Architecture: Design Docs

17-313 Fall 2023

Foundations of Software Engineering

https://cmu-313.github.io

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Administrivia

- Teamwork assessments due every Friday.
- Reminder: Midterm on October 10, in class
  - We will release sample/practice exams for recitation next week.

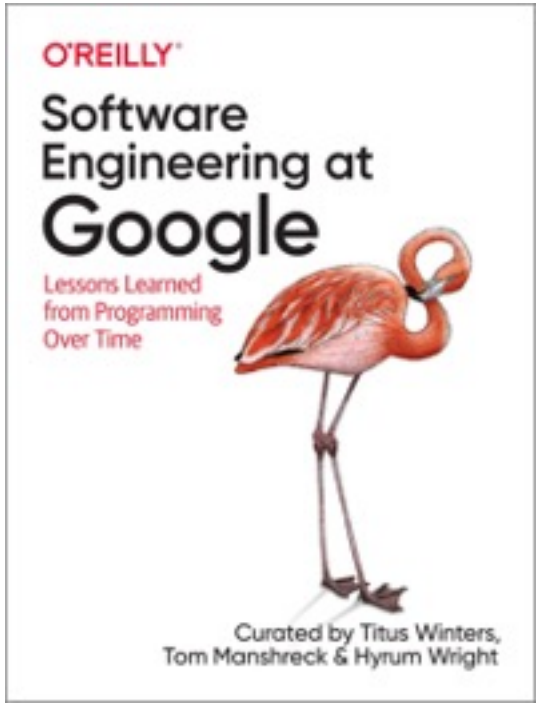
- Ambiguous instructions and some (controlled) pain is a goal for this course.
  - studied new Microsoft engineers for 2 years. The pain you're experiencing in HW2 is the same they go through.
  - You're going to be so much better prepared than them!

Learning Goals

- Articulate the various purposes of a design document.
- Use design documentation to ensure that the correct thing is being implemented.
- Write useful, clear, high-quality design documentation.

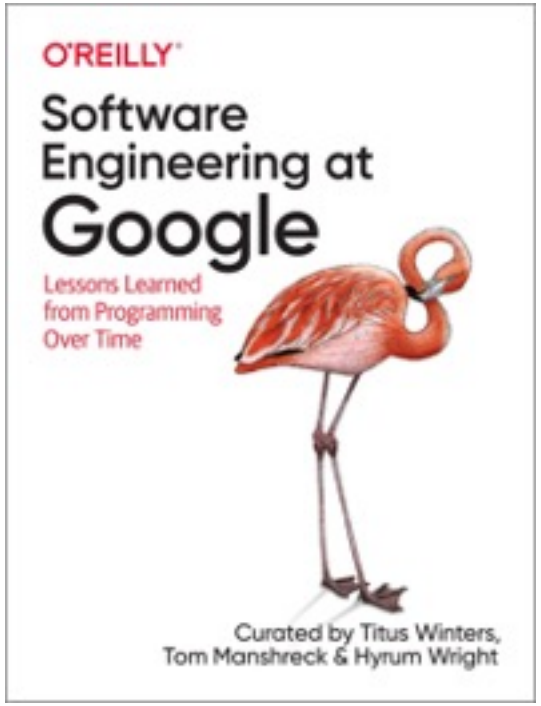
Types of documentation

- Reference documentation (incl. code comments)
- Design documents
- Tutorials
- Conceptual documentation
- Landing pages



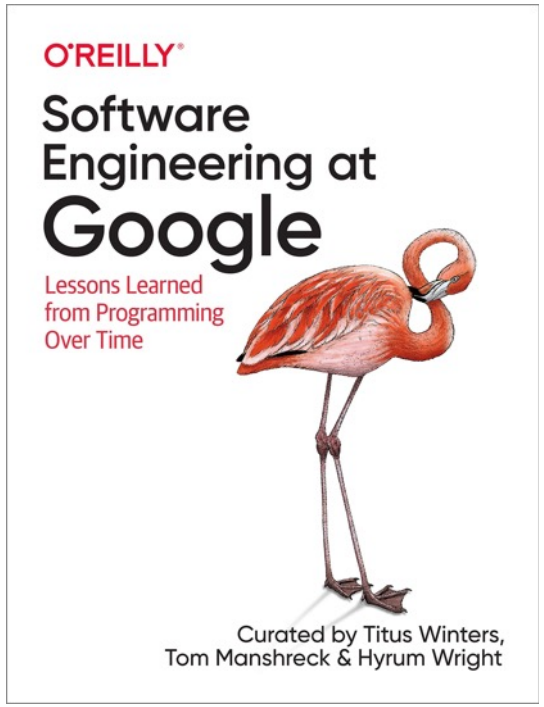
Design documents

- **Code review before there is code!**
- Collaborative (Google Docs)
- Ensure various concerns are covered, such as: security implications, internationalization, storage requirements, and privacy concerns.
- A good design doc should cover
  - Goals and use cases for the design
  - Implementation ideas (not too specific!)
  - Propose key design decisions with an emphasis on their individual tradeoffs



Design Documents

- The *best* design docs suggest design goals, and cover alternative designs, documenting the strengths and weaknesses of each.
- The *worst* design docs accidentally embed ambiguities, which cause implementors to develop contradictory solutions that the customer doesn't want.



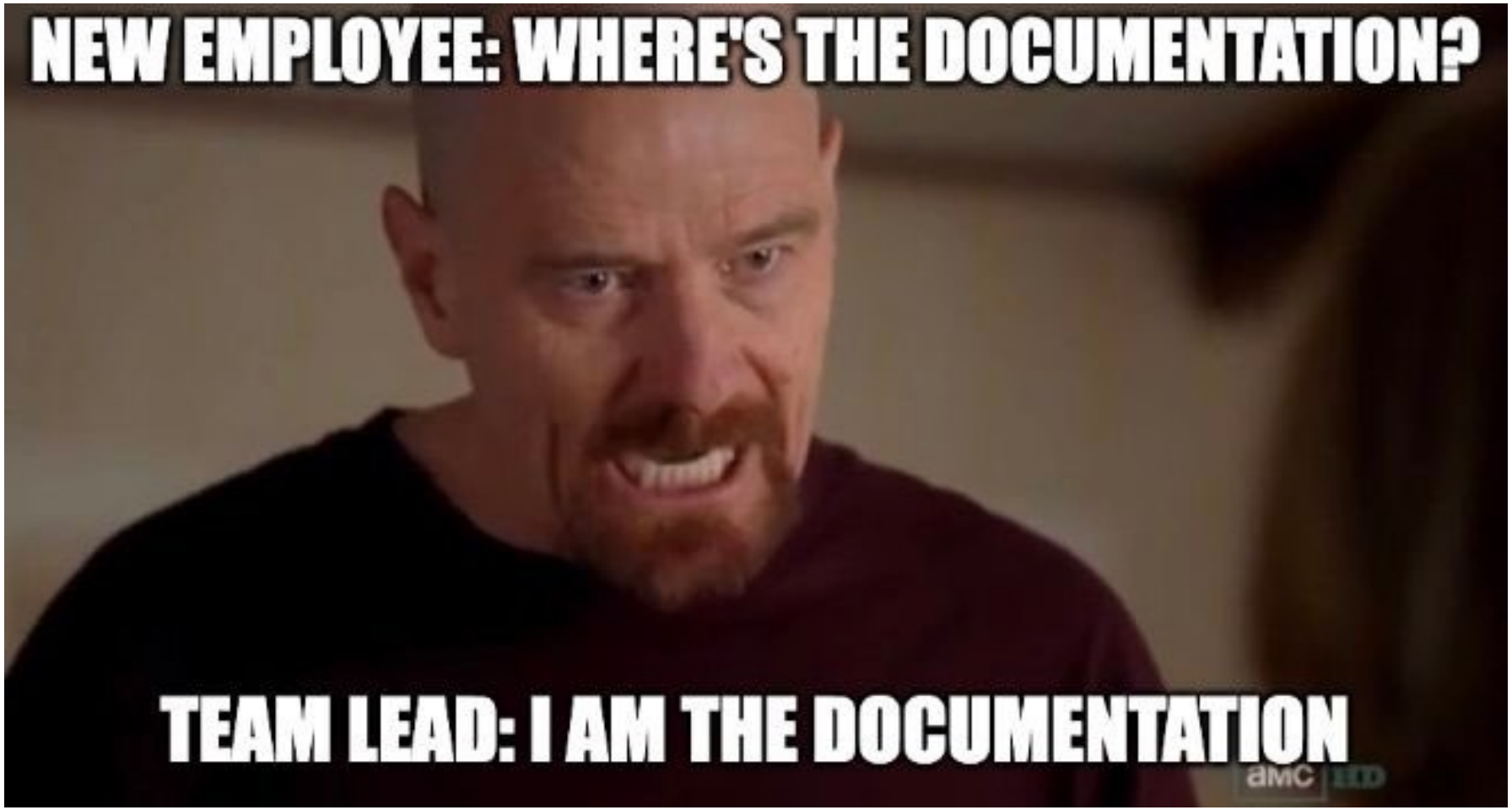
Companies using an RFC-like engineering planning process*

- Airbnb
- Affirm
- Algolia
- Amazon
- AutoScout24
- Asana
- Atlassian
- Blue Apron
- Bitrise
- Booking.com
- Brex
- BrowserStack
- Canonical
- Carousell
- Catawiki
- Cazoo
- Cisco
- CockroachDB
- Coinbase
- Comcast Cable
- Container Solutions
- Contentful
- Couchbase
- Criteo
- Curve
- Daimler
- Delivery Hero
- Doctolib
- DoorDash
- Dune Analytics
- eBay
- Ecosia
- Elastic
- Expedia
- Glovo
- Gojek
- Grab
- Faire
- Flexport
- GitHub
- GitLab
- GoodNotes
- Google
- Grafana Labs
- GrubHub
- HashiCorp
- Hopin
- Hudl
- Indeed
- Intercom
- LinkedIn
- Kiwi.com
- Klarna
- MasterCard
- Mews
- MongoDB
- Monzo
- Mollie
- Miro
- N26
- Netlify
- Nobl9
- Notion
- Nubank
- Oscar Health
- Octopus Deploy
- OLX
- Onfido
- Pave
- Peloton
- Picnic
- PlanGrid
- Preply
- Razorpay
- Reddit
- Red Hat
- SAP
- Salesforce
- Shopify
- Siemens
- Spotify
- Square
- Stripe
- Synopsys
- Skyscanner
- SoundCloud
- Sourcegraph
- Spotify
- Stedi
- Stream
- SumUp
- Thumbtack
- TomTom
- Trainline
- TrueBill
- Trustpilot
- Twitter
- Uber
- VanMoof
- Virta Health
- VMWare
- Wayfair
- Wave
- Wise
- WarnerMedia & HBO
- Zalando
- Zapier
- Zendesk
- Zillow

*not a complete list

pragmaticengineer.com

Why is this important?



Common parts/templates

1. Metadata: *version, date, authors*
2. Executive Summary: *problem being solved, project mission*
3. Stakeholders (and non-stakeholders)
4. Scenarios / User Stories
5. User Experience

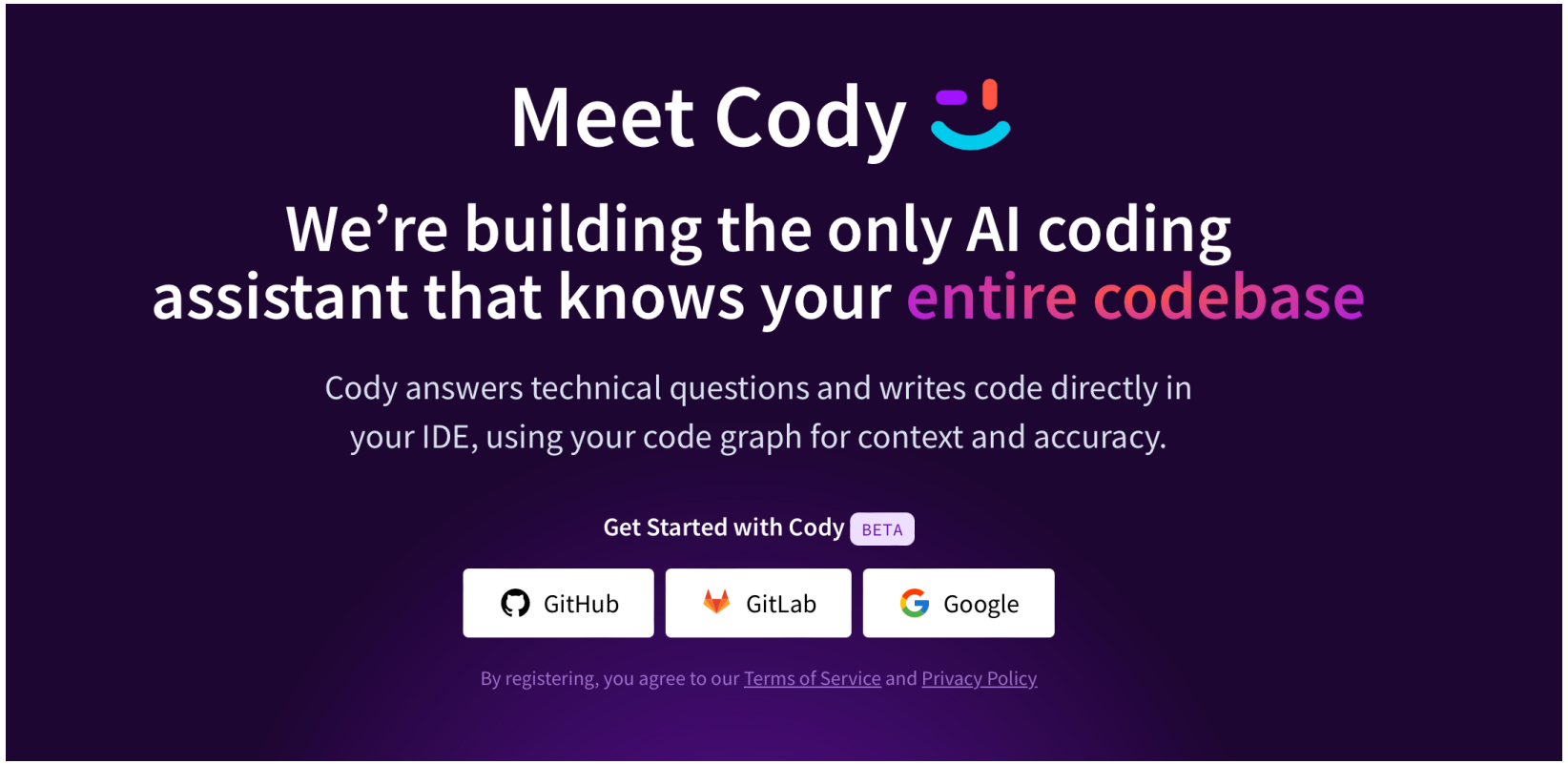
1. High-level Requirements: *Functional*
   - Global Requirements: *Quality, Security, Privacy, Ethics*
2. Features and Operations
3. Design Considerations and Tradeoffs
4. Non-Goals
5. Roadmap / Timeline
6. Open Issues

Examples: SourceGraph RFCs

Requests for Comment

https://about.sourcegraph.com/handbook/communication/rfcs

Sourcegraph



When to use an RFC:

Sourcegraph

- You want to frame a problem and propose a solution.
- You want thoughtful feedback from team members on our globally-distributed remote team.
- You want to surface an idea, tension, or feedback.
- You want to define a project or design brief to drive project collaboration.
- You need to surface and communicate around a highly cross-functional decision with our formal decision-making process.

Don’t use an RFC when

Sourcegraph

- You want to discuss personal or sensitive topics one-on-one with another team member.
- You want to make a decision to change something where you are the decider. In the vast majority of cases, creating an RFC to explain yourself will be overkill. RFCs should only be used if a decision explicitly requires one of the bullets in the previous page.

RFC Labels

Sourcegraph

- **W□P**: The author is still drafting the RFC and it's not ready for review.
- **Review**: The Review label is used when the RFC is ready for comments and feedback.
- **Approved**: When the RFC is for the purpose of making a decision, the Approved label indicates that the decision has been made.
- **□mplemented**: When the RFC is for the purpose of making a decision, the □mplemented label indicates that the RFC's proposal has been implemented.
- **Closed**: When the RFC is for the purpose of collaboration or discussion but not necessarily to make a decision or propose a specific outcome that will eventually become □mplemented, the Closed label indicates that the RFC is no longer an active collaborative artifact.
- **Abandoned**: When the RFC is for the purpose of making a decision, and there are no plans to move forward with the RFC's proposal, the Abandoned label indicates that the RFC has been purposefully set aside.

Observe Sourcegraph Design Docs

- Docs are publicly available
  https://drive.google.com/drive/folders/1zP3FxdDlcSQGC1qvM9lHZRaHH4□9Jwwa

- Let’s take a look at one!

Time to write our own design docs!

- Partition classroom into 4 teams.
- Your mission: Brainstorm a feature to add to NodeBB and write a design spec, together!

Team 1

Team 2

Team 3

Team 4