National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

DEPARTMENT OF COMPUTING

CS-415: Mobile Application Development

Class: BSCS12-ABC / BESE12-A

Lab 10: Asynchronous programming with offline strategies

CLO-2: Design data-driven Mobile Interfaces using advanced design and development techniques

CLO-4: Display proficiency using modern tools and framework usage by developing interactive mobile applications

Date: 15th Apr 2025

Time: 14:00 - 16:50

Lab Instructor: Mr. Moeed Ahmed

Class Instructor: Mr. Muneeb Ahmad Anwar

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Lab 10: Asynchronous programming with offline strategies (Hive)

Introduction

This lab will get students familiar with asynchronous programming and handling API responses received from server in JSON format. Storing, retrieving and modifying data using offline storage database Hive.

Objectives

In this lab you will practice:

- Asynchronous programming using a future
- Handling API responses received from server
- Use of Hive database *(A lightweight and buzzing-fast key-value database made for Flutter and Dart)*

Tools/Software Requirements

- Android Studio Ladybug Feature Drop | 2024.2.2
- Android Emulator (35.3.11) Stable *(Optional, depends on system's requirement)*
- Visual Studio Code (1.97.2 - Latest)
- Flutter Windows Android SDK 3.29.0 (stable)
- Flutter Lab Online

Description

Future:

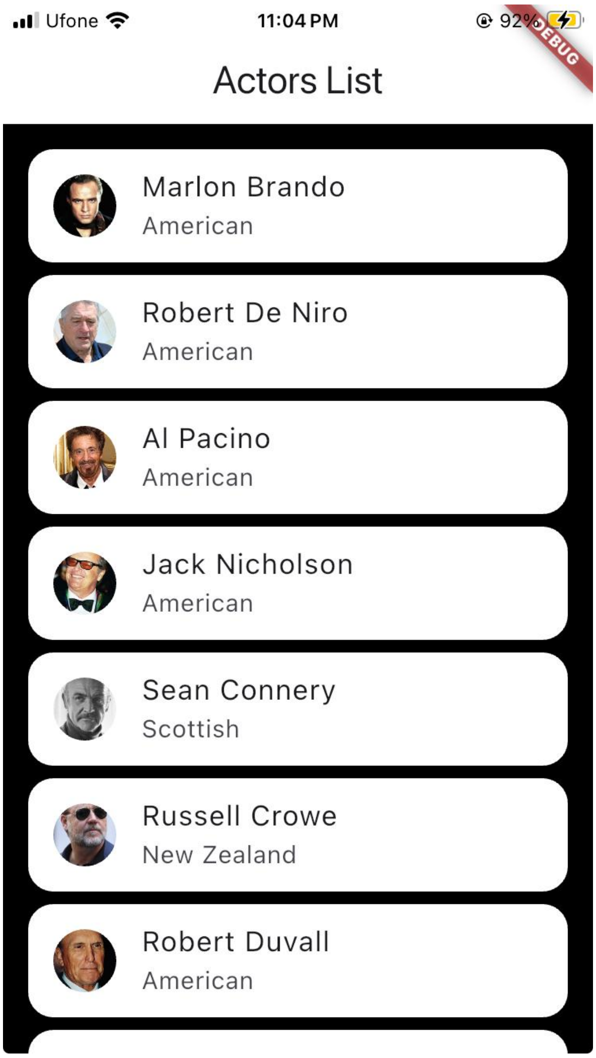
A Future addresses a computation that doesn't finish right away. Though a typical function returns the outcome, an asynchronous function returns a Future, which will ultimately contain the outcome. The Future will reveal to you when the outcome is prepared.

So, a Future can be in one of three states:

- **Uncompleted:** You called a Future, but the response isn't available yet
- **Completed with value:** The output is open, and data is ready (The then () function is called)
- **Completed with an error:** The output is open, but something went wrong (The catch Error () function is called)

Lab Task-1:

1. Make a network request using the **http** package and call the API
   - Install the Postman or add Rest let Client chrome extension to test the above
   - Check the response of above API by using postman or Rest let Client
2. Write your model class to store the contents of the JSON file
3. Write code to receive and parse response from the APIs in a JSON format
4. You should also write code for initializing your model classes from JSON object(s)
5. Create a List view widget to display the data that you get in API response (as shownbelow)
6. Show **name** and **nationality** and **image** from json response
7. Clicking a tile from list view should take user to the actor details screen, where all user info should be displayed



Actors List

Marlon Brando
American

Robert De Niro
American

Al Pacino
American

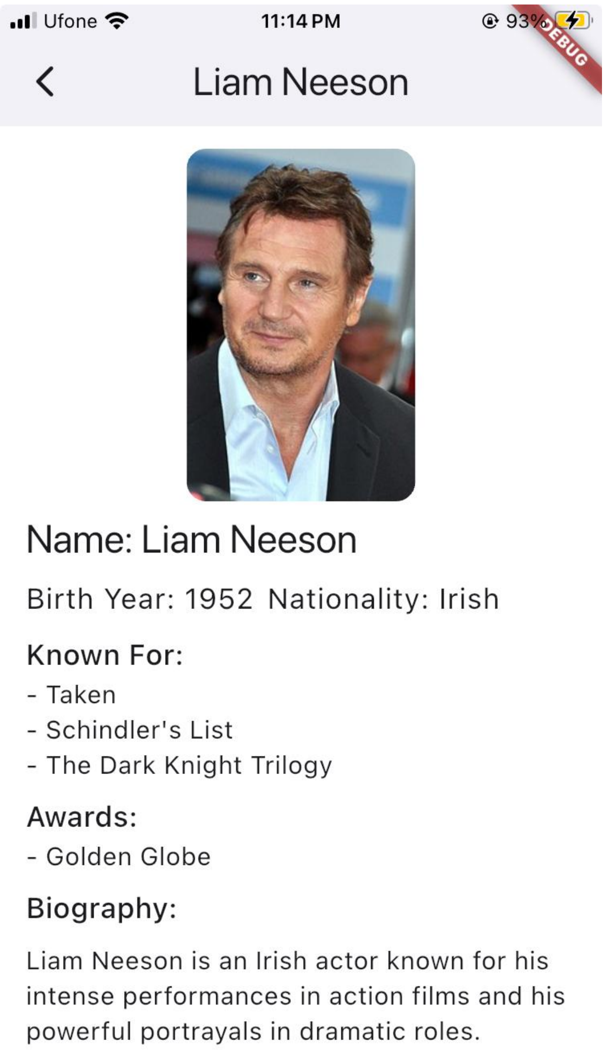
Jack Nicholson
American

Sean Connery
Scottish

Russell Crowe
New Zealand

Robert Duvall
American

ListView containing actors data from API



Liam Neeson

Name: Liam Neeson

Birth Year: 1952 Nationality: Irish

Known For:
- Taken
- Schindler's List
- The Dark Knight Trilogy

Awards:
- Golden Globe

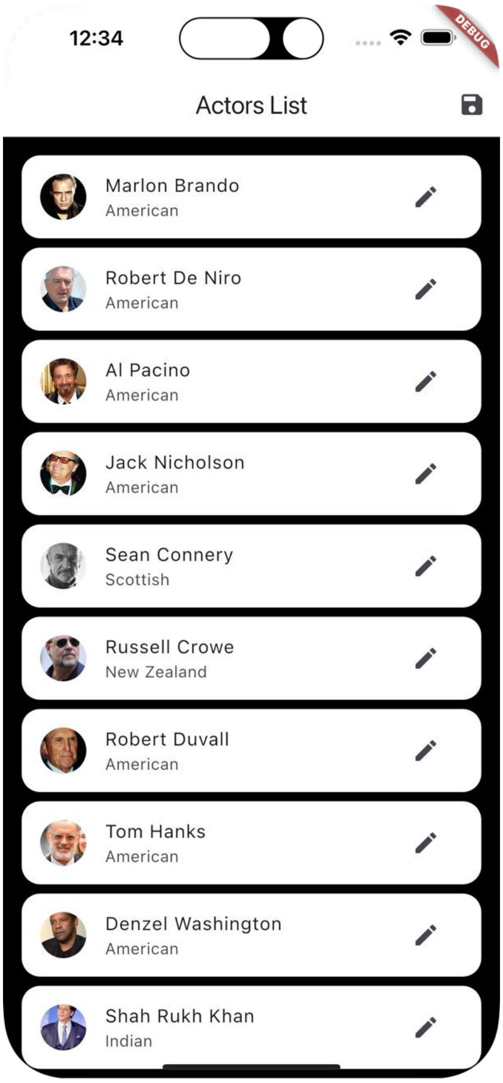
Biography:

Liam Neeson is an Irish actor known for his intense performances in action films and his powerful portrayals in dramatic roles.

Details Screen showing actor details

Lab Task-2:

1. Reuse the above code from Lab Task 1, and connect Hive database to store, retrieve and modify data parsed from the API
2. Add an edit action to each tile in the ListView on home screen
3. Upon clicking the edit button, you should allow user to edit each actor's birth year, nationality, and biography
4. On edit screen, clicking the "save" button should allow user to save modified actors in local Hive DB
5. Add an action in the AppBar on home screen to show "Saved" actors
6. On Saved Actors screen:
   a. Add a ListView to display locally saved actors
   b. User should be able to edit or delete actors from this screen
   c. User should be able to open the view actor details screen upon taping a tile



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Al Pacino
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Sean Connery
Scottish

Russell Crowe
New Zealand

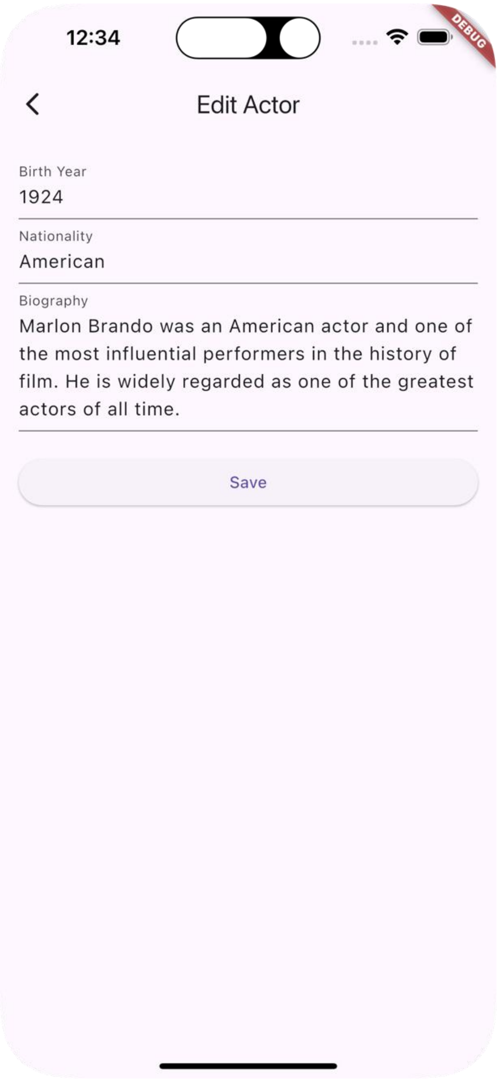
Robert Duvall
American

Tom Hanks
American

Denzel Washington
American

Shah Rukh Khan
Indian

Add Saved button in AppBar and edit button in tiles



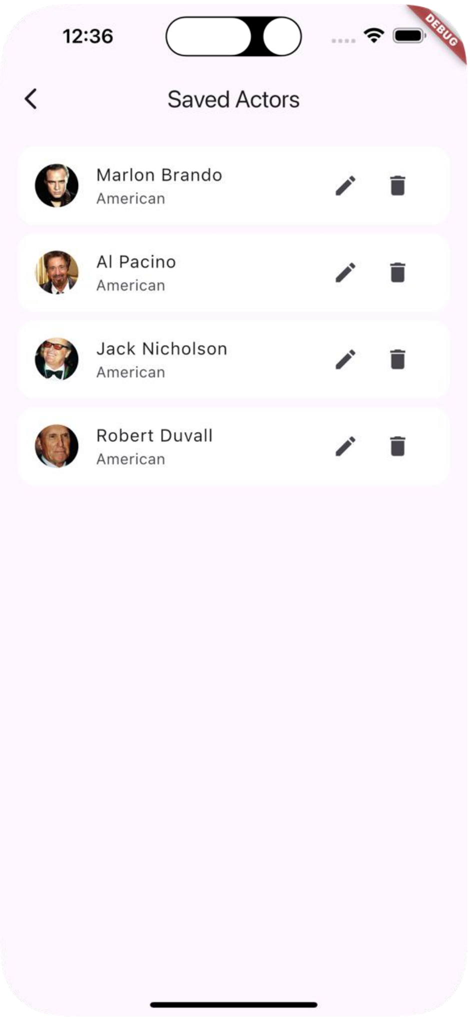
Edit Actor

Birth Year
1924

Nationality
American

Biography
Marlon Brando was an American actor and one of the most influential performers in the history of film. He is widely regarded as one of the greatest actors of all time.

Tapping the edit button should open Edit Actor screen



Marlon Brando
American

Al Pacino
American

Jack Nicholson
American

Robert Duvall
American

Saved Actors screen

Useful Resources:

Below is the list of useful resources to help you in solving this task:

- Asynchronous Programming in Dart
- JSON Parsing gist
- http Library
- JSON Parsing Tutorial
- Hive Documentation

Deliverable:

You need to submit the code files for all above lab tasks along with the report having screenshots of your code and UI before the deadline.