

Tools & Techniques for Collaborative Coding

a CS50 Seminar

First, some caveats...

- This is a surface-level overview.
- I am not an expert.
- Your Mileage May Vary.

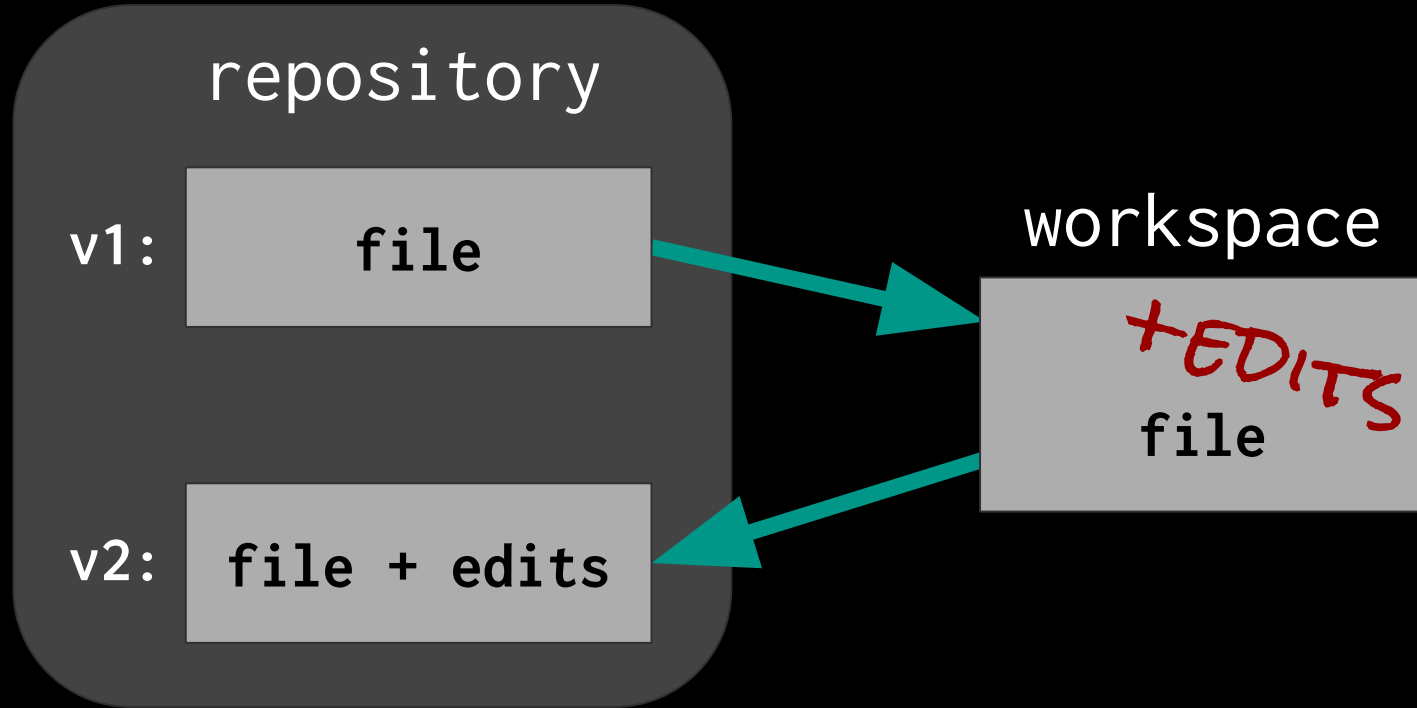


Version Control

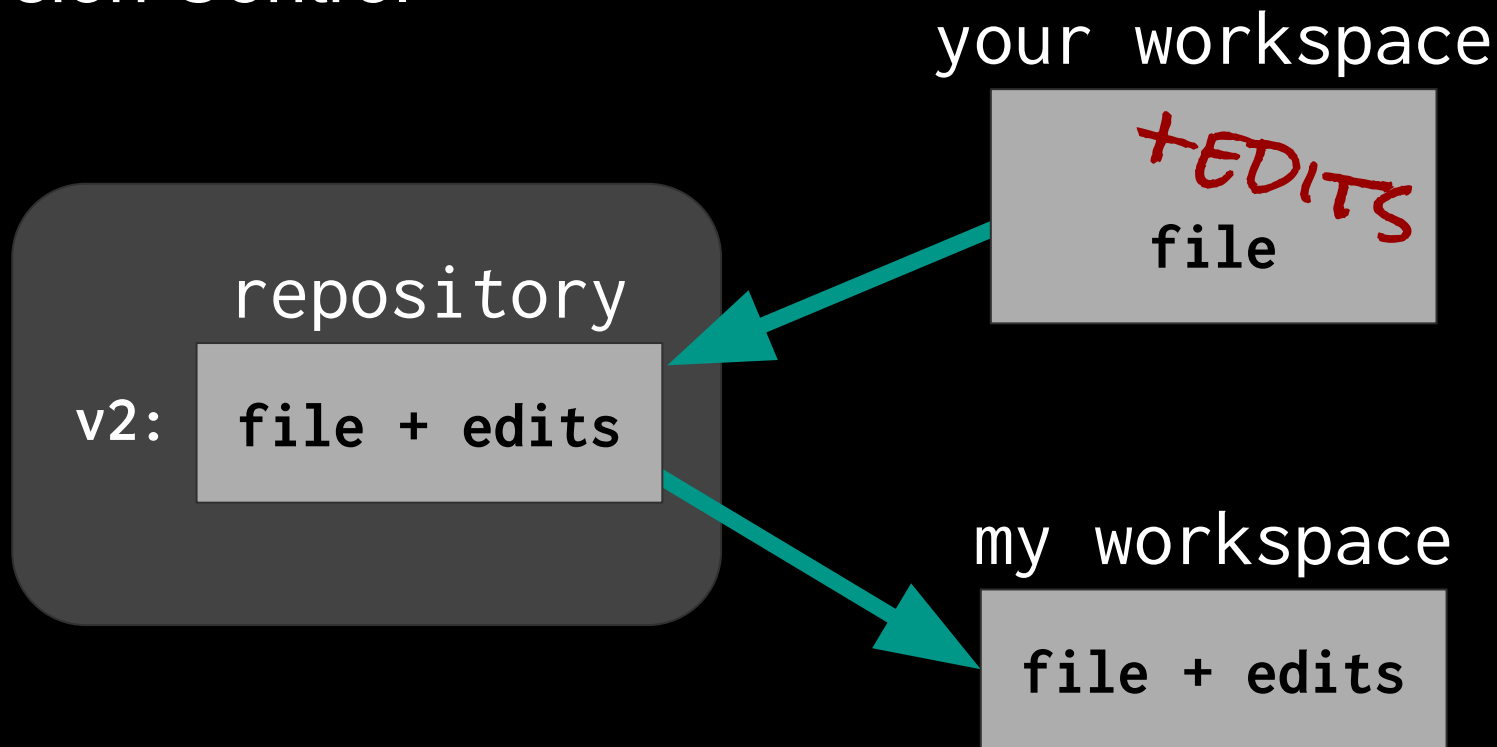
Version Control

- Track
- Share
- Lock / Merge
- Branch
- Revert

Version Control

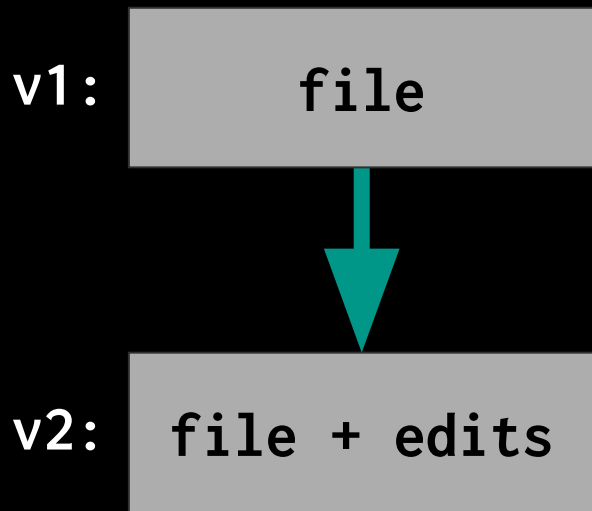


Version Control



Version Control

changelist #123



Date/Time

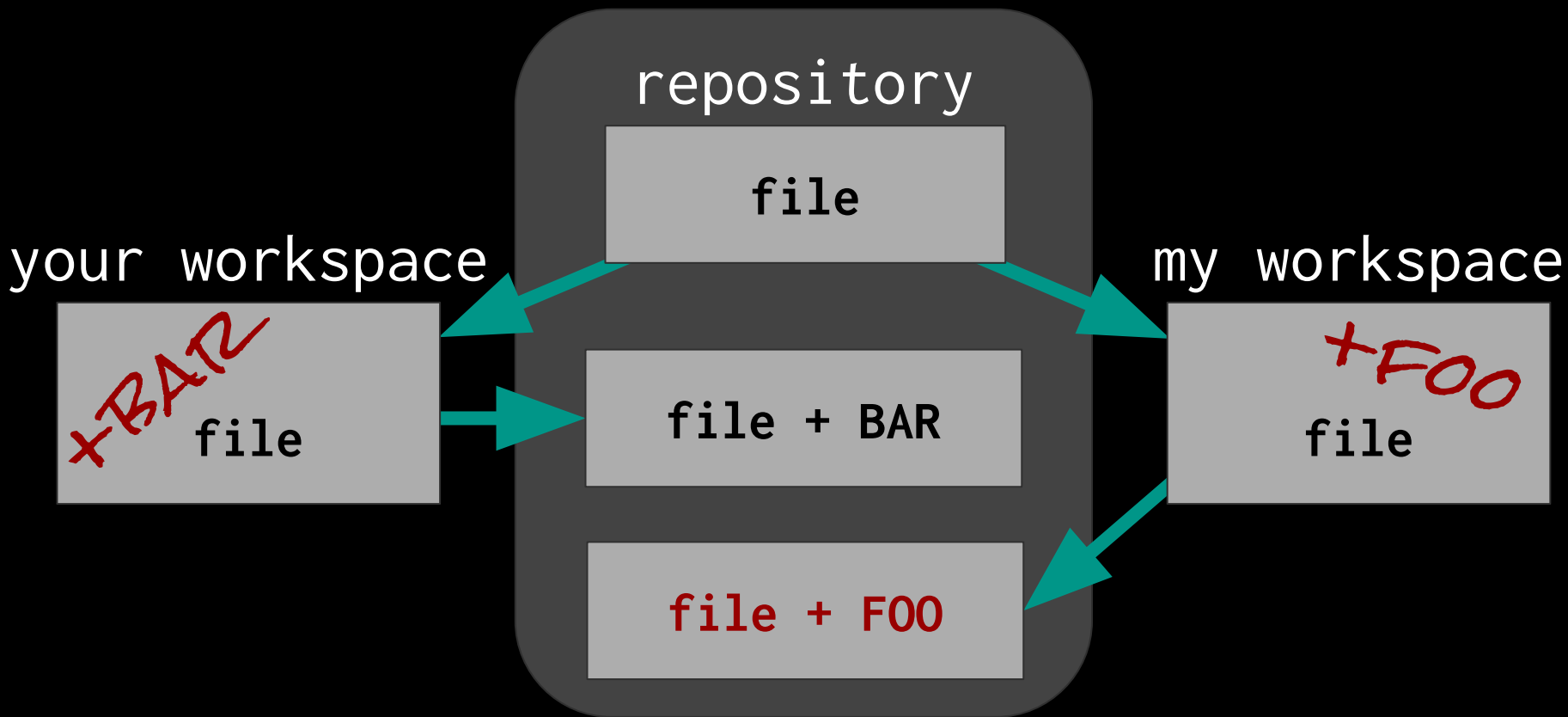
Submitter

Reviewer

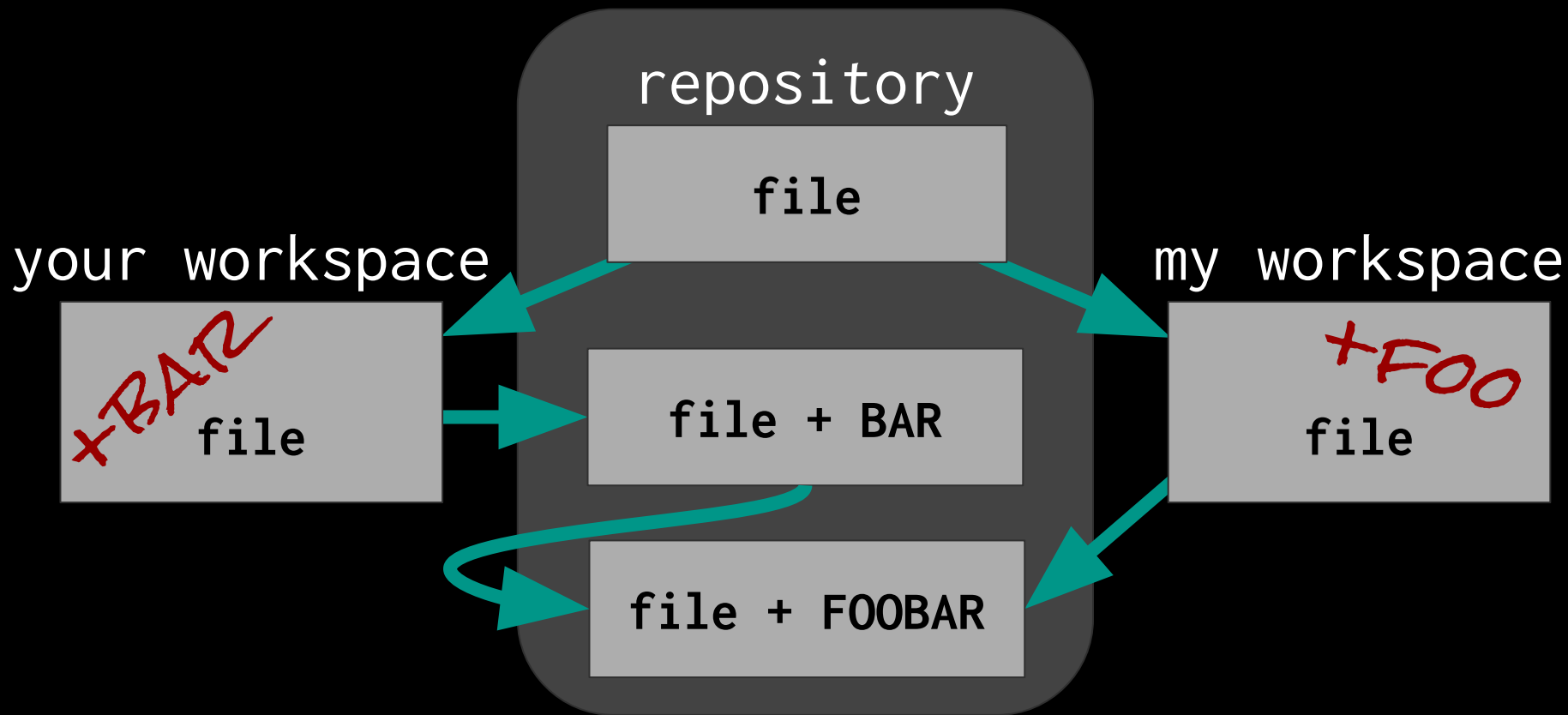
Notes

- what changed and why

Version Control

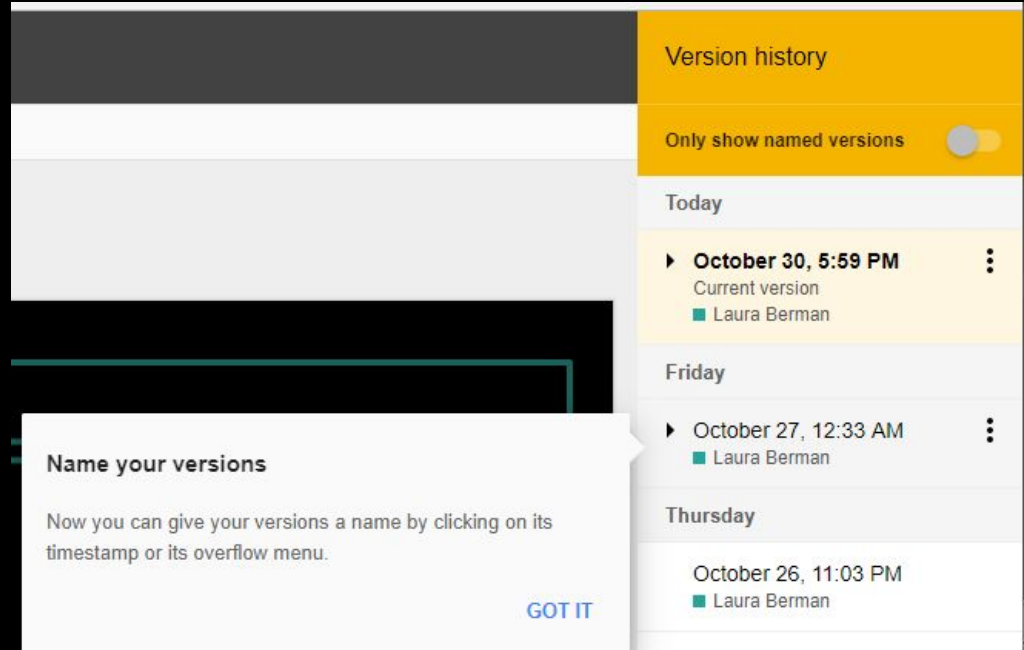


Version Control



Version Control and You

- Explore free tools
- Save often



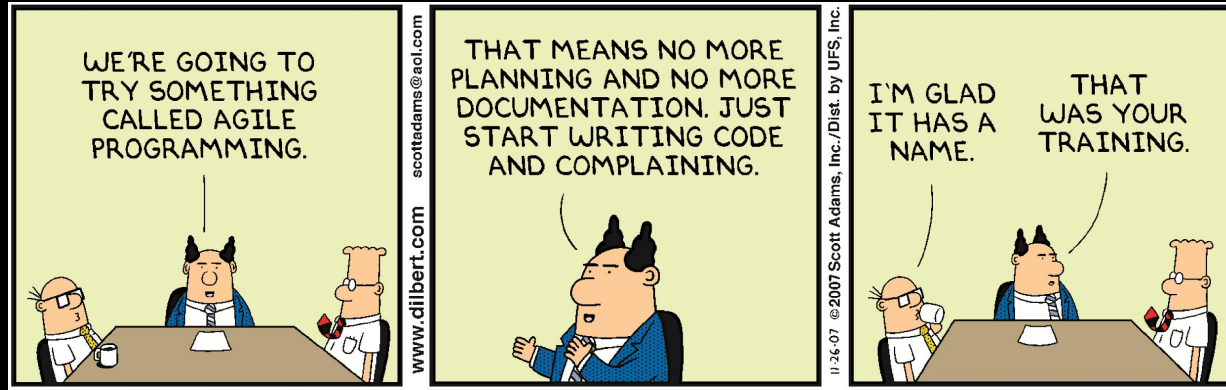
What to Google

Free Version Control Software

Git, Perforce, etc.

Wikipedia Comparison of Version Control Software

Version Control



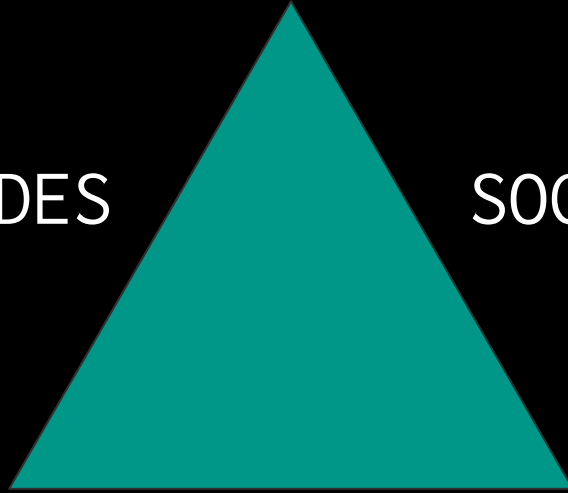
Methodologies

Life in College

GOOD GRADES

SOCIAL LIFE

ENOUGH SLEEP



Methodologies

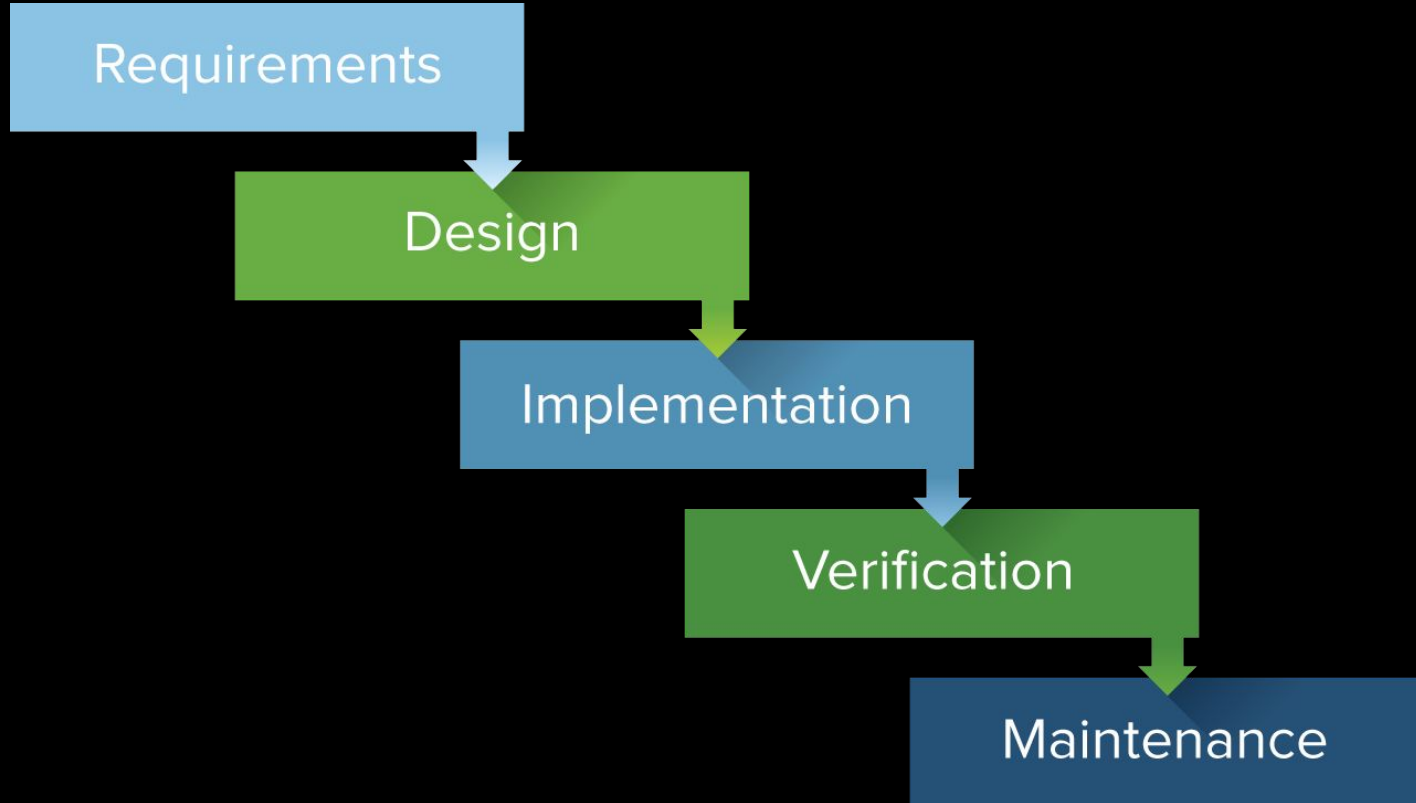
SCOPE

TIME



RESOURCES

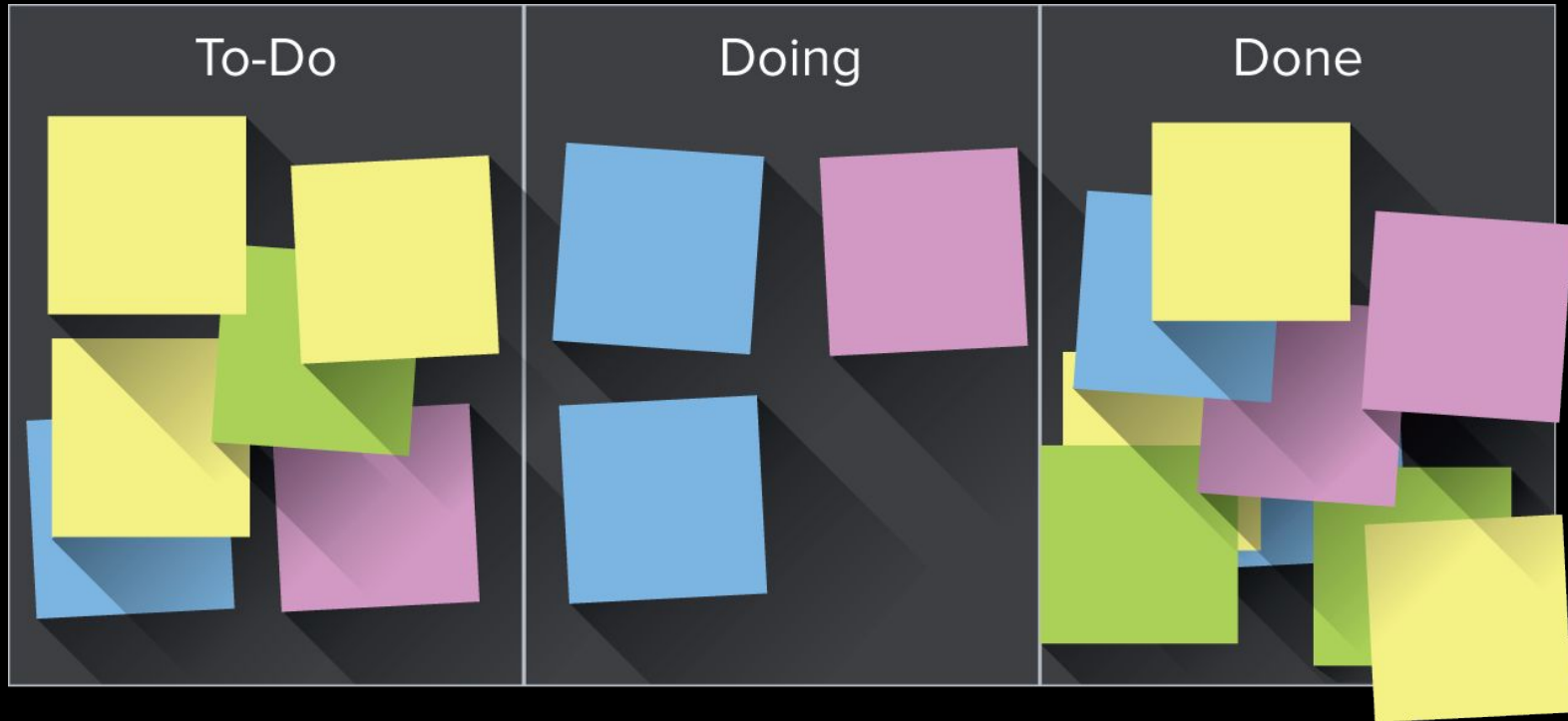
“Waterfall” or Phase-Driven Development



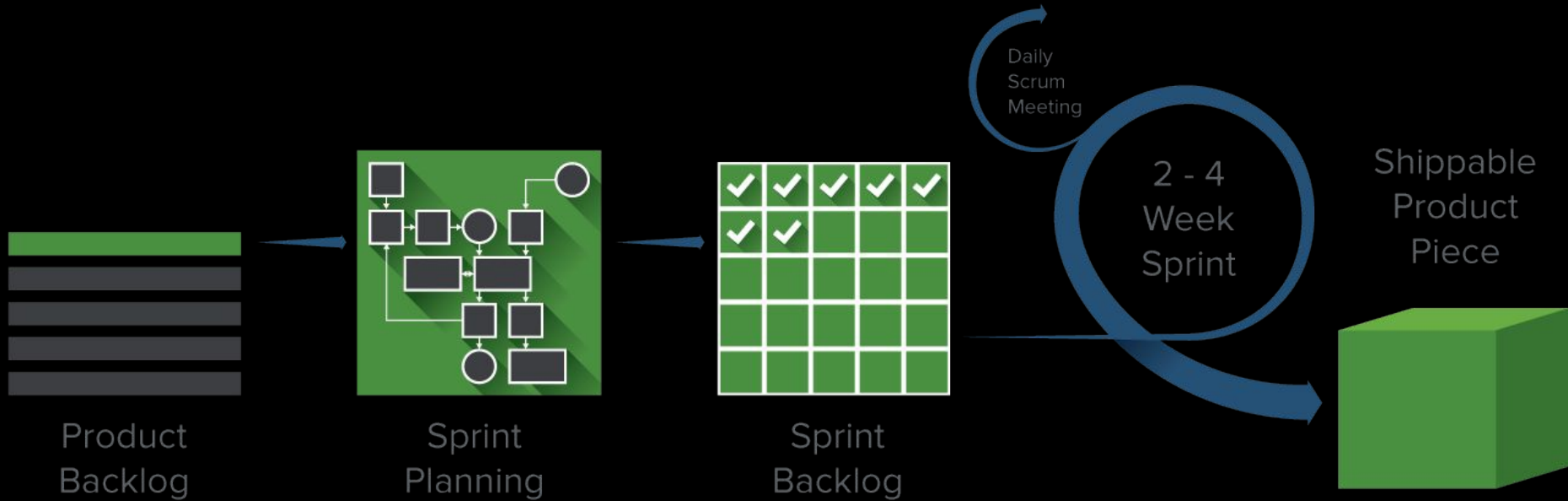
Agile



Agile - Kanban



Agile - Scrum



Agile - Scrum

Product Owner

- Stories
- Backlog Grooming
- Central decision-maker

Scrum Master

- Team coach & facilitator
- Ceremonies
 - Planning & Point-Costing
 - Daily Stand-Up
 - Sprint Review
 - Retrospective

Methodologies and You

- Plan in small pieces
 - Minimum Viable Product
- Think about dependencies
- Try one:
 - Kanban Board
 - Scrum Master
 - Daily Stand-Ups

What to Google

Agile Software Development

The Scrum Alliance

Free Kanban Board Tools

<https://www.smartsheet.com/agile-vs-scrum-vs-waterfall-vs-kanban>



Documentation

Design Documentation

- What?
- How?
- **WHY?**

- It's not just for breakfast
 - Write
 - Review and Revise
 - Implement
 - **MAINTAIN!**

- It's compatible with Agile

User Stories

When _____, Situation
I want to _____, Motivation
So I can _____. Expectation

User Stories

When I go to the store,
I want to get a shopping cart
So I can carry my food.

Acceptance Criteria

Shopping Basket is DONE when:

basket holds 15 ITEMS (average size)

user can GET & RETURN a basket

user can FILL & EMPTY a basket

Polish / Stretch Goals

Shopping Basket:

ergonomic HANDLES

accessibility SCOOTER ATTACHMENT

more efficient STACKING

Documentation and You



What to Google

Software Design Document Template

How to Write Effective User Stories

Documentation



Testing



Bug Reporting

- Severity
 - Critical
 - Major
 - Average
 - Minor
- Frequency
 - Always
 - Sometimes
 - Rarely
 - Unique
- Blocker**
- Steps to Reproduce (STR)
 - PB&J Sandwich
 - Screenshots & specific inputs
- User Pain
 - Numerical value, good for tracking over time
 - $\text{User Pain} = \text{Severity} * \text{Frequency}$

Testing and You

- Always assume the code is broken
- Leave time for testing
- Pay attention to edge cases
- Three Essential Testers:
 - You
 - Someone who has read and understands your code
 - Someone who knows nothing about coding
- Known Issues

What to Google

Free Bug Tracking Software

Atlassian JIRA

User Pain

Testing