PROGRAMMING WITH PYTHON

GO.GWU.EDU/LIBWORKSHOPS

Today's Instructor

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Materials: go.gwu.edu/pyw

Workshop series

Today or next Thurs.
9:15am–12:00pm

Basic Python
Language Concepts

Today or next Thurs.
1–3pm

Data Analysis with
Pandas

About today...

- Ask questions!
- If you're stuck:
  - Ask
  - Help each other out!
- If something is confusing in the workshop, it probably needs improvement; let us know.
- Stay as long as you like

Objectives

- Gain familiarity with one environment for using Python (Google Colab), and awareness of others
- Learn Python language basics
- Load in a data set as a Pandas DataFrame
- Explore and transform ("wrangle") the DataFrame
- Create data visualizations
- Learn how to look things up, how to interpret errors
- Gain confidence to try things we didn't learn today!

Why Python?

- Free
- General purpose
- Easy to learn
- Readable*
- Community-developed / Open Source
- Widely used and documented
- Good built-in and contributed libraries

Different ways to use Python

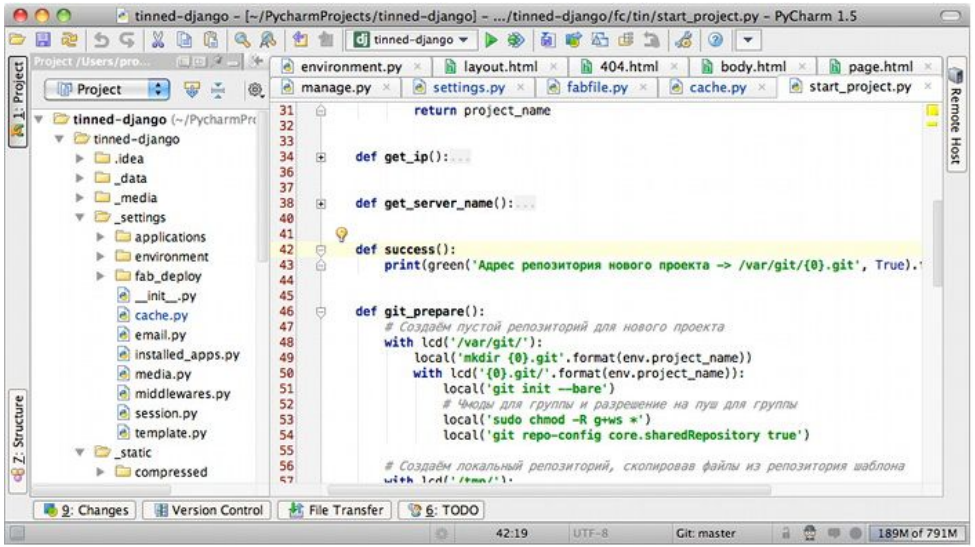
- Command line/REPL

```
Last login: Mon Mar 20 22:09:33 on ttys001
GLSS-M17LFFT:~ kerchner$ python
Python 2.7.10 (default, Oct 23 2015, 19:19:21)
[GCC 4.2.1 Compatible Apple LLVM 7.0.0 (clang-700.0.59.5)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>>
>>> opinion = "This workshop is awful!"
>>> opinion == True
False
>>>
```

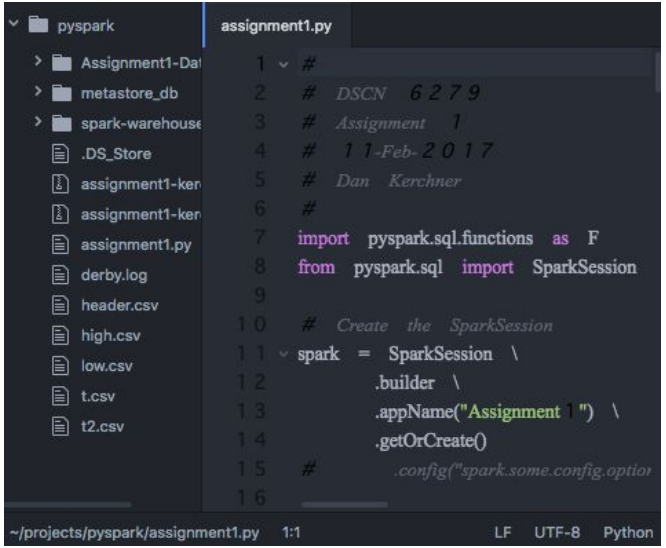
(or https://replit.com/)

Different ways to use Python

- Integrated Development Environment (IDE) – pyCharm, Spyder, …

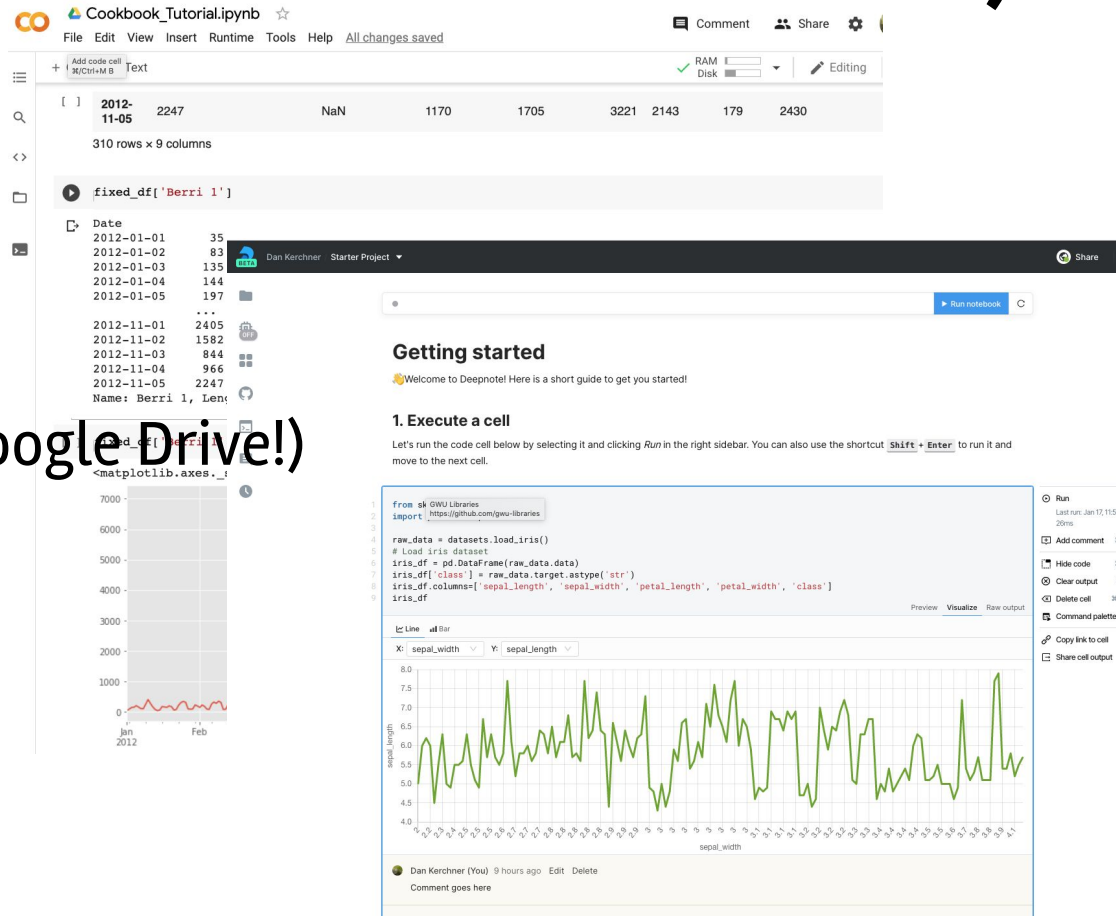


- File editor (e.g. Sublime, vim) with Python plug–in



Different ways to use Python (continued)

- "Notebooks":
  - Jupyter notebooks
  - Google Colab
    (available in your Google Drive!)
  - Kaggle notebooks
  - Deepnote
  - Binder



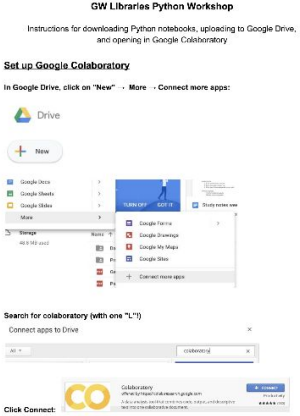
Even more ways to use Python

Anaconda = Python (and R) plus:

- **Jupyter notebooks**
- lots of libraries
  - data processing
  - analytics
  - scientific computing
  - including: **Pandas**

Setup

- Google Colaboratory colab.research.google.com



GW Libraries Python Workshop

Instructions for downloading Python notebooks, uploading to Google Drive, and opening in Google Colaboratory

Set up Google Colaboratory

In Google Drive, click on "New" → More → Connect more apps:

Drive

New

Google Docs
Google Sheets
Google Slides
More
Storage

TURN OFF GOT IT

Google Forms
Google Drawings
Google My Maps
Google Sites
Connect more apps

Search for colaboratory (with one "L"!)

Connect apps to Drive

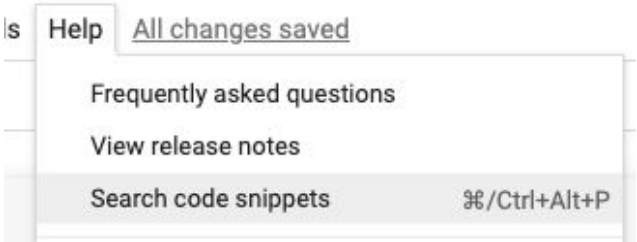
All

colaboratory

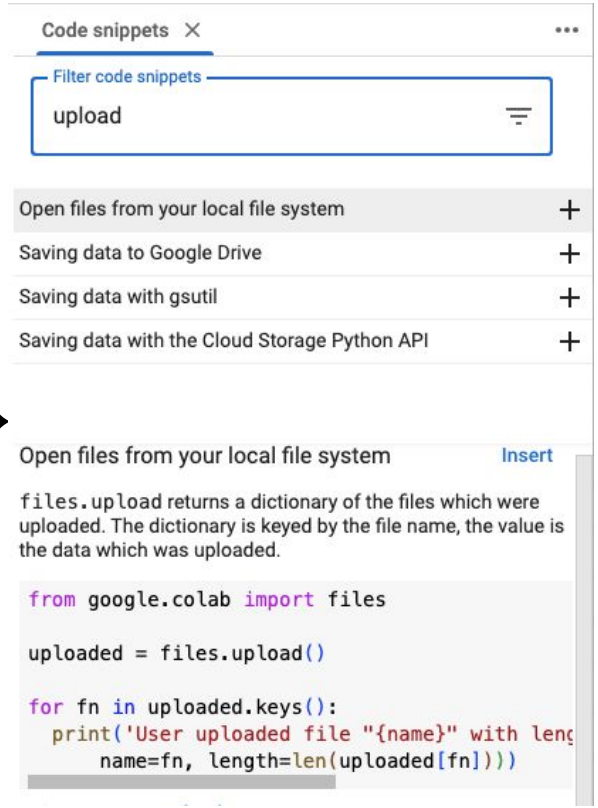
Colaboratory

Click Connect:

Uploading Data (and doing other things) in Google Colab



Use "Code Snippets" (searchable!) →



Some recommendations

- Write assuming your code will be read (incl. by Future You)
- Version your code  GitHub
- Learn to be "Pythonic" in your style
- Isolate your projects from each other – use venv
- Stuck? Try an Internet search
- Which version of Python are you using?
- Find good code examples and make them work
- Keep learning!

Some Python libraries/frameworks

Building web applications	Django Flask
Scientific/numerical	Numpy Scipy Pandas
Machine Learning	scikit-learn, tensorflow
Data Visualization (check out www.python-graph-gallery.com)	matplotlib bokeh ggplot (like ggplot2 in R) plotly (<- interactive) seaborn

Things we learned today in Python that most coding languages also share (Part 1)

- variables
- different data types: numeric, text, logical, etc.
- data structures for holding more than a single value: lists/arrays/matrices/etc.
- loops
- conditional logic (if/then)
- functions
- libraries/packages for bringing in extra functionality

Data analysis we performed today using Pandas

- loading in (reading in) a data set
- subsetting based on columns and/or
  rows based on data criteria
- exploring data variables, both numerical and
  text/categorical
- merging/joining data frames
- plotting data, with matplotlib and with ggplot2

To Learn More

- PyFlo pyflo.net ← NEW!
- Kaggle: kaggle.com/learn
- learnpython.org
- Software Carpentry, Data Carpentry (not just Python)
- docs.python.org/3/tutorial (and docs.python.org)
- GW Online: Get data off the ground with Python
- Upcoming Python workshops @ GW Libraries
- LinkedIn learning it.gwu.edu/linkedin-learning courses
  - 253 Python, 6 Pandas
- More on Pandas:
  - Pandas cookbook: github.com/jvns/pandas-cookbook
  - pandas.pydata.org/pandas-docs/stable/10min.html
  - pandas.pydata.org/pandas-docs/stable/tutorials.html
  - pandas.pydata.org/pandas-docs/stable/cookbook.html
  - www.datacarpentry.org/python-ecology-lesson/

Contact us:

Coding Consultations (with Dan & colleagues):
calendly.com/gwul-coding – Python, R, HTML/CSS/JavaScript

Stats Appointments (with Stats grad students):
go.gwu.edu/dataconsulting

Workshop Materials: go.gwu.edu/pyw

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