NEUR 265

January 23rd, 2023

What is this class?

- Introduction to Neural Data Analysis

- Neural = Brain stuff!
- Data = Brain attributes

- This is an introduction to programming course – with some statistics sprinkled in

My background

- Undergraduate Psychology major – no coding experience (used SPSS or EXCEL)
- Graduate student – started to learn MATLAB (self-taught)
- Post-doc – mostly MATLAB, started to learn R
- Assistant Prof. – MATLAB, R, starting to learn Python

Questions

- What is your coding background?
- How confident are you in your coding ability?
- Why are you taking this course?
- What do you hope to gain from this course?

Syllabus

- By the end of the course, you will be able to:
  - **Understand** your data
  - **Organize** your data
  - **Construct a plan** for analyzing your data
  - **Write** relatively clean and efficient code in python
  - **Visualize** your data

What is this course *not*

- This course is not a math course

  What does math have to do with coding?

- This course is not a theoretical neuroscience course

  We'll build simple predictive models, but nothing too crazy

  See point one above

Assessments

Mondays: Lecture, maybe some coding

Wednesdays: In-class coding assignments (technical challenge)

Due on Wednesdays by midnight (see Course Schedule and Assessment Plan): At-home coding homework (signature bake)

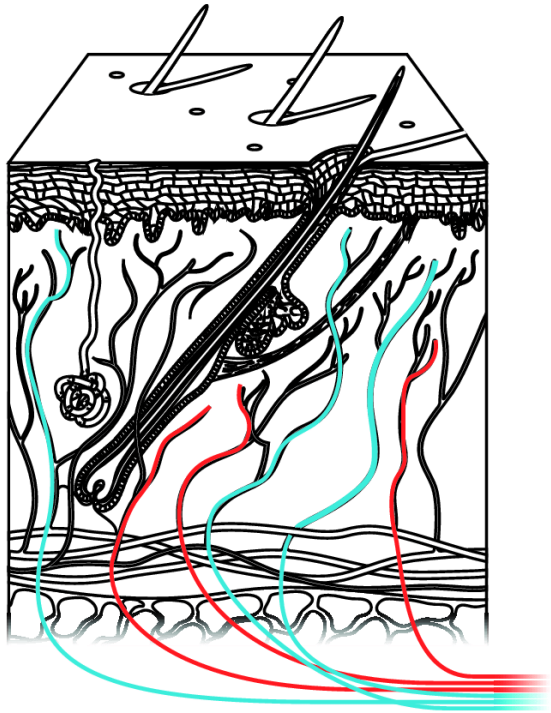
End of semester: Final project (showstopper poster presentation)

Two short essays – one due this Friday, and one due in the middle of the semester

Syllabus Questions?

What is a measurement?

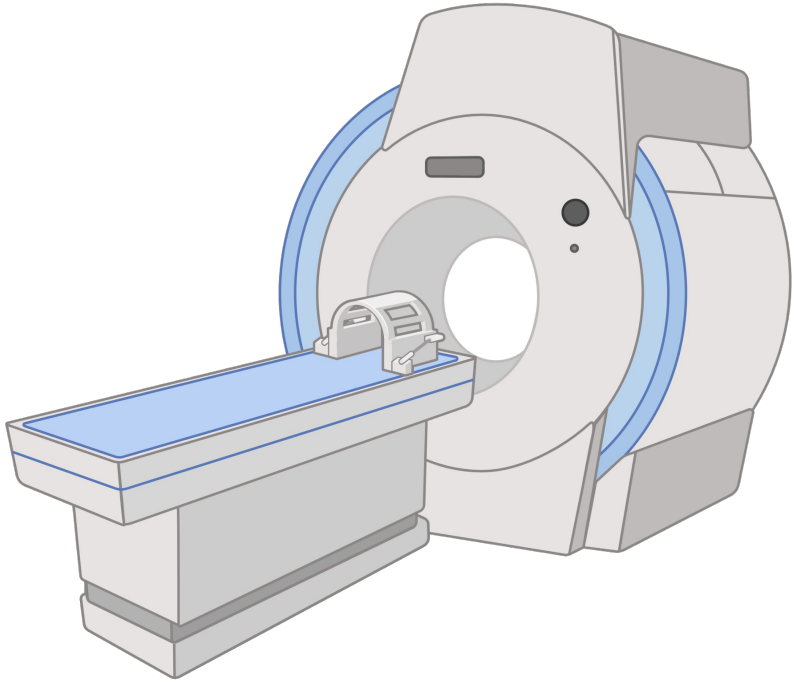
- Let’s take temperature as an example

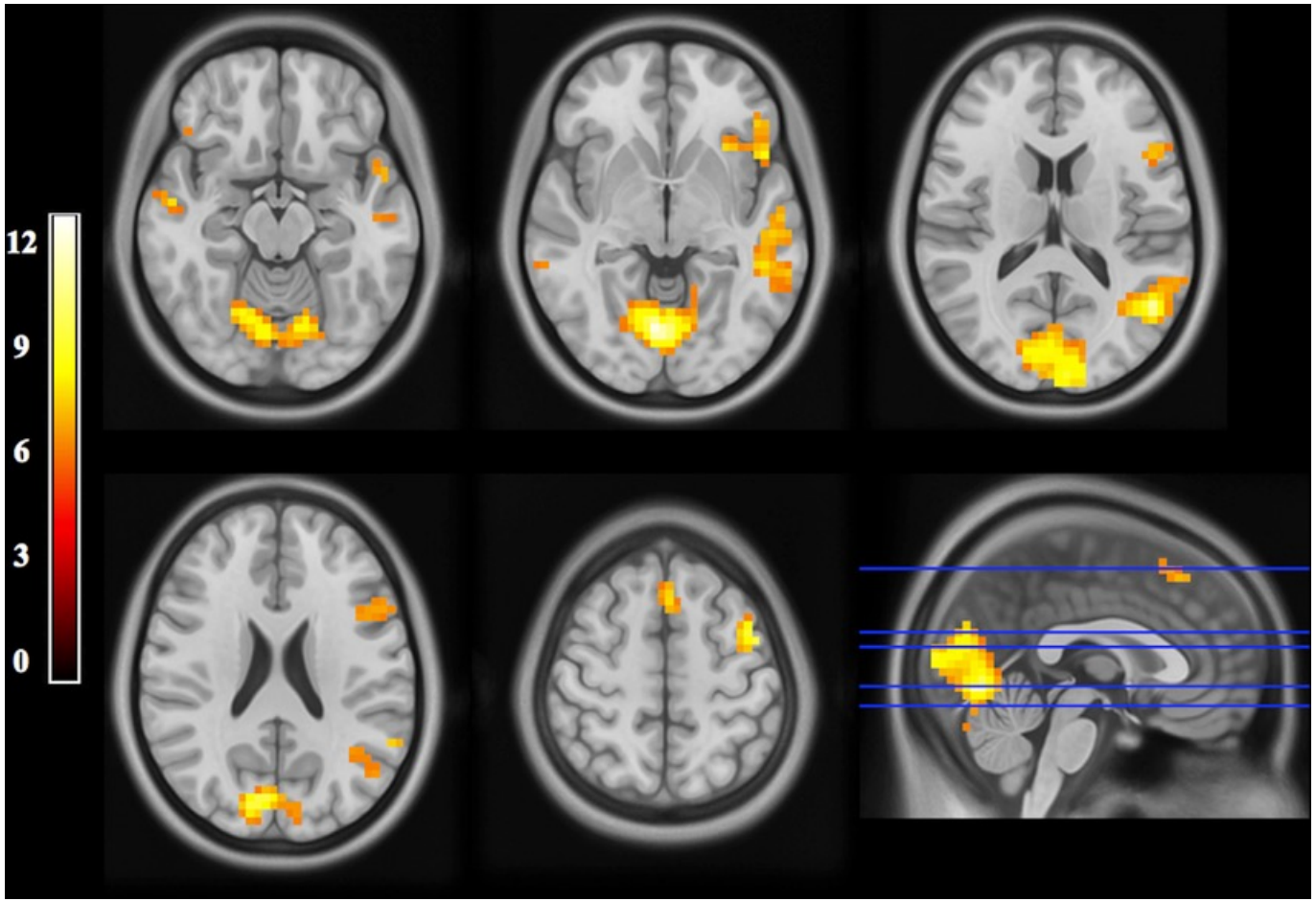


Measuring the brain: Where do we start?

We could start big

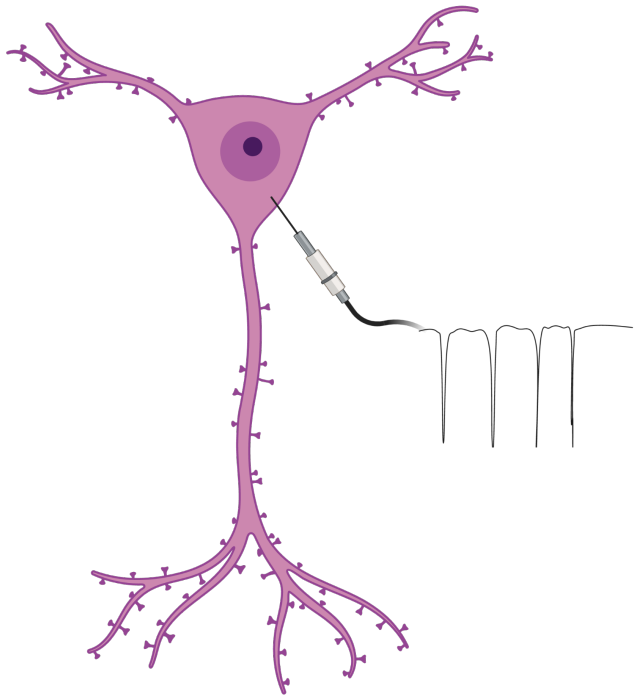
- At the *systems* level

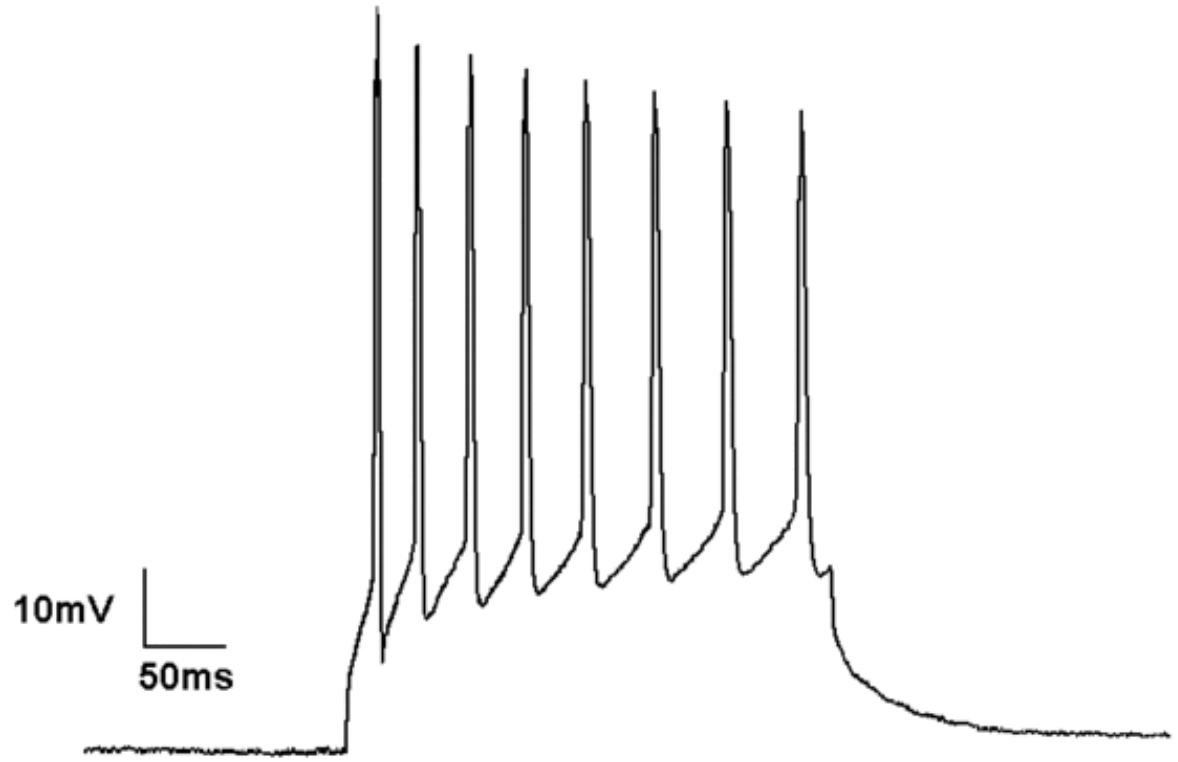




We could start small!

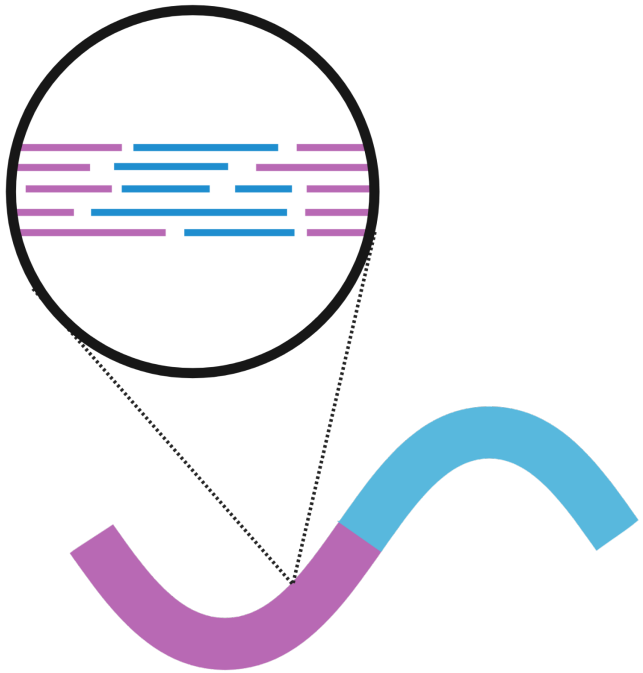
- At the *cellular* level

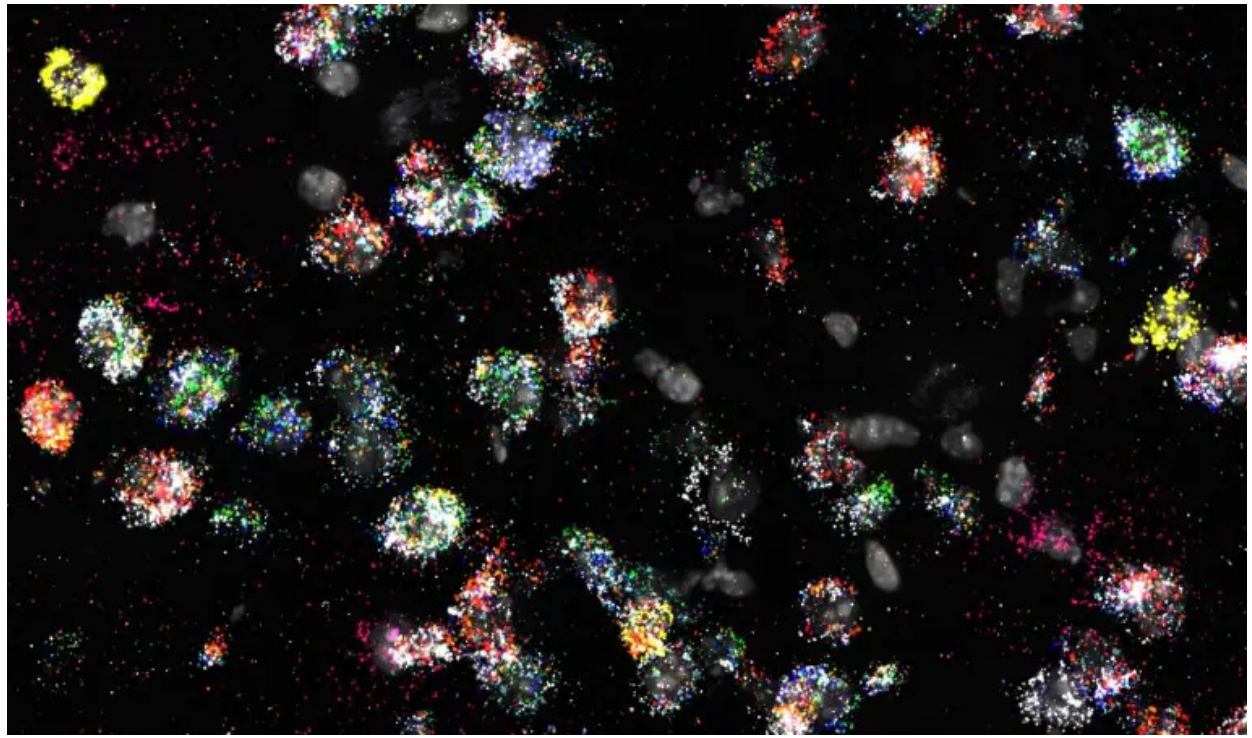




We could go even smaller

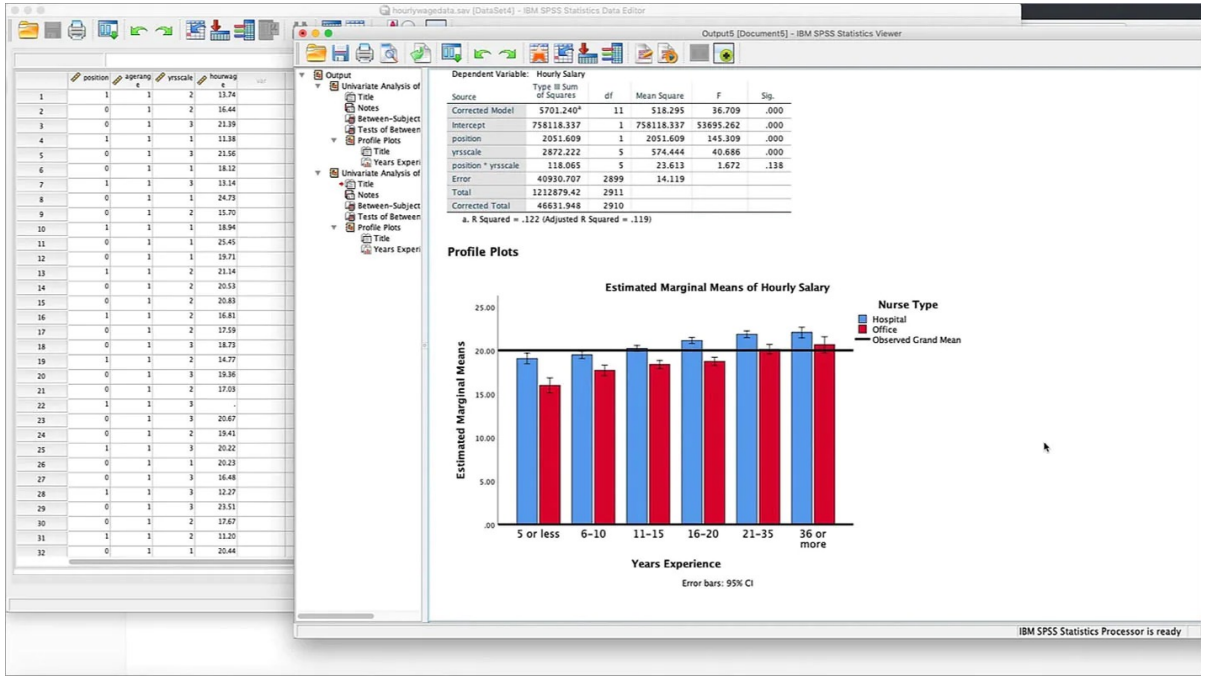
- To the *molecular* level

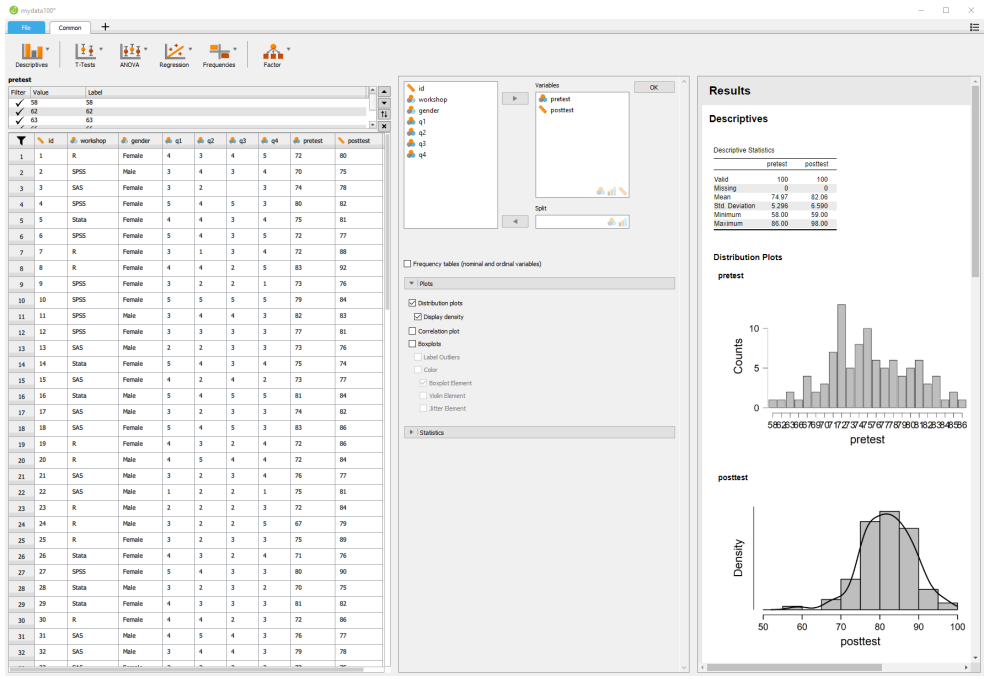


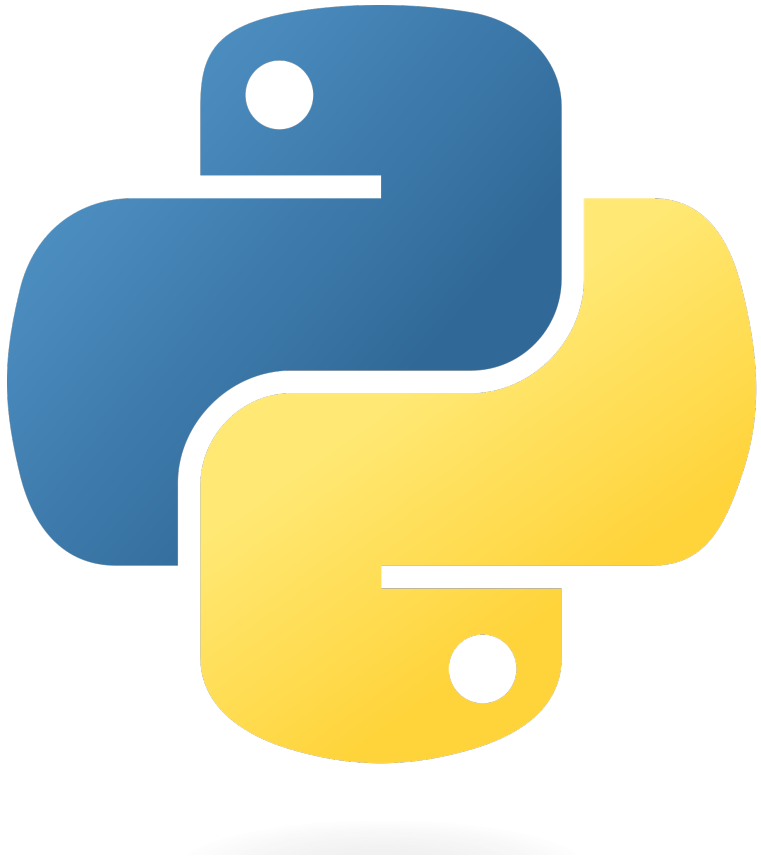


You've got some numbers – now what?

- If you've taken Quantitative Methods (or another statistics class) – what did you use?







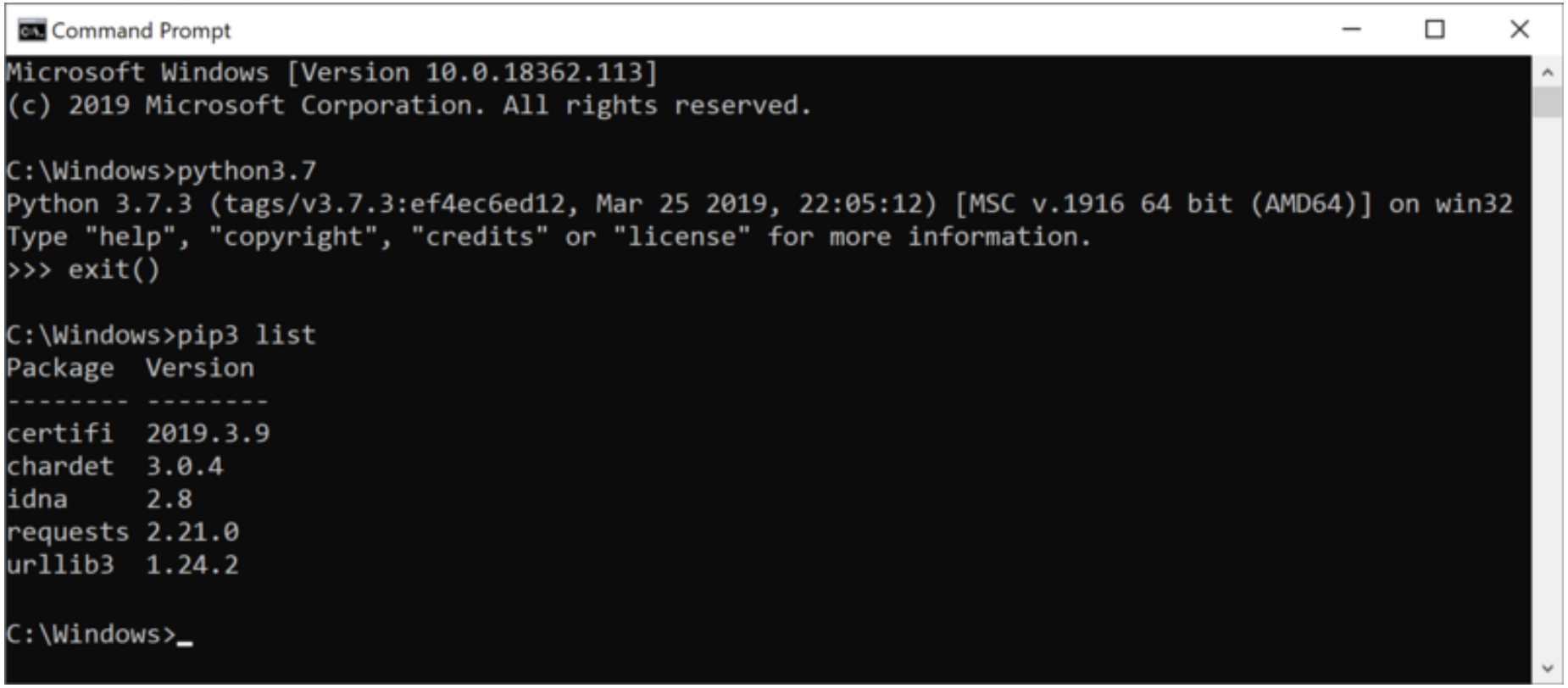
What is Python?

A high-level programming language

Why use Python?

- Flexibility
- Open source
- Logical syntax
- Lots of support / packages available

The Python command prompt looks something like this



We will run our python code in interactive environments called Jupyter notebooks

Jupyter notebooks will let you organize your code in a visually appealing and intuitive way

We will run our Jupyter notebooks through Google Colaboratory

colab

Managing Jupyter Notebooks

All Colab projects will be saved as Jupyter notebooks and uploaded to a GitHub page

GitHub is a website that stores and organizes code