Introduction to Python

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Course Goal

Learn by doing

1. Be able to use Python to **do something** with scientific data
2. Teach yourself to learn more
3. Understand the basic Python vocabulary
4. Gain confidence in your programing skills

Learning Goal: Day 1

1. Install and run Python 3.6
2. Learn where to find more information on about Python
3. Be able to write, save, and run a basic program like "Hello World"
4. Be able to describe the meaning of at least 10 Python specific terms

Course Site

`nd.edu/~brose3/2018reu-cmp`

- includes installation files, data, notes, schedule, etc.
- will be continually updated during the course

Who are you?

Getting Help

- Google/Stackoverflow
  - `python3 [thing to search]`
- Python documentation is very helpful:
  - docs.python.org/3/
- The *interpreter* itself: `help(print)`
- External Resources section on the class website

Road Map

1. Introduction to Python
2. Introduction continued: Git & GitHub
3. Loops and File I/O
4. Special Topics in Standard Python
5. Introduction to NumPy/Matplotlib
6. Numerical Methods
7. Numerical Methods in SciPy
8. Final Project: Doing Science with Python

Let's code!

www.continuum.io/downloads

Math Operations

Basic arithmetic *operators*

```
+  -  *  **  /  //  %

import math
math.cos(math.pi)
```

Functions

Functions - blocks of code

```
print('Hello, world!')
print(5**3)
len('physics')
```

Variables

Variables store information for later.

Each variables is of a specific *type*.

```
name = 'Ben'
print(name)
full_name = name + ' Rose'
print('My full name is', full_name)
type(name)
```

Tired of typing?

We can create a *program* (*module* or sometimes *script*) that we can just run, instead of typing everything in over and over again.

```
#!/usr/bin/env python3
""" file.py -- description

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"""
# code goes here
print(5**2)
```

Your own functions

```
def square_it(number):
    """ square any number

    Parameters
    ----------
    number : float
        the number to sqaure


    Returns
    -------
    float
        the square input number
    """
    return number**2
```

Worksheet

- 6 questions
- 2 programs