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MPL Practical 05

To apply navigation, routing and gestures in Flutter App.

Theory:
1. Navigation & Routing
   - Flutter uses the Navigator widget for screen transitions.
   - Push (Navigator.push()) adds a new screen; Pop (Navigator.pop()) removes it.
   - Named routes simplify navigation by defining paths in MaterialApp.
2. Gestures
   - GestureDetector detects touch interactions like tap, swipe, and long press.
   - Common gestures:
     - Tap – Button clicks.
     - Swipe – Navigation.
     - Long Press – Extra options.

Implementation in Our Code
1. Navigation & Routing:
   - Defined named routes (/, /signup, /home, /project_details, /add_project).
   - Used Navigator.pushNamed() and Navigator.pushReplacementNamed() for transitions.
2. Gestures:
   - GestureDetector detects horizontal swipes to switch tabs.
   - Implemented onHorizontalDragEnd for navigation between sections.

Code:

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

void main() {
  runApp(const GreenFundConnect());
}

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

  @override
  Widget build(BuildContext context) {
    return MaterialApp(
      debugShowCheckedModeBanner: false,
      title: 'GreenFund Connect',
      theme: ThemeData(
        primarySwatch: Colors.green,
        primaryColor: const Color(0xFF2E7D32), // Dark green
        secondaryHeaderColor: const Color(0xFF81C784), // Light green
        fontFamily: GoogleFonts.poppins().fontFamily,
```

```dart
      textTheme: TextTheme(
        headlineLarge: GoogleFonts.montserrat(
          fontWeight: FontWeight.bold,
          color: const Color(0xFF2E7D32),
        ),
        titleLarge: GoogleFonts.poppins(
          fontWeight: FontWeight.w600,
          color: Colors.black87,
        ),
        bodyLarge: GoogleFonts.poppins(
          color: Colors.black87,
        ),
        bodyMedium: GoogleFonts.poppins(
          color: Colors.black87,
        ),
      ),
      elevatedButtonTheme: ElevatedButtonThemeData(
        style: ElevatedButton.styleFrom(
          backgroundColor: const Color(0xFF2E7D32),
          foregroundColor: Colors.white,
          shape: RoundedRectangleBorder(
            borderRadius: BorderRadius.circular(10),
          ),
          padding: const EdgeInsets.symmetric(horizontal: 20, vertical: 12),
        ),
      ),
    ),
    // Define named routes
    routes: {
      '/': (context) => const LoginScreen(),
      '/signup': (context) => const SignupScreen(),
      '/home': (context) => const HomeScreen(),
      '/project_details': (context) => const ProjectDetailsScreen(),
      '/add_project': (context) => const AddProjectScreen(),
    },
    // Initial route
    initialRoute: '/',
    );
  }
}

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

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

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

  final List<Widget> _screens = [
    const ProjectsScreen(),
    const MyInvestmentsScreen(),
    const ProfileScreen(),
  ];

  void _onItemTapped(int index) {
    setState(() {
      _selectedIndex = index;
    });
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Row(
          children: [
            Image.asset(
              'assets/images/logo.png',
              height: 32,
            ),
            const SizedBox(width: 12),
            Text(
              'GreenFund Connect',
              style: GoogleFonts.montserrat(
                fontWeight: FontWeight.bold,
                color: Colors.green,
              ),
            ),
          ],
        ),
        actions: [
          IconButton(
            icon: const Icon(Icons.notifications_outlined),
            onPressed: () {
              // Notifications action
```

```dart
          },
        ),
        IconButton(
          icon: const Icon(Icons.search),
          onPressed: () {
            // Search action
          },
        ),
      ],
    ),
    body: GestureDetector(
      onHorizontalDragEnd: (details) {
        if (details.primaryVelocity! < 0 && _selectedIndex < 2) {
          _onItemTapped(_selectedIndex + 1);
        } else if (details.primaryVelocity! > 0 && _selectedIndex > 0) {
          _onItemTapped(_selectedIndex - 1);
        }
      },
      child: _screens[_selectedIndex],
    ),
    floatingActionButton: FloatingActionButton(
      backgroundColor: Theme.of(context).primaryColor,
      onPressed: () {
        Navigator.pushNamed(context, '/add_project');
      },
      child: const Icon(Icons.add),
      tooltip: 'Add new project',
    ),
    bottomNavigationBar: BottomNavigationBar(
      currentIndex: _selectedIndex,
      onTap: _onItemTapped,
      selectedItemColor: Theme.of(context).primaryColor,
      unselectedItemColor: Colors.grey,
      items: const [
        BottomNavigationBarItem(
          icon: Icon(Icons.home_outlined),
          activeIcon: Icon(Icons.home),
          label: 'Projects',
        ),
        BottomNavigationBarItem(
          icon: Icon(Icons.account_balance_wallet_outlined),
          activeIcon: Icon(Icons.account_balance_wallet),
          label: 'My Investments',
        ),
```

```dart
      BottomNavigationBarItem(
        icon: Icon(Icons.person_outline),
        activeIcon: Icon(Icons.person),
        label: 'Profile',
      ),
    ],
  ),
 );
 }
}

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

 @override
 Widget build(BuildContext context) {
  return Column(
    crossAxisAlignment: CrossAxisAlignment.start,
    children: [
     Padding(
       padding: const EdgeInsets.fromLTRB(16, 16, 16, 8),
       child: Text(
        'Featured Projects',
        style: Theme.of(context).textTheme.titleLarge,
       ),
     ),
     SizedBox(
       height: 250,
       child: ListView(
        scrollDirection: Axis.horizontal,
        padding: const EdgeInsets.symmetric(horizontal: 16),
        children: [
          FeaturedProjectCard(
           title: 'Solar Village Initiative',
           location: 'Maharashtra, India',
           fundingPercentage: 75,
           imageAsset: 'assets/images/solar_village.png',
           onTap: () {
             Navigator.pushNamed(context, '/project_details');
           },
          ),
          FeaturedProjectCard(
           title: 'Wind Power Hub',
           location: 'Tamil Nadu, India',
```

```dart
              fundingPercentage: 45,
              imageAsset: 'assets/images/wind_power.png',
              onTap: () {
                Navigator.pushNamed(context, '/project_details');
              },
            ),
            FeaturedProjectCard(
              title: 'Community Hydro Plant',
              location: 'Himachal Pradesh, India',
              fundingPercentage: 60,
              imageAsset: 'assets/images/hydro_plant.png',
              onTap: () {
                Navigator.pushNamed(context, '/project_details');
              },
            ),
          ],
        ),
      ),
      Padding(
        padding: const EdgeInsets.fromLTRB(16, 24, 16, 8),
        child: Text(
          'All Projects',
          style: Theme.of(context).textTheme.titleLarge,
        ),
      ),
      Expanded(child: ProjectGrid()),
    ],
  );
}
}

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

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(title: const Text('Add New Project')),
      body: Padding(
        padding: const EdgeInsets.all(16.0),
        child: Column(
          children: [
            TextField(
              decoration: InputDecoration(
```

```
            labelText: 'Project Title',
            border: OutlineInputBorder(
              borderRadius: BorderRadius.circular(10),
            ),
          ),
        ),
        const SizedBox(height: 16),
        TextField(
          decoration: InputDecoration(
            labelText: 'Project Description',
            border: OutlineInputBorder(
              borderRadius: BorderRadius.circular(10),
            ),
          ),
          maxLines: 3,
        ),
        const SizedBox(height: 16),
        ElevatedButton(
          onPressed: () {
            // Add project logic
            Navigator.pop(context);
          },
          child: const Text('Submit Project'),
        ),
      ],
    ),
  ),
);
}
}

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

 @override
 Widget build(BuildContext context) {
  return Scaffold(
    appBar: AppBar(title: const Text('Project Details')),
    body: Center(
      child: Column(
        mainAxisAlignment: MainAxisAlignment.center,
        children: [
          const Text(
            'Details about the selected project',
```
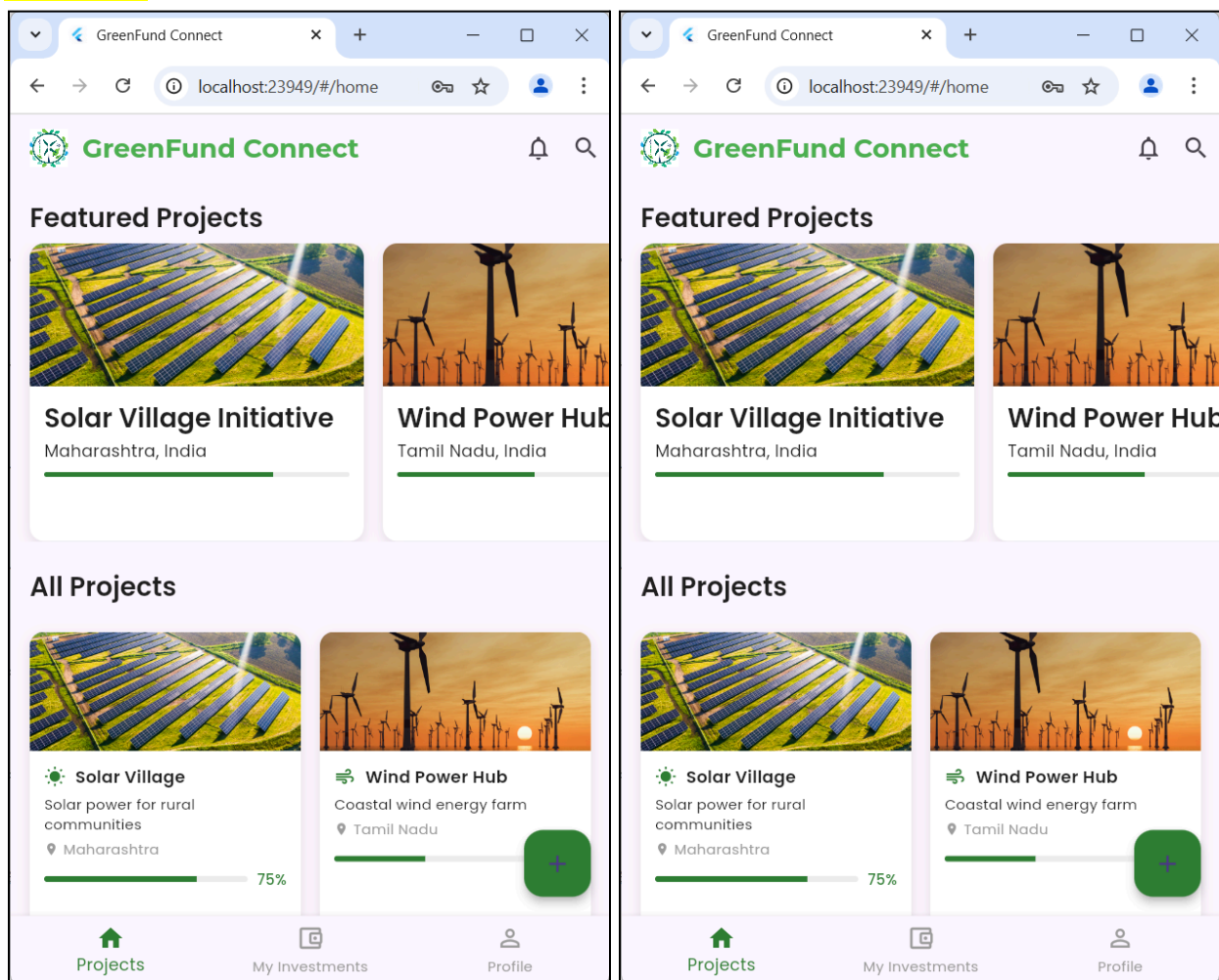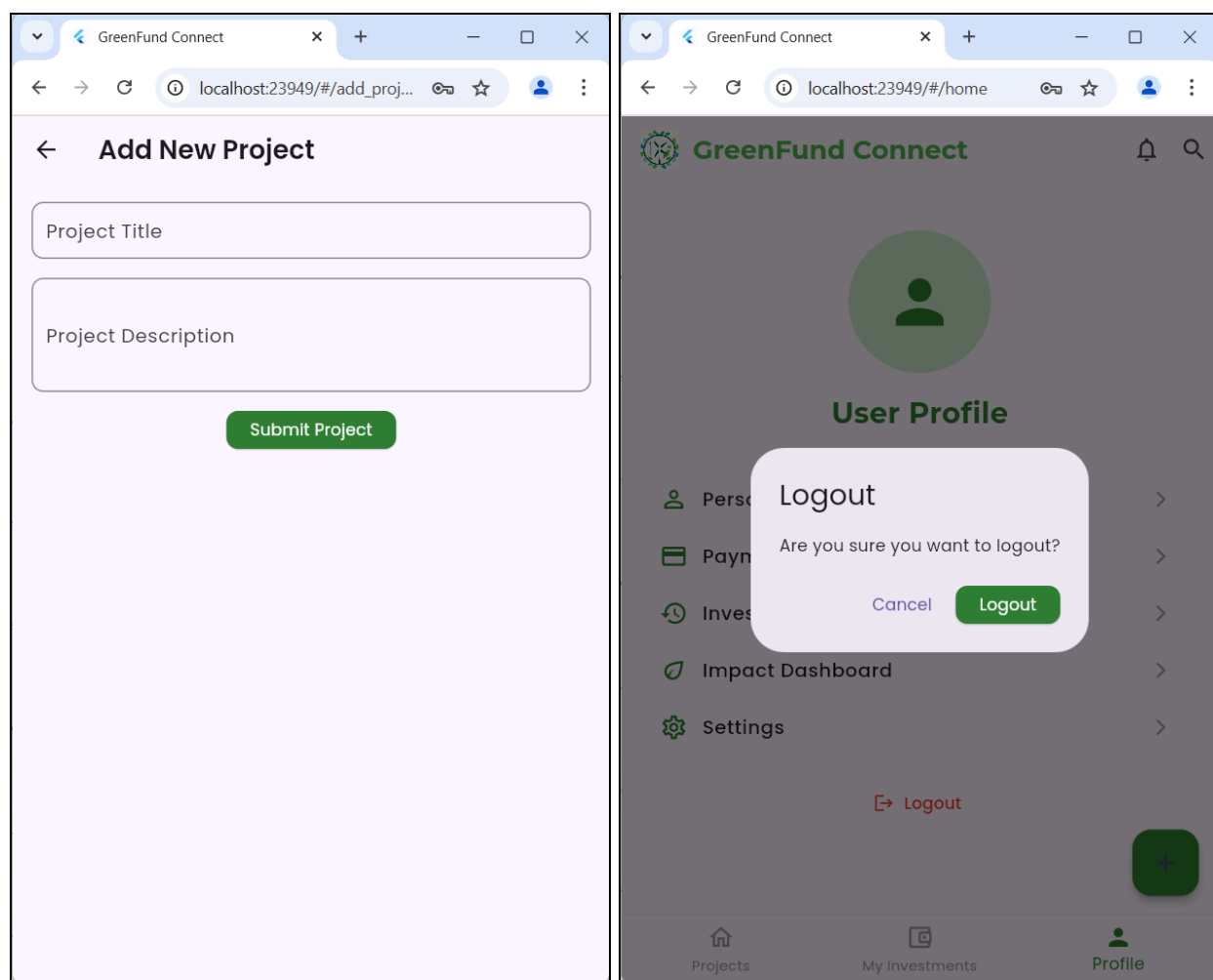
```
        style: TextStyle(fontSize: 18, fontWeight: FontWeight.bold),
      ),
      const SizedBox(height: 20),
      ElevatedButton(
        onPressed: () => Navigator.pop(context),
        child: const Text('Go Back'),
      ),
    ],
   ),
  ),
 );
 }
}
```

Screenshot:

Conclusion

In this experiment, we successfully implemented navigation, routing, and gesture handling in our Flutter app, enabling smooth screen transitions and interactive user interactions. Initially, we faced issues like incorrect route mapping and unresponsive gestures, which we resolved by properly defining named routes and debugging gesture detection using GestureDetector.