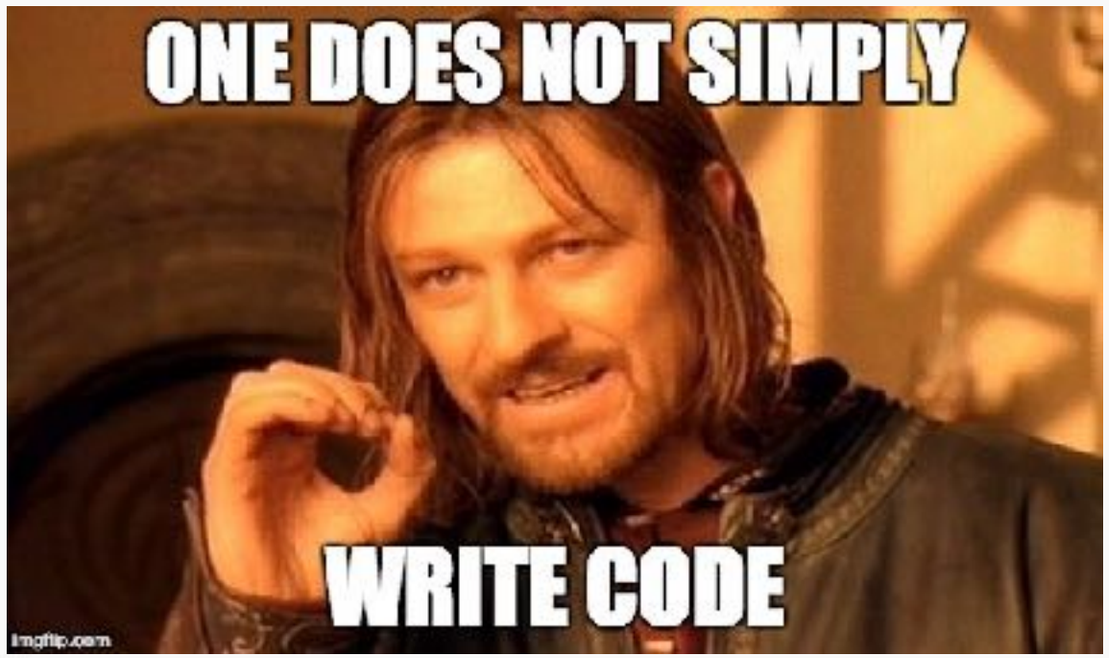
Professional Software Development

Hi,
I’m JD

- JD Wolk, professional software developer for ~7 years, ~4.5 years as a consultant at Philosophie
- Here to give a whirlwind tour of professional software development
- Completely subjective and basically arbitrary. Based on my own experience in the field
- Combination of things you’ll encounter in day-to-day software development, lessons you’ll probably learn, topics you can research, and what I think might be helpful for starting out in the field
- Mostly the stuff besides the nuts-and-bolts of code, though we will talk a bit about it.



- If you only take one thing away from this, let it be that professional software development is about more than just writing code
- This probably isn't a surprise to anyone, but you probably have a lot of "unknown unknowns" if you've only ever worked on hobby software projects before
- To be successful as a professional software developer you need to develop both hard skills and soft skills so you can work effectively on a team

Hard Skills

Tools

Practices

Principles

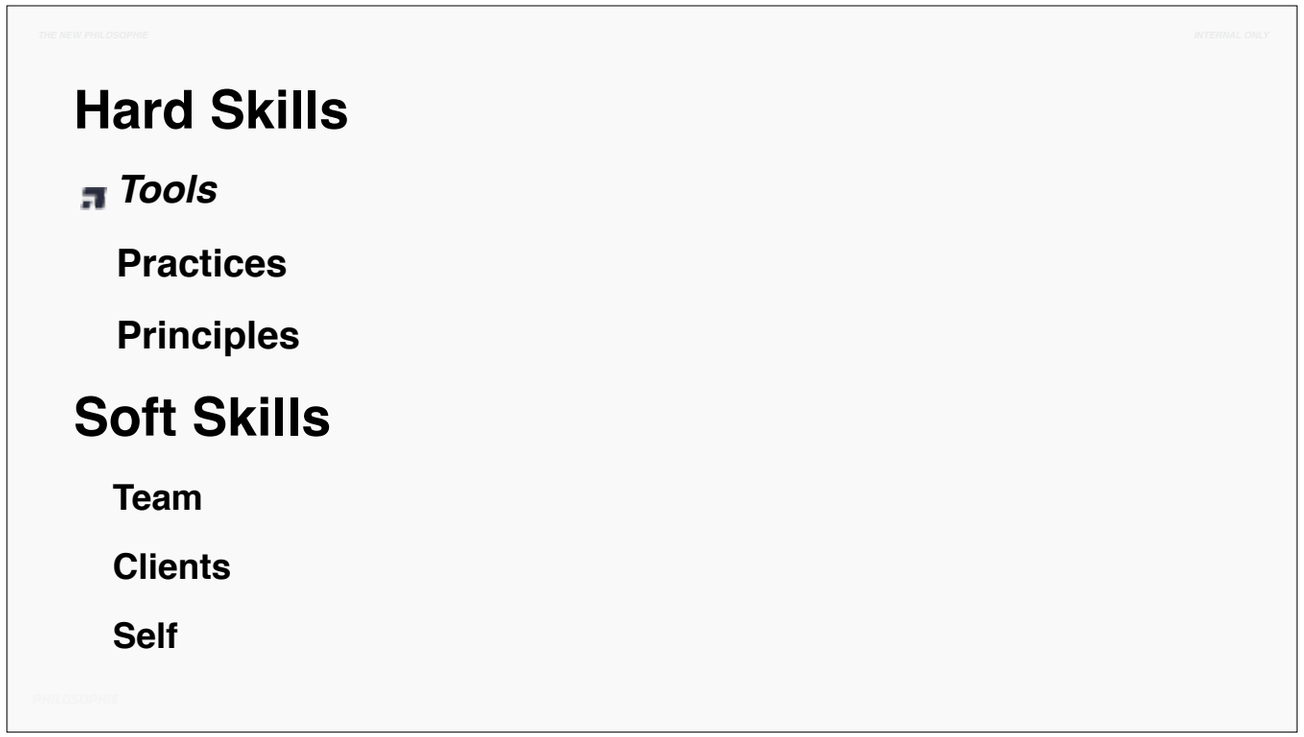
Soft Skills

Team

Clients

Self

This is a high-level outline of this talk



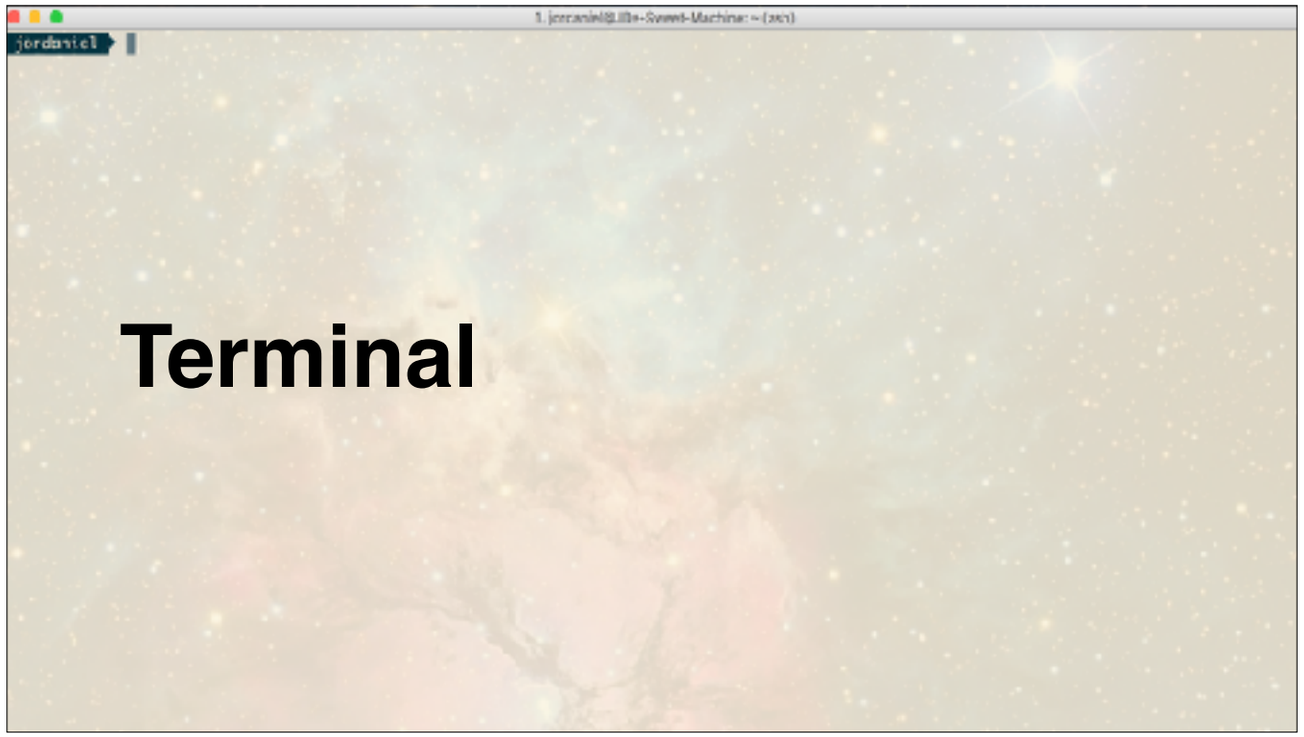
* Tools are one of the most valuable things to learn as a software developer
* The sooner you refine your abilities with your tools, the sooner you can stop letting incidental things get between your thoughts and working code.
* A side benefit is that as you gain more experience with these things you can start to pick them up faster (generally).
* They start out as a hurdle, but eventually you take them for granted as they start to blend into your workflow, making it quicker and giving you more options

* (Text Editor)
* When coding, I spend about 75% of my time looking at my text editor
* You want to have the ability to not think about what you’re doing, like touch typing
* Spend as much time as you need thinking through a problem, then execute very swiftly
* There are 2 types of text editors

* (GUI-based editors)
* Atom seems to be a pretty popular choice for more “modern” editors. Others in this space are sublime text & brackets

Terminal-based

* (Terminal-based editors)
* The two heavyweight contenders in the terminal-based editor space are vim and emacs
* Regardless of whether you prefer a GUI-based editor or whether your preferred language requires an IDE, you should still at least know the basics of working w/ terminal-based text editors like vim or emacs so you can work when ssh'd into remote servers that don't have a GUI



Terminal

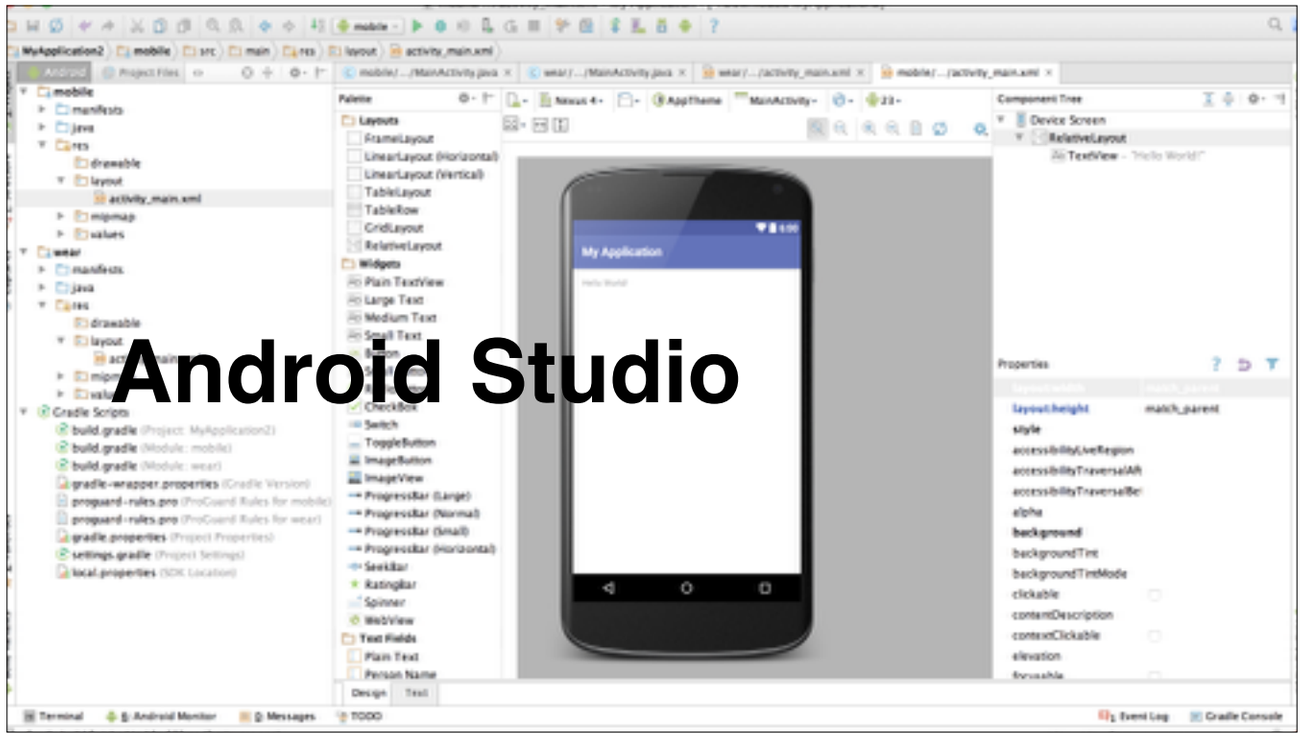
* (Terminal)
* You'll also hear words like: command line, command prompt, shell, console…they're all _basically_ referring to the same thing
* Skill with the terminal is pre-requisite for many tasks
* Mastery allows you to incorporate powerful tools into your workflow
* Ex: the command line is about more than file manipulation and navigation…

(Explain processes in terminal)

* (IDEs)
* Sometimes languages require more overhead as part of their workflow. Text editors are great for languages where this overhead is minimal like JavaScript, Ruby, and Python.
* By contrast, IDEs tend to be used more often for developing in languages that DO have this overhead (you hear terms like static, strongly typed and compiled) (i.e. Java, C++, Objective C, etc)
* Also in cases like mobile development where you need sophisticated GUI tools as part of the development workflow

- Lots of functionality besides just basic text editing: they compile your code, check for errors, run tests, have built in debugging tools, diagram editing, etc, etc
- Don't _need_ to know an IDE unless you're in a language that generally uses one

(XCode)



(Android Studio)

* (Source Control)
* Also called version control
* Source control is partly about keeping code safe, partly about change management
* Anyone ever had a work laptop stolen? Call me careless, but I've had 2
*

git

* (git)
* Most people here have probably been exposed to git
* Git was a leader in what's called "distributed" version control
* Make sure you're committing often in small chunks
    * Makes it less likely you'll lose changes + easier to follow along
* Learning more than the basics of git allows you to maintain a clean history of what happened in the codebase. This is documentation for you and other developers
* Also have nifty tools like git-bisect which lets you step through a series of commits to find which one introduced an error

Hard Skills

- Tools
- *Practices*
- Principles

Soft Skills

- Team
- Clients
- Self

(Moving onto practices)

* (Testing)
* Broadly speaking, testing is ensuring your code works as expected by running it
* Manual testing is running by hand. Starts out manageable, but the more functionality you have to check the less manageable it becomes
* When possible, you want to write automated tests — basically additional test code that you run to do the checking for you
* Running frequently while you develop increases confidence that you're not breaking things
* (Talk about tradeoffs of too little vs too many tests)
* (Talk about tests that are too-specific)
* Downside: One famous computer scientist, Edsgar Dijkstra, pointed out that "testing can be used very effectively to show the presence of bugs but never to show their absence"

Types of Automated Tests

Unit

Integration

*** Acceptance**

*** End-to-end**

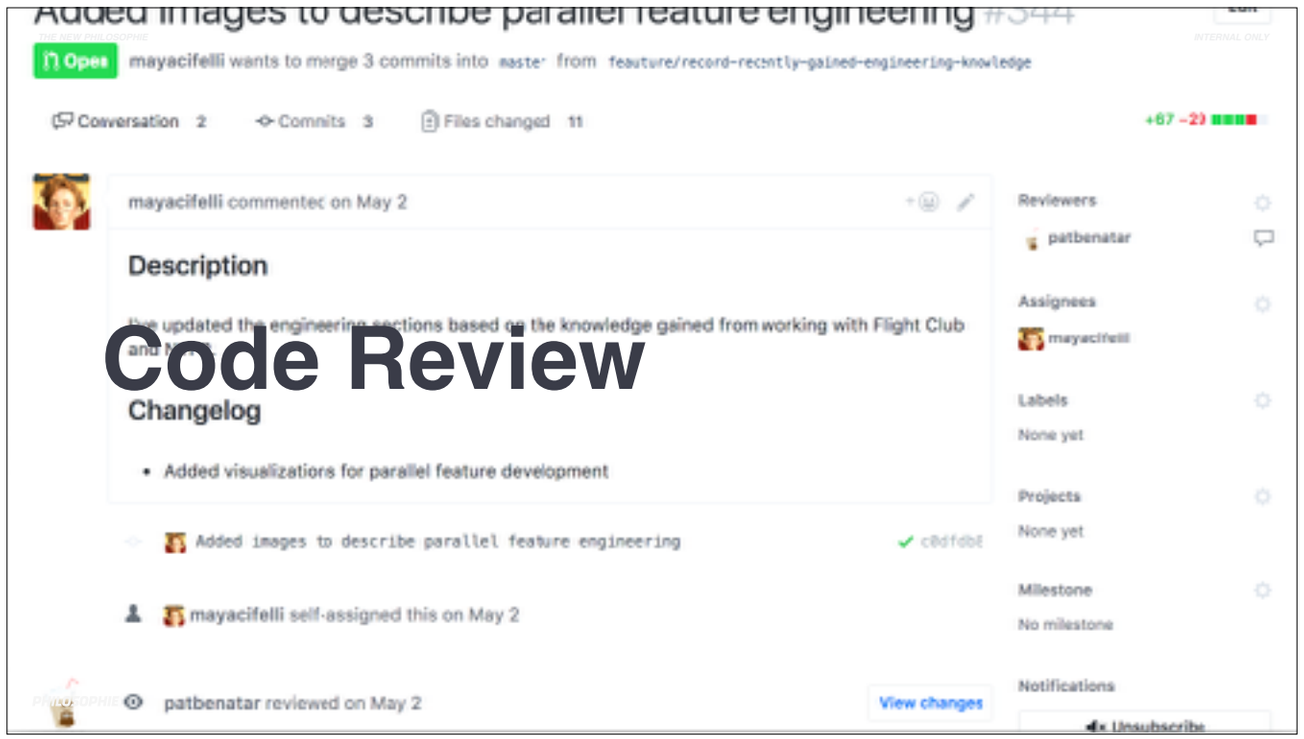
BONUS: Property-based

* (Types of tests)
* End-to-end tests are basically a kind of acceptance test
* Other types too: smoke tests, load tests

TDD =
Test Driven Development

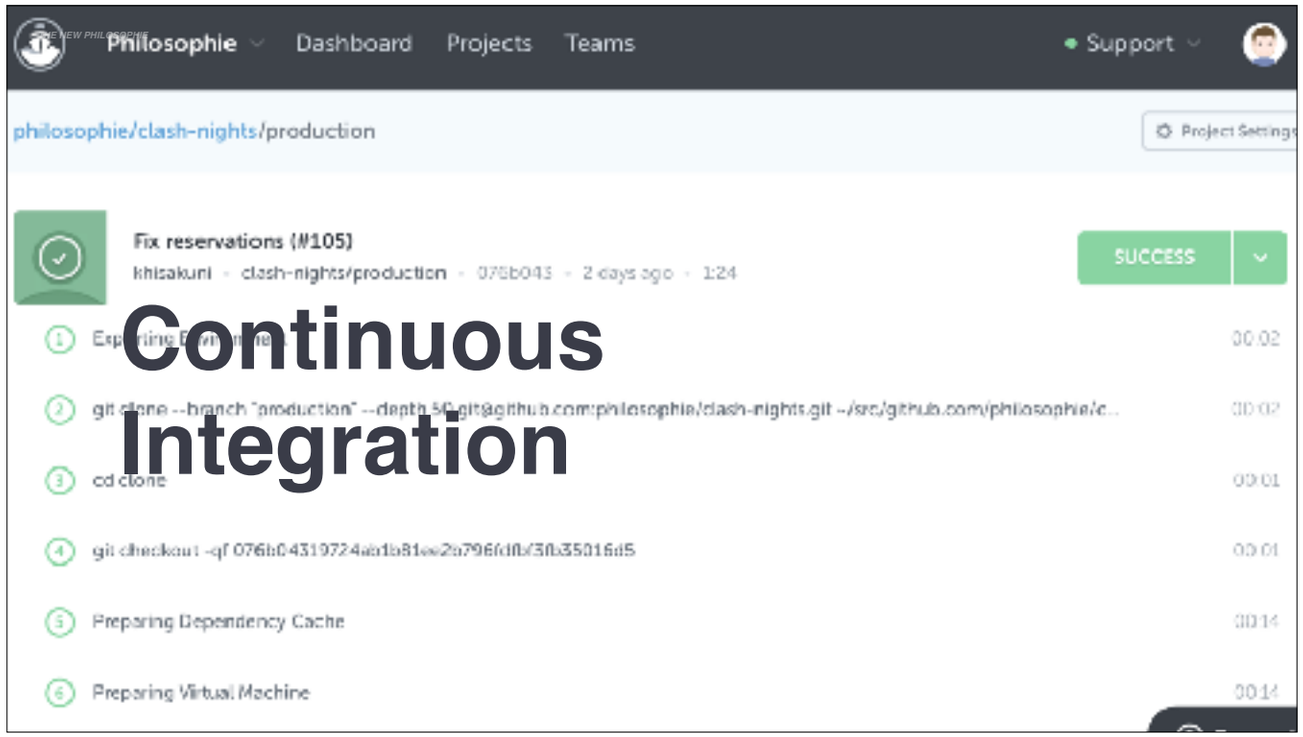
(TDD)

* (Refactoring)
* Improving the design of existing code (mainly so it’s easier to keep working with it as things inevitably change)
* You need to have a support structure in place, whether it’s tests, types, or both, to refactor effectively
* As much as possible, try to refactor as you go so you don’t have a ton of technical debt

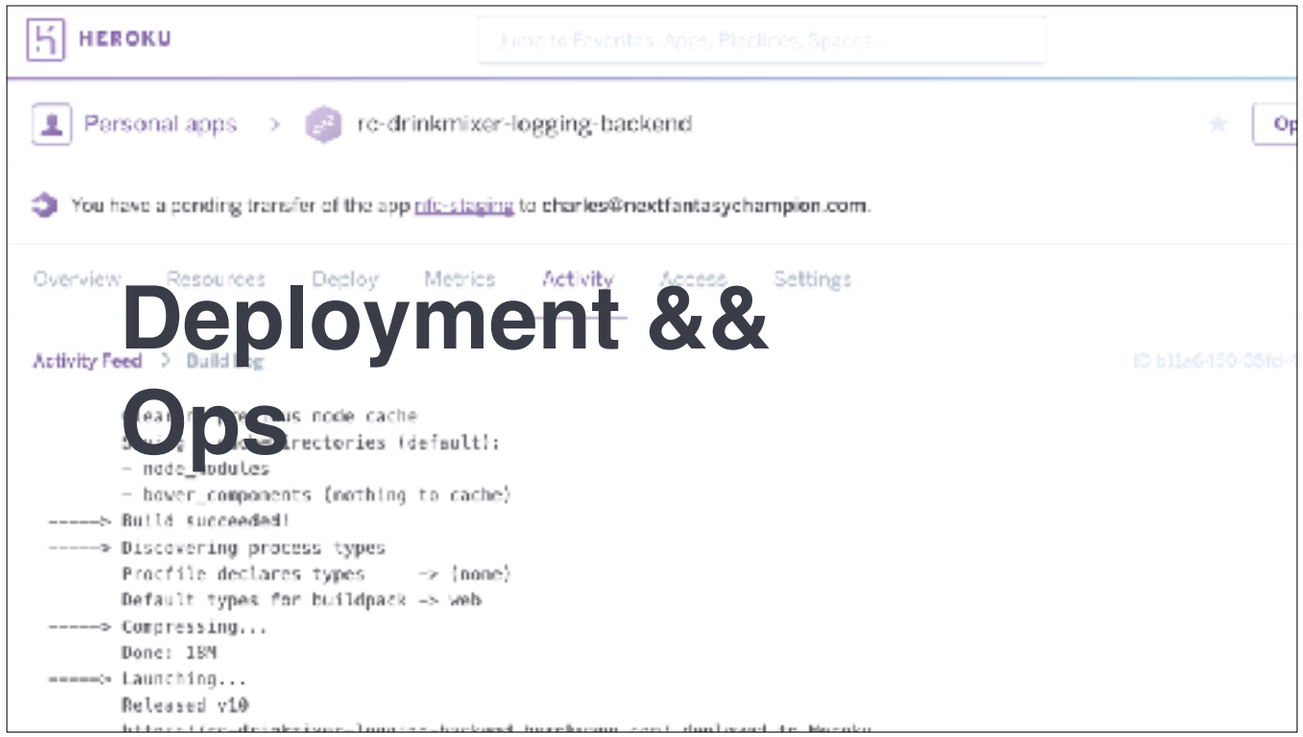


Code Review

* (Code Review)
* Provided by a service like github, gitlab, bitbucket, etc
* , i.e. “CR”, also called “PR” (pull requests or peer review) or “MR” (merge requests)
    * Increases code quality
    * Catches errors
    * Introduces you to new concepts if the reviewer has more experience in the tech you’re writing in
* Make sure you’re providing objective, constructive criticism and make sure to point out good work!

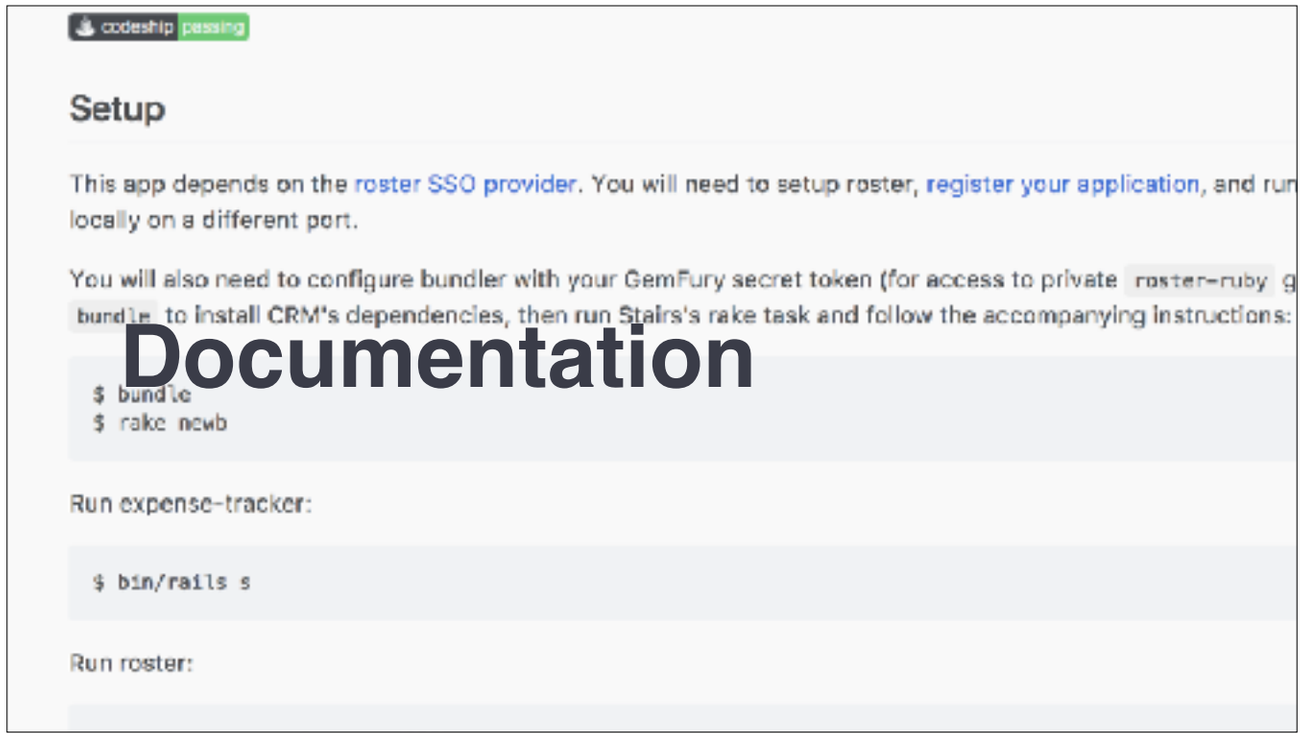


* (CI)
* You aren’t the only one working in the codebase anymore
* (What this entails)
* Services: Codeship, CircleCI, Travis CI
* Tools: Jenkins



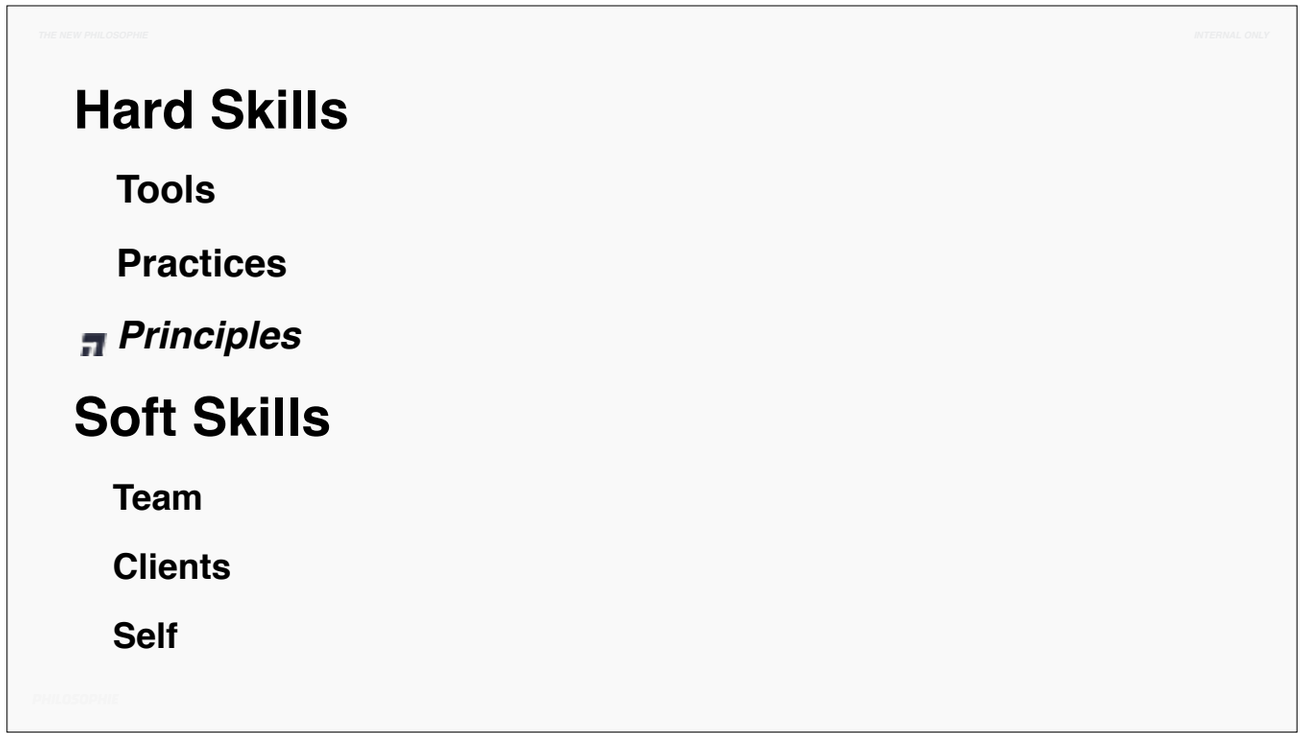
Deployment && Ops

* (Deployment and Ops)
* “Ops” == operations. Basically means system provisioning (i.e. setup) and administration
* Tools like Heroku let you not worry as much about provisioning and managing servers
* Tools like docker are shifting the paradigm
* Just know that there’s a lot of knowledge in ops; you can go down the rabbit hole as deep as you’d like, but you don’t necessarily HAVE to these days (as long as your client can afford managed solutions)
    * Time / Value tradeoff



Documentation

* (Documentation)
* Be wary of comments in code; try to make your code itself self-documenting if possible with:
  * Good naming
  * Tests
  * Types (if appropriate)
* Good technical documentation gives context. The lower-level the thing your explaining, the less likely you need to be explaining how it's doing what it's doing
* Presentationally, markdown is a good tool to have in your tool belt for writing documentation
  * As a bonus, it's a great markup format for taking notes too!



- (Principles)

* I tried to come up with principles that aren’t specific to one language or framework

* Guiding principles. Some of them may contradict; it’s only through experience that they’ll make sense. Treat them as guidelines, not hard rules

What is Good Code™?

* What is Good Code?

Good Code™: Readable

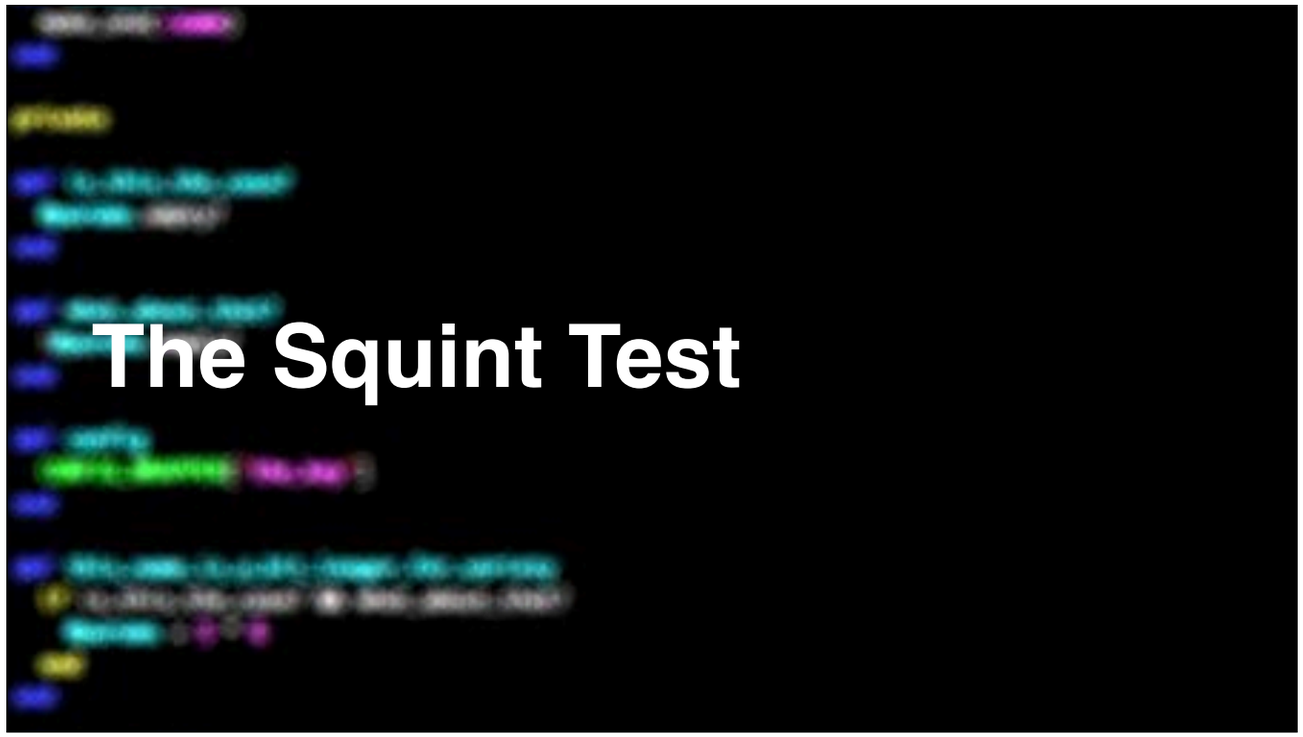
* (Readable)
* Code is read much more often than it is written
* Like other forms of communication, you want to consider your audience. Don’t apply some fancy technique or use some arcane knowledge if it’s not common knowledge among the people who will be maintaining the code
* There’s definitely something to be said for educating people though — what was once arcane knowledge can become common knowledge

Good Code™: Functional

* (Functional)
* Not in the functional/OO sense (though FP can help)
* Functional in the sense that it does what it's supposed to do / serves the appropriate function

Good Code™: Consistent

* (Consistent)
* Style
    * Conventions
        * Variable naming
    * Indentation
    * Enforce it, where possible (i.e. linting)
* Keep functions/methods/classes short
* Group related code
* SQUINT TEST: http://robertheaton.com/2014/06/20/code-review-without-your-eyes/



* • SQUINT TEST: http://robertheaton.com/2014/06/20/code-review-without-your-eyes/

Good Code™: Simple

* (Simple)
* YAGNI -- you ain’t gonna need it
* KISS -- keep it simple, stupid.
* Simple code does exactly what it needs to do — no more and no less
* You usually have to start with complicated code and pare it down to simple code via refactoring

Good Code™: Maintainable

* (Maintainable)
* Overall, good code is code that you can maintain over time.
* It’s not overly complicated
  * “Always code as if the guy who ends up maintaining your code will be a violent psychopath who knows where you live.”
  * Newcomers to the codebase won’t hate you
  * You won’t hate you when you have to revisit the codebase in a year and you’ve forgotten everything about it
* It’s flexible enough to handle changes
  * i.e. don’t make concrete decisions about things until you have to
  * make your code easy to remove as things change

Don’t
Repeat Yourself (DRY)

* (DRY)
* Rule of 3

~~Don’t~~
~~Repeat Yourself (DRY)~~

Deal With The Pain Until You Can’t

* (Deal with the pain)
* Think VERY hard about the abstractions you’re using. Try to derive them from actual code + the domain

Interfaces > Implementations

* (Interfaces > Implementation)
* Where possible, code to an interface for what something should look like rather than the concrete something
    * Then you can easily drop in the thing or later swap it out with something else
* Having experience with a variety of common data-level abstractions makes this easier / less likely to have you coding to the wrong abstraction. Just programming more makes this easier, but it’s kind of an experience thing

Single Responsibility Principle

* (Single Responsibility Principle)
* ,i.e. make sure a unit of code (i.e. class, module, function, whatever) has a single, well-defined purpose
* refactor in this direction -- when you see things getting bloated w/ multiple responsibilities, it’s time to break them out.

* (Tradeoffs)
* There are ALWAYS tradeoffs
* From a technical perspective there are tradeoffs like time vs memory consumption
* From a broader perspective, there is the triple constraint of Time, Cost, and Quality — you can pick any two together but the third will suffer
* Seen from an implementor's POV this usually translates to just Quality vs Speed. You have to be mindful of what mode you're operating in and how to operate in that mode to deliver as effectively as possible.

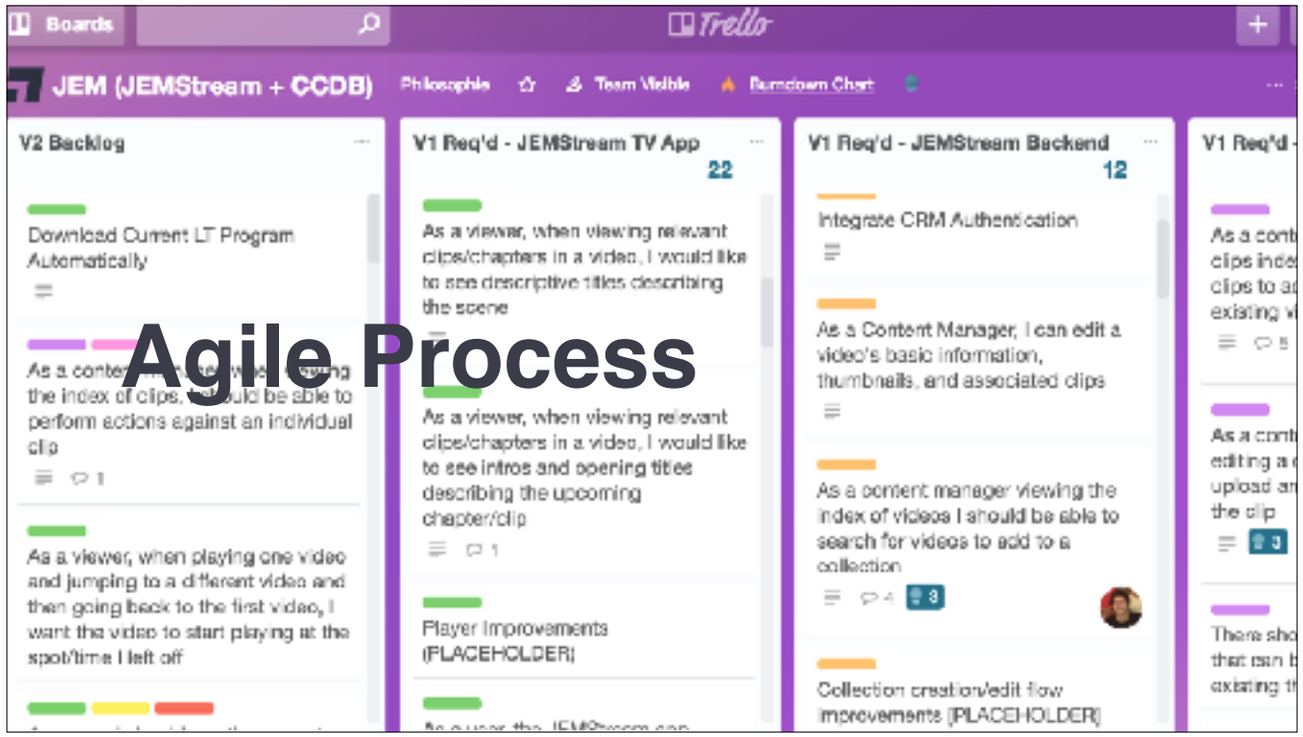
Hard Skills

- Tools
- Practices
- Principles

Soft Skills

- *Team*
- Clients
- Self

(Team)



Agile Process

* (Agile Process)
* Skills re: agile process are all about learning how to move with your team in small, focused intervals toward mini-goals so you can get tighter feedback cycles from your users and/or the client
* Try to keep meetings minimal (i.e. morning standup) + checkpoint

Team Communication

* (Team Communication)
* Trello is also a form of living team communication if used effectively
* Other tools: slack, google docs, sheets, drive

Hard Skills

Tools

Practices

Principles

Soft Skills

Team

Clients

Self

* (Clients)
* “Client” doesn’t have to be an external client (i.e. internal software built for other groups in the organization)
* Client may or may not be the end user of the software
* Either way you should be regularly communicating with whomever your client is

* (Team <-> Client)
* At Philosophie one of our company values is “same team”, i.e. the client is on our team and we’re on theirs
* Constantly be trying to empathize with their needs and wishes
* The more you can be “in the trenches” with the client, the more empathy you will have for them — this is a lesson I learned over time
* And the more time the client spends with you, the more they’ll understand all that goes into making a software product.
* Tools: slack, trello, google docs, sheets, drive
* Talked about documentation before but that was more technical documentation. For client facing documentation, think about your audience
* I’ve never once regretted putting in more time in client documentation — always get feedback that they appreciate / understand in more detail

Professionalism

* (Professionalism)
* Show up to meetings on time or ahead of time
* Try to maintain a good rapport
* Delivery early, deliver often, get lots of feedback
* Always look for ways to delight
* Make your expertise known — don’t flaunt it, but make people aware that you know what you’re talking about

Hard Skills

- Tools
- Practices
- Principles

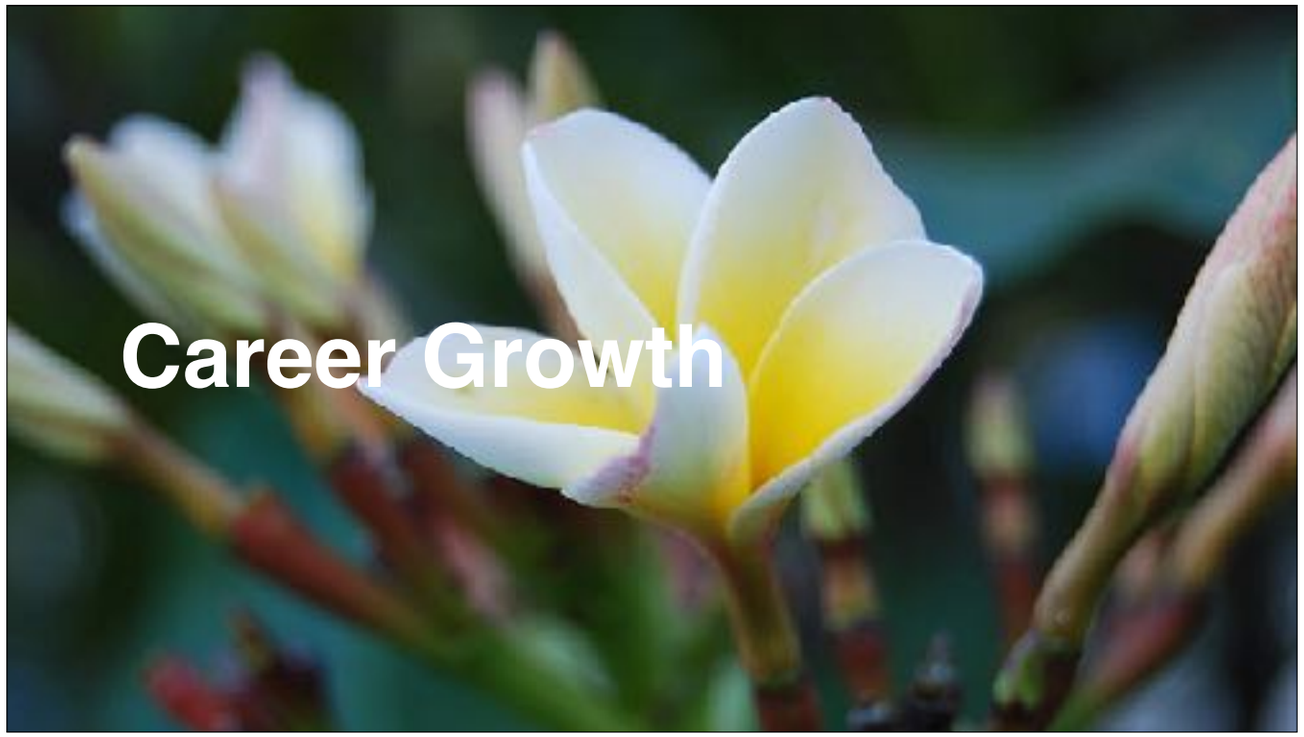
Soft Skills

- Team
- Clients
- *Self*

(Self)

* (Problem Solving)
* Definitely takes tenacity
* Have to be able to approach things from a LOT of different angles
* Usually it helps to have a scientific mindset / approach, especially with, i.e., debugging
* How can I subdivide the problem? What tests can I run to get me closer to a solution?
* Sometimes you have to flip the problem on its head to think of it differently
* Sometimes you have to draw parallels to processes or systems completely outside of the domain your working in. This requires experience
* Sometimes you just need to step away from the problem for a bit and come back later
* Don’t be afraid to ask for help from people who are more familiar with the problem domain (or even people who aren’t!)

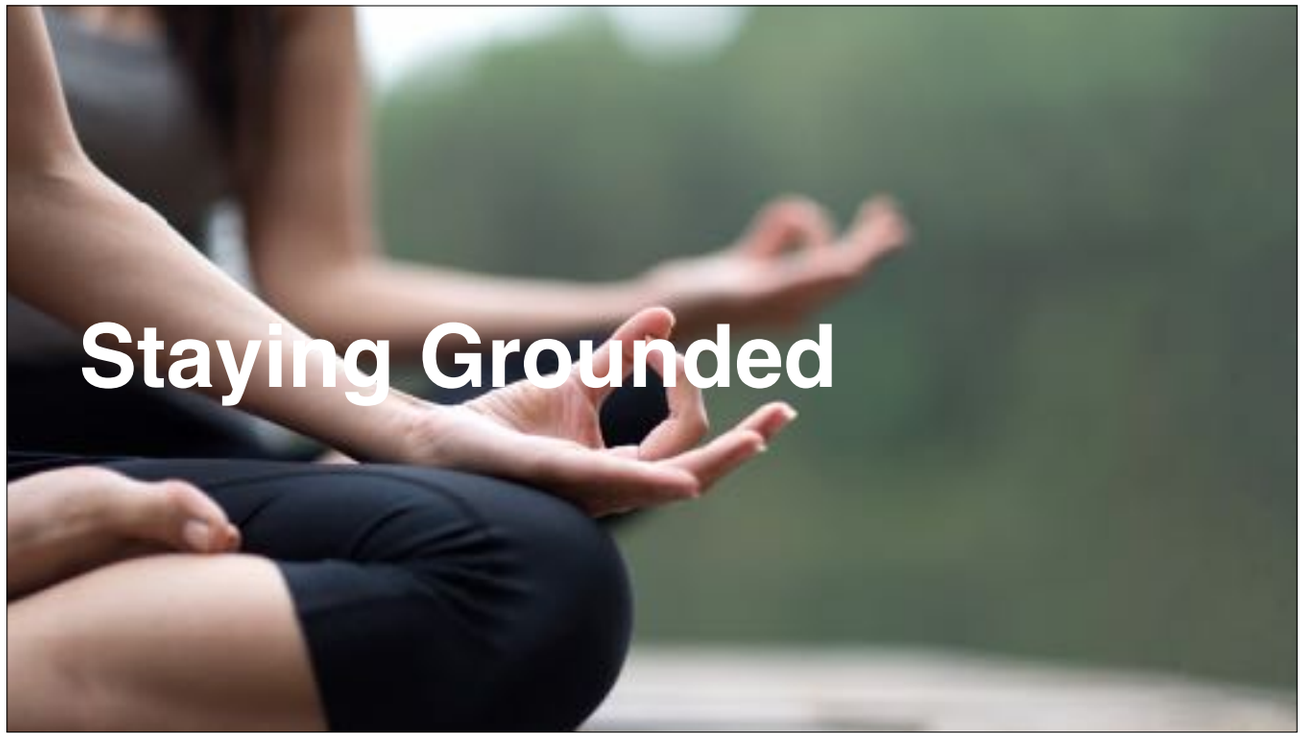
* (Constant Learning)



* (Career Growth)
* Some good advice I’ve heard: when thinking about what you want in a job, think about what job you’ll be applying to AFTER the current job. That will tell you what skills you want to be picking up in the current job you’re applying to

Work/Life Balance

* (Work / Life Balance)
* Burnout is a real thing and tends to affect people in software development more frequently than in a lot of other professions
* You have to actively combat it by regularly coping with stress and occasionally recharging for longer periods



* (Staying Grounded)
* I personally recommend meditation and mindfulness practice
* Need to be able to start your day with a clear head
* Be as effective as you can during working hours so that you can leave with a clear mind
* As much as possible, try to let work be work and home be home

* (Hobbies)
* Hobbies also help - I’m personally a big fan of board games
* BONUS: increase sense of community in the office. We play lunch games practically every day

* (Family and Friends)
* Having a solid support network of family and/or friends also helps a lot
* Remember that you’re an actual person, not a machine. You’ve got to come up for air
* Plan for time off because the pace of work will probably not slow down

Thank You!