Intro to Scientific Python

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Python

- "Python is an interpreted, interactive, object-oriented programming language." - Python Software Foundation
- Current Versions:
  - Python 2.7.18 `https://docs.python.org/2/`
  - Python 3.10.8 `https://docs.python.org/3/`

Python

- "Python is an **interpreted**, interactive, object-oriented programming language." - Python Software Foundation
- 'interpreted' - evaluates commands one-at-a-time, as it goes
- as opposed to 'compiled', which evaluates all commands in advance, then runs the evaluated bulk in one go

Python

- "Python is an interpreted, **interactive**, object-oriented programming language." - Python Software Foundation
- 'interactive' - as it is interpreted, you can give commands and it can react as you give them
- as opposed to compiled languages, where all commands intended to be run must be given in advance

Python

- "Python is an interpreted, interactive, **object-oriented** programming language." - Python Software Foundation
- 'object-oriented' - more tricky to define!
- based on the idea of 'objects', which are structures which can contain data and code
- these objects can then be used to package and refer to data and code elsewhere

- Python 2.x

```
print "Hello, World"
```

```
Hello, World
```

- Or, Python 3.x

```
print("Hello, World")
```

```
Hello, World
```

Workshop Topics

- Modules
  - NumPy
  - MatPlotLib
  - SciPy
- Tools
  - Plotting
  - File Handling
  - Fitting
- Applications
  - Orbital Mechanics (Dynamic Simulation)
  - Monte Carlo (Stochastic Simulation)
  - Root finding by Bisection
  - Numerical Integration and Differentiation

Materials Structure

Main
- GradNet_Python.pdf
- GradNet_Python_Scientific.pdf
- *Basic*
  - [data files for the basic workshop]
  - *Model Solutions*
    - [.py file model solutions]
- *Scientific*
  - [data files for the scientific workshop]
  - *Model Solutions*
    - [.py file model solutions]