R in production

Code (and data) is a shared responsibility

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1. Sharing data
2. Sharing code

This the hardest part of production to simulate in a workshop

Sharing data

Use parquet!

parquet vs csv

- Like csv, every language can read and write.
- Binary column-oriented format (much faster to read).
- Rich type system (including missing values).
- Efficient encodings + optional compression (smaller files).
- Data stored in “chunks”
  (can work in parallel & don’t need to read entire file).
- Supports complex data types (e.g. list-columns).
- Many modern databases can use parquet files directly.

Three key R packages

- **nanoparquet**: zero dependency reader/writer
- **arrow**: powerful entrypoint to the arrow ecosystem
- **duckdb** / **duckplyr**: immediately put your parquet files to work in a database
- (And in python: fastparquet, arrow, duckdb, polars)

Read and writing

```
# https://r-lib.github.io/nanoparquet/
nanoparquet::read_parquet()
nanoparquet::write_parquet()

# https://r4ds.hadley.nz/arrow
arrow::open_dataset()
arrow::write_dataset(format = "parquet")

# https://duckdblabs.github.io/duckplyr/
duckplyr::duckplyr_df_from_parquet()
duckplyr::df_to_parquet()
```

You can also use SQL directly on parquet files with duckdb

```
library(duckdb)
con ← DBI::dbConnect(duckdb::duckdb())

DBI::dbExecute(con, "
  CREATE VIEW pollen AS
    SELECT * FROM read_parquet('data/*.parquet');"
)

DBI::dbGetQuery(con, "SELECT count(*) FROM pollen;")
DBI::dbGetQuery(con, "SELECT * FROM pollen LIMIT 10;")
DBI::dbGetQuery(con, "
  SELECT date, count(*)
  FROM pollen
  WHERE count > 0
  GROUP BY date;
")
```

Your turn

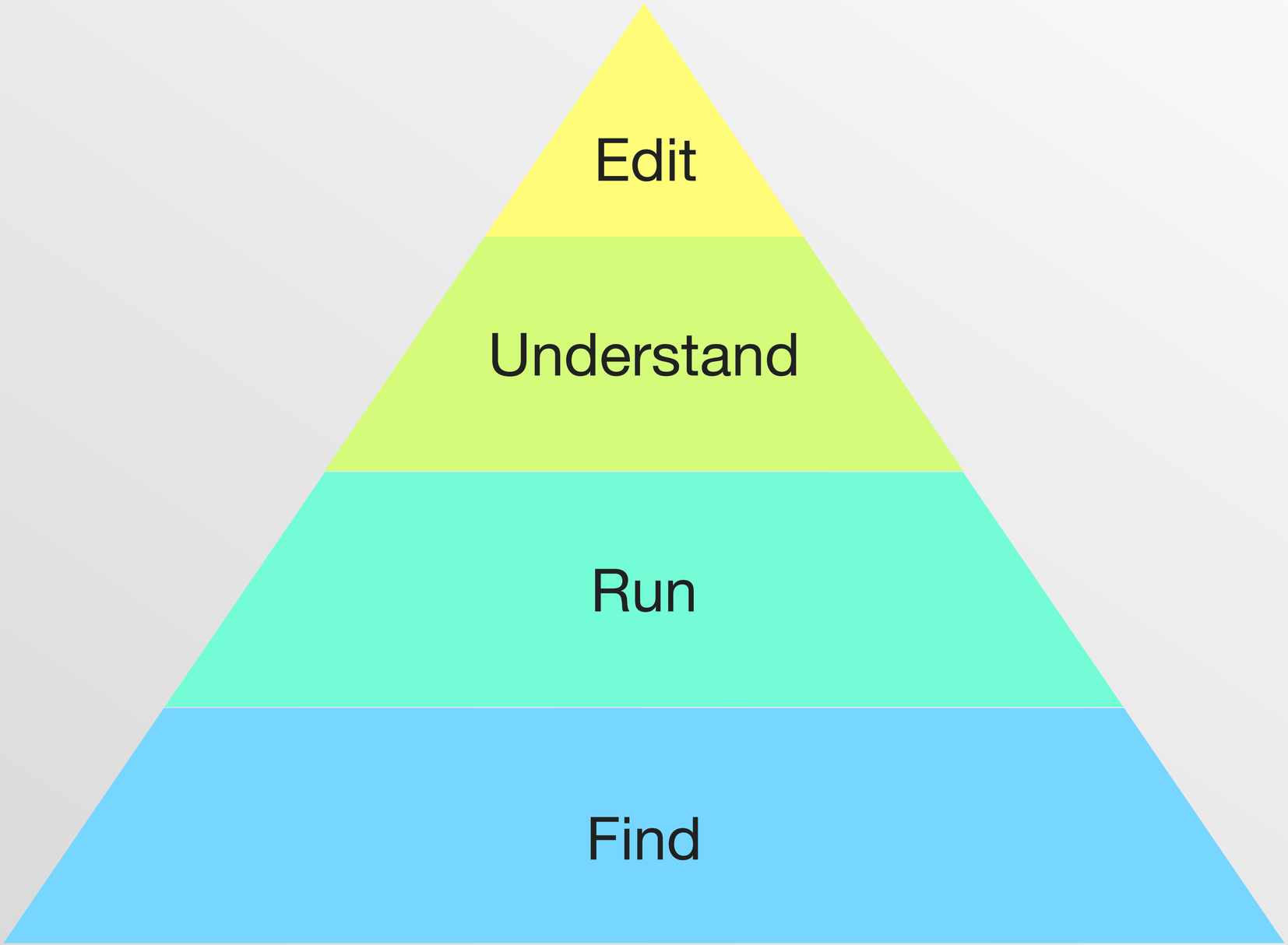
- Use write.csv to save ggplot2::diamonds as a csv file. How long does it take? How big is the resulting file?
- Use nanoparquet::write_parquet() to save ggplot2::diamonds as a parquet file. How long does it take? How big is the resulting file?
- Use read.csv() to load the csv file. How long does it take? How does the output differ to ggplot2::diamonds?
- Use nanoparquet::read_parquet() to load the parquet file. How long does it take? How does the output differ to ggplot2::diamonds?

Sharing code

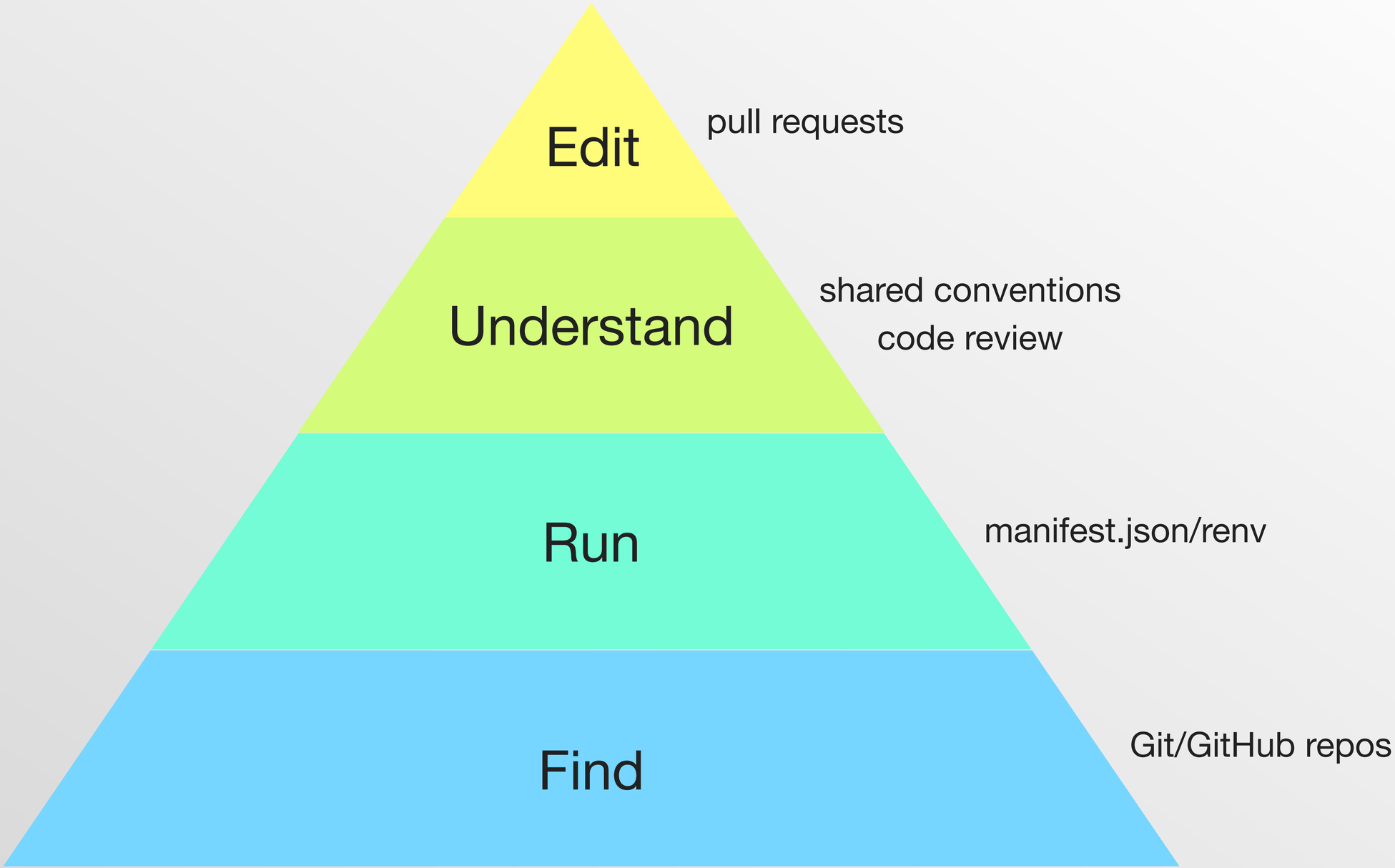
Should your project be a package? 🤷

Should your project be a git repo? 💯

A data scientist’s hierarchy of code needs



A data scientist's hierarchy of code needs



Find

Find

Scattered across personal laptops

Shared network drive

git repos

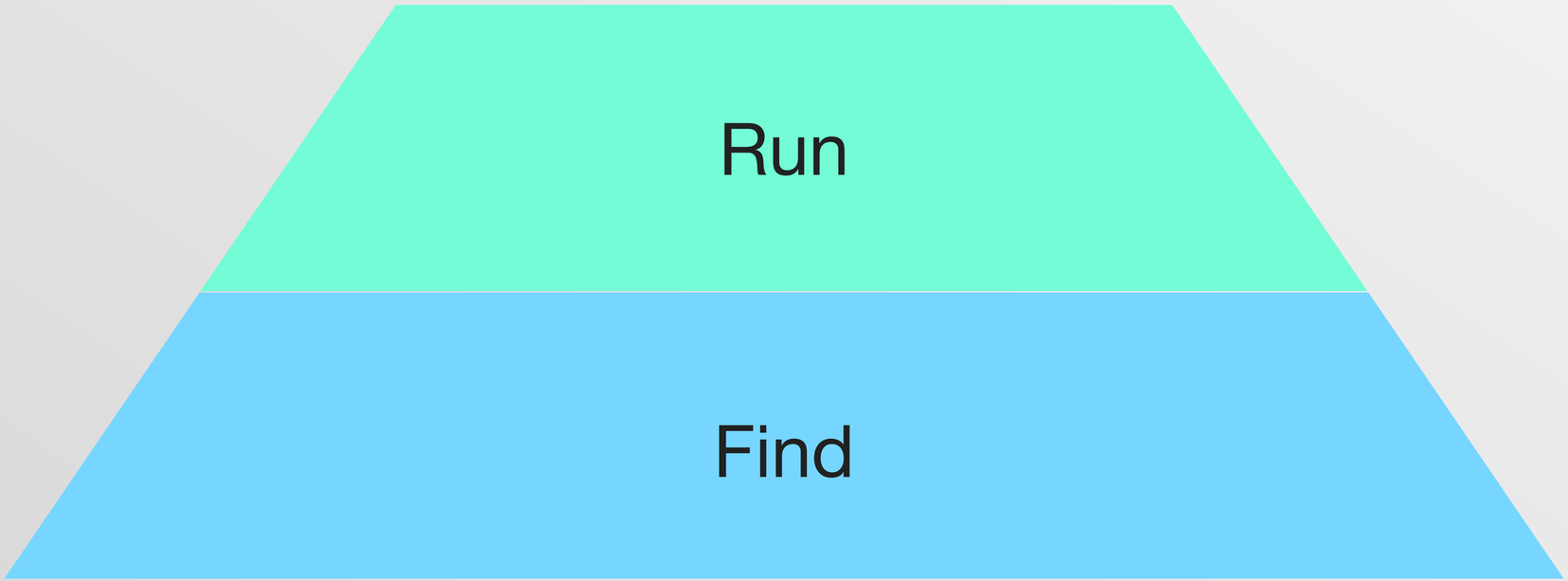
git repos with metadata

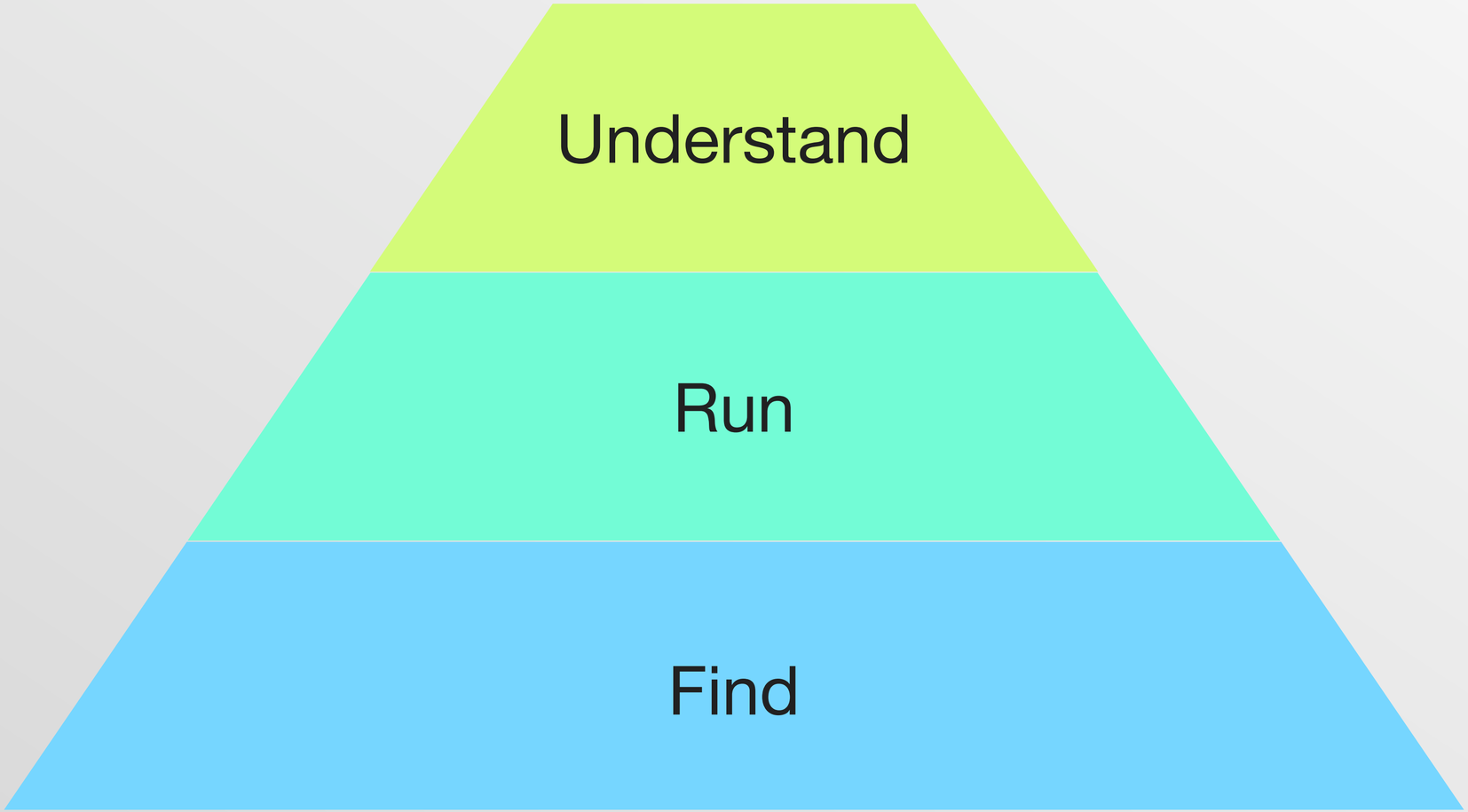
Tags

If you have a lot of projects (github repos) and you have a hard time finding them, then this is a good place to come up with some conventions around naming and tagging.

I don’t think it’s too important what the conventions are, just that you have some.

(Where to document? That’s coming up.)


Run
Find


Understand
Run
Find

1. Build shared conventions
2. Review each others code
3. Build a team package

Team style guide

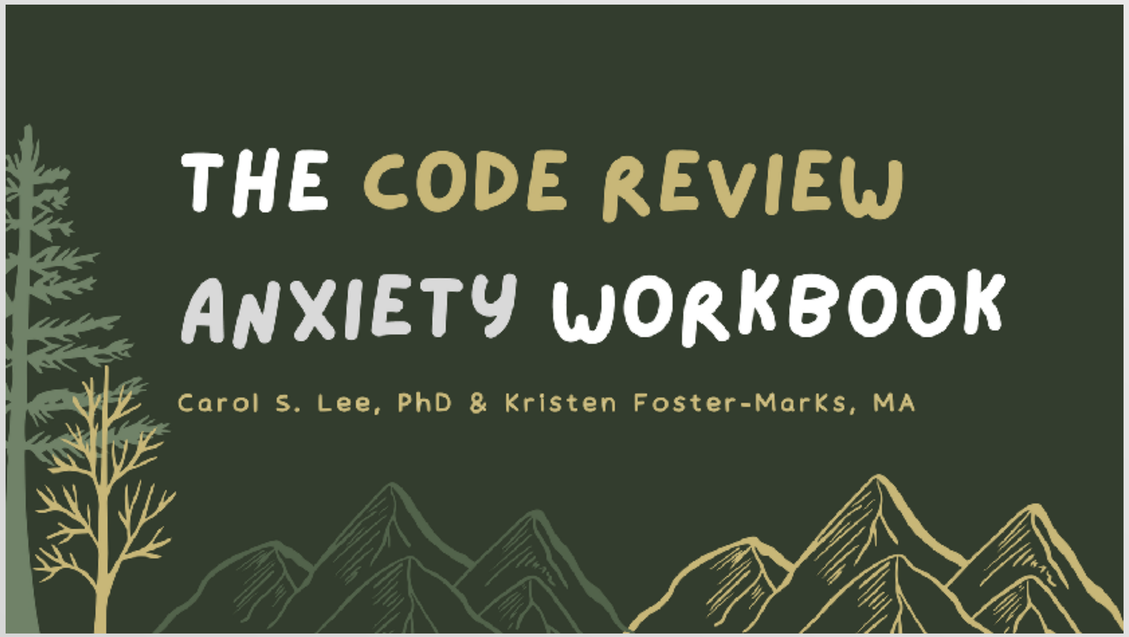
- Build consensus as a team then document your conventions. Some examples:
  - https://github.com/jtleek/rpackages
  - https://github.com/jtleek/datasharing
  - https://style.tidyverse.org/
  - https://design.tidyverse.org/
- Make it a quarto book. Deploy it as a batch job.
- Also helps with onboarding!

Code reviews

- Best way to build shared knowledge and shared conventions.
- Helps both reviewer and reviewee.
- In some organisations, every piece of code written gets reviewed. That’s likely too much for data science teams, but very worthwhile to allocate to some amount for code review.
- Easiest way to solicit a review is to do a pull request on your own repo. Then you tag in a comment and request a review.

Code review principles

- https://code-review.tidyverse.org/
- Define expectations amongst your team for speed of reviews. What needs review and what doesn't? Should you have shared team review time?



- Asking like a DEAR
- Reviewing to GIVE

Asking like a DEAR

- **Describe** the request.
- **Express** how you feel about it!
- **Ask** for specific feedback.
- **Reinforce** kindness with gratitude and responsiveness.

https://developer-success-lab.gitbook.io/code-review-anxiety-workbook-1/part-two-managing-code-review-anxiety/step-4-proactively-engage/asking-like-a-dear

Reviewing to GIVE

- **G**entle
- **I**nterested
- **V**alidate
- **E**asy manner

https://developer-success-lab.gitbook.io/code-review-anxiety-workbook-1/part-two-managing-code-review-anxiety/step-4-proactively-engage/reviewing-to-give

The rule of three

For functions:

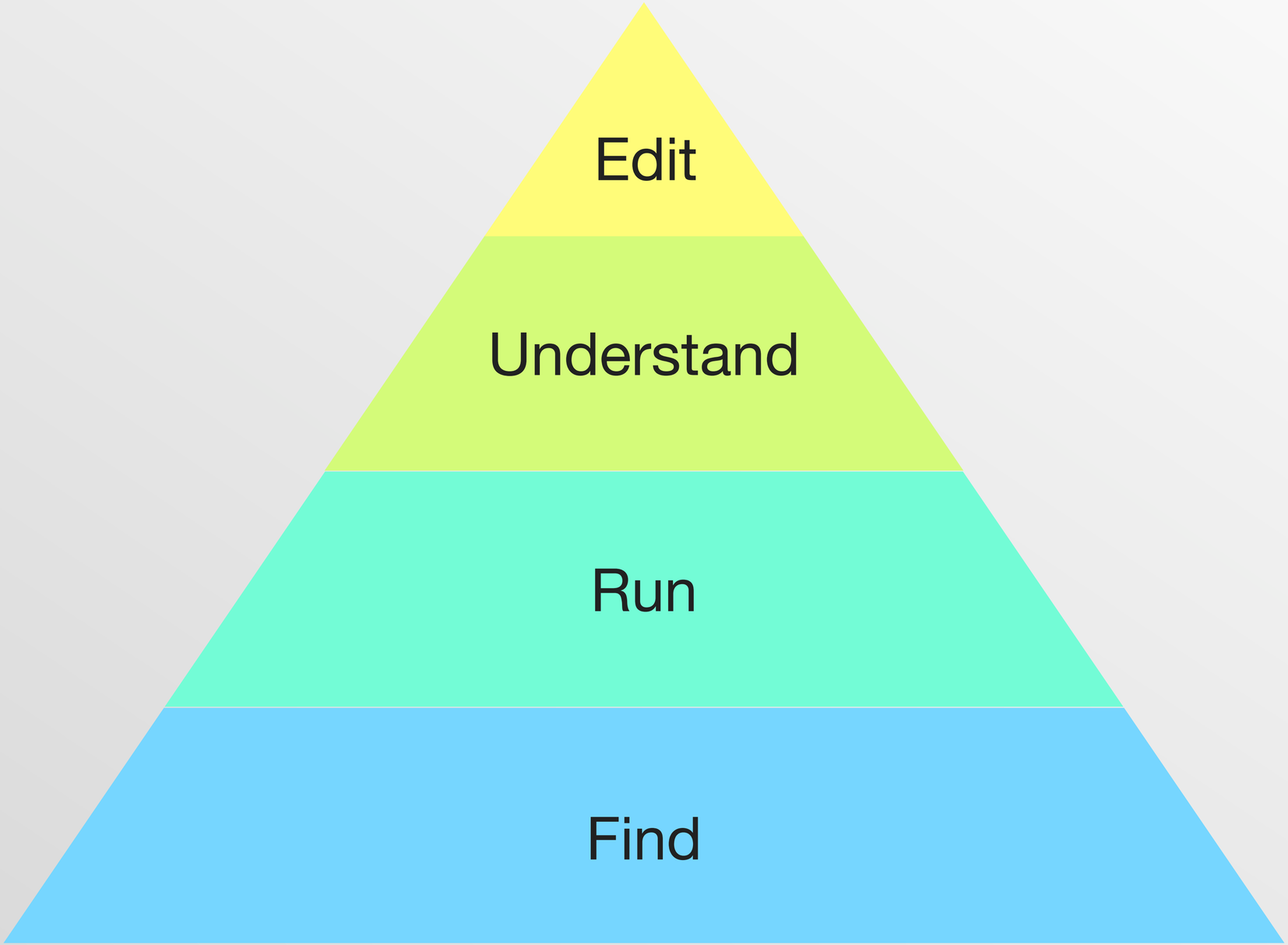
If you've copied and pasted something three times, you should turn it into a function.

For code reviews:

If you've written the same thing three times, you should write it up in your style guide.

Team package

- Some conventions are best encoded as actual functions. Those should live in a team package!
- Two places to start:
  - Common data connections
  - https://posit-dev.github.io/brand-yml/
- Learn how to create a package in http://r-pkgs.org/.


Edit
Understand
Run
Find

Shared ownership

- Valuable to build culture of shared ownership.
- Everyone should have permission to merge, but culture of ask first (unless it’s urgent/on vacation etc).
- Write up your conventions on who does the merge (creator or recipient).

Pull request process

```
# Fork and clone the repo
usethis::create_from_github("{username}/{repo}")

# Create a branch
pr_init("{brief-summary}")

# Make changes and commit
pr_push()
# Follow prompts on GitHub
```

Your turn

Make a pull request to your neighbour's repo.

Or work through one of the practice exercises at https://github.com/tidyverse/tidy-dev-day/tree/main/practice-pr