

Intro to git & GitHub

INP Bootcamp 2022



Goals

- To know what git & GitHub do (if you don't already)
 - Hands-on tutorial at the end. It will be your homework
- To get an overview of the general workflow
- To point you to some useful resources

"FINAL".doc



↑ FINAL.doc!



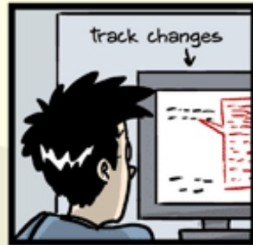
↑ FINAL_rev.2.doc



↑ FINAL_rev.6.COMMENTS.doc



↑ FINAL_rev.8.comments5.
CORRECTIONS.doc



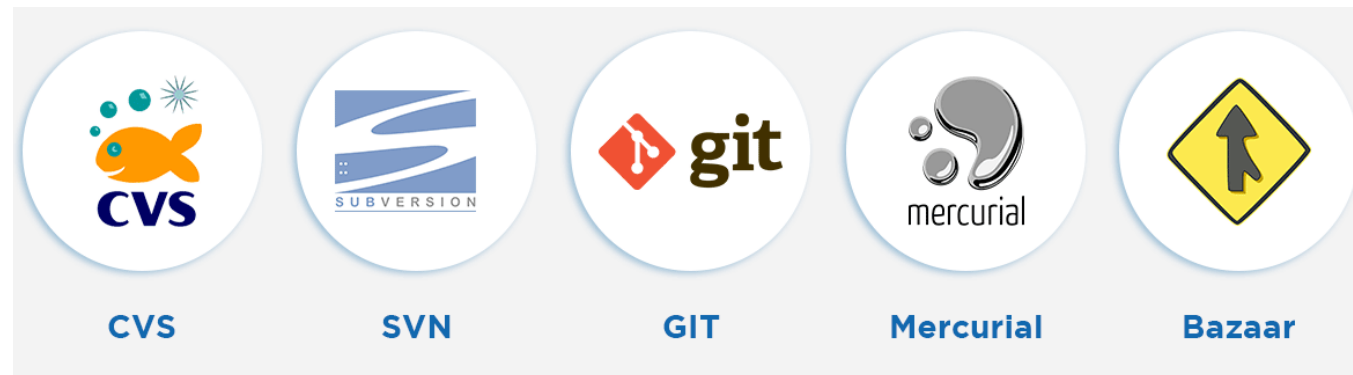
↑ FINAL_rev.18.comments7.
corrections9.MORE.30.doc



↑ FINAL_rev.22.comments49.
corrections.10.#@\$\$%WHYDID
ICOMETOGRADSCHOOL?????.doc

Version Control Systems

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

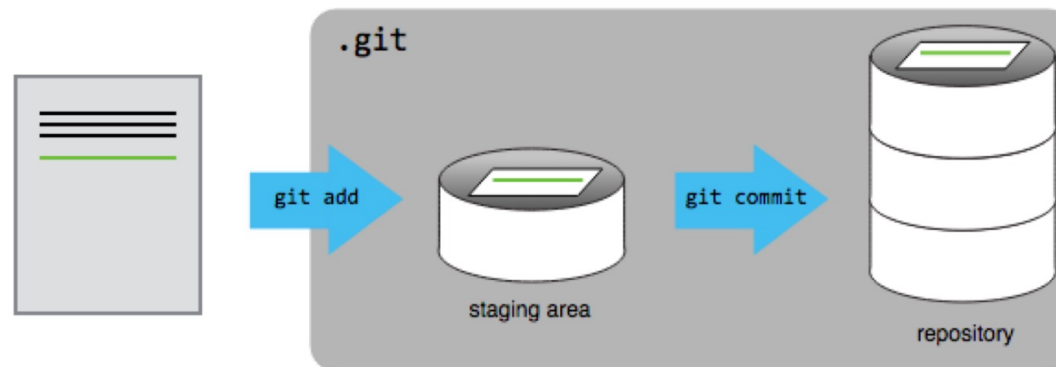


What is Git? How does it work?

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.

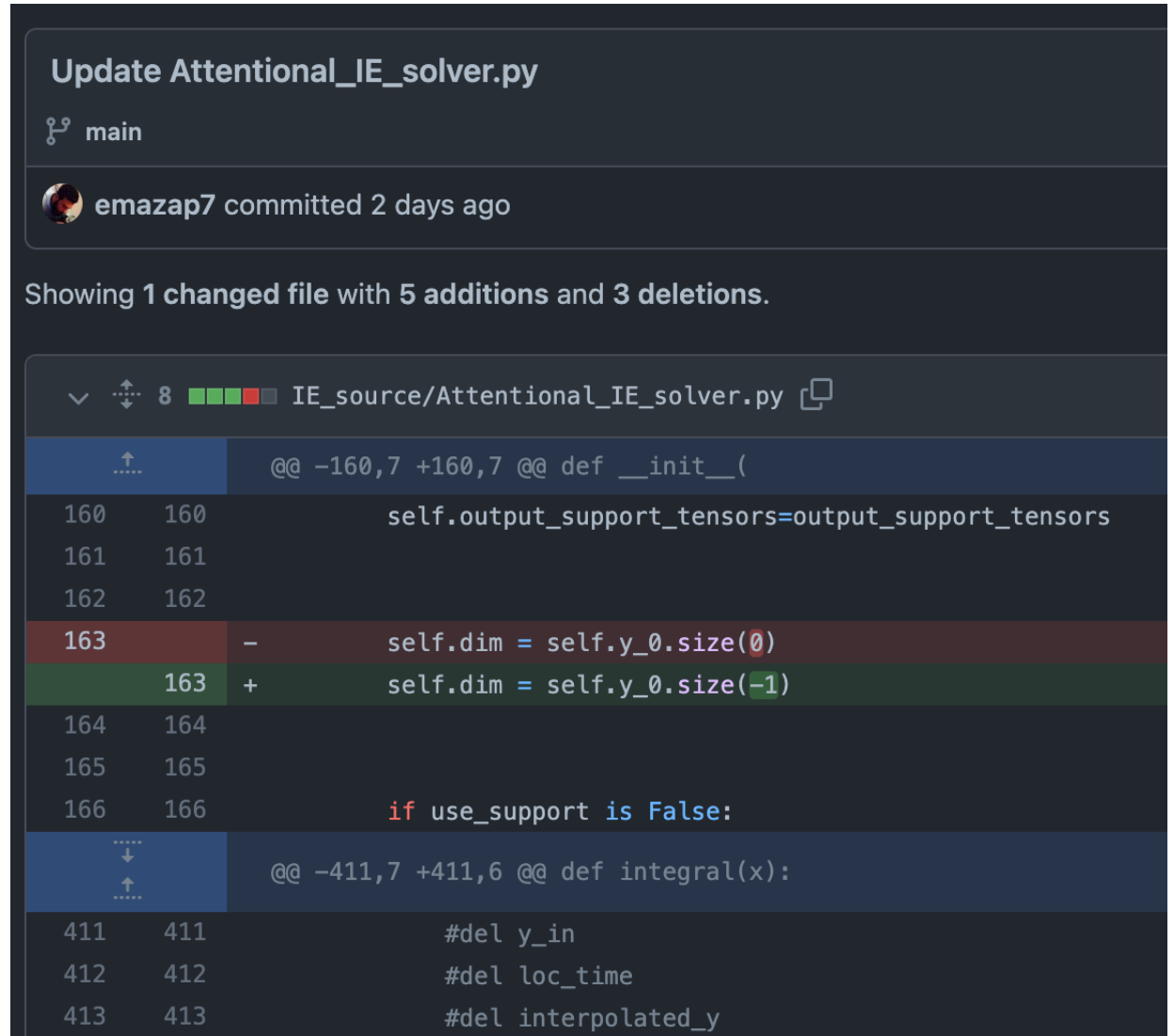


How is Git useful to me?

- “Why isn’t it working all of a sudden?”
- Unlimited and powerful “undo”
- 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
- Collaboration!

How git/GitHub saved the day

- "... but it was working fine on Tuesday! What happened?"
- The logs on GitHub helped to solve the mystery.



The screenshot shows a GitHub commit interface. At the top, the commit title is "Update Attentional_IE_solver.py" and the branch is "main". The commit was made by "emazap7" 2 days ago. Below this, it states "Showing 1 changed file with 5 additions and 3 deletions." The file path is "IE_source/Attentional_IE_solver.py". The diff shows changes to the `__init__` and `integral` functions. In the `__init__` function, line 163 was changed from `self.dim = self.y_0.size(0)` to `self.dim = self.y_0.size(-1)`. In the `integral` function, lines 411-413 show deletions of `y_in`, `loc_time`, and `interpolated_y`.

```
Update Attentional_IE_solver.py
main
emazap7 committed 2 days ago

Showing 1 changed file with 5 additions and 3 deletions.

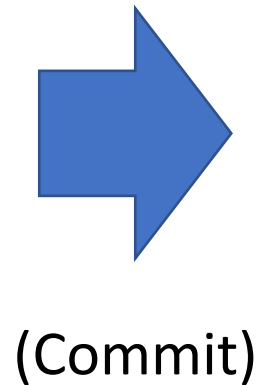
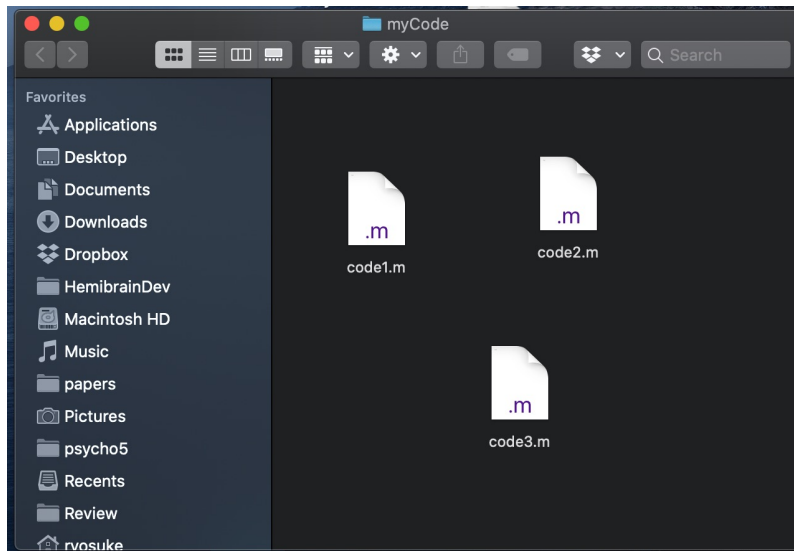
IE_source/Attentional_IE_solver.py

@@ -160,7 +160,7 @@ def __init__(
    self.output_support_tensors=output_support_tensors
    160    160
    161    161
    162    162
    163 - self.dim = self.y_0.size(0)
    163 + self.dim = self.y_0.size(-1)
    164    164
    165    165
    166    166 if use_support is False:

@@ -411,7 +411,6 @@ def integral(x):
    #del y_in
    411    411
    #del loc_time
    412    412
    #del interpolated_y
    413    413
```

Adding to your repo

Bunch of codes in your folder



(Commit)

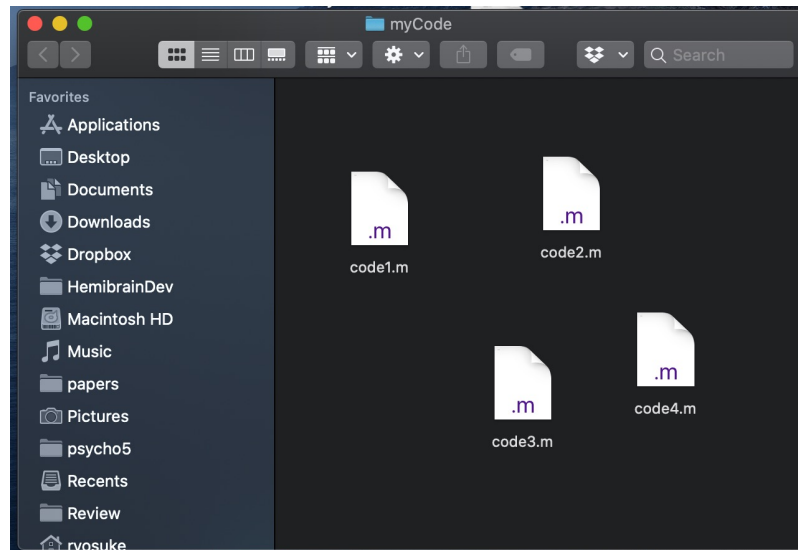
Register to the official version

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

(Repository)

Adding [more files] to your repo

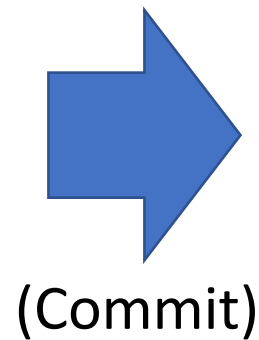
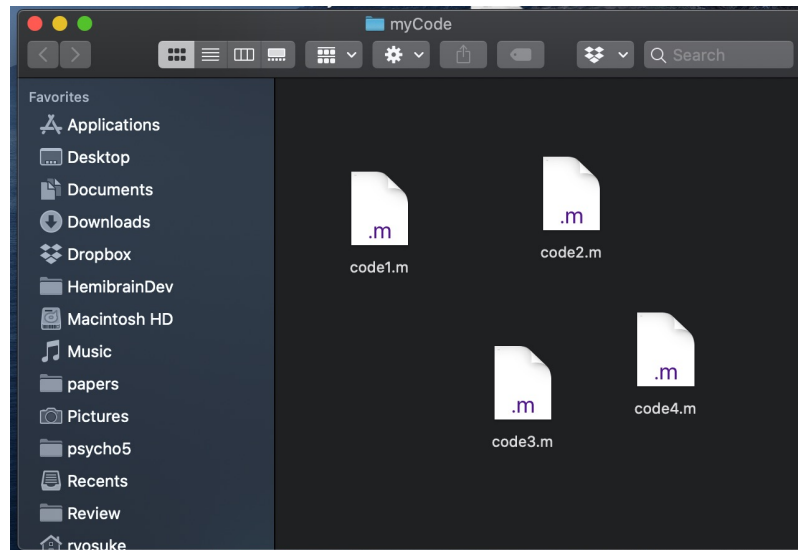
Changes you make in the folder (e.g. more lines in existing codes, new files) are not reflected to the “official version” until you actively register them (“commit”)



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

Adding [more files] to your repo

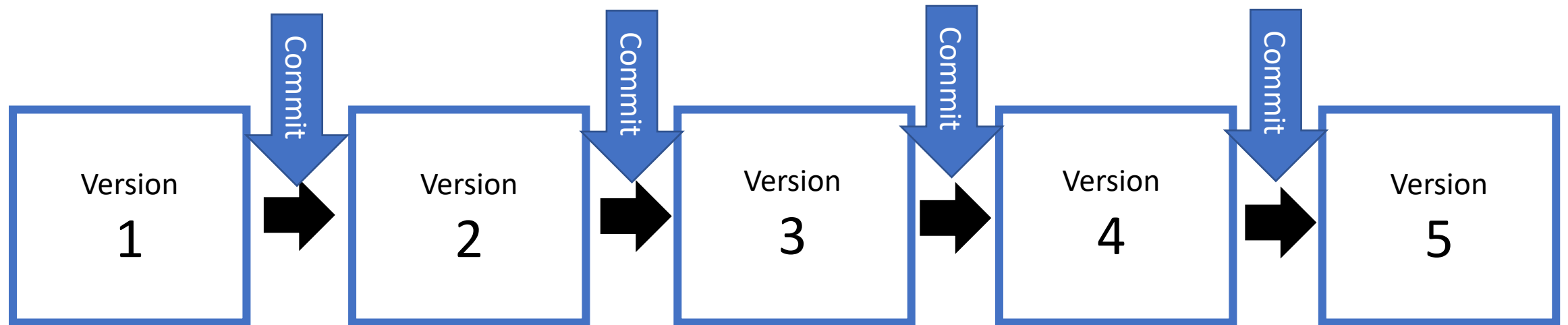
Changes you make in the folder (e.g. more lines in existing codes, new files) are not reflected to the “official version” until you actively register them (“commit”)



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

File versions

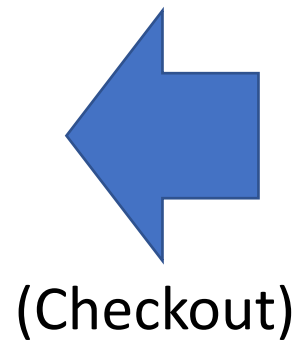
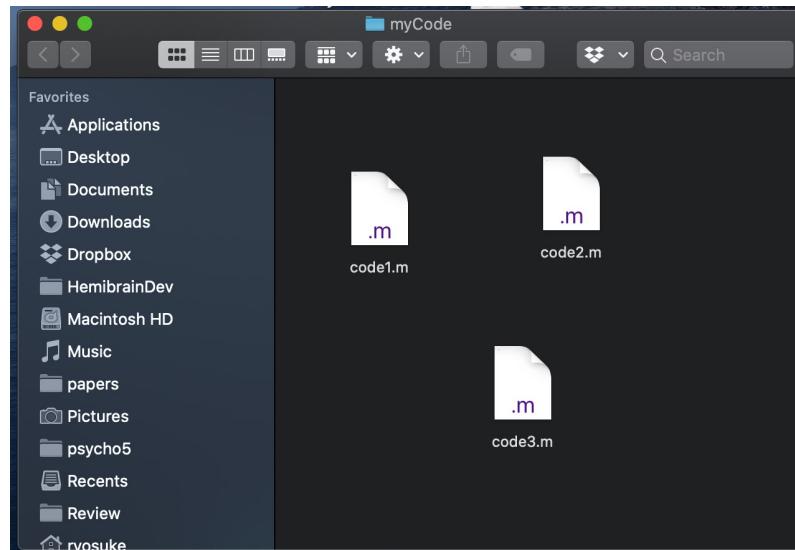
Every time you register (“commit”) changes, you create a new version



Roll back

You can go back to previous versions (= backup)

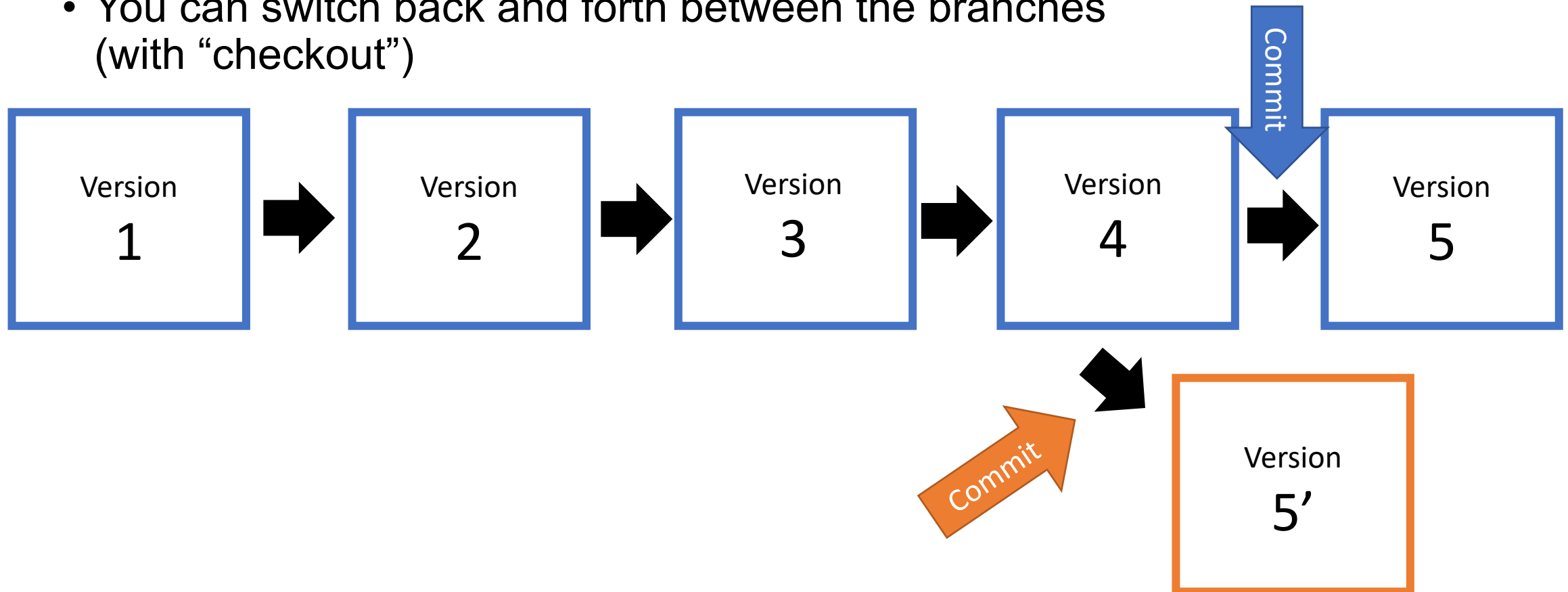
Overwrite what you have in your code folder with the “official version”



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

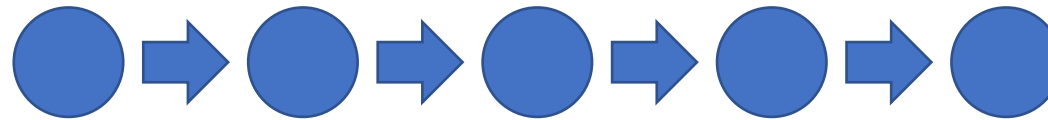
GitHub workflow

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



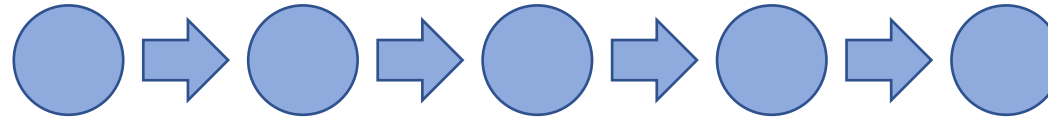
Cloning

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



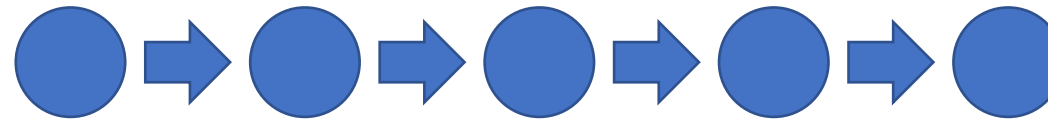
"Clone"

Your own official versions
("local repository")



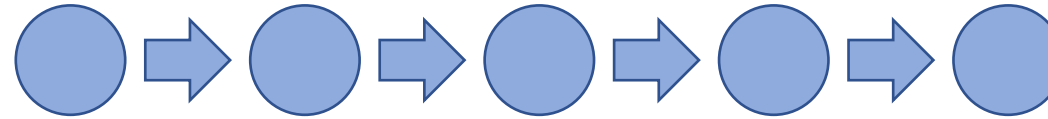
Cloning

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



“Clone”

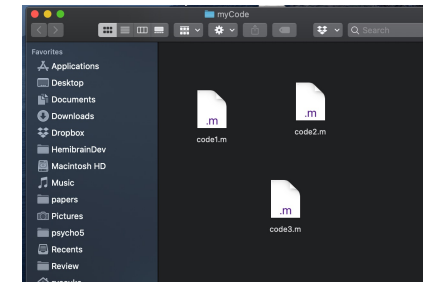
Your own official versions
 (“local repository”)



Copied over

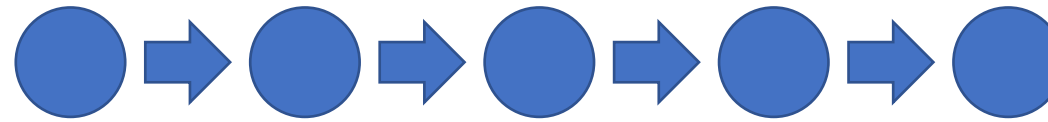


Your code folder



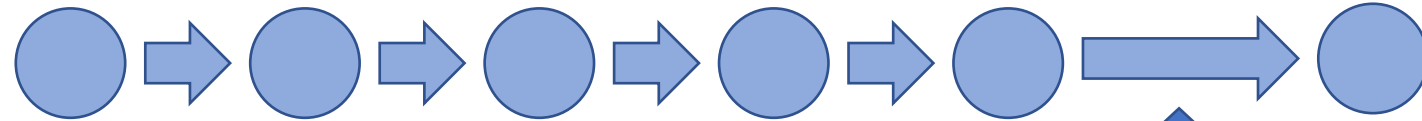
Committing

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



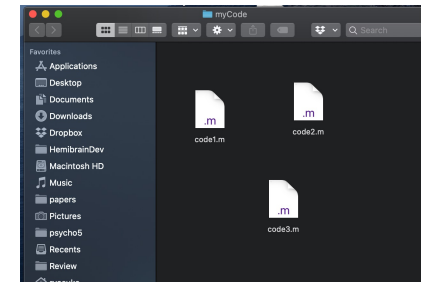
“Clone”

Your own official versions
 (“local repository”)



Register new change
 (“add” & “commit”)

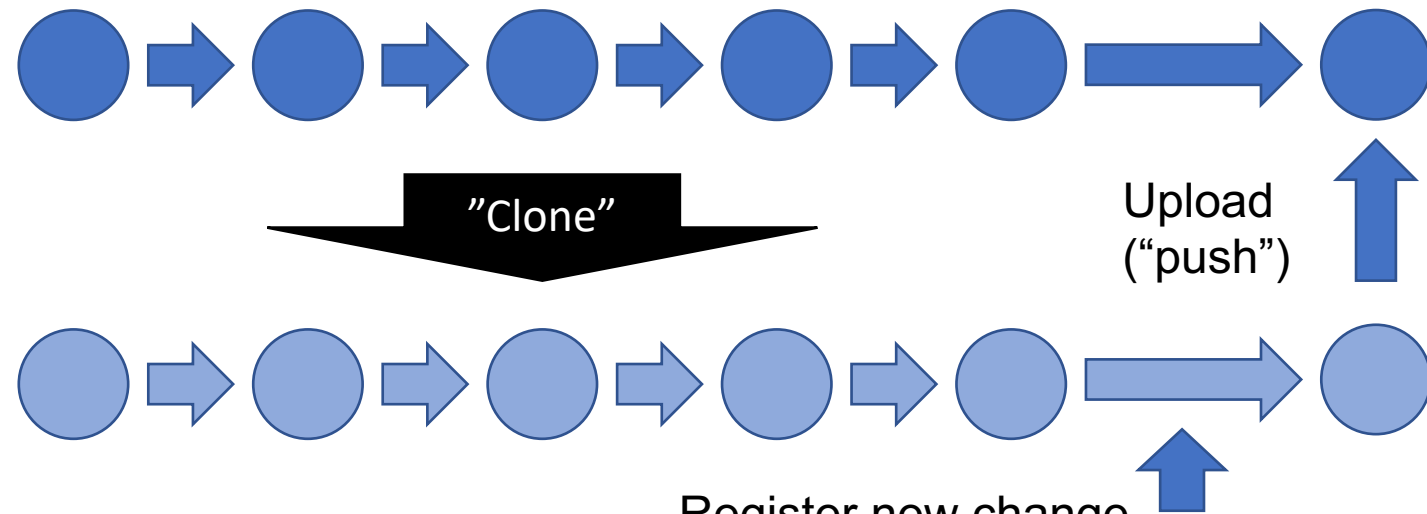
Your code folder



Pushing

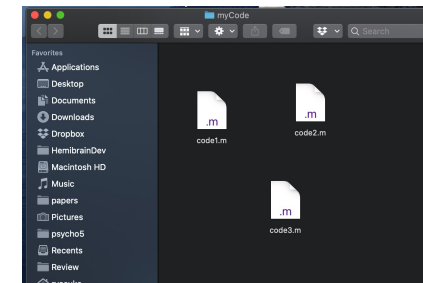
Online
“official versions”
On GitHub
 (“remote repository”)

Your own official versions
 (“local repository”)

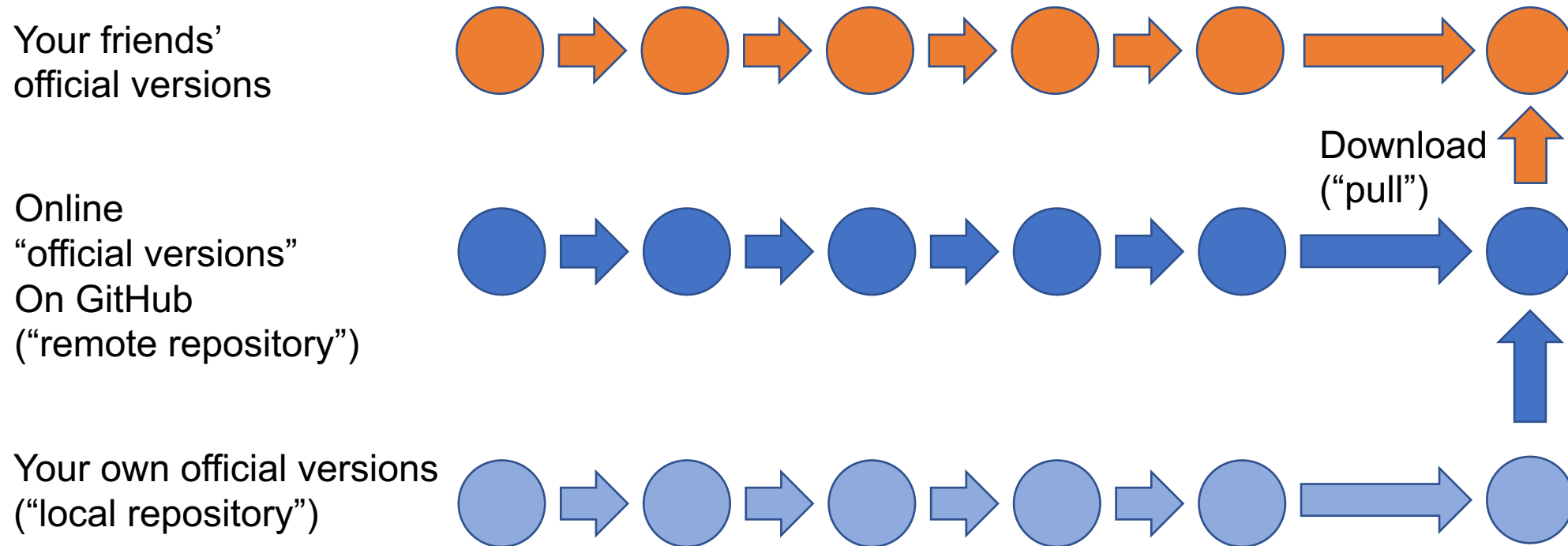


Register new change
 (“add” & “commit”)

Your code folder



Collaborating



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 you need to resolve the conflict manually

Or not...



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
- https://github.com/ahof1704/INP_Git_Intro
Our tutorial specially made for you ❤️