Introduction To Python For ArcGIS

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Why Python?

- ESRI is moving everything to Python

But…

- It's a nice language (although YMMV)
- Easy to learn
- Still powerful

What Can You Do With Python?

- Schedule jobs
- Batch processing
- Automate tasks and tools
- Loop through records
- Manipulate maps, layers, and geometries
- Use other Python packages (e.g., **`numpy`**)

How Do You Run Python?

- ArcMap Python Window
- Custom Toolbox
- Field Calculator
- PythonWin
- IDLE
- Command Line

Python

Variables And Types

Strings

```
a_string = 'One Place'
b_string = "Another Place"
```

Numbers

```
an_integer = 42
a_float = 3.1415
```

Lists

```
list1 = [0, 1, 1, 2, 3, 5]
list2 = [2.718, 3.141]
list3 = ['a', 'b', 'cdef']
```

Expressions

```
3 + 4
3 - 4

"Hello, " + "World"

7 * 3

21 / 7
22 / 7

22 % 7

22 / 7.0
22 / float(7)
```

Operators

- addition (+)
- subtraction (-)
- multiplication (*)
- division (/)
- modulus (%)

Statements, Part 1

Assignment

```
n1 = 3
n2 = n1 + 4
n2 = n2 + 7
```

import

```
import arcpy
import math
```

print

```
print "hello, world"
print n2
```

Statements, Part 2

Conditionals

```
if n2 < 10:
     print 'too few'
elif n2 > 10:
     print 'too many'
else:
     print 'just right'
```

Statements, Part 3

Loops

```
for item in list1:
    if (item % 2) == 0:
        print item, 'is even'
    else:
        print item, 'is odd'
```

Modules

Important GIS Modules

- arcpy
- arcpy.mapping
- arcpy.sa
- numpy
- Lots of others. Batteries Included™

Functions

First, unzip the data file into `C:\` .

```
import arcpy
data = arcpy.Describe('C:/intro-python/charlottesville
```

Properties

```
data.name

data.file

data.path

data.type
```

Let's Do Something!

Get Set Up

1. Open a blank ArcMap.
2. Add a folder connection to `C:\intro-python` .
3. Drag `City_Trails` into the workspace.

Let's Draw Some Buffers

```
import arcpy
arcpy.env.workspace = 'C:/intro-python/charlottesville

layer = 'City_Trails'
distances = ['100 meters', '200 meters', '400 meters']

for dist in distances:
    output = layer + '_' + dist.replace(' ', '_')
    arcpy.Buffer_analysis(layer, output, dist)
```

Links

- Python
- Learn Python the Hard Way (For true beginners.)
- The Official Tutorial (This is best if you have some programming experience.)
- Python 2.6 Documentation
- PythonWin
- ESRI's Python Page
- arcpy
- intro-python.zip (Data used here)