Google

Keep Your Software Working

Principles from Google

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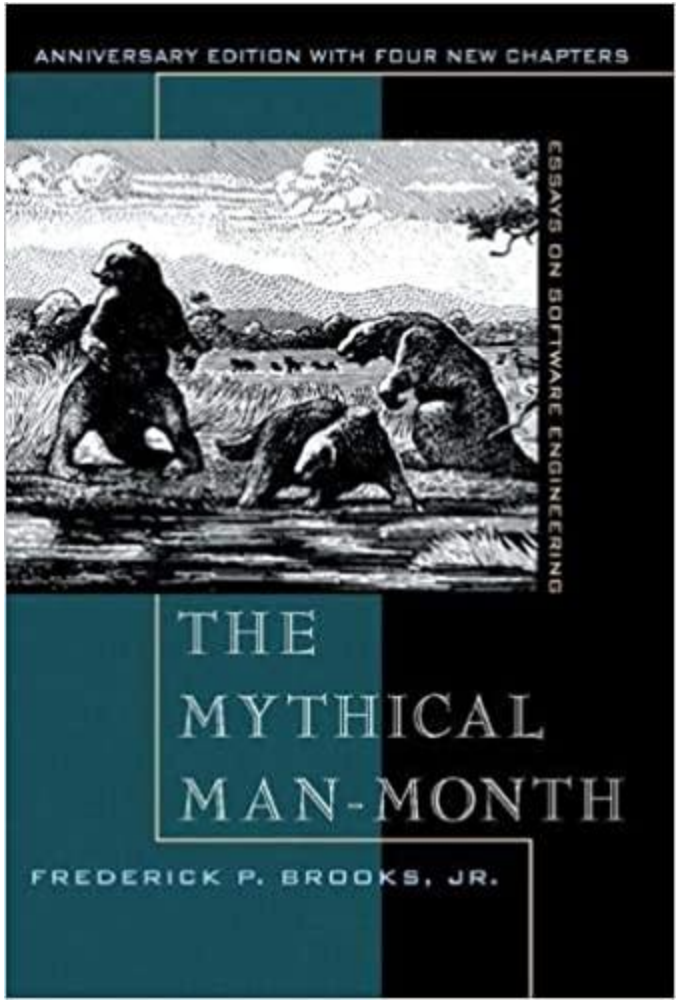
Reproducibility

Programming is NOT Software Engineering

Software engineering is what happens to programming when you add time and other programmers.

[Software Engineering is] the Multi-Person Construction of Multi-Version Programs.


ANNIVERSARY EDITION WITH FOUR NEW CHAPTERS
ESSAYS ON SOFTWARE ENGINEERING
THE MYTHICAL MAN-MONTH
FREDERICK P. BROOKS, JR.

Testing


U.S.S. ENTERPRISE
NCC-1701
THE LIGHT WORKS

Bicycle Maintenance Checklist

- Check tire pressure.
- Check brakes and brake levers.
- Wipe down fork stanchions.
- Clean & lube your chain.
- Check wheels for tightness.
- Check quick release tension.
- Check shift-levers and derailleurs.

Testing

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How you protect your code from time and change

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(while still allowing useful changes at minimal effort)

Properties of Good Tests

- Easy to trigger
- Fast to respond
- Reliable
- Actionable

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- Easy to trigger
- Fast to respond
- Robust (not flaky)
- Resilient (not brittle)
- Correctness
- Readability
- Completeness

Hermeticity

Speculative Execution

OS Bugs

Languages, Libraries

Bugs Everywhere

Hermeticity

Build Systems

Automation Progression

I'll Write a Script!

You chain together all the pieces of your analysis so you don't have to remember the invocations.

I'll Identify the Dataflow!

You write make-like rules for "If X needs to be updated, do these steps."
You add that to a simple rule-based build system or control flow system.

I'll Define the Transforms

You use a modern build system to fully specify the inputs/outputs at each step. This allows better caching and reproducibility, because there are no hidden side effects. A change to either upstream data or tools will propagate downstream.

Modern Build Systems

Dependencies

Programming Dependencies: Good

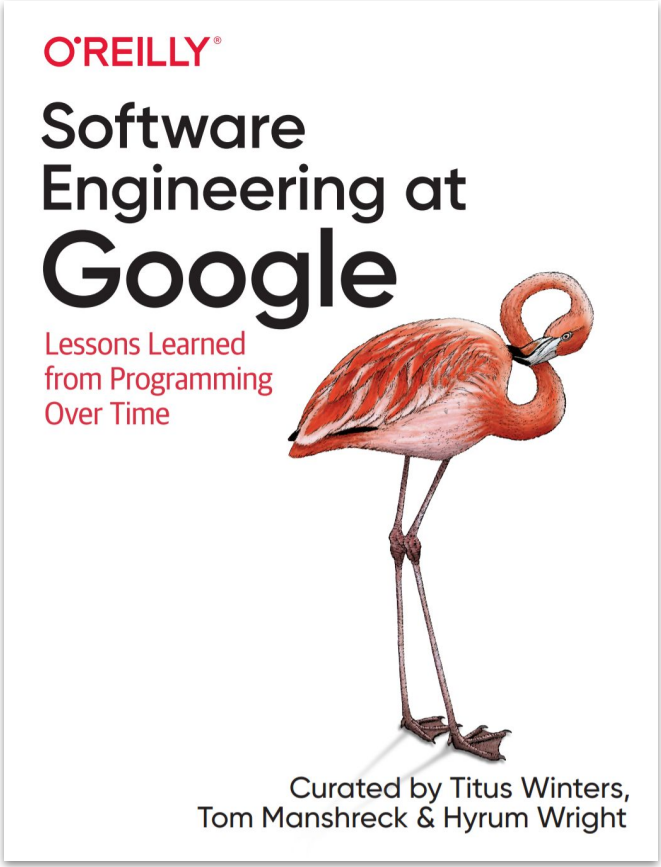
Software Engineering Dependencies: Not As Good

Research Code is Code

Please Write Tests

Have a Reliable Build/Processing Pipeline

Programming is NOT Software Engineering



Questions?