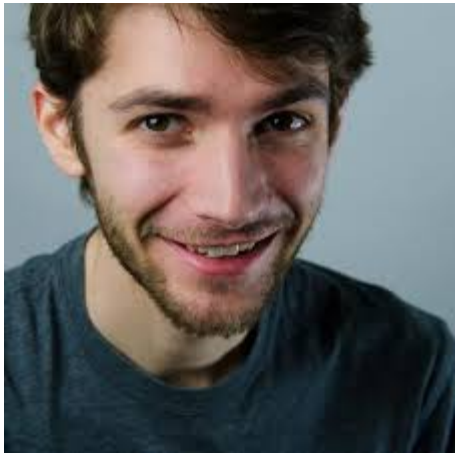
The Elm Programming Language

Richard Townsend

Advanced Topics in Programming Languages and Compilers

Where did Elm come from?



Evan Czaplicki

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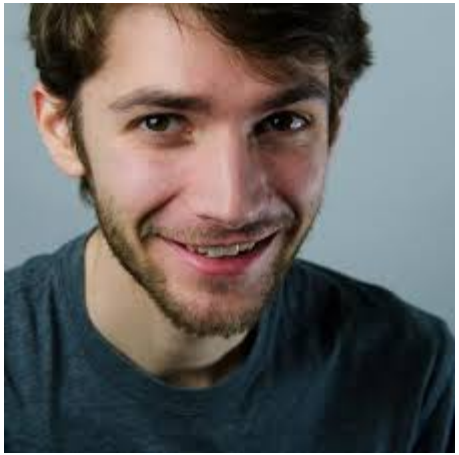

Evan Czaplicki

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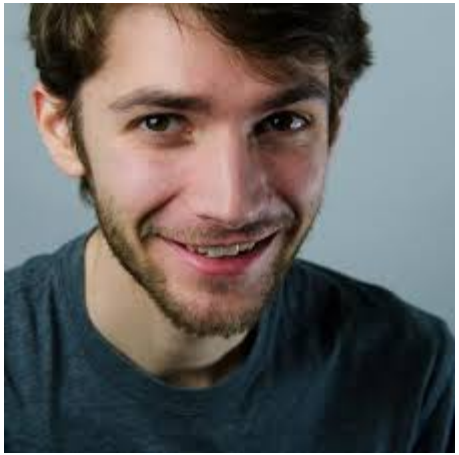

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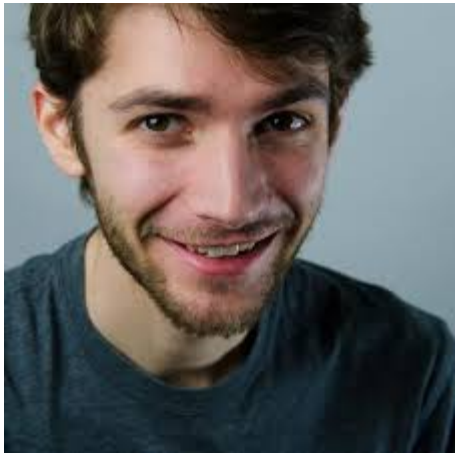

Evan Czaplicki

- Frustrated with GUI design
- Use declarative approach
- Want responsive GUIs

Functional Reactive Programming

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Pure Functional

Reactive

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How do we get both?

Signals: Time-Varying Values

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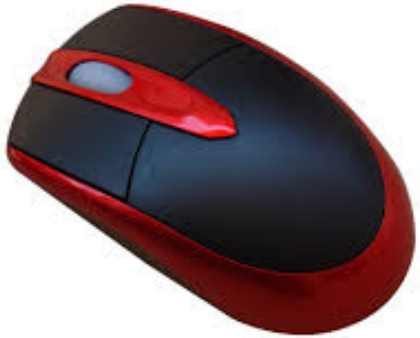
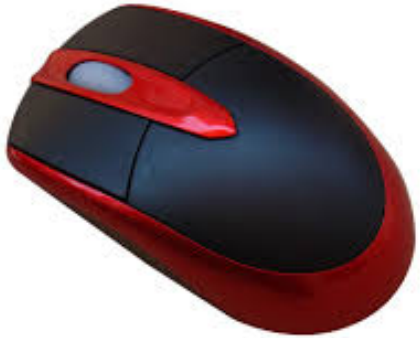


Signals: Time-Varying Values



The main idea

Everything is a pure expression…
unless you use Signals.

The main idea

Elm’s Idea:

1. Pure expressions -> layout of GUI

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Elm's Idea:

1. Pure expressions -> layout of GUI

2. Signals -> react to real-world events

3. `lift` and `foldp` -> update layout dynamically

Elm in Action: GUI Layout

```
content : [Element]
content = [ plainText "Bears, Oh My!"
          , image 200 200 "/yogi.jpg"
          , asText (reverse [1..9])
          ]

main : Element
main = flow down content
```

Bears, Oh My!

[9,8,7,6,5,4,3,2,1]

Elm in Action: Signals

```
import Mouse

resizeableYogi : Int -> Element
resizeableYogi n = image n n "/yogi.jpg"

edgeLength : Signal Int
edgeLength = lift (\(x,y) -> max x y) Mouse.position

main : Signal Element
main = lift resizeableYogi edgeLength
```

Elm in Action: Mix N' Match

Current Compiler

http://elm-lang.org/

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- Advantages
  - Complex graphics are possible
  - “unmatched cross-platform support”
- Disadvantages
  - Issues with concurrency
  - Slow program execution

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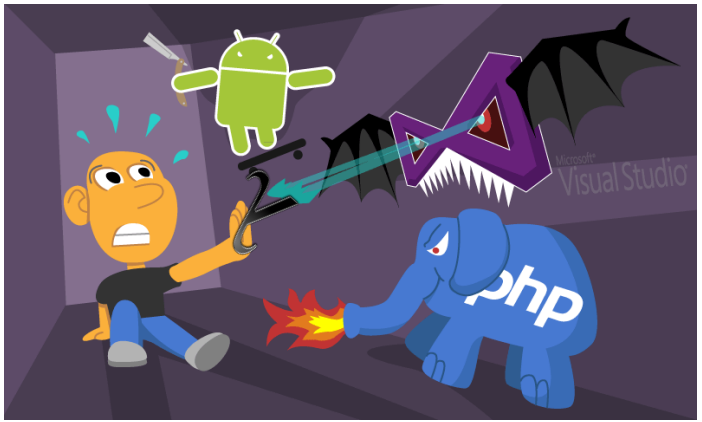
Conclusions

- Elm is pretty awesome!
  - functional
  - web programming scares you

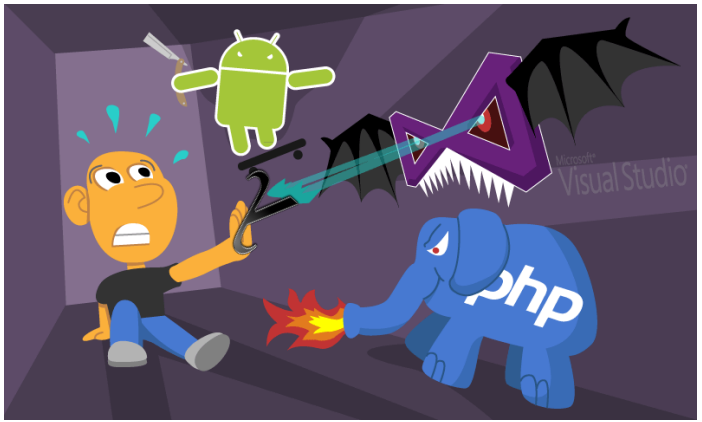


Programming Isn't Scary. Digital image. *Impatient Designer*. N.p., n.d. Web. 25 Sept. 2014.

Conclusions

- Elm is pretty awesome!
  - functional
  - web programming scares you

- Still growing!
  - production continues at Prezi
  - time-traveling debugger



Prezi

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References

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Czaplicki, Evan. "Elm." *Elm*. N.p., n.d. Web. 28 Sept. 2014. <http://elm-lang.org>.

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