Python for GIS Librarians:

Toward a Data Science Core Competency for Geospatial Librarianship

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http://bit.ly/Phil-WAMLpy

WAML San Diego 2018

```
arcpy.management.ConvertCoordinateNotation(name+table, name+decdeg, "DMSX", "DMSY", "DMS_2", "DD_NUMERIC", None, "GEOGCS

# field mapping: which fields from quad index table will be joined
fms = arcpy.FieldMappings()
fms.addTable(quadIndex)
fields_sequence = ['USGS_QD_ID', 'QUAD_NAME']
fields_removed = [f.name for f in fms.fields if f.name not in fields_sequence]
for field in fields_removed:
    fms.removeFieldMap(fms.findFieldMapIndex(field))

fms_out = arcpy.FieldMappings()
fms_out.addTable(name+decdeg)
for field in fields_sequence:
    mapping_index = fms.findFieldMapIndex(field)
    field_map = fms.fieldMappings[mapping_index]
    fms_out.addFieldMap(field_map)

# joins specified fields from quad index table to DecDeg table, adds name+_DecDeg_Quad feature layer to gdb
arcpy.analysis.SpatialJoin(name+decdeg, quadIndex, name+quad, "JOIN_ONE_TO_ONE", "KEEP_ALL", fms_out, "INTERSECT", None,

# field mapping: which fields from GNIS table will be joined
fms = arcpy.FieldMappings()
fms.addTable(gnisPoints)
fields_sequence = ['FEATURE_NA', 'FEATURE_CL']
fields_removed = [f.name for f in fms.fields if f.name not in fields_sequence]
for field in fields_removed:
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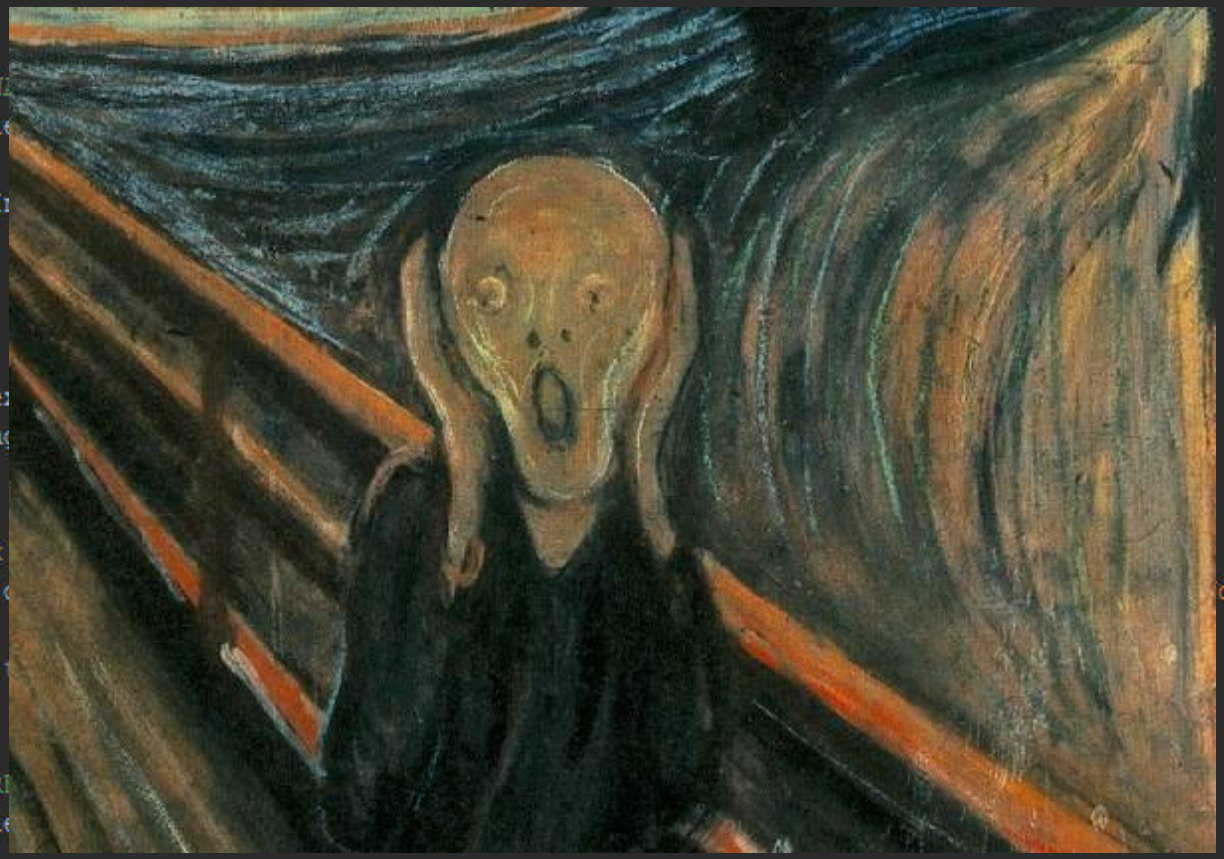

Overview of Presentation

- What is Python?
- Why did I learn it? Why should you?
- Learning Resources
- Toward a Data Science Core Competency

Any Python users in the house?

Any Python users in the house?

Any R users in the house?

What is Python?

Image: wikimedia

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- Programming language

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What is Python?

- Programming language
- Free and open source
- Among the most used programming languages in the world
- "There's a Python library for that"

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Quick Vocab Lesson

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xml: working with xml

Pandas: working with tabular data

Requests: calling URLs

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***Script**:* A series of commands that you run to automate tasks. Python is a scripting language.

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***Script**:* A series of commands that you run to automate tasks. Python is a scripting language.

API (Application Programming Interface): Method of data exchange.

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(still learning)

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- From there, mostly self taught
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- But in truth, necessity is the mother of invention
- From there, mostly self taught
  (YouTube! Code Academy)
- About 2-3 months gnashing of teeth,
  pounding of head, tear drops

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- Do it for Open Science!

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- Data reference:
  1. Data munging & transformations
  2. Mining, scraping, APIs, downloading

Example 1:

Data that doesn't play nice.

(Massage the data!!)

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- Automate repetitive geoprocessing tasks
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- Fast and efficient
- Makes you feel good at your job!

Example 2:

Save hours of work for yourself

(or your heady fwends)

Learning Resources

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- Software Carpentry
- W3Schools
- Code Academy
- Your institution?
- Google!

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Interfaces

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- Spyder

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Wikimedia

Jupyter

Recommended Installation

- Anaconda

Anaconda comes with Jupyter Notebooks!!

Interfaces

- PyCharm
- Spyder

Example 3:

Jupyter Notebooks will help you break through!

(Bonus: Mine data from an API!!)

Resources

GIS Libraries for Python

- ArcPy: Automate ArcGIS tasks
- PyQGIS: Automate QGIS tasks (open source)
- GeoPandas: Adds geospatial operations to Pandas (open)
- Shapely: Geometry (buffer, intersect, union, etc.) (open)
- Rasterio: Raster operations (open)
- GeoPy: Geocoding and distance calculations (open)
- Plotly: Visualization (free(mium))
- So Many Others!!!

Phil White, WAML 2018

Toward a Data Science Core Competency

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1. Our patrons are increasingly skilled in tech.

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2. GIS Librarians serve a broad community... any discipline!

3. There is so much data out there... if we can just get to it!

4. We should embrace open technologies.

Can you learn Python?


Yes We Can!
obamalibrary.gov

```
presentation.close()

print ('Thank You')

for q in audience:
        query = ask(q)

email = 'philip.white@colorado.edu'

print (email)
```