Numerical Python

(Numpy)

Numpy : (Num-pī or numpēē)
is the primary package for
numerical computation in
Python.

Numpy is not part of the "Standard Library"

This means you have to install it manually.

pip install numpy

(matplotlib depends on numpy so you may already have it installed)

Numpy is primarily about extending Python to handle matrices.

This is the essential function of a data analytics tool.

Recall that a matrix is a grid with rows and columns.

1	3.4	'dog'	...	...
2	4.6	'cat'	...	...
3	2.3	'fish'	...	...
4	2.7	'turtle'	...	...
5	1.5	'llama'	...	...
6	0.6	'Penguin'	...	...
7	6.1	'flamingo'	...	...
8	1.2	'lion'	...	...

Kinda of like a worksheet in Excel

A few of important differences:

(1) All elements must be of the same type.

(2) The grid must be perfectly rectangular (Every column must have the same number of items)

(3) Can be 1, 2, or more dimensions

We want to be able to index each element of the matrix

for this we need to specify the row number and column number

We do this using a tuple

Important Sidebar:

Tuples - this is a built in data type in Python we haven't talked about yet.

Tuples are one of the major collection types in Python.

- Lists ✓
- Dictionaries ⊘
- Sets ⊘
- Tuples ☺

List - Ordered (Indexable), mutable.
[ ] - for short cut

↑ Can be changed after creation.

Tuple - Ordered (Indexable), immutable.

( ) - for creation.

↑ can't change after creation.

Example:

```
a_tuple = (1, True, 3.14, 'cat')
print(a_tuple[0]) # Prints '1'
```

Tuples are usually used "anonymously"

They are often used for temporary storage where we don't need to give them a name. Lists are a better option for more long term storage.

Example: Numpy creation and indexing

Numpy is the foundational package for numerical computing in Python, but you won't use it by itself very often.

Next class we will talk about PANDAS. Which is the package for Data.