Web Programming

Week 9

"Frameworks and APIs change fast. Software design principles are evergreen. Learn principles that translate across language barriers."

Eric Elliot

Retrospective

Quiz

Homework

Retro: Test "FW"

"Framework" = 2 Abstraktionen: *public API*

- test(name, callback)
- Assert

More will come later. . .

Callback - HOF

Higher-order Function

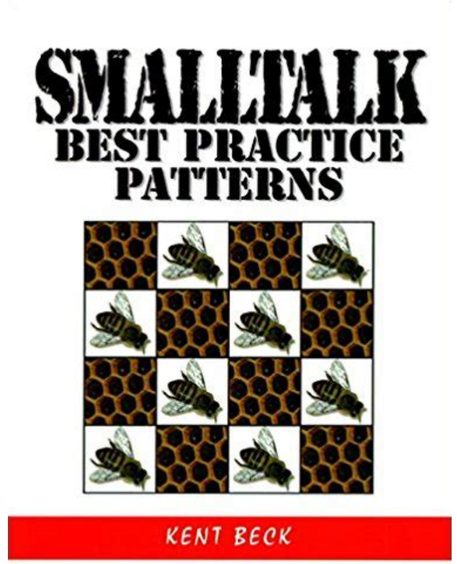
```
function test(name, callback) {
    const assert = Assert();
    callback(assert);
    report(name, assert.getOk());
}
```

prework

callback

postwork

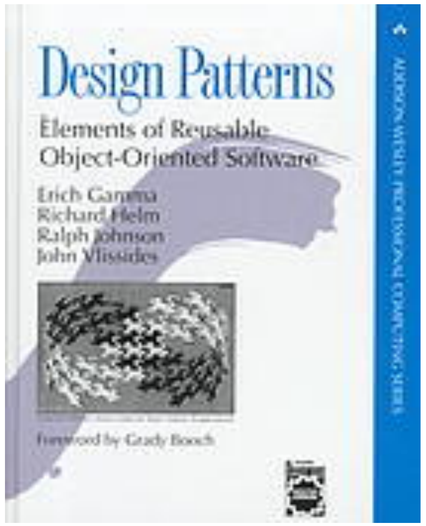
Patterns



Execute Around Method

http://web.cecs.pdx.edu/~black/OOP/slides/Best%20Practices.pdf

Template Method,
Method Object



Ressource Handling

Extracted – Abstracted

Protocol: open, use, close.

Files, DB Queries, Transactions,
load URLs, call REST services, error containment,
CPU-time, Threads (Pool), UI-Access, …

Today: UI "Framework"

FW usage requires FW insight:
what it does,
how it does it,
why it does it this way.

" I could build this myself! "

"Hello, World!" of UI FWs

Start "explore"

Move 1: start at the end

Tests are red

The simplest solution that could possibly work™

Milestone 0

It runs

Reasonable amount of tests

All tests ok

Red-Green-Refactor

Move: Reorganisation

Separate the un-essentials

Improve clarity (= abstraction)

Improve clarity

Responsibilities: "What" vs "How"

Dependencies: Who knows whom?

Sequence: What happens when?

Clear and simple rules.

Observable (v.1.0)

```
const Observable = value => {
    const listeners = [];
    return {
        onChange: callback => listeners.push(callback),
        getValue: ()       => value,
        setValue: val      => {
            if (value === val) return;
            value = val;
            listeners.forEach(notify => notify(val));
        }
    }
};
```

many

protection

ordering

Observable Topics++

Observer modifies Observable

Less obvious: A -> B -> C -> A

One or more Observers?

Callback at registration? Remove?

"Bindstorm"

Milestone 2

Separate Todo operations from Todo display

All tests ok

Improve Clarity

A) single Todo changes

B) the List of Todos changes

=> observable list

Milestone 3

View, Controller, and Model are separated

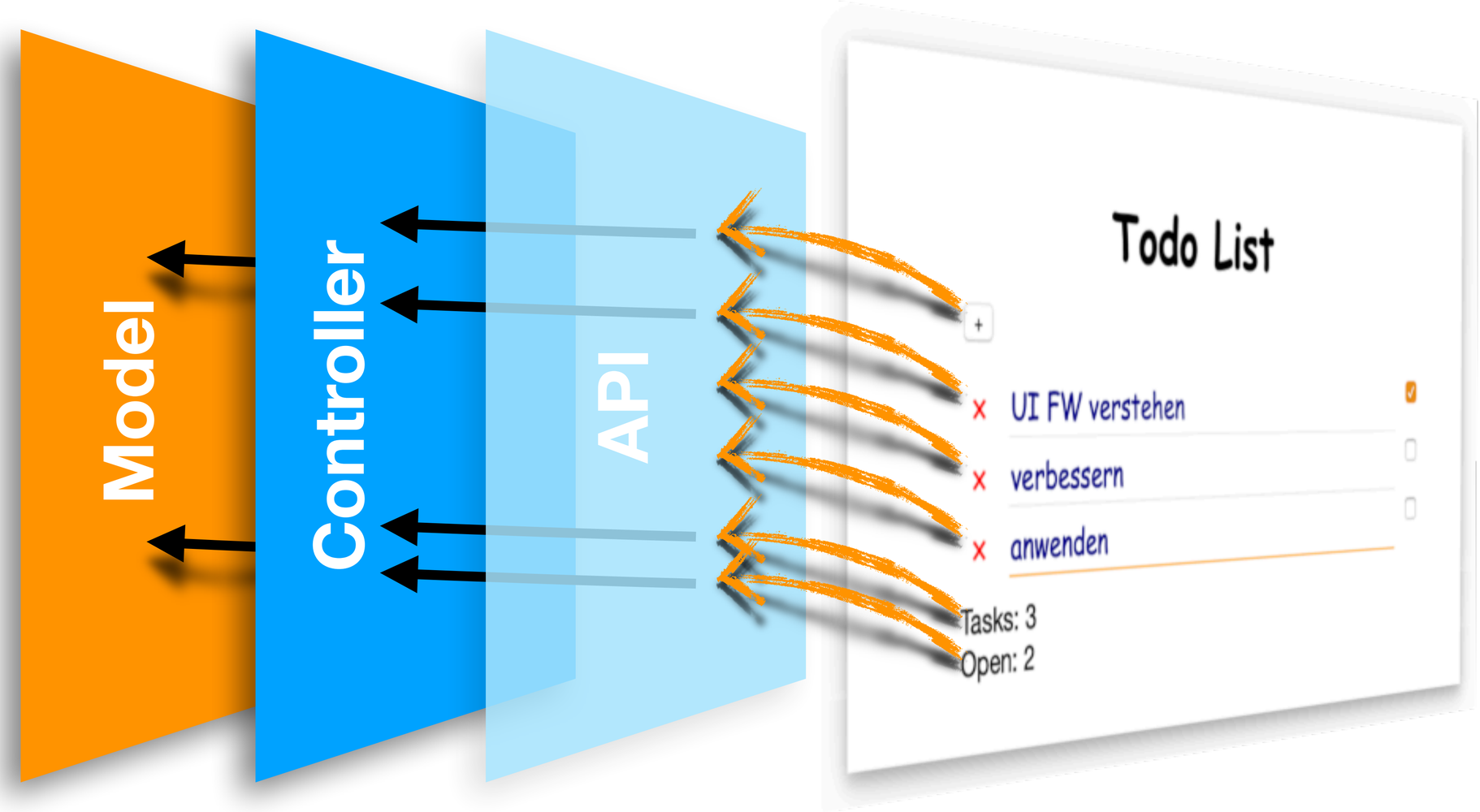
All tests ok

Milestone 4

All Views
separated

All tests ok

MVC, classic version



Possible Extensions

- 👍 Observer Pattern: Observable Values
- 👍 Observable Collections (Array, List, Set)

  Binding, Validation, Conversion

  Asynchronous Data Flow (e.g. REST)

Work at Home

Can you spot the memory-leaks in the Observable List?

Can you test it?

Can you resolve it?