The Science of Software
(a.k.a. Formal Methods)

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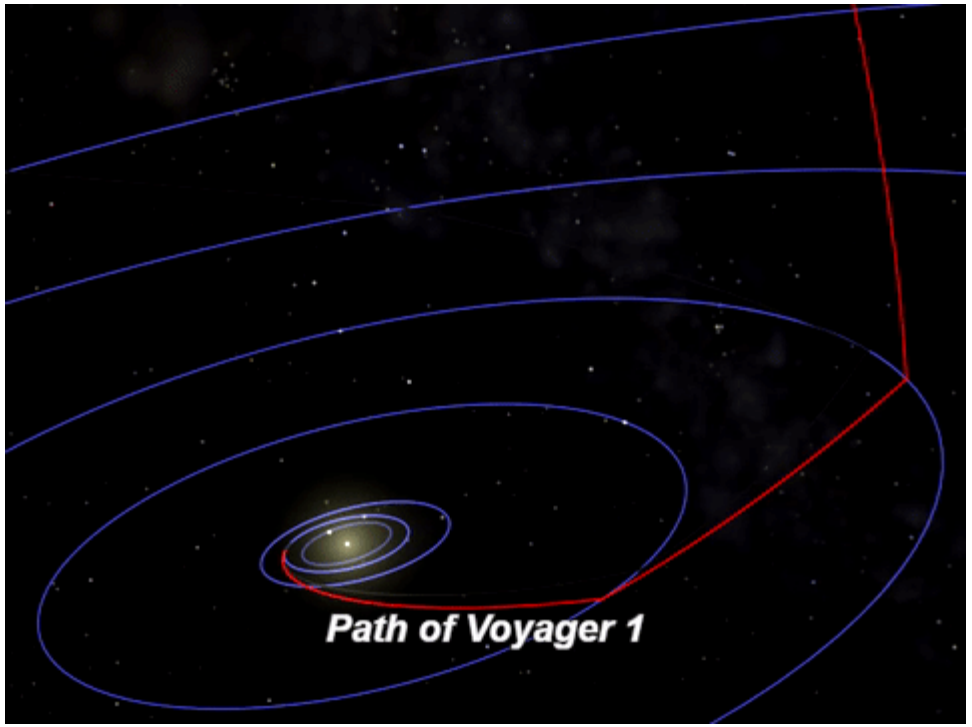
What is science?

science => predictions



What is the science of software?

- What predictions can we make about the programs we write?
- Can I predict that my program will:
  - Terminate?
  - Never throw an exception?
  - Produce the right result?
  - Always?
  - Sometimes?
  - …

(

software science ≠ computing science

software science ⊊ computer science

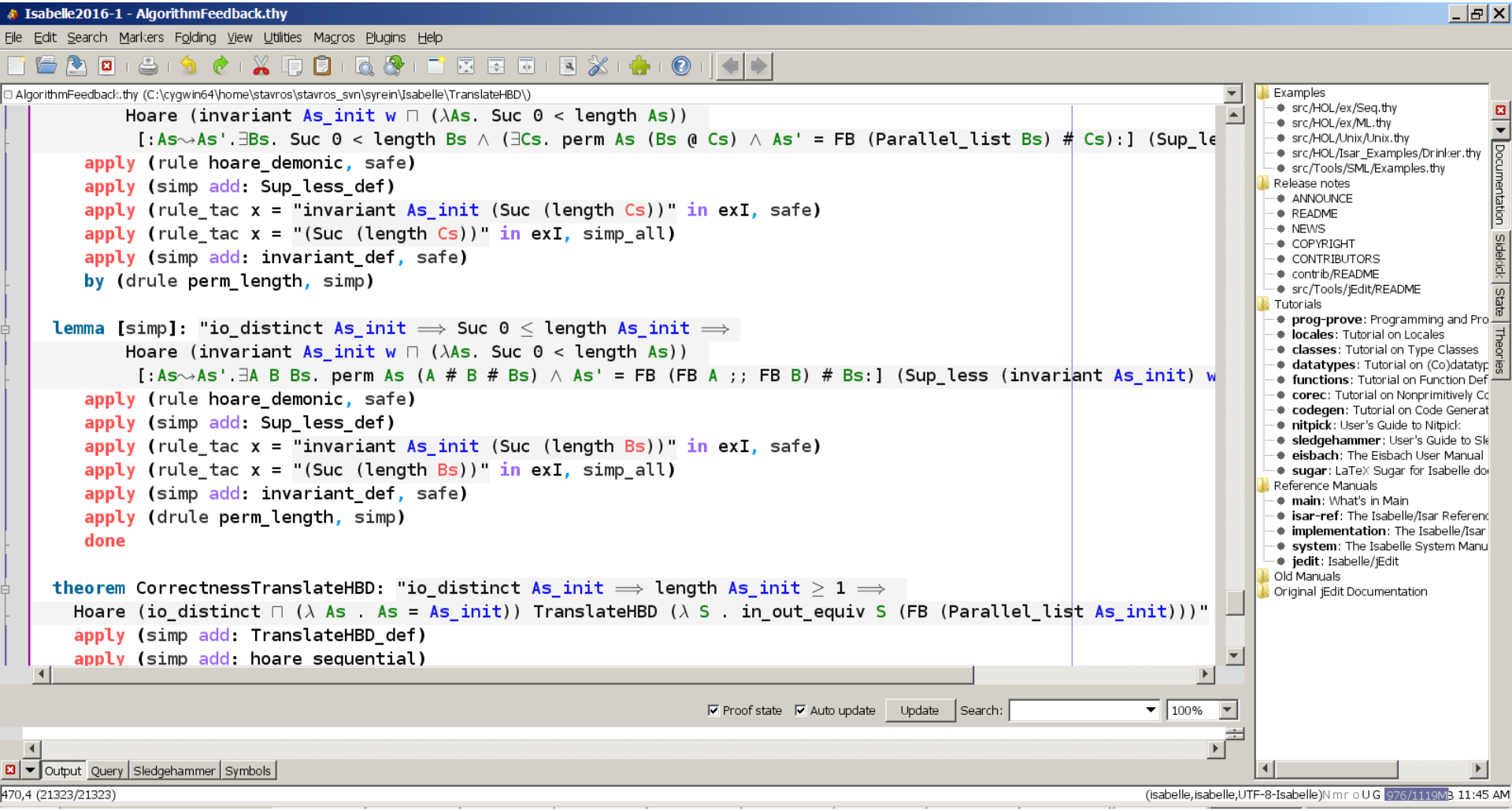
)

What is the mathematics of the science of software?

- Language
- Truth
- …

logic

Formal (mechanized) logic and **proof** – specification and verification



From software to systems

Courtesy `http://www.fastcodesign.com`
Thanks to Christos Cassandras for recommending this video

CONTRIBUTED ARTICLES

How Amazon Web Services Uses Formal Methods

By Chris Newcombe, Tim Rath, Fan Zhang, Bogdan Munteanu, Marc Brooker, Michael Deardeuff

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10.1145/2699417

Comments (1)

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Since 2011, engineers at Amazon Web Services (AWS) have used formal specification and model checking to help solve difficult design problems in critical systems. Here, we describe our motivation and experience, what has worked well in our problem domain, and what has not. When discussing personal experience we refer to the authors by their initials.

At AWS we strive to build services that are simple for customers to use. External simplicity is built on a hidden substrate of complex distributed systems. Such complex internals are