Aim Small, Miss Small: Writing Correct Programs

@stuarthalloway

cognitect


97 Things Every
Software Architect
Should Know


Agile Web
Development
with Rails

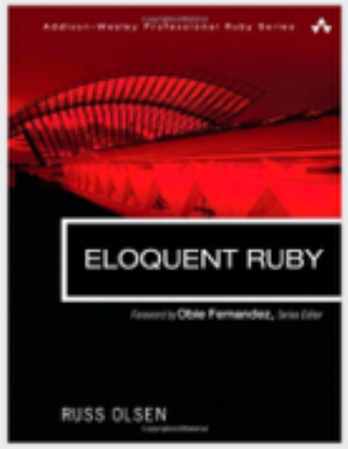

Better, Faster,
Lighter Java
O'REILLY


Clojure
Applied
From Practice to Practitioner
Ben Vandgrift
Alex Miller

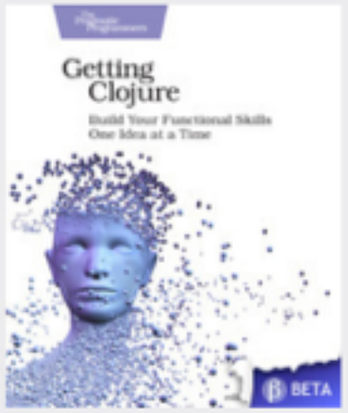

O'REILLY
Clojure
Cookbook
Luke VanderHart & Ryan Neufeld


ClojureScript
Up and Running
O'REILLY


Component Development
for the Java Platform
Stuart Dabbs Halloway


ELOQUENT RUBY
RUSS OLSEN


Functional
JavaScript
O'REILLY

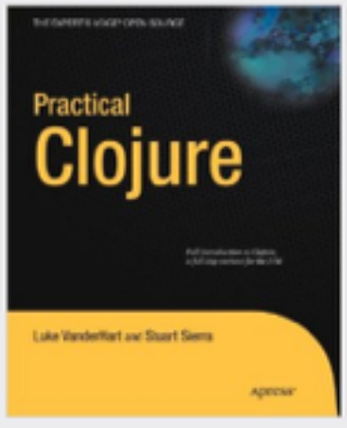

Getting
Clojure
Build Your Functional Skills
One Idea at a Time
BETA


Beautiful
Architecture

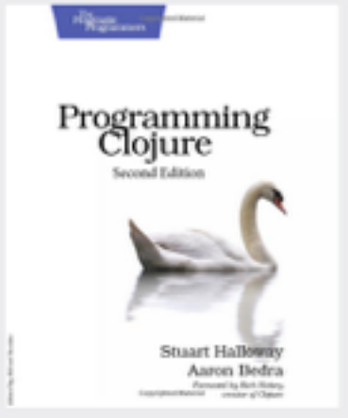

CODE
[SHIFTER]
C E MEIER


THE Joy OF
Clojure
SECOND EDITION


O'REILLY
Living
Clojure
Carin Meier

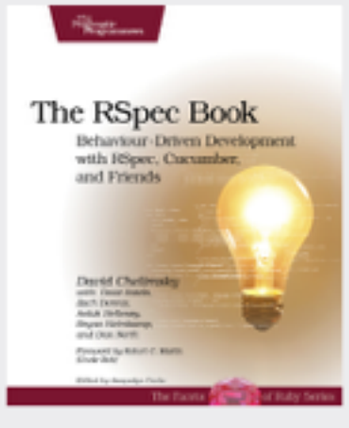

Practical
Clojure
Luke VanderHart and Stuart Sierra
Apress

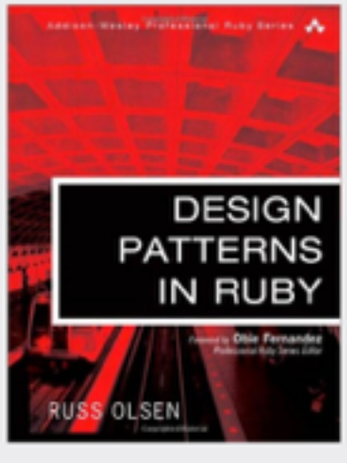

Pragmatic
Ajax
A Web 2.0
Primer
Justin Gehtland
Ben Galbraith
Dion Almaer

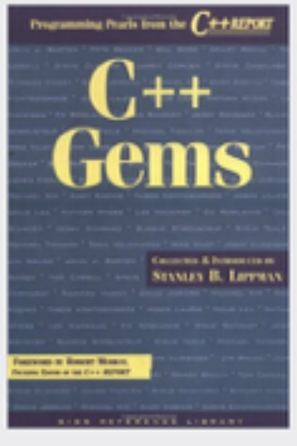

Programming
Clojure
Second Edition
Stuart Halloway
Aaron Bedra


Rails
for Java
Developers
Stuart Halloway
Justin Gehtland

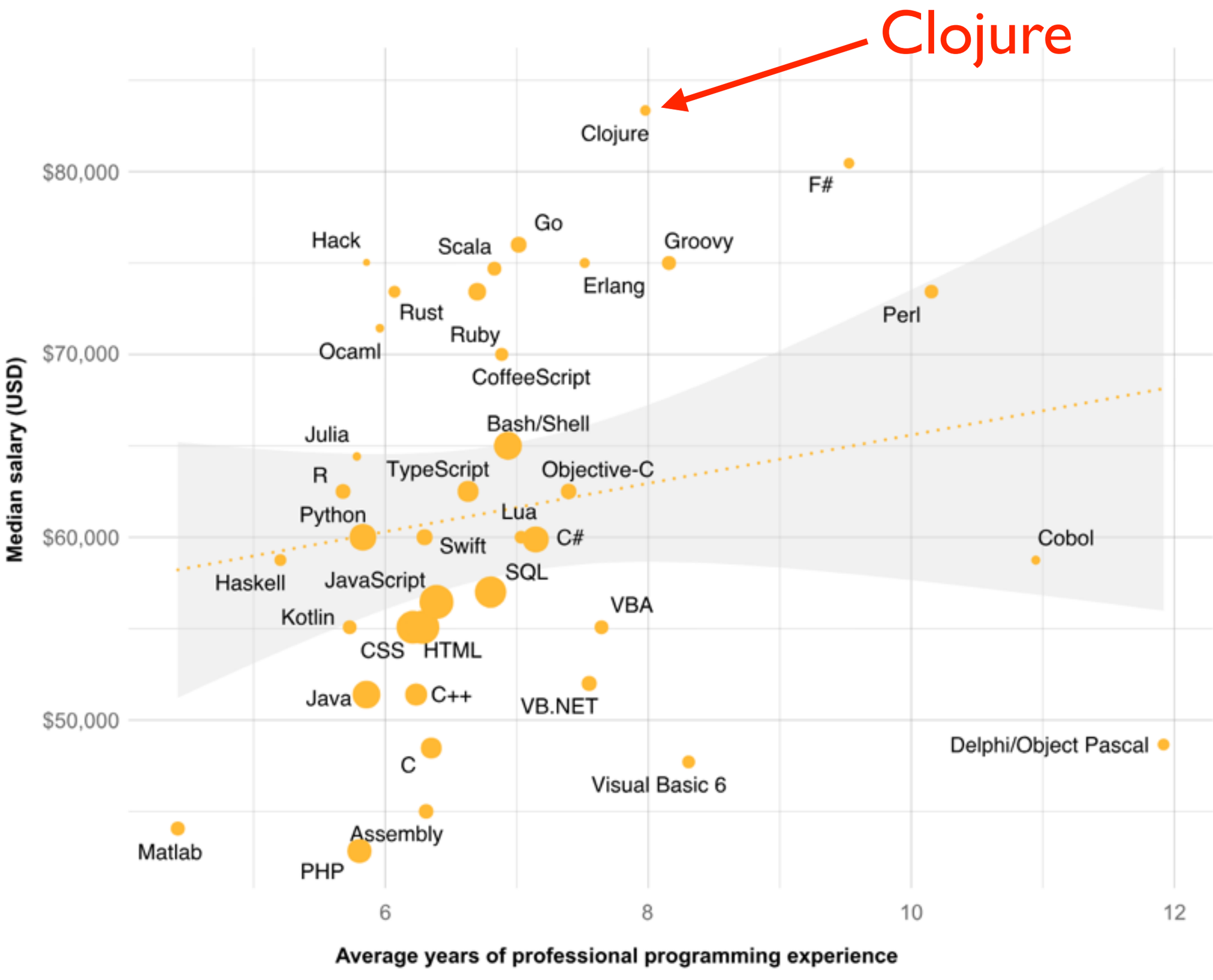

Release It!
Second Edition
Design and Deploy
Production-Ready Software
Michael T. Nygard


The RSpec Book
Behaviour-Driven Development
with RSpec, Cucumber,
and Friends
David Chelimsky


DESIGN
PATTERNS
IN RUBY
RUSS OLSEN


C++
Gems
Stanley B. Lippman

Salary and Experience by Language

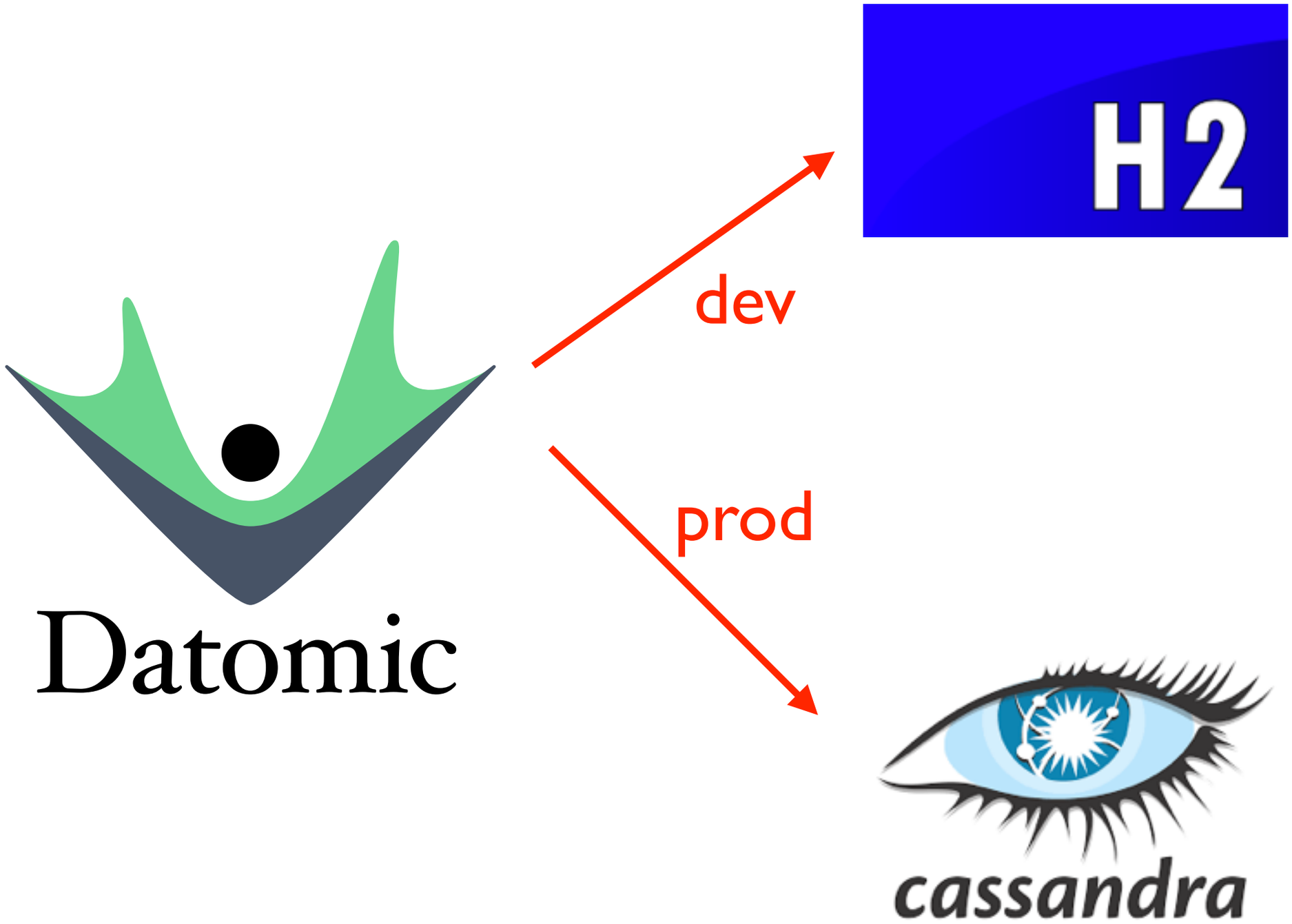


https://insights.stackoverflow.com/survey/2018/

Datomic

https://en.wikiquote.org/wiki/Jean-Luc_Picard

When Schema Changes Are Lock-Free


H2
dev
prod
Datomic
cassandra

correct (adj.)
free from error

correct (v.)
put right

Tools Galore

red squiggly underlines

type systems

unit tests

frameworks

proofs

generative testing

stacktraces
frameworks
agile methods
TDD
logging
humane error messages
step debuggers
simulation

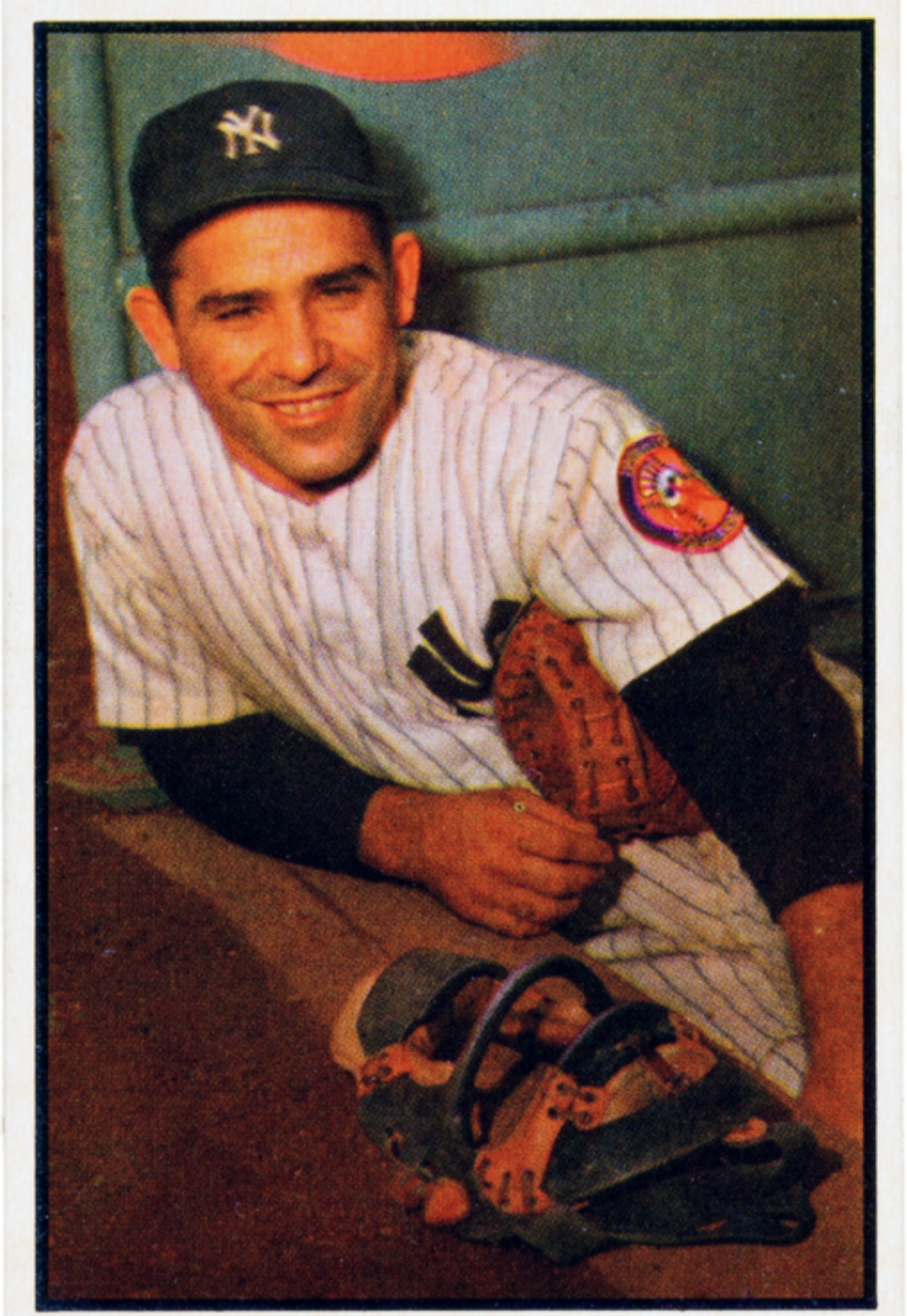
1.1 Trillion Dollars

https://www.youtube.com/watch?v=cmQLnBtDjbw

https://medium.com/@ryancohane/financial-cost-of-software-bugs-51b4d193f107

Aim Small, Miss Small

Aim Small, Miss Small



if you don’t know
where you are
going, you might
wind up
somewhere else

https://upload.wikimedia.org/wikipedia/commons/f/f1/1953_Bowman_Yogi_Berra.jpg

Aiming

problem statement

written down

rationale

kept current

indelible

“When you make an important decision, write it down.”

—Nathaniel Manista, right here, yesterday

https://orgmode.org/

https://www.omnigroup.com/omnigraffle

Aim *Small*, Miss Small

Small As In...

one-letter variable names?

short methods?

low algorithmic complexity?

font size?

simple (adj.)

from sim- plex
“one fold / braid”

complected

braided together

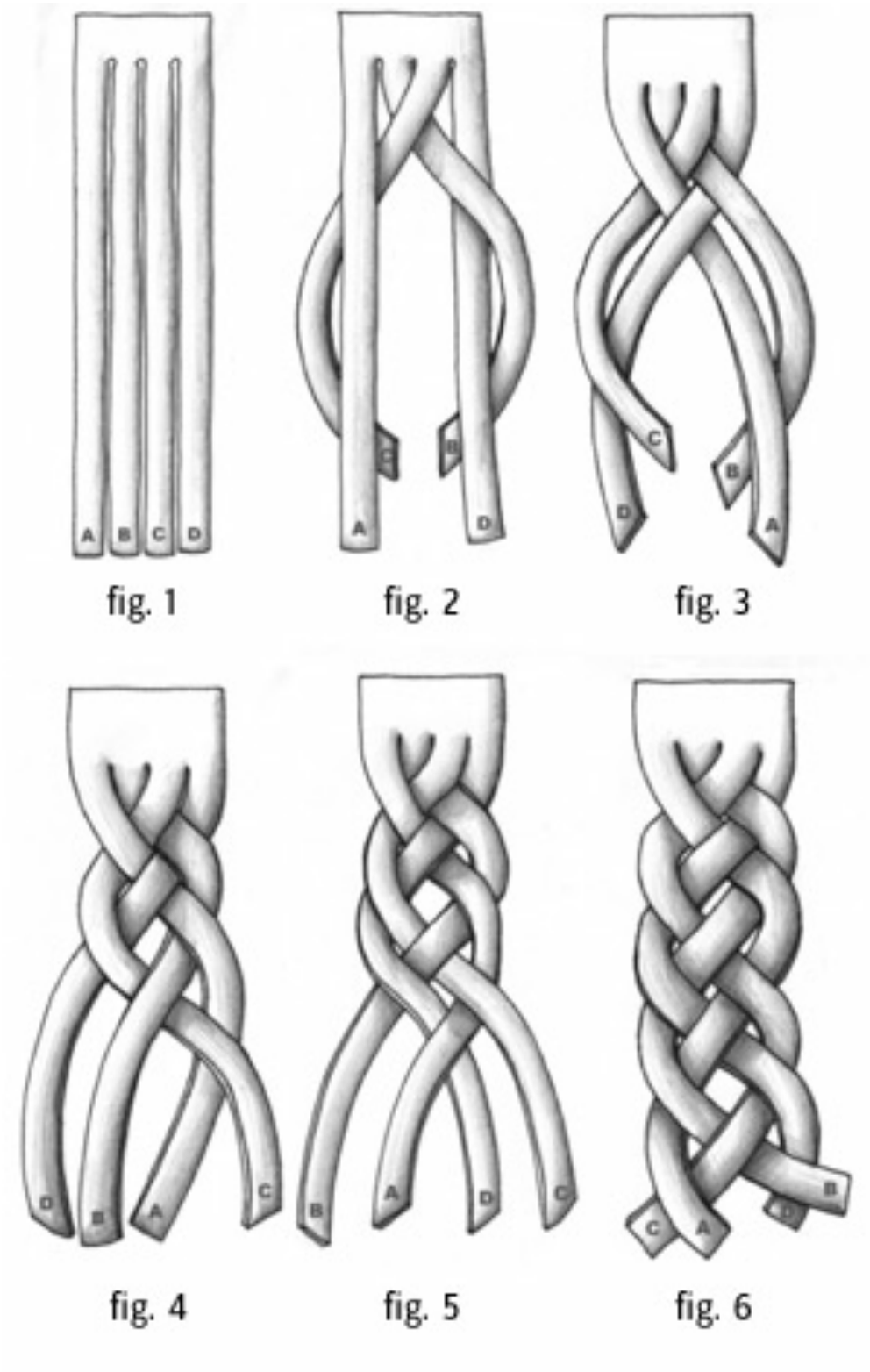


fig. 1 fig. 2 fig. 3

fig. 4 fig. 5 fig. 6

complecting

bloats your programs

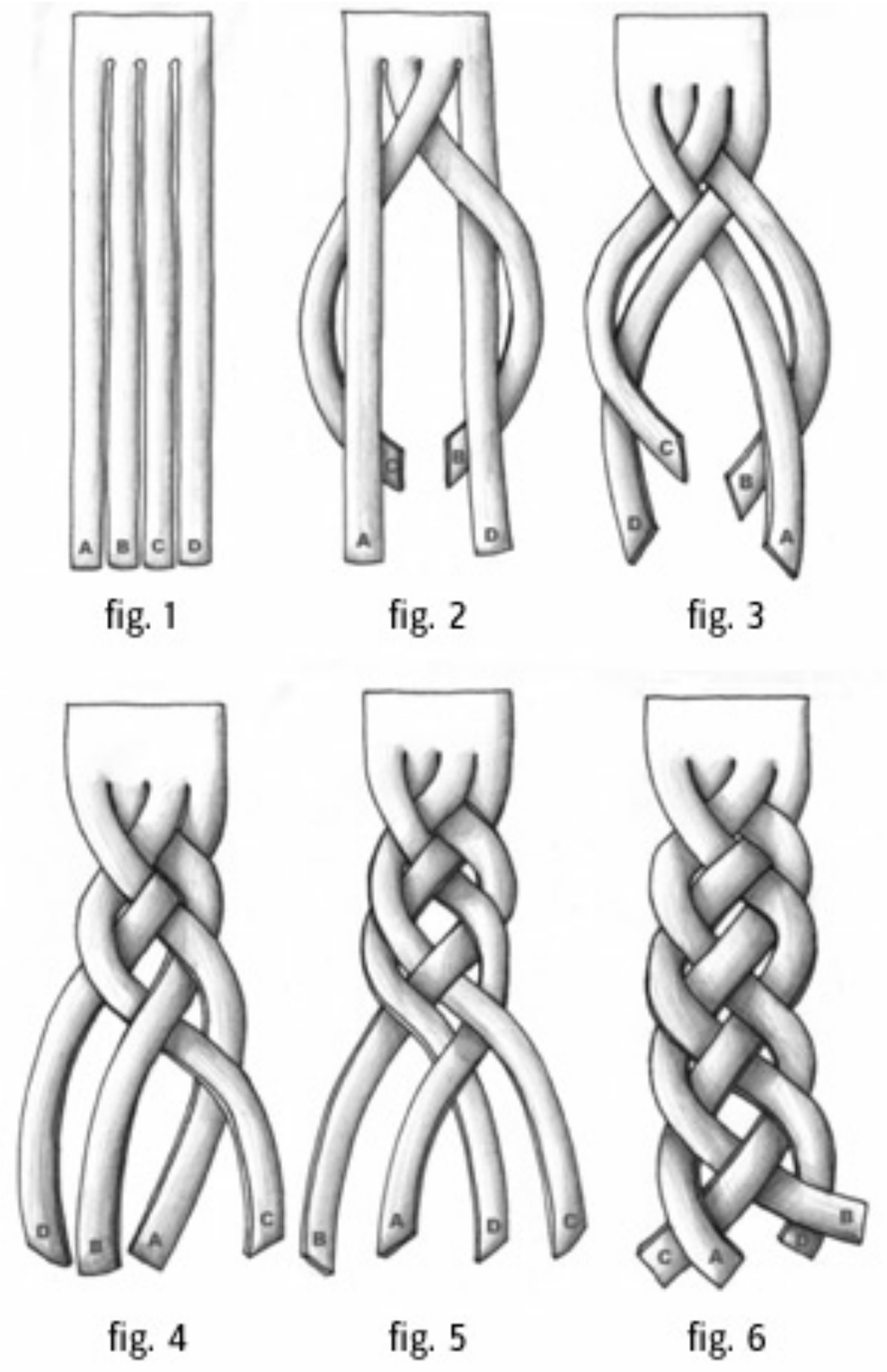


fig. 1 fig. 2 fig. 3

fig. 4 fig. 5 fig. 6

https://www.infoq.com/presentations/Simple-Made-Easy

Generality

"It is better to have 100 functions operate on one data structure than 10 functions on 10 data structures."

http://www.cs.yale.edu/homes/perlis-alan/quotes.html

The Book Manager

"I currently have 22 classes with 14 of them focused on the View aspect of the model"

https://softwareengineering.stackexchange.com/questions/304197/how-many-classes-are-too-many

f(story cards) = 0

At Application Scale

	Java	Clojure
data structures	hundreds to thousands	tens
functions	thousands to OMFG	hundreds

Aim Small, ***Miss*** Small

The Tools Are Back

red squiggly underlines

type systems

unit tests

frameworks

proofs

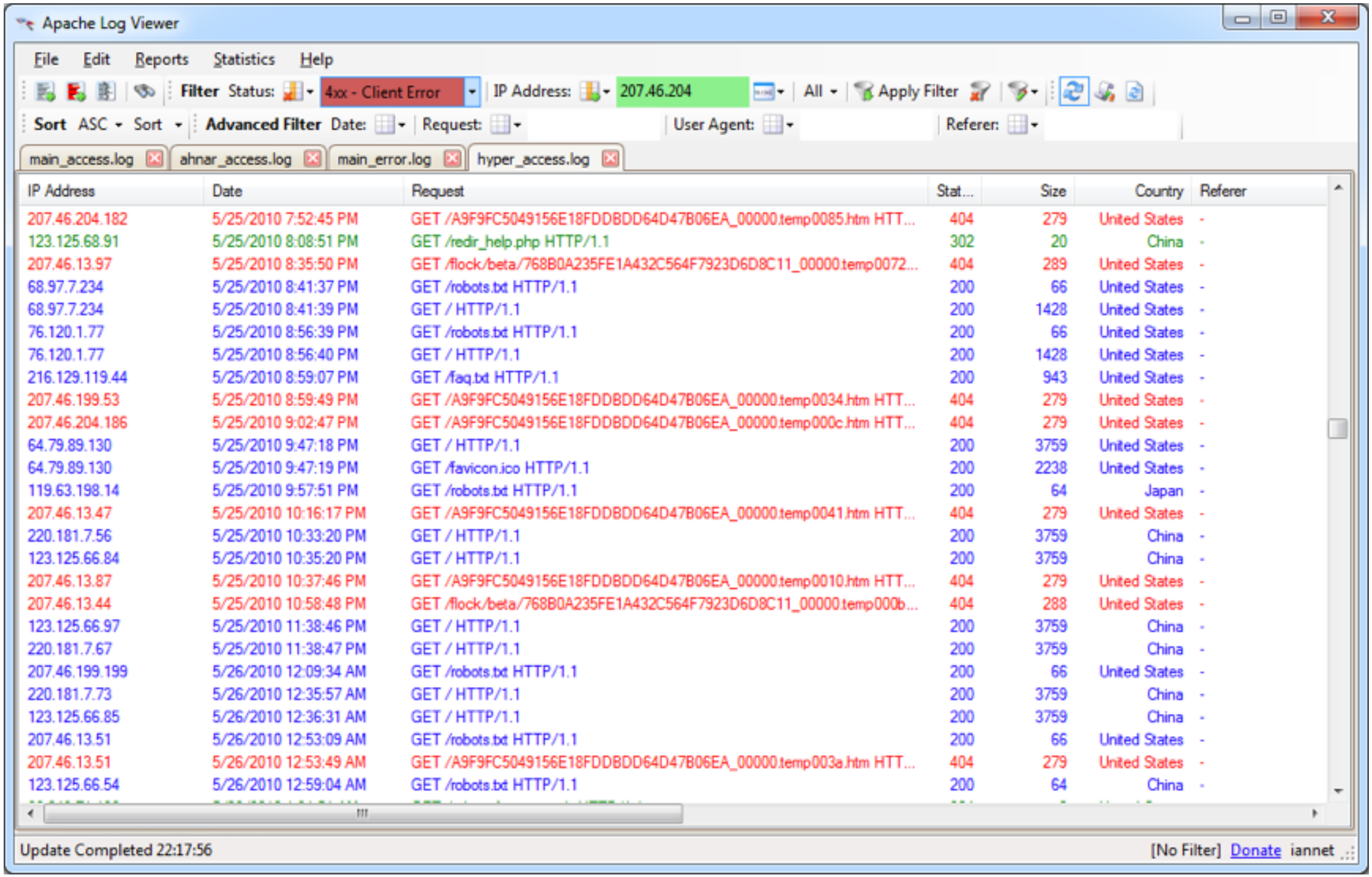
generative testing

stacktraces
frameworks
agile methods
TDD
logging
humane error messages
step debuggers
simulation

evidence (n.)

appearance from which inferences may be drawn

Logs Are Great Evidence



https://softwarerecs.stackexchange.com/questions/1358/apache-log-viewer-alternative-for-linux

Logs

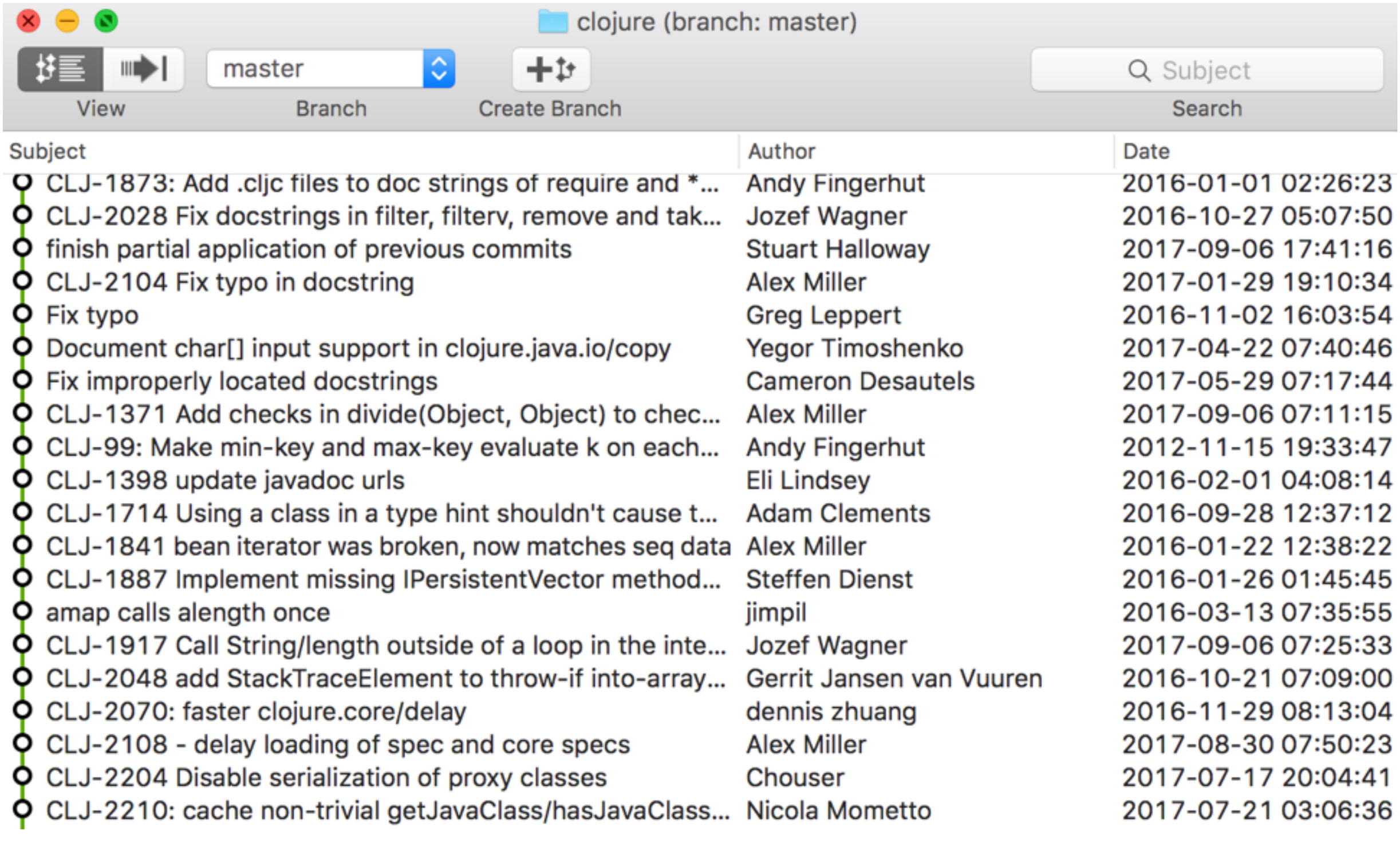
persistent

indelible

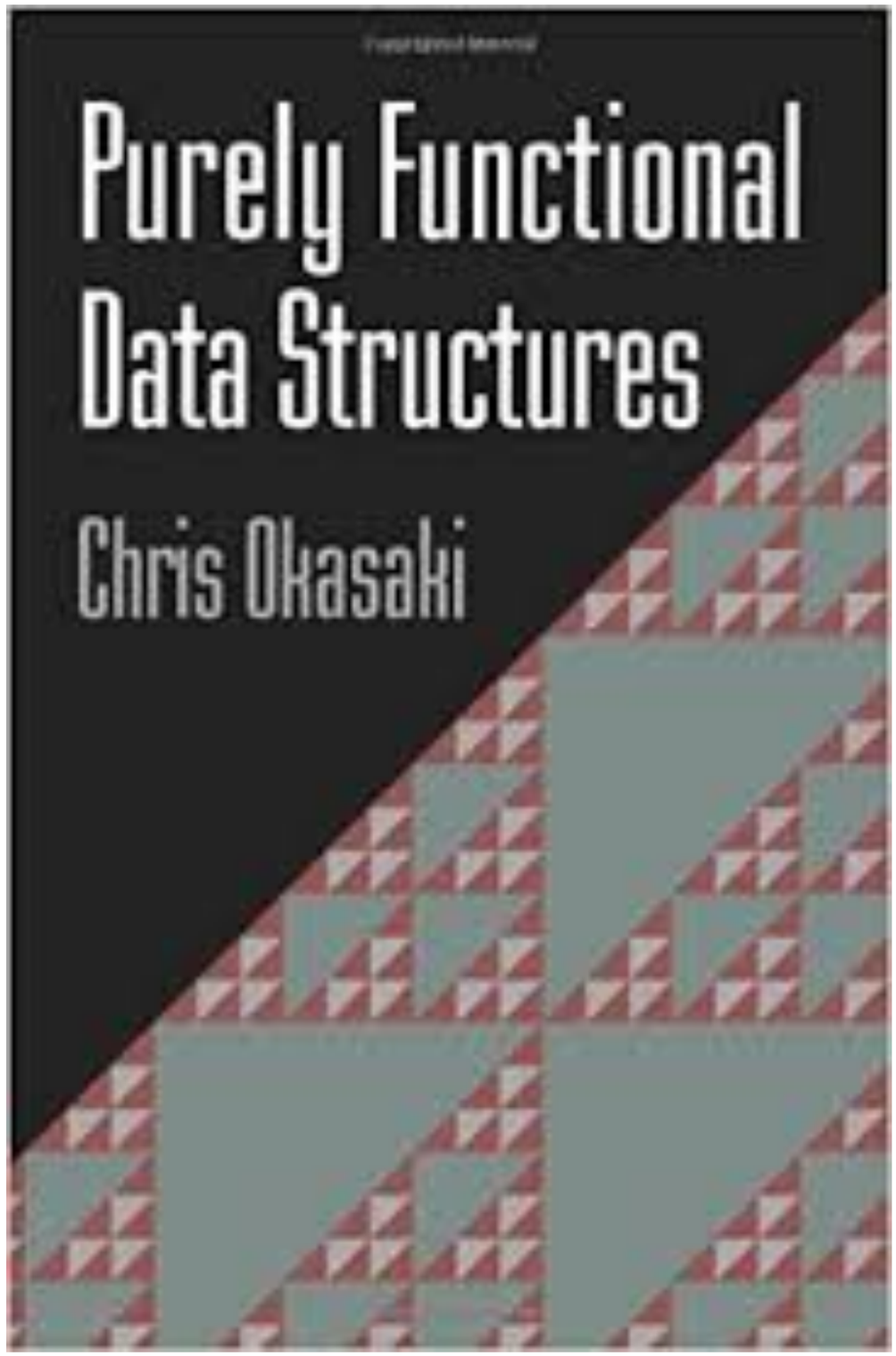
temporal*

ordered*

Git Too


clojure (branch: master)
master
View
Branch
Create Branch
Subject
Search
Subject
Author
Date
CLJ-1873: Add .cljc files to doc strings of require and *...
Andy Fingerhut
2016-01-01 02:26:23
CLJ-2028 Fix docstrings in filter, filterv, remove and tak...
Jozef Wagner
2016-10-27 05:07:50
finish partial application of previous commits
Stuart Halloway
2017-09-06 17:41:16
CLJ-2104 Fix typo in docstring
Alex Miller
2017-01-29 19:10:34
Fix typo
Greg Leppert
2016-11-02 16:03:54
Document char[] input support in clojure.java.io/copy
Yegor Timoshenko
2017-04-22 07:40:46
Fix improperly located docstrings
Cameron Desautels
2017-05-29 07:17:44
CLJ-1371 Add checks in divide(Object, Object) to chec...
Alex Miller
2017-09-06 07:11:15
CLJ-99: Make min-key and max-key evaluate k on each...
Andy Fingerhut
2012-11-15 19:33:47
CLJ-1398 update javadoc urls
Eli Lindsey
2016-02-01 04:08:14
CLJ-1714 Using a class in a type hint shouldn't cause t...
Adam Clements
2016-09-28 12:37:12
CLJ-1841 bean iterator was broken, now matches seq data
Alex Miller
2016-01-22 12:38:22
CLJ-1887 Implement missing IPersistentVector method...
Steffen Dienst
2016-01-26 01:45:45
amap calls alength once
jimpil
2016-03-13 07:35:55
CLJ-1917 Call String/length outside of a loop in the inte...
Jozef Wagner
2017-09-06 07:25:33
CLJ-2048 add StackTraceElement to throw-if into-array...
Gerrit Jansen van Vuuren
2016-10-21 07:09:00
CLJ-2070: faster clojure.core/delay
dennis zhuang
2016-11-29 08:13:04
CLJ-2108 - delay loading of spec and core specs
Alex Miller
2017-08-30 07:50:23
CLJ-2204 Disable serialization of proxy classes
Chouser
2017-07-17 20:04:41
CLJ-2210: cache non-trivial getJavaClass/hasJavaClass...
Nicola Mometto
2017-07-21 03:06:36

Persistent Data Structures



https://www.amazon.com/Purely-Functional-Structures-Chris-Okasaki/dp/0521663504

Aim Small, Miss *Small*

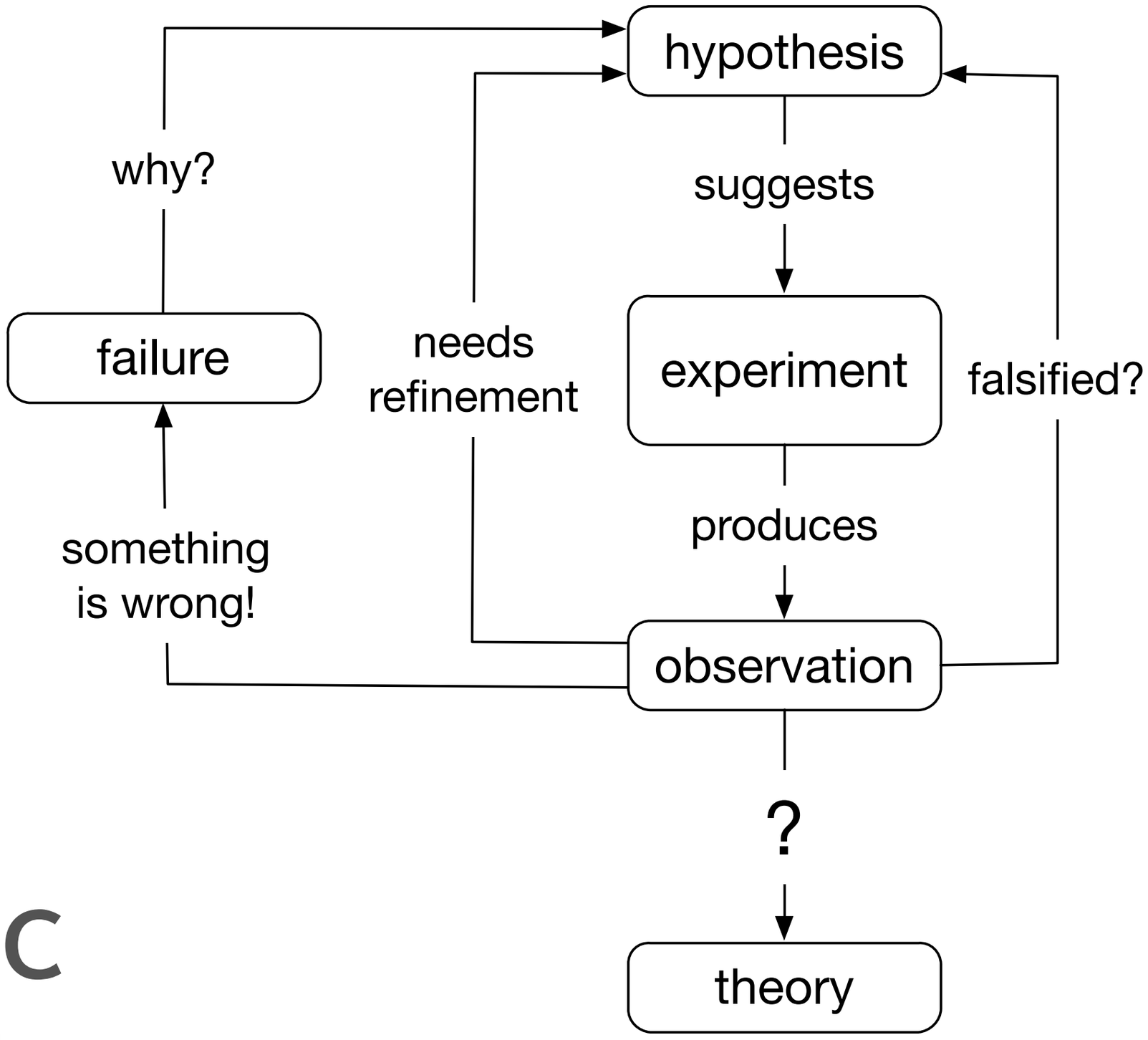
Like TDD?

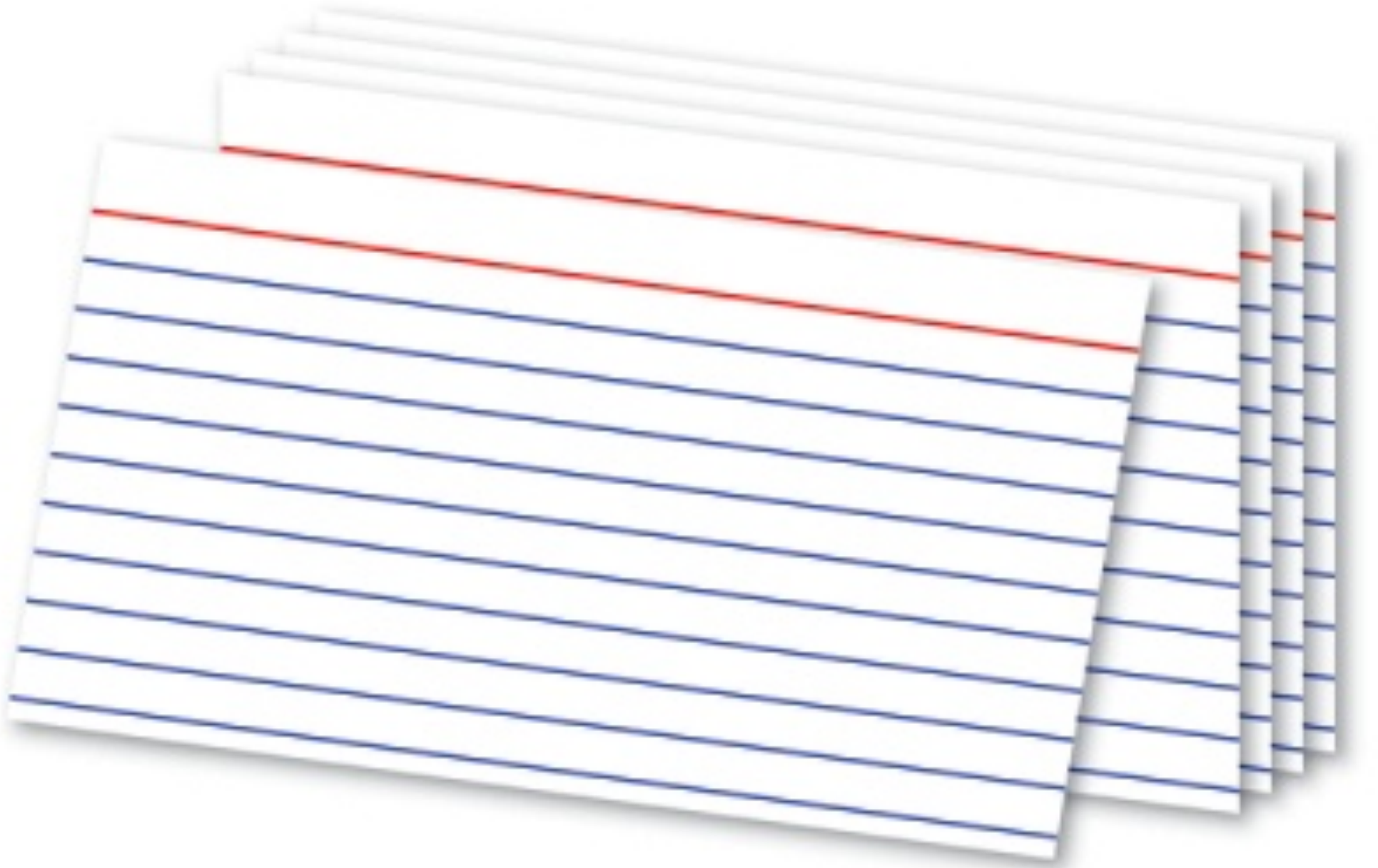
Try RDD

https://vimeo.com/223309989

http://blog.cognitect.com/blog/2017/6/5/repl-debugging-no-stacktrace-required

Scientific Method





https://www.officedepot.com/a/products/1397818/Office-Depot-Brand-Ruled-Index-Cards/

https://www.officedepot.com/a/products/1395046/Office-Depot-Brand-Rainbow-Index-Cards/

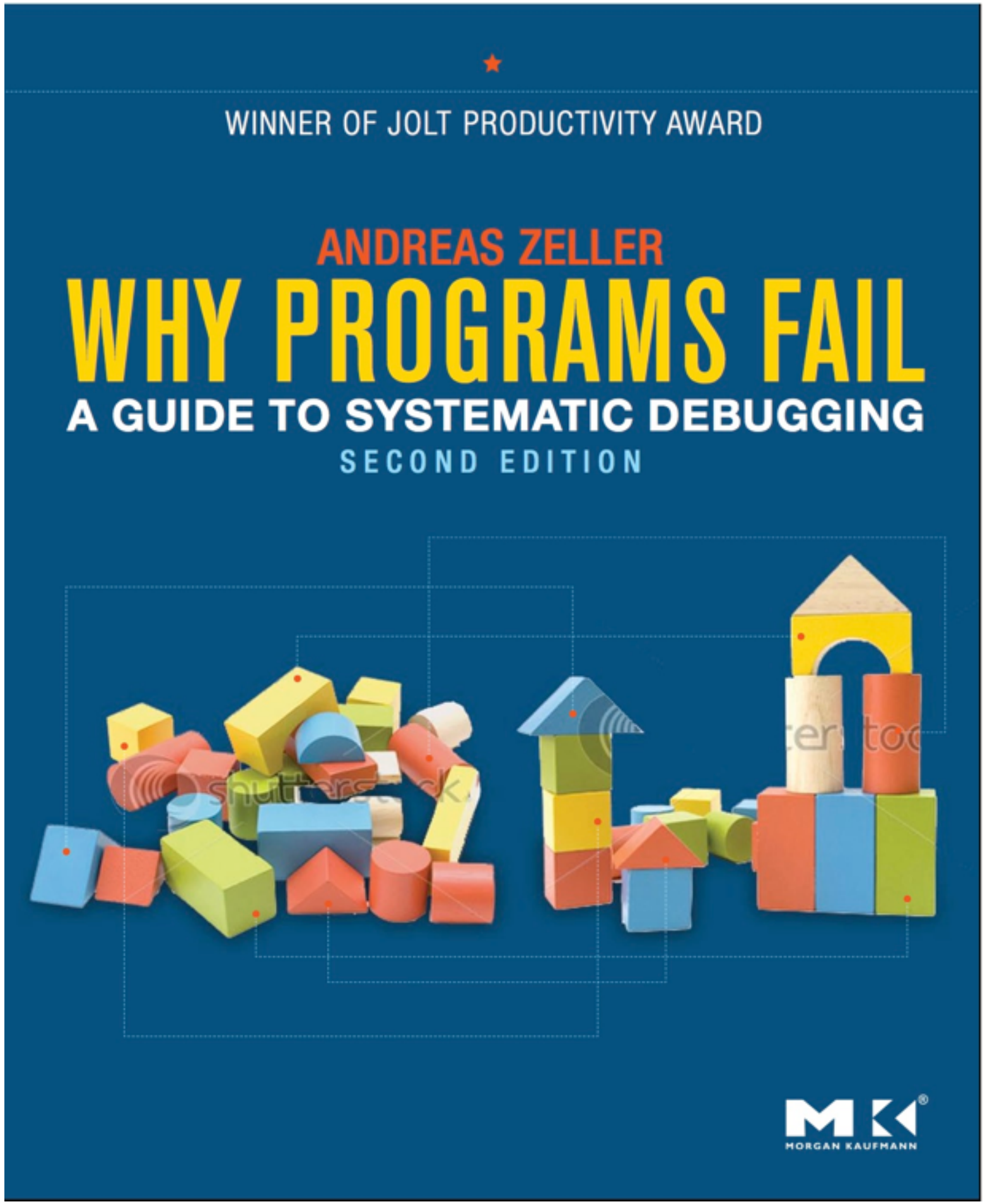
Weak Science Beats Strong Tools

poor problem statement

incomplete hypothesis

exploratory experiments

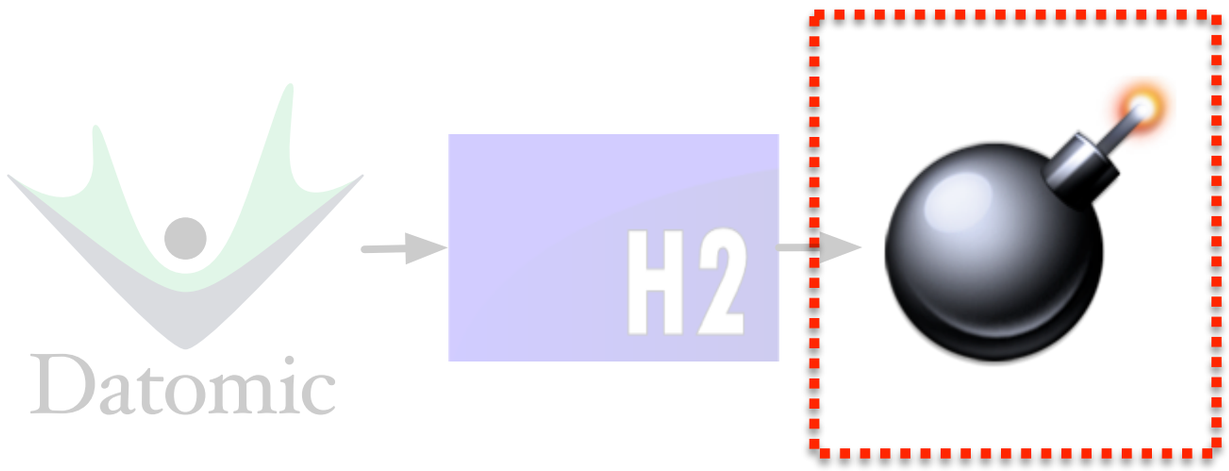
minimal domain knowledge



http://www.whyprogramsfail.com/

Planned

Actual



What Went Wrong?

code was complected

no problem statement

guesses without method

Cheatsheet

aim	thought
small	simplicity, generality
miss	evidence
small	scientific method

\

Aim Small, Miss Small

Hammock Driven Development

Talk: https://www.youtube.com/watch?v=f84n5oFoZBc
Transcript: https://github.com/matthiasn/talk-transcripts/blob/master/Hickey_Rich/HammockDrivenDev.md

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Simple Made Easy

Talk: https://www.infoq.com/presentations/Simple-Made-Easy
Transcript: https://github.com/matthiasn/talk-transcripts/blob/master/Hickey_Rich/SimpleMadeEasy.md

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Debugging With The Scientific Method

Talk: https://www.youtube.com/watch?v=FihU5JxmnBg
Transcript: https://github.com/matthiasn/talk-transcripts/blob/master/Halloway_Stuart/DebuggingWithTheScientificMethod.md

Aim Small, Miss Small: Writing Correct Programs

@stuarthalloway