INTRODUCTION TO COMPUTER PROGRAMMING IN PYTHON

Lesson 3
Astro Scholars 2022

Review

Python as a Calculator

Do basic mathematical operations by following the order of operations – PEMDAS

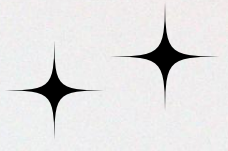
Types

Text: `str`
Numeric: `int`, `float`, `complex`
Sequence: `list`, `tuple`, `range`
Mapping: `dict`
`Boolean: bool`
Indexing

Iteration

Loop through data sequentially

- For loops



SIMPLE PLOT

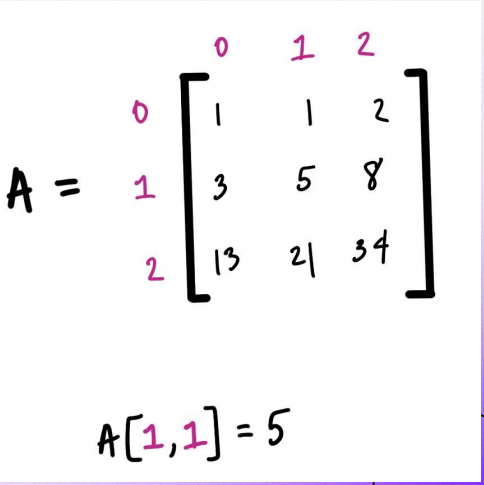
Matplotlib

- A Python **library** for **data visualization**
- For a basic plot of an image:
  1. **Read** the data so the computer can understand it
  2. Use Matplotlib to display the data as a **2D array** (every coordinate on a graph corresponds to a pixel value of the image)

ARRAYS

Arrays

- Hold many values under a single variable name
  - You can access the values by referring to an index number, as we did with lists, but this time, you will have to index by row and column
- You can do operations on all the values in an array at once
- You can loop through individual values
- You can operate on multiple arrays at once
- To work with arrays in Python, we use the library `Numpy`



PLOTS

Plotting

- First, you create a figure and set of axes and set optional settings like the figure size and number of plots (default is one if you don't specify otherwise)
  - `fig, ax = plt.subplots(figsize=[12,6])`
- Then, you use the axes object you created, and tell Matplotlib what you want to plot on those axes, you can repeat this command with different data to plot multiple data on the same set of axes
  - `ax.plot(xdata,ydata)`
- Finally, once you are done plotting, tell matplotlib that you are ready to see the created figure
  - `plt.show()`

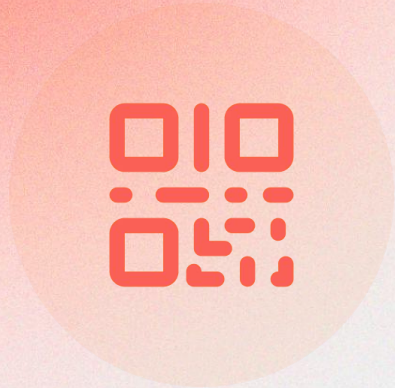
RESOURCES

https://matplotlib.org/stable/api/_as_gen/matplotlib.axes.Axes.imshow.html

https://matplotlib.org/stable/api/_as_gen/matplotlib.axes.Axes.plot.html

https://numpy.org/doc/stable/reference/generated/numpy.array.html

Exit Ticket



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3. At what point(s) were you least engaged as a learner?

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Questions?