Lecture 4: Processing Linguistic Data

LING 1340/2340: Data Science for Linguists

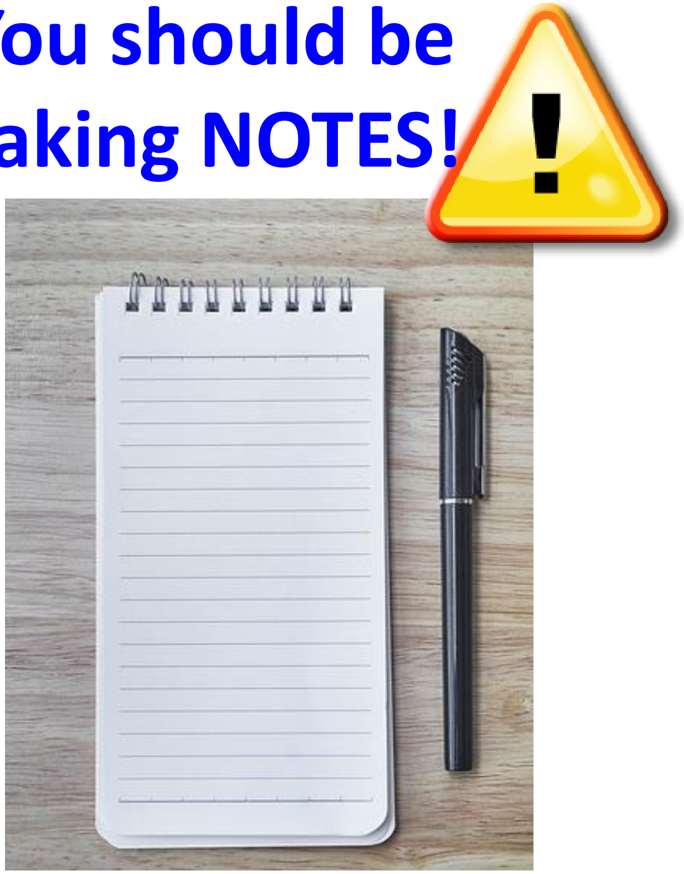
Na-Rae Han

Objectives

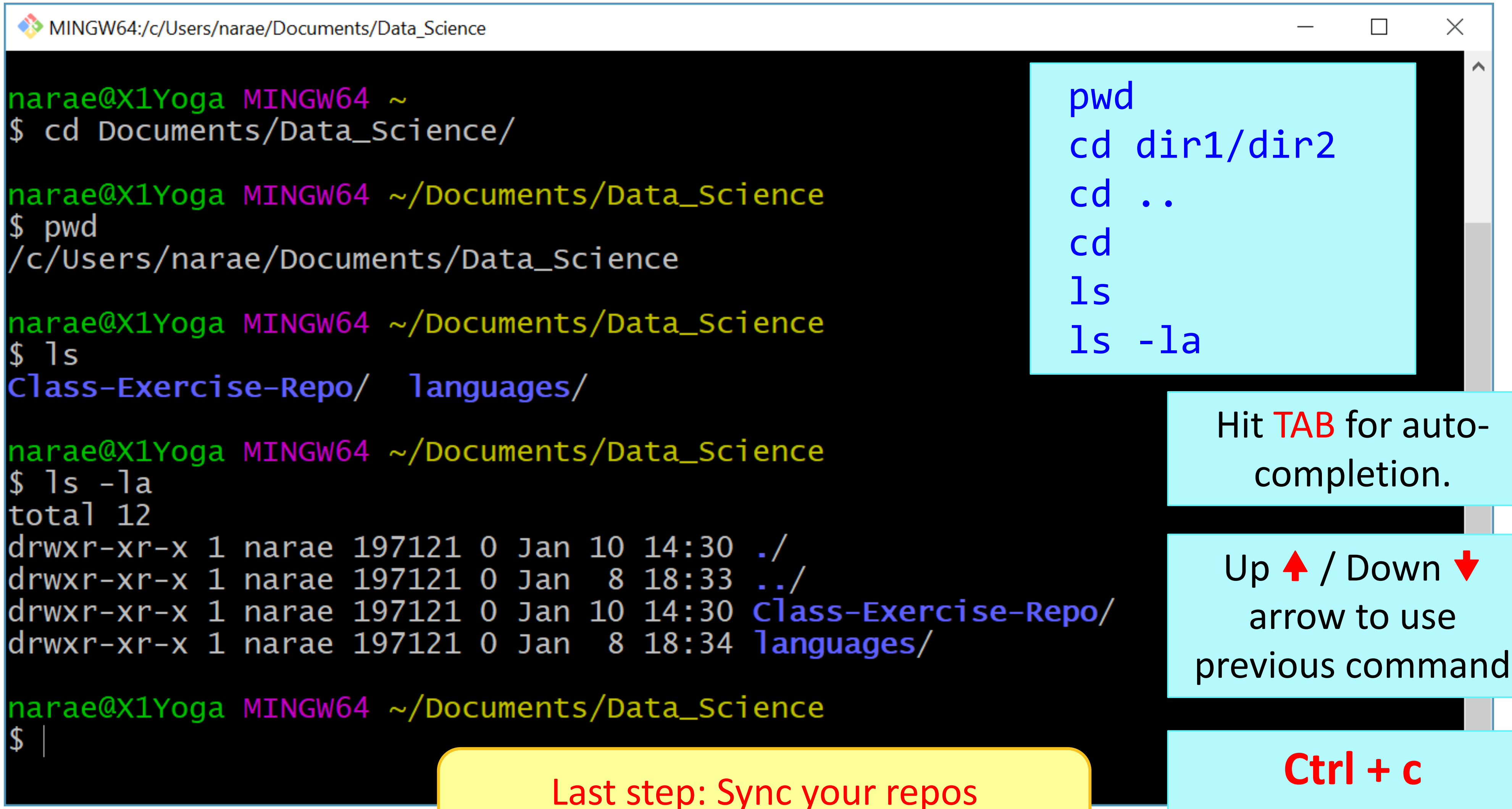
- Homework 1: What linguistic datasets did you all process?

- Tools:
  - Git and GitHub
  - Jupyter Notebook
  - Using DataCamp tutorials

You should be taking NOTES!



First thing to do every class



MINGW64:/c/Users/narae/Documents/Data_Science

```
narae@X1Yoga MINGW64 ~
$ cd Documents/Data_Science/

narae@X1Yoga MINGW64 ~/Documents/Data_Science
$ pwd
/c/Users/narae/Documents/Data_Science

narae@X1Yoga MINGW64 ~/Documents/Data_Science
$ ls
Class-Exercise-Repo/  languages/

narae@X1Yoga MINGW64 ~/Documents/Data_Science
$ ls -la
total 12
drwxr-xr-x 1 narae 197121 0 Jan 10 14:30 ./
drwxr-xr-x 1 narae 197121 0 Jan  8 18:33 ../
drwxr-xr-x 1 narae 197121 0 Jan 10 14:30 Class-Exercise-Repo/
drwxr-xr-x 1 narae 197121 0 Jan  8 18:34 languages/

narae@X1Yoga MINGW64 ~/Documents/Data_Science
$ 
```

```
pwd
cd dir1/dir2
cd ..
cd
ls
ls -la
```

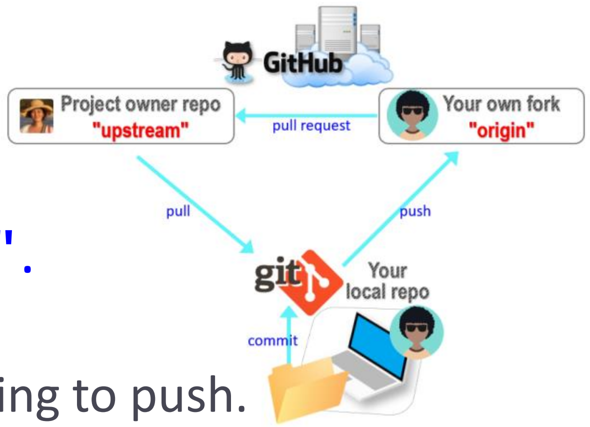
Hit TAB for auto-completion.

Up ↑ / Down ↓ arrow to use previous command

Ctrl + c to cancel

Last step: Sync your repos (**Class-Exercise-Repo** especially)

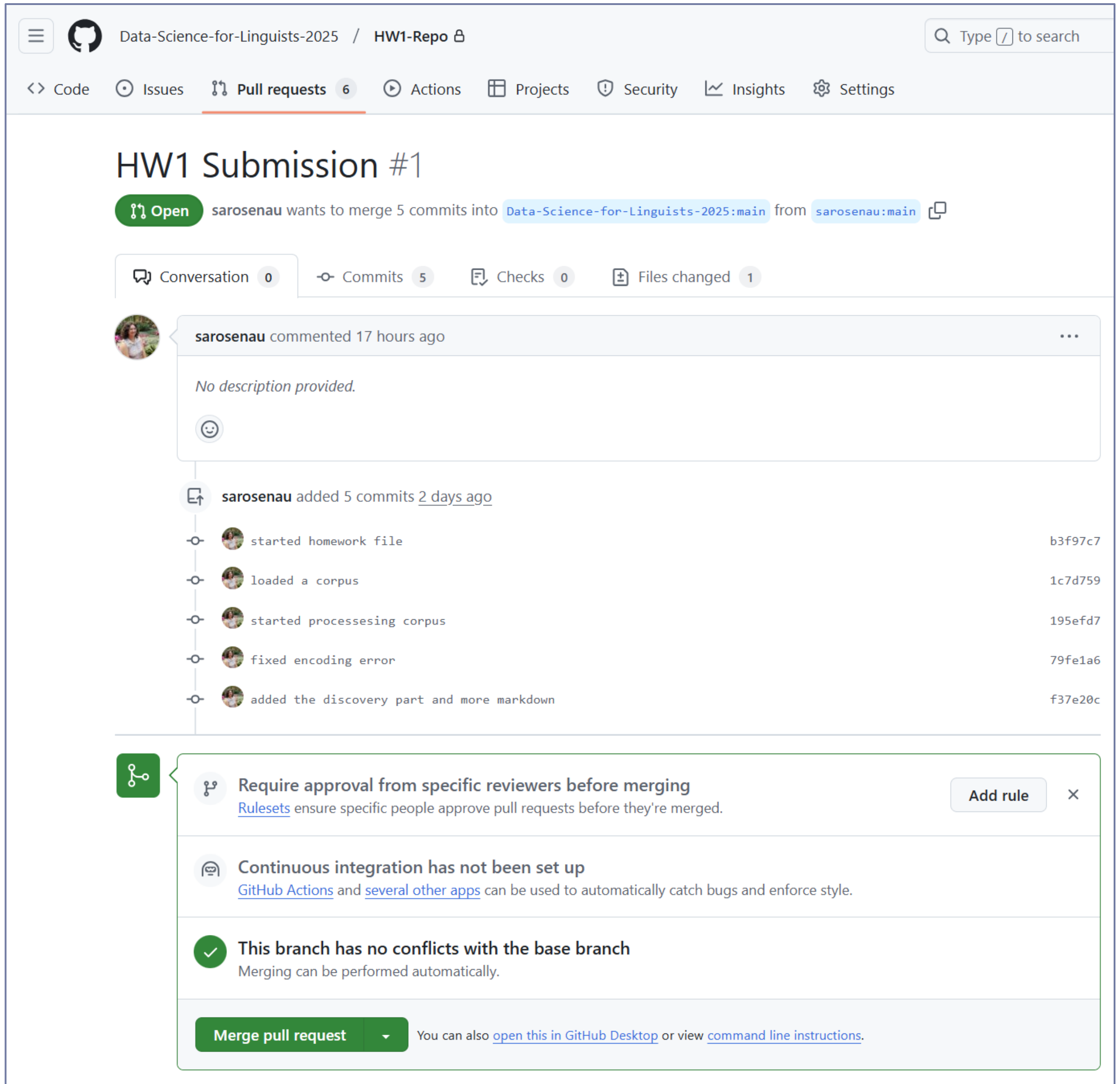
Your workflow



1. **Housekeeping**: Check YOUR WORK via "`git status`".
   - Your local repo is clean: no unsaved/uncommitted work.
   - Your GIHUB fork already has your latest commit: there's nothing to push.
2. **Housekeeping**: Bring in updates from OTHERS.
   - On your **GitHub fork**, check what updates have accumulated in the upstream repo.
   - Through "Sync fork → Compare", make sure those updates don't have conflicts with your fork. Don't press that green "Update Branch" button!
   - Back on **command line**, pull from upstream. Now your local repo is synced with the original repo.
   - Finally, sync your GitHub fork by pushing. The universe is in order now!
3. Work on your homework, to-do, etc.
   - *Now* start your homework. Make some commits along the way.
   - Push to your GitHub fork for one last time.
   - Submission time: Create a **pull request**. Make sure your pull request doesn't have conflicts.

HW1: processing pull request, merging

- With everyone working on their own files/folders, merging is conflict-free:



Data-Science-for-Linguists-2025 / HW1-Repo

HW1 Submission #1

Open sarosenau wants to merge 5 commits into `Data-Science-for-Linguists-2025:main` from `sarosenau:main`

sarosenau commented 17 hours ago

No description provided.

sarosenau added 5 commits 2 days ago

```
started homework file                         b3f97c7
loaded a corpus                               1c7d759
started processesing corpus                   195efd7
fixed encoding error                          79fe1a6
added the discovery part and more markdown    f37e20c
```

Require approval from specific reviewers before merging
Rulesets ensure specific people approve pull requests before they're merged.

Continuous integration has not been set up
GitHub Actions and several other apps can be used to automatically catch bugs and enforce style.

This branch has no conflicts with the base branch
Merging can be performed automatically.

You can also open this in GitHub Desktop or view command line instructions.

HW1: sync your HW1-Repo

1. Configure "upstream" remote:

```
git remote add upstream https://github.com/Data-Science-for-Linguists-2025/HW1-Repo.git
```

2. Check your GitHub fork, make sure there are no conflicts with upstream

3. Pull from upstream:

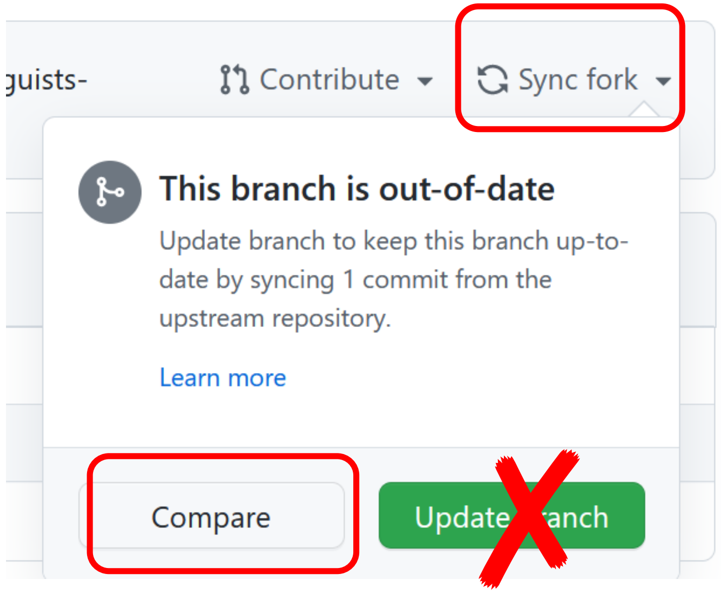
```
git pull upstream main
```

4. Push to your GitHub fork:

```
git push
```

Everyone's repos are synced.

Now, everyone has everyone's homework submission.


This branch is out-of-date

Update branch to keep this branch up-to-date by syncing 1 commit from the upstream repository.

HW1: Review

- What did you all work on?
- What lessons did you learn?
- You wish list: what new skills would you like to learn?
- What is the `.gitignore` file?
- Why did we exclude data files from Git?
- What is up with that "your_file_here.txt" blank file? What is `git rm`?
- Jupyter Notebook: do you like it?

Term Project overview

- Go over the term project guidelines:
  - https://naraehan.github.io/Data-Science-for-Linguists-2025/project

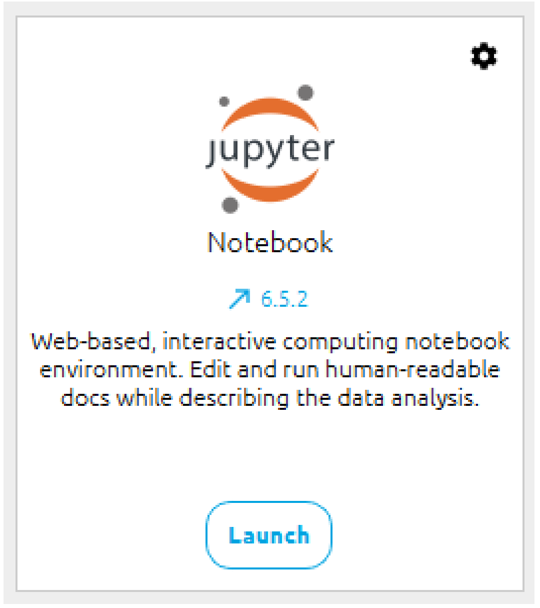
- Also talk about what makes a good/successful project, ways to come up with project ideas

Jupyter Notebook

- Allows you to create and share documents that contain live code cells, output, equations, visualizations and explanatory text.
- Learn how to use it. Your Python code should be in the Jupyter Notebook format:
  - xxxx.ipynb
- You can launch it from the command line.
  - Move into the desired directory, and then execute

    ```
    jupyter notebook &
    ```

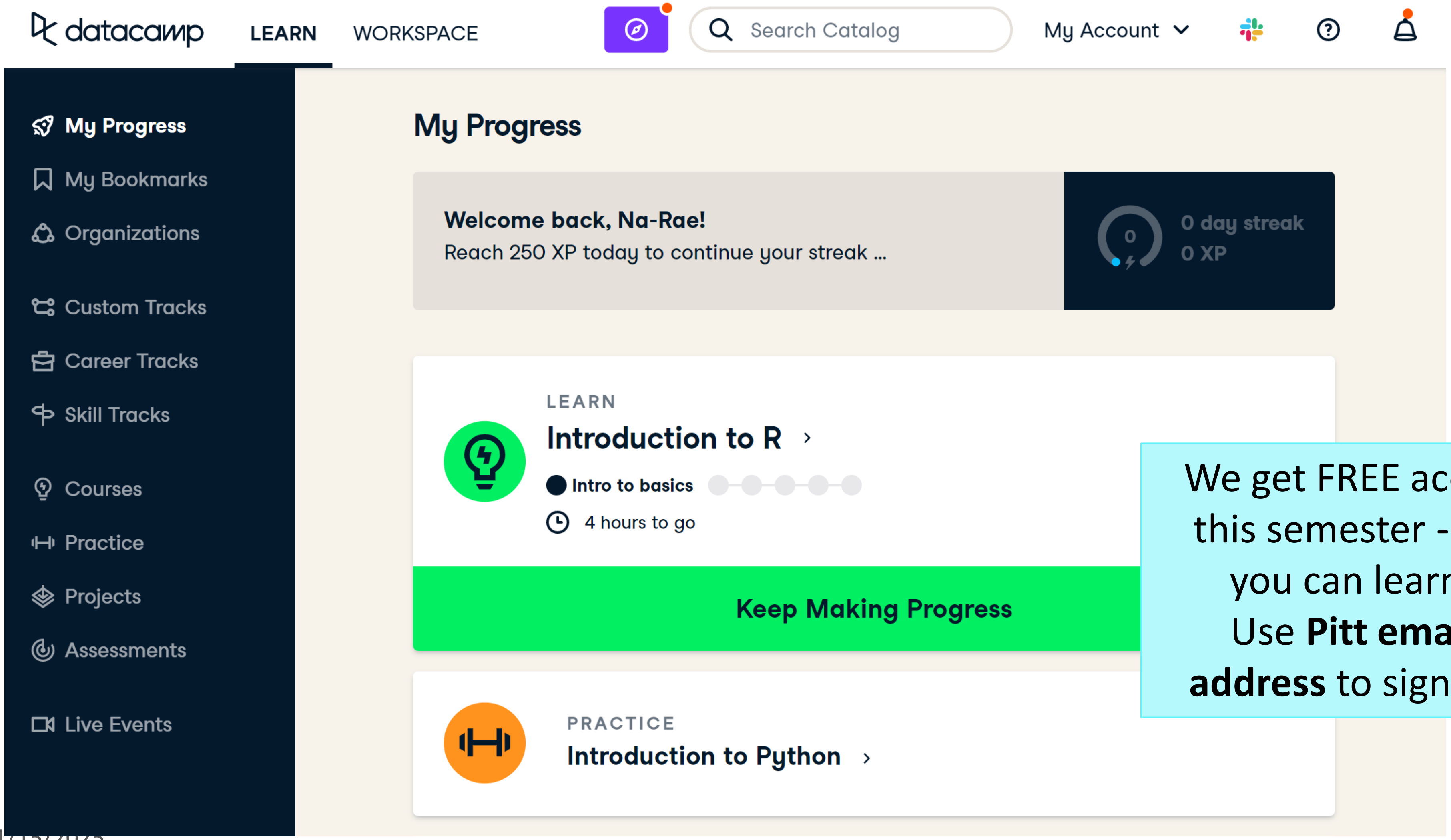
    ←'&' is not necessary, but it lets you keep using the terminal
  - If it doesn't work, then edit your system's path variable or just use a shortcut provided by your OS.



Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.

Course Group on DataCamp

- Video-based, interactive tutorials



My Progress

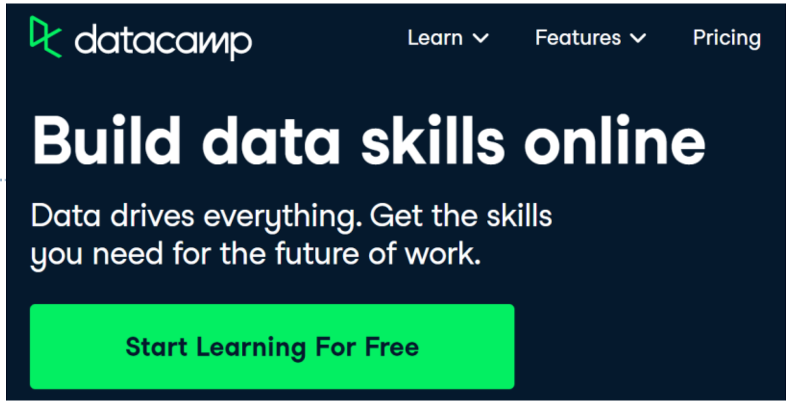
Welcome back, Na-Rae!
Reach 250 XP today to continue your streak ...

LEARN
Introduction to R ›
Intro to basics
4 hours to go

PRACTICE
Introduction to Python ›

We get FREE access this semester -- all you can learn! Use **Pitt email address** to sign up.

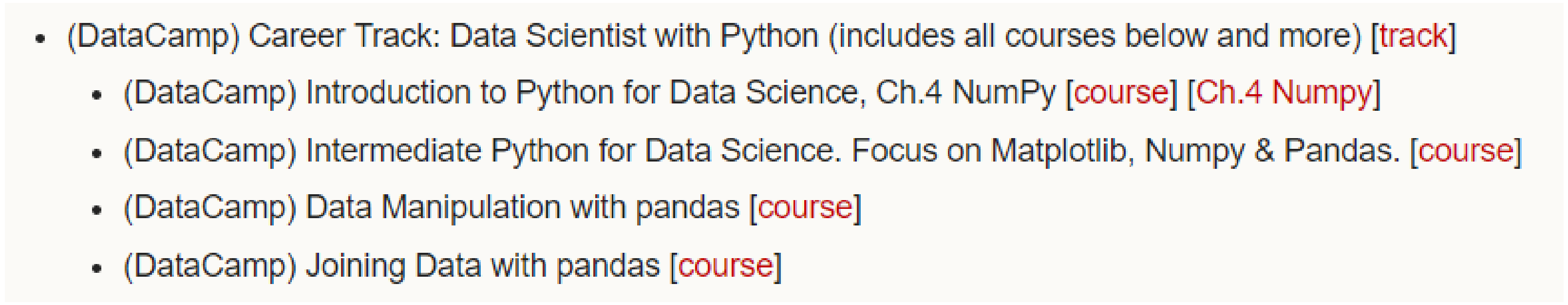
How to use DataCamp



Build data skills online

Data drives everything. Get the skills you need for the future of work.

- Topics for the next couple of weeks:
  - numpy library
  - pandas library
  - visualization libraries such as `matplotlib`
- Which video tutorials? Find them on our Resources page:

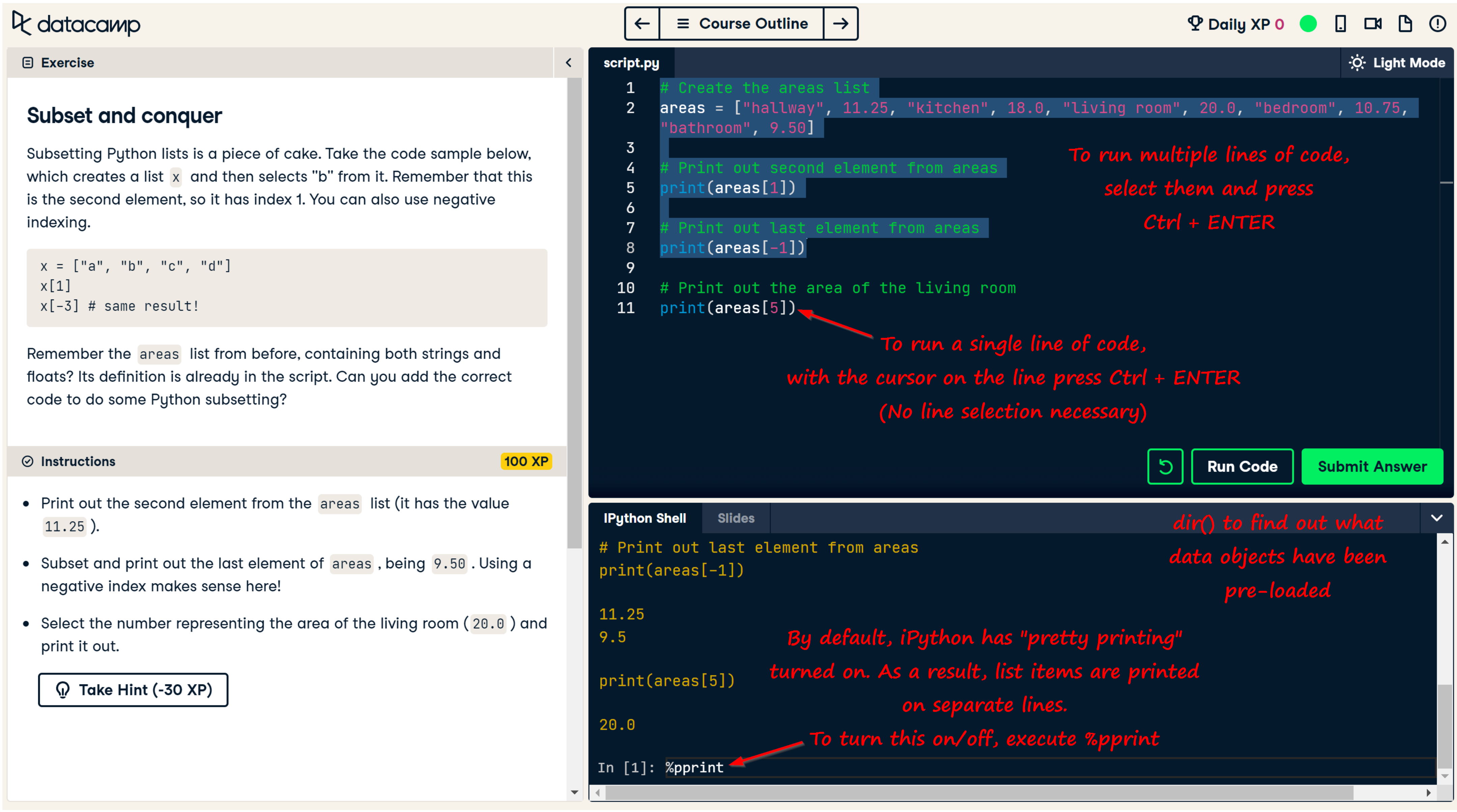


- (DataCamp) Career Track: Data Scientist with Python (includes all courses below and more) [track]
  - (DataCamp) Introduction to Python for Data Science, Ch.4 NumPy [course] [Ch.4 Numpy]
  - (DataCamp) Intermediate Python for Data Science. Focus on Matplotlib, Numpy & Pandas. [course]
  - (DataCamp) Data Manipulation with pandas [course]
  - (DataCamp) Joining Data with pandas [course]

- Great learning resource, but **not mandatory**. They *complement* the textbook nicely.
- Online exercise interface needs some getting used to.

  → next slide

https://campus.datacamp.com/courses/intro-to-python-for-data-science/chapter-2-python-lists?ex=7



Subset and conquer

Subsetting Python lists is a piece of cake. Take the code sample below, which creates a list `x` and then selects "b" from it. Remember that this is the second element, so it has index 1. You can also use negative indexing.

```
x = ["a", "b", "c", "d"]
x[1]
x[-3] # same result!
```

Remember the `areas` list from before, containing both strings and floats? Its definition is already in the script. Can you add the correct code to do some Python subsetting?

- Print out the second element from the `areas` list (it has the value `11.25`).
- Subset and print out the last element of `areas`, being `9.50`. Using a negative index makes sense here!
- Select the number representing the area of the living room (`20.0`) and print it out.

```
# Create the areas list
areas = ["hallway", 11.25, "kitchen", 18.0, "living room", 20.0, "bedroom", 10.75,
"bathroom", 9.50]

# Print out second element from areas
print(areas[1])

# Print out last element from areas
print(areas[-1])

# Print out the area of the living room
print(areas[5])
```

To run multiple lines of code, select them and press Ctrl + ENTER

To run a single line of code, with the cursor on the line press Ctrl + ENTER (No line selection necessary)

```
# Print out last element from areas
print(areas[-1])

11.25
9.5

print(areas[5])

20.0

In [1]: %pprint
```

dir() to find out what data objects have been pre-loaded

By default, iPython has "pretty printing" turned on. As a result, list items are printed on separate lines.

To turn this on/off, execute %pprint

Wrapping up

- To-do #3 out
  - Study numpy.
  - No need to be super thorough on numpy, since it's a springboard to pandas.
- HW #1 extension: due Fri
  - Feel free to work further on your HW #1 and resubmit (="pull request").
- Office hours (this week)
  - Riley: Wed 2-4, Thu 12:30-3
  - Na-Rae: Thu 10:30-noon
- Linguistics Dept Colloquium this Friday (1/17) @3pm, 208 CL
  - By David R. Mortensen: https://www.cs.cmu.edu/~dmortens/