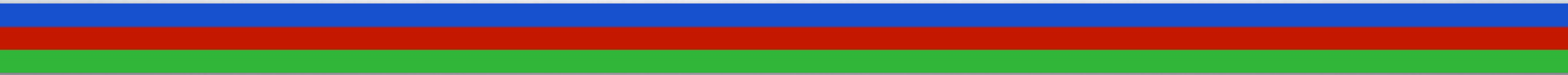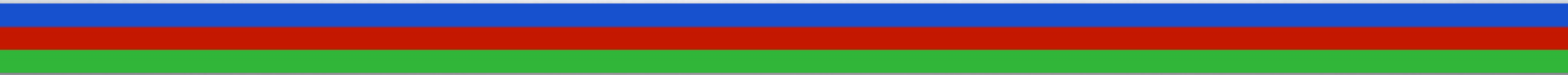# HOW TO WRITE HARD TO TEST CODE

Jakub Spręga

This is not a presentation about

HACKING

It is about

DESIGNING

What is wrong with this code?

ISSUE

Mixing object graph construction with application logic

WARRING SIGNS

- **new** keyword in application logic

SOLUTION

- Instantiate class in isolation
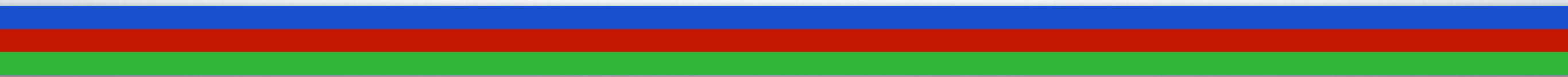- Dependency injection

What is wrong with this code?

ISSUE

Ask for things, Don't look for things

WARRING SIGNS

- Missing object **constructor** (getters and setters instead)
- Object is **not fully initialized** after creation

SOLUTION

- Ask for what you need
- Use constructor to inject object collaborators

What is wrong with this code?

ISSUE

Doing work in constructor

WARRING SIGNS

- **new** keyword in constructor
- **Static methods calls** in constructor
- Anything more than **filed assignment in constructor**
- "**init**" like methods
- Flow controll (conditionals/loops)

SOLUTION

- Once more - **DI is your friend!**
- Do not create collaborators in your constructor, but pass them in
- init method is last resort - better move this to other object (SRP)
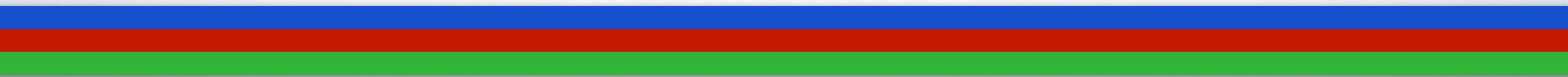
What is wrong with this code?

D

ISSUE

Global state

WARRING SIGNS

- Using **singletons**
- Using **static fields**
- Using **static initialisation block**

SOLUTION

- Use **Application shared state** instead of **JVM global state** (Spring/Guice/CDI)
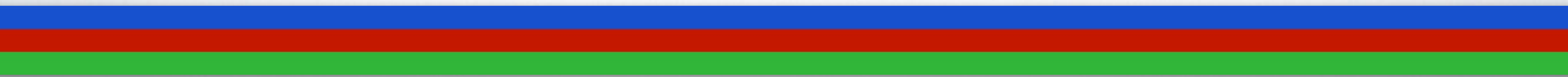
What is wrong with this code?

E

ISSUE

Static methods

WARRING SIGNS

- Using **static methods**

SOLUTION

- Create adapter object - wrap/decorate wrong designed objects
- Again! - DI is your friend

What is wrong with this code?

ISSUE

Class does too much

WARRING SIGNS

- Summing up what the class does includes the word "and"
- SomethingManager classes
- Class would be challenging for new team members to read and quickly "get it" (WTF per minute)
- Class has fields that are only used in some methods
- Class has static methods that only operate on parameters
- Even blank line can be a warring sing

SOLUTION

- Identify the individual responsibilities
- Extract responsibilities to appropriate named classes
- Trust your feelings and start with TDD (red/green/**refactor**)
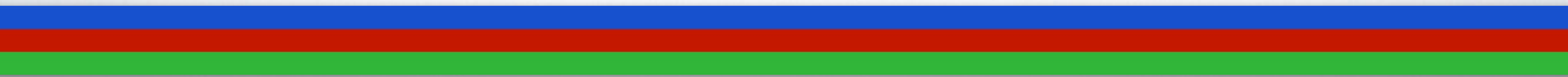
What is wrong with this code?

ISSUE

Conditionals (if/switch)

WARRING SIGNS

- Function is hard to read because of many if conditions
- New behaviour require modification of existing code
- Change object behaviour based on parameter send to method eg. boolean switches, enums

SOLUTION

- Lot of conditionals can be replaced by polymorphism
- Follow Open closed principle

What is wrong with this code?

ISSUE

Digging into collaborators

WARRING SIGNS

- Hard to prepare test data
- Breaking Law of Demeter. A method of an object may only call methods of:
  - The object itself
  - An argument of the method
  - Any object created within the method
  - Any direct properties/fields of the object
  - Or just simple "Don't talk to strangers"
- Using "Context" like objects as method parameter

SOLUTION

- Follow Law of Demeter…
- … with some exceptions like builders, DSL (fluent api), domain objects

References:

- http://misko.hevery.com

- http://butunclebob.com/ArticleS.UncleBob.PrinciplesOfOod

- https://github.com/square/okhttp/tree/master/mockwebserver

H

DESIGN > HACKING

Thank you!