CORE | Skills

Prerequisite Day 1: Introduction to the tools and concepts

The material in this tutorial is inspired by & adapted from the Software Carpentry lesson on version control & Dany Vohl's tutorial from the ANITA astroinformatics school in 2017 as well as

Set Up

Let's see if our Anaconda installation worked

- ➢ Open the **Anaconda Navigator**:
  - https://docs.anaconda.com/anaconda/navigator/getting-started/
- ➢ Open **JupyterLab**:
  - Use Anaconda navigator to open a jupyter lab
  - If you have the tools you can use the command line: `jupyter notebook`
- ➢ Try opening a new notebook using a Python 3 kernel

If all this worked for you we are all set, close down the notebook and log out of Jupyter.

Advanced step:

- ➢ This can be done via the Anaconda launcher or the command line
- ➢ Create an environment for the workshop
  - Navigator: https://docs.anaconda.com/anaconda/navigator/getting-started/#managing-environments
  - Command line: https://conda.io/docs/user-guide/tasks/manage-environments.html
- ➢ Start the environment

HELLO

my name is

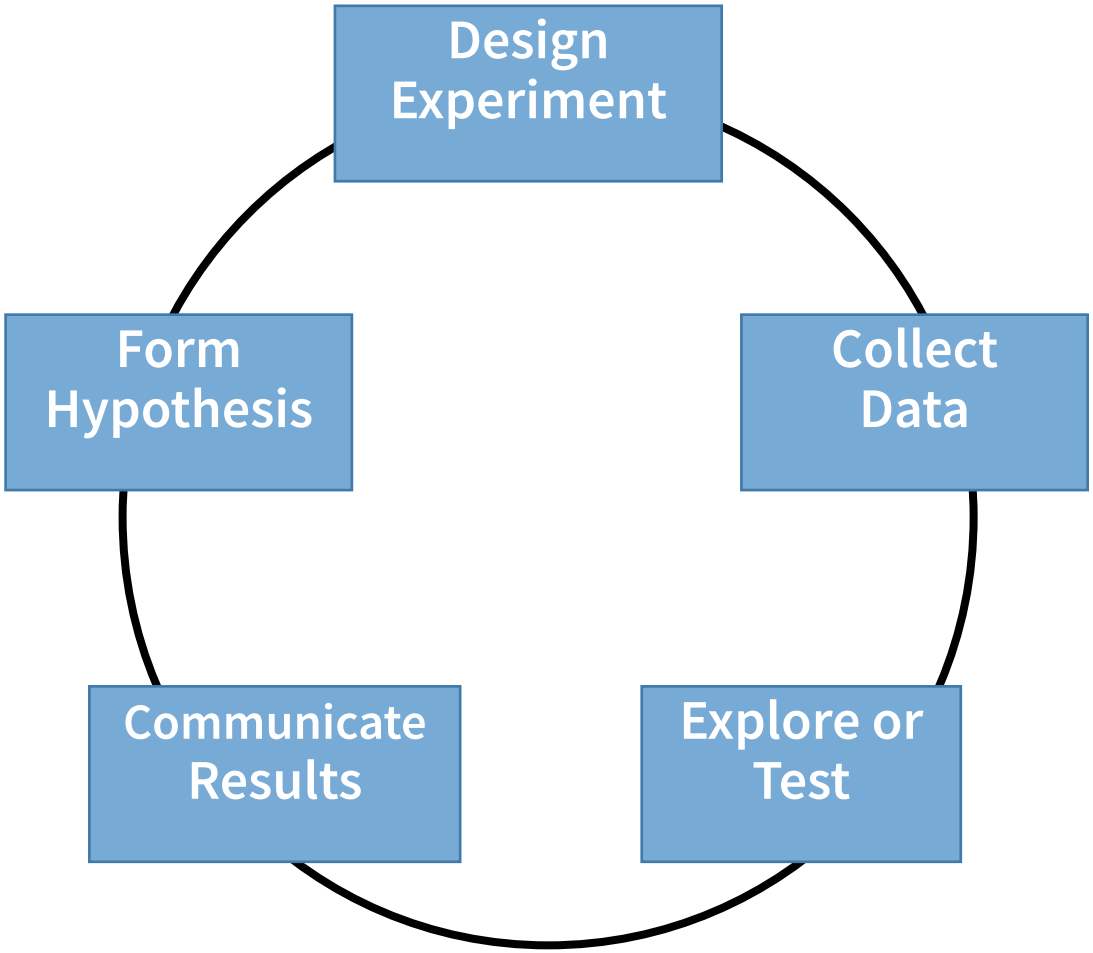
Rebecca Kathryn Cara

Concepts

CORE | Skills

1. Overview of the tools used (Anaconda, Python, Git, Github, Gitkraken)
2. Project set up
   a. Package management and Environments
3. Navigating your computer
   a. File structure
   b. Using bash or command prompt to move around
4. Intro to Jupyter notebooks + IDEs
5. Reproducibility
6. Version control
7. Good code etiquette
8. Where to find help

Data Science



Data Science

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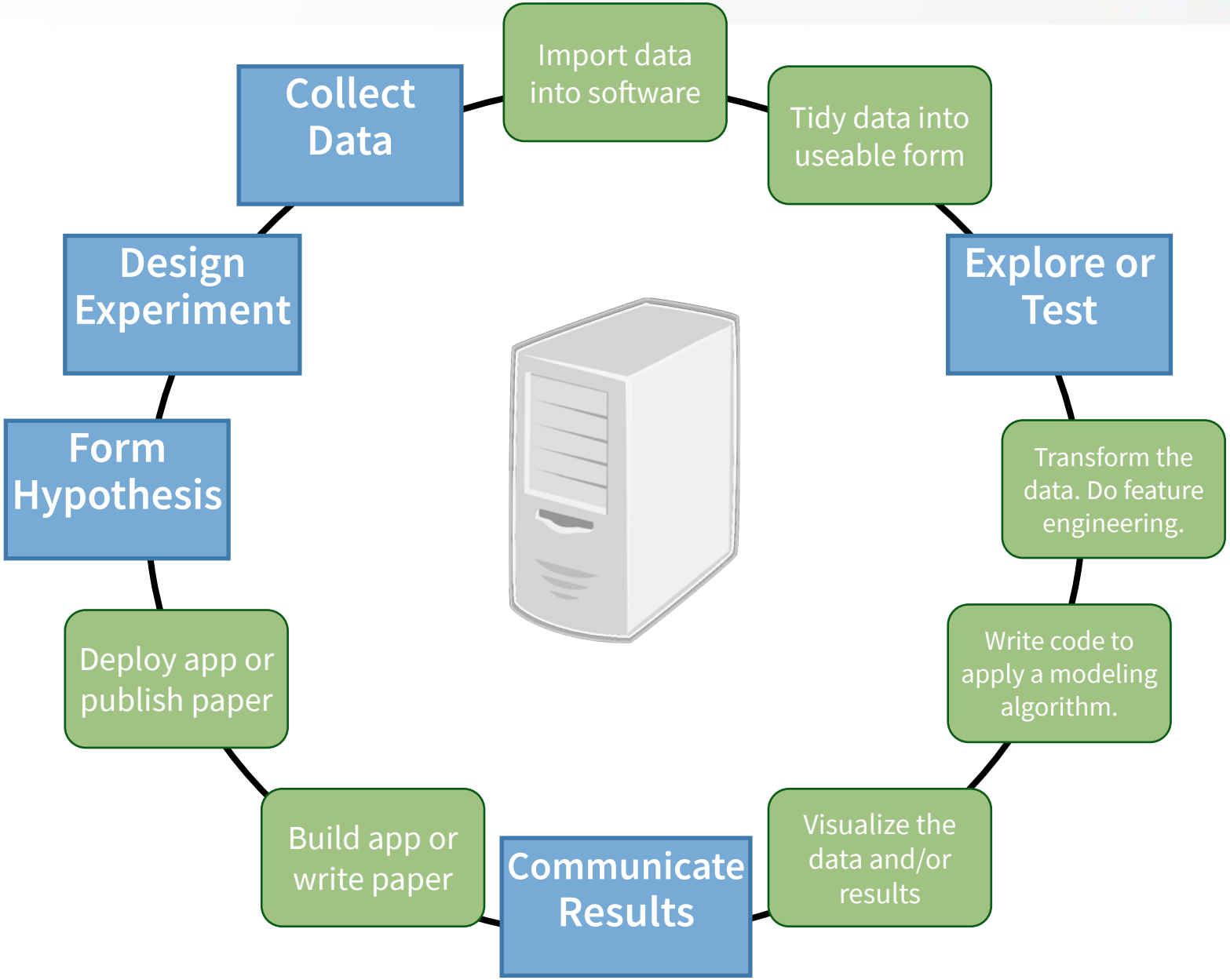

How to communicate with your PC

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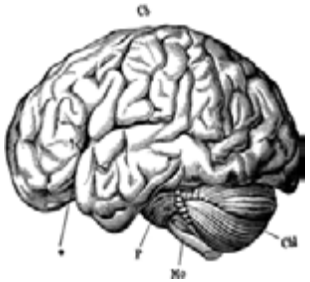
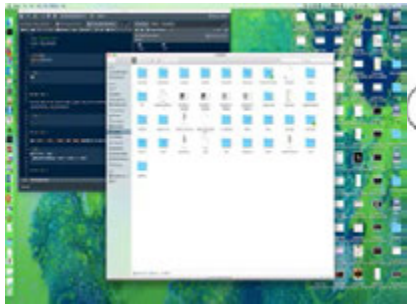
1. run programs
2. store data
3. communicate with each other, and
4. interact with us

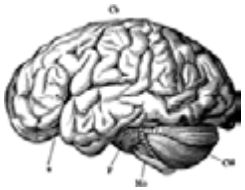


Human thought

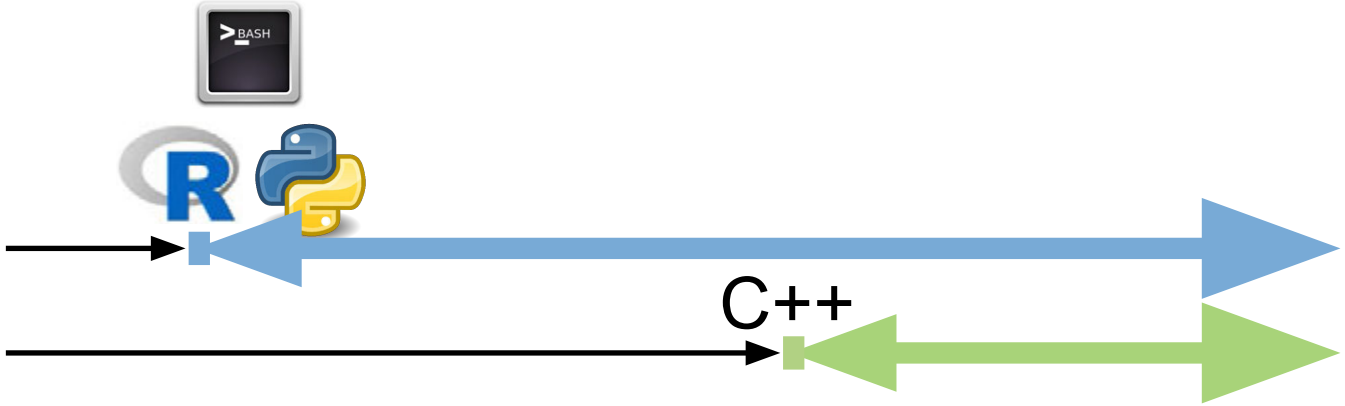


- Simple tasks
- One at a time
- Hard to automate or reproduce

Machine language



Human thought



Machine language

Tools used throughout the course

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- Distribution of Python and R with commonly used packages and tools
- Includes package and environment management system *conda*

ANACONDA®

- web-based, interactive computational environment
- Write code and markdown to share results and work

jupyter

- High level, interpreted programming language

Conda

- Create environments for projects which use incompatible/different versions of packages
- Use it to download and update packages from a central repo

Version Control System

- Keep track of your evolving code

git

- Github is a remote server where repos can be hosted and shared
- Git Kraken is a user interface to git
- It can connect to your local and remote repos

axosoft GitKraken

Project set up

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Folder structures / workflow

At your table discuss how you currently organise your files, feel free to talk about a specific dataset you are working on.

Consider the following:

- How do you handle data? Where is it stored?
- How do you keep track of your workflow?
- Do you have a naming convention for directories and files?
- Can you draw your proposed folder structure?

Additional:

See if you can devise a better naming convention or note one or two improvements you could make to how you name your files

Project set up

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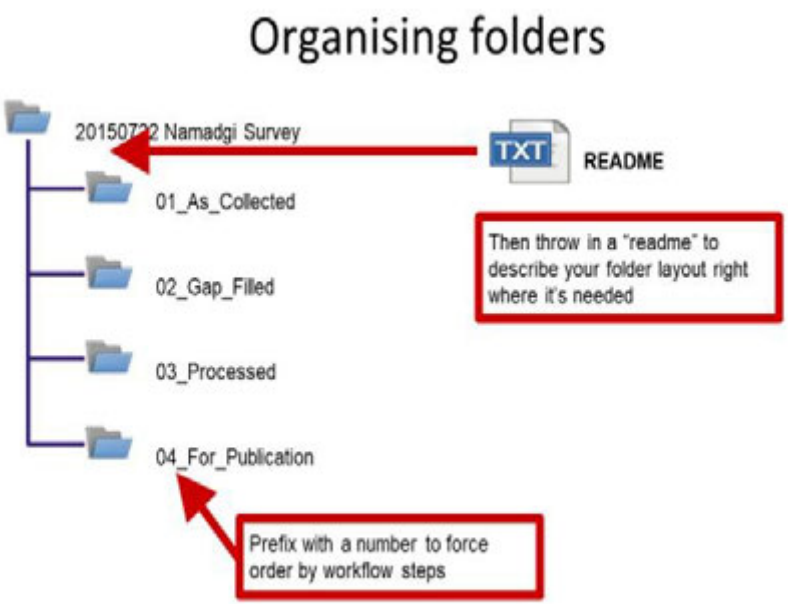
1. Folder structures
   a. Structure folders **hierarchically** - start with a limited number of folders for the broader topics, and then create more specific folders within these
   b. **Separate ongoing and completed work** - as you start to create lots of folders and files, it is a good idea to start thinking about separating your older documents from those you are currently working on
   c. Probably the simplest way to **document your structure** - for your future reference - is to add a "README" file - a text file outlining the contents of the folder.



Project set up

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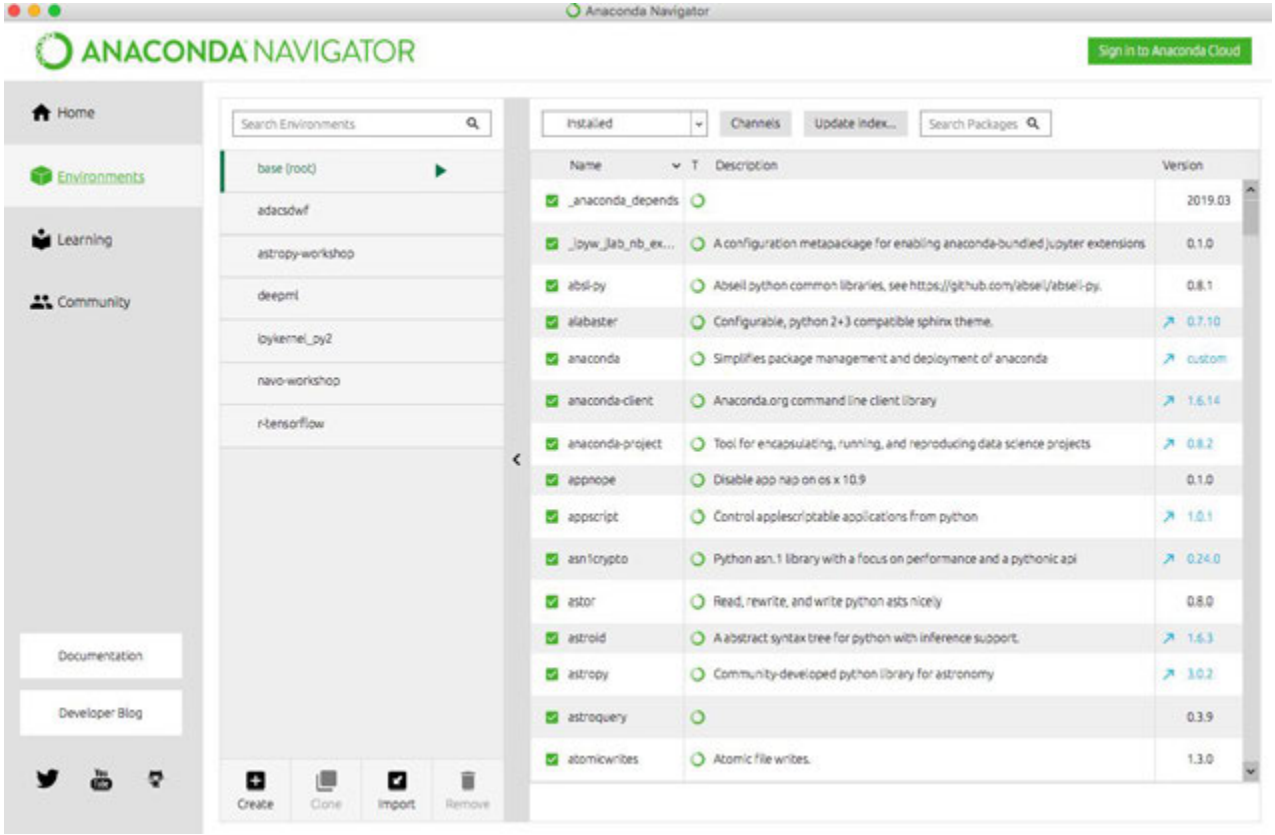
Package and Environment Management

1. Software and packages have **different versions**
2. Different software and packages can have **different conflicting dependencies**

It is good practice to manage these dependencies by setting up an **environment**.

`conda` is an environment manager which can be used via the command line or the anaconda navigator.



Short intro to the command line

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1. run programs
2. store data
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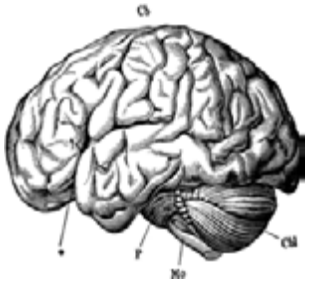
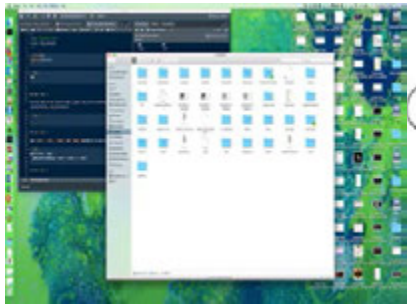


Human thought



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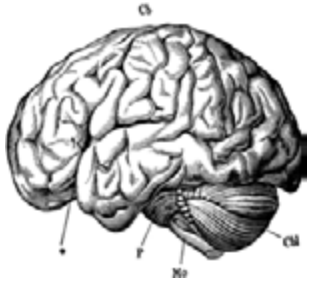
Machine language



Human thought

- Simple language + command line interface
- Read-evaluate-print loop (**REPL**)
- The shell is a program which runs other programs instead of doing it's own calculation
- Great for automating tasks
- Scripting allows for easy reproducibility

Machine language

Navigating your computer

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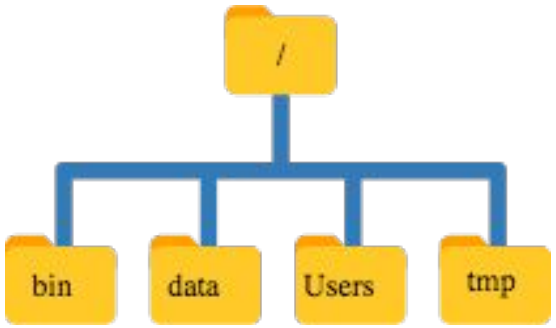
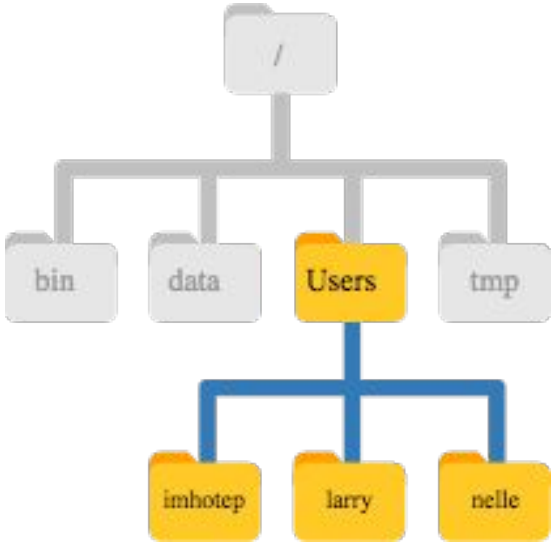
The part of the operating system responsible for **managing files and directories** is called the **file system**.

- The file system is responsible for managing information on the disk.
- Information is stored in files, which are stored in directories (folders).
- Directories can also store other directories, which forms a directory tree.



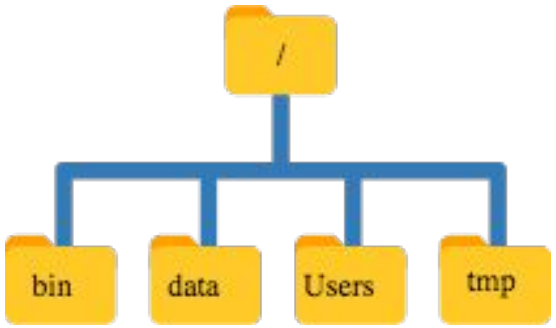
Every user on a computer will have a **home directory**.
The home directory path will look different on different operating systems. On Linux it may look like `/home/nelle`, and on Windows it will be similar to `C:\Documents and Settings\nelle` or `C:\Users\nelle`



Navigating your computer

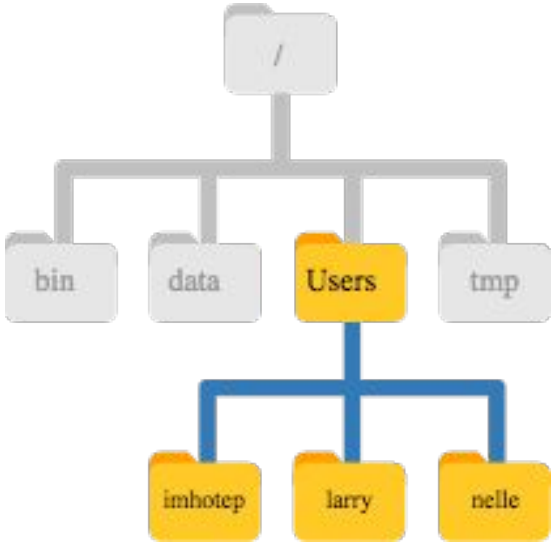
CORE | Skills

Directory Tree:
At the top is the **root directory** that holds everything else. We refer to it using a slash character, `/`**, on its own**.



Inside that directory are several other directories, in which are other directories, and so on.

Directories can also contain executables, files and links to directories/executables/files.
Most files' names are `something.extension`. The extension isn't required, and doesn't guarantee anything, but is normally used to indicate the type of data in the file, e.g., `.txt`.



Navigating your computer

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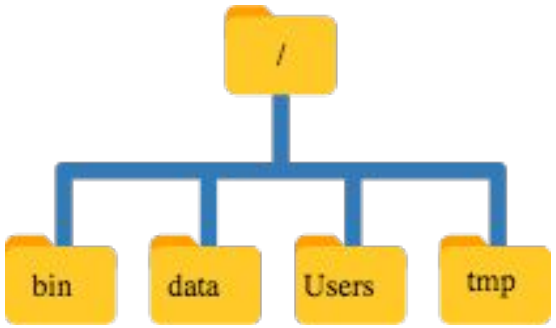
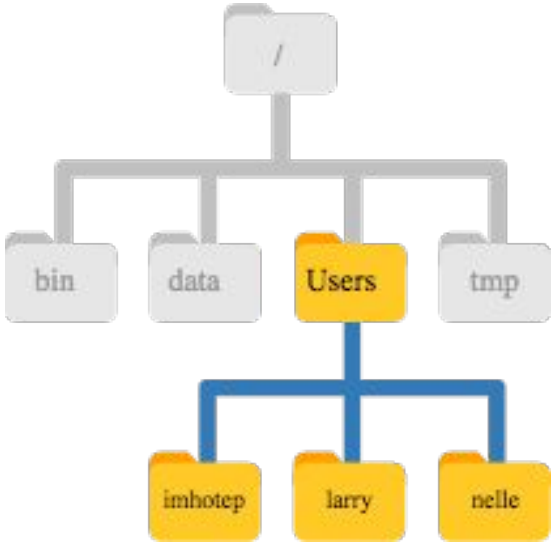
When creating a **path** (i.e. address) to a file we use its location within the directory tree to locate it. To separate directory names in the path name we use `/` or `\`:
`C:\Users\nelle\report.txt`



There are two types of paths: **relative path** and **absolute path:**

- A relative path specifies a location starting from the current location.
- An absolute path specifies a location from the root of the file system.



There are also special characters to describe locations in the directory tree:

- `..` means 'the directory above the current one';
- `.` on its own means 'the current directory'.
- `~` is the current user's home directory, has to be at the start of specified path

`C:\Users\nelle\report.txt` is equivalent to `~\report.txt`

Short intro to the command line

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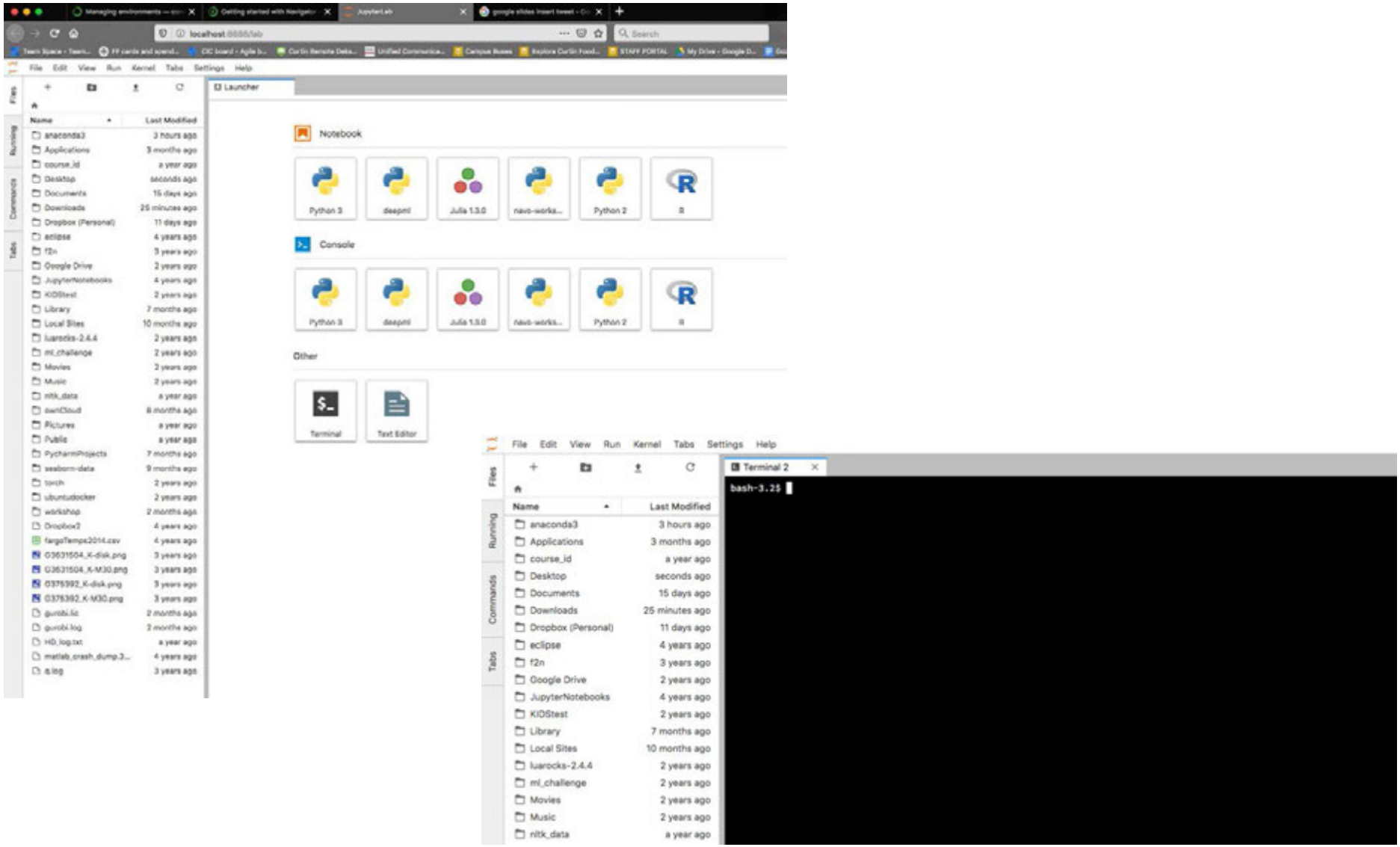
Open **JupyterLab** and start a Terminal



Short intro to the command line

CORE | Skills

```
268964i — -bash — 90×37
M-A0011268-S:~ 268964i$
M-A0011268-S:~ 268964i$ ls -F /
Applications/                   home/
Library/                        installer.failurerequests
Network/                        net/
System/                         opt/
Users/                          private/
Volumes/                        sbin/
bin/                            tmp@
cores/                          usr/
dev/                            var@
etc@
M-A0011268-S:~ 268964i$ ls -FG /
Applications/               cores/                      private/
Library/                    dev/                        sbin/
Network/                    etc@                        tmp@
System/                     home/                       usr/
Users/                      installer.failurerequests   var@
Volumes/                    net/
bin/                        opt/
M-A0011268-S:~ 268964i$
```

The first line shows only a **prompt**, indicating that the shell is waiting for input

The part that you type, `ls -F /` in the second line of the example, typically has the following structure: a **command**, some **flags** (also called **options** or **switches**) and an **argument**.

Flags start with a single dash (`-`) or two dashes (`--`), and change the behaviour of a command.
Arguments tell the command what to operate on (e.g. files and directories).

A command can be called with more than one flag and more than one argument: but a command doesn't always require an argument or a flag!

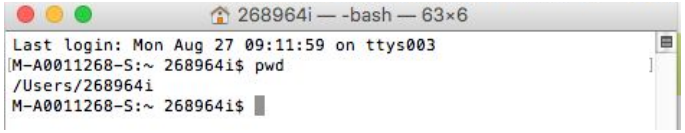
Intro to Bash - Navigating

CORE | Skills

When we open the Bash terminal we start out in our **home directory.**

Let's find out where this is exactly by running a command called `pwd` (which stands for "print working directory").

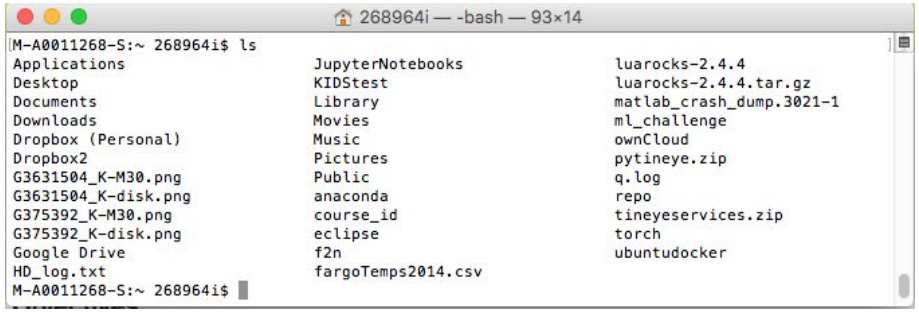
```
$ pwd
```



We can see what's in our home directory by running `ls`, which stands for "listing"

```
$ ls
```

```
$ dir
```



Remember a **command** can often be followed by **flags** and/or **argument**, e.g.:

```
$ ls -FG
```

`ls` has lots of other **flags**. There are two common ways to find out how to use a command and what flags it accepts:

`$ ls --help` or `$ man ls`

There is also a handy *tldr* online, explaining the most commonly used command options:

https://tldr.ostera.io/

Intro to Bash - Navigating

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Next let's **change our location** to a different directory, so we are no longer located in our home directory.

The command to change locations is `cd` ("change directory") followed by a directory name to change our working directory:

```
$ cd workshop
```

To check this worked:

```
$ pwd
```

And to see the content of the folder, including hidden files and directories:

```
$ ls -aFG
```

Special names:

- `.` → this location
- `..` → the directory above
- `~` → the current user's home directory, has to be at the start of specified path
- `-` → the previous directory I was in

Useful command

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`$ ls -Flag [location]`	list content of specified location, using specified flags
`$ dir [location]`	windows/anaconda command prompt: list content of specified location
`$ pwd`	print working directory → current location in filesystem
`$ cd [location]`	change directory to specified location, relative paths work
`. and ..`	special characters denoting *here* and *directory above*
`~ and -`	special characters denoting *HOME* and *previous directory*
`$ mkdir [name]`	make directory with specified name (can include paths)
`$ nano [filename]`	open specified file using the *nano* text editor
`CTRL-O then <Enter>`	*nano* command to save content of file
`CTRL-X`	*nano* command to close file (asks confirmation if file changed)
`$ touch [filename]`	creates empty file with specified name if file does not exist

If using windows command prompt check out these useful commands:

https://www.digitalcitizen.life/command-prompt-how-use-basic-commands

Navigating your computer

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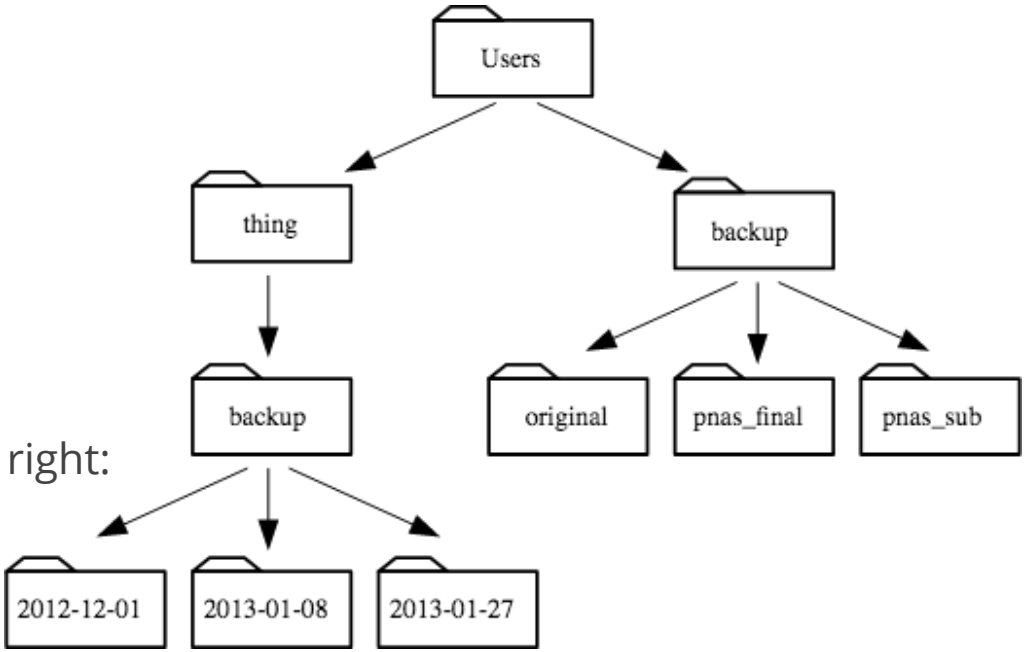
Starting from `/Users/amanda/data/`, which of the following commands could be used to navigate to the home directory, which is `/Users/amanda`?

5:00 Stop

1. `cd .`
2. `cd /`
3. `cd /home/amanda`
4. `cd ../..`
5. `cd ~`
6. `cd home`
7. `cd ~/data/..`
8. `cd`
9. `cd ..`



Using the file system diagram on the right:
if `pwd` displays `/Users/thing`,
what will `ls -F ../backup` display?

1. `../backup: No such file or directory`
2. `2012-12-01 2013-01-08 2013-01-27`
3. `2012-12-01/ 2013-01-08/ 2013-01-27/`
4. `original/ pnas_final/ pnas_sub/`

Jupyter Notebooks

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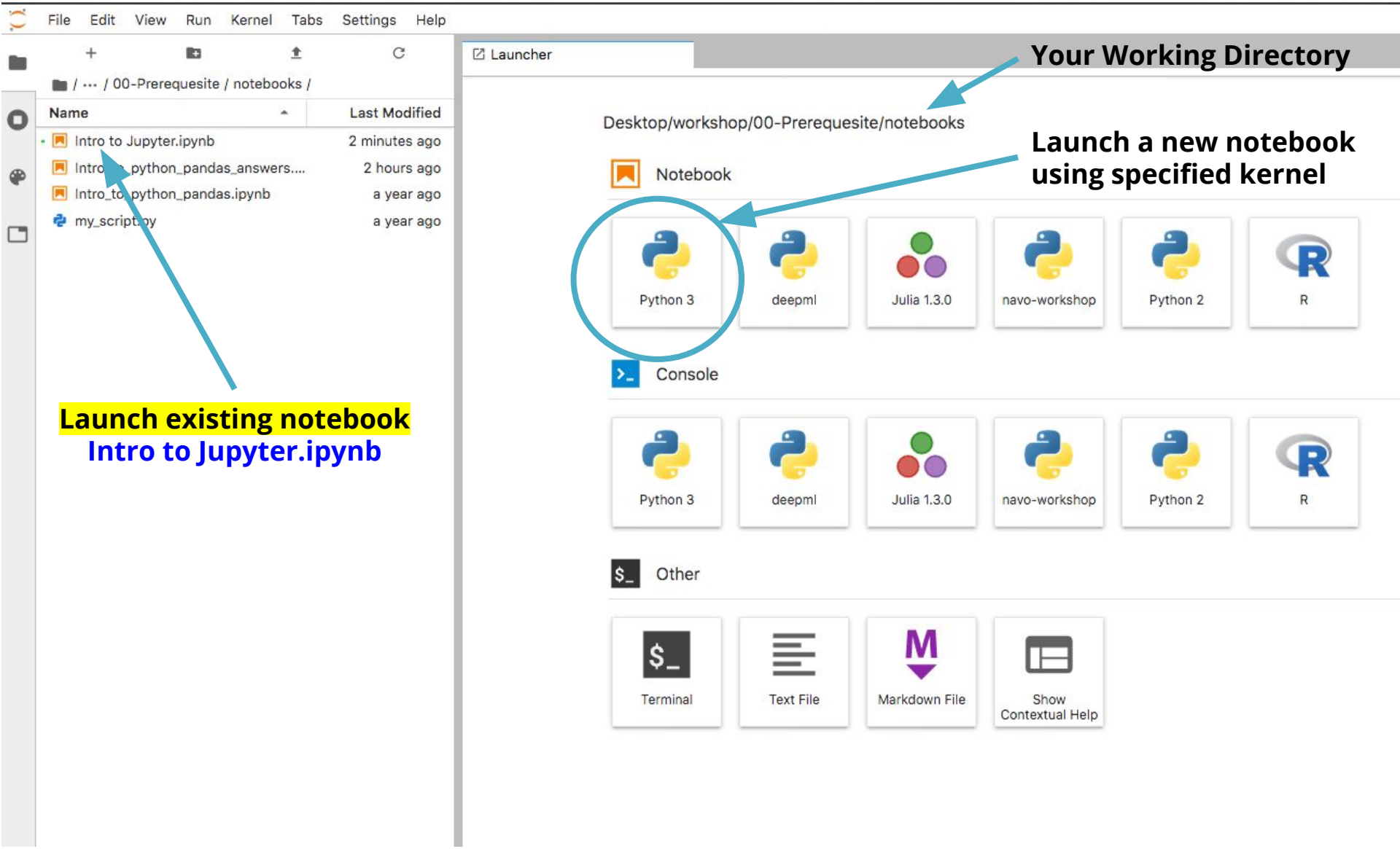

Interactive Development Environment

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And IDE is like a text editor but with lots of extra fancy-ness added on.

In fact you can take your favorite text editor (emacs or vim) and give it an upgrade with plugins that will turn it into more of an IDE.

- Syntax Highlighting and Checking
- Auto Indentation
- Spell Checking (language aware)

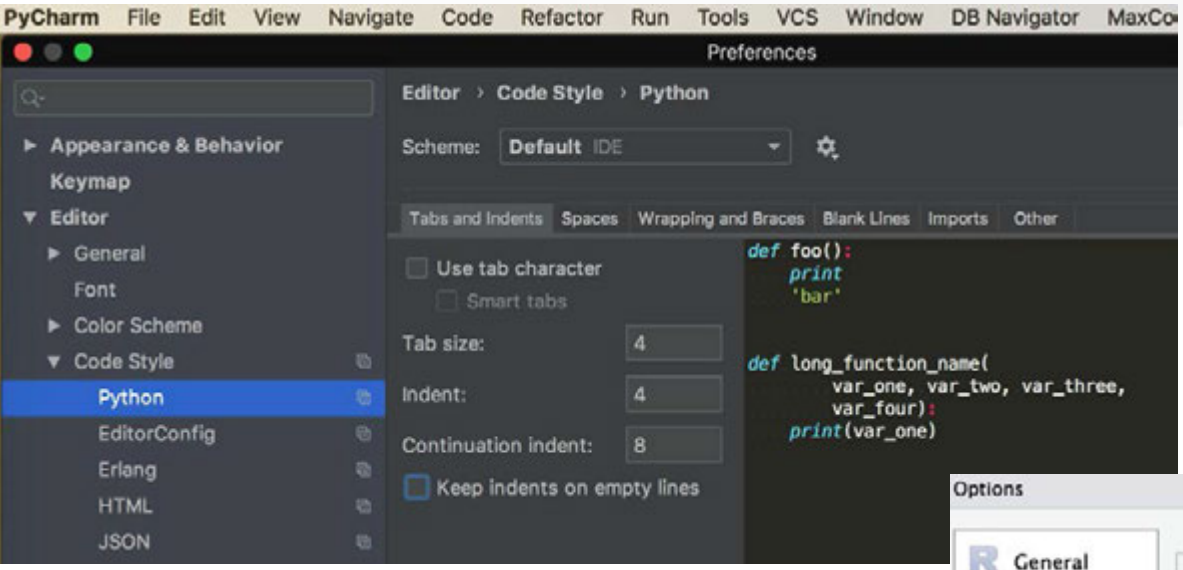
Get a ‘real’ IDE

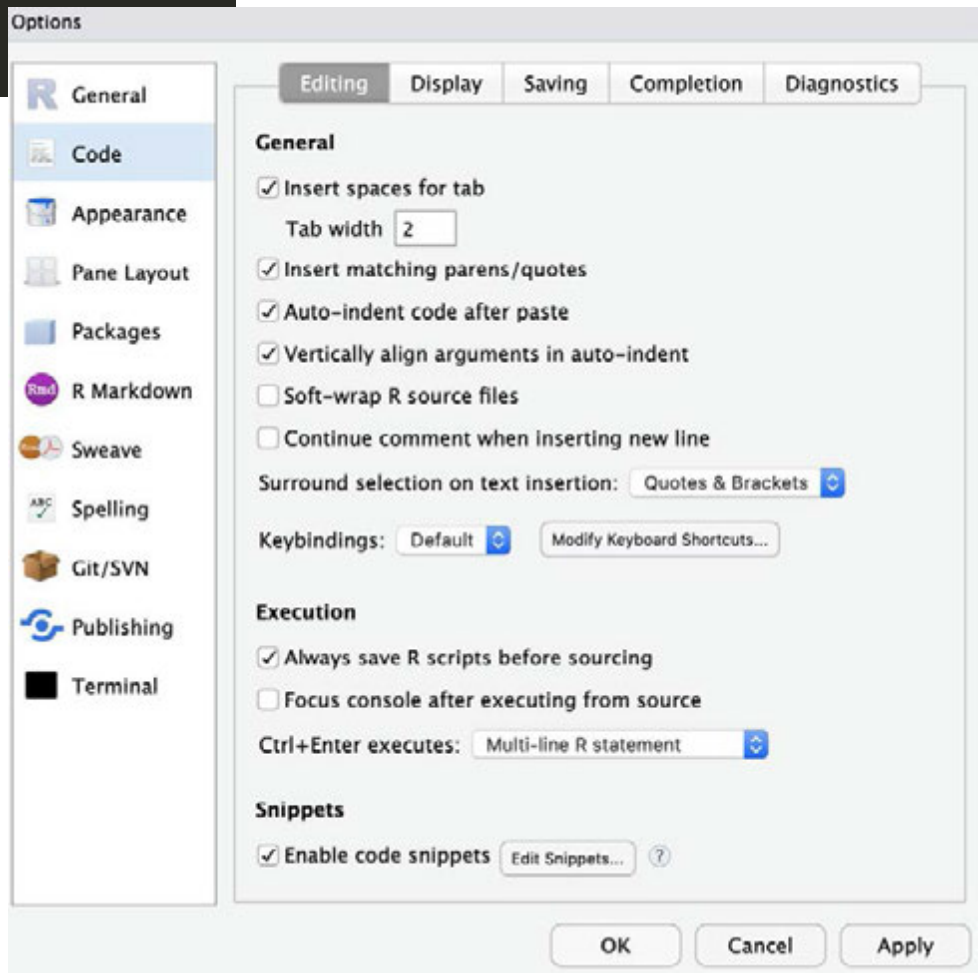
Includes: debugging tools, integration with version control, refactoring tools, templates for new modules/files and docstrings.

- PyCharm (not just for python)
- RStudio

Others:

- Spyder (part of anaconda install)
- Emacs and Vim have lots of plug-ins and extensions for this
- Many others -> see what people around you are using





IDEs can help

Concepts

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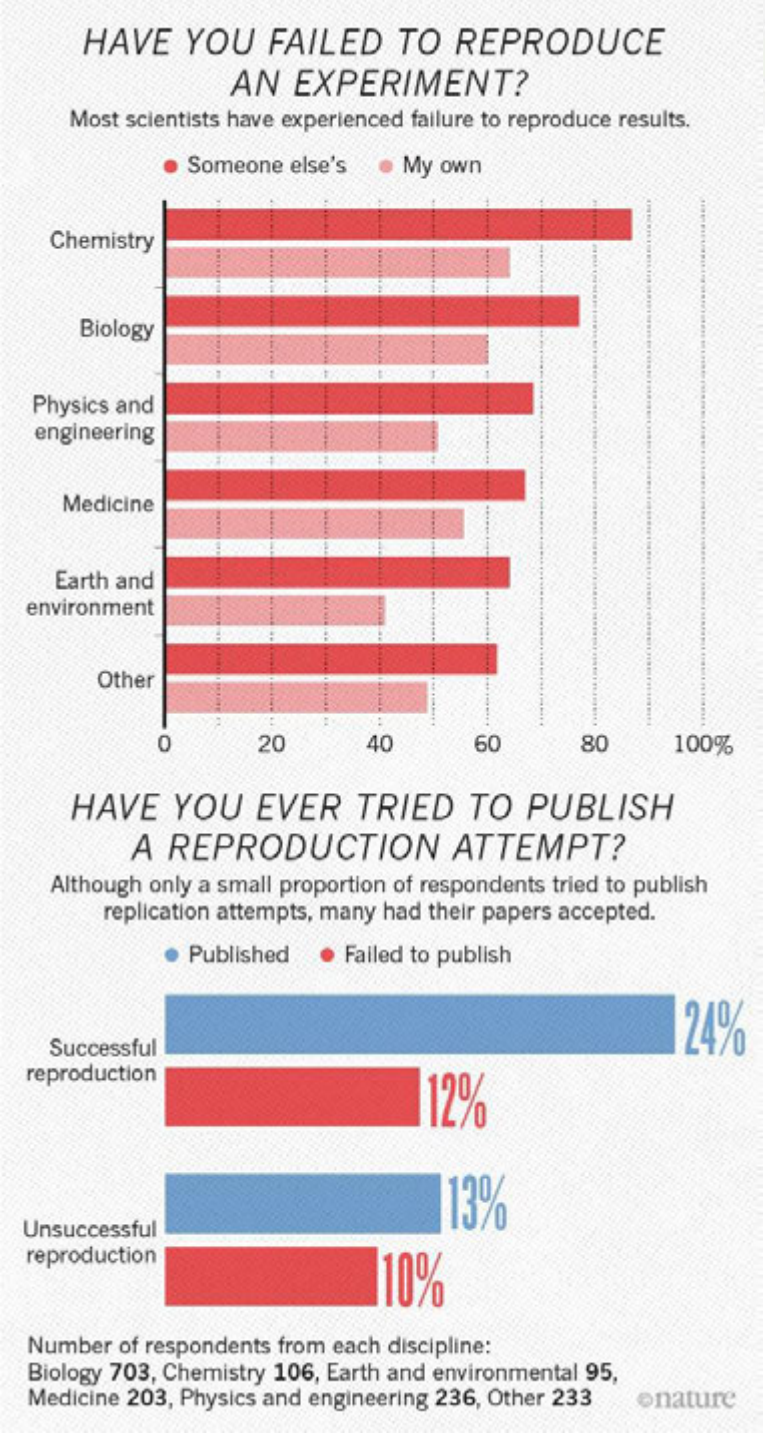
1. Tools used
2. Navigating your computer
3. Reproducibility
   a. Amanda Miotto's workshop: https://guereslib.github.io/Reproducible-Research-Things/
   b. Documentation
   c. Naming conventions: https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/osmanagement/filename_conv.html
4. Version control
   a. Introducing git: https://opensource.com/resources/what-is-git
   b. Clone an existing Github repo
   c. Introducing GitKraken
   d. GitKraken tutorial
   e. Collaboration? Github and remote repositories
5. Some good code etiquette hints
6. Where to find help

Reproducibility

Why is it important?



https://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970

Reproducibility

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Scenario - personnel loss

i. What would happen? Could you continue their work?
   1. Where is the data, code, info on what they are doing?

ii. How can you improve this scenario?

Documentation:

- Documentation is the idea of documenting your procedures for your experiment so that an outsider could understand the workings of your team.
- Bus factor
- Documentation is a love letter to your future self - Damian Conway

Reproducibility

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Naming Conventions:

- Easier to process - All team members won't have to over think the file naming process
- Easier to facilitate access, retrieval and storage of files
- Easier to browse through files saving time and effort
- Harder to lose!

Reproducibility

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Former PhD student and subsequent founder of the Figshare platform, Mark Hahnel, typified a common challenge:

'During my PhD I was never good at managing my research data. I had so many different file names for my data that I always struggled to find the correct file quickly and easily when it was requested. My former PI was so horrified upon seeing the state of my data organisation that she held an emergency lab book meeting with the rest of my group when I was leaving'.

Research Information, April/May 2014

Reproducibility

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As previously suggested, consistent and meaningful naming of files and folders can make everyone's life easier. See this example below:

YYYYMMDD_SiteA_SensorB.CSV Date Location Sensor

Which when applied, would look like this below:

20150621_Yaouk_Humidity.CSV

Some characters may have special meaning to the operating system so avoid using these characters when you are naming files. These characters include the following: / \ " ' * ; - ? [ ] ( ) ~ ! $ { } < > # @ & | space tab newline

Reproducibility

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Discuss - Good or Bad File Names?

i. Myfile.docx

ii. 20200130_core_instructions_draft.docx

iii. Fig 2.png

iv. 20200130_core_instructions_v1.docx

v. My figure *v2.png

vi. fig02_core_instructions_presentation.png

https://speakerdeck.com/jennybc/how-to-name-files?slide=3

The Problem

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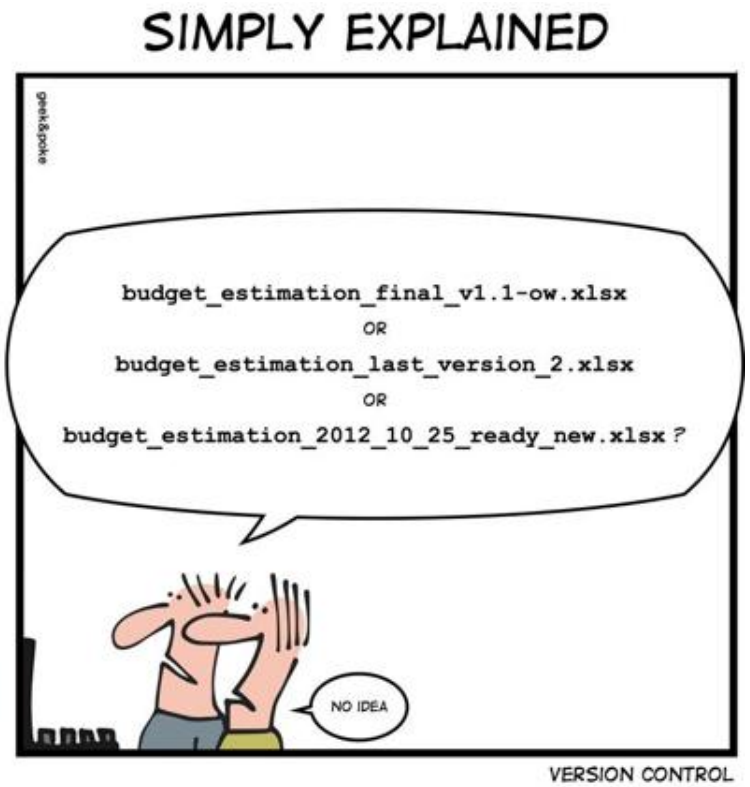

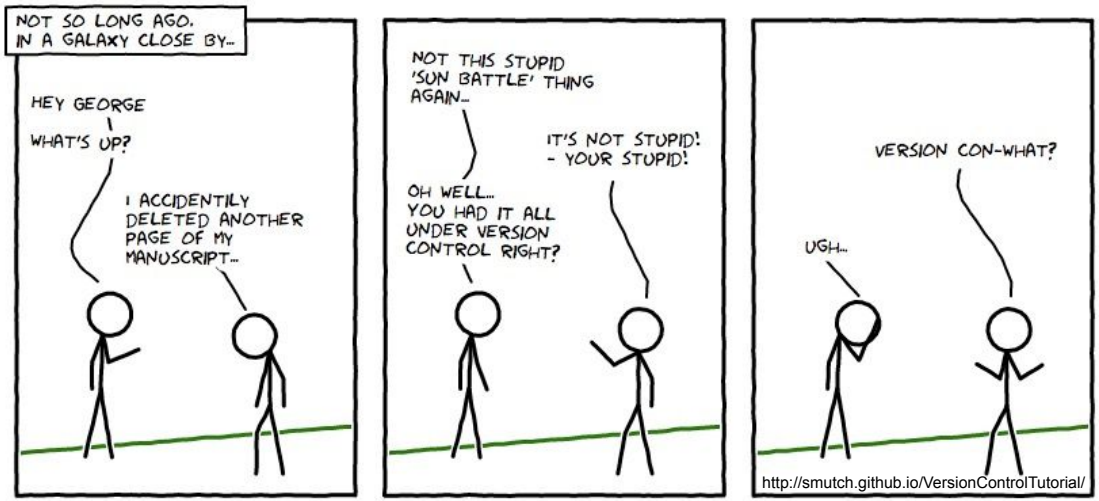

Version control, a.k.a. revision control / source code management, is basically a system for **recording and managing changes made to files and folders.**

You can track:

- source code (e.g. Python, R, Bash scripts),
- other files containing mostly text (e.g. LaTeX, csv, plain text),
- work by a lone developer, or
- collaboration on projects (track who's done what, branch to develop different streams, etc).

Why Version Control?

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As data scientist, we spend much of our time writing code, whether it be for data cleaning, machine learning, or visualisation. As such, our codes are often constantly evolving. By putting all of our code under version control we can:

- **tag code** versions for later reference *(via tags)*.
- record a **unique identifier** for the exact code version used to produce a particular plot or result *(via commit identifiers)*.
- **roll back** our code to previous states *(via checkout)*.
- **identify** when/how **bugs** were introduced *(via diff/blame).*
- **keep multiple versions** of the same code in sync with each other *(via branches/merging).*
- efficiently **share and collaborate** on our codes with others *(via remotes/online hosting).*

Why Version Control?

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It's important to also realise that many of the advantages of version control are not limited to just managing code. For example, it can also be useful when writing papers/reports. Here we can use version control to:

- **bring back** that paragraph we accidentally deleted last week.
- **try out a different structure** and simply disregard it if we don't like it.
- **concurrently work on a paper** with a collaborator and then **automatically merge** all of our **changes** together.

The upshot is ***you should use version control for almost everything***. The benefits are well worth it...

Introducing Git

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In this tutorial we will be using Git for version control.

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git tracks changes made to files. You can initialise a Git Repository (the .git/ folder inside a project folder) for a project to build a history of your project over time:

- Added files/folders
- Changed files/folders
- Renamed files/folders
- Removed files/folders

Why Github

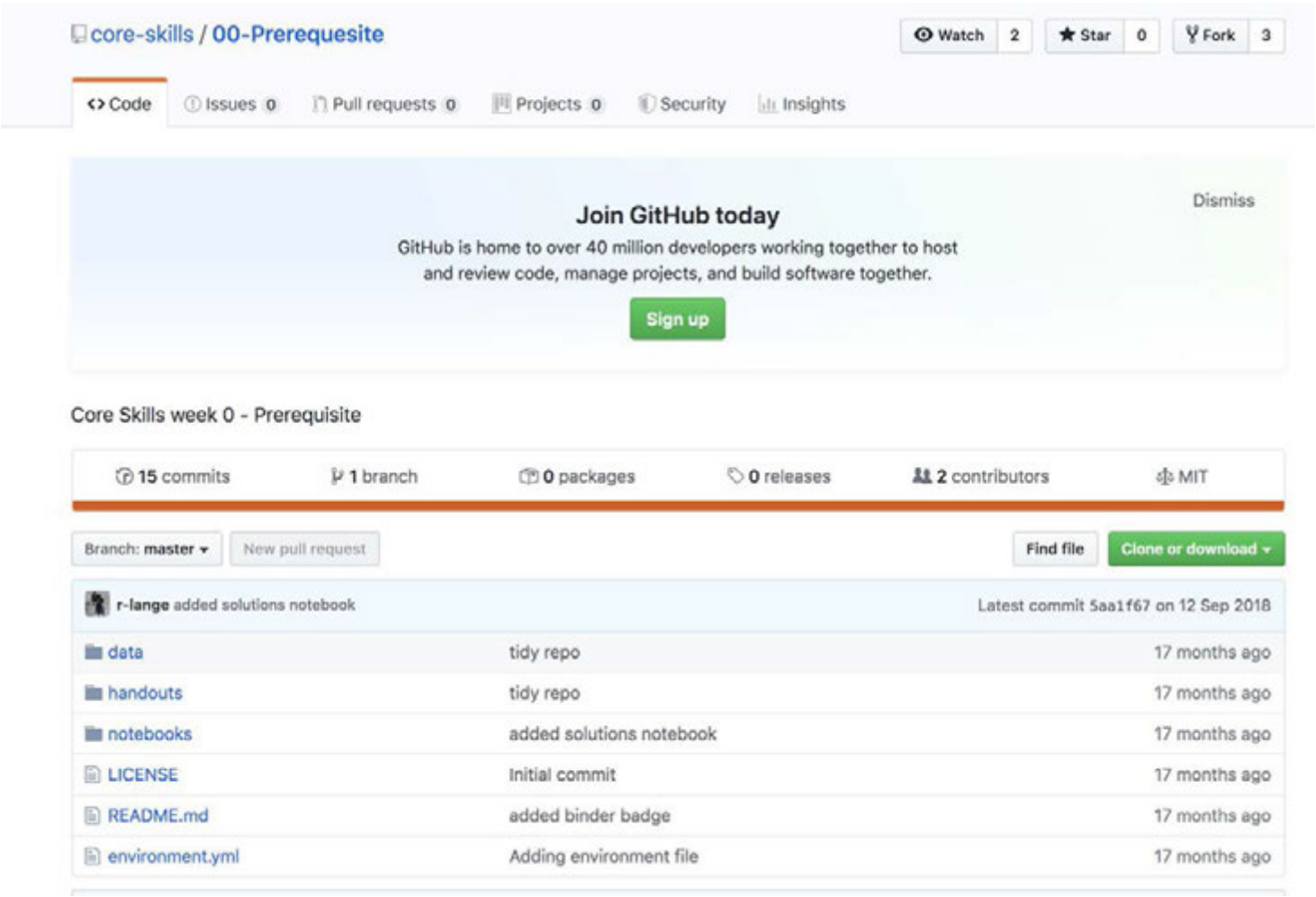
CORE | Skills

- ❑ Remote repository
- ❑ Version Control
- ❑ Visible code and reproducibility
- ❑ Open code and reuse
- ❑ Collaborative code development
- ❑ Open code development

Clone an existing Github Repo

CORE | Skills

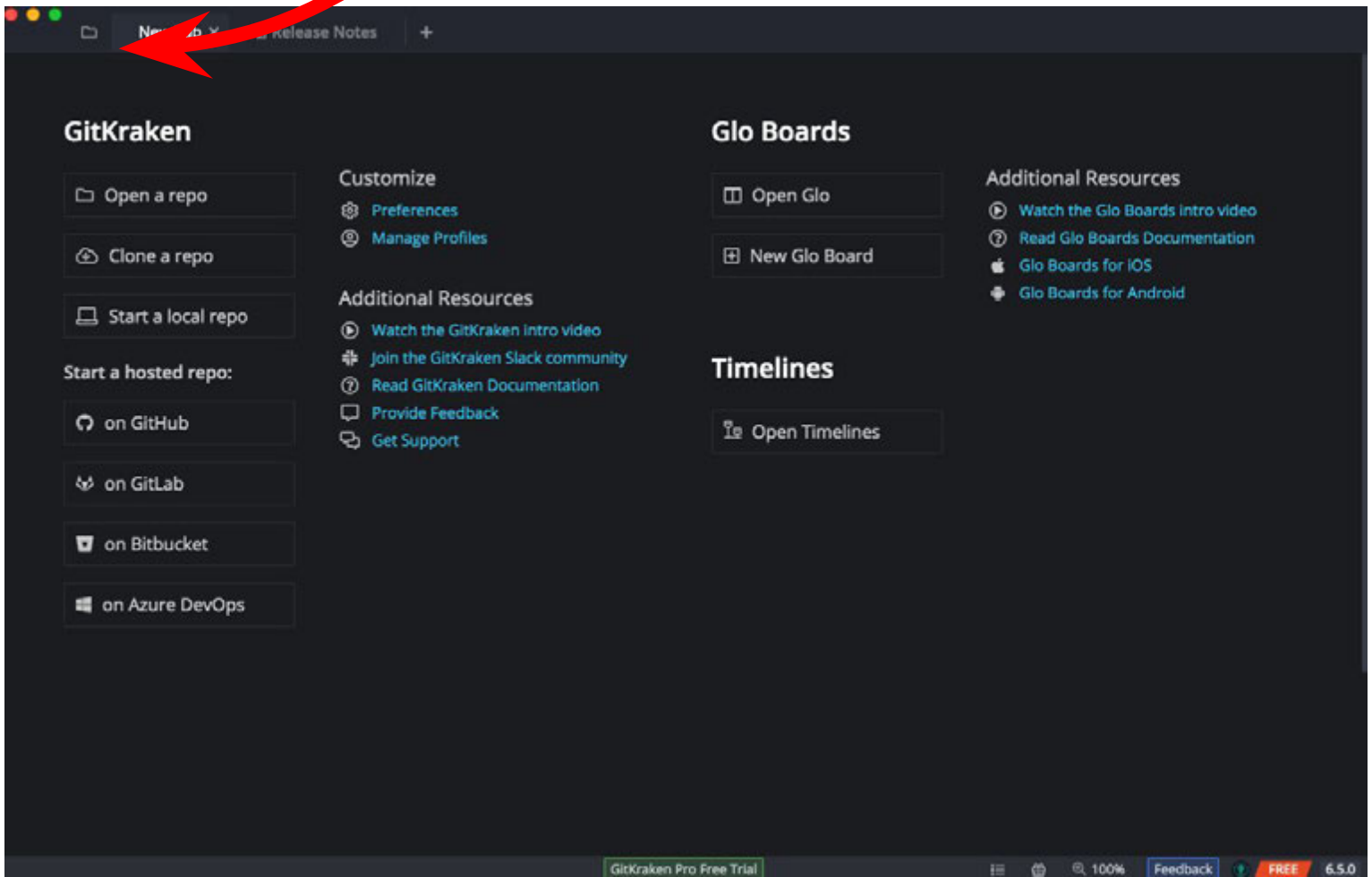
- Go to: https://github.com/core-skills/00-Prerequesite



Clone an existing Github Repo

CORE | Skills

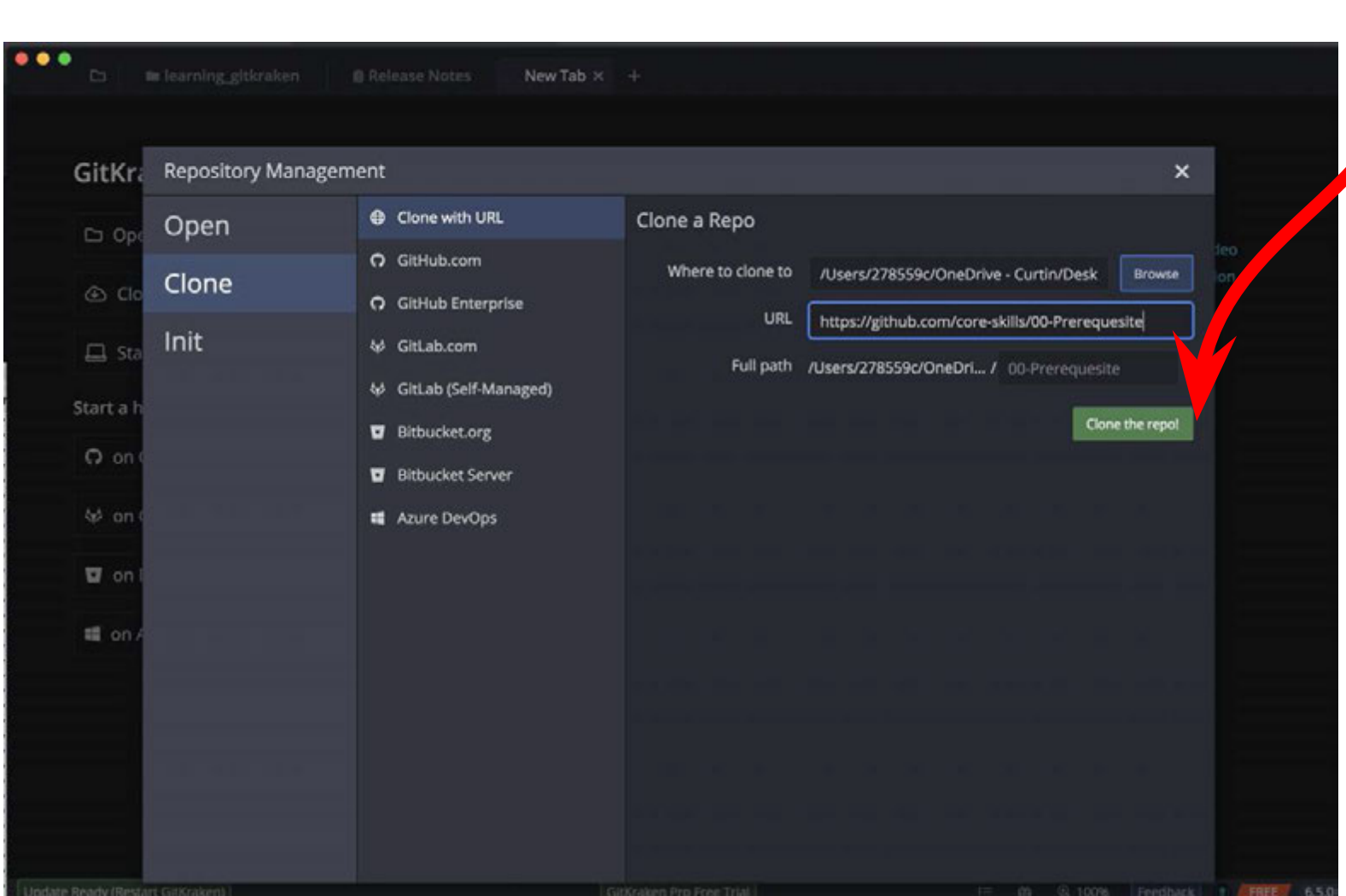
In GitKraken, click on the ‘Folder’ Icon



Clone an existing Github Repo

CORE | Skills

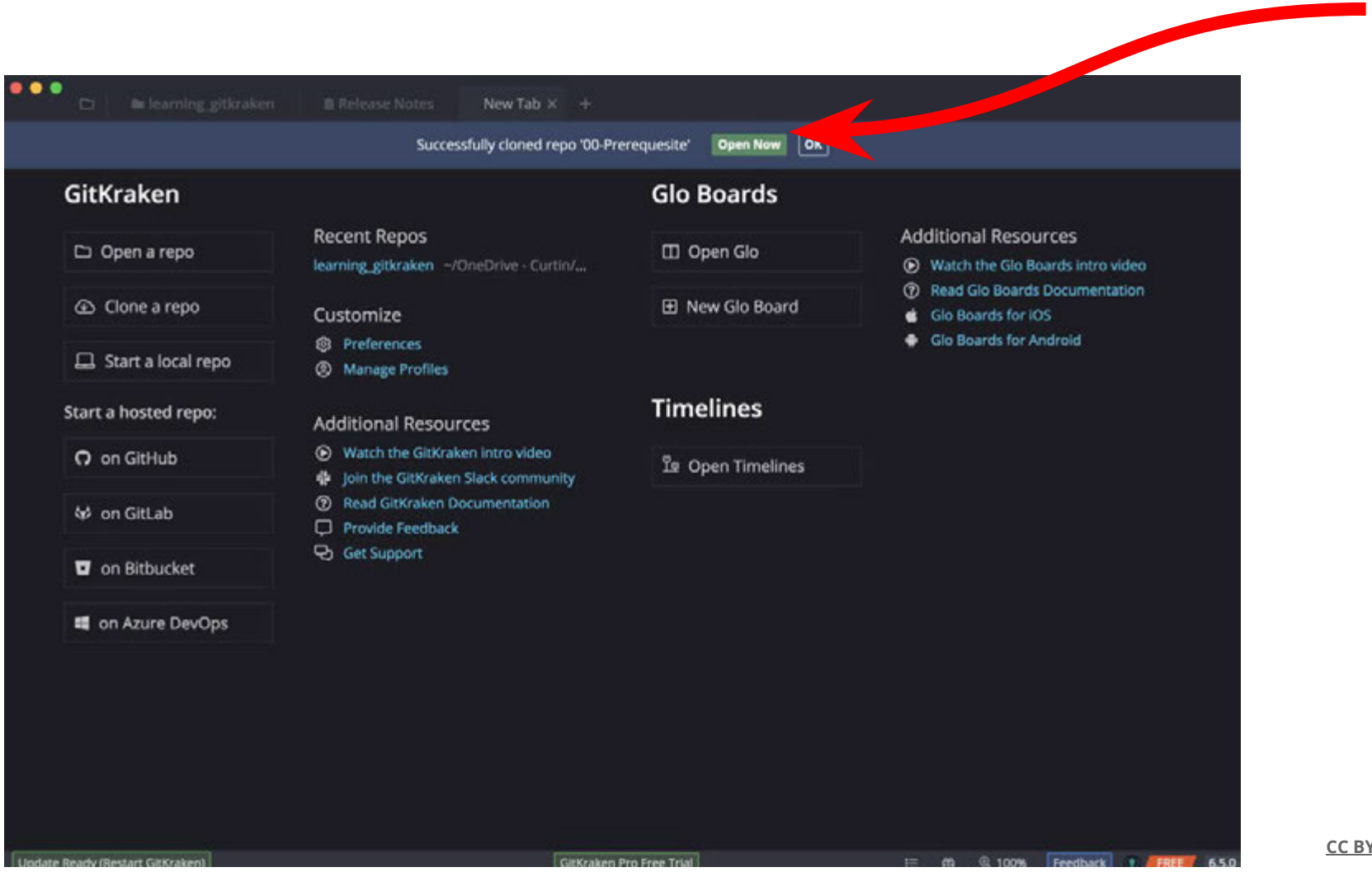
Click 'Clone', and 'Clone with URL', choose where to clone it to (in your workshop folder), enter the URL https://github.com/core-skills/00-Prerequesite and click 'Clone the repo!'



Clone an existing Github Repo

CORE | Skills

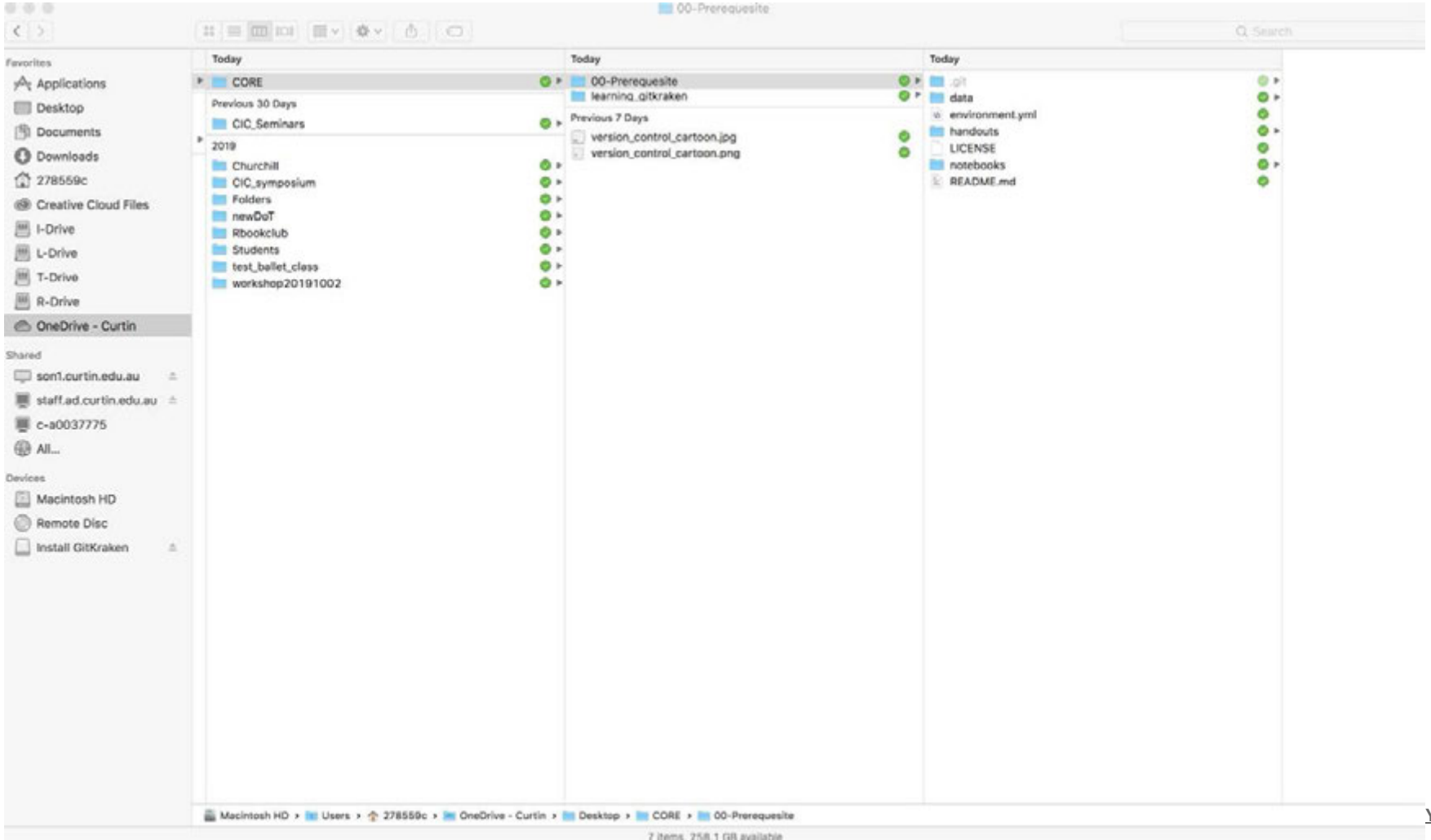
Click ‘Open Now’ to view the repository



Clone an existing Github Repo

CORE | Skills

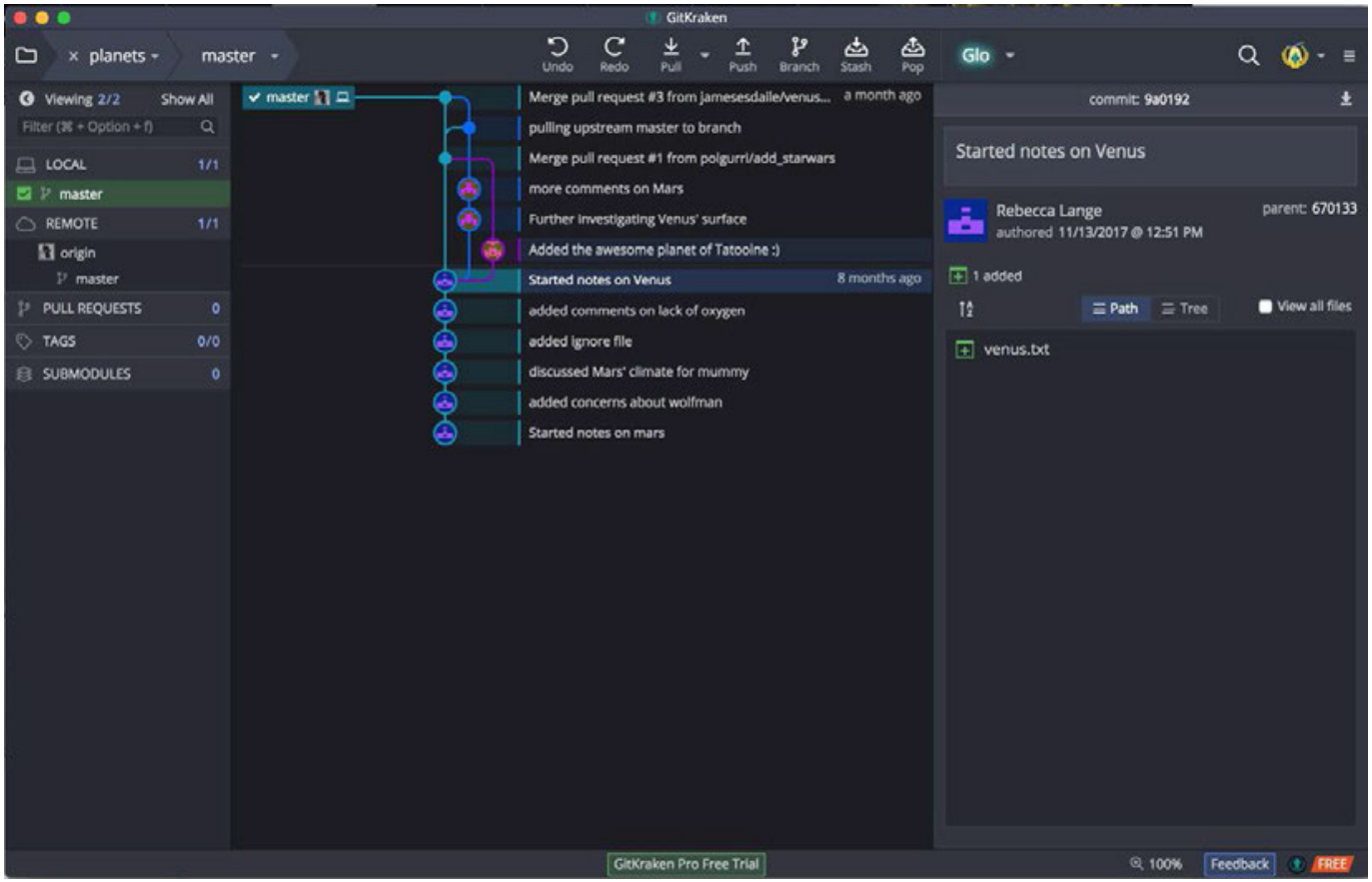
View the repository and contents



Introducing GitKraken

CORE | Skills

GitKraken is a Git GUI client for Windows, Mac and Linux that is free for non-commercial use. It provides a way to track your project changes by using a graphical interface as an alternative to the command line.

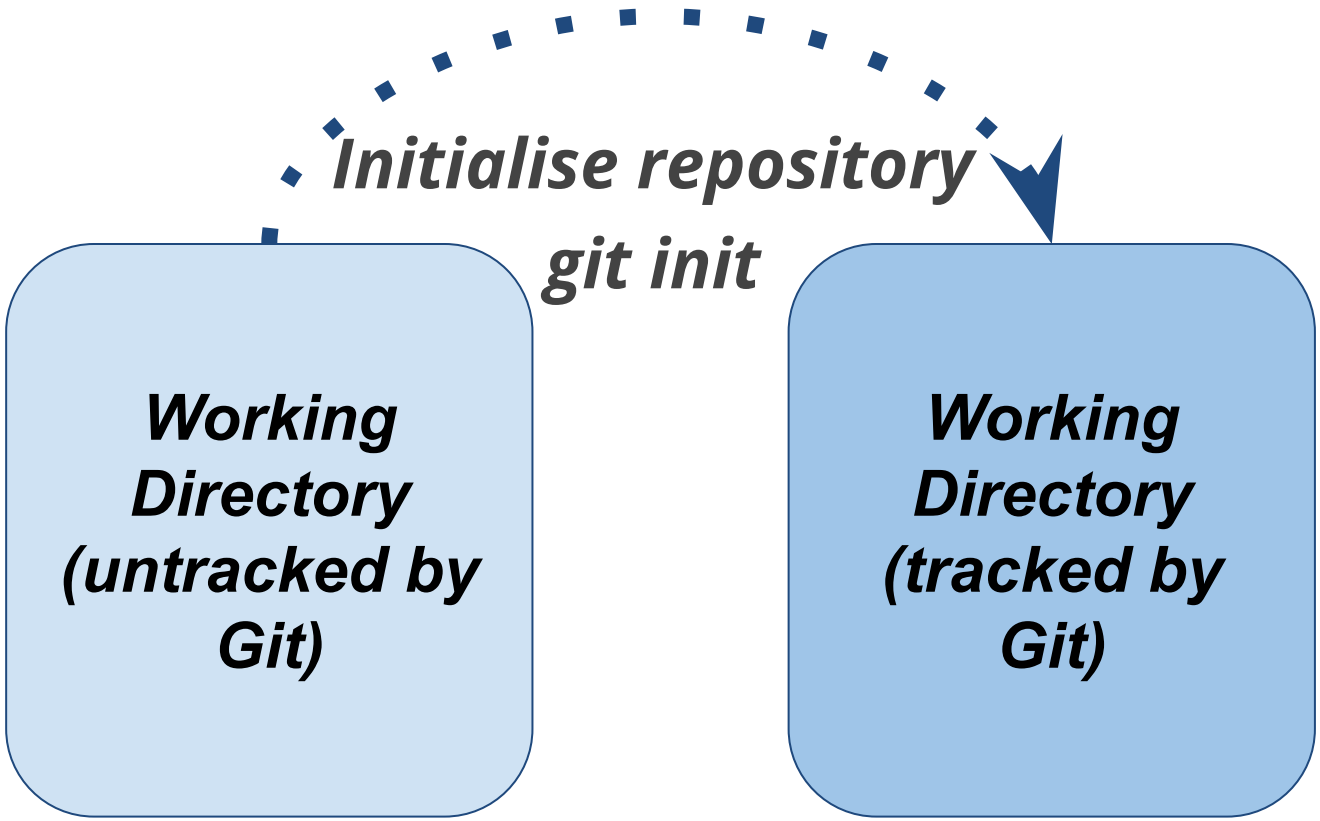


GitKraken Tutorial

CORE | Skills

Create a new folder for in the workshop folder called “learning_gitkraken”

This folder is our 'Working Directory'

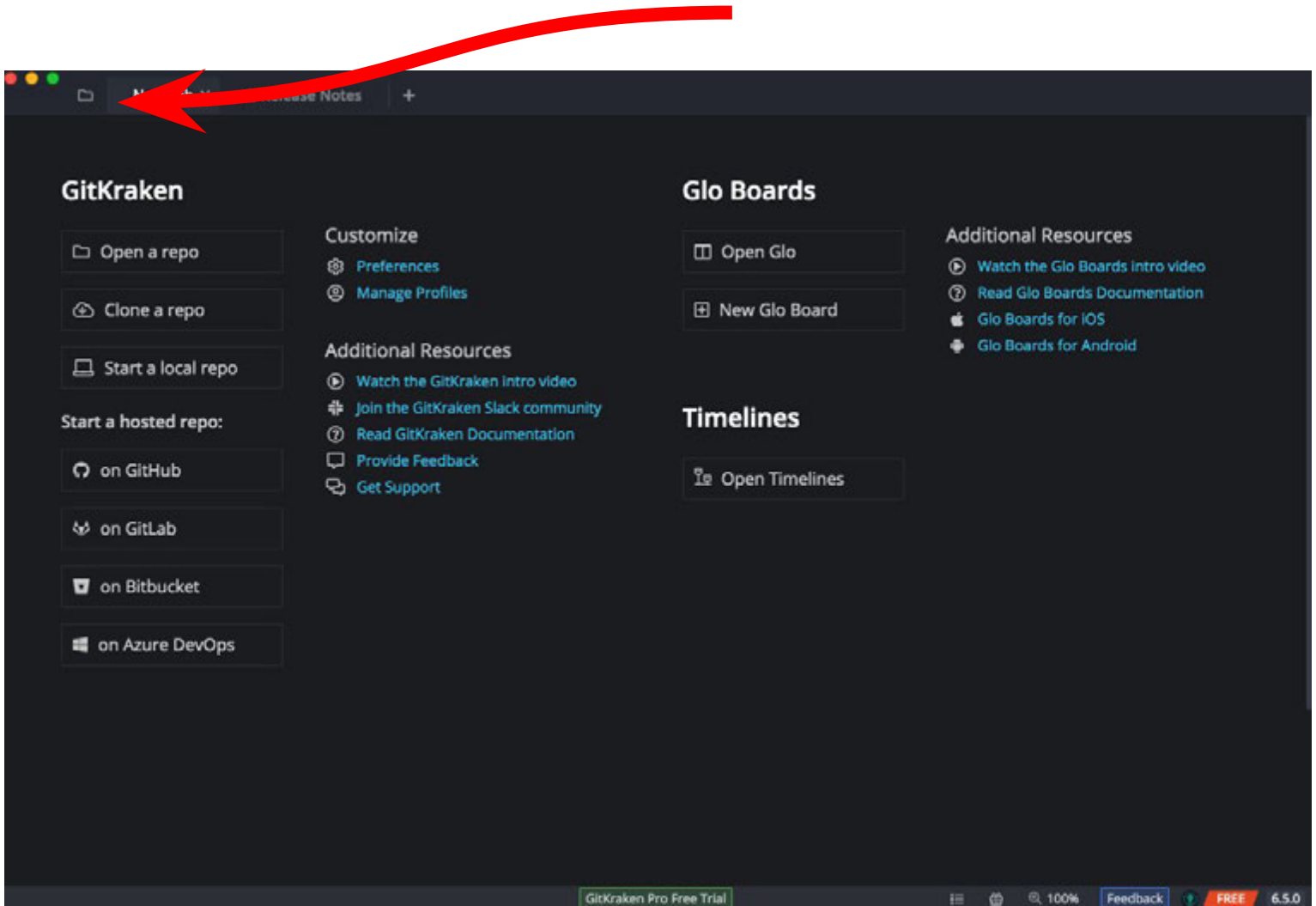


https://www.toolsqa.com/git/git-life-cycle/

GitKraken Tutorial

CORE | Skills

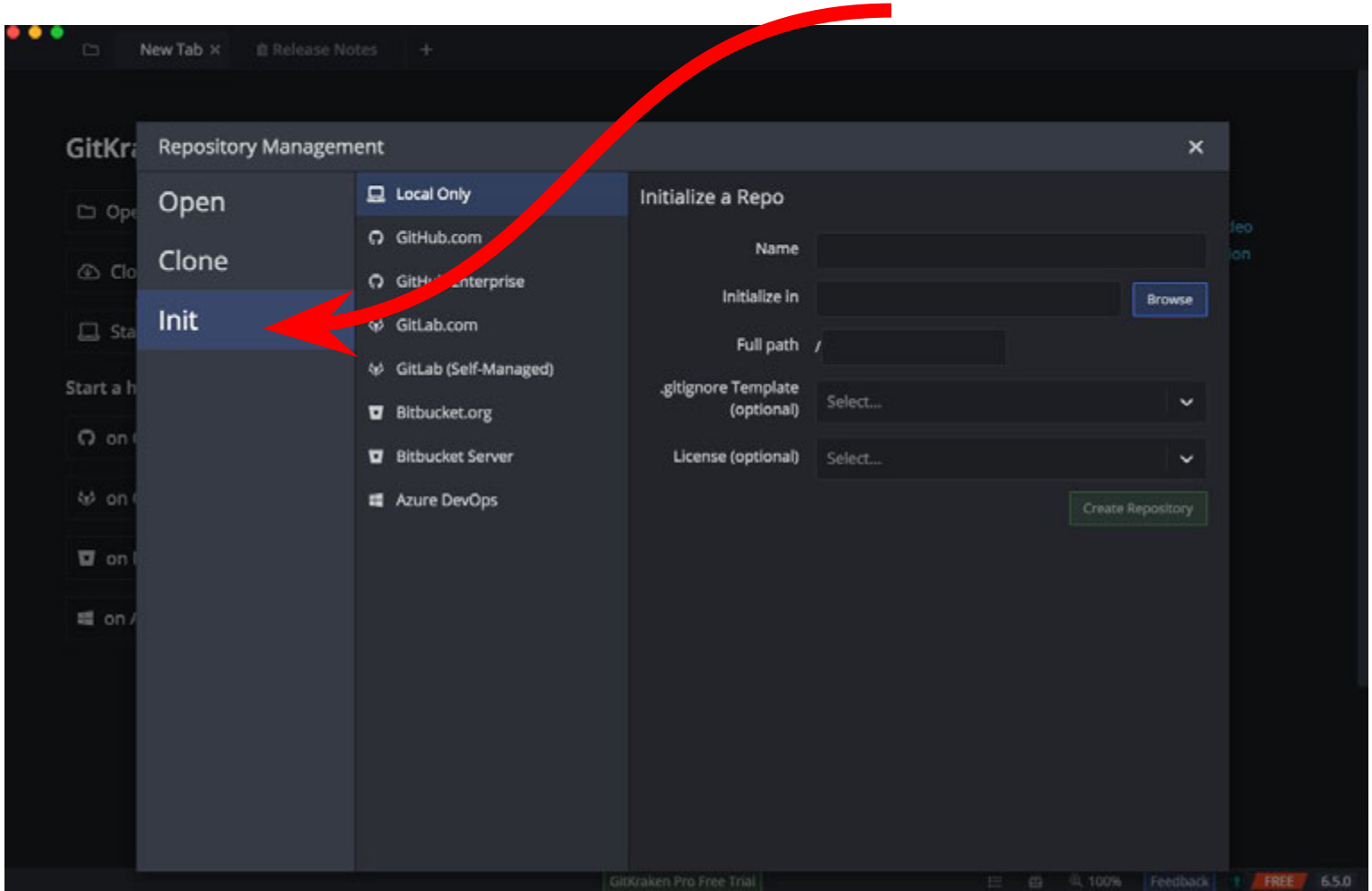
Open GitKraken, click on the ‘Folder’ Icon



GitKraken Tutorial

CORE | Skills

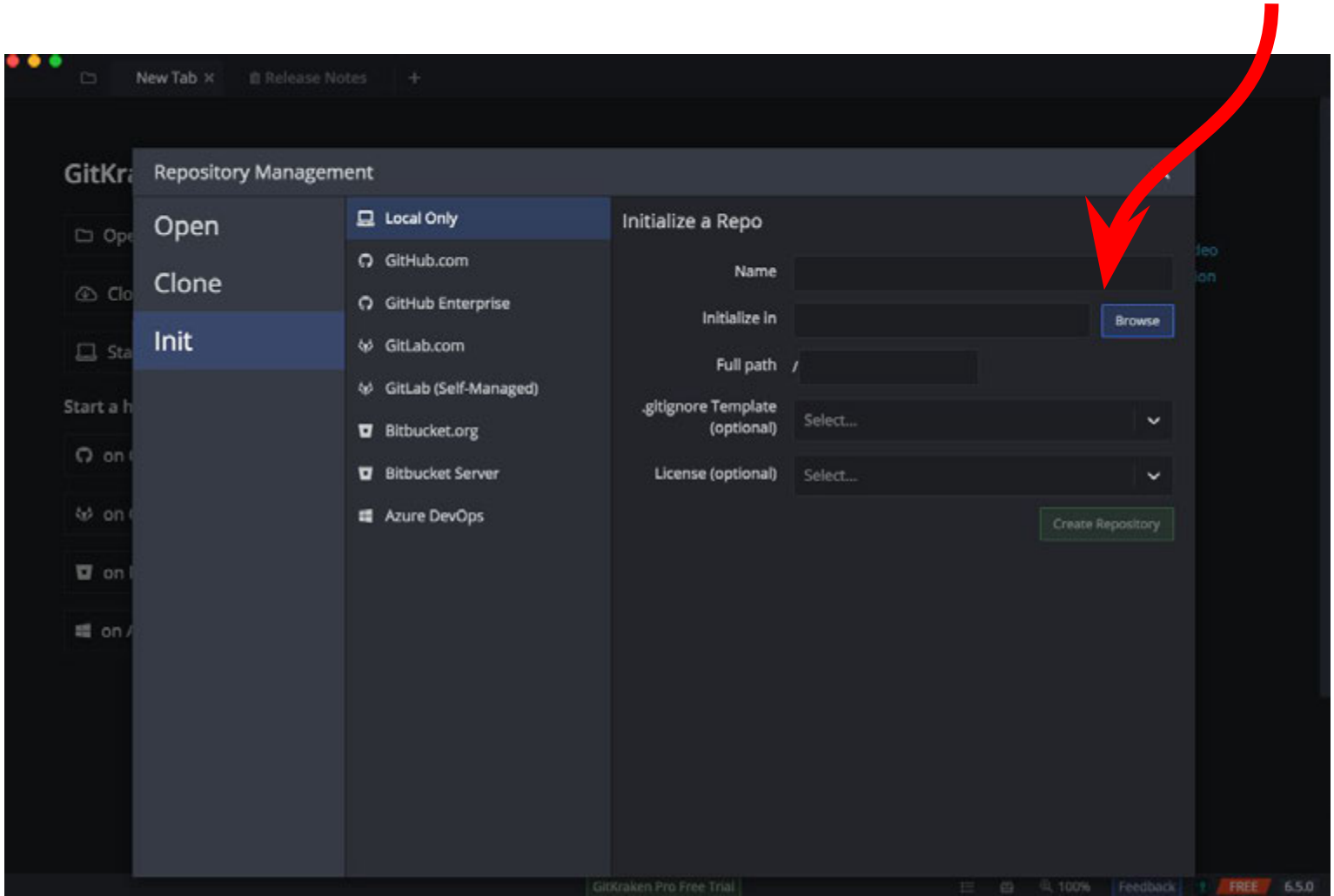
Click ‘Init’ to initialise the Git Repository



GitKraken Tutorial

CORE | Skills

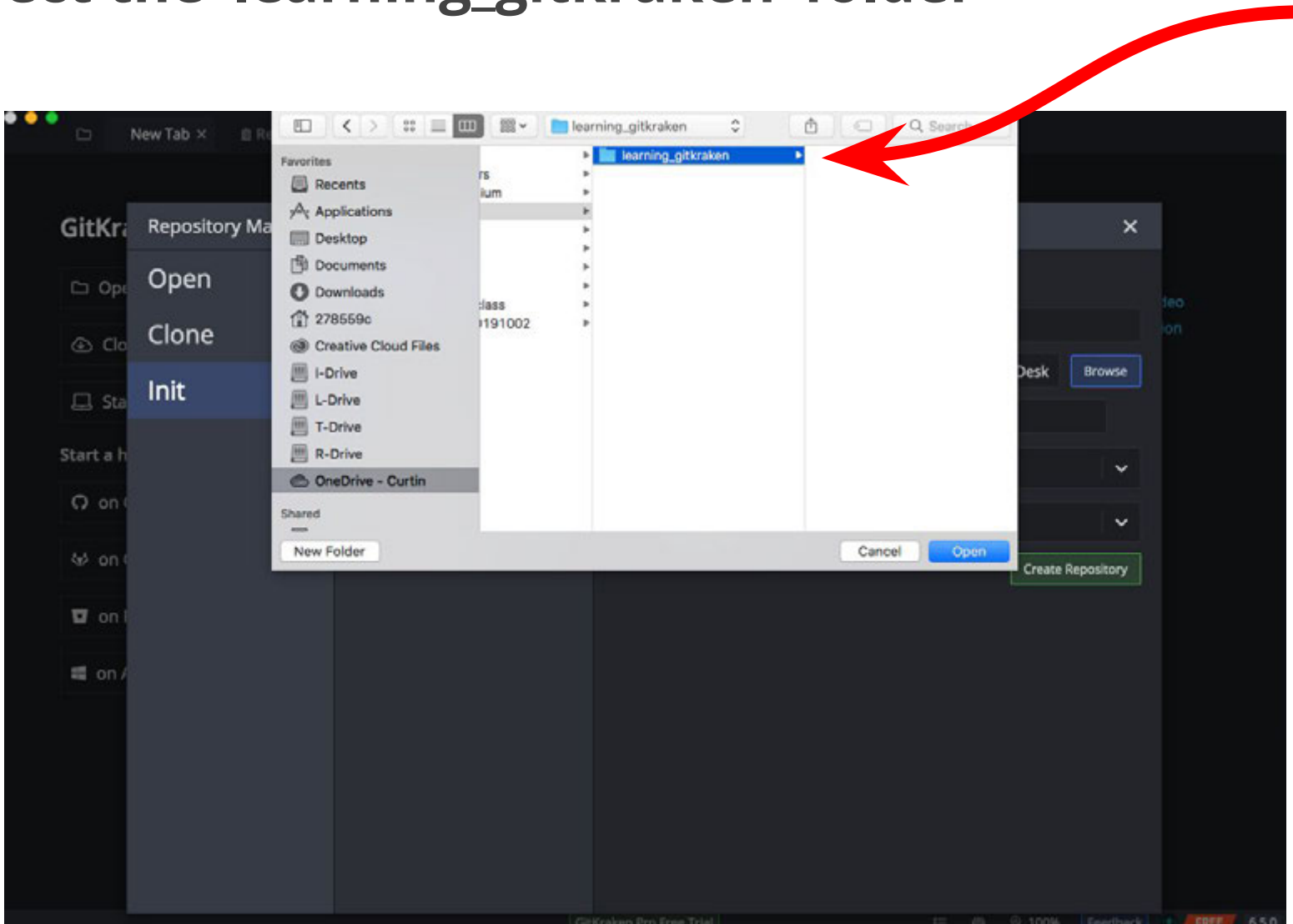
Click ‘Browse’ to select the folder you created



GitKraken Tutorial

CORE | Skills

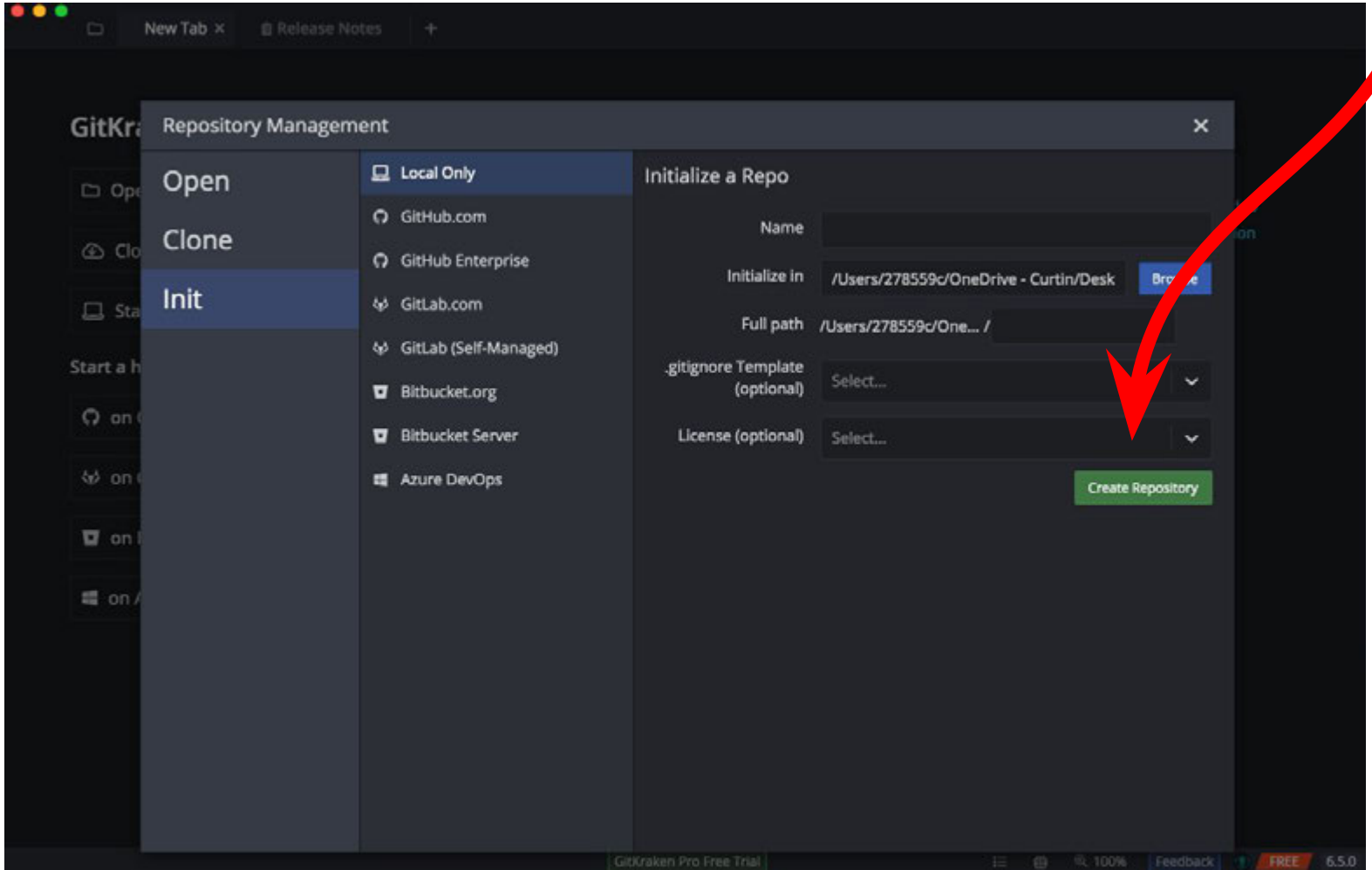
Select the ‘learning_gitkraken’ folder



GitKraken Tutorial

CORE | Skills

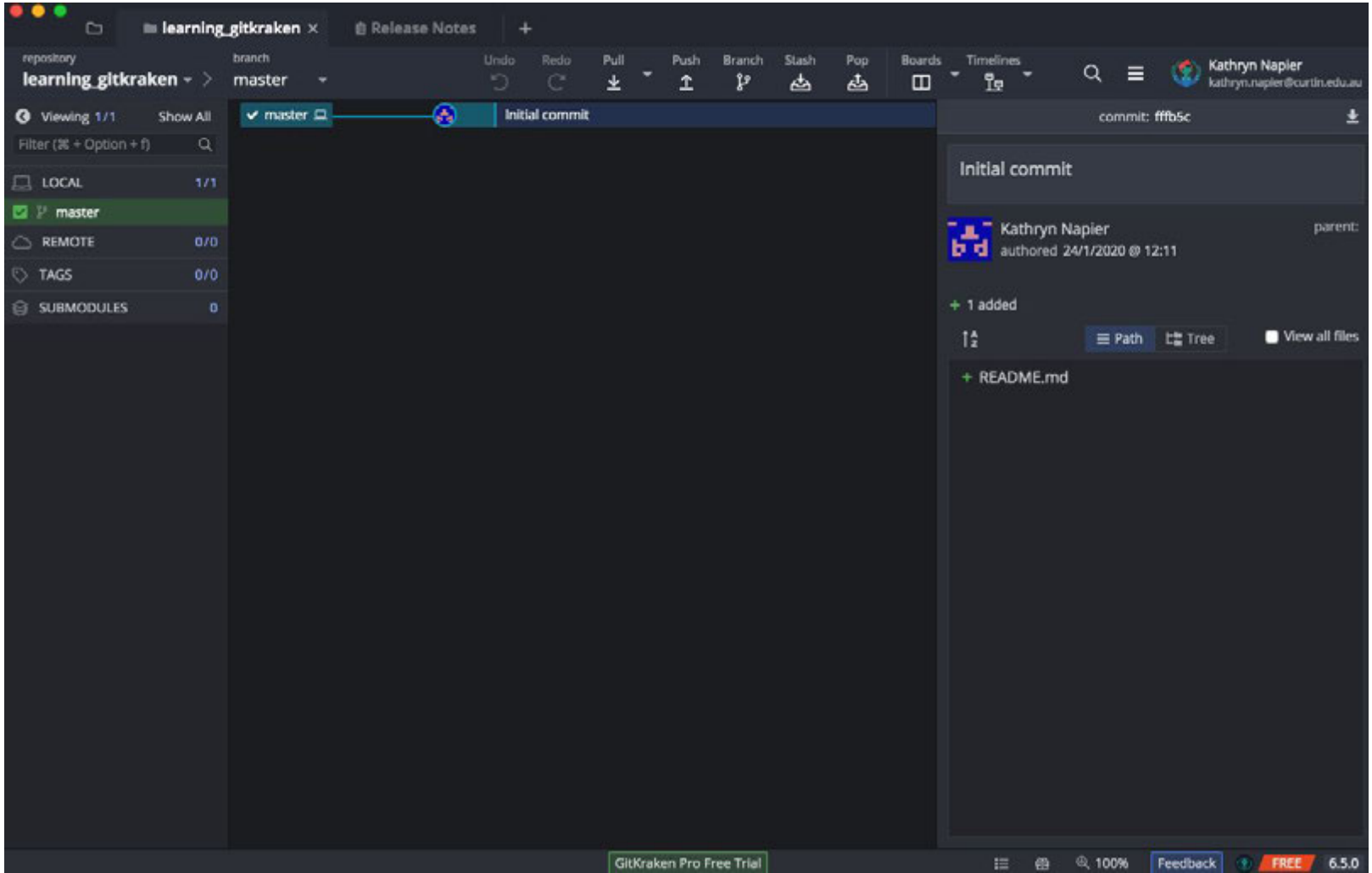
Click ‘Create Repository’



GitKraken Tutorial

CORE | Skills

You can now start tracking changes!



GitKraken Tutorial

CORE | Skills

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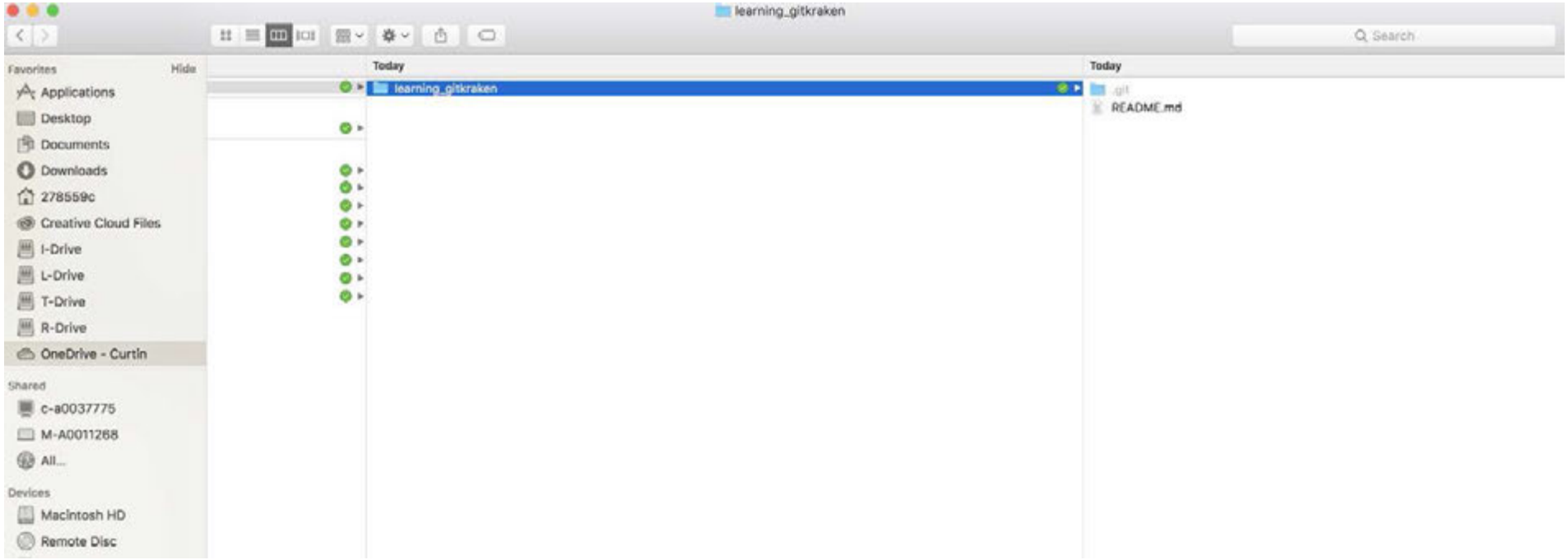
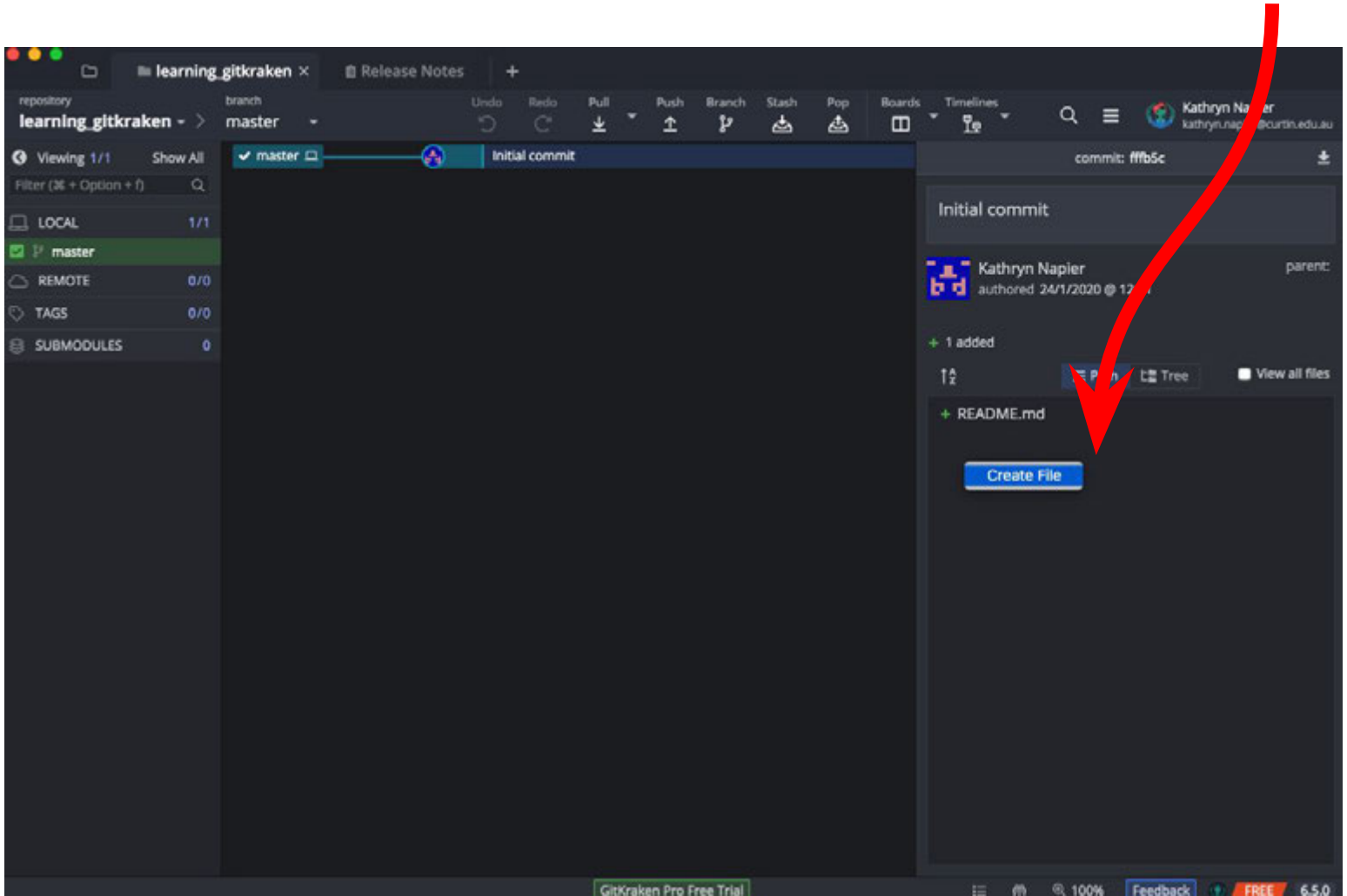


GitKraken Tutorial

CORE | Skills

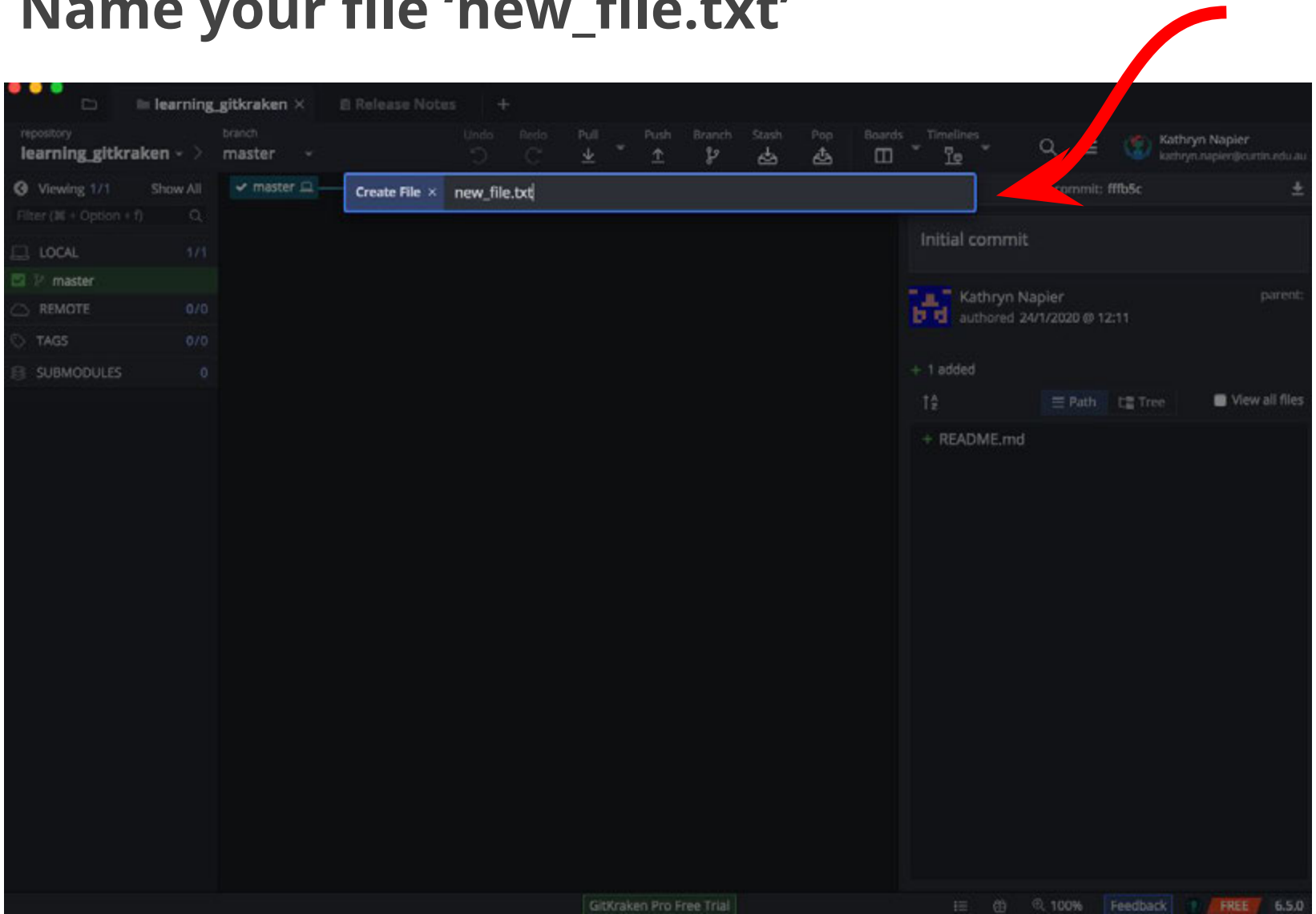
Add a new file in your project folder: right click in the blank ‘commit’ screen



GitKraken Tutorial

CORE | Skills

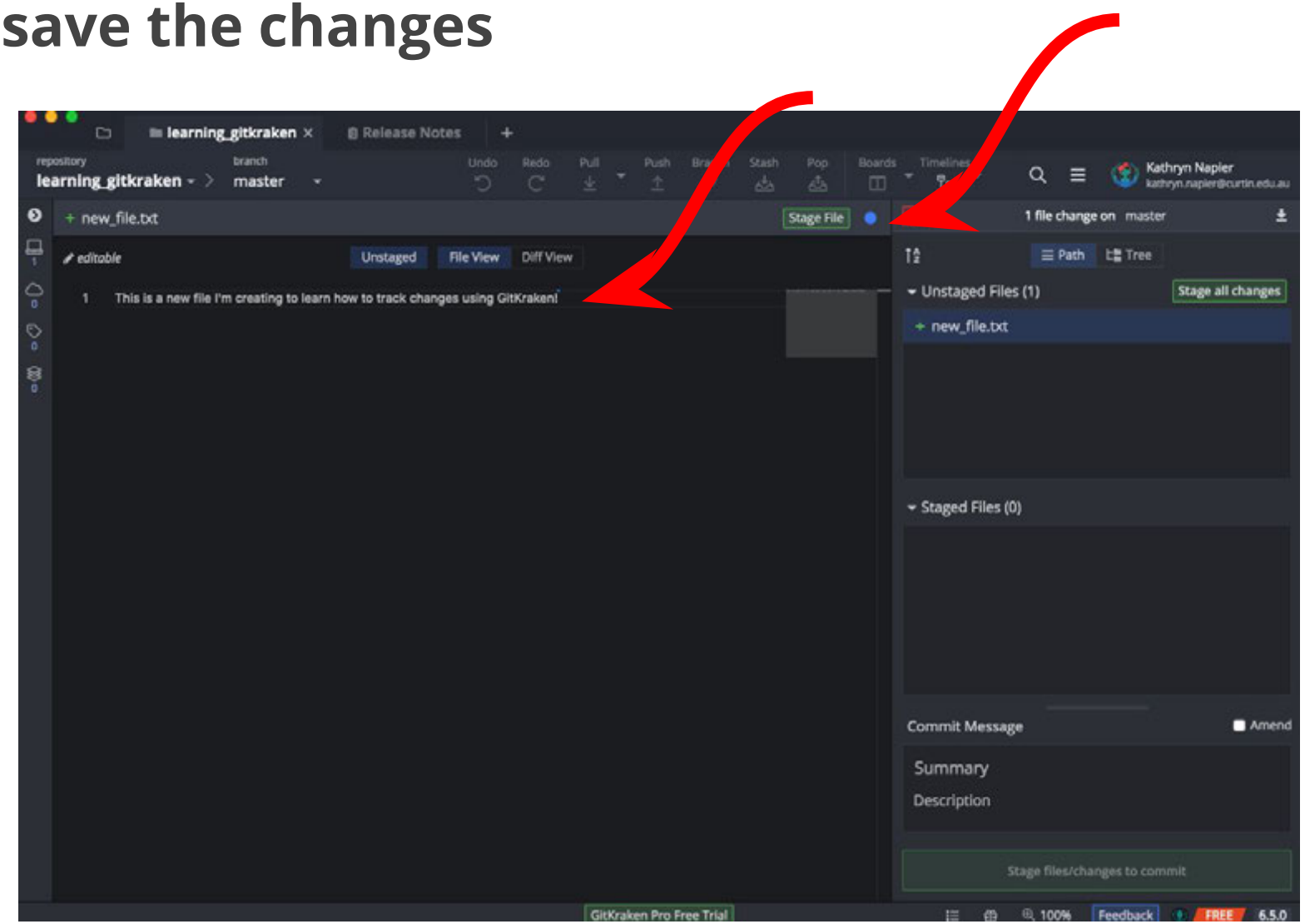
Name your file ‘new_file.txt’



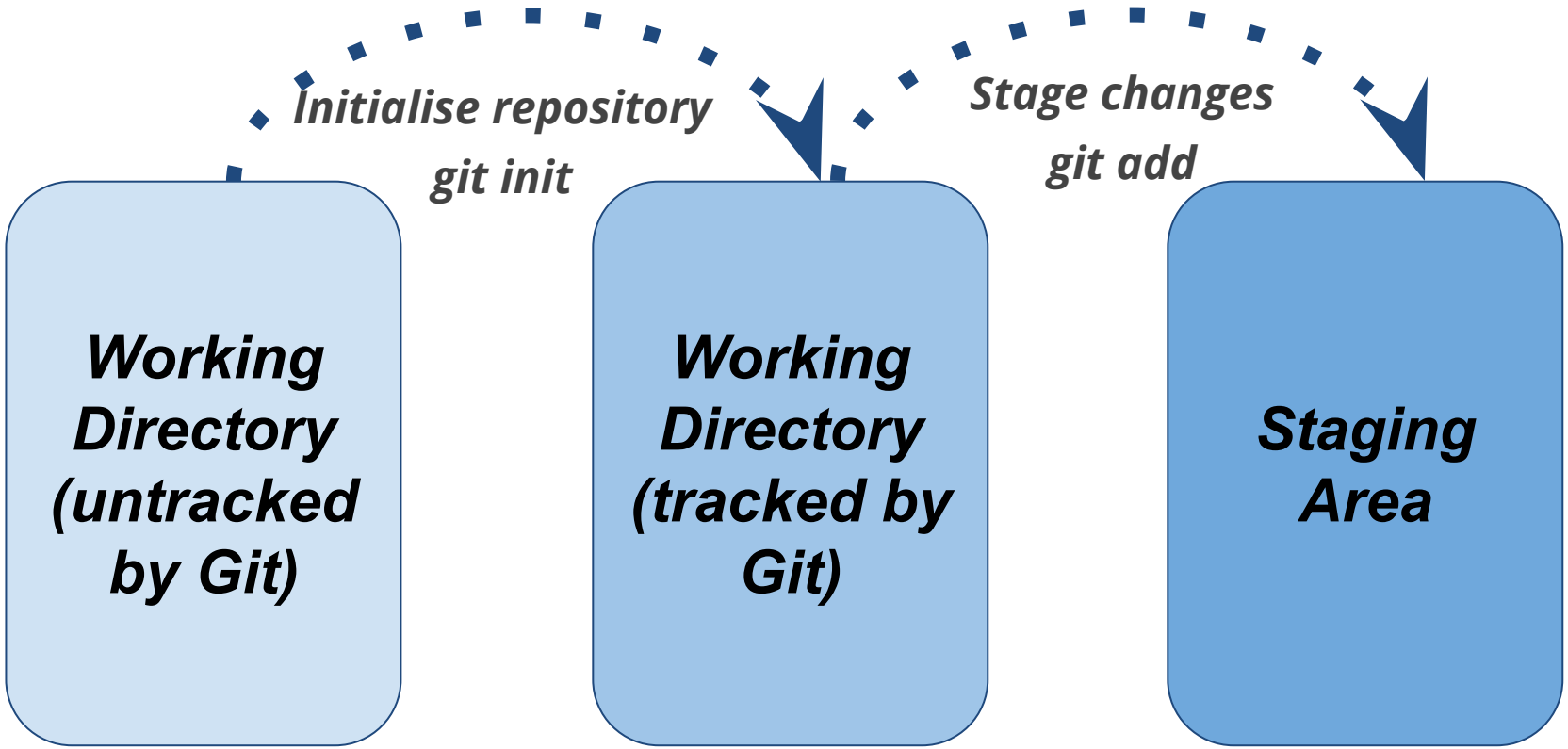
GitKraken Tutorial

CORE | Skills

Type in some text, then click the blue circle to save the changes



The Staging Area is where you add the files to be committed to Git for version tracking

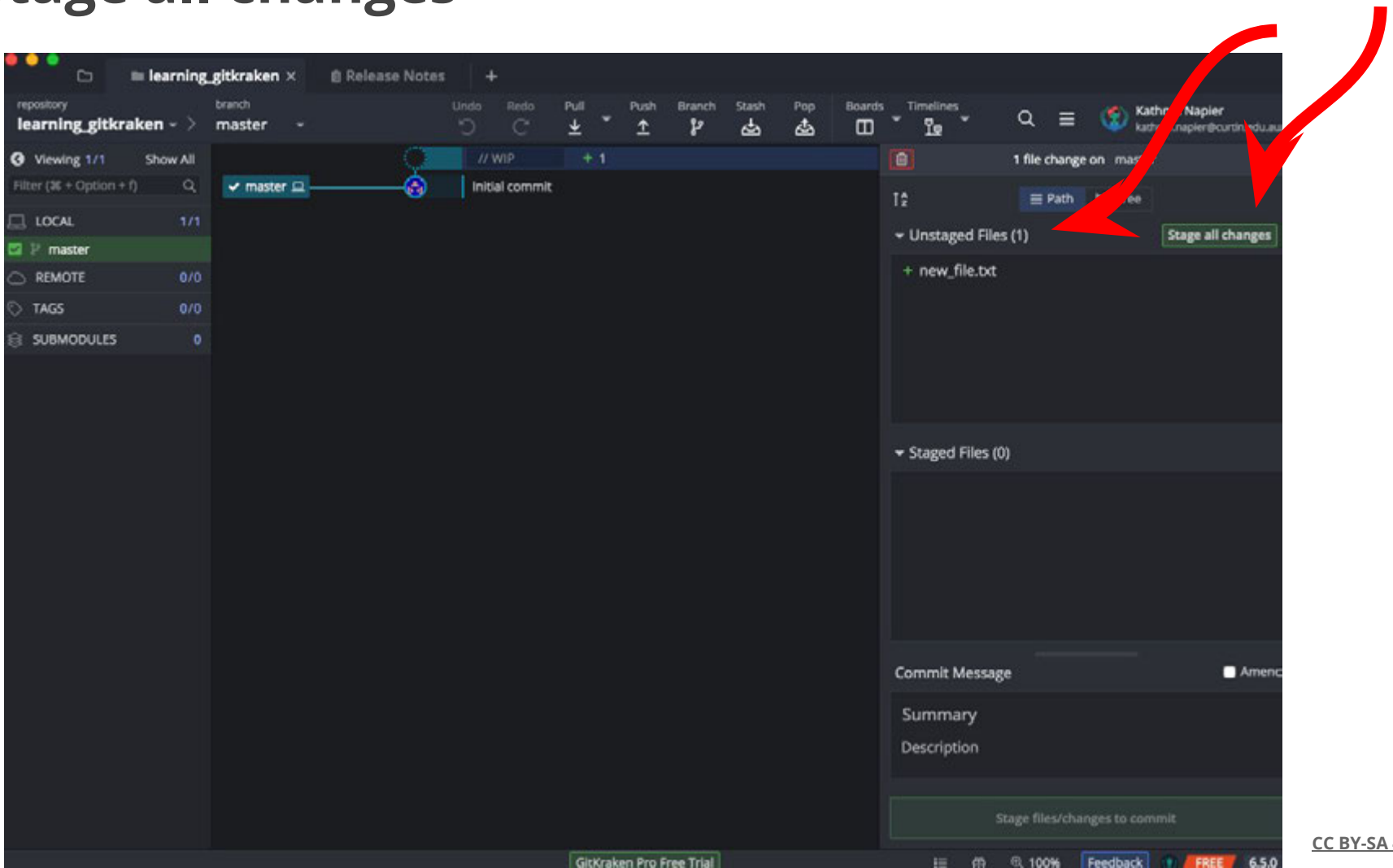


https://www.toolsqa.com/git/git-life-cycle/

GitKraken Tutorial

CORE | Skills

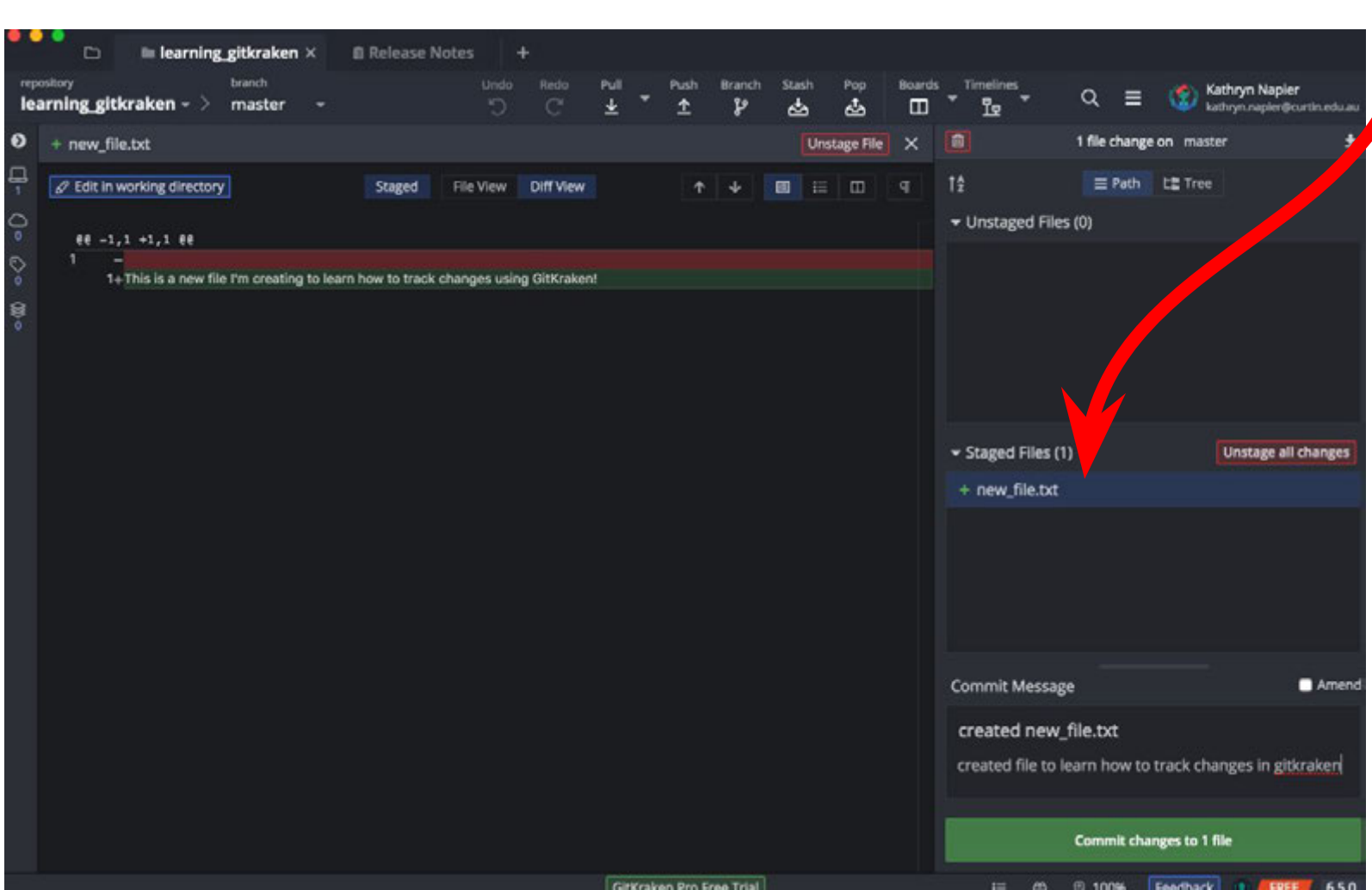
The file has been saved, but is ‘Unstaged’. Click ‘Stage all changes’



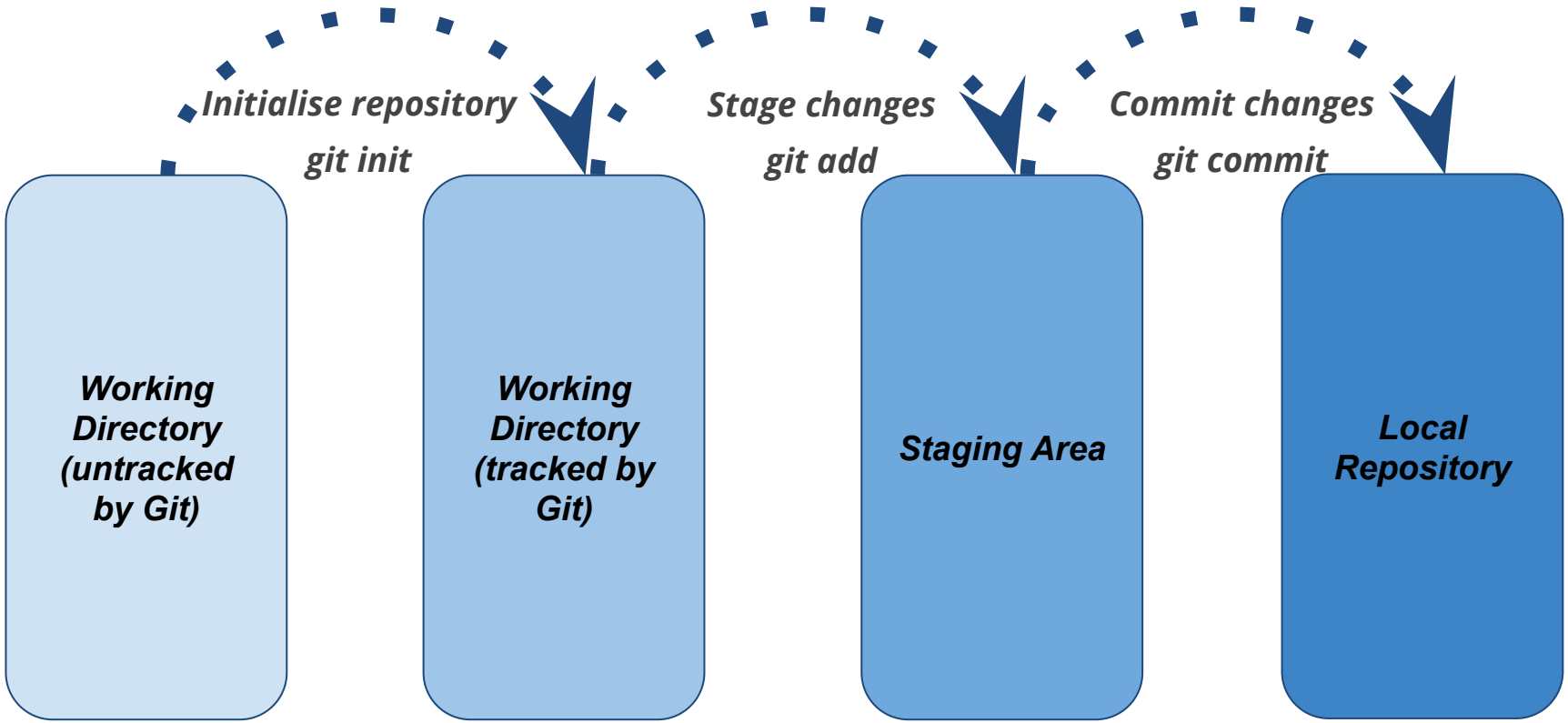
GitKraken Tutorial

CORE | Skills

You can click on the file to see the 'Diff View'



Git records all commits, so you can track versions and changes over time

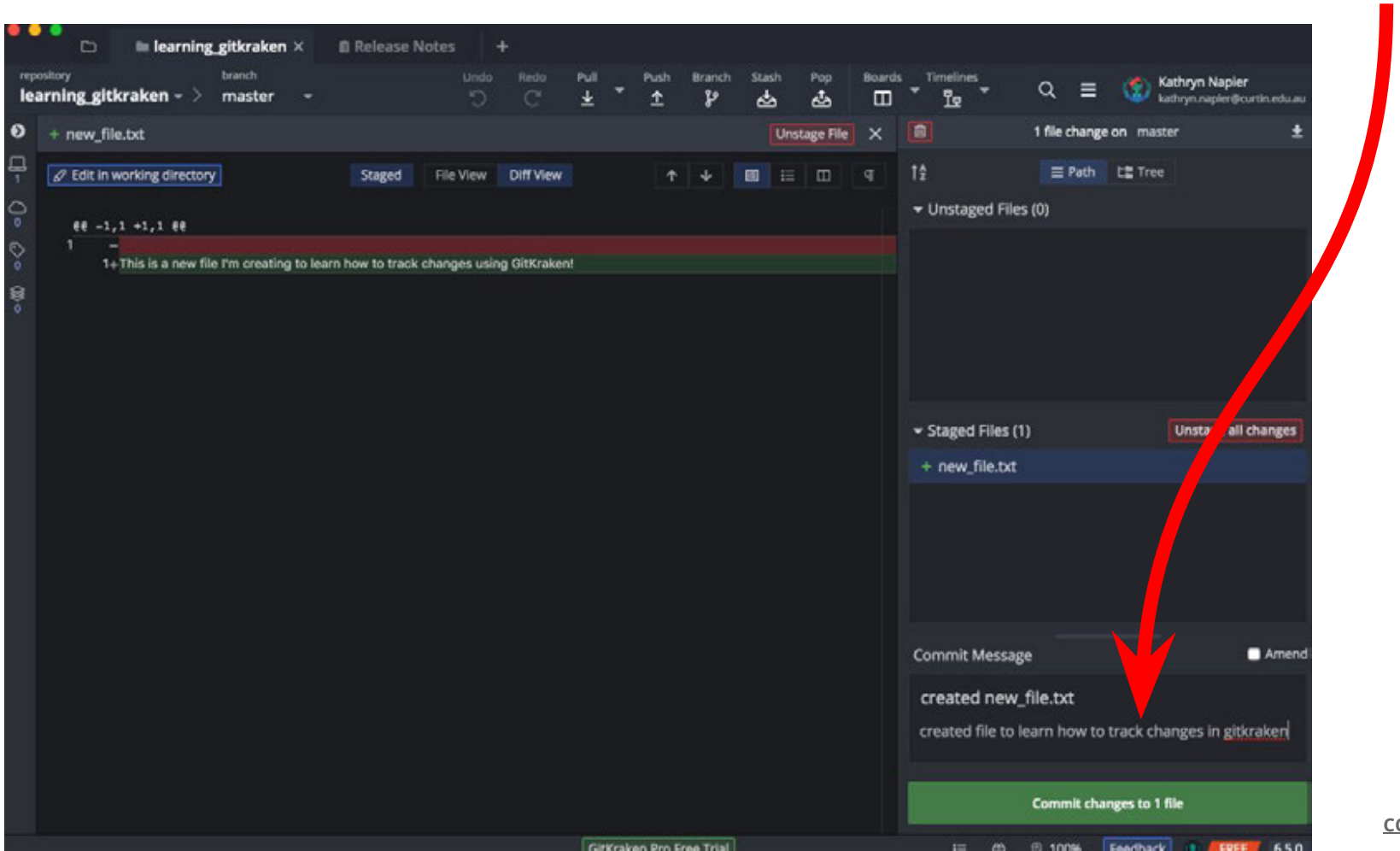


https://www.toolsqa.com/git/git-life-cycle/

GitKraken Tutorial

CORE | Skills

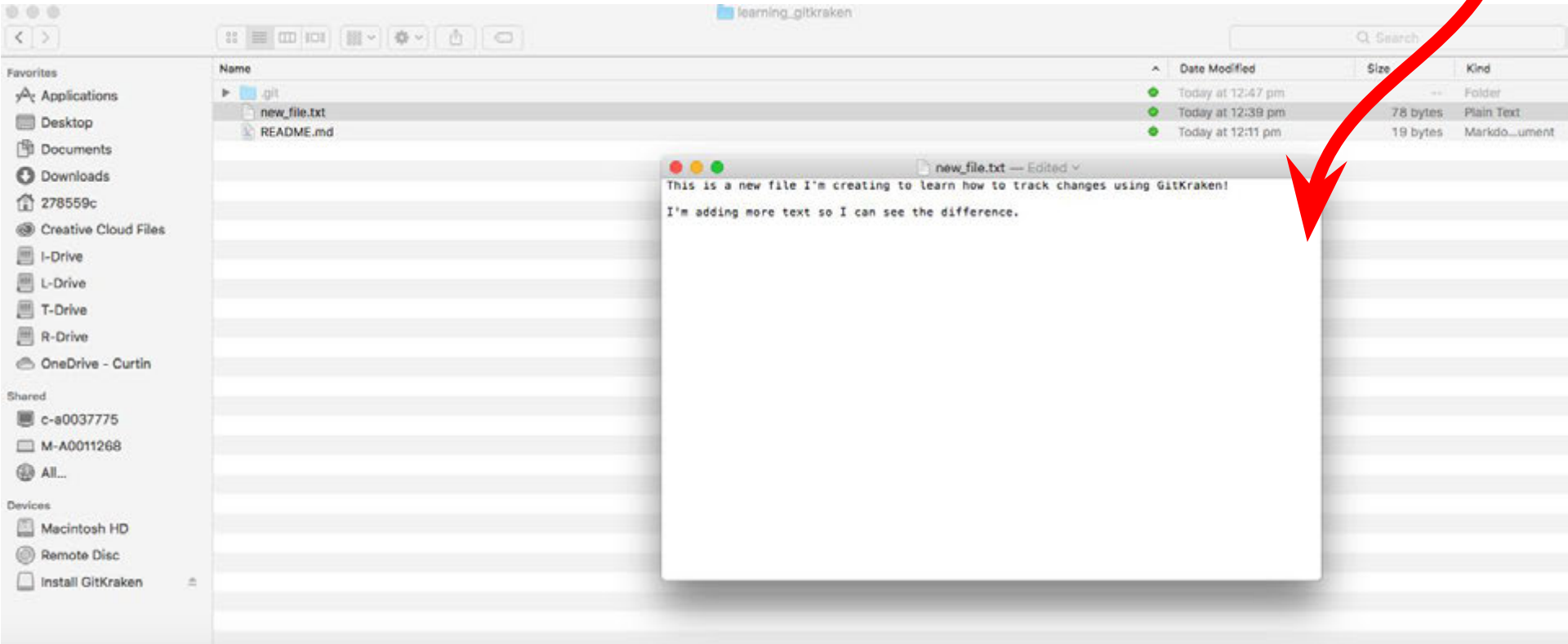
Next step is to ‘Commit’ the changes. Include a ‘Summary’ and a ‘Description’ then click ‘Commit changes to 1 file’



GitKraken Tutorial

CORE | Skills

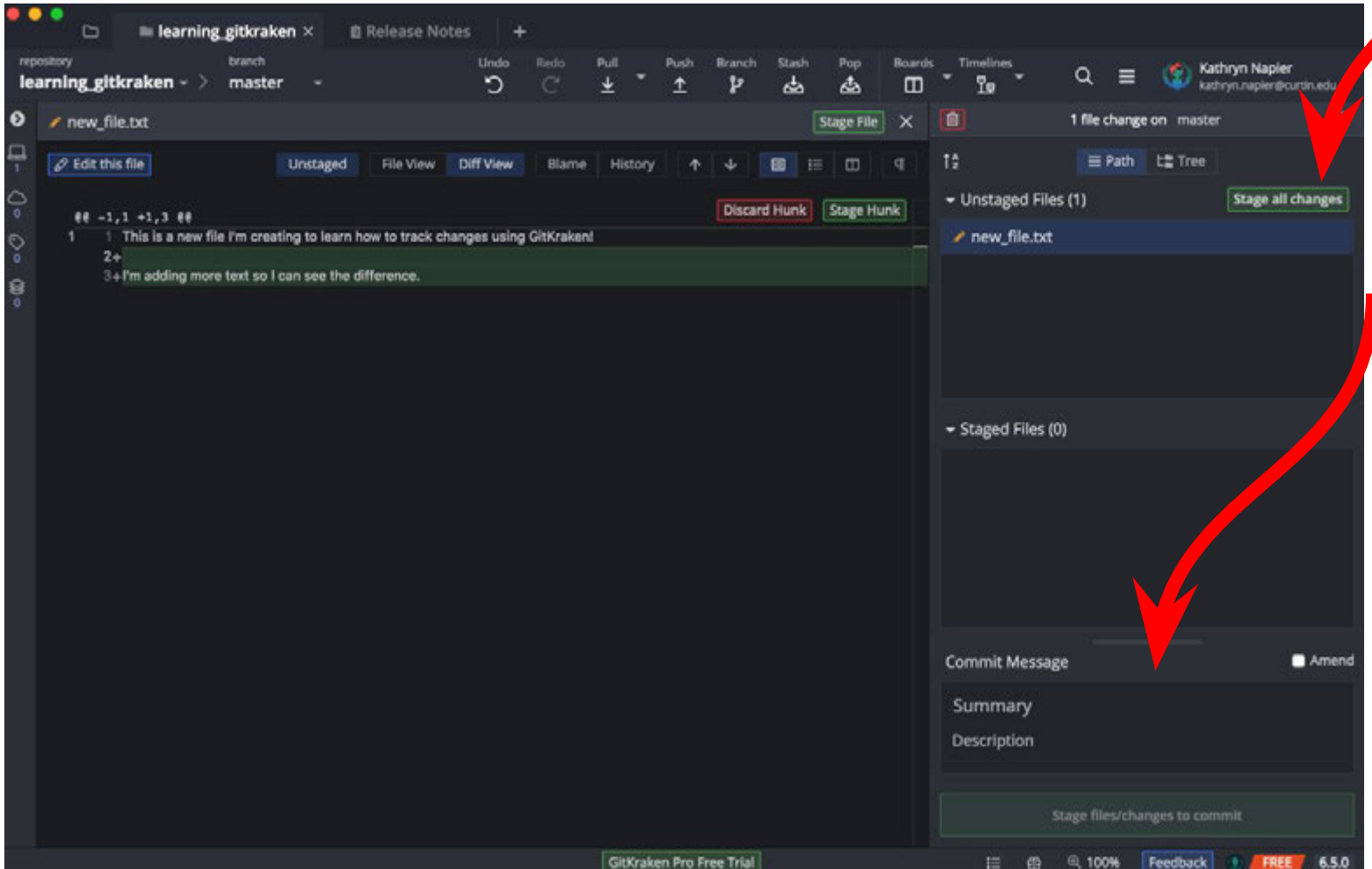
Navigate to your project folder, open the file and add some more text and save the file



GitKraken Tutorial

CORE | Skills

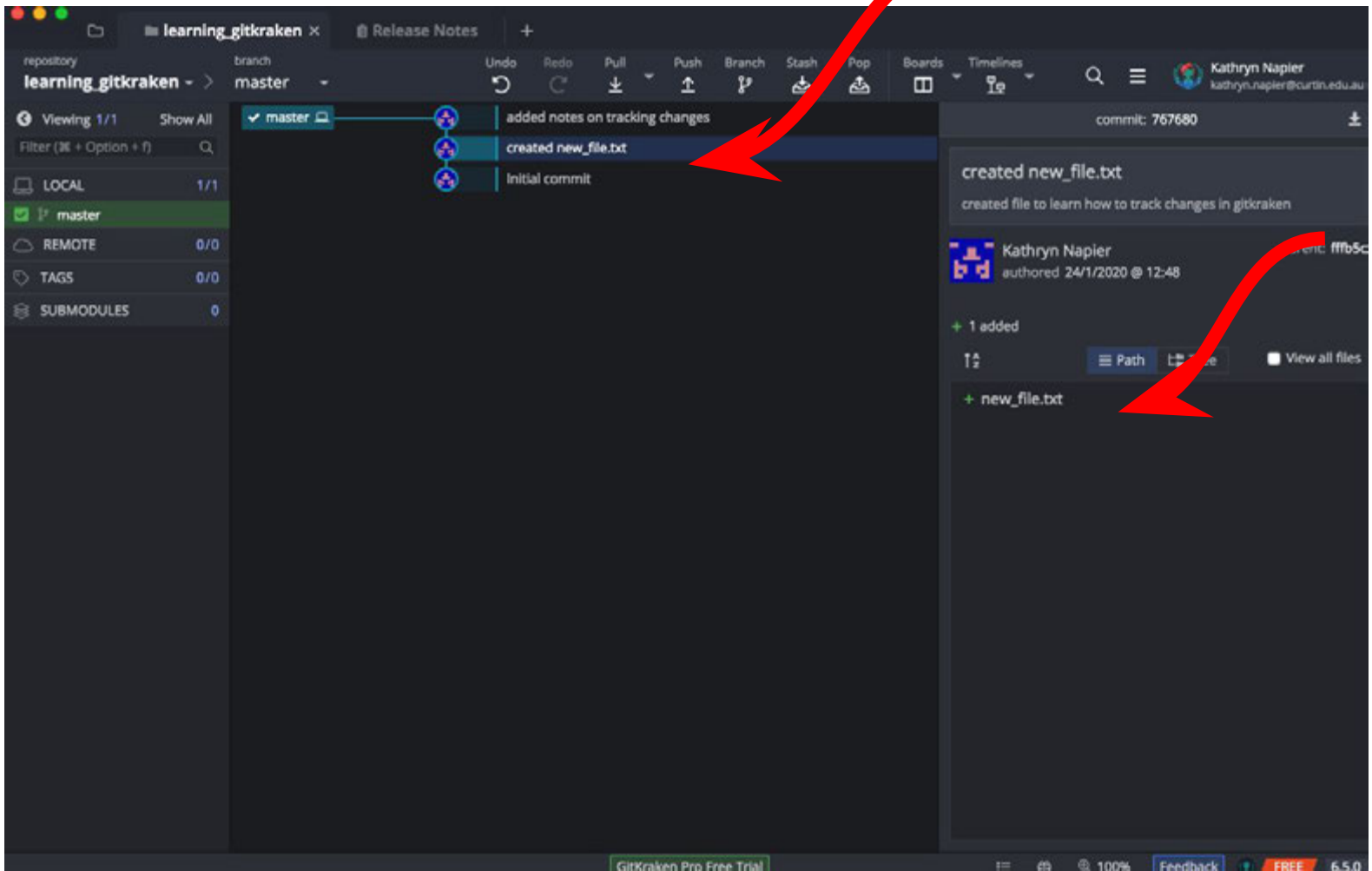
Go back to GitKraken and follow the previous steps to stage and commit the latest changes



GitKraken Tutorial

CORE | Skills

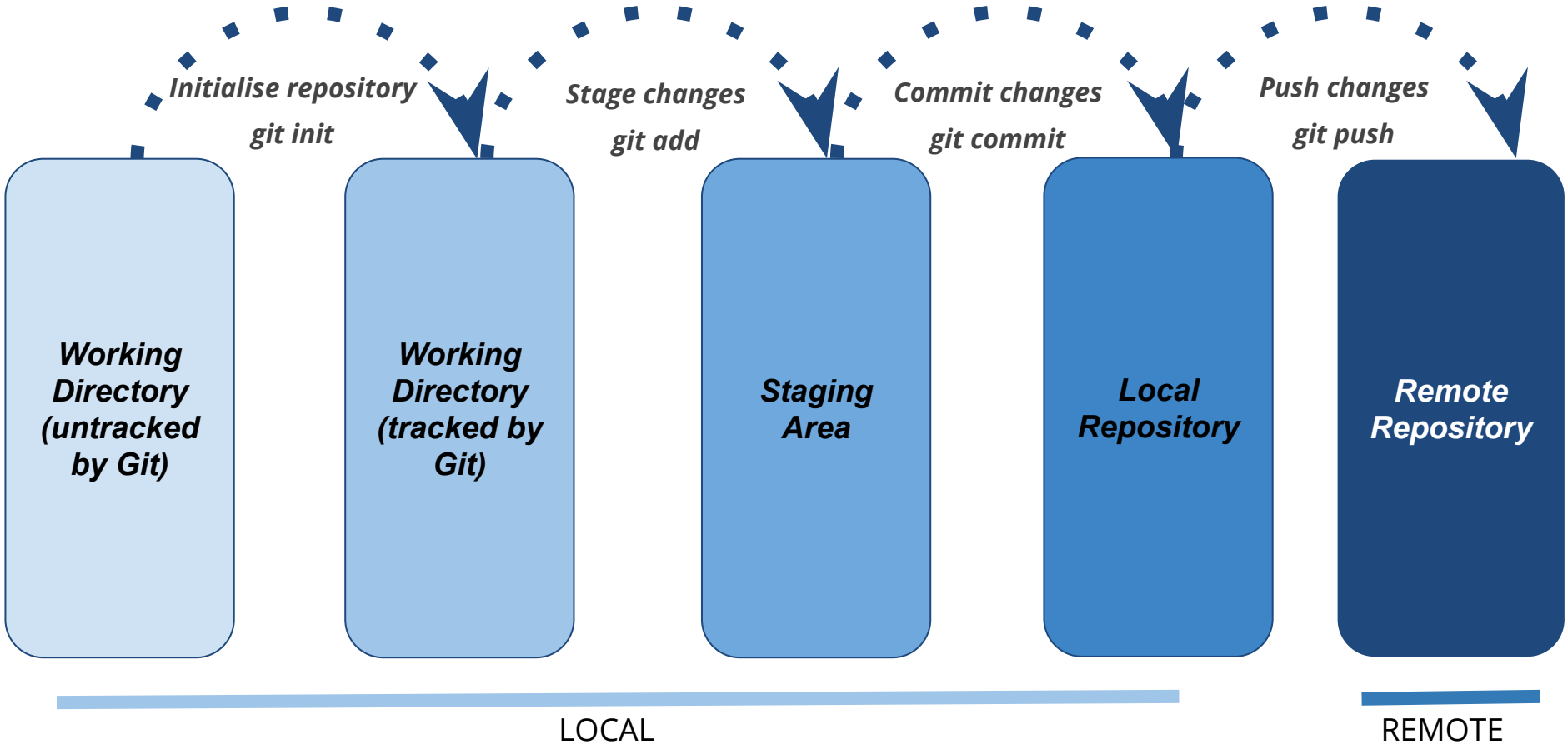
You can look at previous commits to see the changes made



Github and Remote Repositories

CORE | Skills

What if you need to collaborate?



https://www.toolsqa.com/git/git-life-cycle/

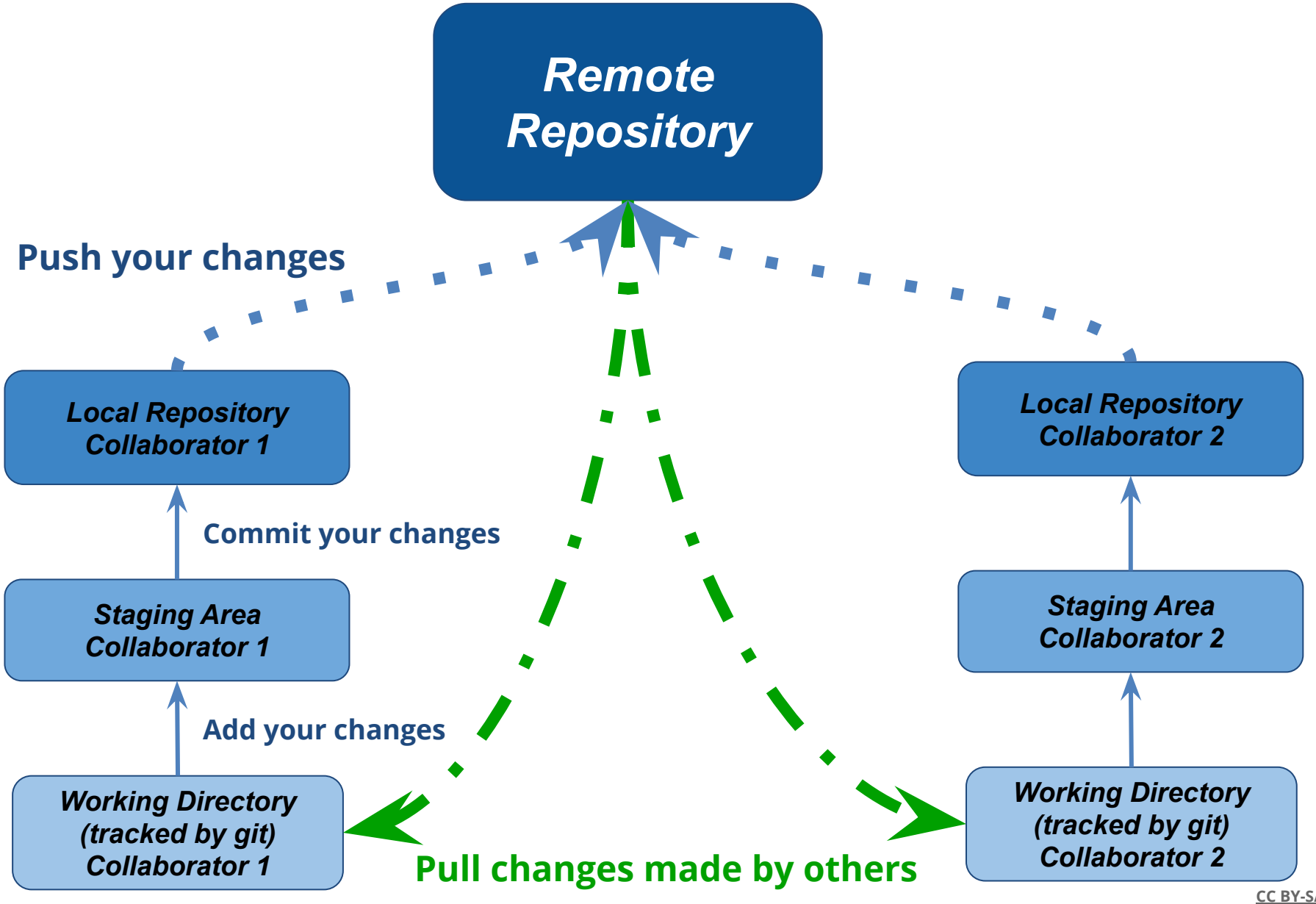
Why Github

CORE | Skills

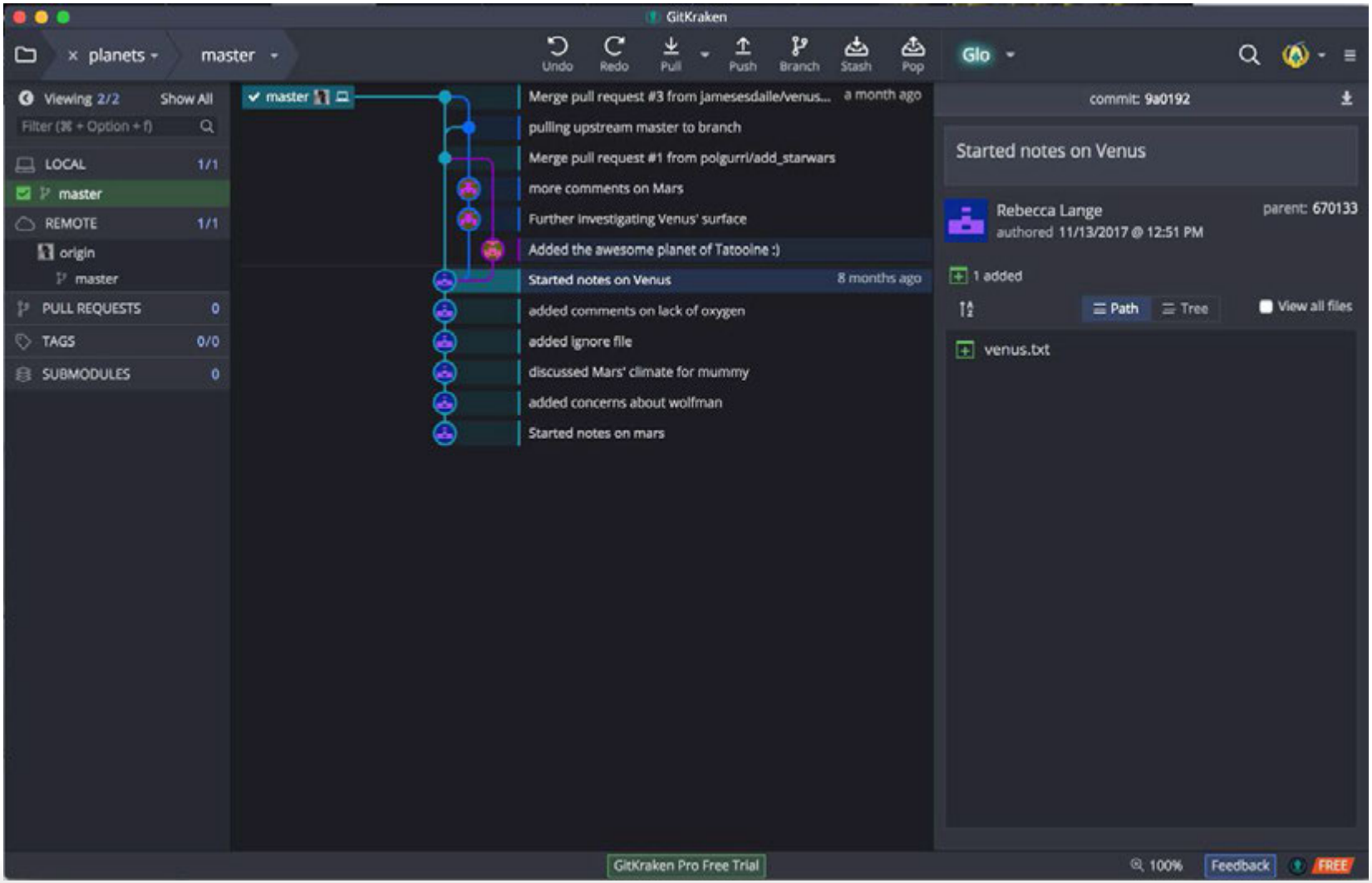
- ❑ Remote repository
- ❑ Version Control
- ❑ Visible code and reproducibility
- ❑ Open code and reuse
- ❑ Collaborative code development
- ❑ Open code development

Github and Remote Repositories

CORE | Skills



Multiple collaborators



Useful Links

GitKraken Tutorials

https://www.gitkraken.com/learn-git

Github Git Cheatsheet

https://education.github.com/git-cheat-sheet-education.pdf

Concepts

CORE | Skills

1. Tools used
2. Navigating your computer
3. Version control
4. Reproducibility
5. Some good code etiquette hints
    a. Programming “Rules of Thumb”
    b. Make code readable and understandable
    c. Good practice
6. Where to find help
    a. Error messages
    b. Google
    c. Stackoverflow
    d. Documentation
    e. Code review groups

Programming "Rules of Thumb"

Programming Rules of Thumb

1. K.I.S.S. (Keep It Simple, Stupid)
    a. Subprograms should do precisely ONE conceptual task and no more.
    b. If a problem can be decomposed into two or more independently solvable problems, do so.
2. Rule of Three
    a. When you copy/paste a piece of code 3 or more times turn it into a function.
3. 90-90 rule (failure to anticipate the hard parts)
    a. "The first 90 percent of the code accounts for the first 90 percent of the development time. The remaining 10 percent of the code accounts for the other 90 percent of the development time."
    b. —Tom Cargill, Bell Labs
4. Efficiency vs clarity (chasing false efficiency)
    a. Never sacrifice clarity for some perceived efficiency.
5. Naming of things
    a. Naming conventions are there to make code easier to read

Style Guides

CORE | Skills

"Programs must be written for people to read, and only incidentally for machines to execute." — Harold Abelson, Structure and Interpretation of Computer Program

A style guide is about **consistency**. Consistency with this style guide is important. Consistency within a project is more important. Consistency within one module or function is the most important.
[PEP8 style guide]

Why care?

- provides consistency
- makes code easier to read
- makes code easier to write
- makes it easier to collaborate

[Beautify your R code by Saskia Freytag]

Python

- Python Enhancement Proposals https://www.python.org/dev/peps/#numerical-index
- PEP 8 -- Style Guide for Python Code

R [Beautify your R code by Saskia Freytag]

- tidyverse style guide
  - most comprehensive, underscore for naming conventions
- Advanced R style guide
  - fairly comprehensive, underscore for naming conventions
- Google style guide
  - first of its kind, CamelCase for naming conventions

Create readable code

CORE | Skills

Python was designed to be readable

Code-blocks are defined by indentation

Line continuations are not required

Syntax is human readable

```
a="""Beautiful is better than ugly.
Explicit is better than implicit.
Simple is better than complex.
Complex is better than complicated.
Flat is better than nested.
Sparse is better than dense.
Readability counts.
"""

lines = a.split('\n') # \n is the newline character
num_lines = len(lines)

nwords = 0
for line in lines:
    words = line.split()
    nwords += len(words)
```

```
def do_lots_of_things(option1, # required
                      option2=0, # not required, has default value
                      option3=1,
                      labels=(),
                      sqlconnecion=None,
                      retries=3,
                      verbose=False,
                      do_print=True):
    pass
```

Naming conventions

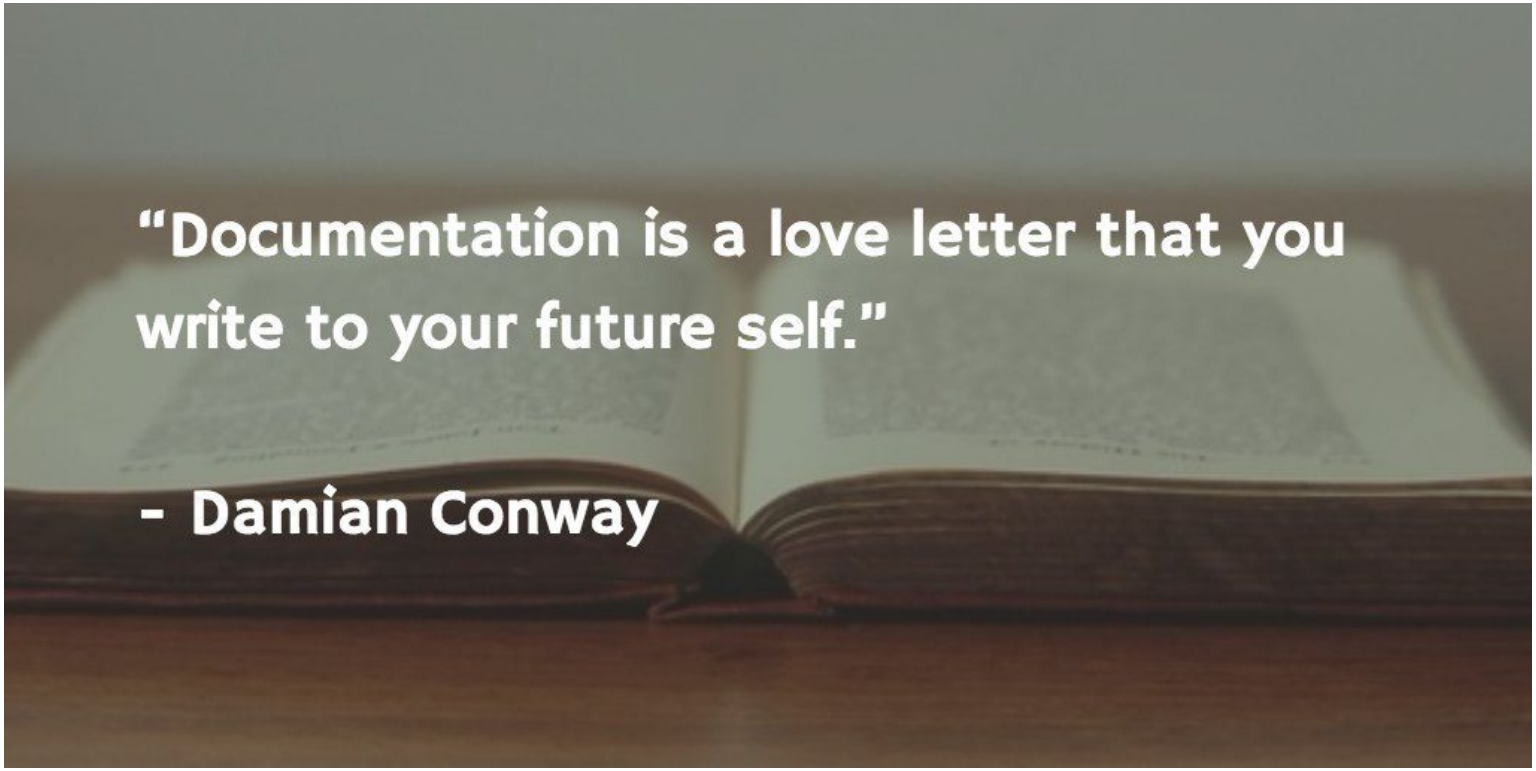
CORE | Skills

Use words! Be verbose but not needlessly so.

- nouns for classes and variables,
- verbs for functions,
- (adjectives for decorators?)
- Underscores_for_functions
- CamelCaseForClasses
- ALL_CAPS_FOR_STATIC_VARIABLES

Document your work

CORE | Skills



Comments are not documentation

CORE | Skills

Writing code is not a story that unfolds and entertains people with twists and character developments. It's a **recipe**.

1. Ingredients for the shopping list ⇒ modules to import
2. Description of techniques ⇒ functions
3. Directions ⇒ code in main scope

Documentation is for people **using** the code (regular folks)
Documentation describes the ingredients and what kind of cakes are made.

Comments are for people **reading** the code (ie developers and future you)
Comments are about the cake making process.

DRY or DIE!

Don't **R**epeat **Y**ourself (**D**uplication **I**s **E**vil)

Duplicated code means duplicated errors and bugs

Write a function, call it many times

Better still,

- write a **module** in Python and **import** this, or
- save your collection of **functions** in a separate .R script and **source** it

The DRY principle - II (or DRO maybe?)

Don't **R**epeat **O**thers

- (re-) implementing code often means going through the same growth/development curve of bugs and corner cases
- Common problems have common solutions, use them!
- **'import'** / **'library'** your way to success

DRY_examples.ipynb

Separate code and data

CORE | Skills

Having a script that needs to be edited every time it runs is just asking for trouble.

KeepThemSeparated.ipynb

Test code

CORE | Skills

"Finding your bug is a process of confirming the many things that you believe are true — until you find one which is not true."

—Norm Matloff

The only thing that people write less than documentation is test code.

Pro-tip: Both documentation and test code is easier to write if you do it as part of the development process.

1. Write function definition and basic docstring
2. Write function contents
3. Write test to ensure that function does what the docstring claims.
4. Update code and/or docstring until (3) is true.

What to test?

Whatever you currently do to convince yourself that your code works is a test!

Everytime you find a bug or some corner case, write a test that will check it.

Making mistakes doesn't make you a bad person, making the **same mistake** over and over does.

Testing in R:

http://r-pkgs.had.co.nz/tests.html

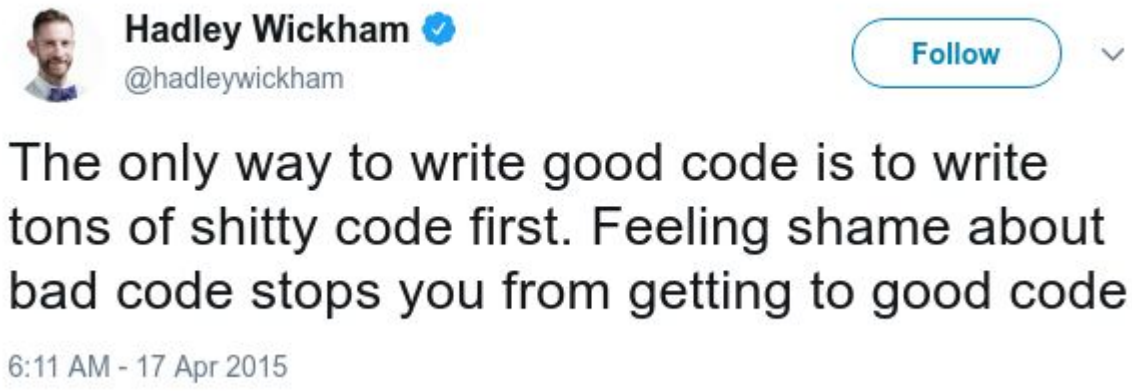
Testing in Python:

https://docs.python-guide.org/writing/tests/

Testing.ipynb

Recap

CORE | Skills



- Writing good code takes practice.
- Reuse things that work for you.
- Develop a support group you can call on for help.
  - We have weekly meet-up groups like hacky-hour
- Share your code on GitHub or similar, with documentation, so others can benefit from your work.
  - People can help you debug by reporting issues and submitting bug fixes via pull requests
  - Remember sharing your code on github does not mean you can be held accountable for its maintenance.

*Publish your code and cite that of others.

Where to get help

CORE | Skills

- Read error messages, they are there to assist you
- Google is your friend
- Stackoverflow is your bible
  - Basically Yahoo answers/Quora for code
  - Most questions already exist

Stack overflow

CORE | Skills

https://stackoverflow.com/questions/tagged/python

Search

stackoverflow Products [python]

Home

PUBLIC

Stack Overflow

Tags

Users

Jobs

TEAMS What's this?

Free 30 Day Trial

Questions tagged [python]

Ask Question

Python is a multi-paradigm, dynamically typed, multipurpose programming language, designed to be quick (to learn, to use, and to understand), and to enforce a clean and uniform syntax. Two similar but incompatible versions of Python are commonly in use, Python 2.7 and 3.x. For version-specific Python questions, add the [python-2.7] or [python-3.x] tag. When using a Python variant or library (e.g. Jython, PyPy, Pandas, Numpy), please include it in the tags.

Unwatch Tag | Ignore Tag | Learn more... | Improve tag info | Top users | Synonyms (4) | python jobs

131,090 questions

Newest | Active | Bountied 48 | Unanswered | More | Filter

612 votes
24 answers
207k views

How to test multiple variables against a value?

I'm trying to make a function that will compare multiple variables to an integer and output a string of three letters. I was wondering if there was a way to translate this into Python. So say: x = 0 ...

python | if-statement | comparison | match | boolean-logic

asked Feb 27 '13 at 12:26
user1877442
6,311 • 3 • 10 • 5

3095 votes
32 answers
1.6m views

Understanding slice notation

I need a good explanation (references are a plus) on Python's slice notation. To me, this notation needs a bit of picking up. It looks extremely powerful, but I haven't quite got my head around it....

python | list | slice | iterable

asked Feb 3 '09 at 22:31
Simon
62k • 24 • 80 • 116

533 votes
19 answers

Asking the user for input until they give a valid response

I am writing a program that accepts an input from the user. #note: Python 2.7 users should use `raw_input`, the equivalent of 3.X's `input` age = int(input("Please enter your age: ")) if age >= 18:...

python | validation | loops | python-3.x | user-input

community wiki
11 revs, 8 users 67%

Where to get help

CORE | Skills

- Read error messages, they are there to assist you
- Google is your friend
- Stackoverflow is your bible
  - Basically Yahoo answers/Quora for code
  - Most questions already exist
- Documentation
  - Inbuilt doc strings
  - Online manuals
  - Tutorials
  - Awesome lists on github

Inbuilt doc strings

CORE | Skills

```
In [1]: help(len)
Help on built-in function len in module builtins:

len(...)
    len(object) -> integer

    Return the number of items of a sequence or mapping.
```

```
In [2]: len?
Type:        builtin_function_or_method
String form: <built-in function len>
Namespace:   Python builtin
Docstring:
len(object) -> integer

Return the number of items of a sequence or mapping.
```

jupyter Python Playground (unsaved changes)

Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Code

```
In [1]: import tensorflow as tf

In [ ]: X = tf.placeholder()
```

```
Signature: tf.placeholder(dtype, shape=None, name=None)
Docstring:
Inserts a placeholder for a tensor that will be always fed.

**Important**: This tensor will produce an error if evaluated. Its value must
be fed using the `feed_dict` optional argument to `Session.run()`,
`Tensor.eval()`, or `Operation.run()`.

For example:

```python
```
```

Online documentation

CORE | Skills

https://docs.python.org/3/

Search

Python » English 3.8.1 Documentation »

Download

Download these documents

Docs by version

Python 3.9 (in development)
Python 3.8 (stable)
Python 3.7 (stable)
Python 3.6 (security-fixes)
Python 3.5 (security-fixes)
Python 2.7 (EOL)
All versions

Other resources

PEP Index
Beginner's Guide
Book List
Audio/Visual Talks
Python Developer's Guide

Python 3.8.1 documentation

Welcome! This is the documentation for Python 3.8.1.

Parts of the documentation:

What's new in Python 3.8?
or all "What's new" documents since 2.0

Tutorial
start here

Library Reference
keep this under your pillow

Language Reference
describes syntax and language elements

Python Setup and Usage
how to use Python on different platforms

Python HOWTOs
in-depth documents on specific topics

Installing Python Modules
installing from the Python Package Index & other sources

Distributing Python Modules
publishing modules for installation by others

Extending and Embedding
tutorial for C/C++ programmers

Python/C API
reference for C/C++ programmers

FAQs
frequently asked questions (with answers!)

Indices and tables:

Global Module Index
quick access to all modules

General Index

Search page
search this documentation

Github: Awesome lists

CORE | Skills

Curated list of Python resources for data science.

awesome | awesome-list | data-science | datascience | python | deep-learning | data-analysis | data-visualization | data-mining | machine-learning | artificial-intelligence | deeplearning | statistics | bayes

325 commits | 1 branch | 0 packages | 0 releases | 4 contributors | View license

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

r0f1 Update README.md — Latest commit 12d5588 2 days ago

CONTRIBUTING.md	Update CONTRIBUTING.md	12 months ago
INTERESTING.md	Update INTERESTING.md	11 months ago
LICENSE	License	11 months ago
README.md	Update README.md	2 days ago

README.md

Awesome Data Science with Python

> A curated list of awesome resources for practicing data science using Python, including not only libraries, but also links to tutorials, code snippets, blog posts and talks.

Core

pandas - Data structures built on top of numpy.
scikit-learn - Core ML library.
matplotlib - Plotting library.

Where to get help

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- Read error messages, they are there to assist you
- Google is your friend
- Stackoverflow is your bible
  - Basically Yahoo answers/Quora for code
  - Most questions already exist
- Documentation
  - Inbuilt doc strings
  - Online manuals
  - Tutorials
  - Awesome lists on github
- Join or start a code review group
  - Meetup
  - Hacky hour

meetup hacky hour

CORE | Skills

Hacky Hour UWA

@HackyHourUWA

for all your code and data questions

PERTH MACHINE LEARNING GROUP

Perth Django and Python Developers

Western Australian R Group

R Ladies

pyladies PERTH

Thank you.

Questions?

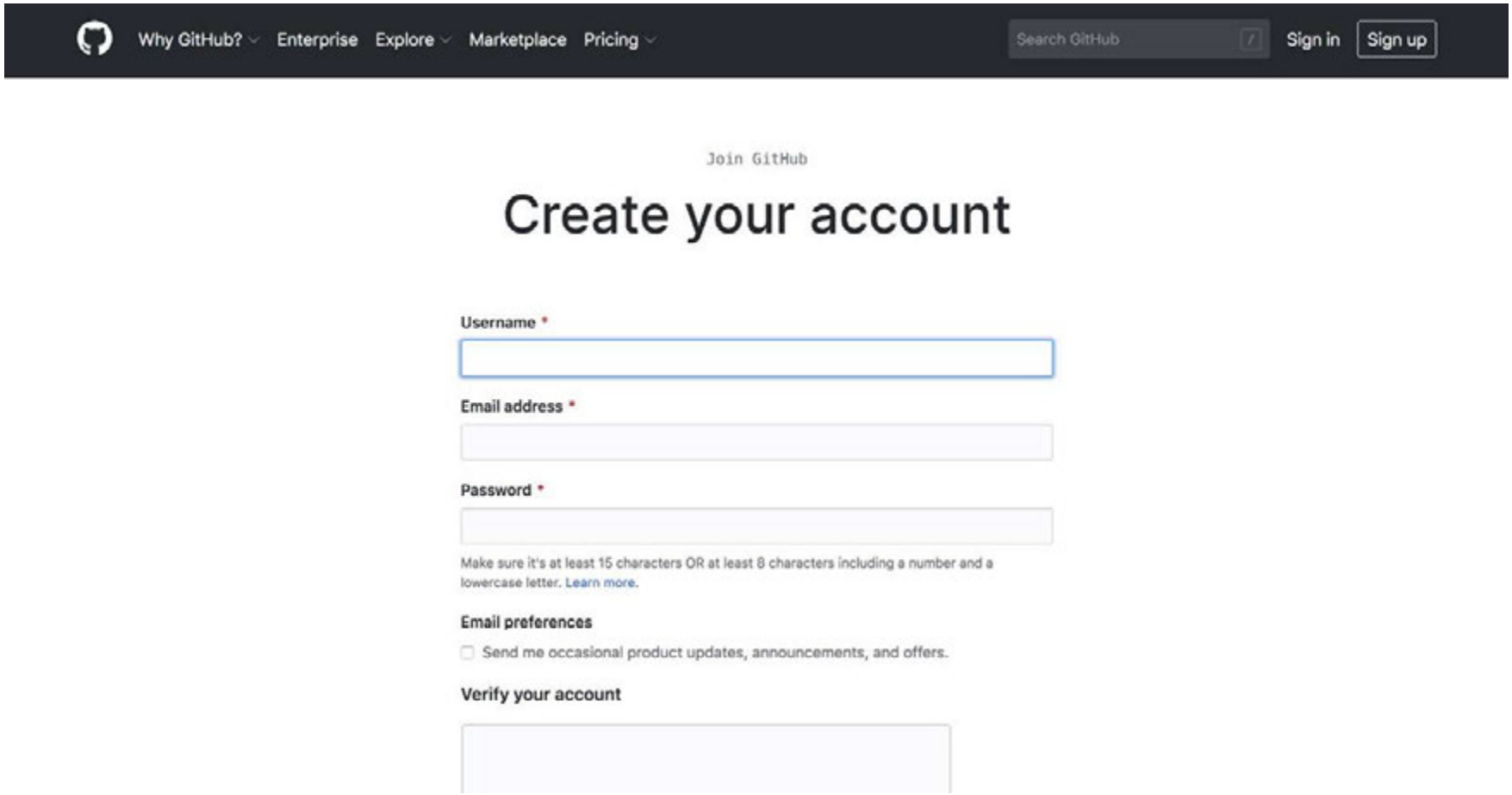
Additional git/github

What if you need to **collaborate**?

Create a Github account

CORE | Skills

- Go to: https://github.com/ and click ‘Sign up’



Create a Github repo

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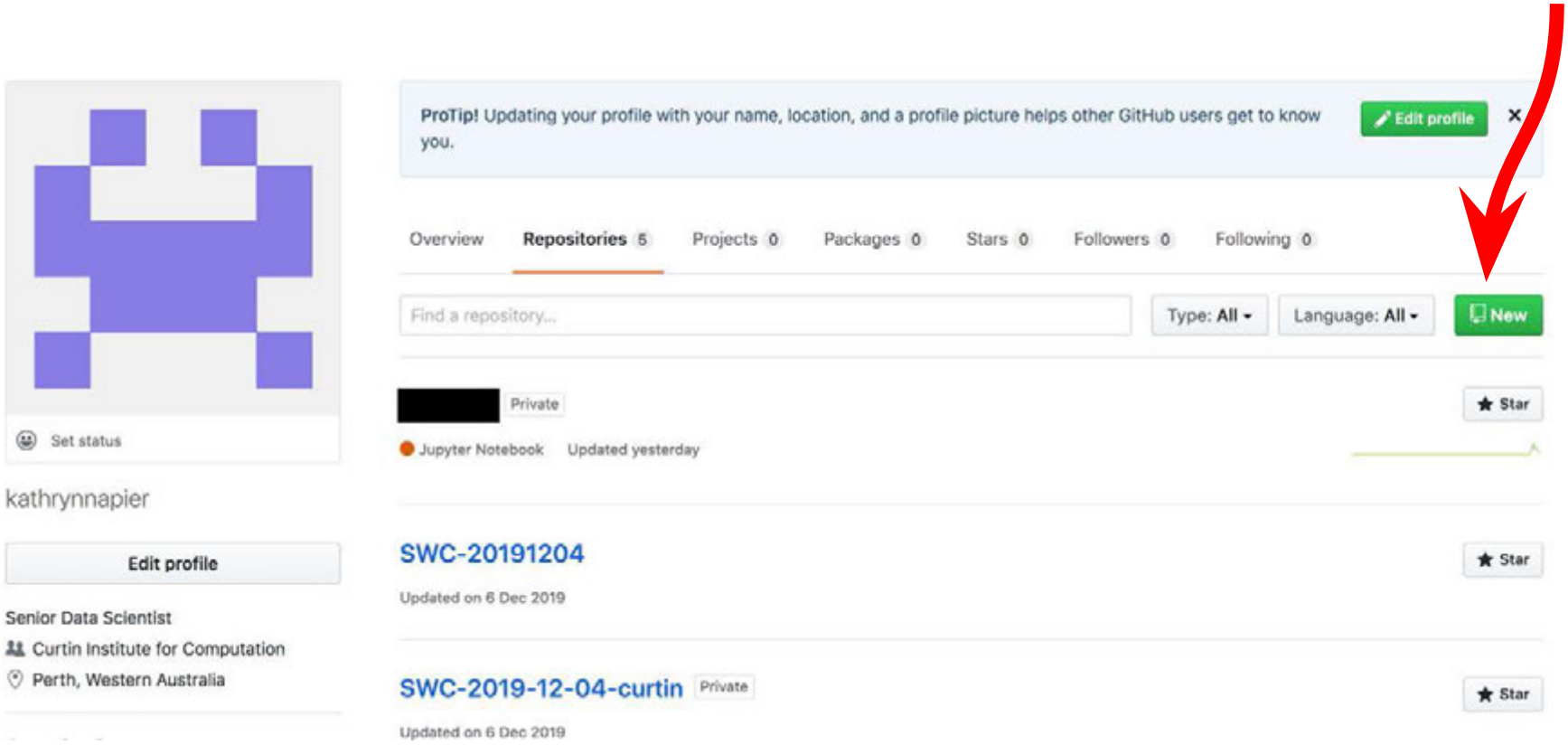
- **Click on 'New' to create a new github repository**



Create a Github repo

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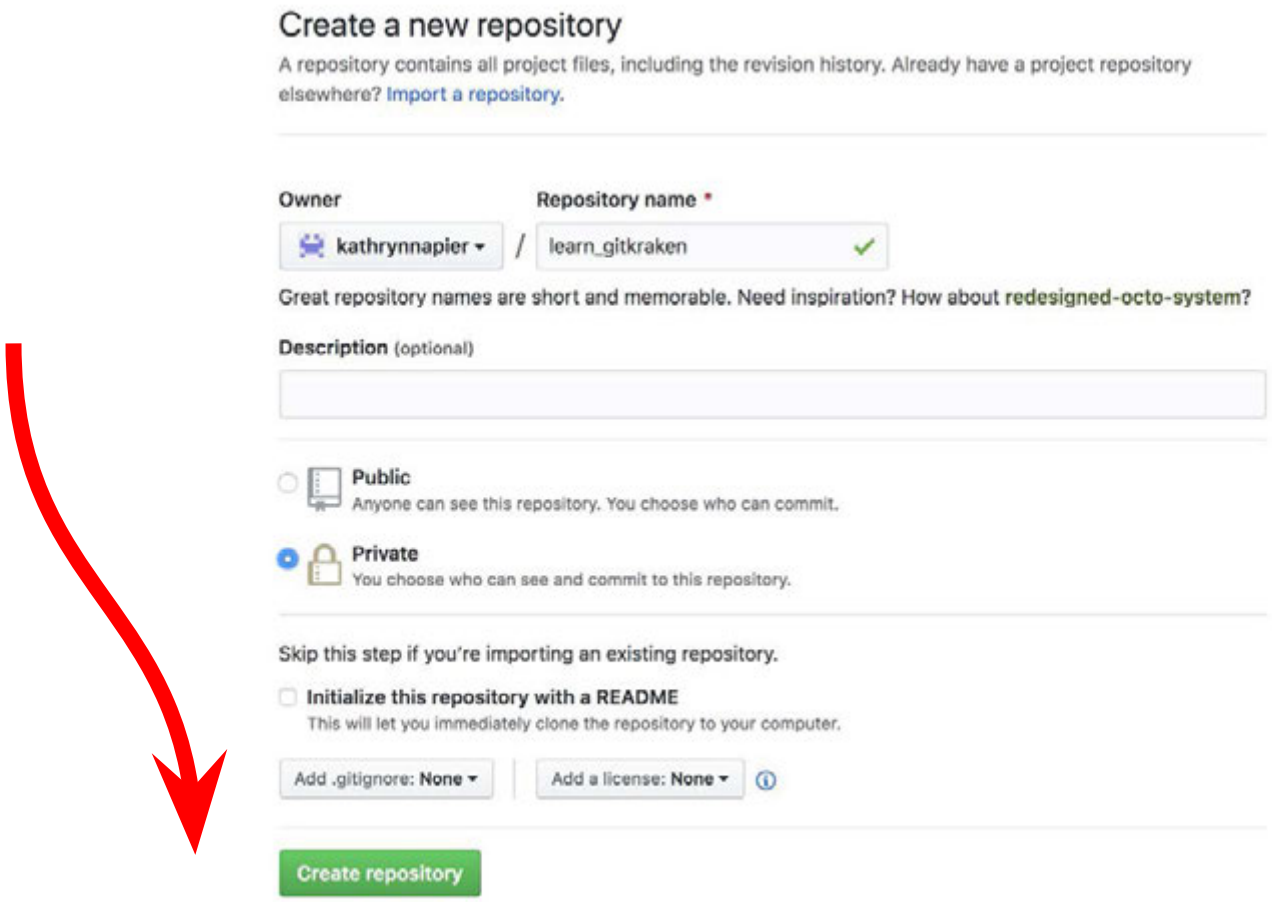
- **Name the repository, set to private, DO NOT initialise with a README. Click 'Create repository'**



Create a Github repo

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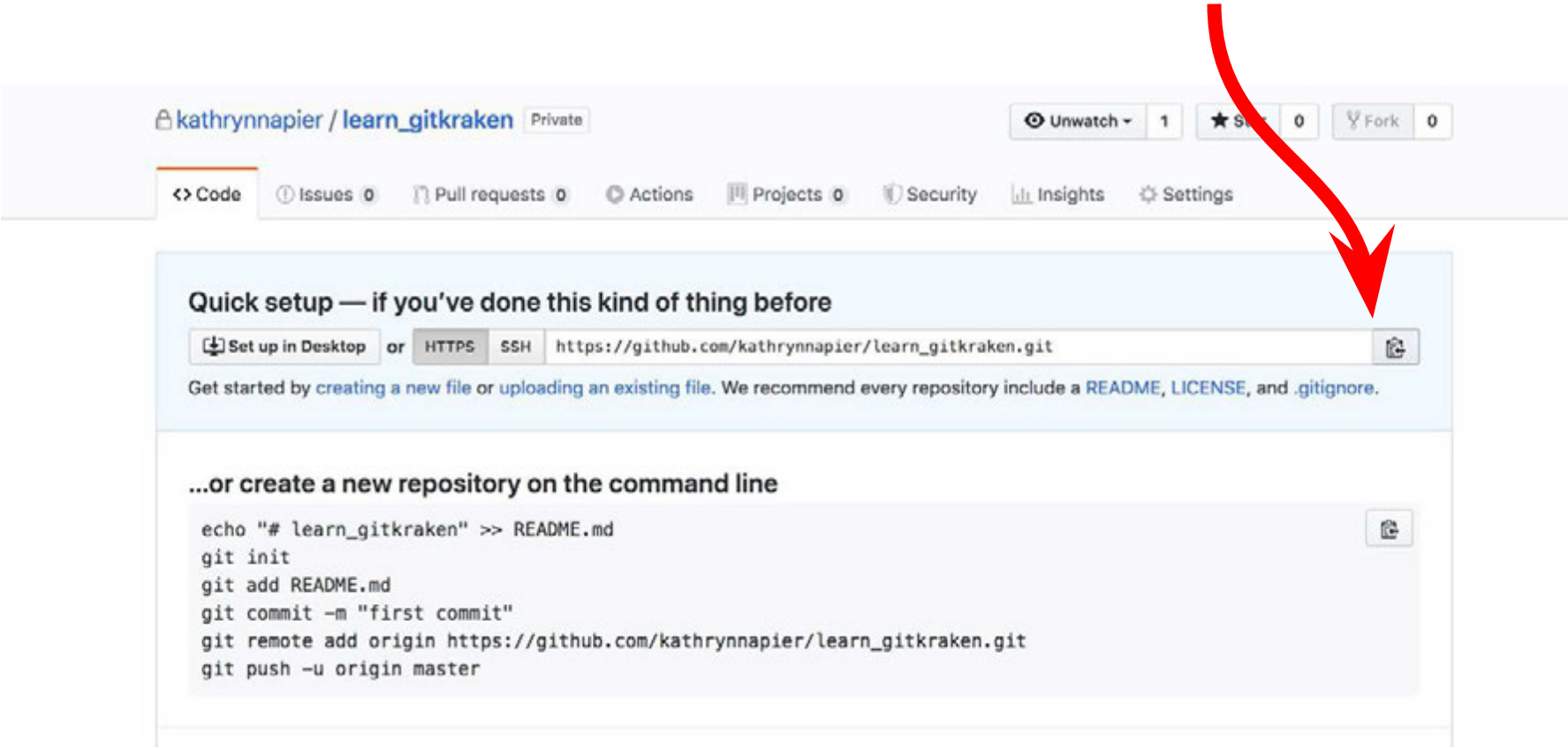
- **Copy the HTTPS link**



Sign into GitKraken with Github

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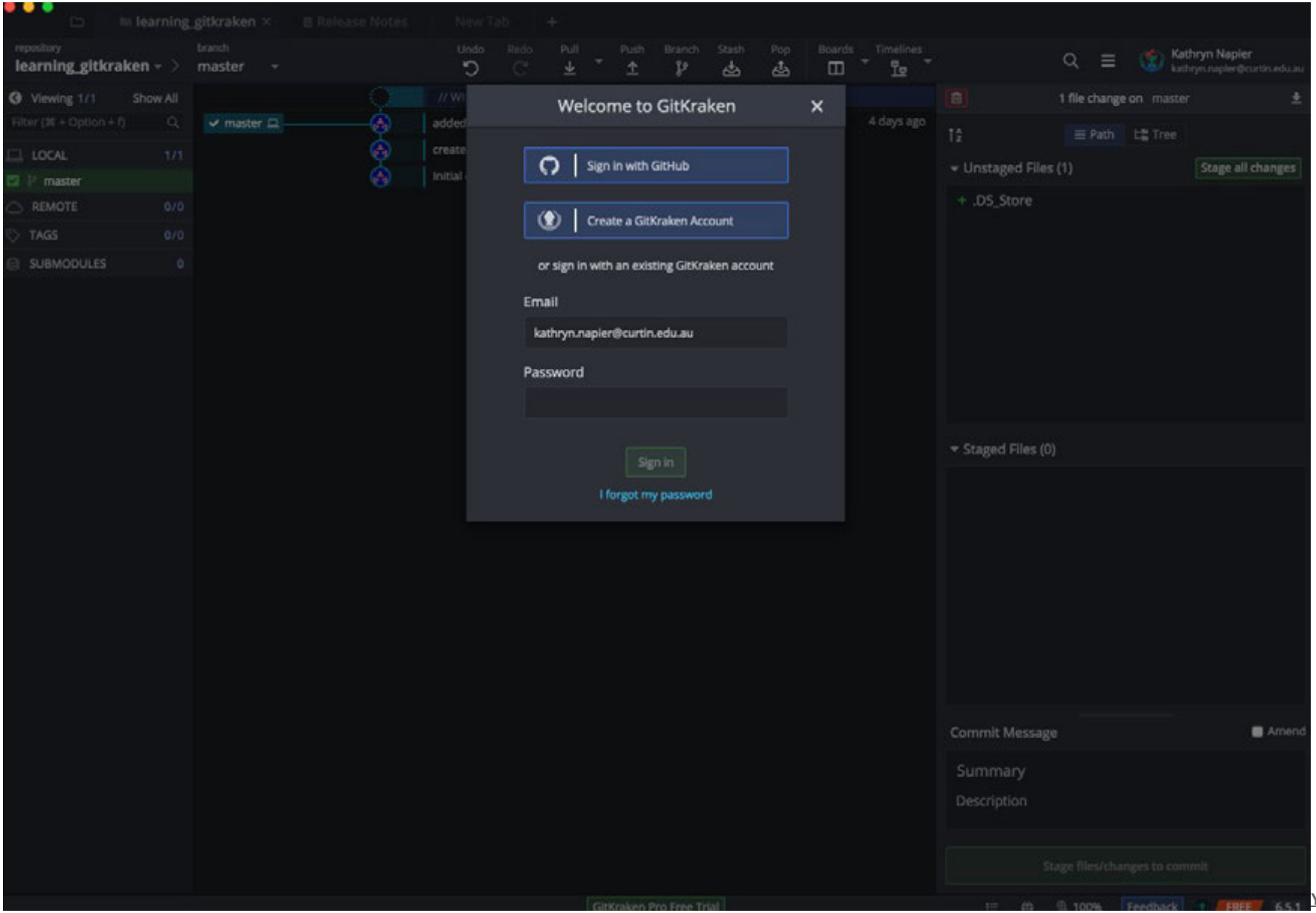

Link your local and remote

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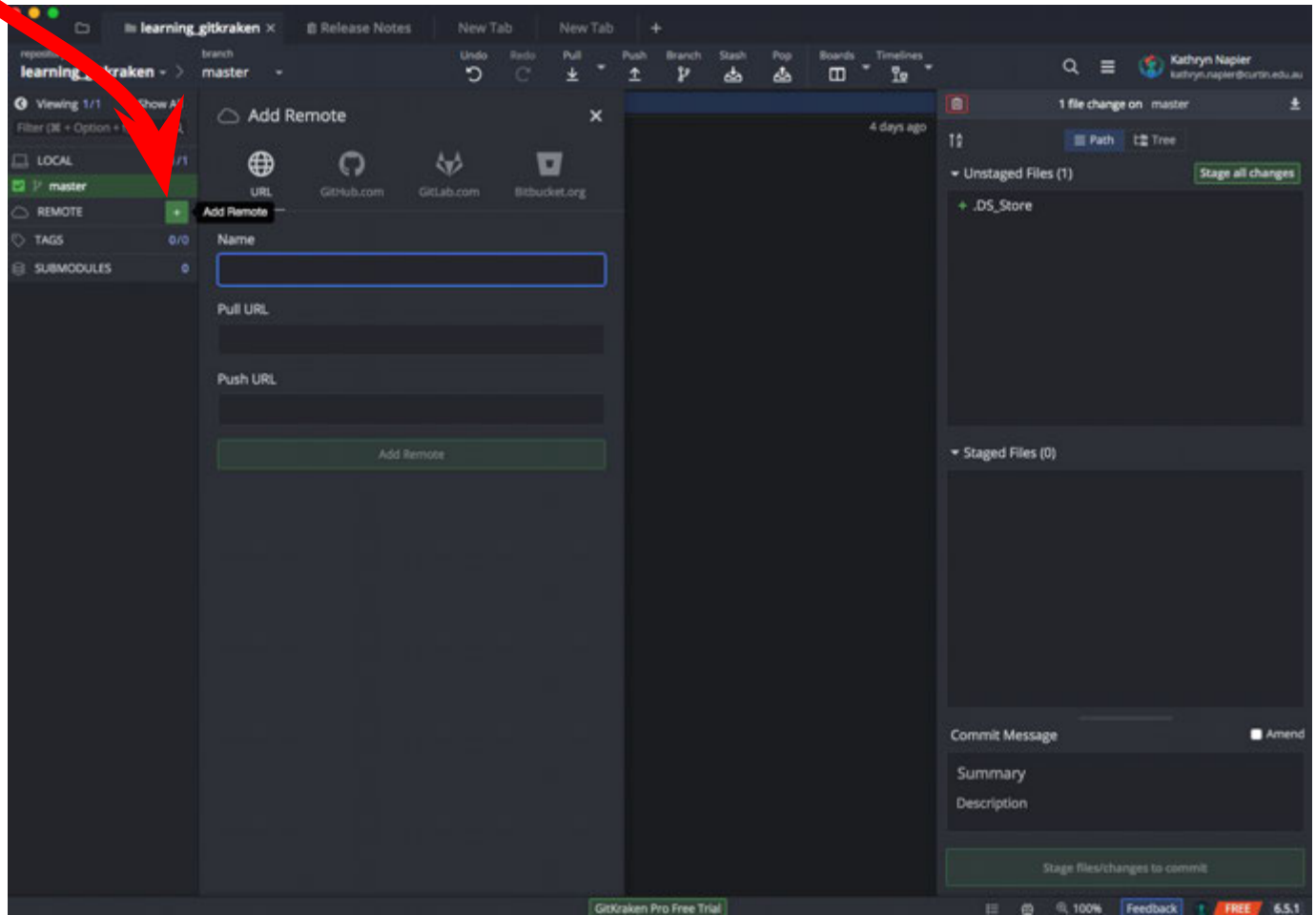
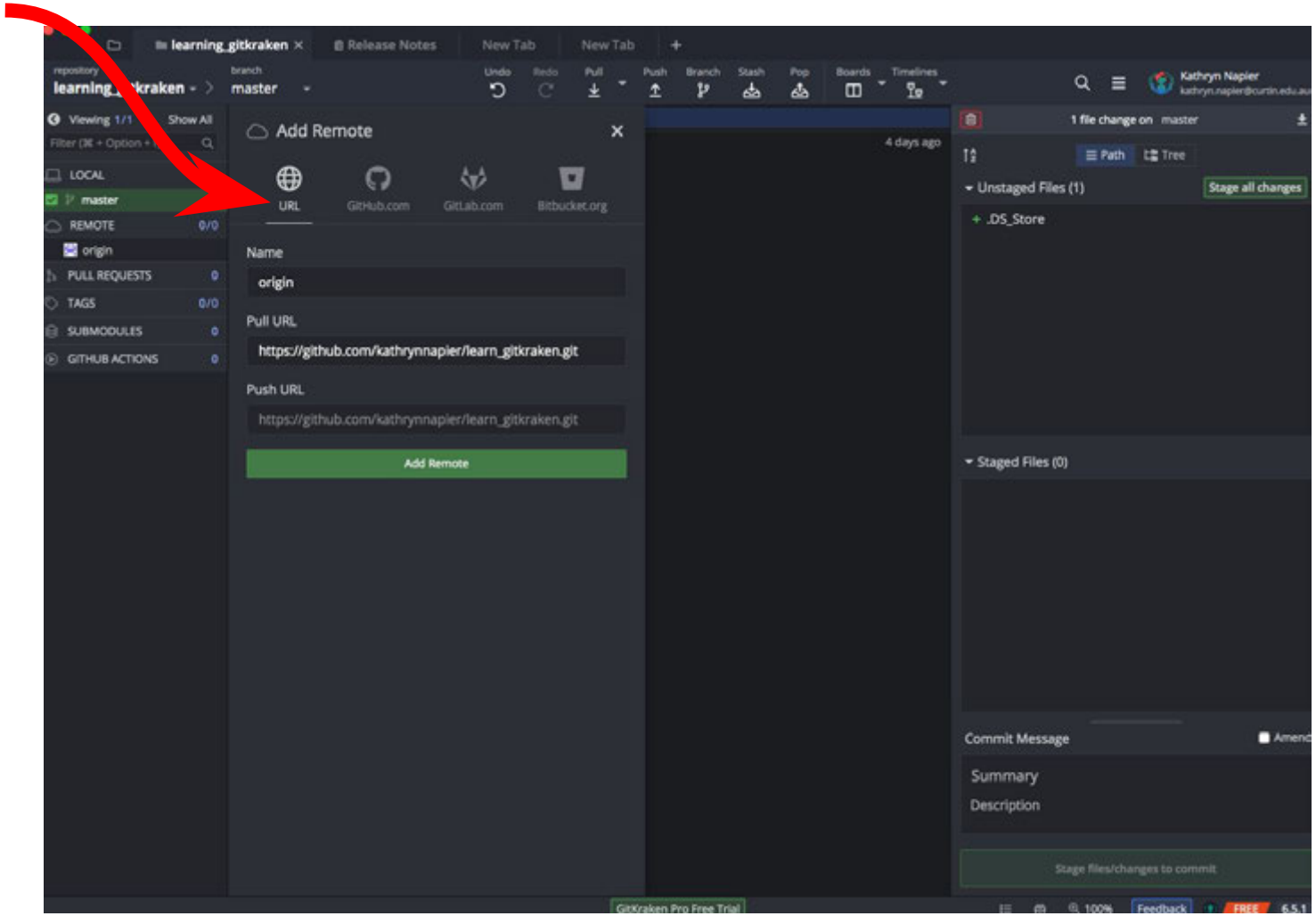
- **Click the '+' that appears when you hover on 'REMOTE' on the left hand side**



Link your local and remote

CORE | Skills

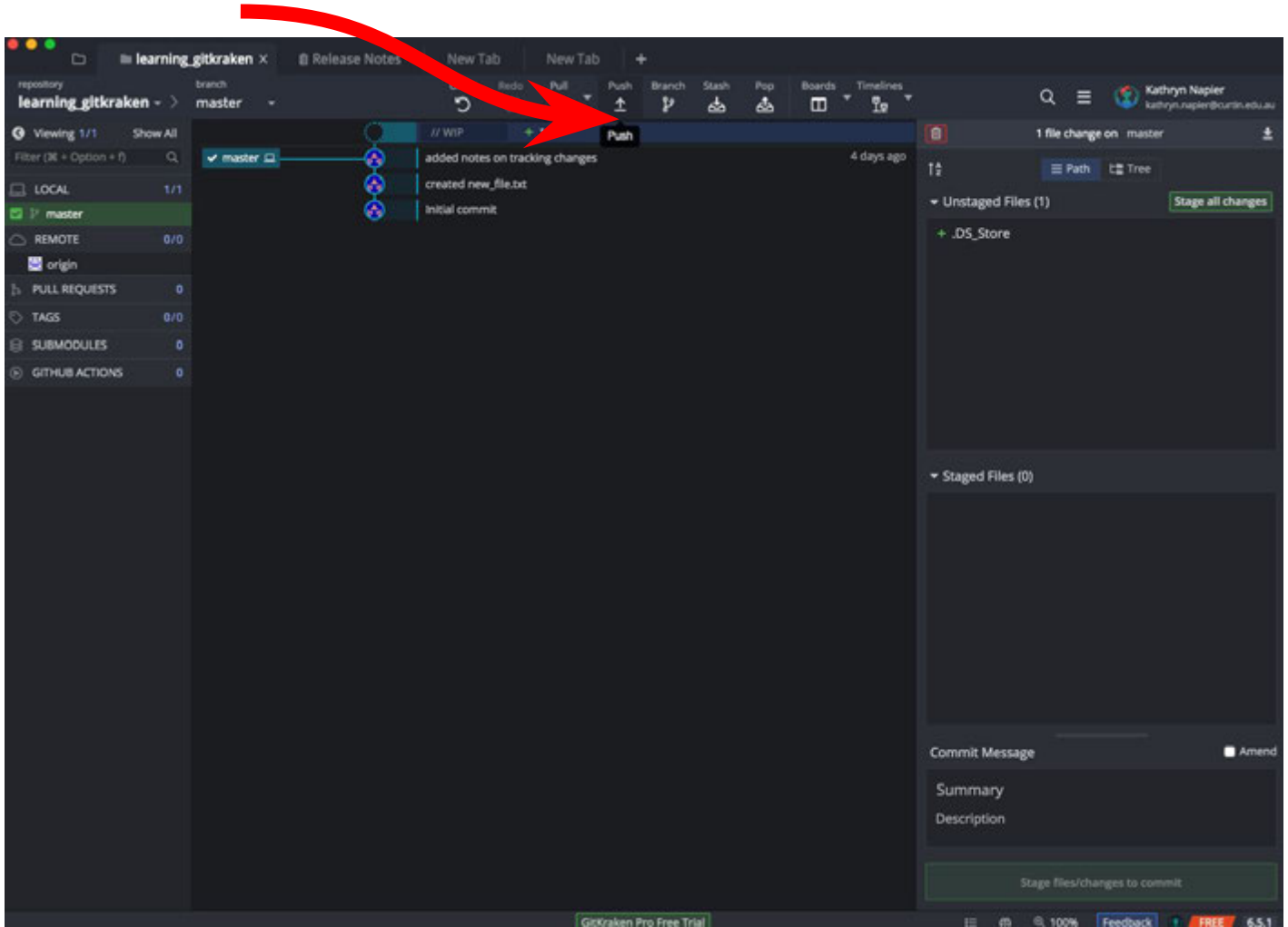
- **Click ‘URL’, set the name to ‘origin’, and copy the Github url into pull and push URL, then ‘Add Remote’**



Push to Github

CORE | Skills

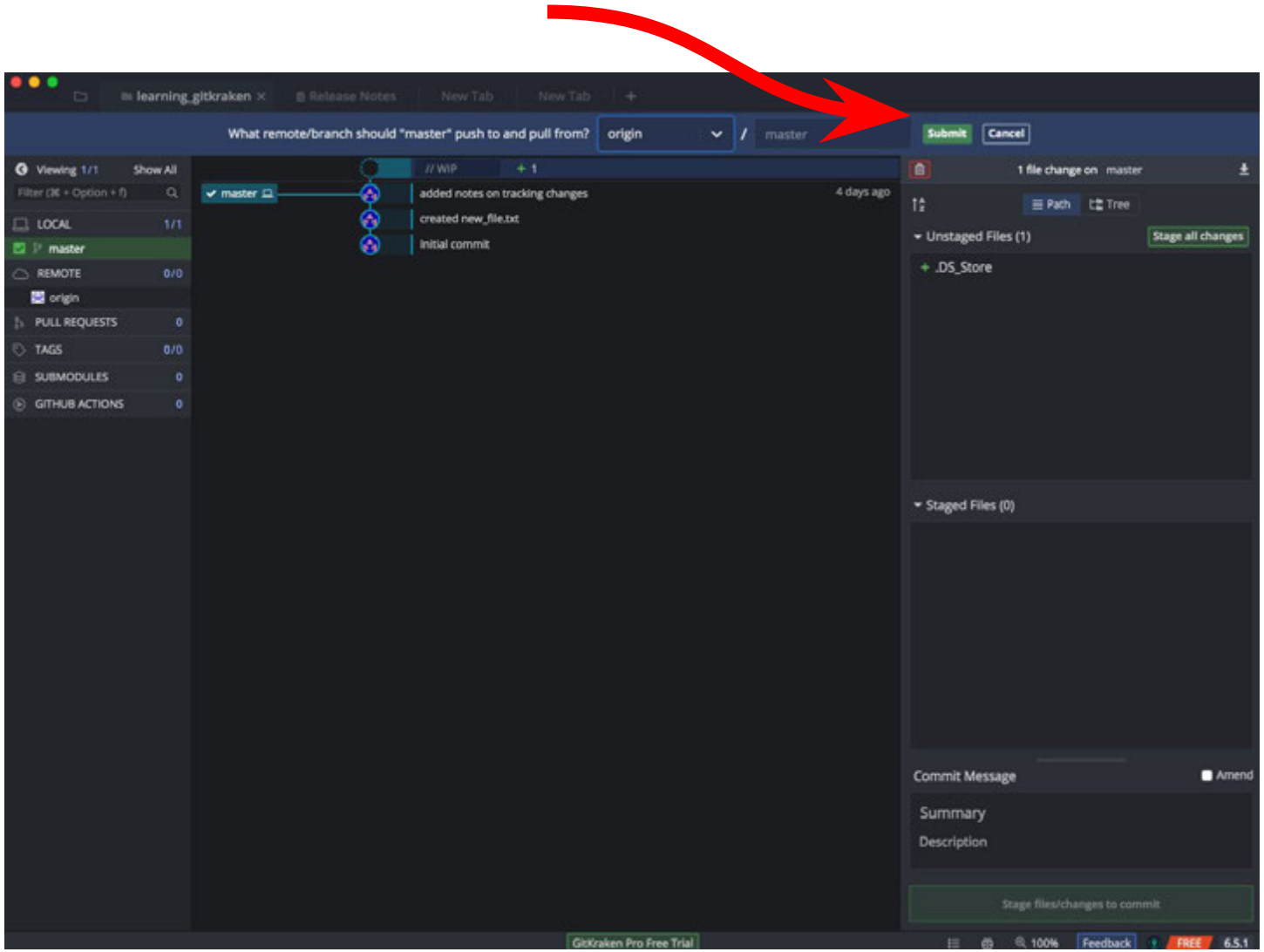
- **Click ‘Push’**



Push to Github

CORE | Skills

- **Click ‘Submit’**



Push to Github

CORE | Skills

- **You can now see your files on the remote repository!**