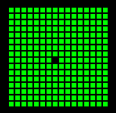
Making web apps with the MVU pattern

(Mr. Math, SPISE MISU ApS)

2022-11-07 @ Girls in IT (virtual edition)



Overview

- About me (very shortly)
- MVU pattern
  - Background
  - The tool (Fable)
  - Demo (live coding)

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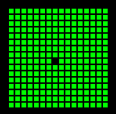
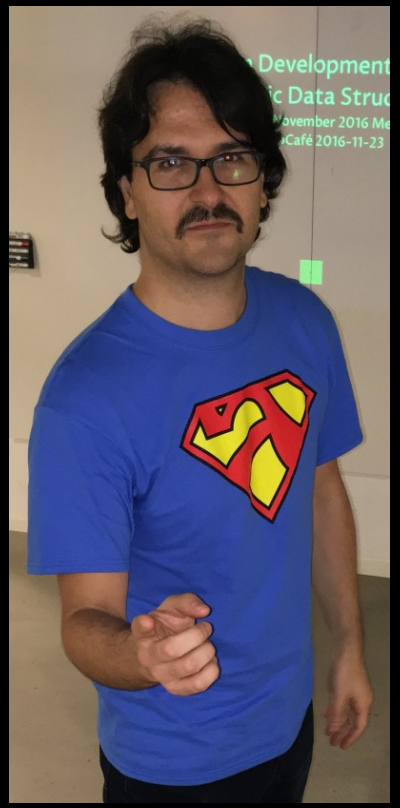


About me (very shortly)



- **Mr.** Ramón Soto **Math**iesen (***Spaniard*** + ***Dane***)
- MSc. Computer Science and minors in Mathematics (KU + Pisa)
- ***CompSci*** @ SPISE MISU ApS
  - Trying to solve EU GDPR with a scientific approach (techincal means)
    - https://uniprocess.org
    - Permissive copyleft license (LGPL-3.0)
  - Mostly with ***Haskell*** and to a lesser extend ***Elm*** and ***PureScript***
  - (Auto) sponsor R&D by doing freelance work
- Blog: http://blog.stermon.com/ (slides under /talks/)
- PureScript / Elm / Haskell / TypeScript / F# / OCaml / Lisp / C++ / C# / JavaScript

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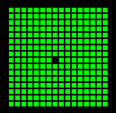
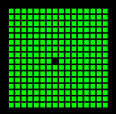


Matching of expectations

- In this talk, I will try to showcase how we can make (react) web apps in a sound (mind) and safe (application) manner by using the MVU pattern, used by Elm and Fable (Elmish)
- There will be shown a few slides at the beginning and then some at the final, to recapitulate, but other than that, we are going to be “live-coding”, with the risks that this entails

  Note: As we have about two hours for this session, please don’t hesitate to interrupt whenever you have a question



Background


```
const MessagesDropdown = (props) => {
  const visibility = props.open ? 'visible' : '';
  const totalUnseenCount = props.threads.reduce((memo, t) => {
    return memo + (t.unseen ? 1 : 0);
  }, 0);
  let messageText = 'Messages';
  if (totalUnseenCount > 0) {
    messageText += ' (' + totalUnseenCount + ')';
  }
  return (
    <div
      className={'ui scrolling dropdown ' + visibility + ' item'}
      onClick={props.onDropdownClick}
    >
      {messageText} <i className='dropdown icon'></i>
      <div className={'menu transition ' + visibility}>
        <ThreadListCompact
          threads={props.threads}
        />
      </div>
    </div>
  );
};
```

What's happening in the following JS-React snippet?

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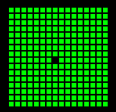

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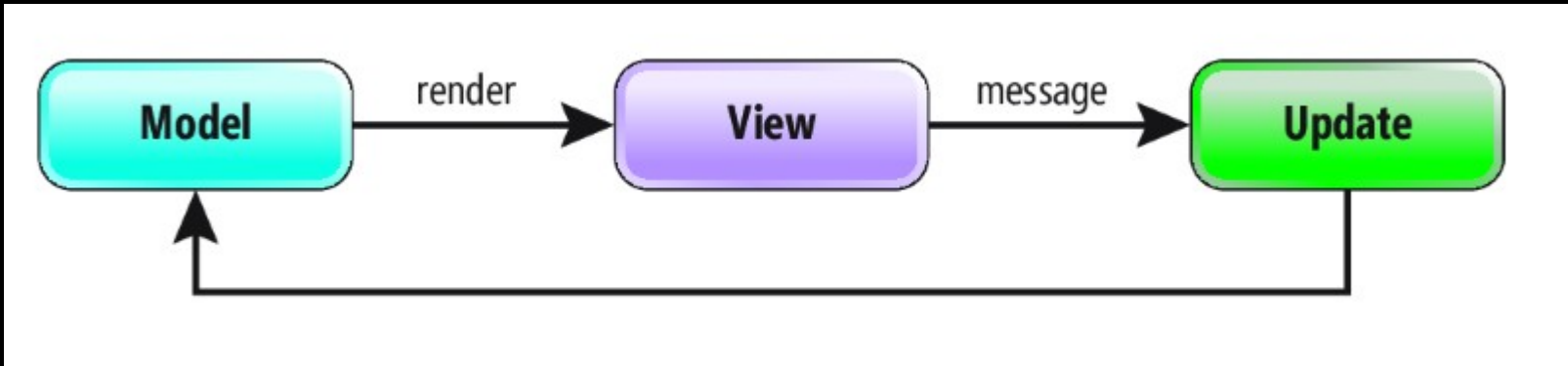
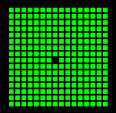
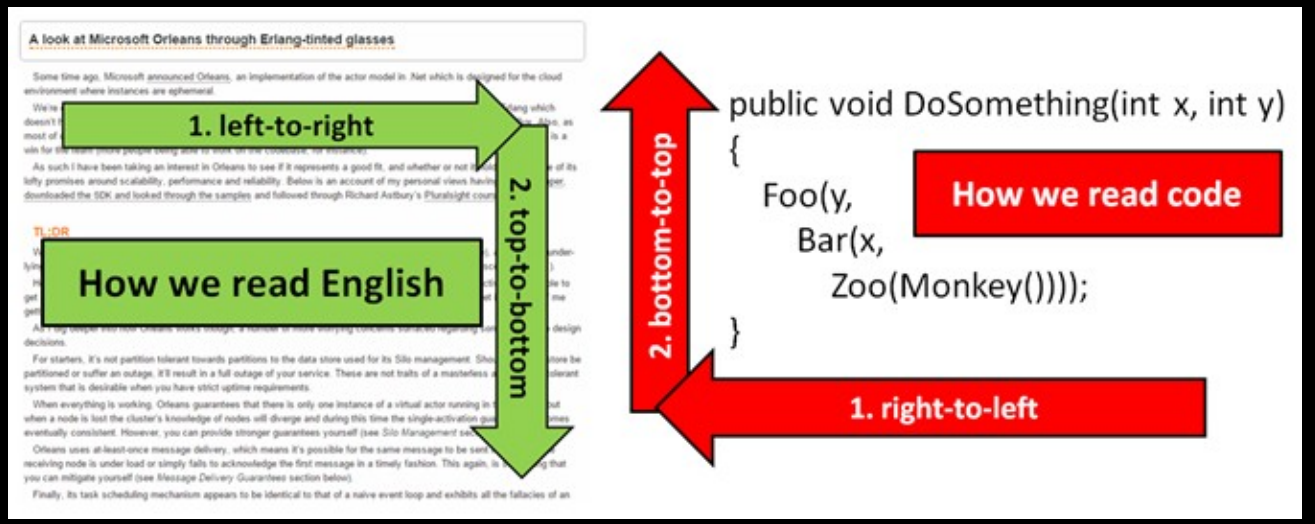
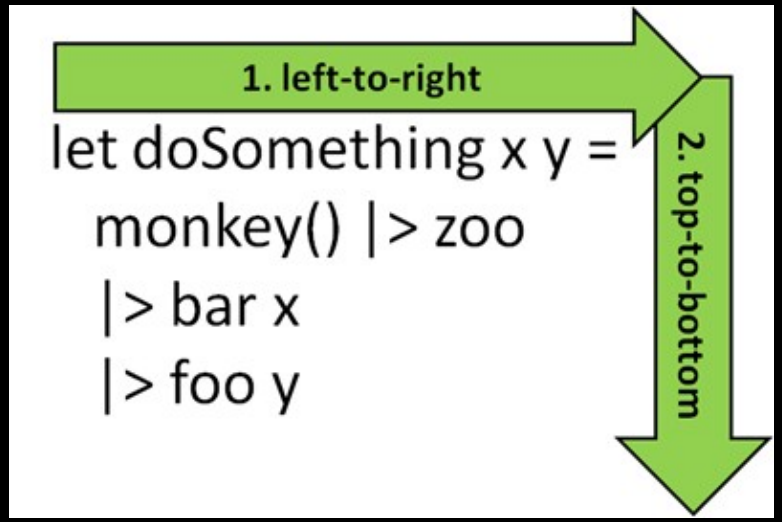


The **M**odel-**V**iew-**U**pdate Pattern
(MSDN Magazine Issues 2019 October)



The tool (Fable)
Simple and intuitive (readable)





- Forced indentation, just like Python, in combination with |> operator, makes it easy to read again & again

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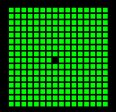
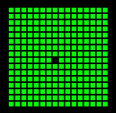


The tool (Fable)
Functions as first-class citizens

- Higher-order functions.
  - Passing functions as arguments is just like gluing functions together, composing them to bigger ones:

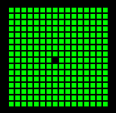
```
[0 .. 9] |> List.map (fun x -> x + x)
```

The tool (Fable)
Strongly type-safe

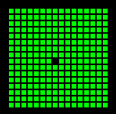
- Computer says no :

```
(* error FS0001: The type 'string' does not match the type 'int' *)
let result = 42 + "42"
```

Demo (live coding)

- Make a basic “Hello, World!” web-app
- Transition to a “Counter” web-app
- Transition to a “Random Doggo image” web-app
  - https://random.dog/woof.json
- Transition to a “Voting areas in CPH” web-app
  - https://www.opendata.dk/city-of-copenhagen/...



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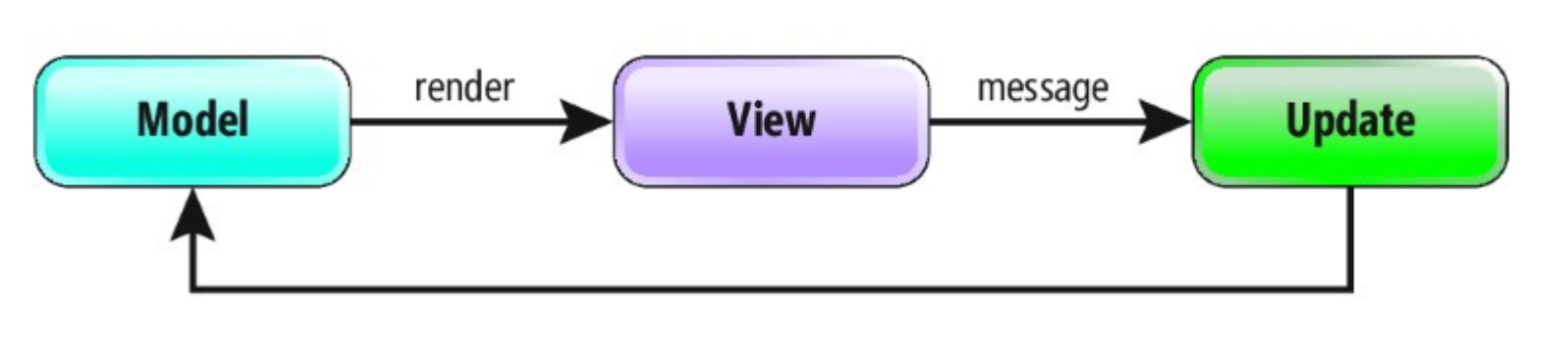


The **M**odel-**V**iew-**U**pdate Pattern
(MSDN Magazine Issues 2019 October)

Summary

Girls in IT Zealand

Explaining MVU-pattern IRL (3D print + notebook)

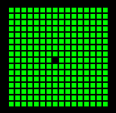
2022-11-07

Summary

Girls in IT Zealand

- Once the MVU-pattern is understood, it's just re-applying the same approach again-and-again
- When having to deal with 3rd party systems, the update function changes a bit as it now has to deal with external effects
- Trivially going from JSON payload to sound code (with types)
- Want to give it a try?
  - Try Fable:
    - https://fable.io/repl/
  - Try Elm:
    - https://elm-lang.org/try
  - Coding Pirates material:
    - https://gitlab.com/codingpirates/web-app-workshop

    Note: Material in Danish, please use Google Translator



Q&A

Any questions?