

Introduction

SURP 2022 Python Bootcamp
Ohio State Astronomy
Slides by: James W. Johnson

Hello!

We'd like to introduce ourselves

- Amanda Ash (2nd year)
- Anusha Pai (4th year)
- Deb Pathak (1st year)
- James Johnson (6th year)
- Joy Bhattacharyya (3rd year)
- Kaz Gary (1st year)
- Liam Dubay (2nd year)
- Paarmita Pandey (1st year)

Format

Slides typically take 60-90 minutes

- ~5-minute break partway through
- Strongly advised to *not* copy example codes – the slides are all online anyway
- Spend your mental energy on *understanding* rather than *copying*

Each session has a set of exercises

- We won't be collecting/grading anything – this isn't a course

Material is very condensed to fit into six sessions – mastery of these skills will come over time, even beyond this summer

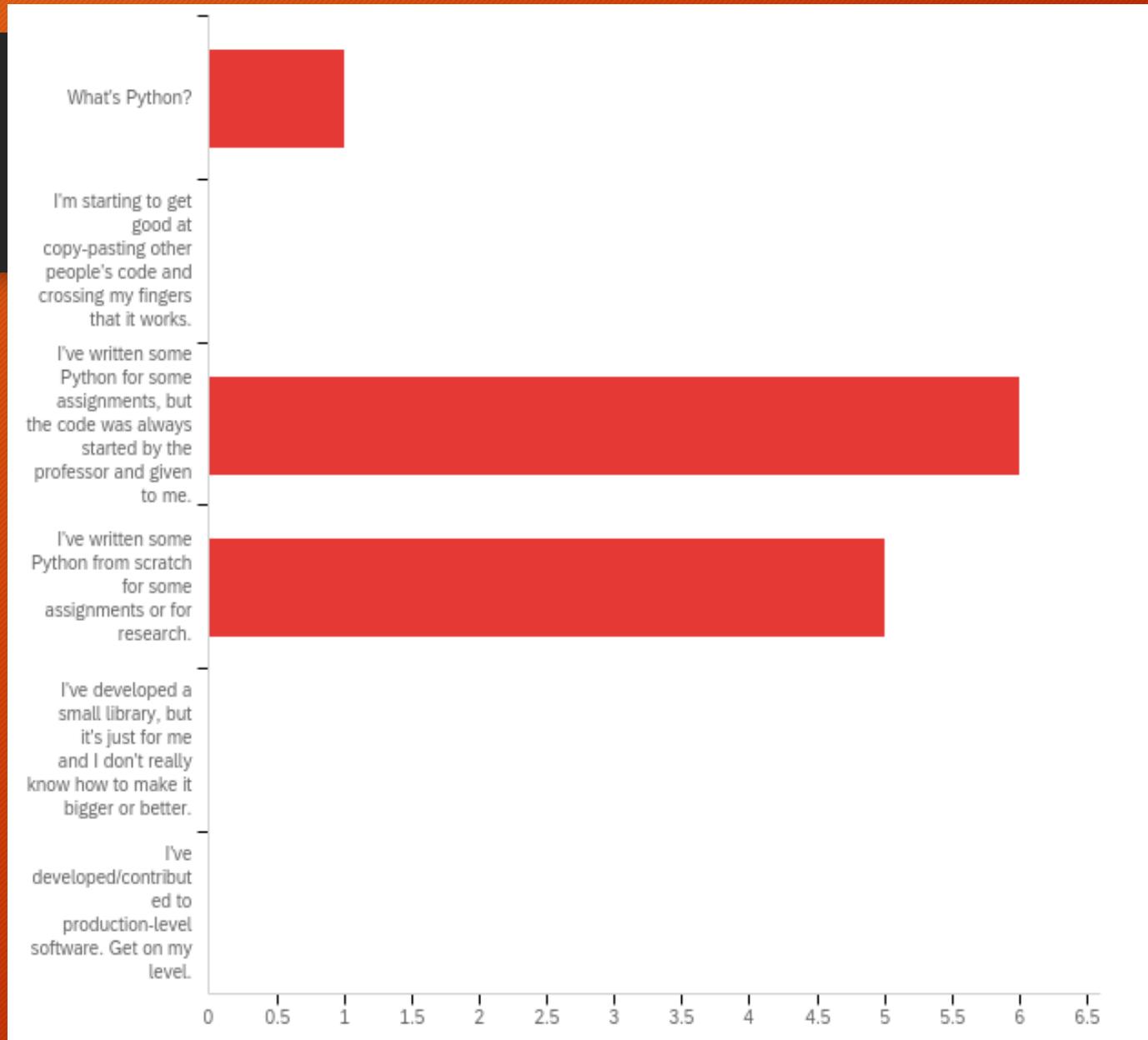
In the long run, what you get out of this will reflect what you put into it

Survey Responses

Q1: How would you describe your skill level in Python?

A wide range of skills, but mostly new to Python

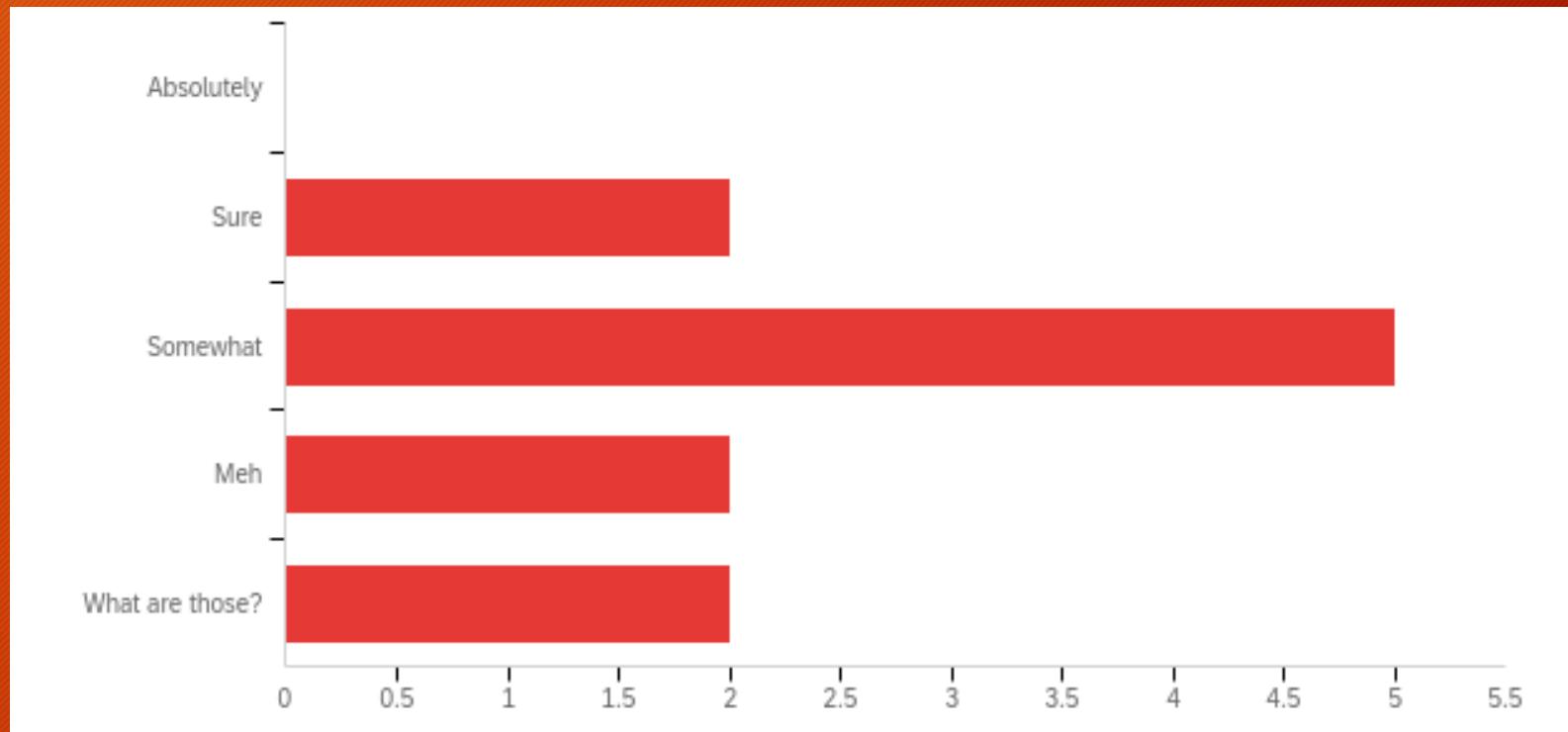
We're aiming to get you up to the second-to-last option



Survey Responses

Q2: Are you comfortable with if/else conditions, for- and while-loops, and def statements?

A wide range of skills in functional programming

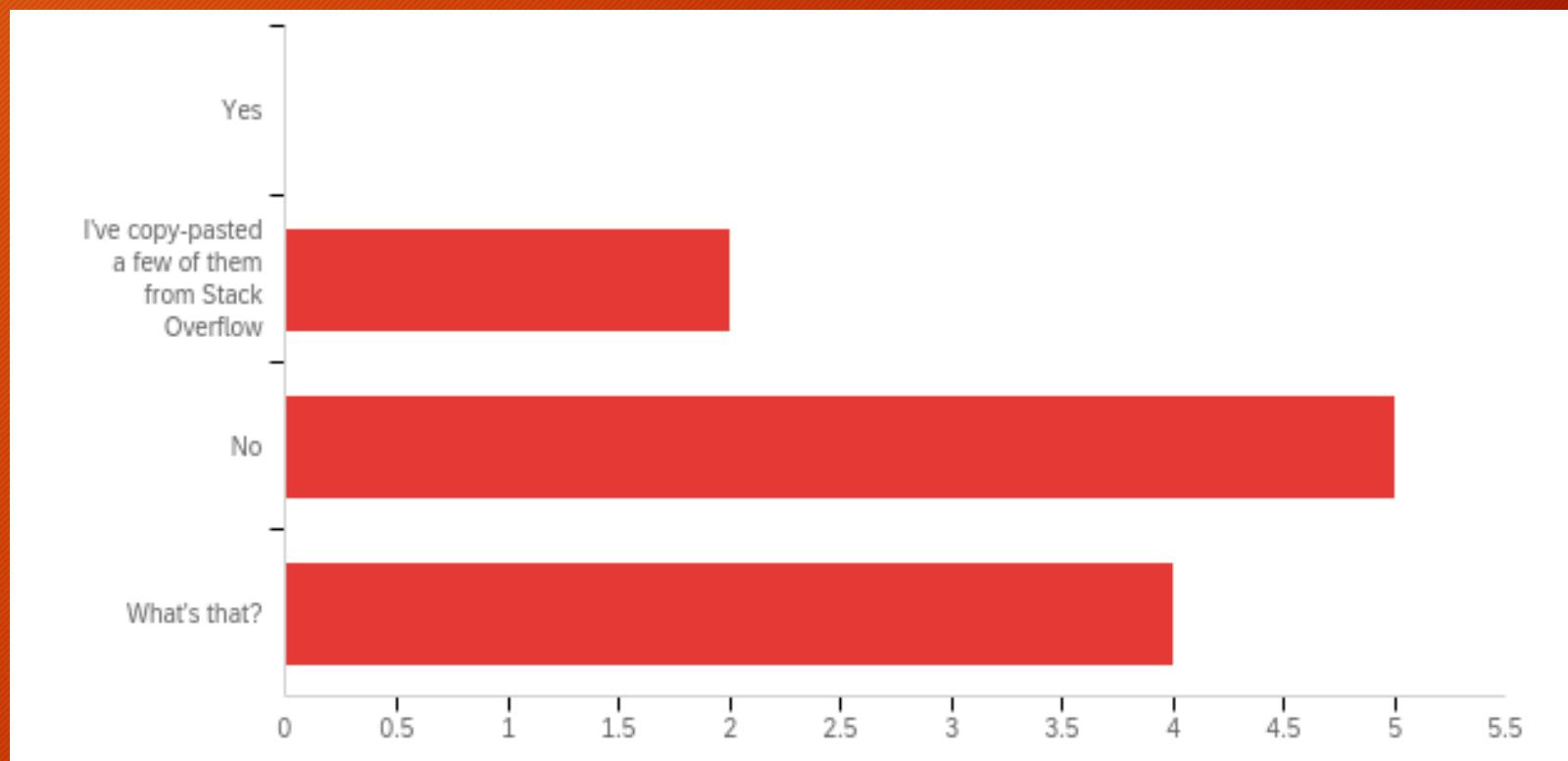


Survey Responses

Q3: Have you ever written a class?

Most of you are new to classes

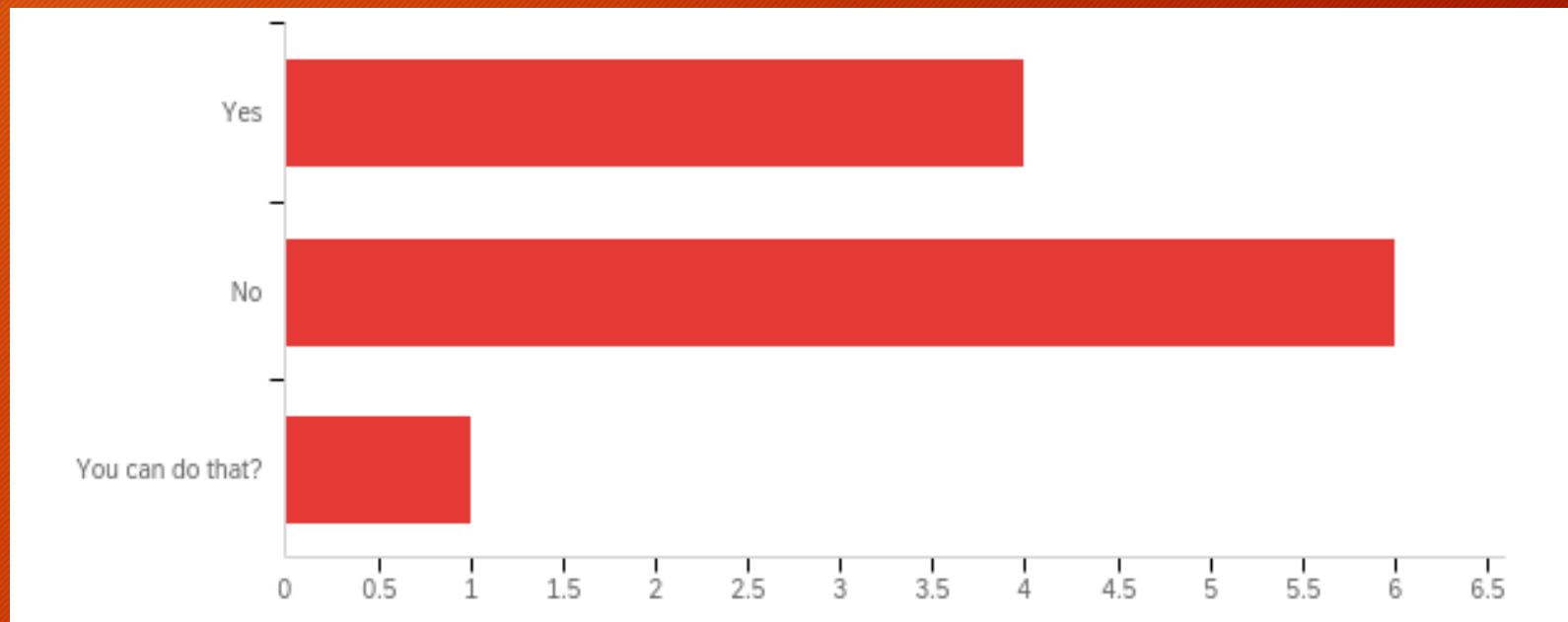
This will be the focus of sessions 4 and 5



Survey Responses

Q4: Do you know how to, or have you already imported your own code from another file?

Some of you have, some of you haven't

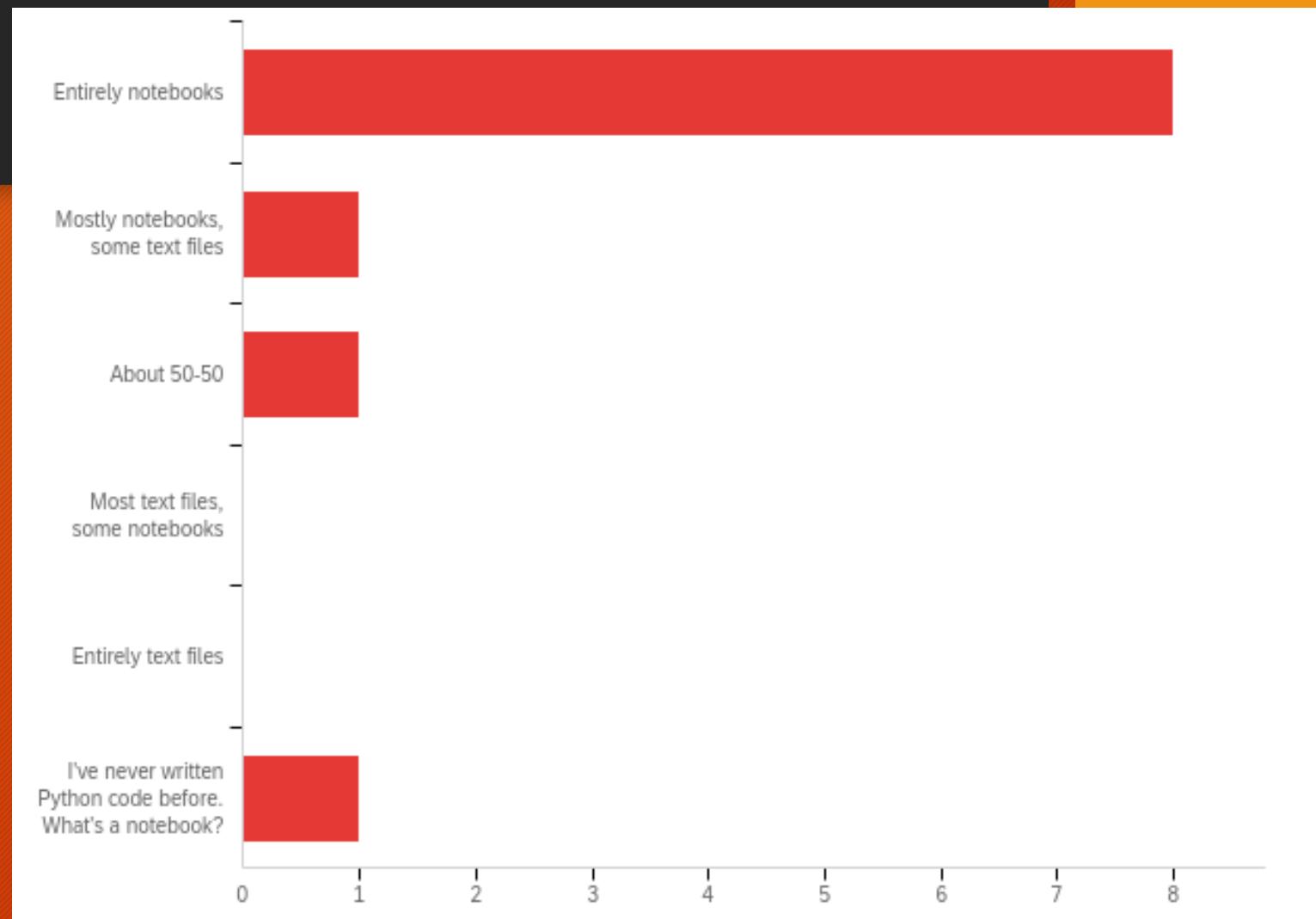


Survey Responses

Q5: Do you write code in text files or jupyter notebooks (or some equivalent)?

Mostly notebooks, but a few of you have worked in text files

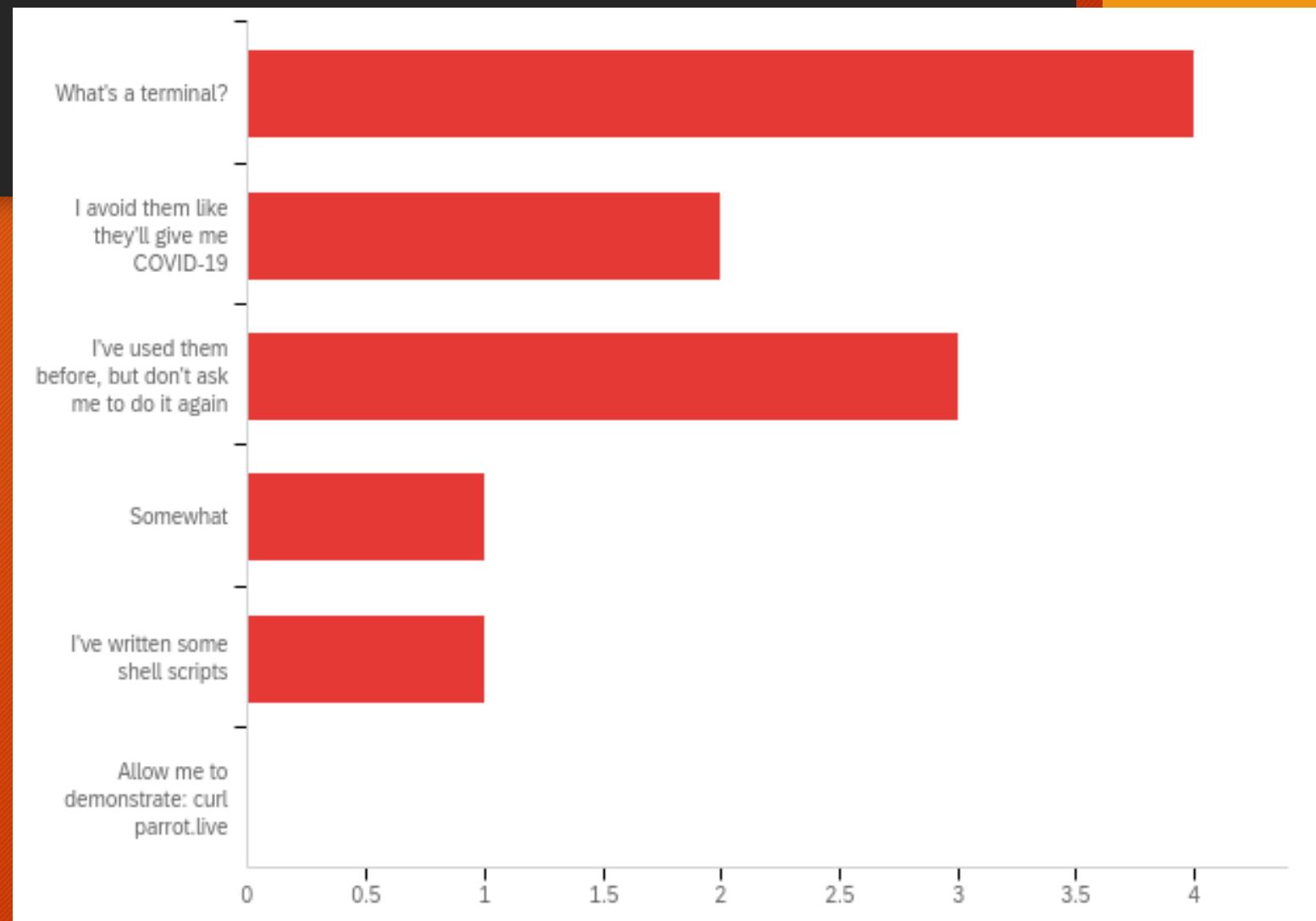
When you've built up a large code base for a project, they serve different purposes



Survey Responses

Q6: How comfortable are you using a terminal/command-line?

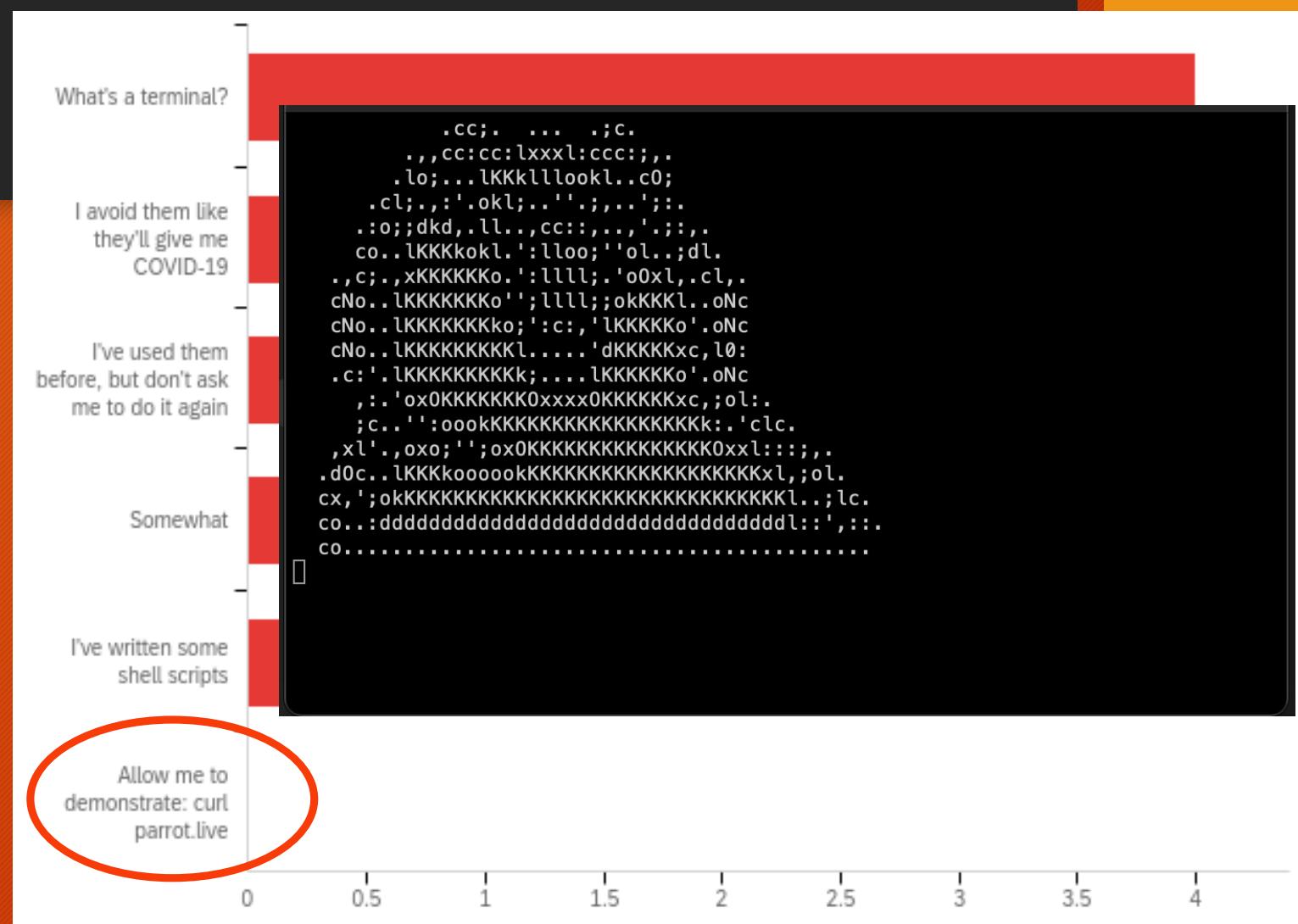
Some of you have never used them, others have



Survey Responses

Q6: How comfortable are you using a terminal/command-line?

Some of you have never used them, others have



Survey Responses

New material:

- For many of you: the terminal, object-oriented programming
- For about half of you:
 - How to import your own code from elsewhere in your computer (packaging may be new to some)

Some of the material is either impossible or quite difficult when coding in a notebook.
I advise all of you to use this bootcamp as practice for working in text files.

Additional Learning Material

Those of you new to Python – we strongly advise going through some of this ahead of Wednesday's session, which will be a crash course

Python Foundation's Beginner's Guide: <https://www.python.org/about/gettingstarted/>

<https://www.learnpython.org/> - There is also an iOS app for this

Codecademy: <https://www.codecademy.com/learn/learn-python-3>

Tools: A Text Editor

Differs from an *Integrated Development Environment* (IDE) in that IDEs will *run* the code – all they do is open, create, edit, etc. plain text files

- pycharm, spyder

I recommend Sublime Text

<https://www.sublimetext.com/>

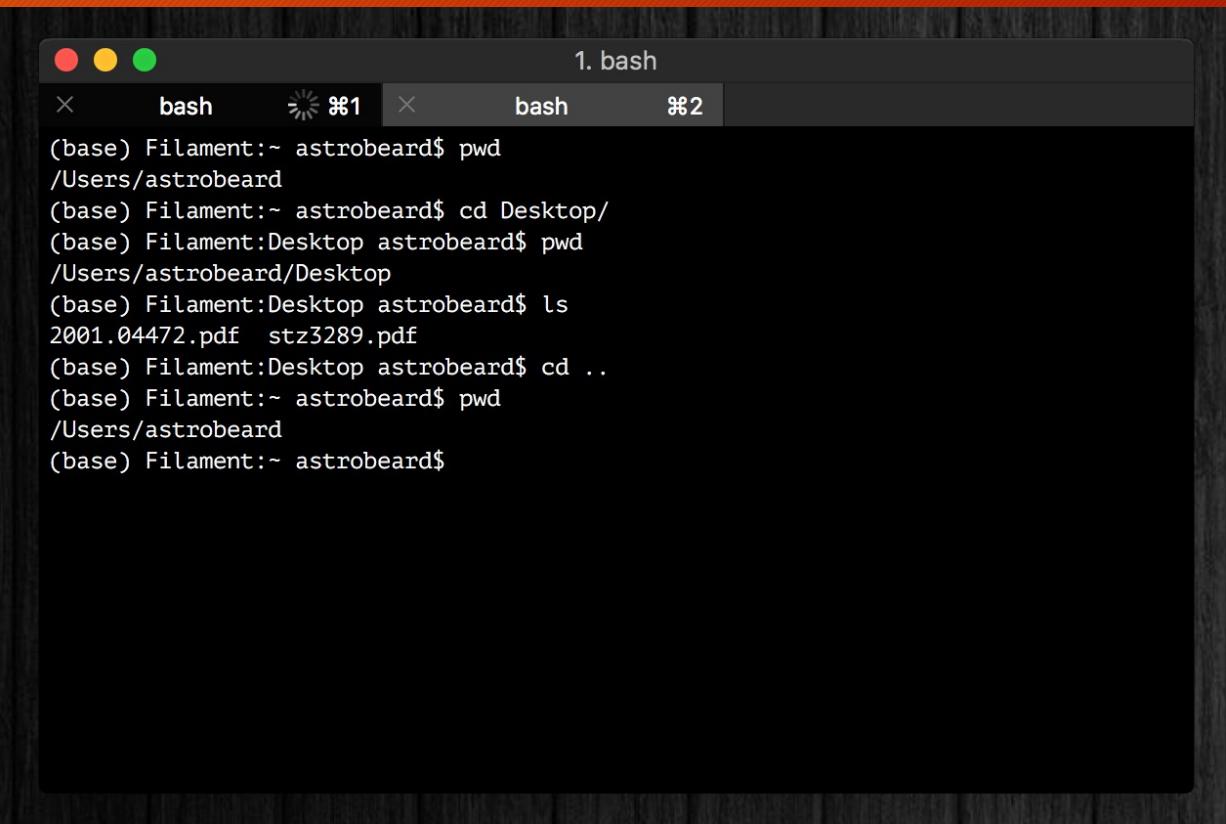
Tools: A Terminal

I recommend iTerm2

- Terminal *replacement*
- <https://www.iterm2.com/>

You should think of a terminal as just a different interface on a Finder window with some extra programs built-in

Tip: you can run python line-by-line in a terminal (*python* or *ipython*)

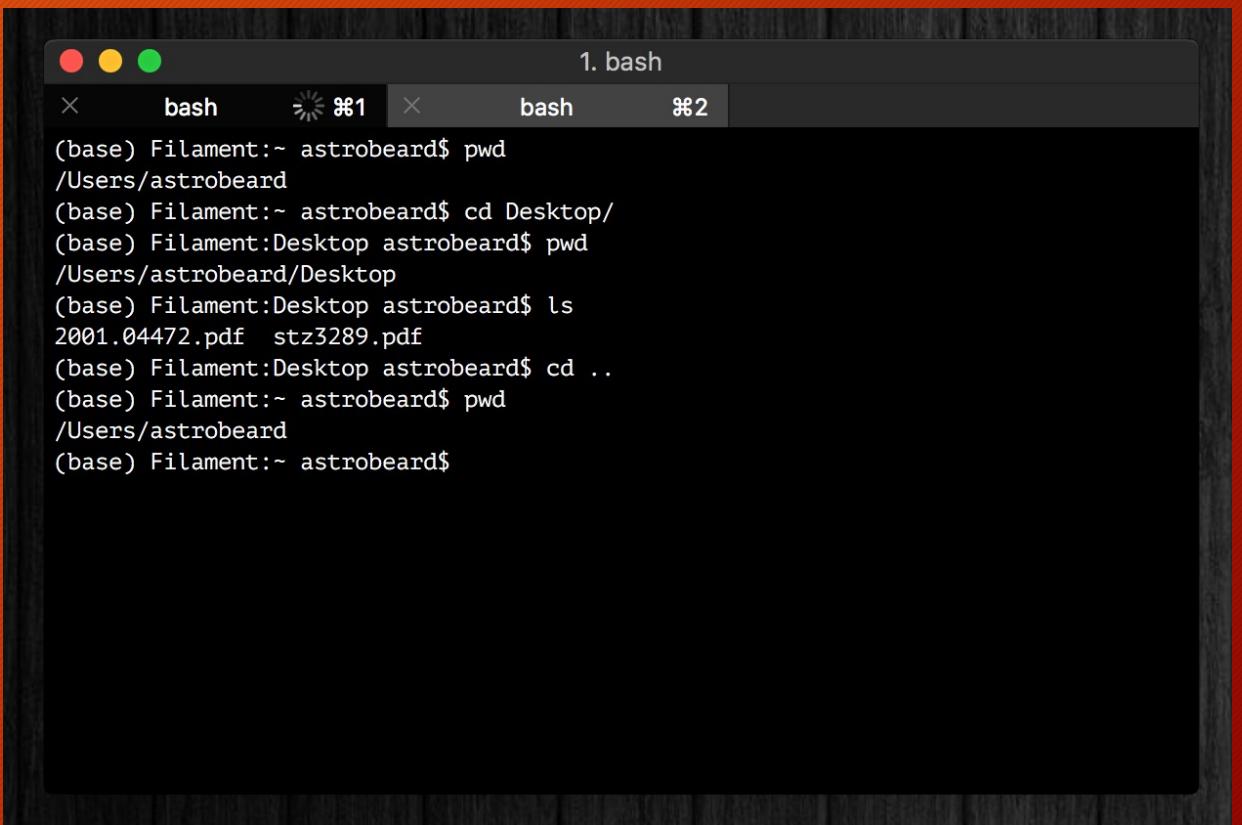


```
(base) Filament:~ astrobeard$ pwd
/Users/astrobeard
(base) Filament:~ astrobeard$ cd Desktop/
(base) Filament:Desktop astrobeard$ pwd
/Users/astrobeard/Desktop
(base) Filament:Desktop astrobeard$ ls
2001.04472.pdf  stz3289.pdf
(base) Filament:Desktop astrobeard$ cd ..
(base) Filament:~ astrobeard$ pwd
/Users/astrobeard
(base) Filament:~ astrobeard$
```

Tools: A Terminal

If you're running Windows, your terminal will be different than some of the notes and exercises here, unless you take some extra steps at the beginning to set up a bash interpreter.

Talk to us if you need help with this!



```
(base) Filament:~ astrobeard$ pwd
/Users/astrobeard
(base) Filament:~ astrobeard$ cd Desktop/
(base) Filament:Desktop astrobeard$ pwd
/Users/astrobeard/Desktop
(base) Filament:Desktop astrobeard$ ls
2001.04472.pdf  stz3289.pdf
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(base) Filament:~ astrobeard$ pwd
/Users/astrobeard
(base) Filament:~ astrobeard$
```

Tools: Cloud Computing

Allows you to run python on a remote server

SciServer is a popular platform across many STEM fields:

<https://www.sciserver.org/>



In the long run you should choose the tools that you're most comfortable with

If You Haven't Already

<https://www.anaconda.com/products/individual>

- This will install Python, Anaconda, and Jupyter Notebooks

Latest version of python: 3.11.3

- Most libraries now require ≥ 3.8
- Python 3.7 will be deprecated June 27, 2023

Python 2.7 is *deprecated*

- Talk to us if you need to use it, for now just don't install that version



Goals

What we'll aim to cover:

- How to use a terminal
- Review of the basics: control structures, data types, functions, import, etc.
- How to read documentation
- Common uses of Anaconda in astronomy
- How to import your own code, and how to set up a directory tree to organize it
- Classes: how to make new objects
 - Inheritance and Composition
- Some basic software engineering principles (i.e. good habits)

Monday Motivation

Every expert coder was once a novice.

You can't improve your coding practices without first criticizing what you once thought was great code.

Since we're not professional developers, scientists have to *actively* create and foster good coding habits if they want them. Being early career researchers, you have the option to make this decision now. It will only become more difficult to do this.