Farewell

Functional Programming 2017/18

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Final menu

- Presentations about libraries and structures
- Q&A session
  - Write Qs on a piece of paper
  - As after the break
- Closing remarks

Presentations

- Libraries
  - Generic deriving and `aeson` -> JSON
  - `persistent` -> databases
  - `monad-par` -> parallelism
- Structures
  - Semirings
  - Arrows

Q&A session

What does the state monad do and why is it used?

Why?

- Some algorithms are inherently stateful
  - Or that is the easiest way to express them
  - E.g., Dijkstra’s algorithm for shortest paths
- We want to use them in our application
- Without compromising the pure/impure separation
  - We *simulate* mutation using pure means

What does the state monad do and why is it used?

What?

A *stateful* computation gets the current state and produces a new one along with the result

```
type State s a = s -> (a, s)
```

- The State monad threads the state for you
  - Less boilerplate, fewer stupid mistakes
- State + `do` notation feels like imperative programming

Closing remarks

Goals for the course

- Learn the **functional** paradigm and **style**
  - You can apply FP techniques everywhere!
  - Every (serious) language has H-O functions
- Experience a **strong static type system**
- **Reason** about programs
  - Correct software is our ultimate goal

Courses about or using FP at UU

- *Functioneel Programmeren*
- Talen en Compilers: year 3, period 2
  - Haskell applied to compiler writing
- Software Testing en Verificatie: year 3, period 4
  - More reasoning about programs

If you want to know more

More Haskell?

- *Pearls of Functional Algorithm Design*, by Bird
  - Puzzles with a nice functional solution
- *the fun of programming*, by Gibbons and de Moor
  - Even more niceties in a functional style
- *Haskell from First Principles*, by Allen and Moronuki
  - Covers additional topics, like transformers
- *Beginning Haskell*, by, ehmmm… me
  - Which happens to be an intermediate book

If you want to know more

Learn other functional languages

- *F#* for the .NET platform
  - *Beginning F# 4.0* and *Expert F# 4.0*
- *Scala* for the Java platform
  - *Functional Programming in Scala*
- *Swift* for iOS development
  - *Functional Swift*

If you want to know more

Or just drop by my office

Success with your exams!