

# Opening The Black Box

**Howdy!**  
**I'm an engineer at**  
**Acquia**

**Dustin Younse**  
**@milsyobtaf**

# What Is Debugging?



**Glitch**

@glitch



Follow



My code once took down a client's Intranet mid-demo. Tell us your coding screw-ups, so we can show new coders [#weallmakemistakes](#) 🙋

**Glitch** 🐟🐟 @glitch

This Junior Dev nuked the prod db on 1st day of new job:  
[reddit.com/r/cscareerques...](https://reddit.com/r/cscareerques...)

Retweets  
**330**

Likes  
**617**



5:02 AM - 13 Jun 2017



335



330



617



**Zach Holman** 

@holman

Follow



Replying to @glitch

i shipped github to production in  
development mode, that was neat

Retweets

9

Likes

85



6:46 AM - 13 Jun 2017



2



9



85



**jennosaur js**

@jennschiffer



Follow



i miiiight have also taken down the china nba site for a few min while switching the nets from nj to brooklyn (long after they moved fyi)

Likes

26



6:24 AM - 13 Jun 2017



1



26



**K Cravens**

@CakeRavens

Follow



Replying to @glitch

My first client patch caused all their W2's to print with the "deceased" box checked. It was a nunnery. I KILLED AN ENTIRE NUNNERY.

Retweets  
**30**

Likes  
**155**



5:10 AM - 13 Jun 2017



3



30



155





**Dustin Younse**

@milsyobtaf

Follow



Replying to @glitch

I took down a university library on the 1st day of the semester with a botched FTP transfer of .htaccess. Better than Finals Week I suppose.

10:21 AM - 14 Jun 2017





# What Is Debugging?

# Nothing But Text?

CMS Platform for Content, Con x

← → ↻

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# Nothing But Text?

- CSS aggregated but not cached
- JS blocked in the browser
- File permissions in sites/default/files

# Debugging vs Troubleshooting

- Mostly a semantic difference
- 5 minutes vs 5 hours?
- “Fixed” vs understood and corrected

# What Is The Black Box?

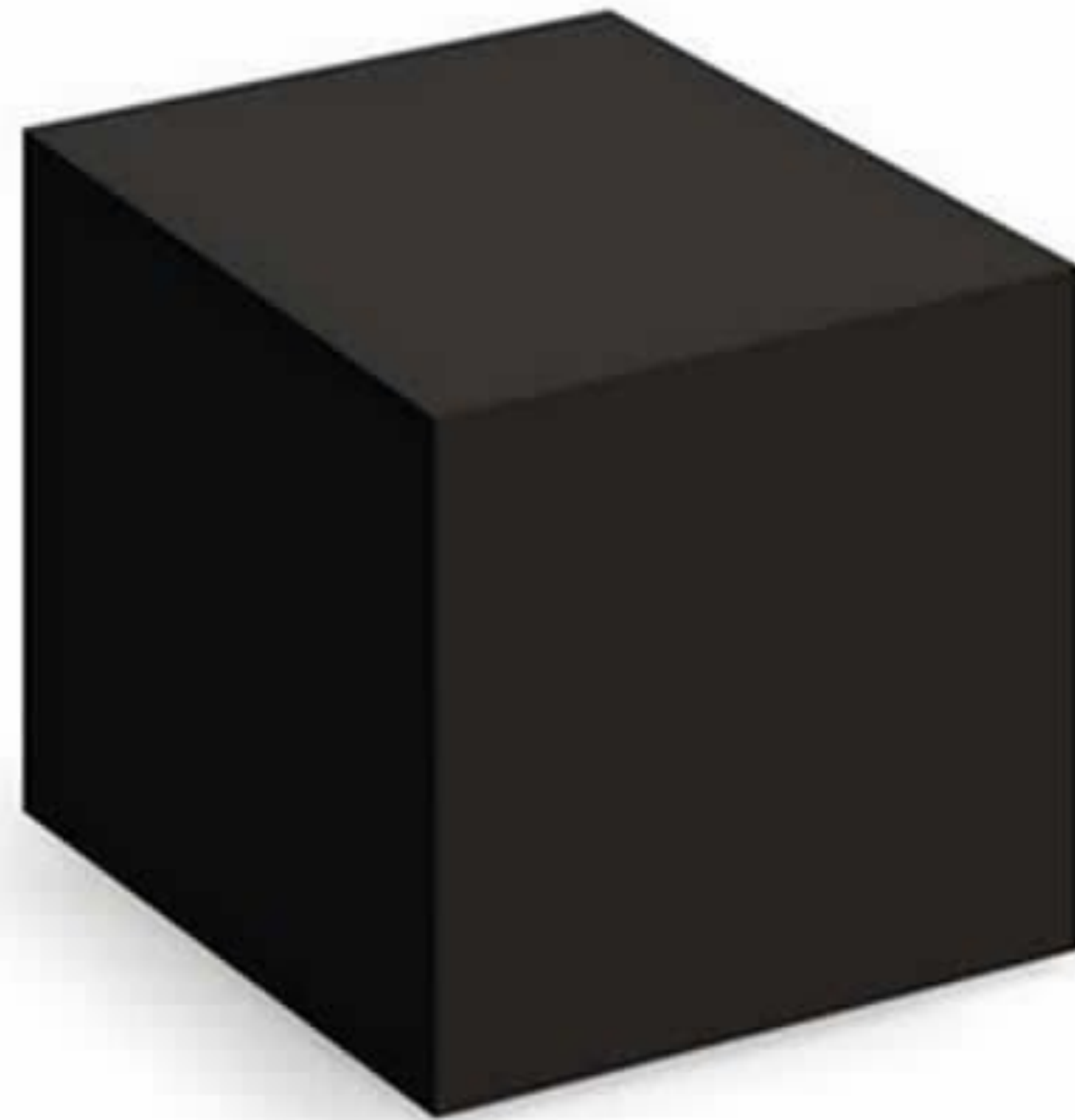
# A Familiar Story?

- Non-technical education
- Self taught web skills
- Above average Googling abilities
- Late nights staring at error messages

# What Is Drupal?



# Mental Model of Drupal



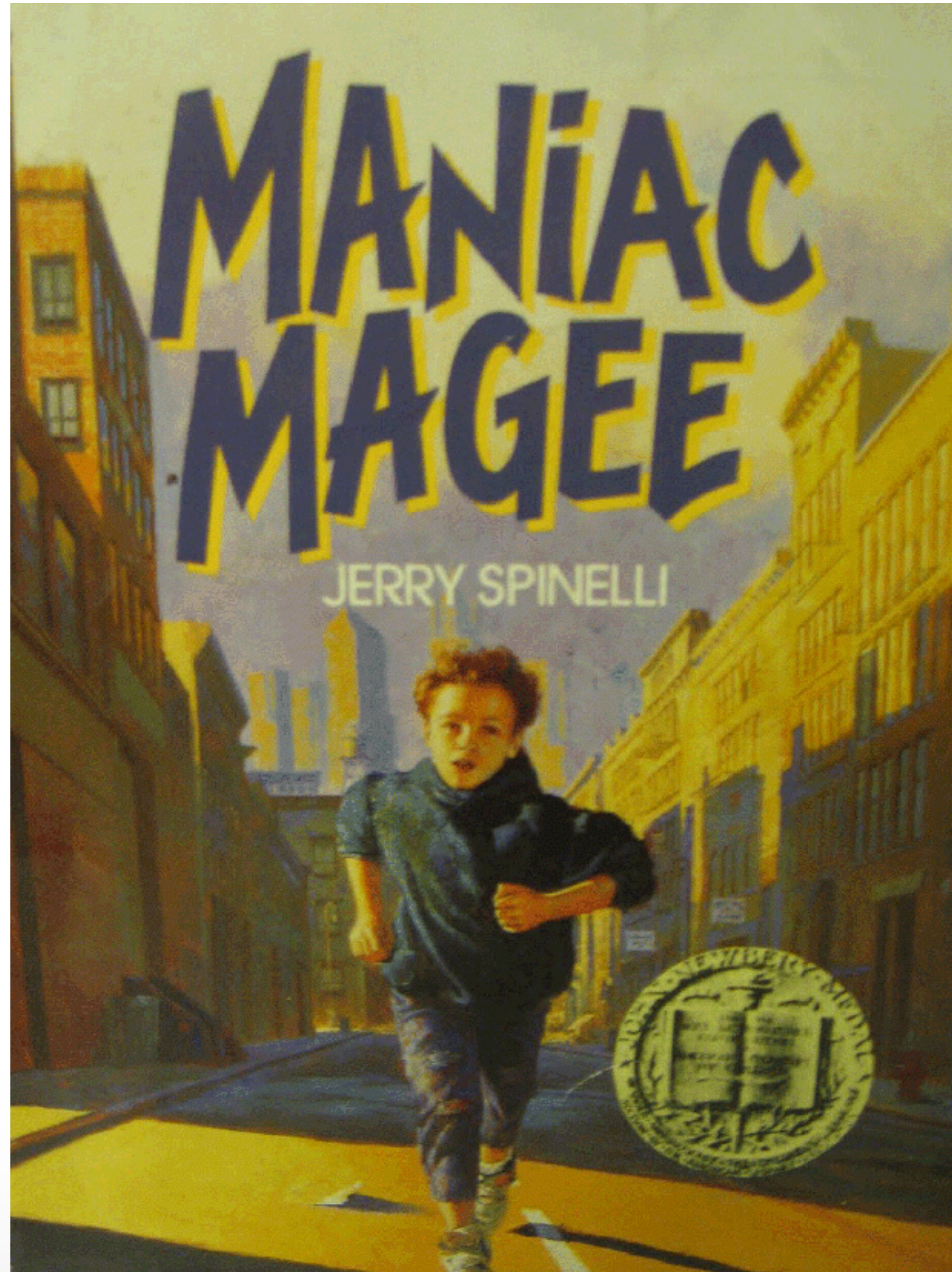


# Mental Model of Drupal





# Mental Model of Drupal

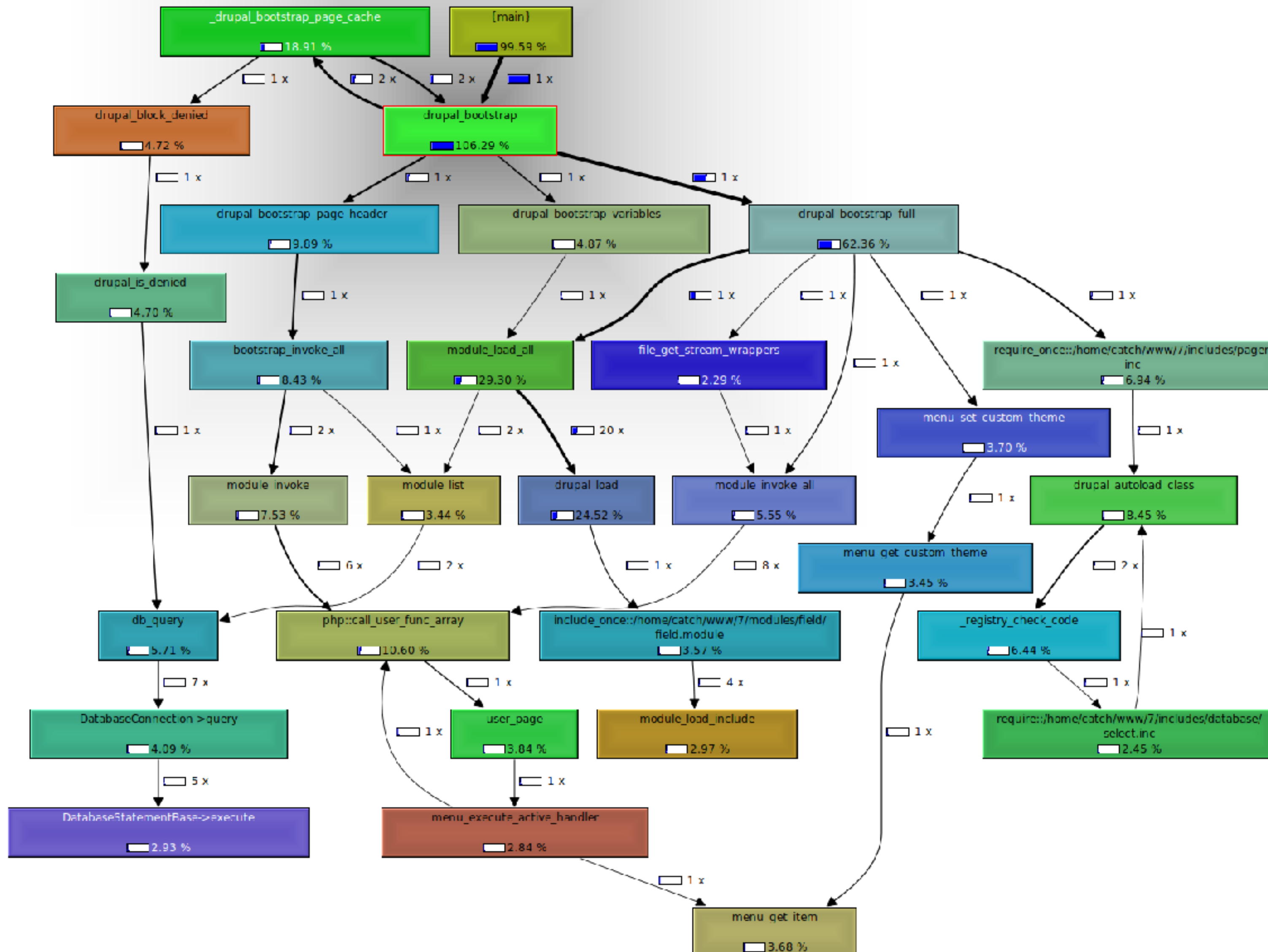




# Mental Model of Drupal

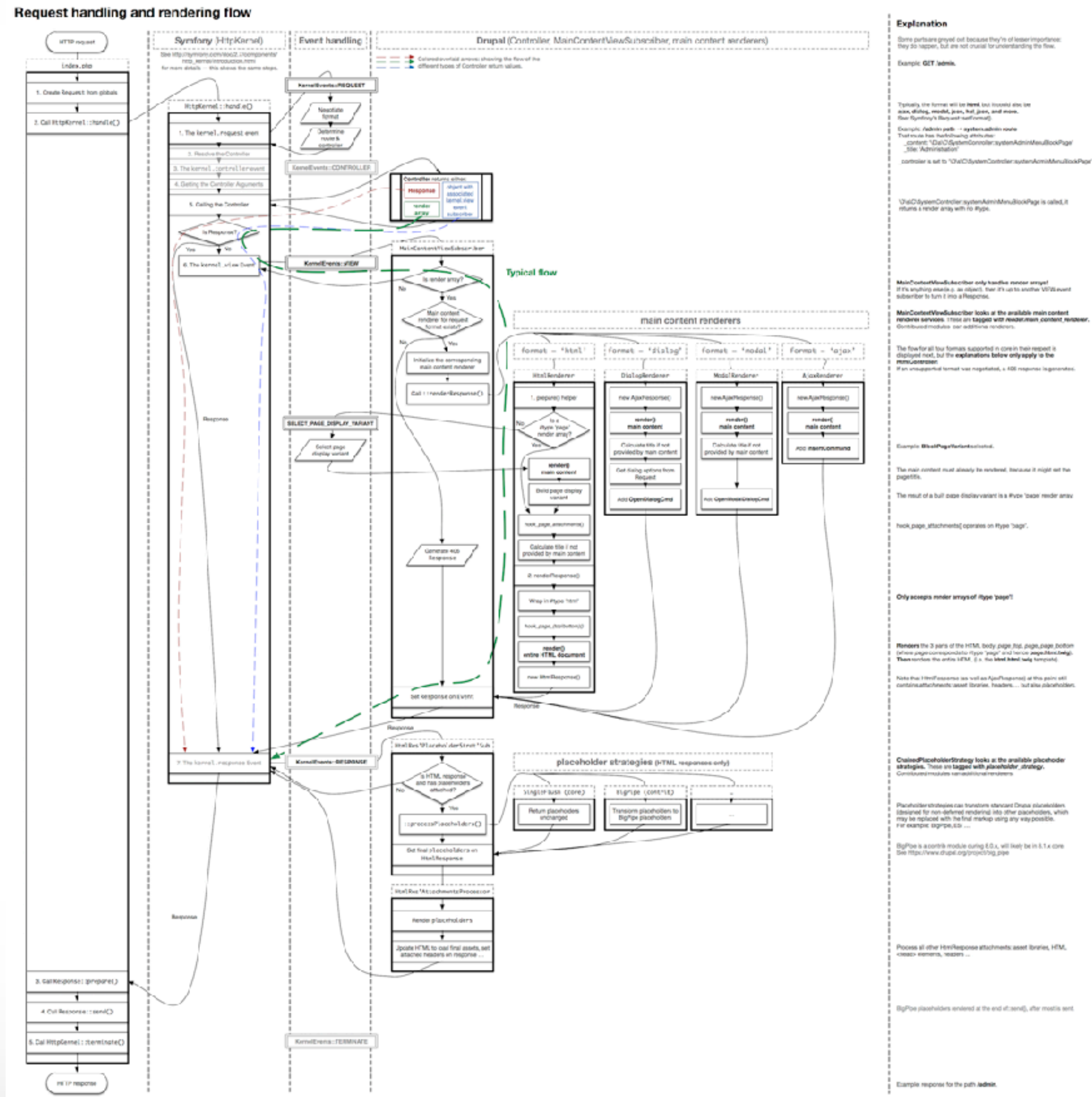


# Mental Model of Drupal





# Mental Model of Drupal



Start At The Beginning



# When All You Have Is A Hammer



# Text Editors

- “Text Editors”
- Text Editors
- IDEs

# “Text Editors”

- Notepad (Windows)
- Text Edit (Mac)
- Nano (Linux / Mac)



# Text Editors

- Notepad++ (Windows)
- Dreamweaver (Mac / Windows)
- Sublime Text (Mac / Linux / Windows)
- Atom (Mac / Linux / Windows)
- vim (Mac / Linux)

# Integrated Development Environments

- PHPStorm (Mac / Linux / Windows)
- Eclipse (Mac / Linux / Windows)
- Komodo (Mac / Linux / Windows)

# Operating Systems With Built In Text Editors

- emacs (Mac / Linux / Unix / Everything else)

# Development Environments

- On your server
- On your machine
- On your machine, but it acts like the server



# Development Environments

- FTP Development
  - “Cowboy coding”
- Local Environments
  - MAMP / LAMP / Vagrant
- Next generation
  - Kalabox
  - DrupalVM

# FTP Development

- FTP Development
  - “Cowboy coding”
  - No version control up front
  - Little debugging visibility
    - Log files (maybe), debug statements
    - Watchdog logs (maybe)

# Debug Statements in Code

- `print_r()`
  - Raw dump of a variable or context, no formatting
- `print_r($node);`
  - `<pre><?php print_r($node); ?></pre>`
- `dsm()` / `kint()`
  - Formatted dump of a variable or context
- `dsm($node);`

# Local Development

- MAMP / Dev Desktop / Native LAMP
  - Code runs entirely locally
  - Added bonus of offline work, no internet required
- `print_r()`, `dsm()`, `kint()`, but also more
- `xdebug`

# Local Development: The Next Generation

- Kalabox with Pantheon / Acquia integration
- DrupalVM and other custom Vagrant boxes
- `print_r()`, `dsm()`, `kint()`, `xdebug`
- Very accurate performance profiling
  - XHProf
  - Blackfire
  - Tidewater

# What's xdebug?

# xdebug: Step Through Debugging

- Hitting pause on code execution
- Inspecting the current state of “the stack”
- Modifying values *live*



# Something Is Broken!



Relax.



**DHH** 

@dhh

Unless you're making software for rockets, self-driving cars, or pacemakers, ease off on the "mission critical" bullshit, yeah?

RETWEETS

**353**

LIKES

**968**



7:22 AM - 15 Feb 2017



50



353



968

Relax.



# Remember Cobble's Knot



# What's Broken?

- Is something not showing up?
  - New content - is it published?
  - Old content - are permissions set properly?
- Is something showing up that shouldn't?
  - Raw HTML and Javascript in a WYSIWYG field?

# Work From The Bottom Up

- Log Files
  - You should learn how to find your log files before you need your log files
- multitail
  - Linux / Mac utility to easily view logs with more options than tail



# Where Is It Broken?

- Custom Module
- template.php / .theme file
- Theme Template



# The Scientific Method

# Finally, Debugging

- Change **one** thing at a time
- Test that change
- Repeat

# git Is Your Friend

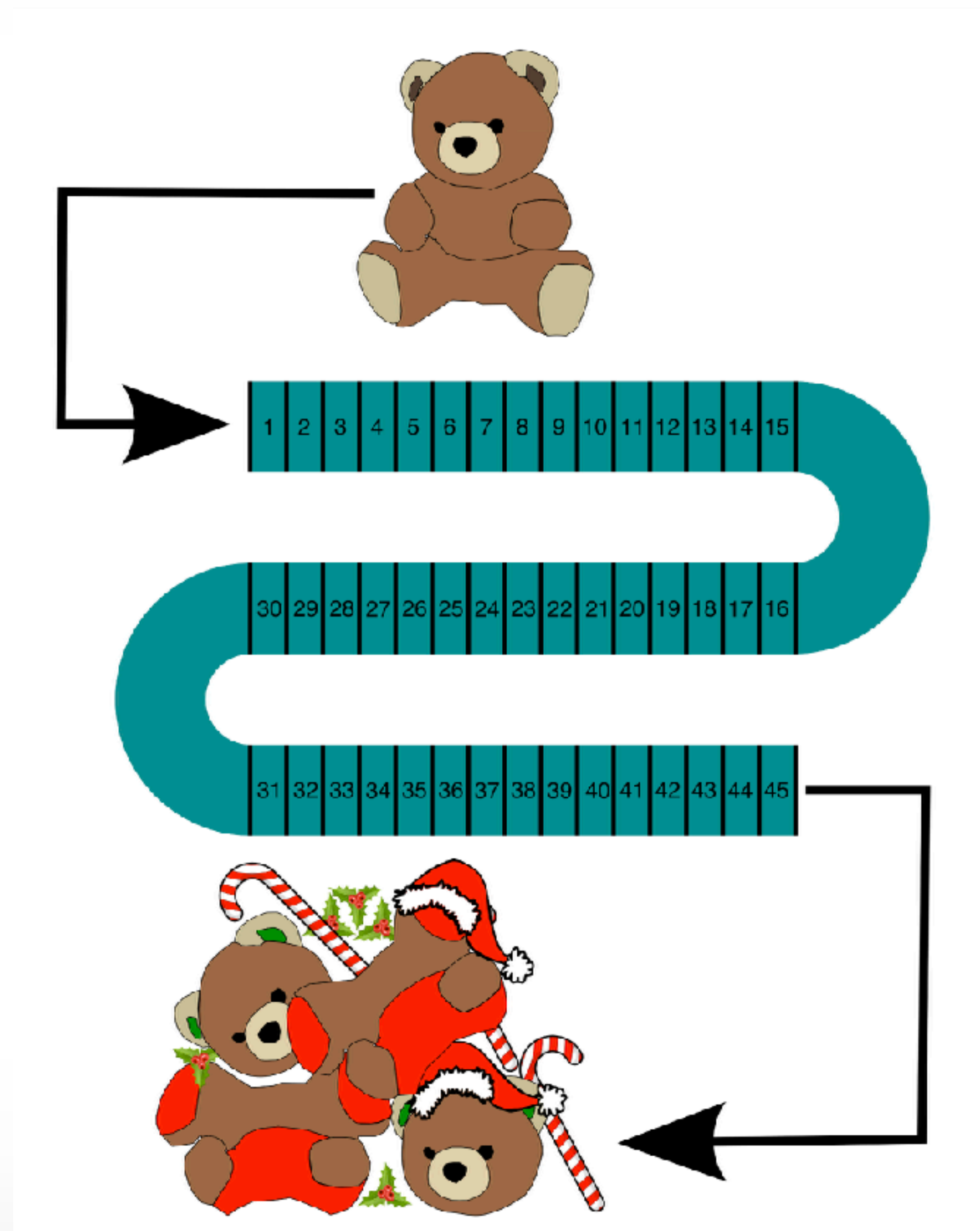
- Save your progress as you work
  - Recreate your Features or config yml
- Makes rabbit holes manageable

# git bisect Is Your Friend

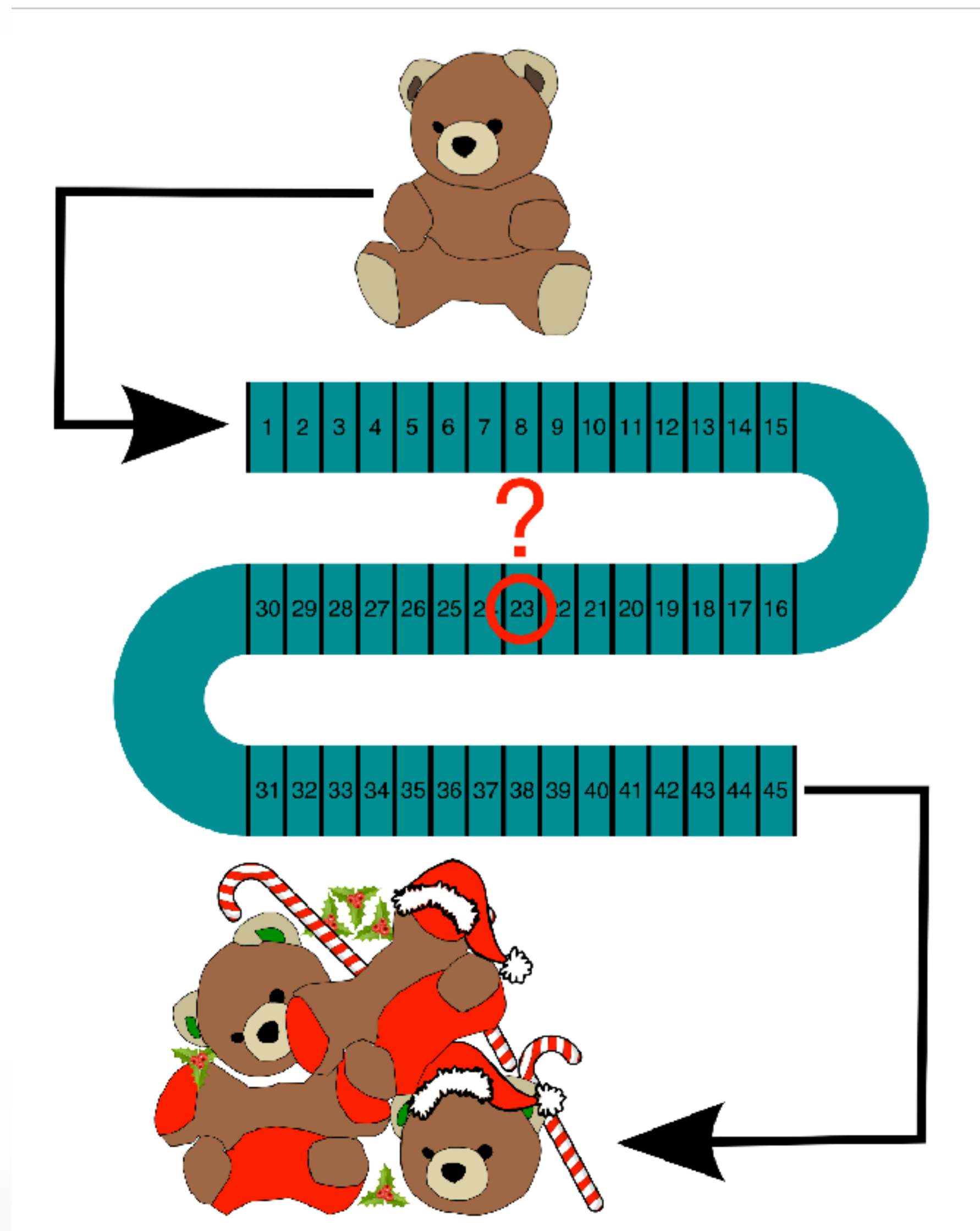
- Let's you isolate changes between commits



# git bisect Is Your Friend



# git bisect Is Your Friend





# git diff Is Your Friend

- Remove your debug statements
- Ensure you only changed **as much** as you needed to change
- You only commit **dsm('Butts');** to master **once**

# git blame Finds Your Enemies



# git blame Finds Your Enemies



# git blame Is *Your* Friend



# git annotate Is *Your* Friend

- Can help you track down who wrote the offending code
  - This ***should not*** be a witch hunt
  - This ***should*** be a chance to find context for the issue

# Other Debugging Methods

# Debugging Techniques

- Walk away. Seriously.
- Talk to a coworker.
  - Talk to a rubber duck.
- Write it down. By hand.

Make The Future Easier



# Proactive Debugging

- watchdog() (D7)
- \Drupal::logger() (D8)
- syslog Module
  - <https://www.elastic.co/blog/hey-elasticsearch-stack-and-x-pack>
  - <https://loggly.com>
  - <https://www.sumologic.com>
- Write a test!
  - Simpletest
  - Behat

- **The Art of Troubleshooting** by Jason Maxham
  - <https://artoftroubleshooting.com/book/>
- **Debugging: The 9 Indispensable Rules for Finding Even the Most Elusive Software and Hardware Problems** by David Agans
  - <http://debuggingrules.com>
- **Debugging During Development in Drupal 8** by Allie Jones
  - <https://www.gitbook.com/book/zivtech/debug-tools-for-drupal8/>
- **Using the PhpStorm Debugger** by JetBrains
  - [https://confluence.jetbrains.com/x/\\_idqAw](https://confluence.jetbrains.com/x/_idqAw)
- **Maniac Magee** by Jerry Spinelli
  - <https://www.worldcat.org/oclc/20422223>

**Further  
Reading**

**Thanks!**  
**Questions?**  
**War stories?**

**@milsyobtaf**

**<https://github.com/milsyobtaf/prez>**