Practical Session 1

Foundations Spatial Data Science

How are we going to work ?

- Practical session, every week 2 hours - Don’t switch group!
- 1h “Lecture - Tips & Tricks” - 10min break - 50min “Self-Work”
- Questions - Raise your hand or Write in the Zoom chat!

Keep in Mind

- **It will be challenging**
  - Theory and practice are different!
- **Type, don’t copy paste**
  - Examples help build muscle memory, tweak and change them
- **We am here to help**
  - Be active on Slack - Help each other out
- **Keep it simple**
  - Building blocks after building blocks

Today Goals & Aims

- Command Line Tools & Terminal
- Git & GitHub - Get started
- Markdown file - Write your own and edit it
- Docker - What, Why, How

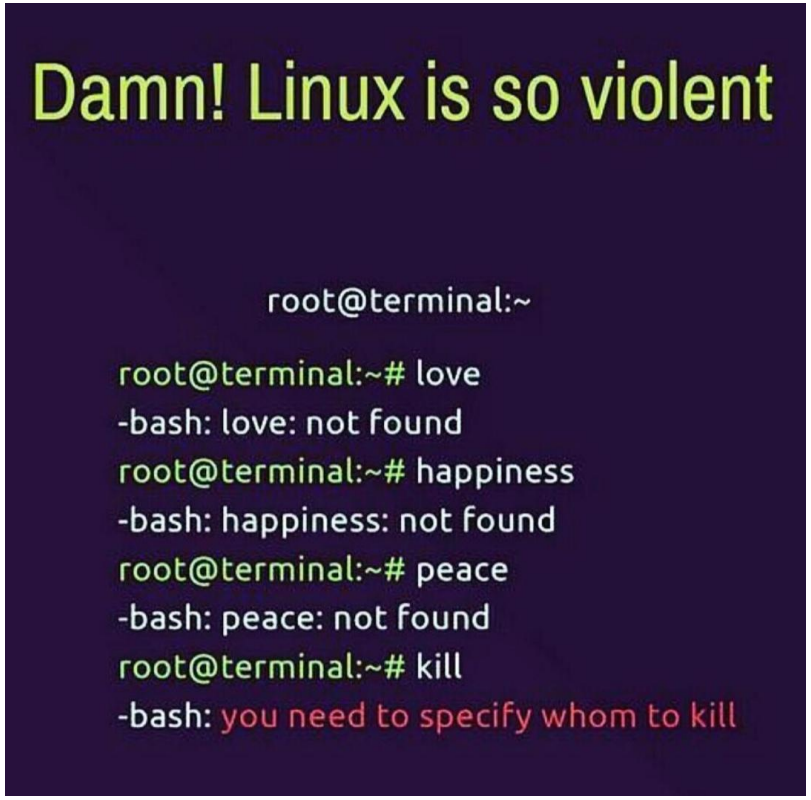
Today Goals & Aims

Term Calendar

	Weekly Topic		WORKSHOP Lead	WORKSHOP Date (Monday)	PRACTICAL Date Groups 1,2,3 (Tuesday)	PRACTICAL Date Groups 4,5,6 (Wednesday)
1	Getting Oriented	initiate	David, Nicolas	4 Oct	4 Oct	5 Oct
2	Foundations (Part 1)	initiate	Nicolas	11 Oct	11 Oct	12 Oct
3	Foundations (Part 2)	initiate	Nicolas	18 Oct	18 Oct	19 Oct
4	Objects & Classes	initiate	David	25 Oct	25 Oct	26 Oct
5	Numeric Data	engage	David	1 Nov	1 Nov	2 Nov
	Reading Week					
6	Spatial Data	engage	Nicolas	15 Nov	15 Nov	16 Nov
7	Textual Data	engage	Nicolas	22 Nov	22 Nov	23 Nov
8	Visualising Data	solve	David	29 Nov	29 Nov	30 Nov
9	Classifying Data	solve	David	6 Dec	6 Dec	7 Dec
10	Clustering Data	solve	Nicolas	13 Dec	13 Dec	14 Dec

Terminal


LINUX BASH
WHY WON'T YOU WORK


Damn! Linux is so violent
root@terminal:~
root@terminal:~# love
-bash: love: not found
root@terminal:~# happiness
-bash: happiness: not found
root@terminal:~# peace
-bash: peace: not found
root@terminal:~# kill
-bash: you need to specify whom to kill

Terminal - Basic Commands

- *ls* # list files in directory
- *cd* # change directory
- *cd ..* # move back up one directory
- *mkdir* # create new directory (folder)
- *touch file_name* # create a new file “file_name”
- *nano file_name* # open “file_name” to edit it
- *cat file_name* # output contents of “file_name”

Git - What is it?

Git - Free and open source distributed version control system.

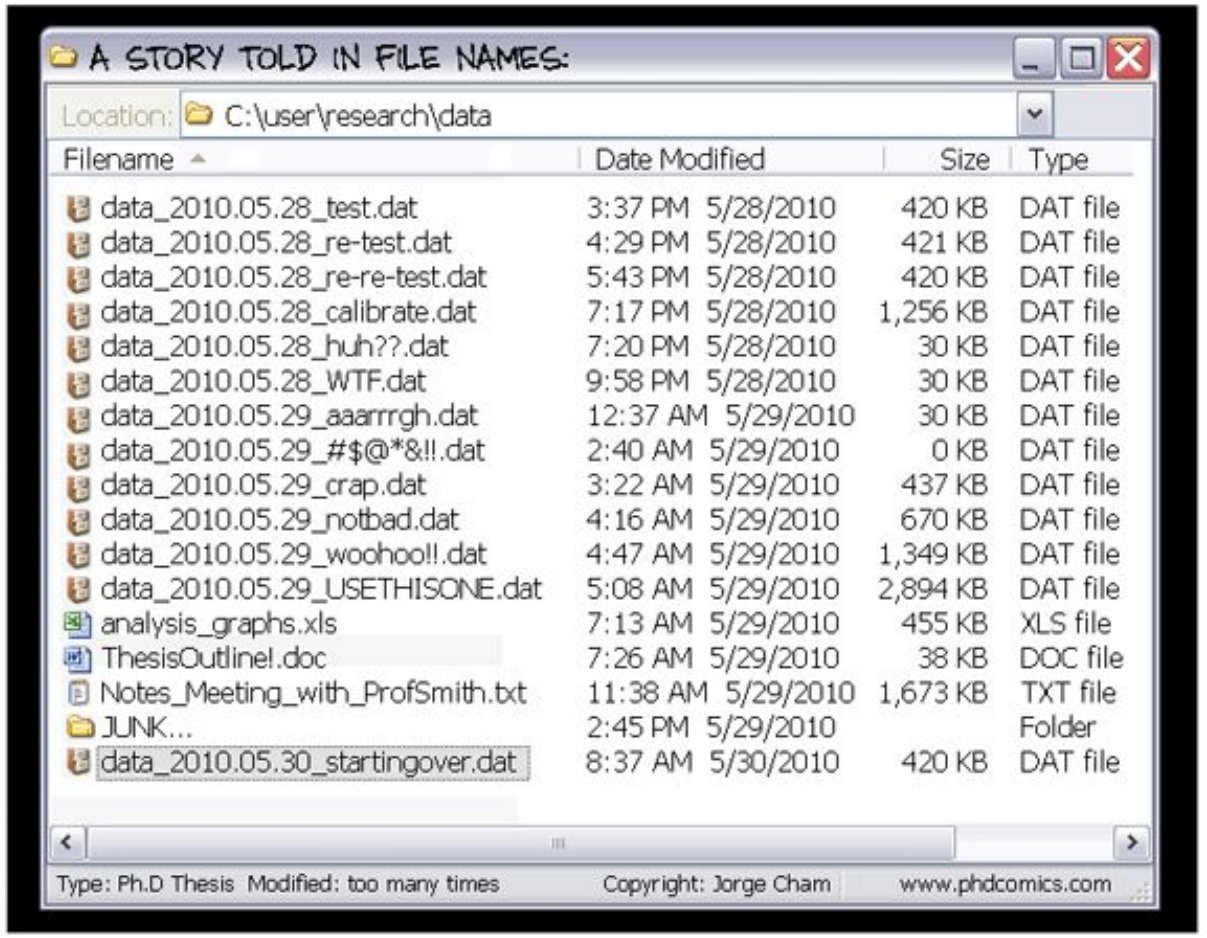
1. Track changes to files over time
2. Record project changes and go back to any specific version at any time
3. Help to collaborate on team projects

GitHub - What is it?

GitHub - Development platform using *Git*.

1. Cloud-based storage
2. Host *Git* repositories on the web
3. Interact with other developer's code, make changes, edit
4. Fork - Pull - Merge

GitHub - Why do we use it?



"Piled Higher and Deeper" by Jorge Cham, www.phdcomics.com

GitHub - Workflow

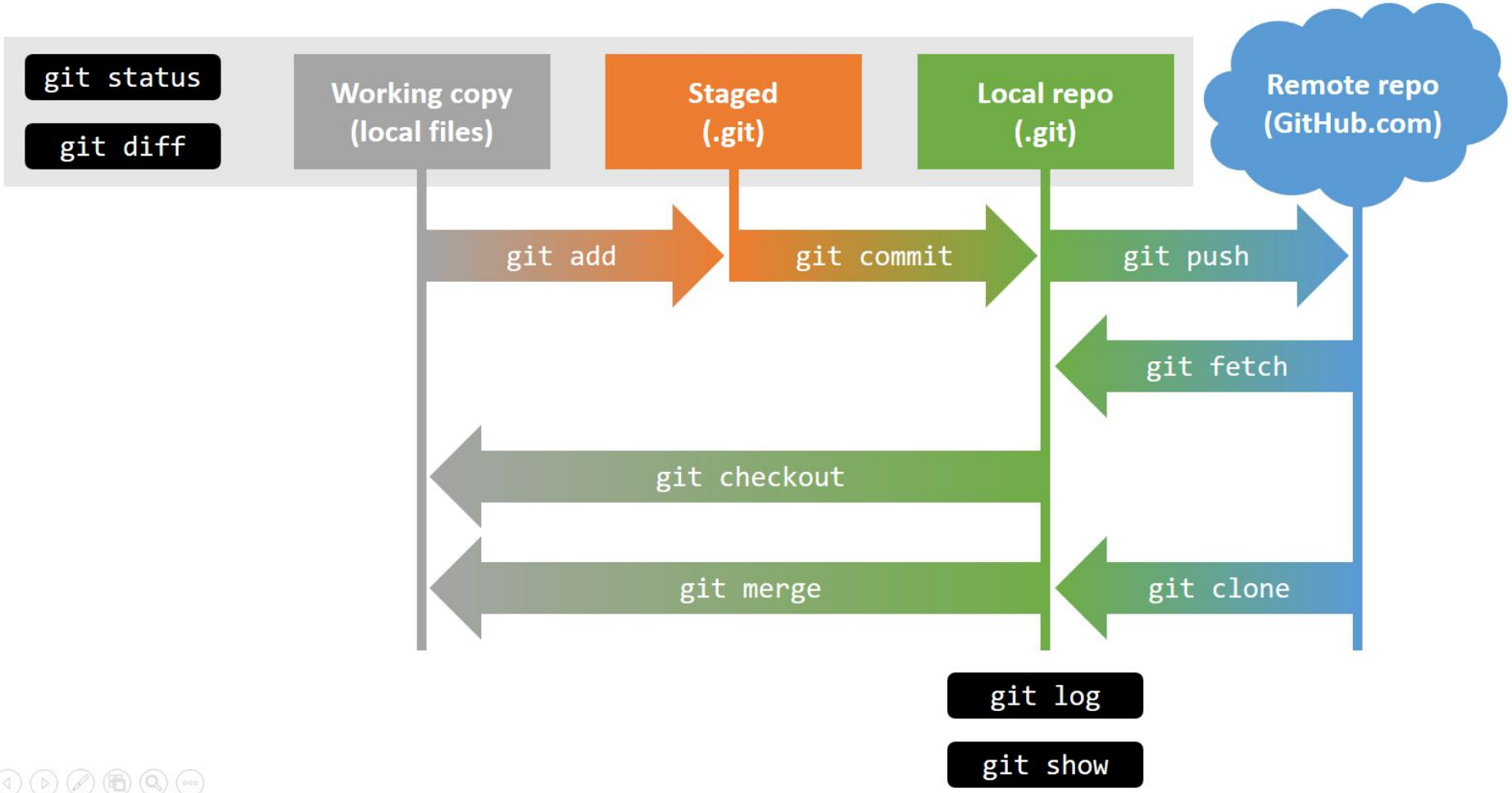
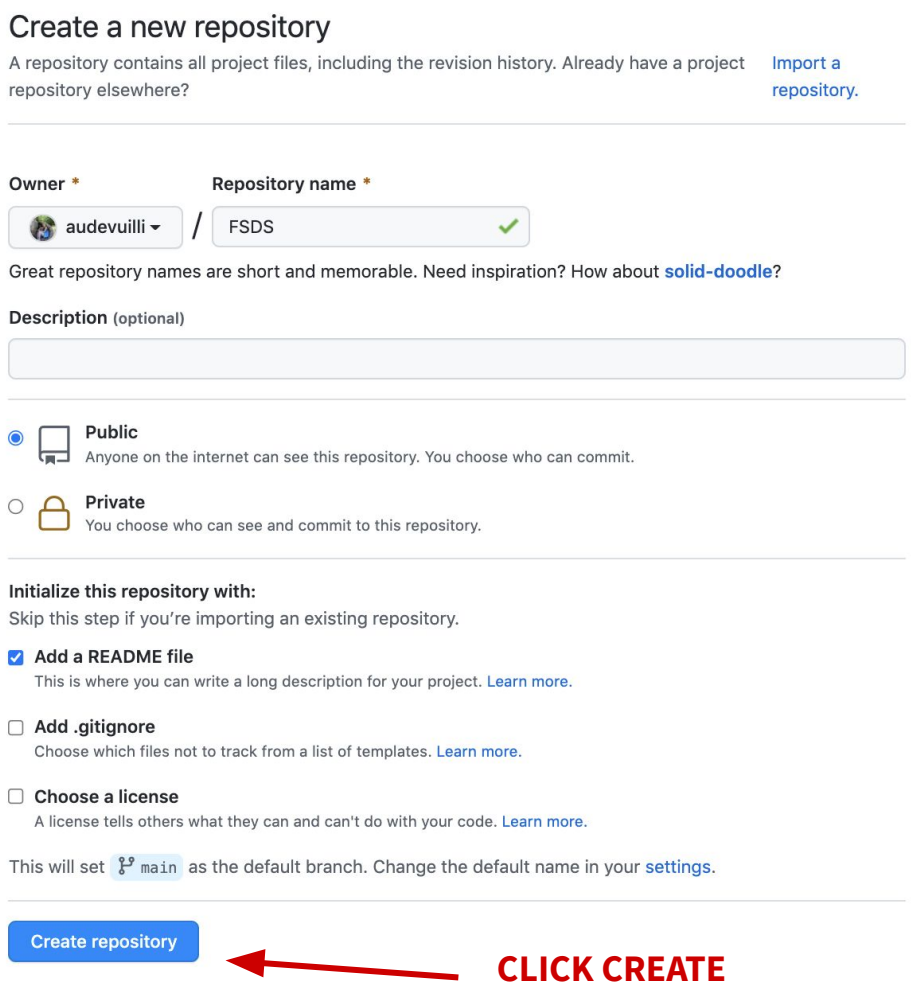


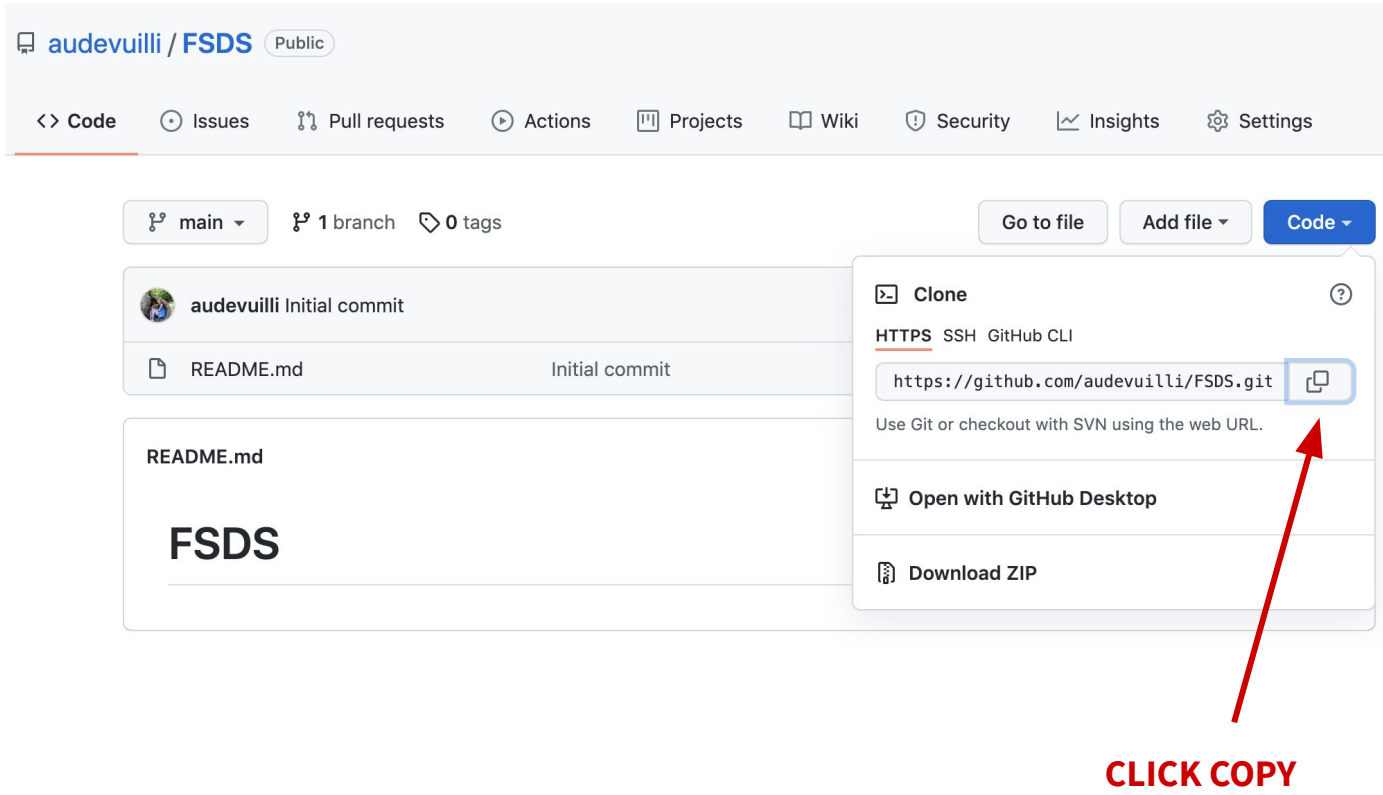
Diagram: Dough Mahugh, https://www.dougmahugh.com/envisioning-github

GitHub - Understanding the basics

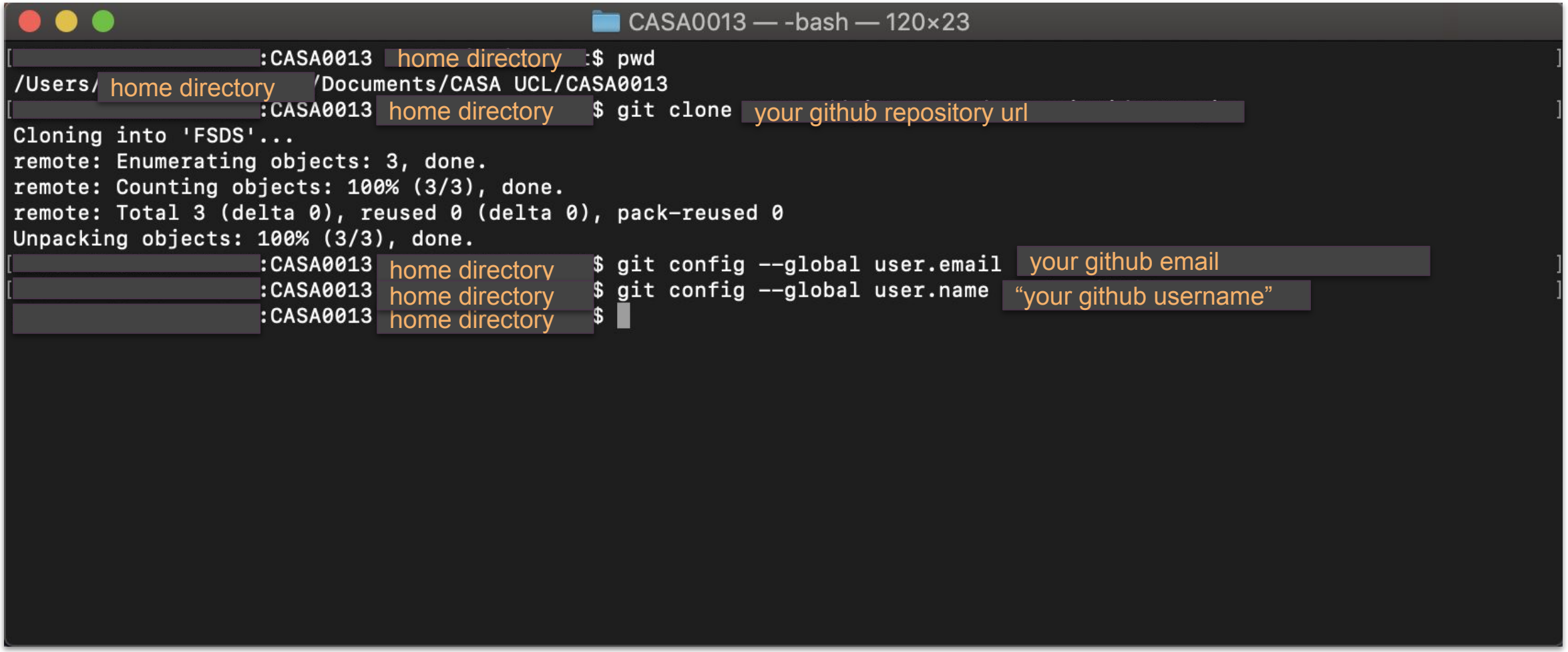
1. Go to GitHub and make a new repository
2. Connect your GitHub repo to your local repo
3. Create, edit code and push it to GitHub

GitHub - Practical Task 1





GitHub - Practical Task 1



GitHub - Account Security

- Enable 2-factor authentication
- Create personal access tokens (PATs) to authenticate programmatically
- Config GitHub on your local machine ->

  git config --global user.email "myemail@ucl.ac.uk"

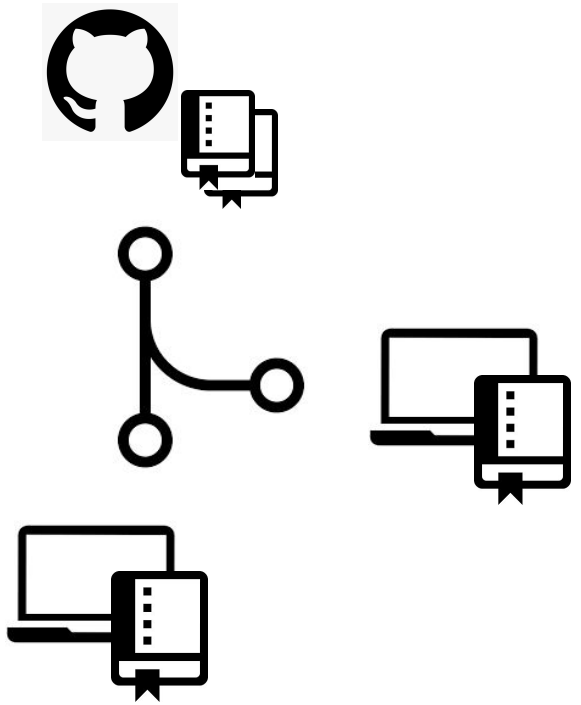
  git config --global user.name "my GitHub username"

  git config credential.helper store

GitHub - git clone

git clone <github-repo-url>

This will clone a GitHub repo to your local machine.



- You can clone any public repository
- Use the repository **url** to clone it

GitHub - Basic Commands

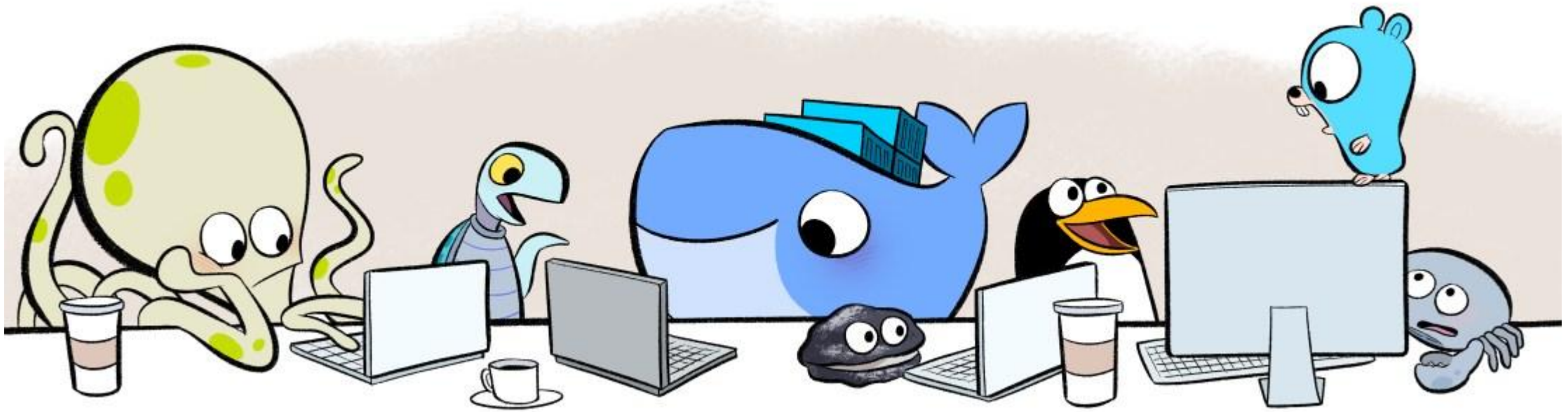
- *git status* - # get status of git
- *git pull origin master*
- *git add file_name* - # staged file_name
- *git commit -m “Short message - What is the change?”*
- *git push* - # push to main branch (GitHub repo)

Markdown - What is it?

Markdown (.md) - A way to style text on the web.

- Control the formatting of words as **bold** or *italic*
- Add images, lists, tables, code
- Create headers, insert quotes
- Direclty link to someone with @mentions

Docker



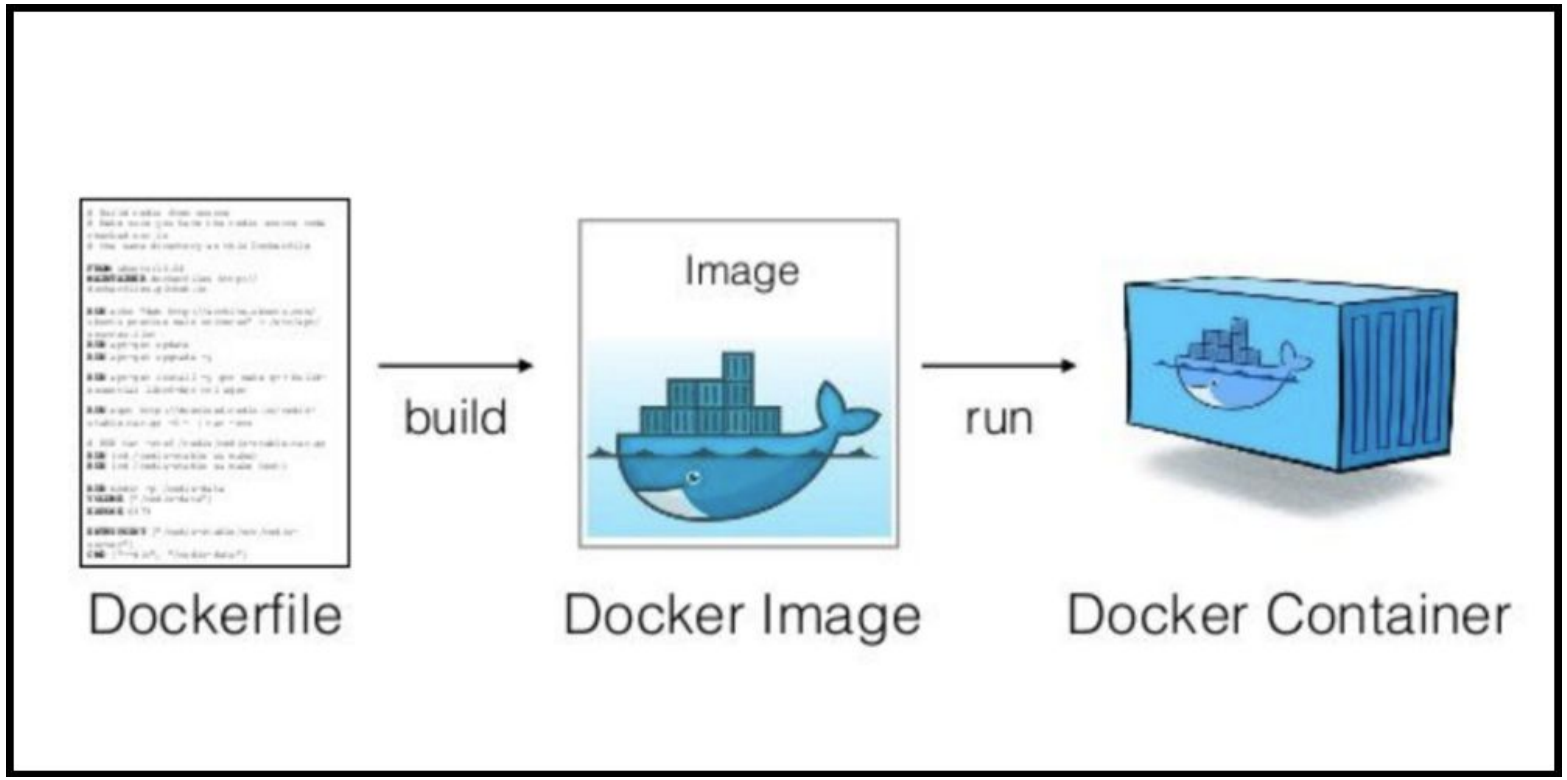
Docker Blog, Illustration, https://www.docker.com/

Docker - What is it?

Docker - Platform to develop, deploy, and run applications with **containers**, describe as “containerization”.

- Lightweight
- Don’t have a full OS
- Portable, build locally, deploy to any docker environment
- Solve *“it works on my machine”* headache

Docker - Understanding the basics



Docker - Understanding the basics

Docker Images - Contain everything that is need to run an application as a container (code, runtime, libraries, configuration files, environment variables).

Docker Containers - Unit of software that packages up code and all its dependencies. Runtime instance of an image. Run as a discrete process from one computing environment to another. Have their own memory.

Docker - Get Started

1. Download and install Docker
2. Save “download a script” as ***docker.sh*** in your home directory
3. Open Terminal in your home directory -> ***sh ~/docker.sh start***
4. Open your web browser -> ***localhost:8888***
5. Enter password **...**

Docker - Run & Check!

- Start docker -> ***sh ~/docker.sh start***
- Navigate to your *CASA/modules/fsds*
- Create a new IPython Notebook file called *Practical 1*, Save it
- Stop docker -> ***sh ~/docker.sh stop***

Recap - What did we learn today?

- **Terminal** - Allow you to access any files from your computer.
- **GitHub** - Platform to host git repo. Allow to share, edit others developer's code.
- **.md** -> Markdown file & .ipynd -> Python Notebook
- **Docker Images** - Contain all the codes, dependencies that you need to run application (here Jupyter Notebook)

Time to practice !

References

GitHub

- Molly Nemerever, *"Git, GitHub, & Workflow Fundamentals"*, https://dev.to/mollynem/git-github--workflow-fundamentals-5496
- Colt Steele, *"Learn GitHub in 20 Minutes"*, https://www.youtube.com/watch?v=nhNq2kIvi9s
- Codepath, *"Using Git with Terminal"*, https://guides.codepath.com/ios/Using-Git-with-Terminal

Markdown

- GitHub Guides, *"Mastering Markdown"*, https://guides.github.com/features/mastering-markdown/

References

Docker

- NetworkChuck, *“Docker Containers”*, https://www.youtube.com/watch?v=eGz9DS-aIeY
- Sebastian Eschweiler, *“Docker - Beginner’s Guide - Part 1: Images & Containers”*, *https://medium.com/codingthesmartway-com-blog/docker-beginners-guide-part-1-images-containers-6f3507fffc98*
- Prakhar Srivastav, *“Docker for beginners”*, *https://docker-curriculum.com/*