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Programming Mobile Applications in Flutter

Intro lecture

Who are we?

- mgr inż. Jakub Fijałkowski
- Contact: jakub.fijalkowski@leancode.pl
- Backend Guild Leader at LeanCode
- ~10 yrs of backend development, some experience with mobile
- Rust, .NET, Cloud, DevOps
- Books, Golf, Gigs

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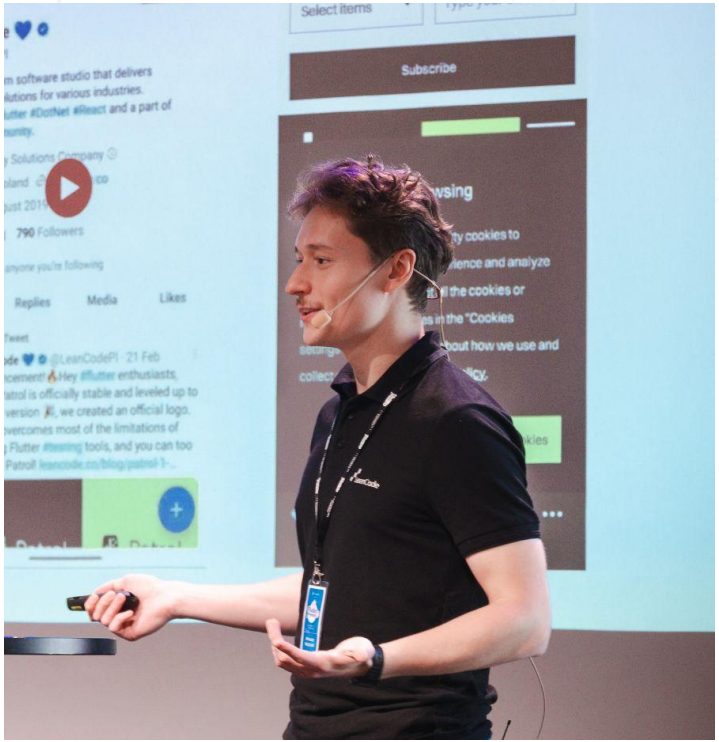
Who are we?

- inż. Mateusz Wojtczak
- Contact: mateusz.wojtczak@leancode.pl
- Head of Mobile @ LeanCode
- > 7 years of mobile appsdevelopment
- Flutter, React Native, Xamarin, Native
- producing music after work



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As LeanCode, we sponsored all major **Flutter events**:

- ❑ FlutterCon Berlin,
- ❑ Flutter & Friends Stockholm,
- ❑ Flutter Firebase Festival Prague.

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Who are you?

What is it all about?

Rules

- Points 0-100:
  - **51-60pt - 3**
  - **61-70pt - 3.5**
  - **71-80pt - 4**
  - **81-90pt - 4.5**
  - **91-100pt - 5**

- Project - 100pt
- Activity during lectures - 10pt
- Top 3 solutions on labs - 5pt each

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Lectures

1. Introduction and Dart
2. Introduction to Flutter 1
3. Introduction to Flutter 2
4. State Management
5. Async and HTTP
6. State Management with External Libraries
7. Architecture and Dependency Injection
8. Storing Data

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Lectures

9. Forms
10. Firebase
11. Code Generation and Internationalization
12. Animations
13. Flutter Web and Flutter Desktop
14. Communication with Native
15. **Guest Lecture**

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Labs

1. Getting Started with Flutter
2. Layouts 1
3. Layouts 2
4. State Management
5. Communication with API
6. State Management with External Libs
7. Firebase & Authentication
8. **It depends on you :)**

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Project

- Individual multi-layer Flutter application that works at least on one mobile platform (Android/iOS)
- Application should contain at least five screens
- Application should communicate with 3rd party API OR use other data persistence solution
- Application's topic and scope is defined by the student, should be described in initial documentation and approved by the lecturer

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Sample Projects

- TODO List with authorization and synchronization between devices
- Chat with authorization
- Shopping list with categories, search, history
- Feed using 3rd party API
- Online shop with deep links, categories, filters, sort, cart
- PoI browser - map and list, tags, categories, sort by localization

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Documentation

- Initial Documentation
  - Project Description
  - Use cases
- Final Documentation
  - Project description
  - Integrations
  - List of optional requirements
  - Instruction
  - Test account (if applicable)
  - Database/Firestore schema (if applicable)
  - CI/CD description/screenshot (if applicable)

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Example initial docs

- Chat with Authorization
- Description
  - Screens list and short description
    - Login Screen
    - Channel List Screen
    - Message List Screen
    - ...
- Use cases
  - As a User, I can sign in using Google/Facebook/Instagram/Apple account
  - As a User, I can see a list of channels
  - As a User, I can create/delete/leave channel if I have sufficient permissions
  - As a User, I can send plain text messages
  - As a User, I can send images/videos/files
  - As a User, I can edit messages

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Assessment Rules

Implementation of the required project assumptions - **50pt**

- Initial documentation - **5pt**
- Implementation of a multi-layer application - **15pt**
- Code quality - **10pt**
- UI/UX - **10pt**
- Final documentation - **10pt**

Adherence to the schedule - 10pt

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Assessment Rules

Optional requirements (**max 50pt)**

- Support for additional platform (Android/iOS/Web/Desktop) - **5pt** each
- Implementing BLoC pattern - **10pt**
- Animations - **10pt**
- Tests - **10pt**
- Signing in process - **10pt**
- Complex form with validation - **10pt**
- CI/CD - **5pt**
- Platform Channels - **10pt**
- Internationalization - **5pt**
- Accessibility - **5pt**
- Custom painting - **10pt**
- Deep links - **10pt**
- Using Camera/Bluetooth/Other platform features - **10pt**
- Offline support - **20pt**

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Timeline

- **27.10.2023** - Initial documentation (Labs)
- **26.01.2024** - Project Submission
  - Source Code and Final Documentation
- **09.02.2024** - Late Project Submission
  - Each day of being late will take a decrease of **5pt** from the total number of gained points

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Any questions?

https://github.com/leancodepl/flutter-at-mini

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Dart

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Dart

- Statically typed
- Object-oriented
- Garbage-collected
- ~~C-style syntax~~ modern-ish syntax
- Asynchrony support
- 100% sound null safe
- Open source, developed by Google

```dart
int fibonacci(int n) {
  if (n == 0 || n == 1) return n;
  return fibonacci(n - 1) + fibonacci(n - 2);
}

var result = fibonacci(20);
```

```dart
var (a, b) = ('left', 'right');
(b, a) = (a, b); // Swap.
print('$a $b'); // Prints "right left".
```

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Dart

- Designed for client development
  - Optimized for UI & Flutter
  - Productive Development - Make changes iteratively: use hot reload to see the result instantly in your running app
- Compiled to ARM & x64 machine code for mobile, and desktop.
- Compiled to JavaScript on web.
- Dart VM with just-in-time (JIT) compilation and an ahead-of-time (AOT) compiler for producing machine code.

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Why Dart?

Why Dart?

- Flutter used four primary dimensions for evaluation, and considered the needs of framework authors, developers, and end users:
  - Developer productivity
  - Object-orientation
  - Predictable, high performance
  - Fast allocation
- **Opportunity to work closely with the Dart community, which is actively investing resources in improving Dart for use in Flutter**

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Why Dart? - TLDR

- It looks like JavaScript
- It is fast enough (we have 16.6 ms to render a frame)
- It’s garbage-collected
- It can perform tree shaking to reduce code size
- It’s tightly connected to Flutter use cases
- It’s targeted to run on mobile/desktop/web.

Dart 3

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dartpad.dev

Show me the code!

Questions?