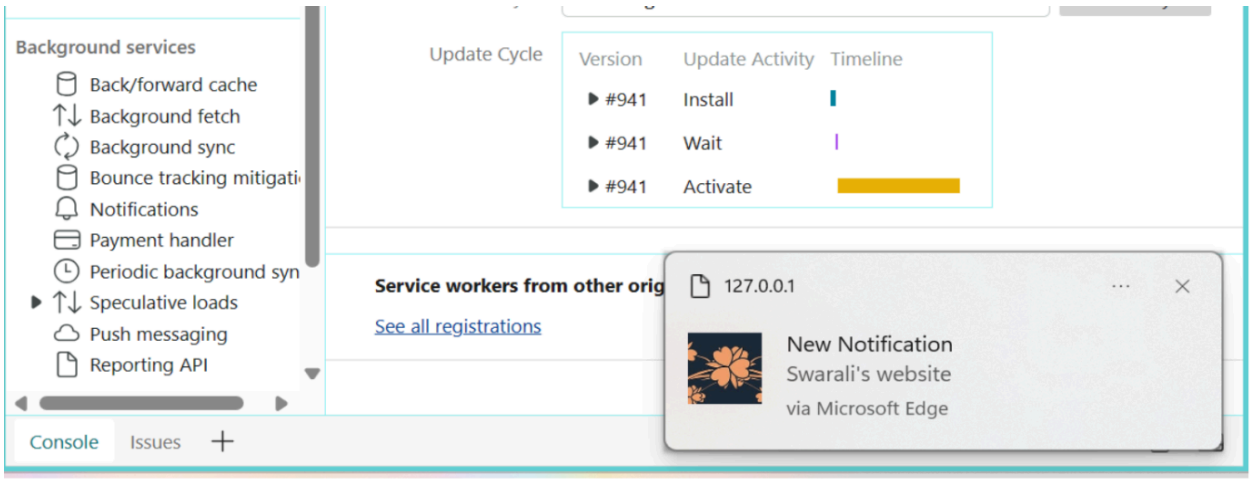




NOTIFICATION PERMISSION GRANTED,
PUSH NOTIFICATION SENT-(along with image)

```
3 Fetch successful!                                                    service-worker.js:16
  Live reload enabled.                                                 (index):144
  Notification permission granted.                                     app.js:15
  Service Worker registered with scope: http://127.0.0.1:5500/         app.js:5
  Fetch successful!                                                    service-worker.js:16
  Push notification data: ▼ {method: 'pushMessage', message: "Swarali's website"} i   service-worker.js:32
                            message: "Swarali's website"
                            method: "pushMessage"
                          ▶ [[Prototype]]: Object
  Push notification sent                                               service-worker.js:34
```





Conclusion: Service worker events have been implemented successfully.

PWA EXPT-10

Name: Swarali Dhobale
Class:D15A_13

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

Theory:

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

GitHub Pages provides the following key features:

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

Reasons for favoring this over Firebase:

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

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

Pros

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

Cons

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

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

Some of the features offered by Firebase are:

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

Reasons for favoring over GitHub Pages:

1. Realtime backend made easy
2. Fast and responsive

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

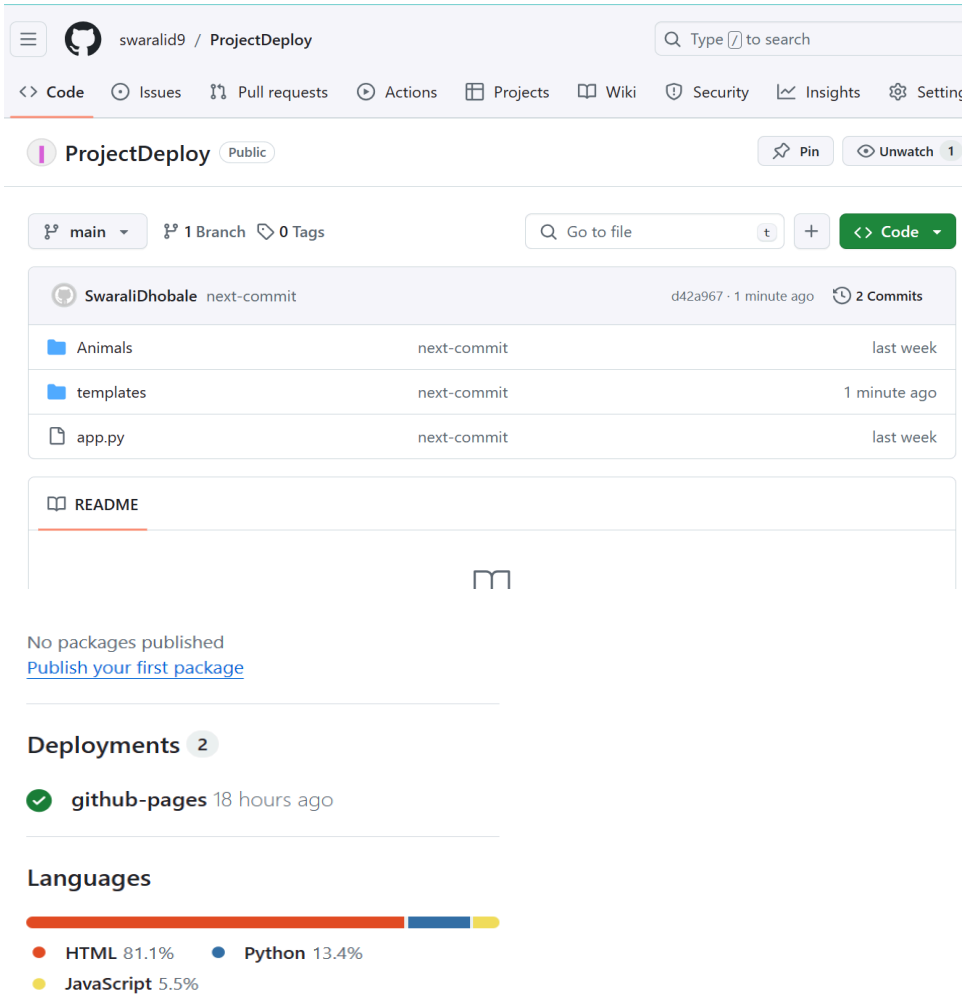
Pros

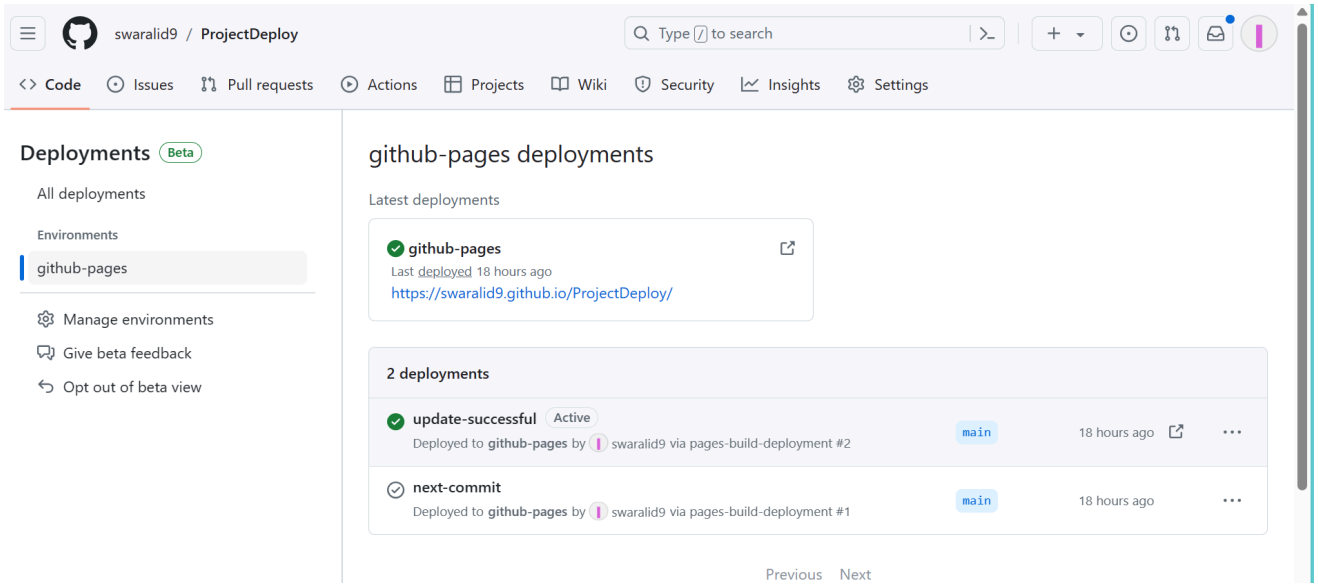
1. Hosted by Google. Enough said.
2. Authentication, Cloud Messaging, and a whole lot of other handy services will be available to you.
3. A real-time database will be available to you, which can store 1 GB of data.
4. You'll also have access to a blob store, which can store another 1 GB of data.
5.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

Cons

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

Link to github repo:- LINK





Conclusion: Website has been deployed on Github Pages.

PWA EXPT-11

Name: Swarali Dhobale
Class:D15A_13

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

Theory:

Google Lighthouse :

Google Lighthouse is a tool that lets you audit your web application based on a number of parameters including (but not limited to) performance, based on a number of metrics, mobile compatibility, Progressive Web App (PWA) implementations, etc. All you have to do is run it on a page or pass it a URL, sit back for a couple of minutes and get a very elaborate report, not much short of one that a professional auditor would have compiled in about a week.

The best part is that you have to set up almost nothing to get started. Let's begin by looking at some of the top features and audit criteria used by Lighthouse.

Key Features and Audit Metrics

Google Lighthouse has the option of running the Audit for Desktop as well as mobile version of your page(s). The top metrics that will be measured in the Audit are:

Performance: This score is an aggregation of how the page fared in aspects such as (but not limited to) loading speed, time taken for loading for basic frame(s), displaying meaningful content to the user, etc. To a layman, this score is indicative of how decently the site performs, with a score of 100 meaning that you figure in the 98th percentile, 50 meaning that you figure in the 75th percentile and so on.
PWA Score (Mobile): Thanks to the rise of Service Workers, app manifests, etc., a lot of modern web applications are moving towards the PWA paradigm, where the objective is to make the application behave as close as possible to native mobile applications. Scoring points are based on the Baseline PWA checklist laid down by

Google which includes Service Worker implementation(s), viewport handling, offline functionality, performance in script-disabled environments, etc.

Accessibility: As you might have guessed, this metric is a measure of how accessible your website is, across a plethora of accessibility features that can be implemented in your page (such as the 'aria-' attributes like aria-required, audio captions, button names, etc.). Unlike the other metrics though, Accessibility metrics score on a pass/fail basis i.e. if all possible elements of the page are not screen-reader friendly (HTML5 introduced features that would make pages easy to interpret for screen readers used by visually challenged people like tag names, tags such as <section>, <article>, etc.), you get a 0 on that score. The aggregate of these scores is your Accessibility metric score.

Best Practices: As any developer would know, there are a number of practices that have been deemed 'best' based on empirical data. This metric is an aggregation of many such points, including but not limited to:Use of HTTPSAvoiding the use of deprecated code elements like tags, directives, libraries, etc. Password input with paste-into disabled Geo-Location and cookie usage alerts on load, etc.

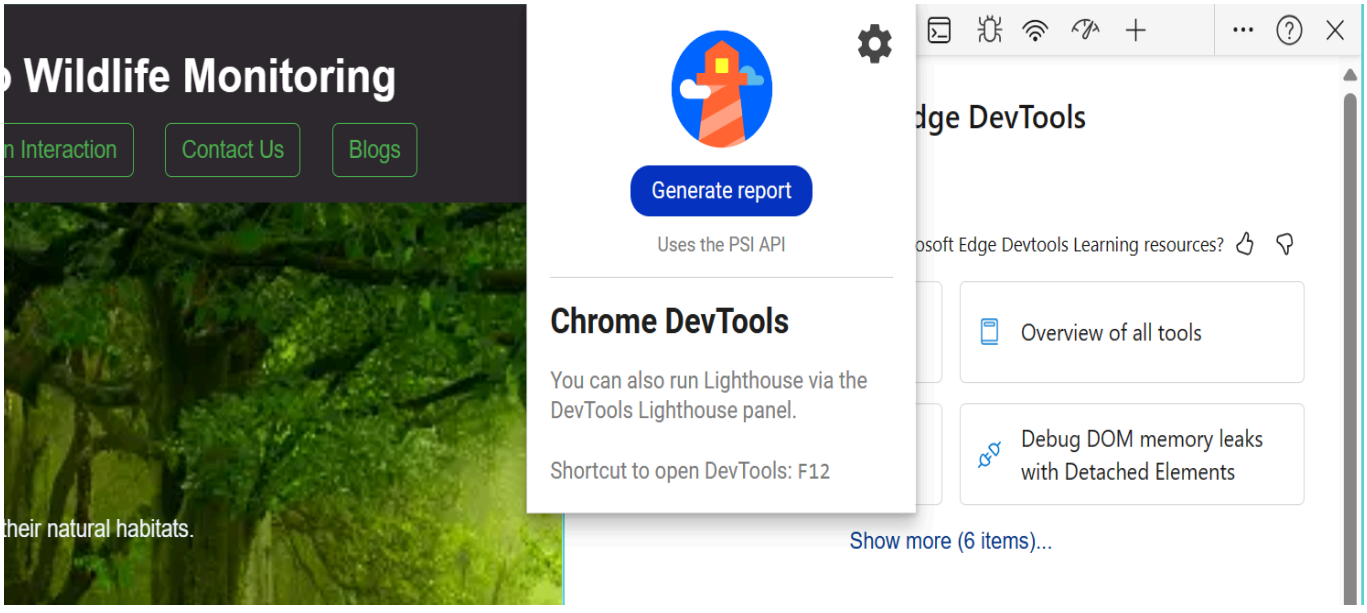
Manifest.json

```
{
  "name": "Wildlife Monitoring",
  "short_name": "Wildlife",
  "description": "Explore the diverse wildlife captured in their natural habitats.",
  "start_url": "/",
  "display": "standalone",
  "background_color": "#ffffff",
  "theme_color": "#4CAF50",
  "icons": [
    {
      "src": "/images/icon-192x192.png",
      "sizes": "192x192",
      "type": "image/png"
    },
    {
      "src": "/images/icon-512x512.png",
      "sizes": "512x512",
```

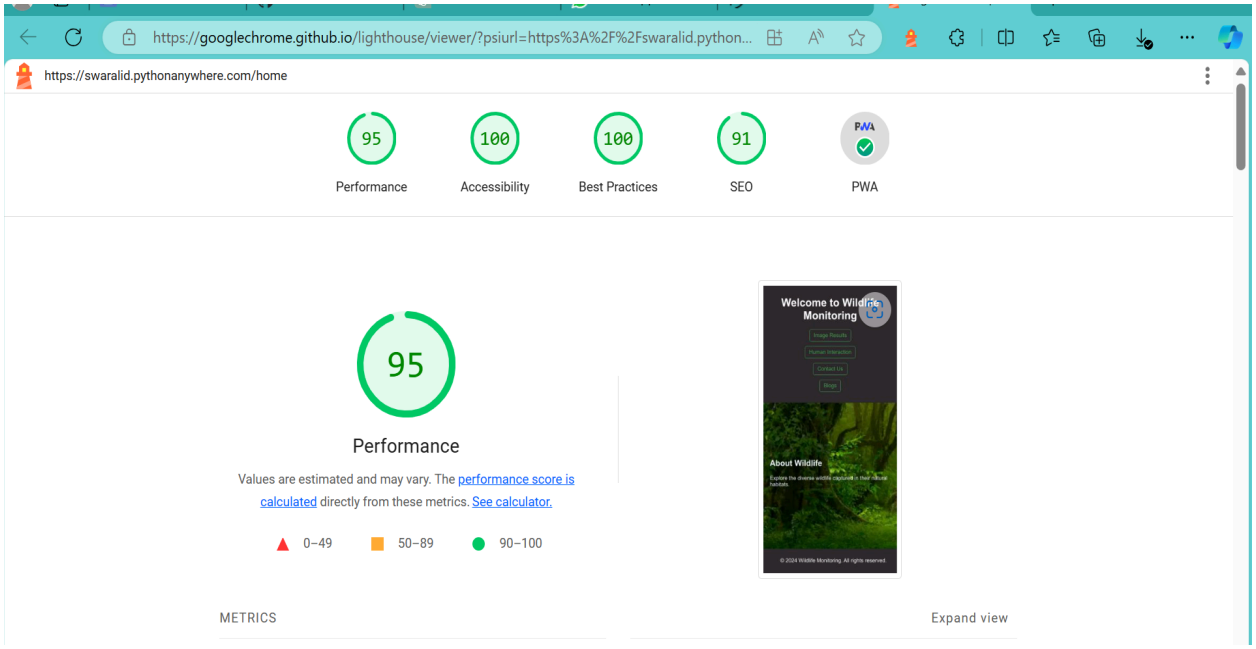
```
      "type": "image/png",
      "purpose": "any maskable"
    }
  ],
  "scope": "/",
  "categories": ["utilities"],
  "lang": "en",
  "dir": "auto",
  "related_applications": [],
  "prefer_related_applications": false,
  "screenshots": [],
  "shortcuts": [],
  "orientation": "portrait-primary",
  "serviceworker": {
    "src": "/service-worker.js",
    "scope": "/"
  }
}
```

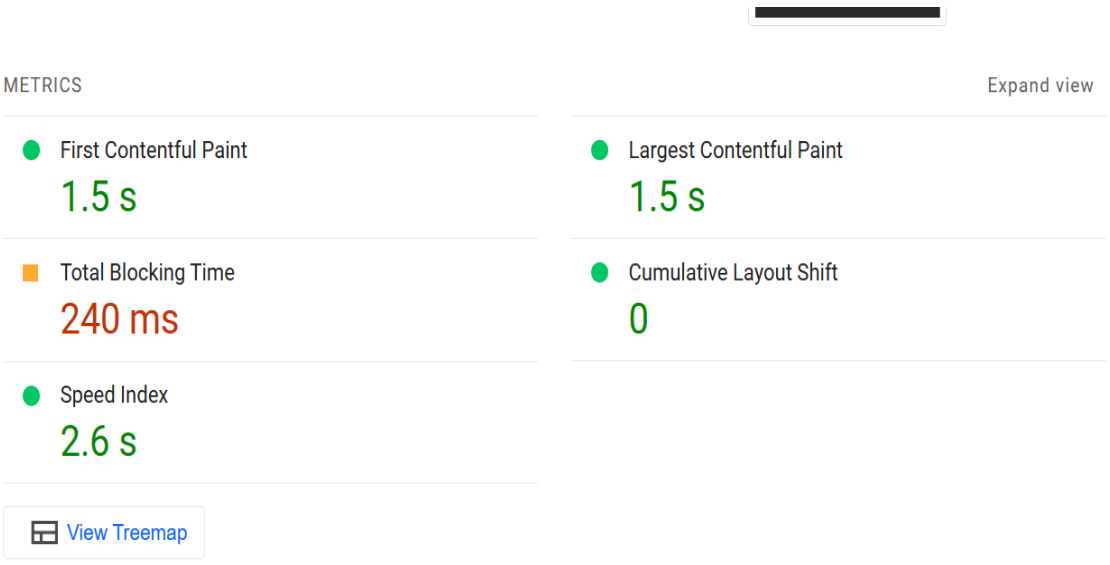
Implementation

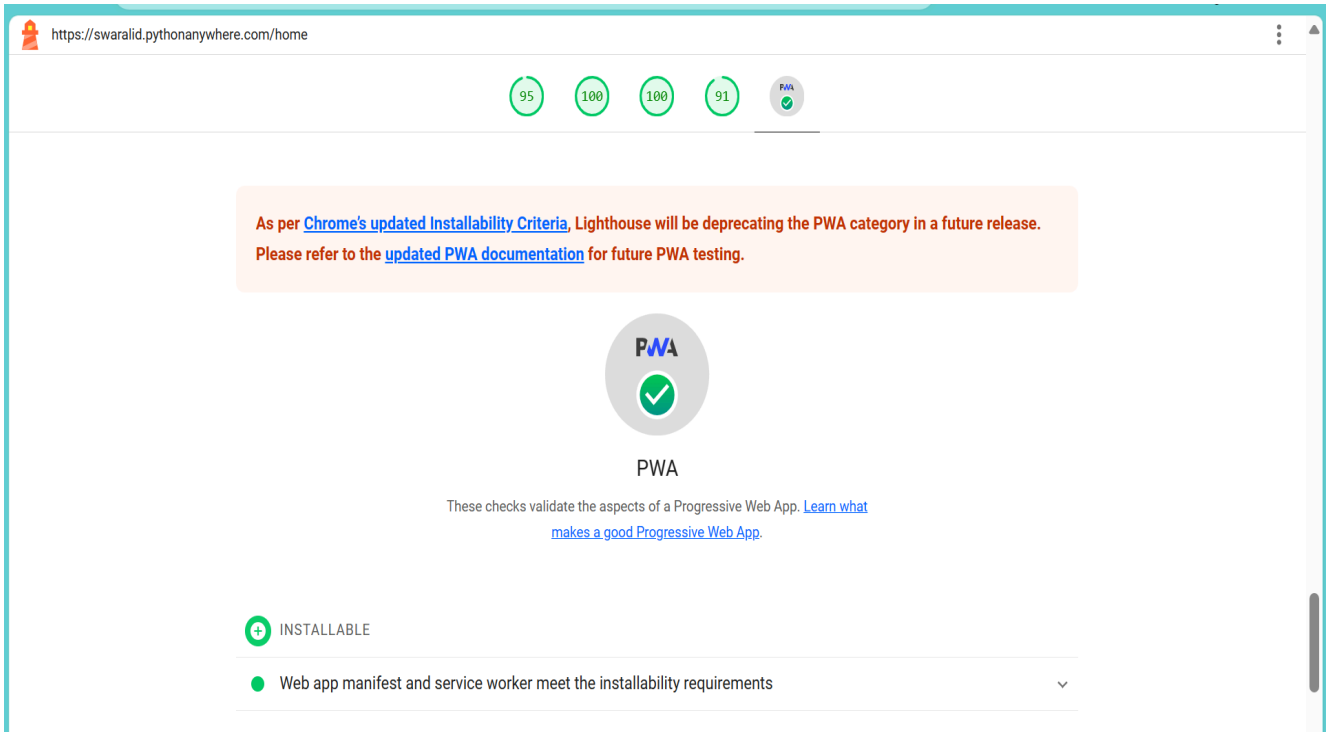
Added extension:-

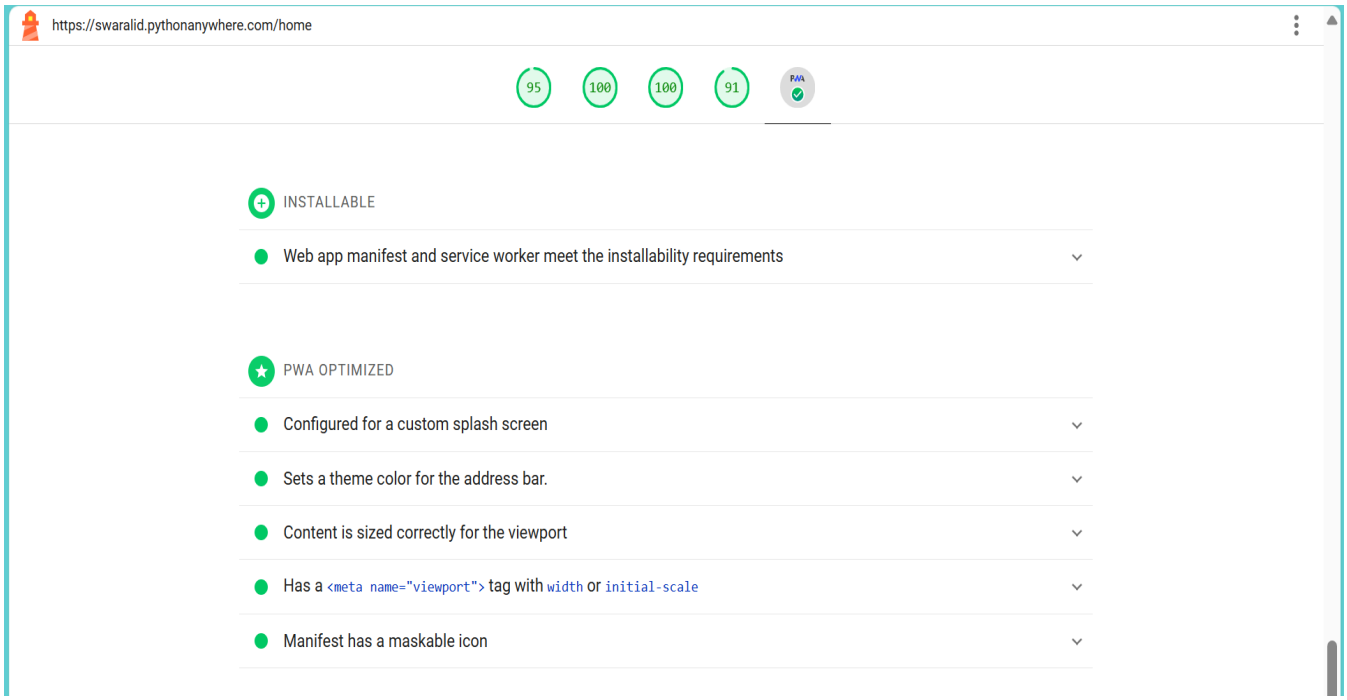


Report generated:-









Conclusion: Website has been completely configured for PWA optimization, as seen in above image.