UNIVERSITY OF PADOVA
DEPARTMENT OF INFORMATION ENGINEERING

Biomedical Wearable Technologies
for Healthcare and Wellbeing

Persistence – Part 1

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Giacomo Cappon

Outline

- **Recap**
- Persist key-value data
- shared_preferences
- Counter app with persistence

- Exercise
- Homework
- Resources

Recap

Lesson 1
Collaborate and version code ✓

Lesson 2/3
Get familiar with Dart ✓

Lesson 4
Understand Flutter’s principles ✓

Lesson 5
Create a layout ✓

Lesson 6
Navigate between screens ✓

Lesson 7
Manage the app state ✓

Milestone #1

Lesson 8
Make simple API calls ✓

Lesson 9
Fetch wearable data ✓

Milestone #2

Lesson 10
Implement user authentication

Lesson 11
Persist user data

Lesson 12
Advanced stuff

Milestone #3

Do something with your fantasy

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Persist key-value data

- Today we will start to understand how to implement persistence: as such, it will be possible to "save" things on the disk and "resume" the state of the application when it is restarted

- The simplest type of persistence (and commonly used by many applications)? Storing primitive (`String, bool, int, float, List<String>`) key-value data. Some examples:
  - `“id” : 3`
  - `“user” : ”mario”`
  - `“isAdmin” : false`
  - …

key : value

Persist key-value data

- Some use cases of key-value data persistence:
  - Remember the preferences of a certain user
    - App theme
    - App “general” parameters
  - Restore previous session status
    - Was the user logged in during the last session?
    - Decide which screen to visualize when the app restarts

key : value

- How to implement key-value data persistence
  - Fortunately, in Flutter implementing this functionality is very easy thanks to the shared_preferences package
    - https://pub.dev/packages/shared_preferences

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shared_preferences

- shared_preferences encloses a singleton of class SharedPreferences that can be accessed via the `getInstance()` asynchronous static method:

```
final sp = await SharedPreferences.getInstance();
```

- What is a “**singleton**”?
  - Singleton is a design pattern (1 of the 23) of object-oriented programming that guarantees that for a given class, only one instance of that class can be created.
  - This means that only one instance of the `SharedPreferences` will be present in our app. So, in practice, the `getInstance()` method will return always the same object.

shared_preferences – write

- Here's the methods of shared_preferences to **write** data:

```
// Save an integer value to 'counter' key.
await sp.setInt('counter', 10);
// Save an boolean value to 'repeat' key.
await sp.setBool('repeat', true);
// Save an double value to 'decimal' key.
await sp.setDouble('decimal', 1.5);
// Save an String value to 'action' key.
await sp.setString('action', 'Start');
// Save an list of strings to 'items' key.
await sp.setStringList('items', <String>['Earth', 'Moon',
'Sun']);
```

shared_preferences – read

- Here's the methods of shared_preferences to **read** data:

```
// Try reading data from the 'counter' key. If it doesn't exist,
returns null.
final int? counter = sp.getInt('counter');
// Try reading data from the 'repeat' key. If it doesn't exist,
returns null.
final bool? repeat = sp.getBool('repeat');
// Try reading data from the 'decimal' key. If it doesn't exist,
returns null.
final double? decimal = sp.getDouble('decimal');
// Try reading data from the 'action' key. If it doesn't exist,
returns null.
final String? action = sp.getString('action');
// Try reading data from the 'items' key. If it doesn't exist,
returns null.
final List<String>? items = sp.getStringList('items');
```

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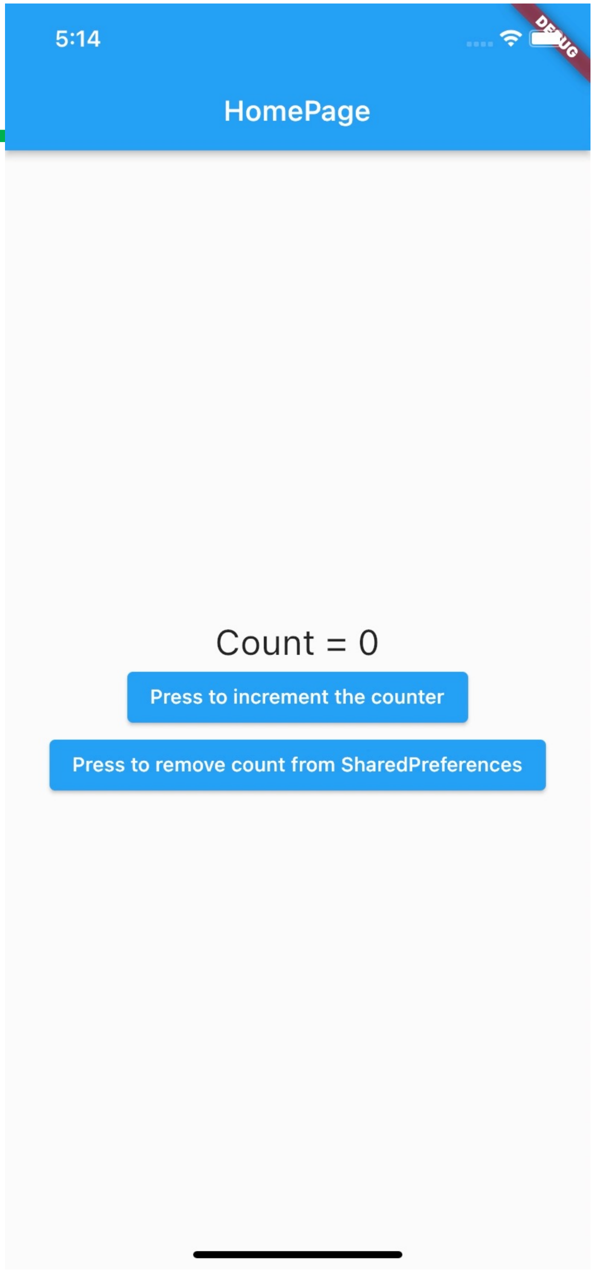
Counter app with persistence

- As a case of study, today we will implement a simple app called "pairs" that persists an integer to offer the following functionalities:
  - If a user tap a button, an integer counter (starting from 0) is incremented by 1 and the result is displayed by a `Text` widget. The new value of the counter is then persisted using shared_preferences
  - If the user restarts the app, the app "resumes" the value of the counter by loading it from the disk
  - If another button is tapped, the integer is removed from SharedPreferences. So, if the app is restarted, the counter will start back from 0.

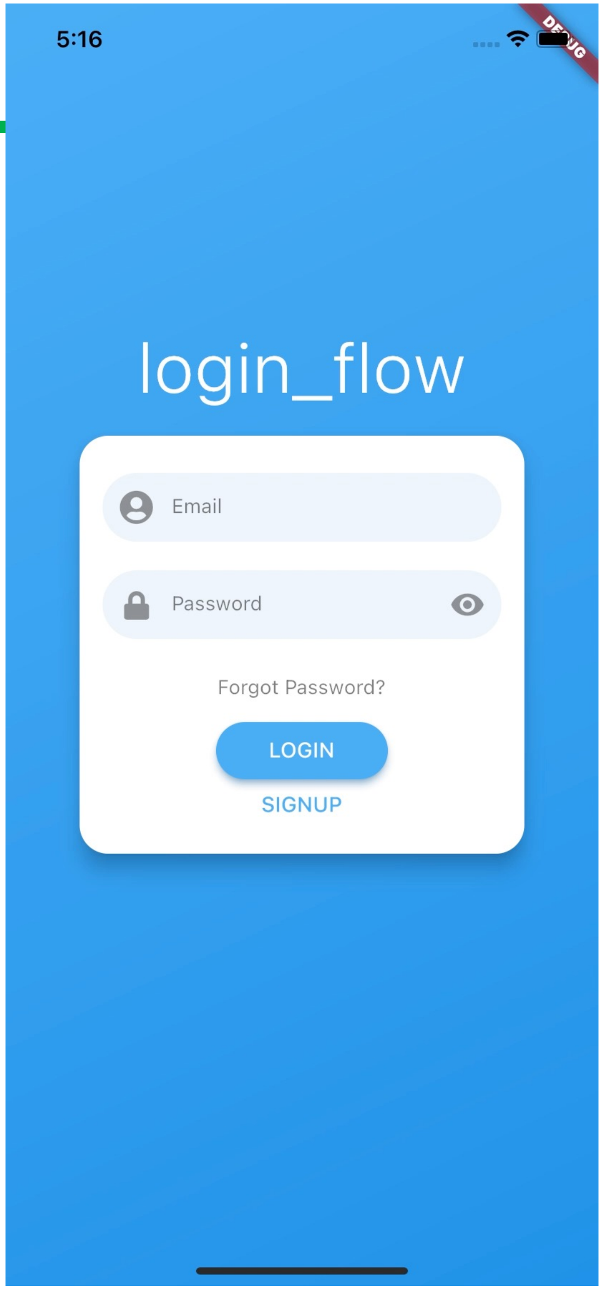

5:14
DEBUG
HomePage
Count = 0
Press to increment the counter
Press to remove count from SharedPreferences

Full example in lab_10-persistence_part_1/pairs/

Outline

Exercise

- Exercise 10.01 (easy-medium)
  - Start from the code of Exercise 06.02 (the login_flow app)
  - Right now, every time you restart the app, the LoginPage is showed to user
  - Use the shared_preferences package to change this behaviour and let the app "remember" the last user session. As such:
    - If a user opens the app for the first time, the LoginPage route is showed;
    - If the user logs in, the HomePage is showed;
    - If a user restarts the app and he/she did not log out in the last session, the HomePage is showed;
    - If a user restarts the app and he/she logged out in the last session, the LoginPage is showed.



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Homework

- Get familiar with shared_preferences

- Take look to a safer alternative: flutter_secure_storage
  - https://pub.dev/packages/flutter_secure_storage

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Resources

- shared_preferences package
  - https://pub.dev/packages/shared_preferences

- Flutter community cookbook on SharedPreferences
  - https://docs.flutter.dev/cookbook/persistence/key-value