R Analysis Workflow

MSK QSURE R Training, Session 3

Karissa Whiting

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Outline

- Overview of R Workflow
- Linear & Logistic Regression Case Study
- Functions
- Git/ Github
- *Not covered but will provide code:*
    - Code for cleaning data with dates
    - Linear Mixed Effects Models
    - Shiny Apps

The R Analysis Workflow

- Clean and Explore Data
  - `dplyr`
  - `lubridate`
- Analyze it
  - `stats`
  - `survival`
  - `lme4`/ `lmer`
  - `ggplot`
- Report Your Findings
  - R Markdown / `knitr`
  - `gt` / `gtsummary`
  - `broom`
- Iterate, Share, and Collaborate!
  - `git`/ `github`
  - `devtools` & `usethis`

Case Study - Modeling Diabetes Risk Factors

- Analyze risk factors for diabetes
- Is waist to hip ratio a risk factor for diabetes?
- Outcome: glycosolated hemoglobin level (> 7 is considered diabetic)
- Available Variables of interest:
    - cholesterol level
    - stabilized glucose
    - location of individual
    - age
    - gender
    - height/weight
    - body frame
    - waist in inches
    - hip in inches

```
library(faraway)
?diabetes
```

Reproducibility

Why is a Reproducible R Workflow Important?

Reproducibility

Why is a Reproducible R Workflow Important?

- Allows you to show evidence of your results
- Encourages transparency about decisions made during analysis
- Enables others to check and use/extend your methods and results
- Enables FUTURE YOU to check and use/extend your methods and results

Reproducibility

How do we ensure our R code is reproducible?

- Have a clear project workflow structure
- Comment and document your code
- Use reproducible reporting practice (e.g. Rmd inline text)
- Avoid absolute file paths (e.g. `~/Users/Whiting/Projects...`)
- Version control (document changes you make, or use git!)
- Read More: https://ropensci.github.io/reproducibility-guide/

Why Write a Function?

- D.R.Y. - limit copy pasting and potential mistakes
- Automate common tasks
- You only need to update code in one place

Function Tips

- If you are copy pasting code > 3 times, write a function
- Give your function a useful name

Function Example

```
add_one <- function(number) {
  result = number + 1
  return(result)
}

add_one(7)
```

```
## [1] 8
```

```
#add_one("hai")
```

Function Practice

Write a function to calculate BMI given height (inchs) and weight (lbs)

BMI = (weight * 703) / (height)^2

```
calc_bmi <- function() {
  ???????????????
}
```

Git and Github

Git and Github

- *Git* is version control software that records changes to a file/ project.
  - View specific changes to code over time
  - Revert files to past states as needed
- *Github* web-based UI and social platform that works on top of git.
  - Upload your code so others can view and contribute to it
  - View and contribute to other projects

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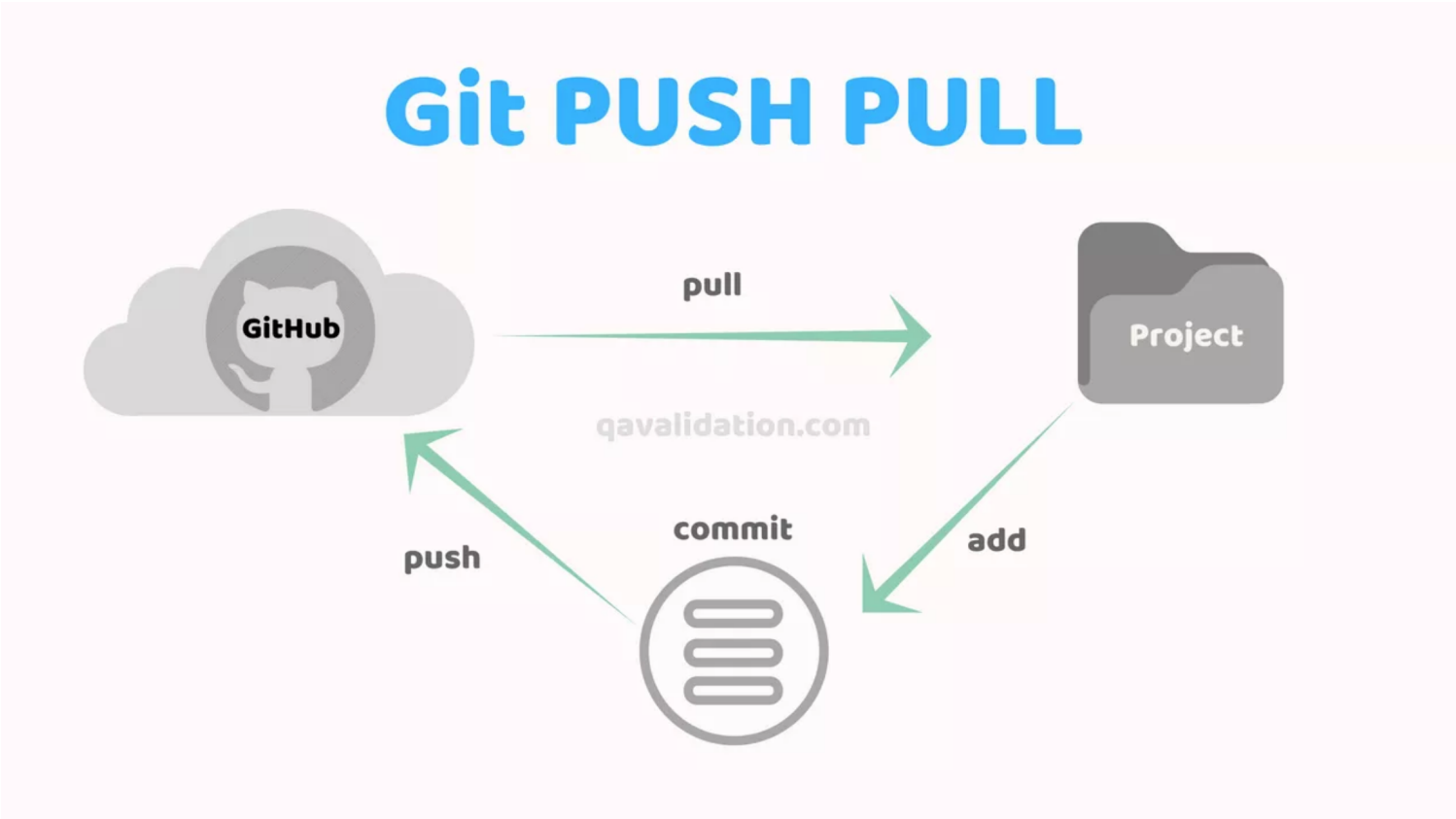
- **NOTE: DON'T PUT CODE OR DATA ON GITHUB IF PROJECT USES PROTECTED DATA**

Git and Github



Last Notes

- Stack Overflow is your friend: https://stackoverflow.com/
- Help eachother! (but also learn how to read R documentation)
- Stay in the loop
    - Rbloggers: https://www.r-bloggers.com/
    - Twitter: @hadleywickham, @JennyBryan, #rstats
- Get involved
    - Start a github account
    - Make a package

THANK YOU!!


If statistics programs/languages were cars...
Excel
SPSS
SAS
STATA
R