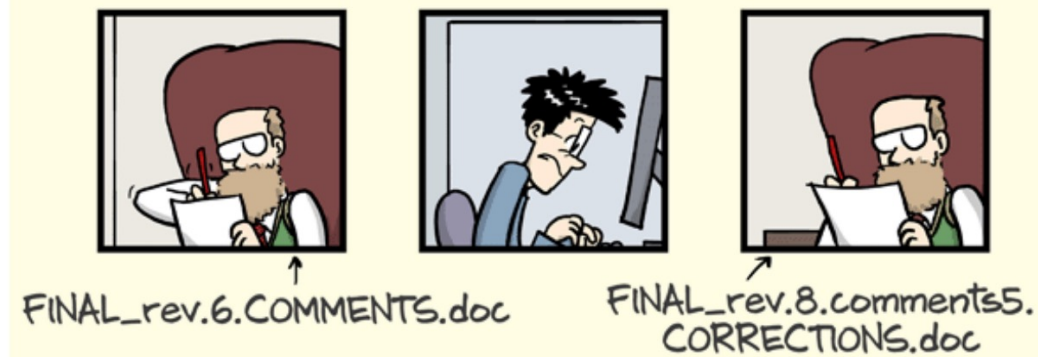
Intro to git/GitHub

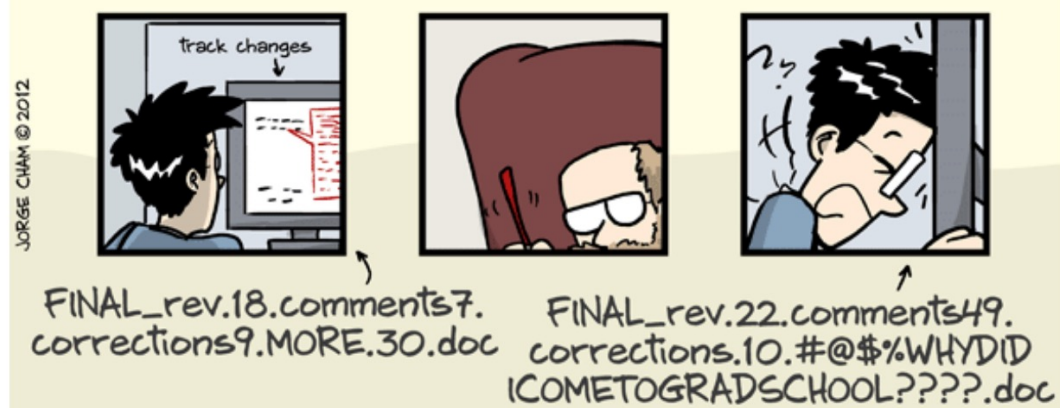
INP Bootcamp 2021

Goals

- To know what git/GitHub do (if you don’t already)
  (Tutorial at the end)
- To point you to some useful resources

"FINAL".doc





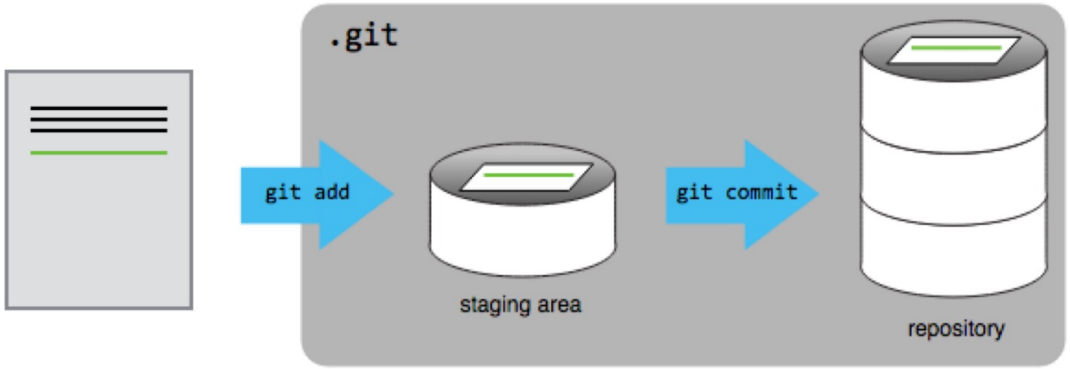
Version Control

- Easy and powerful way to track changes to your work
- Useful for both writing (if using e.g. LaTeX) and code
- Backups of your work
- General coding safety net

What is Git? How does it work?

Git tracks changes to a file (or set of files) through a series of snapshots called “commits” or “revisions”.

These snapshots are stored in a “repository” which contains a history of all the changes to the files.

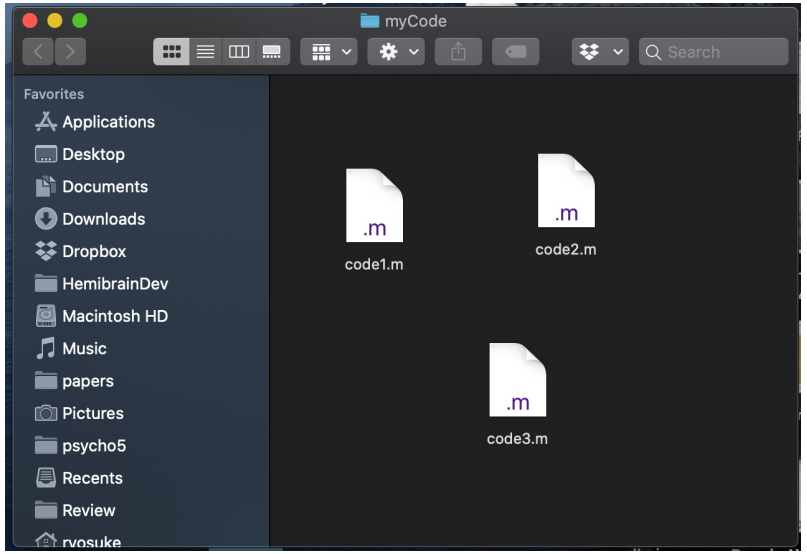


How is Git useful to me?

- “Why isn’t it working all of a sudden?”
- Cleaner file system (no more “code, codev2, codev3_test, codev3_test1” directories)
- Record of your edits (and thought process!)
- Check for bugs in inconsistent results
- Unlimited and powerful “undo”
- Collaboration!

Adding to your repo

Bunch of codes in your folder



(Commit)

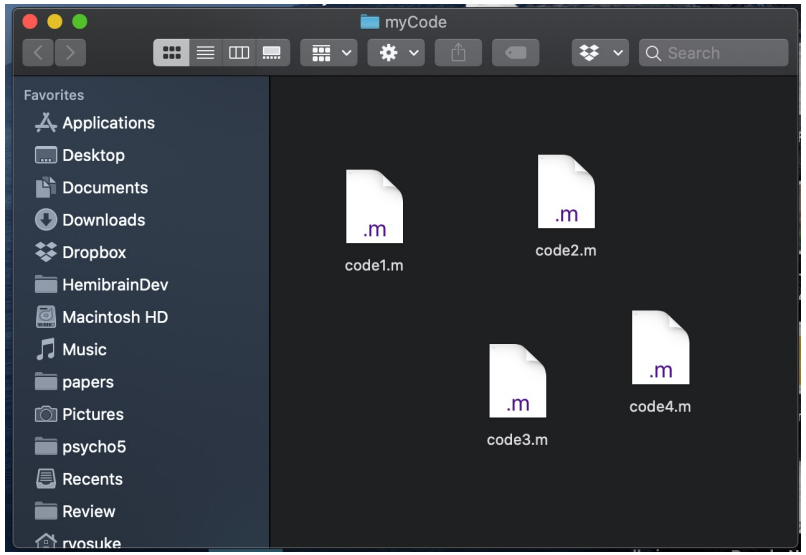
Register to the official version

- Code1.m
- Code2.m
- Code3.m

(Repository)

Adding [more files] to your repo

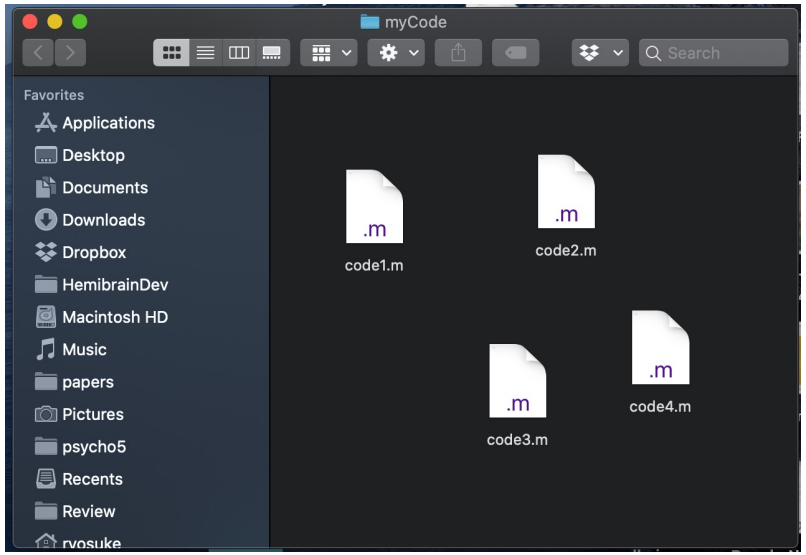
Changes you make in the folder (e.g. more lines in existing codes, new files) are not reflected to the “official version” until you actively register them (“commit”)



- Code1.m
- Code2.m
- Code3.m

Adding [more files] to your repo

Changes you make in the folder (e.g. more lines in existing codes, new files) are not reflected to the “official version” until you actively register them (“commit”)

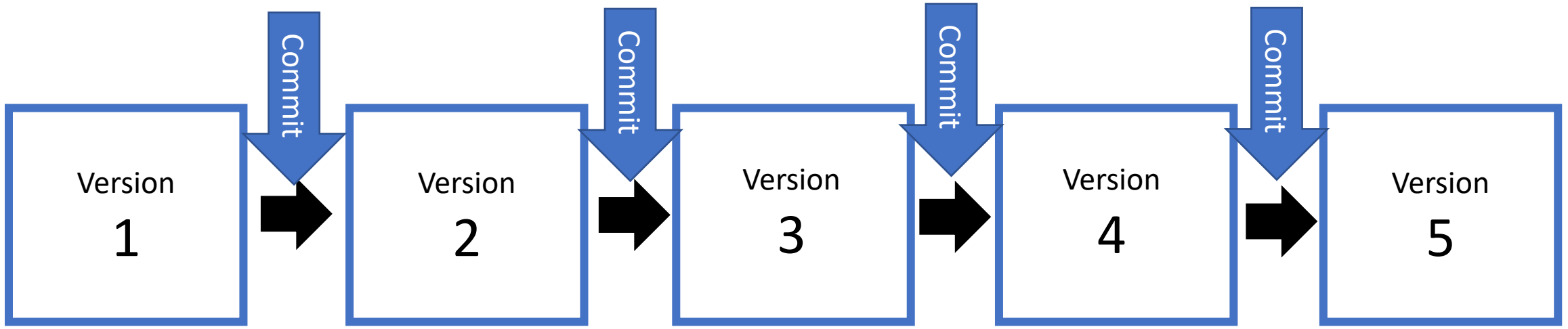


(Commit)

- Code1.m
- Code2.m
- Code3.m
- Code4.m

File versions

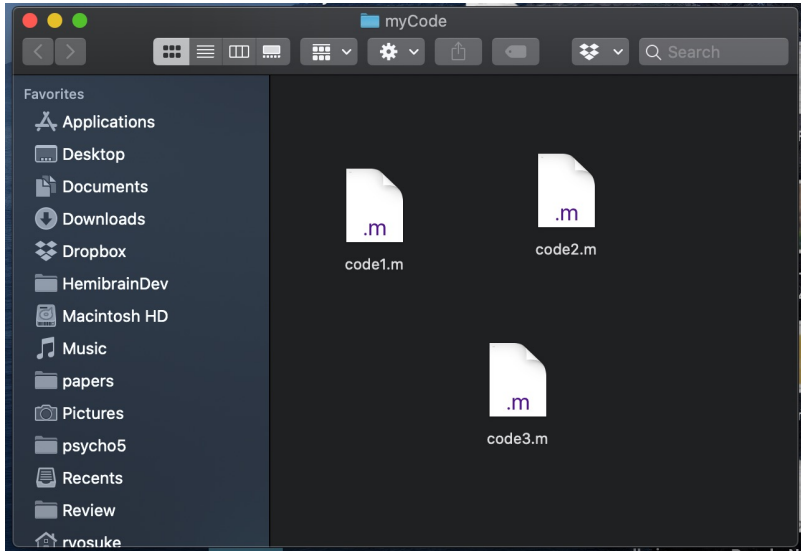
Every time you register (“commit”) changes, you create a new version



Roll back

You can go back to previous versions (= backup)

Overwrite what you have in your code folder with the “official version”

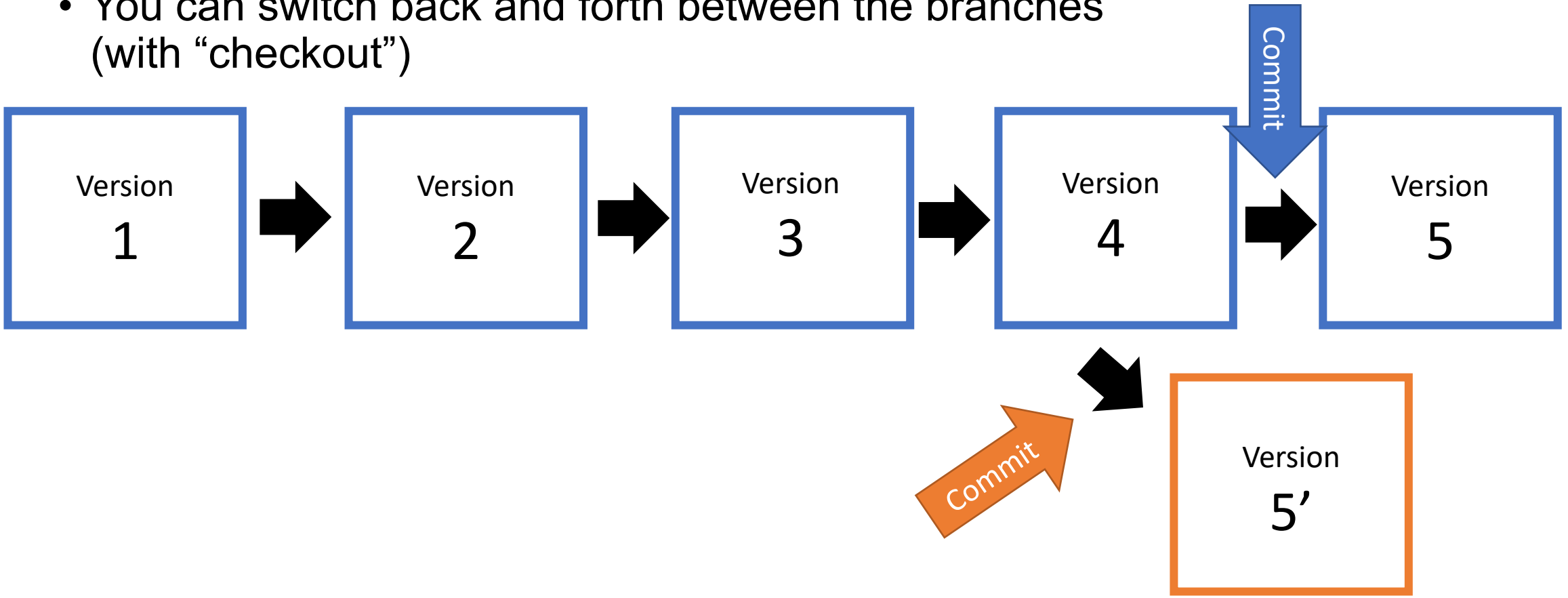


(Checkout)

Older version

Branching

- You can branch this chain of “official versions”
- You can switch back and forth between the branches (with “checkout”)



GitHub

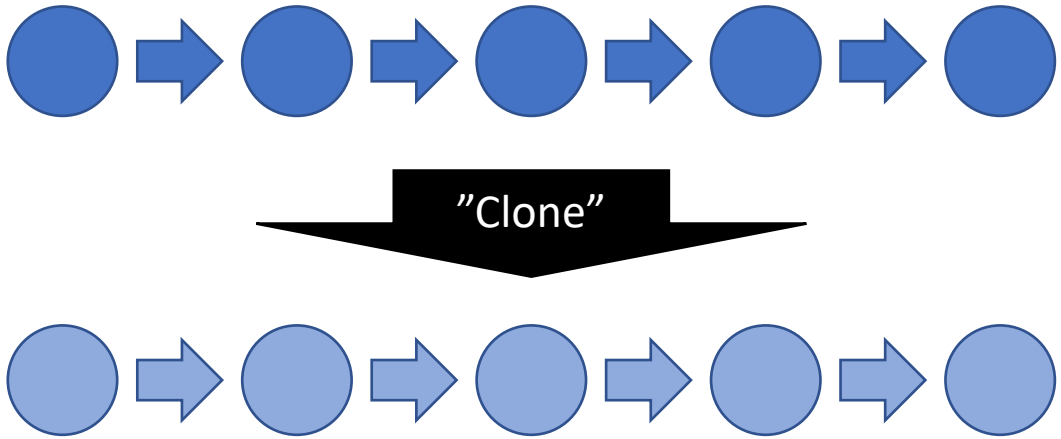
- GitHub is a web service that lets you store the official versions (“repository”) of your code online
  - Online backup
  - Sharing code between computers
  - Sharing code to the world

GitHub workflow

Online
“official versions”
On GitHub
(“remote repository”)

Cloning

Online
“official versions”
On GitHub
(“remote repository”)



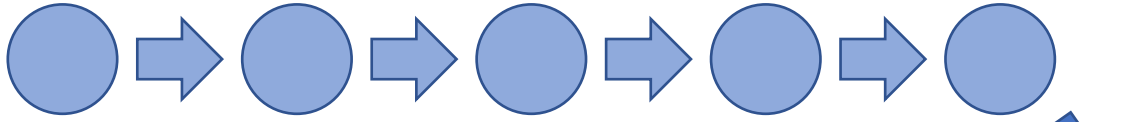
Your own official versions
(“local repository”)

Cloning

Online
“official versions”
On GitHub
(“remote repository”)

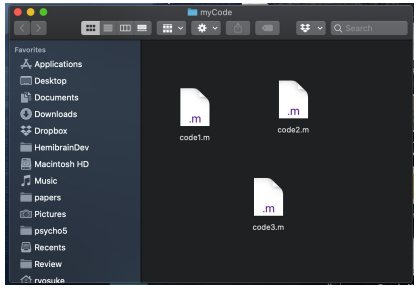
”Clone”

Your own official versions
(“local repository”)



Copied over

Your code folder

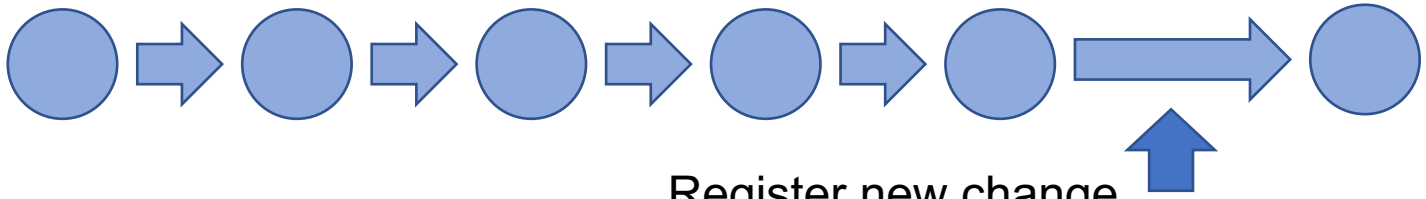


Committing

Online
“official versions”
On GitHub
(“remote repository”)

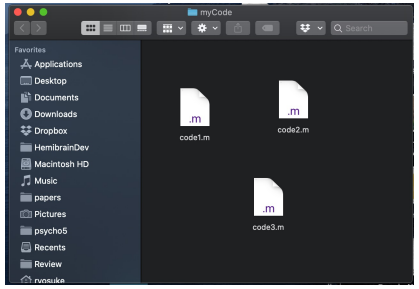
”Clone”

Your own official versions
(“local repository”)



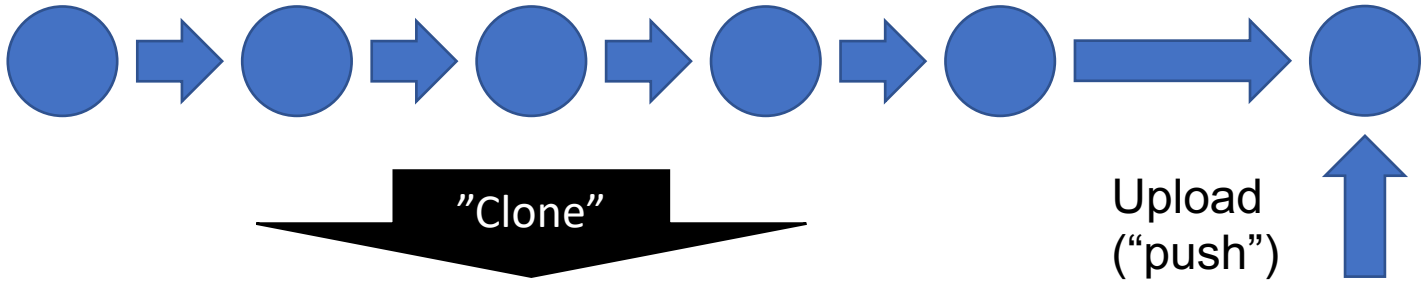
Register new change
(“commit”)

Your code folder



Pushing

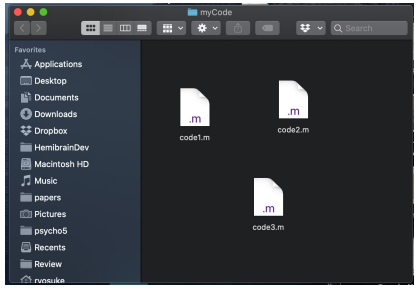
Online
“official versions”
On GitHub
(“remote repository”)



Your own official versions
(“local repository”)

Register new change
(“commit”)

Your code folder

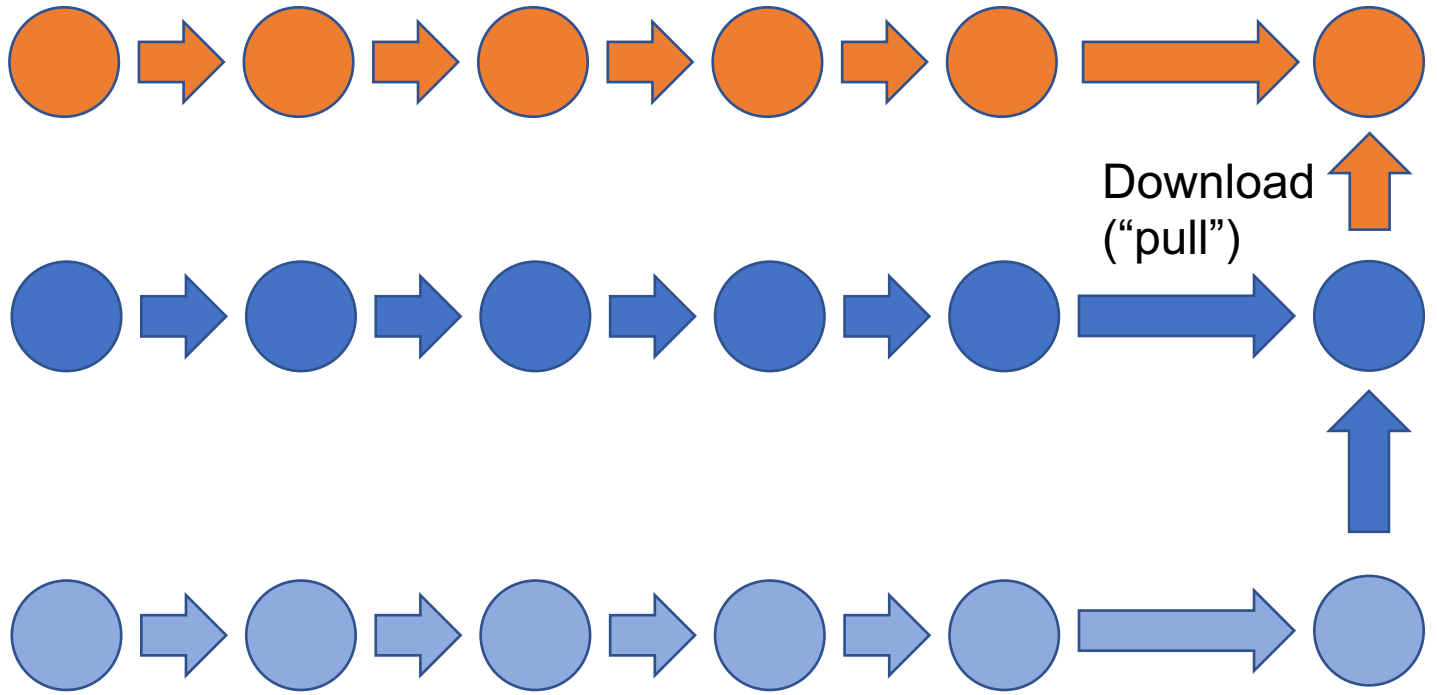


Collaborating

Your friends'
official versions

Online
"official versions"
On GitHub
("remote repository")

Your own official versions
("local repository")



Other topics

- What if you and your friend are simultaneously working on the copy of the same branch?
  - Conflicts arise
  - Git usually nicely resolves these automatically unless you are working on the same line of same file
  - Otherwise manually you need to resolve the conflict manually

Summary

- Git lets you make “official copies (repository)” of your code folder
- Every time you register new changes to the official copy, a new version is created
- Git remembers all the past versions, which can be used as backup
- The chain of official copies can branch, and you can go back and forth between branches easily.
- GitHub allows you to store “official copies” online, which helps people work on the same sets of code across multiple computers

Resources

- https://github.com/
  GitHub (recommend making a free account)
- https://www.sourcetreeapp.com/
  SourceTree (a free app that makes you do all this graphically)
- https://guides.github.com/activities/hello-world/
  GitHub tutorial – I'd recommend making a mock repository to understand the functioning of git/GitHub