Why *You* should study Advanced Functional Programming

Patrik Jansson, FP group, Chalmers and U. of Gothenburg

2012-11-20

- Learn from the best — Gothenburg FP group is world class
- Competitive advantage — FP experts wanted in industry
- Applicable — Telecom, Banking, Climate Modelling, ...
- Curiosity — math meets machine

Functional Programming in context

Rapid prototyping, strong type system, powerful design patterns, conceptual clarity, industrial strength compilers, promising parallelisation properties.

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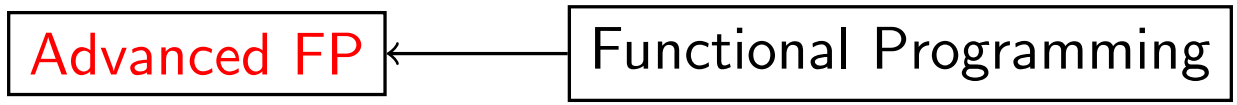

Contents: Problem solving using

- domain modelling (using functions, types, classes, modules)
- domain specific languages (embedded in Haskell)
- specification based development

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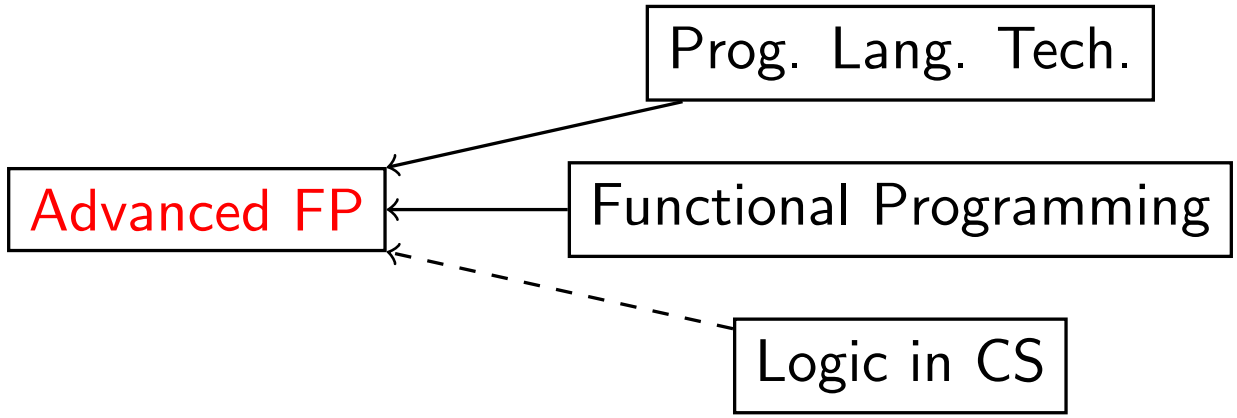

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Prereq: (ProgLang or ProgPara) and FP

Learn from the best, with the best

Studying CSE in Gothenburg is an opportunity to work with and learn from world class research in

- Computer Architecture
- Computer Security
- **Functional Programming**
- Type Theory
- ...

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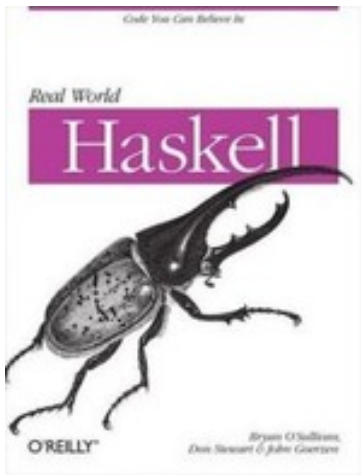
Advanced **Functional Programming**:

- Learning by doing: labs in pairs ⇒ deeper understanding
- A good team of students ⇒ fruitful discussions
- Advanced ⇒ self-study + tutoring + lectures

Other related courses (in the spring)

- Programming language technology, (SP 3)
- Programming paradigms, (SP 3)
- Parallell Functional Programming, (SP 4)
- Compiler construction, (SP 4)
- Language-based security, (SP 4)
- Model-based testing (SP 4)

+ projects + MSc theses



Study Functional Programming in Gothenburg

- Curiosity — math meets machine
- Competitive advantage — FP experts wanted
- Learn from the best — good students + strong research

Domain Specific Languages, rapid prototyping, strong type system, powerful design patterns, conceptual clarity.

Study AFP in SP3 (Jan–Mar)!

Aim The aim of the course is to explore the powerful mechanisms that functional programming languages offer to solve real problems and structure larger programs. The focus lies on library design and the concept of embedded languages.

Learning outcomes

- design embedded domain specific languages (EDSLs)
  - (abstract) syntax, semantics
  - implement EDSLs in Haskell (as combinator libraries)
- read, understand and extend Haskell programs which use advanced type system features
  - type classes
  - (generalized) algebraic datatypes
  - functors, monads and monad transformers
- use specification based development techniques
  - formulate and test properties about the program
  - reason about correctness of functional programs
  - transform programs on the basis of such reasoning
- explain and discuss the above topics