CS4012
Topics in Functional Programming
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Topics?

It's about using Haskell (and other languages) to explore advanced topics from research and industry

The ideas that have emerged from the functional programming community in the last 10-15 years

Where did the designers of Scala, F#, Java 8, etc. get their ideas?
Functional Programming?

Functional programming

Graph by Tobias Hermann
What will we do?

Lectures on advanced topics
Readings from research papers in the field
Projects applying these ideas, building better functional programs
Focus is on Haskell, but we will mention a little about Scala, Clojure, F#, Agda, Idris
What kind of topics?

Embedded Domain Specific Languages
Monadic programming
Parallel and Concurrent functional programming (including Software Transactional Memory, Map/Reduce, and other topics
Advanced type system features (e.g. existential types, dependent types)
Lenses ("jQuery for data types")
Pipes and Conduits
Most importantly: How to use all this in program design
Why do this?

You want...

to be a better programmer (whatever language you end up using)
to explore things that won't be making it to textbooks for a few years yet
a chance to examine and critique recent (and classic) research papers