# Python for Geographers

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# Goals

1. Understanding how to read Python
2. Environment setup essentials
3. Ways to teach yourself Python

# Agenda

1. Bare basics for getting started
2. Demystifying Python
3. Python Open Source packages
4. GIS and Data Analysis in Python
5. Learning Resources

# So, what is Python?

- Free scripting language
- Syntax that is easy to learn and understand

**Benefits:**

1. Scalability
2. Integrated packages
3. Open source and community development

# How do I get Python?

- **Get Python - https://www.anaconda.com/distribution/**
- **Install Python - https://docs.anaconda.com/anaconda/install/**
- **Verify install - https://docs.anaconda.com/anaconda/install/verify-install/**

# Where do I write my Python Scripts?

- Terminal, Notepad++, Sublime, Idle, Visual Studio, PyCharm, Python window in Pro, Jupyter notebooks
- Notepad / Sublime / Idle – Stand alone script
- Visual Studio / PyCharm – Projects in Python
- Jupyter Notebooks – Stand alone scripts, Projects, Tutorials

# DEMO

Getting Started

# Scripting in Python 1 – Data Types

- **int:** 5, -72
- **float:** 5.6, -95.234
- **str:** “Python”, “I am a String”
- **bool:** True, False
- **list:** [4, 26, 11], [‘Hello’, 42, ‘World’, 9.9]
- **tuple:** (5,3), (‘a’, 2.8, 7)
- **dict:** {“name”:”Anne”, “age”:20}

# Scripting in Python 2 – Instructions

- **Statements:**
- print, import, del, if-else, for, try-except

- **Built in functions:**
- len(), max(), min(), type(), sum()
- https://docs.python.org/3/library/functions.html

- **Methods:**
- Functions that are associated with a specific data type or object.

# DEMO

Introduction to Python

# Popular Open Source Python packages

- **Pandas –** https://pandas.pydata.org/pandas-docs/stable/getting_started/10min.html#min
- **Numpy –** https://docs.scipy.org/doc/numpy/user/quickstart.html

- **Matplotlib –** https://matplotlib.org/tutorials/index.html
- **Seaborn -** https://seaborn.pydata.org/introduction.html

- **Scipy –** https://www.tutorialspoint.com/scipy
- **Scikit-learn -** https://scikit-learn.org/stable/tutorial/index.html

# Popular Open Source Python packages for GIS

- Geopandas – https://geopandas.readthedocs.io/en/latest/reference.html
- Shapely – https://shapely.readthedocs.io/en/stable/manual.html

- Rasterio – https://rasterio.readthedocs.io/en/latest/
- GDAL - https://seaborn.pydata.org/introduction.html

- Pyshp – https://pypi.org/project/pyshp/
- PYSAL - https://pysal.readthedocs.io/en/latest/

# DEMO

GIS and Data Analysis in Python

https://github.com/ManushiM/esri-devsummit/tree/master/PythonForGeographers_2019

# Learning Resources

- W3Schools - https://www.w3schools.com/python/
- Python Tutorial - https://docs.python.org/3/tutorial/
- Books
  - Head First Python (O'Reilly)
  - Think Python: How to think like a Computer Scientist (O'Reilly)
- Arcpy
  - https://www.esri.com/training/
  - Python  Scripting for ArcGIS (Esri Press)
- ArcGIS Python API - https://developers.arcgis.com/python/
- Exercises for practice - https://www.practicepython.org/

# Recap

- Get Python with Anaconda
- Decide the kind of script you need to write and choose environment
- Script = Data Types + Instructions
- Leverage Open Source libraries for your needs
- ArcGIS Python API (WebGIS), arcpy (DesktopGIS) for your GIS needs
- Python is Fun!

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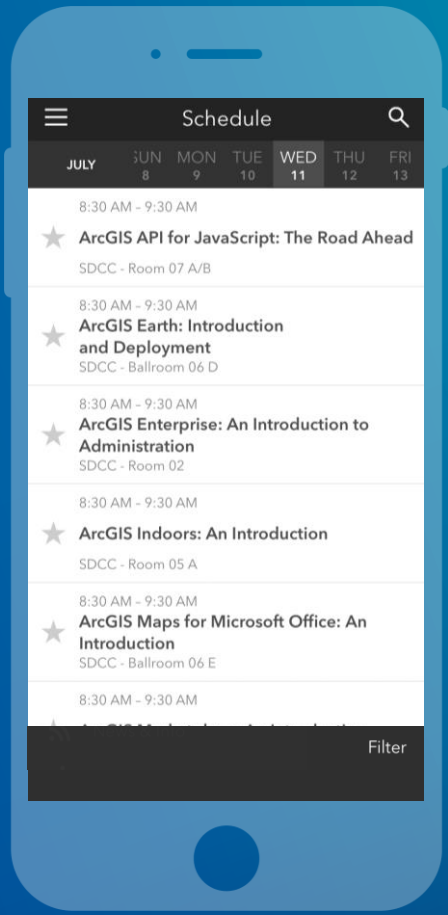


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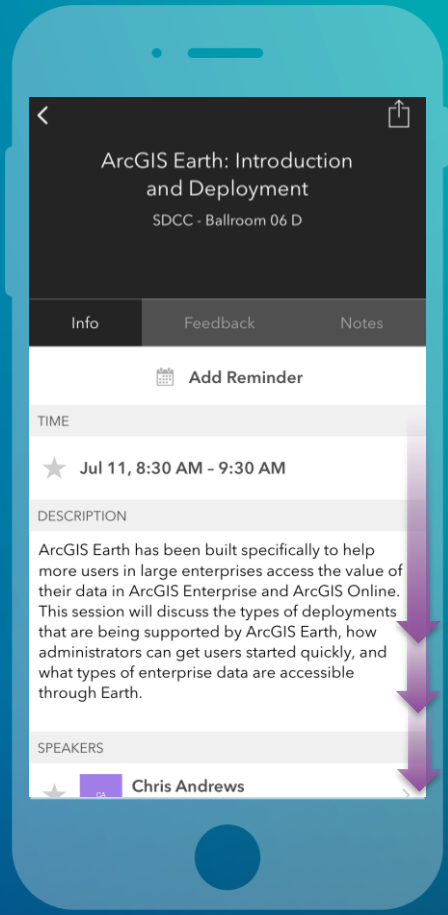


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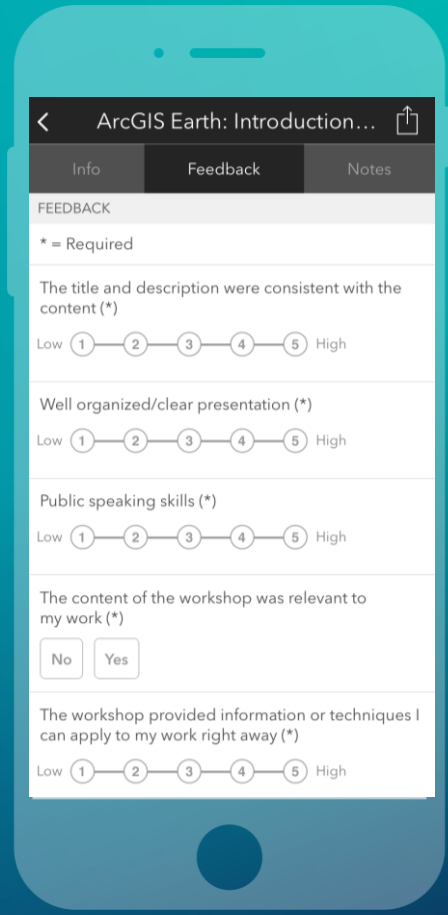


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