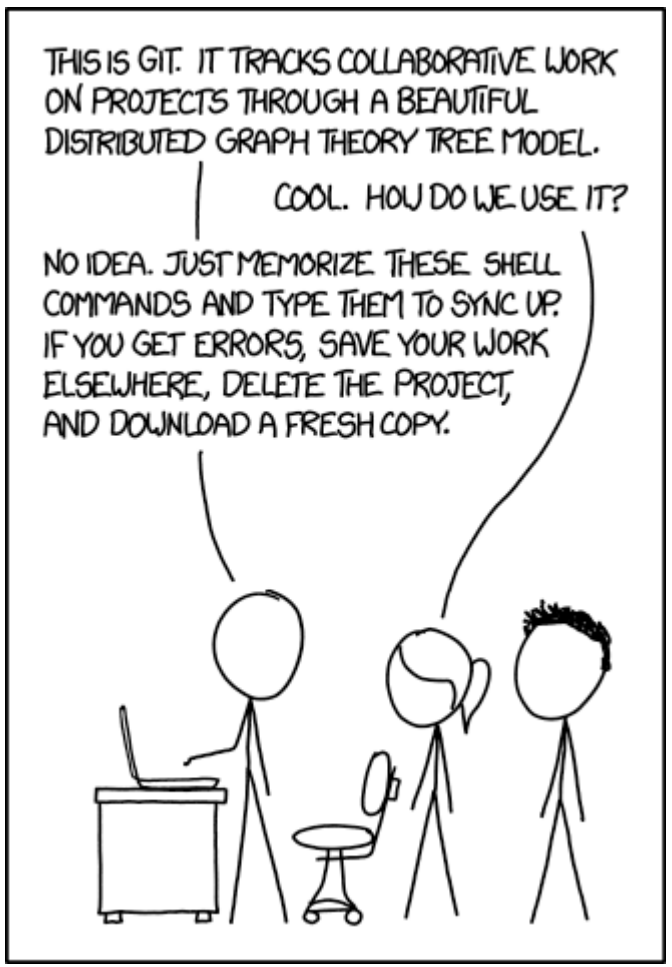
Git

Joseph Longworth

Session Outline



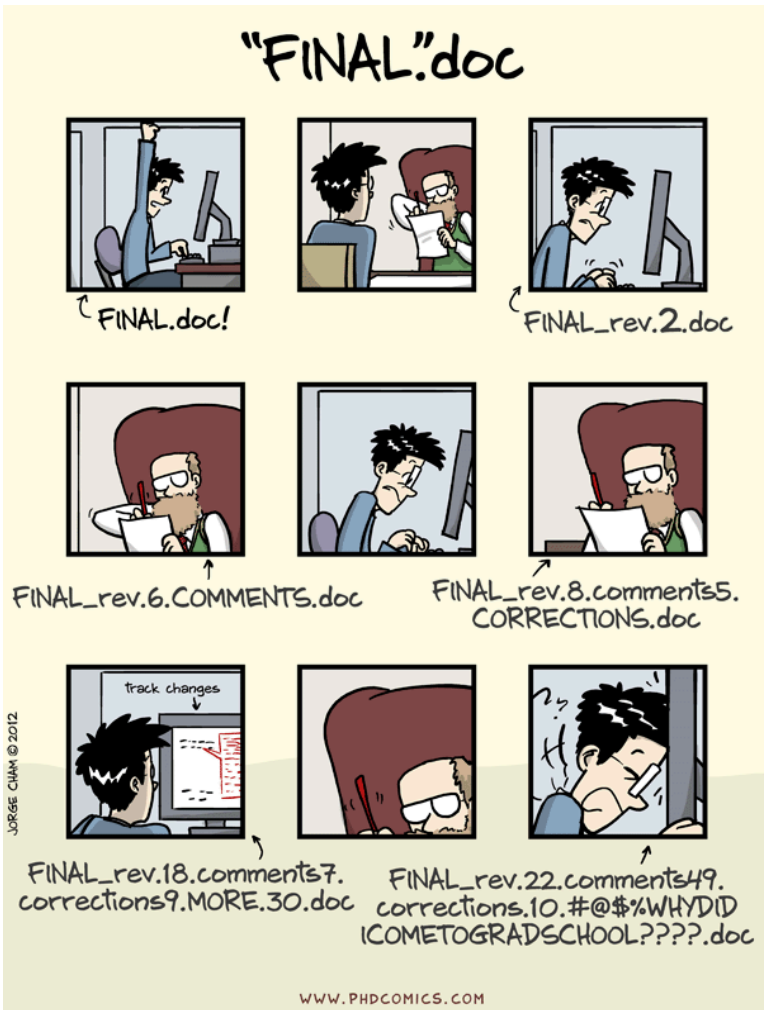
- What is Version Control Software and it's benefit
- Fundamentals of Git interaction (Work Locally)
- Git Hosting Services and Collaboration

Who is this?

- Anyone remember who this was?
- Linus Torvalds
- Having created Linux in 1991 in 2005 he created Git.

Version Control

The Chaos of Uncontrolled Code



- Renaming our files with version “indicators” quickly gets confused.
- This is complex when working alone when working collaboratively it’s a 

- Lost changes, confusion, and frustration become commonplace.

Introducing Version Control

Think about:

- How have you tracked your files in the past
- How would describe you edits over time
- How would you explain it to someone else

5 min video on version control general concept

https://git-scm.com/video/what-is-version-control

Git Fundementals

How to Start with Git

Think about:

- We should have git installed already 🤞
- What `git configs` are needed to get started
- Look for git `git init`
- What is `git add` and `git commit`

4 min video Git

https://git-scm.com/video/get-going

Git Commands Recap

`git init`	Creates a new Repository
`git add`	Moves files to staging area
`git commit -m ""`	Commits staged files to git history
`git status`	Current State of our stage
`git log --oneline`	History view (condensed)

Class Activity 1

Class Activity 1.1

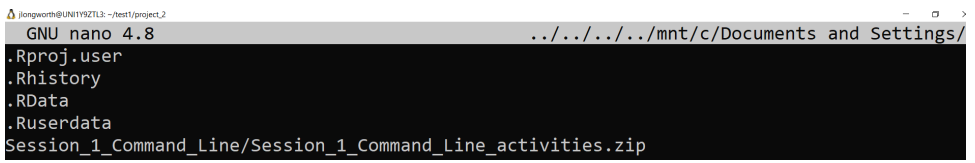
1. Open you linux terminal that we had form the last session
2. Change directory `cd` to the home directory
3. Run git configs
    1. `git config --global user.name "MeMario"`
    2. `git config --global user.email "@gmail.com"`
4. run `git init first_git`
5. change directory into the new git tracked directory `cd ???`
6. Create a file with `touch file_1.txt`
7. Check `git status`

Class Activity 1.2

1. `git add file_1.txt` to add the file to the ‘stage’
2. Check `git status`
3. `git commit -m "Describe your commit"`
4. Repeat creating 2 more commits (use nano to edit your file)
5. run `git log --oneline` what can you see?

Extra bits

.gitignore



`git add -A`

- Using the -A all files altered in the repository apart from those in .gitignore will be added.

Coffee Break

Git Hosting Services & Collaboration

Git Hosting Services

Git hosting services provide a platform for storing, managing, and collaborating on code using Git.

GitHub and GitLab are powerful tools for managing your code, but they cater to slightly different styles:

- **GitHub:**
  - ~ 70 million users
  - **Focus:** Open source projects and individual developers.
  - **Strengths:** Simple interface, huge open-source community.
- **GitLab:**
  - ~30 million users
  - **Focus:** Collaboration and private projects (even for teams!).
  - **Strengths:** Built-in project management tools, self-hosting option.

Web vs Local Server

We can work with these we services though likely we will first work with our own institutional server.

Internet

- https://github.com/
- https://gitlab.com/

- **LIH**
  - https://git.lih.lu/
  - https://gitlab01.lih.lu/
- **UNI**
  - https://gitlab.lcsb.uni.lu/
  - gitlab-cloud.uni.lu

Clone vs. Fork: Duplicating a Git Repository

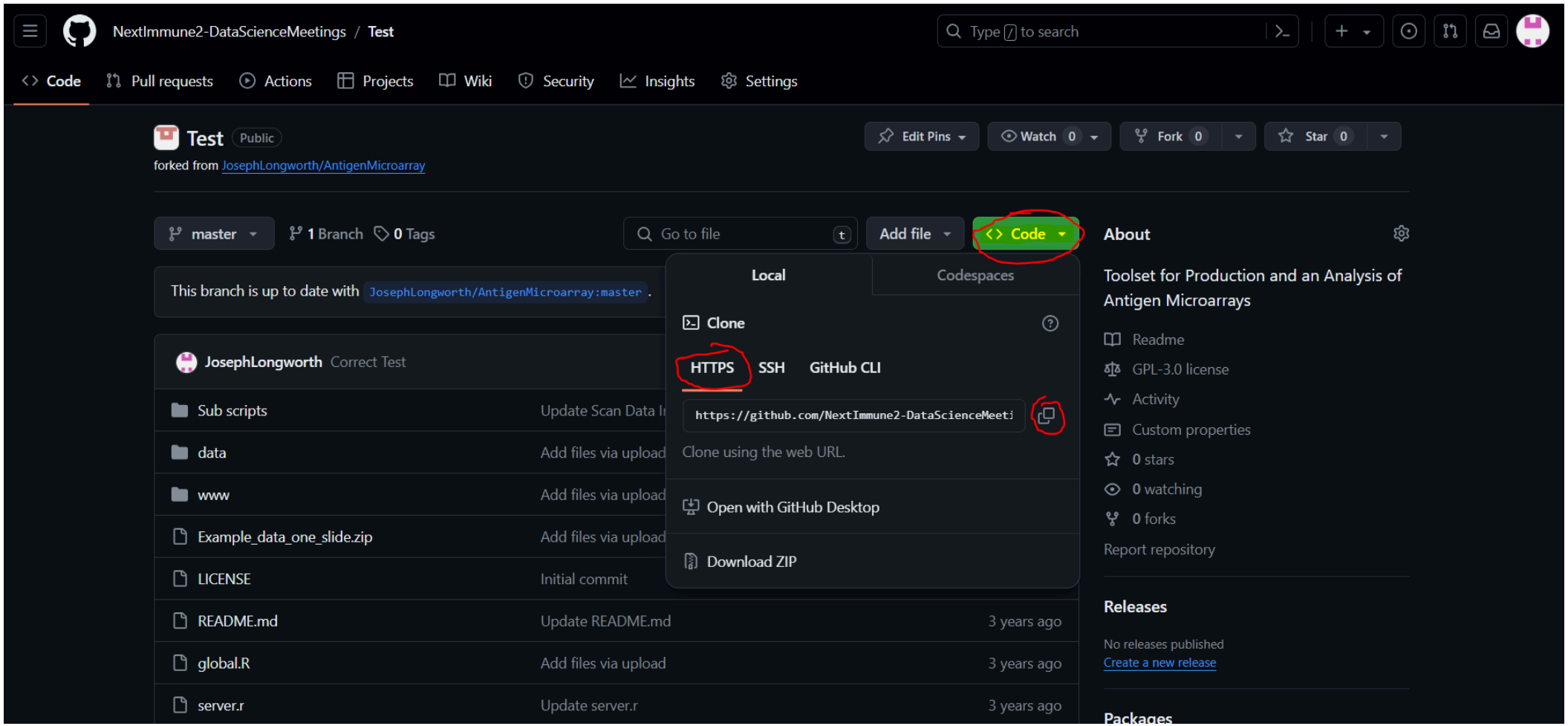
- **Clone:** Creates a complete copy of a remote repository on your local machine
  - Ideal for: Downloading and working on a project without affecting the original.
- **Fork:** Creates a copy of a remote repository on your Git hosting service (e.g., GitHub).
  - You can make changes and propose them back to the original project through pull requests.

Class Activity 2

Class Activity 2

1. Go to Github and log in. See your current repositories
2. go to https://github.com/JosephLongworth/AntigenMicroarray
3. Fork the project to your own account
4. Clone your forked project `git clone "url link found on page"` (use https unless you have the ssh set up)
5. change to text in the Readme file using `nano`
6. `git push` the changes and check the website

Class Activity 2.2



Collaborative Working

look for:

- what is a branch
- `git pull`
- `git push`
- `git merge`

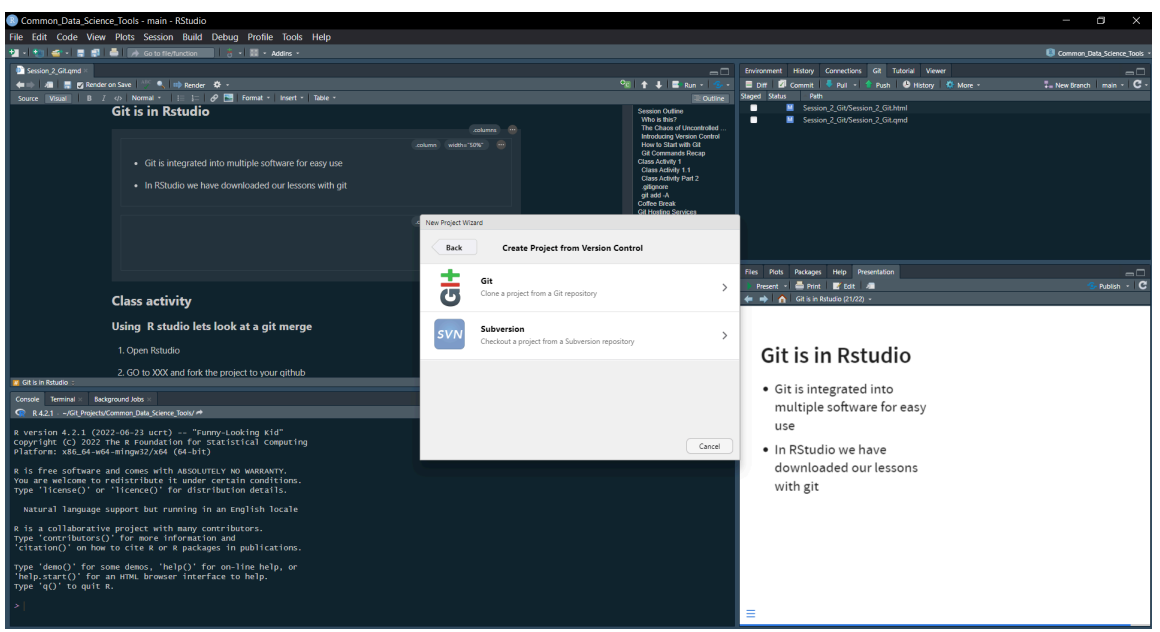
on version control general concept

2:40-6min

https://git-scm.com/video/what-is-git

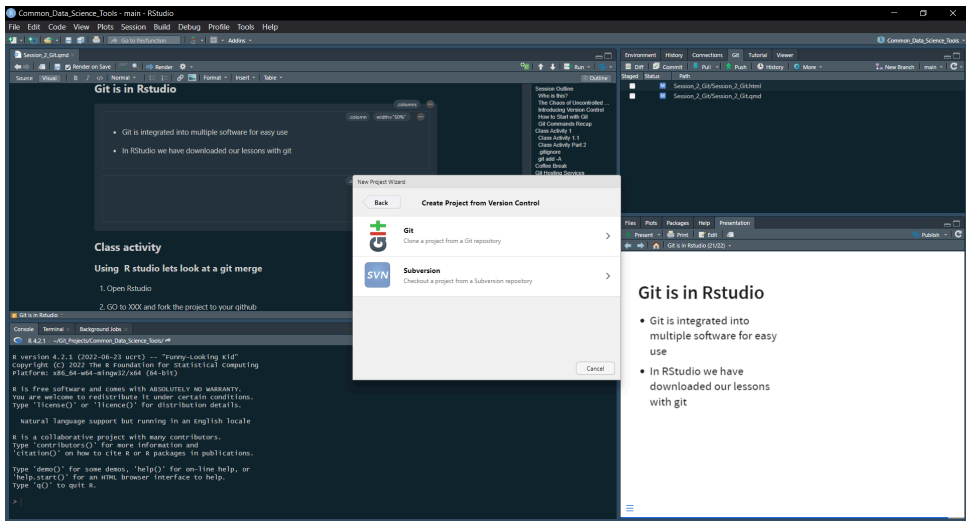
Collaboration Commands Recap

`git push`	Update the remote to your current state
`git pull`	Update you local version with the remote
`git branch`	Create a branch to work in a isolated section
`git merge`	Merge branches together



Git is in Rstudio

- Git is integrated into multiple software for easy use
- In RStudio we have downloaded our lessons with git



Class Activity 3

Class Activity 3 Merging

1. Open Rstudio
2. GO to https://github.com/JosephLongworth/Merge_Demonstartion
3. Using Projects in rstudio GUI clone the repository
4. Switch branches in rstudio
5. from the main branch run `git merge branch1` in the Terminal
6. look at results what could and couldn't be 'auto merged'
7. Fix conflicts and push back

Fin