CMPS 312 Mobile Application Development
Lab 6: State Management and List

Objective

In this lab, you will practice state management using StatefulWidget. Then you will work on displaying items in a scrollable list, and allow users to search, filter, and sort items. By the end of this lab, you will be able to:

- **Use basic state management** using a StatefulWidget to handle app state and update the UI based on user interactions.
- **Structure a Flutter project** by organizing folders and files for models, repositories, and UI components.
- **Read JSON data** from the assets folder to display it in the app.
- **Build interactive UI** with widgets such as ListView, Dropdown, Scaffold, AppBar , Card, and TextField.
- **Implement list search, filter , and sort**.

Overview

This lab consists of two parts:

1. **Part A – TipBuddy**: Last week, you designed the layout for the Tip Calculator App using basic Flutter widgets. This week, you will add state management to handle user inputs and calculate tips dynamically based on user-entered values.
2. **Part B - Stadiums App**: Build a Stadiums App from scratch. You will use the Riverpod package to manage the app state and implement displaying a list of stadiums, searching by name or city, filtering by status, and sorting based on different criteria.

Part A – TipBuddy

In this part of the lab, you will build on the Tip Calculator App you designed last week. You will add and manage state variables to compute the tip amount based on user inputs. This will help you understand how to use state in your app and update the UI when the state changes.

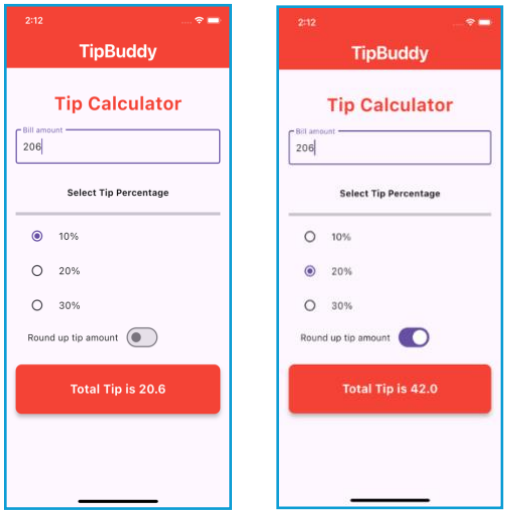


Figure 1 TipBuddy App

PART B – Stadium App

In this part of the lab, you will build a new Flutter application called StadiumsApp that displays a list of stadiums with interactive features such as searching, filtering, and sorting. You will implement state management using the Riverpod package to manage the app state (i.e, stadium data) and keep the UI in sync with the app state.

1. Create a new Flutter project named `StadiumsApp`.
2. Create an assets/data folder in your project directory and add the provided **`stadiums.json`** file.
3. Copy the provided images folder and paste it inside the assets folder

4. Update the `pubspec.yaml` file to include the assets directory so that the JSON file and the images can be accessed within the app.

```
assets:
  - assets/images/
  - assets/data/stadiums.json
```

5. Create a `Stadium` class inside a `model` folder.
    - Define fields that match the properties in the JSON file (e.g., *name, city, status, seatingCapacity, imageName*).
    - Implement a constructor and a `fromJson` method to convert JSON objects into `Stadium` instances.
6. Create a **`StadiumRepo`** class inside a repo folder. This class will handle loading and filtering stadium data from the `stadiums.json` file. Implement the following methods:
    - `getStadiums()` that reads the stadium data from the JSON file and converts it into a list of Stadium objects.
    - `filterStadiums(String query)` method to filter the list of stadiums based on the name, city, or status using the where method.

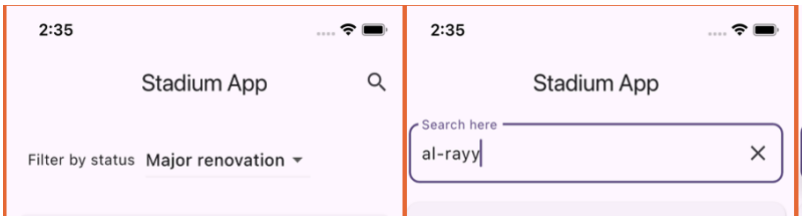
```dart
Future<List<Stadium>> getStadiums() async {
  // load json from assets

  var jsonString = await rootBundle.loadString('assets/data/stadiums.json');
  var jsonData = jsonDecode(jsonString);
  for (var item in jsonData) {
    stadiums.add(Stadium.fromJson(item));
  }
  return stadiums;
}
```

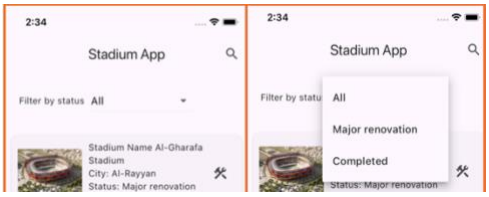
7. Create `stadium_screen.dart` and add to it a scaffold widget with an App Bar and a body as shown in figure 2.
8. In the body create a column that has a **ListView**: Use a `ListView.builder` to display the list of stadiums. Each stadium should be displayed inside a `Card` widget with the following details:
    - Stadium name

- City
- Status
- Seating capacity
- Stadium image (use placeholder images if needed)

9. Create **AppBar**: Add a search icon to the AppBar. When the user taps the icon, display a `TextField` for the search functionality. This textfield should be inside the body.
10. **Search Bar**: Implement a `TextField` widget that captures user input and filters the list of stadiums in real-time based on the entered name or city. The search bar should be inside the column in the body and should only be displayed when the user clicks on the search icon. Also add a dismiss X icon that hides the search text field.



11. **Filter dropdown**: Add a DropdownMenu widget to filter stadiums based on their status. The available options should include "All", "Completed", and "Under Renovation".



The complete app is shown below in figure 2.

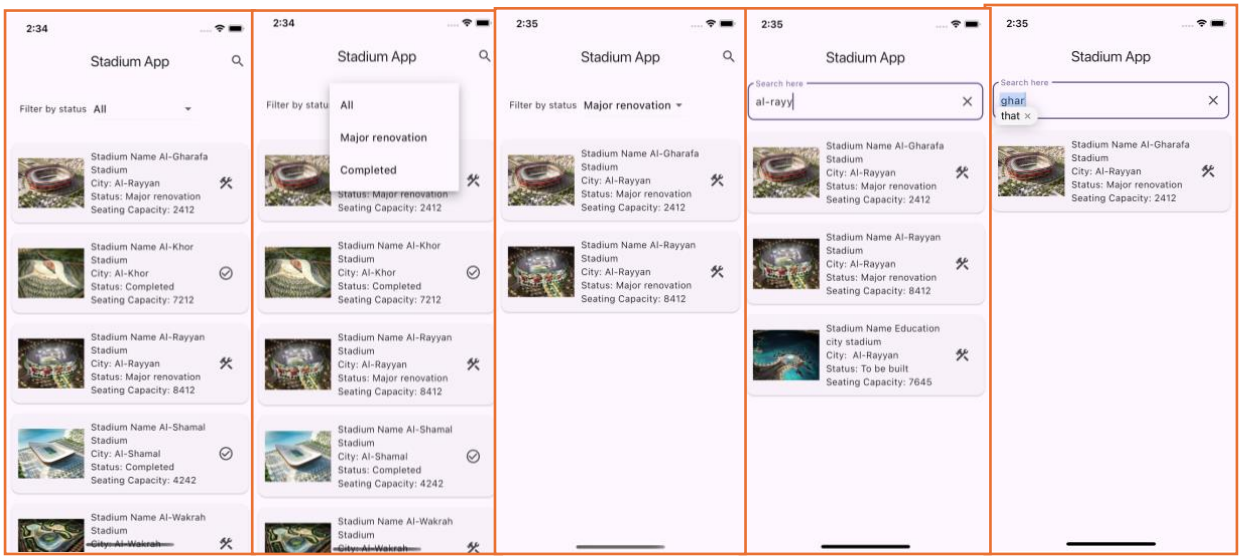


Figure 2 Stadium App Design and Features