

AIM:

Learning Resources

- State Management in Flutter

Practical Task:

- Build a shopping cart app with product listings using ListView and GridView.
- Use setState to manage cart items dynamically.

Topics Covered:

- Stateful Widgets and State Management
- Navigation and Routing
- User Interaction with Lists

References:

<https://www.youtube.com/watch?v=XCmJagNPbi4>

https://pub.dev/packages/flutter_cart

<https://blog.logrocket.com/building-shopping-cart-flutter/>

THEORY:**State Management in Flutter**

State management is a crucial aspect of Flutter development, enabling dynamic user interfaces that respond to changes. In Flutter, the state is divided into:

1. **Ephemeral State (UI State):** Managed within a single widget using setState().
2. **App State (Global State):** Shared across multiple widgets using advanced solutions like Provider, Riverpod, or Bloc.

For this task, setState() is used to manage cart items dynamically. It allows immediate UI updates when users add or remove items from the cart.

Widgets Used in Shopping Cart App

1. **ListView & GridView:** Used to display product listings in a structured manner.
2. **Stateful Widgets:** Essential for managing dynamic data such as cart items.
3. **Navigation & Routing:** Helps users navigate between product listing and cart details.
4. **User Interaction:** Implementing buttons to add/remove items from the cart.

CODE:**main.dart**

```
import 'package:flutter/material.dart';
import 'package:provider/provider.dart';
import 'providers/cart_provider.dart';
import 'home_page.dart';
import 'cart_page.dart';
```

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

```
class MyApp extends StatelessWidget {
  const MyApp({super.key});
```

```
  @override
  Widget build(BuildContext context) {
```

```

return ChangeNotifierProvider(
  create: (_) => CartProvider(),
  child: Consumer<CartProvider>(
    builder: (context, cart, child) {
      return MaterialApp(
        title: 'ShopCart',
        debugShowCheckedModeBanner: false,
        home: const BottomNavBar(),
      );
    },
  ),
);
}
}

class BottomNavBar extends StatefulWidget {
  const BottomNavBar({super.key});

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

class _BottomNavBarState extends State<BottomNavBar> {
  int _selectedIndex = 0;
  static final List<Widget> _pages = [const HomePage(), const CartPage()];

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

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      body: _pages[_selectedIndex],
      bottomNavigationBar: BottomNavigationBar(
        currentIndex: _selectedIndex,
        onTap: _onItemTapped,
        items: const [
          BottomNavigationBarItem(icon: Icon(Icons.home), label: 'Home'),
          BottomNavigationBarItem(
            icon: Icon(Icons.shopping_cart), label: 'Cart'),
        ],
      ),
    );
  }
}

```

home_page.dart

```
import 'dart:convert';
import 'package:flutter/material.dart';
import 'package:http/http.dart' as http;
import 'product_detail.dart';
import 'models/product.dart';

class HomePage extends StatefulWidget {
  const HomePage({super.key});

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

class _HomePageState extends State<HomePage> {
  List<Product> _products = [];
  List<Product> _filteredProducts = [];
  bool _isLoading = true;

  @override
  void initState() {
    super.initState();
    fetchProducts();
  }

  Future<void> fetchProducts() async {
    final response =
      await http.get(Uri.parse('https://fakestoreapi.com/products'));
    if (response.statusCode == 200) {
      List<dynamic> data = json.decode(response.body);
      setState(() {
        _products = data.map((item) => Product.fromJson(item)).toList();
        _filteredProducts = _products;
        _isLoading = false;
      });
    }
  }

  void _filterProducts(String query) {
    setState(() {
      _filteredProducts = _products
        .where((p) => p.title.toLowerCase().contains(query.toLowerCase()))
        .toList();
    });
  }

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      backgroundColor: Colors.white, // Light Background
      appBar: AppBar(
        title: const Text(

```



```
itemBuilder: (context, index) {
    final product = _filteredProducts[index];
    return AnimatedContainer(
        duration: const Duration(milliseconds: 500),
        curve: Curves.easeInOut,
        margin: const EdgeInsets.symmetric(
            horizontal: 10, vertical: 5),
        decoration: BoxDecoration(
            color: Colors.white,
            borderRadius: BorderRadius.circular(12),
            boxShadow: [
                BoxShadow(
                    color: Colors.purple.withOpacity(0.2),
                    blurRadius: 5,
                    spreadRadius: 1,
                ),
            ],
        ),
        child: ListTile(
            leading: Hero(
                tag: "product_${product.id}",
                child: Image.network(
                    product.image,
                    width: 60,
                    height: 60,
                    fit: BoxFit.cover,
                ),
            ),
            title: Text(
                product.title,
                style: const TextStyle(
                    fontWeight: FontWeight.bold, fontSize: 16),
            ),
            subtitle: Text(
                "\$\${product.price}",
                style: const TextStyle(
                    color: Colors.deepPurple,
                    fontSize: 14,
                    fontWeight: FontWeight.bold),
            ),
            trailing: const Icon(Icons.arrow_forward_ios,
                color: Colors.purple),
            onTap: () => Navigator.push(
                context,
                MaterialPageRoute(
                    builder: (_) =>
                        ProductDetailPage(product: product),
                ),
            ),
        ),
    );
};
```

```

        },
        ),
        ],
        );
    }
}

```

product_detail.dart

```

import 'package:flutter/material.dart';
import 'package:provider/provider.dart';
import 'models/product.dart';
import 'providers/cart_provider.dart';

class ProductDetailPage extends StatelessWidget {
    final Product product;
    const ProductDetailPage({super.key, required this.product});

    @override
    Widget build(BuildContext context) {
        final cart = Provider.of<CartProvider>(context);

        return Scaffold(
            backgroundColor: const Color.fromARGB(255, 230, 243, 255),
            appBar: AppBar(
                title: Text(
                    product.title,
                    style: const TextStyle(fontSize: 18, fontWeight: FontWeight.bold),
                ),
                backgroundColor: const Color.fromARGB(255, 0, 174, 255),
            ),
            body: Padding(
                padding: const EdgeInsets.all(16.0),
                child: Column(
                    crossAxisAlignment: CrossAxisAlignment.center,
                    children: [
                        Hero(
                            tag: product.id, // Adds animation between pages
                            child: ClipRRect(
                                borderRadius: BorderRadius.circular(12),
                                child: Image.network(product.image, height: 250),
                            ),
                        ),
                        const SizedBox(height: 16),
                        Text(
                            product.title,
                            textAlign: TextAlign.center,
                            style: const TextStyle(

```

```
        fontSize: 22,
        fontWeight: FontWeight.bold,
        color: Colors.black),
    ),
    const SizedBox(height: 8),
    Text(
        "\$\{product.price}",
        style: const TextStyle(
            fontSize: 20,
            fontWeight: FontWeight.bold,
            color: Colors.green),
    ),
    const SizedBox(height: 12),
    Text(
        product.description,
        textAlign: TextAlign.center,
        style: const TextStyle(fontSize: 16, color: Colors.black87),
    ),
    const SizedBox(height: 20),
    ElevatedButton.icon(
        onPressed: () {
            cart.addToCart(product);
            ScaffoldMessenger.of(context).showSnackBar(
                SnackBar(
                    content: const Text("Item added to cart!"),
                    behavior: SnackBarBehavior.floating,
                    duration: const Duration(seconds: 2),
                    shape: RoundedRectangleBorder(
                        borderRadius: BorderRadius.circular(8),
                    ),
                    backgroundColor: Colors.green,
                ),
            );
        },
        icon: const Icon(Icons.shopping_cart),
        label: const Text("Add to Cart"),
        style: ElevatedButton.styleFrom(
            backgroundColor: Colors.blue,
            padding:
                const EdgeInsets.symmetric(horizontal: 20, vertical: 12),
            textStyle:
                const TextStyle(fontSize: 18, fontWeight: FontWeight.bold),
        ),
        ),
    ],
),
),
);
}
```

cart_page.dart

```
import 'package:flutter/material.dart';
import 'providers/cart_provider.dart';
import 'package:provider/provider.dart';

class CartPage extends StatelessWidget {
  const CartPage({super.key});

  @override
  Widget build(BuildContext context) {
    final cart = Provider.of<CartProvider>(context);

    return Scaffold(
      backgroundColor: Colors.white,
      appBar: AppBar(
        title: const Text(
          "My Cart",
          style: TextStyle(
            color: Colors.white,
            fontSize: 22,
            fontWeight: FontWeight.bold,
          ),
        ),
        backgroundColor: Colors.purple,
        centerTitle: true,
      ),
      body: cart.items.isEmpty
        ? const Center(
            child: Text(
              "Your cart is empty!",
              style: TextStyle(fontSize: 18, fontWeight: FontWeight.w600),
            ),
          )
        : Column(
            children: [
              Expanded(
                child: ListView.builder(
                  itemCount: cart.items.length,
                  itemBuilder: (context, index) {
                    final product = cart.items[index];

                    return Card(
                      margin: const EdgeInsets.symmetric(
                        horizontal: 10, vertical: 5),
                      shape: RoundedRectangleBorder(
                        borderRadius: BorderRadius.circular(12),
                      ),
                      elevation: 4,
                      child: ListTile(

```



```

        color: Colors.grey.shade100,
        child: Row(
            mainAxisAlignment: MainAxisAlignment.spaceBetween,
            children: [
                const Text(
                    "Total:",
                    style: TextStyle(
                        fontSize: 18,
                        fontWeight: FontWeight.bold,
                    ),
                ),
                AnimatedSwitcher(
                    duration: const Duration(milliseconds: 500),
                    transitionBuilder:
                        (Widget child, Animation<double> animation) {
                    return ScaleTransition(
                        scale: animation, child: child);
                },
                child: Text(
                    "\$\${cart.totalPrice.toStringAsFixed(2)}",
                    key: ValueKey<double>(cart.totalPrice),
                    style: const TextStyle(
                        fontSize: 18,
                        fontWeight: FontWeight.bold,
                        color: Colors.deepPurple,
                    ),
                ),
            ],
        ),
    ),
),

// "Buy Now" Button with Stylish Design
Padding(
    padding: const EdgeInsets.all(12.0),
    child: ElevatedButton(
        onPressed: cart.items.isEmpty ? null : () {},
        style: ElevatedButton.styleFrom(
            backgroundColor: Colors.deepPurple,
            padding: const EdgeInsets.symmetric(
                horizontal: 40, vertical: 12),
            shape: RoundedRectangleBorder(
                borderRadius: BorderRadius.circular(10),
            ),
            elevation: 5,
        ),
        child: const Text(
            "Buy Now",
            style: TextStyle(fontSize: 18, color: Colors.white),
        ),
    ),
),

```

```

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

models/product.dart

```

class Product {
    final int id;
    final String title;
    final double price;
    final String category;
    final String description;
    final String image;

    Product({
        required this.id,
        required this.title,
        required this.price,
        required this.category,
        required this.description,
        required this.image,
    });

    factory Product.fromJson(Map<String, dynamic> json) {
        return Product(
            id: json['id'],
            title: json['title'],
            price: (json['price'] as num).toDouble(),
            category: json['category'],
            description: json['description'],
            image: json['image'],
        );
    }
}
```

providers/cart_provider.dart

```

import 'package:flutter/material.dart';
import './models/product.dart';

class CartProvider with ChangeNotifier {
    final List<Product> _items = [];
    final Map<int, int> _quantities = { }; // Track product quantities

    List<Product> get items => _items;

    double get totalPrice {

```

```

return _items.fold(0,
    (total, product) => total + (product.price * _quantities[product.id]!));
}

void addToCart(Product product) {
    if (_quantities.containsKey(product.id)) {
        _quantities[product.id] = _quantities[product.id]! + 1;
    } else {
        _items.add(product);
        _quantities[product.id] = 1;
    }
    notifyListeners();
}

void decreaseQuantity(Product product) {
    if (_quantities.containsKey(product.id) && _quantities[product.id]! > 1) {
        _quantities[product.id] = _quantities[product.id]! - 1;
    } else {
        _items.remove(product);
        _quantities.remove(product.id);
    }
    notifyListeners();
}

int getQuantity(Product product) {
    return _quantities[product.id] ?? 0;
}

void removeFromCart(Product product) {
    _items.remove(product);
    _quantities.remove(product.id);
    notifyListeners();
}

```

theme.dart

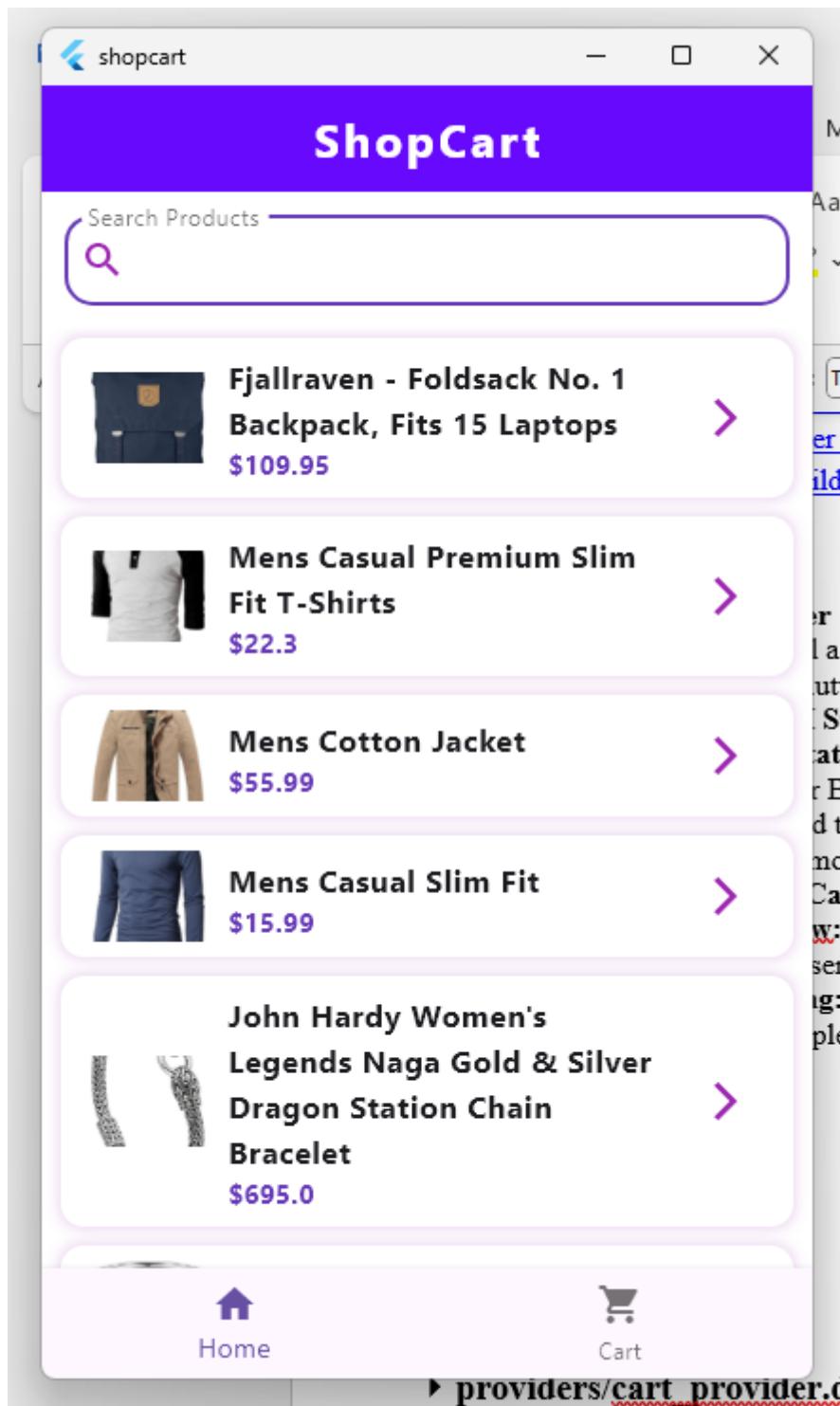
```

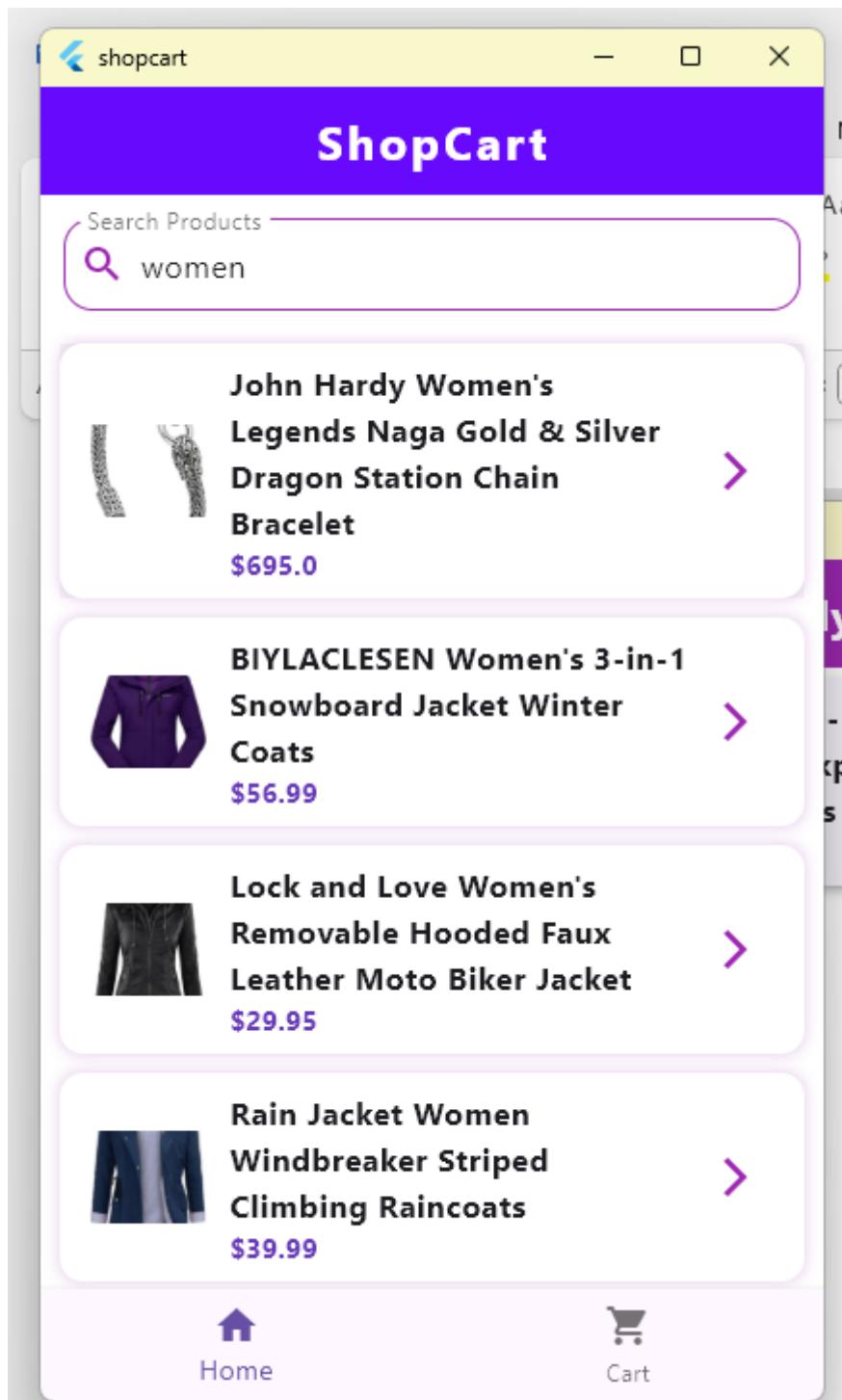
import 'package:flutter/material.dart';

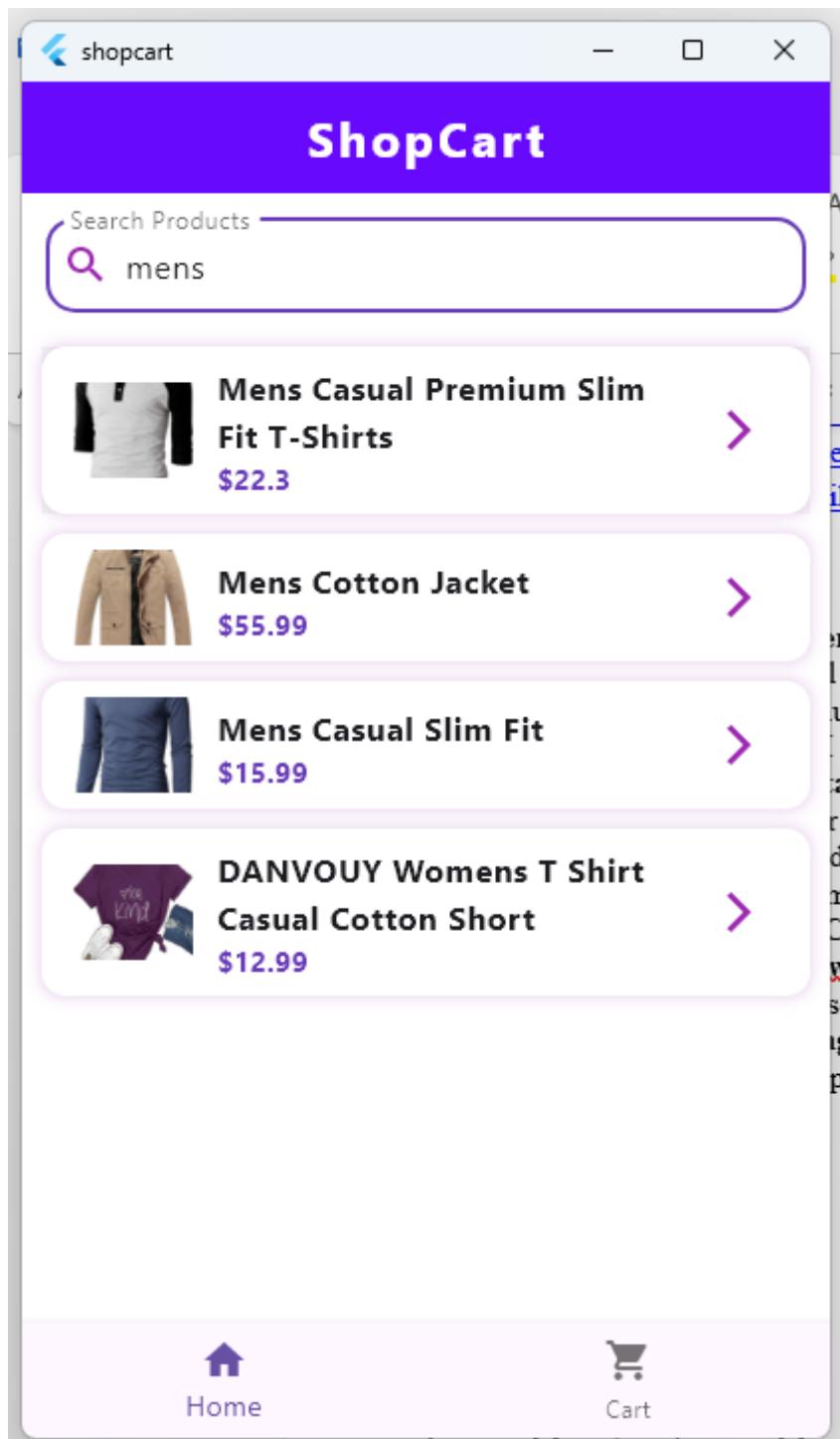
final darkTheme = ThemeData.dark().copyWith(primaryColor: Colors.blue);
final lightTheme = ThemeData.light();

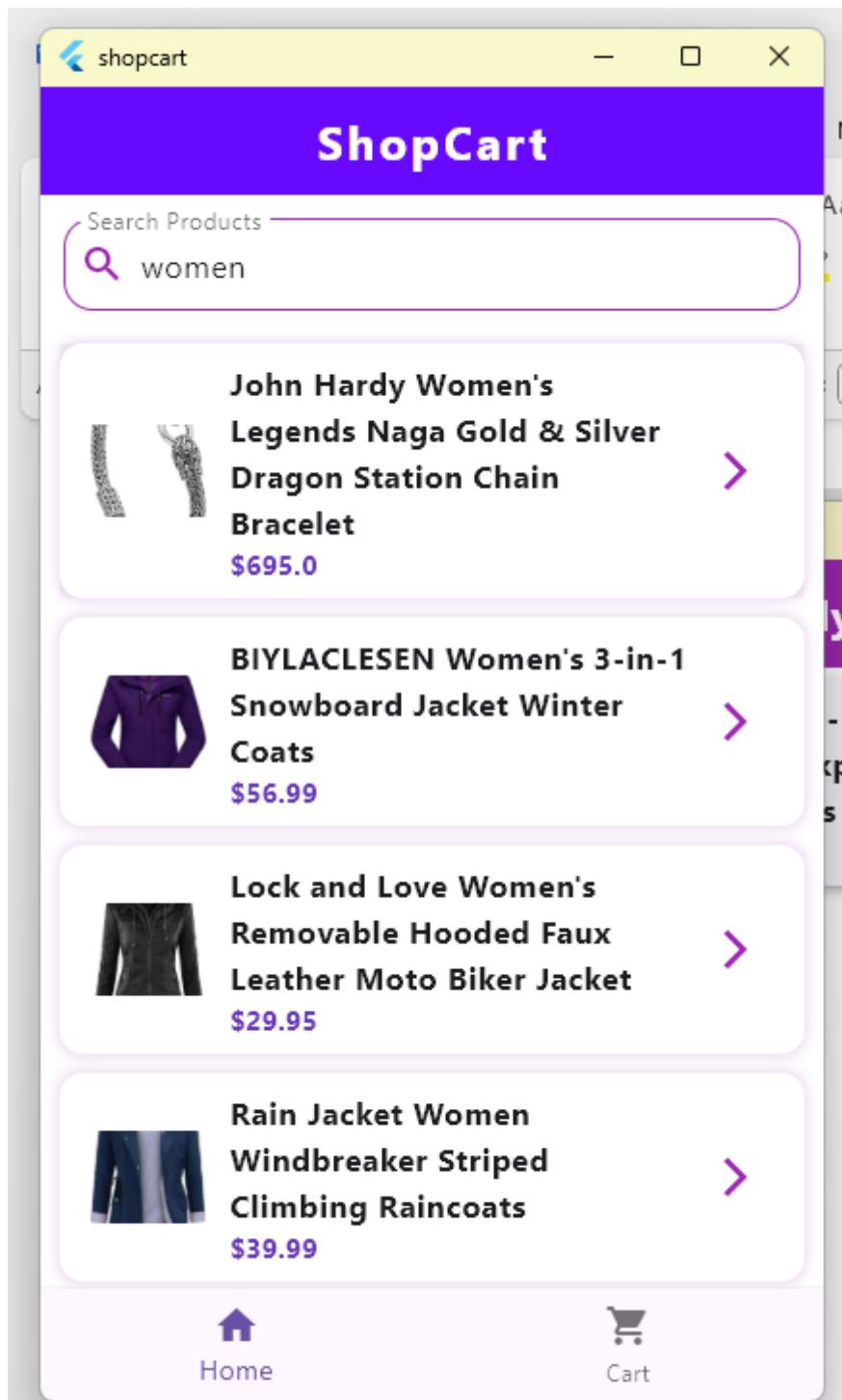
```

OUTPUT:

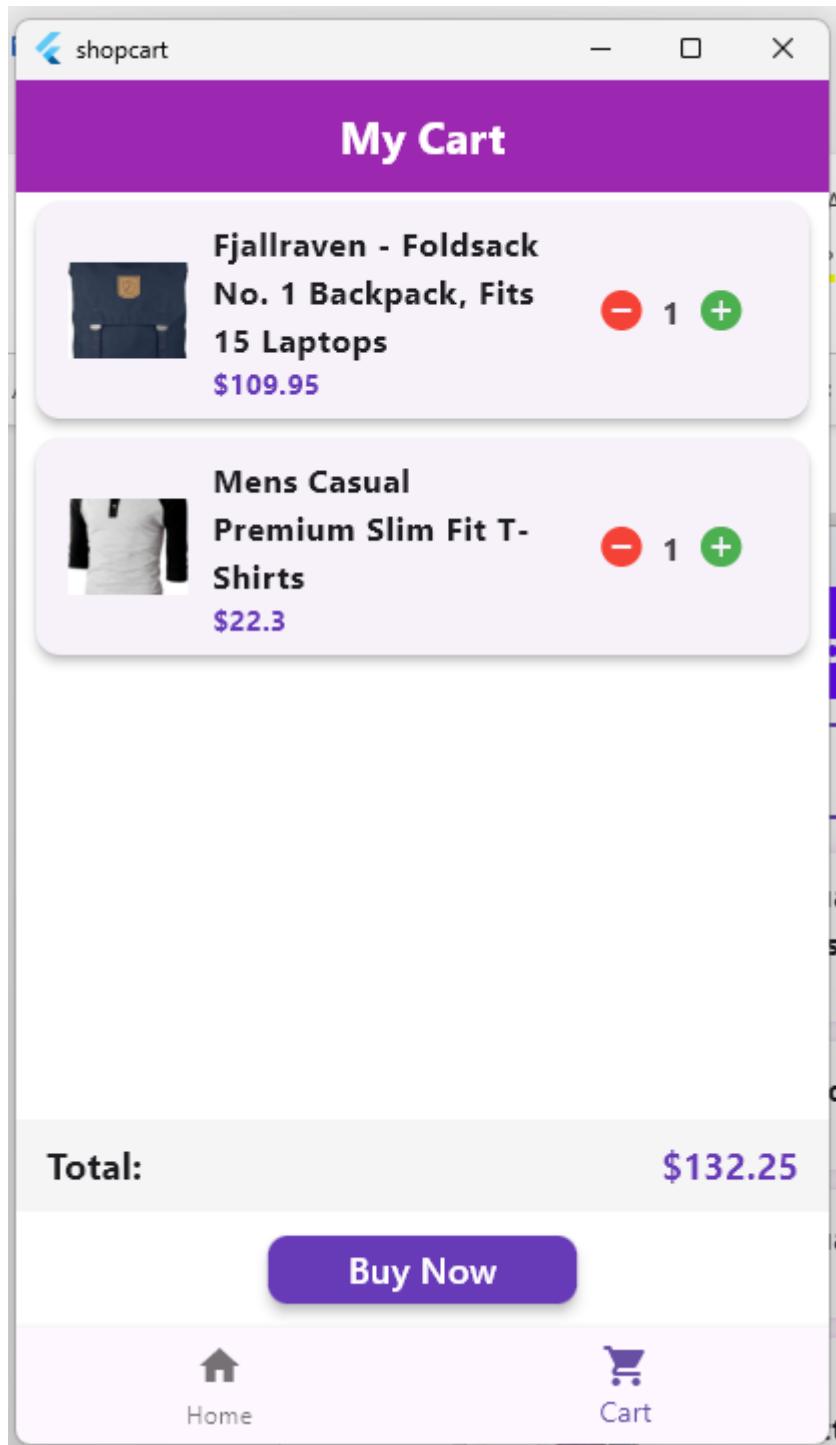


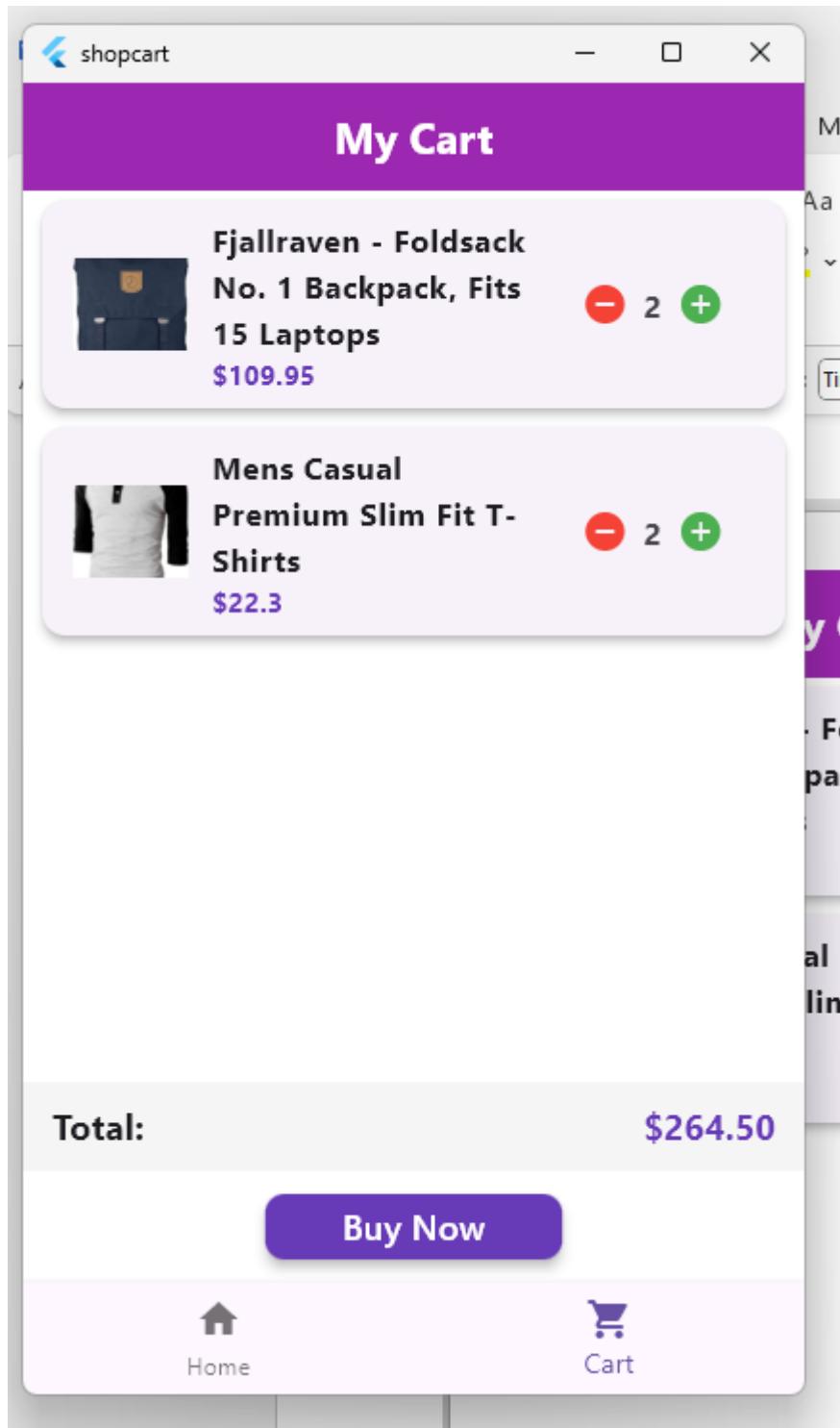


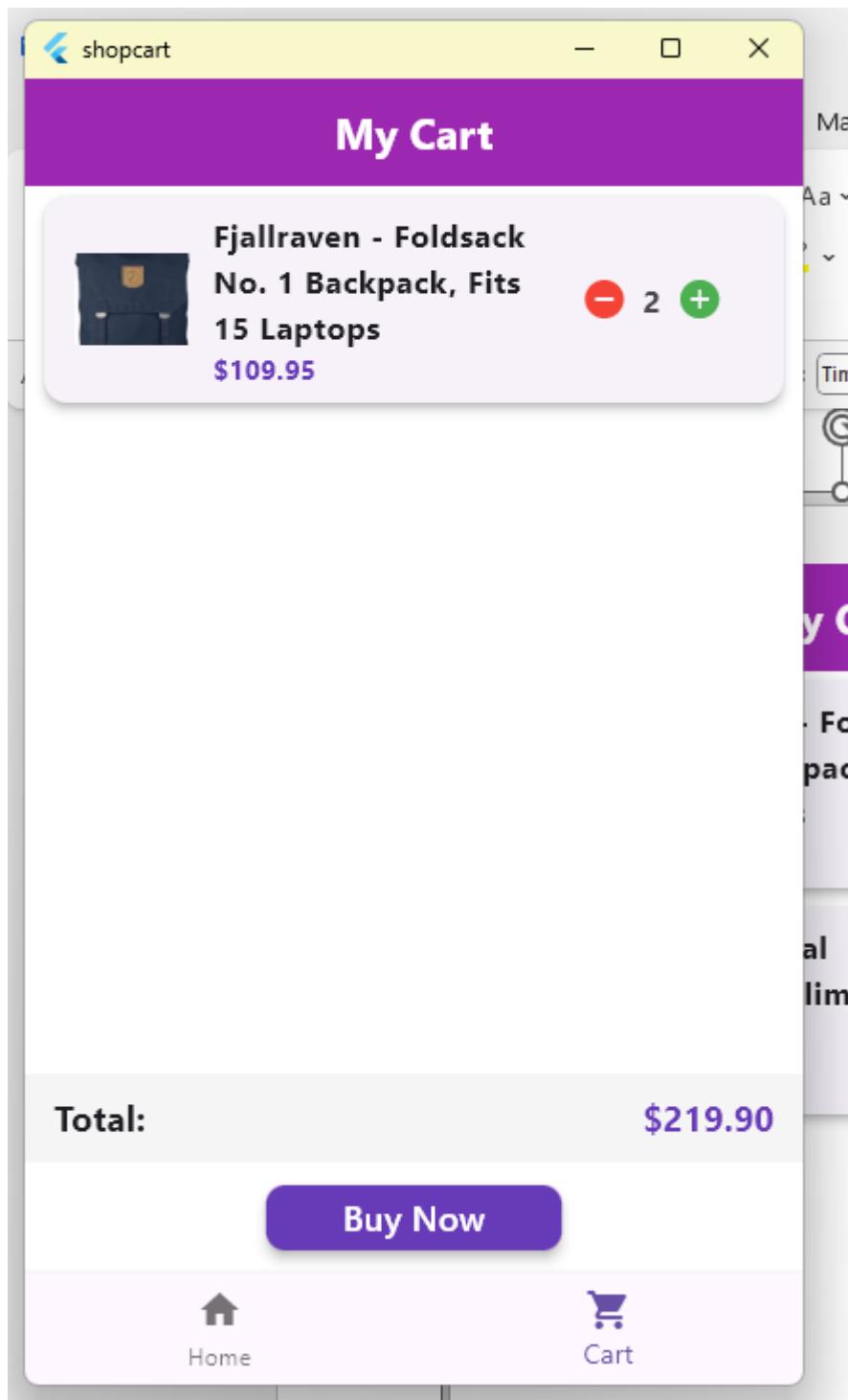




The screenshot shows a product page for a Fjallraven - Foldsack No. 1 Backpack. The backpack is dark blue with a tan logo patch. The price is \$109.95. A green button at the bottom says "Item added to cart!".







Latest Applications:

- ❖ **E-commerce Apps:** Shopping platforms like Amazon or Flipkart use similar cart functionality.
- ❖ **Food Ordering Apps:** Users add items to their cart before checkout, similar to Zomato or Swiggy.
- ❖ **Booking Systems:** Event or hotel booking apps require cart-like selection for multiple services.

❖ **Inventory Management:** Managing lists of products in a warehouse application.

Learning Outcomes:

After completing this task, students will be able to:

- ✓ Understand the concept of stateful widgets and state management in Flutter.
- ✓ Implement setState() to update UI dynamically.
- ✓ Use ListView and GridView to display product listings efficiently.
- ✓ Manage navigation between different screens using Flutter's Navigator.
- ✓ Handle user interactions such as adding/removing products from the cart.