
# Code Like a Snake Charmer

## Introduction to Python!

Jamey Johnston, Sr. Data Scientist/Engineer
Moderated By: Hemantgiri S. Goswami

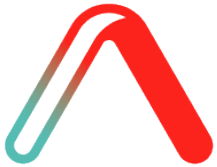
# Technical Assistance

If you require assistance during the session, type your inquiry into the question pane on the right side.

Maximize your screen with the zoom button on the top of the presentation window.

Please fill in the short evaluation following the session. It will appear in your web browser.

# Upcoming Events



PASS SUMMIT 2019
NOV 5-8 | SEATTLE WA

PASS' flagship event takes place in Seattle, Washington
November 5-8, 2019
**PASSsummit.com**

PASS MARATHON

PASS Marathon: Career Development
October 10, 2019

# Jamey Johnston

## Sr. Data Scientist/Engineer

/jameyj

@STATCowboy

Project Coach Texas A&M Analytics

### Education

Texas A&M - MS in Analytics

LSU - BS in Spatial Analysis

### Photographer

http://jamey.photos

### Blog

http://STATCowboy.com

### Code

https://github.com/STATCowboy/SnakeCharmer-Intro

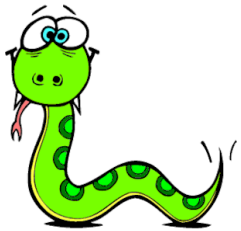
# Agenda

- Introduction to Python
- Anaconda / IDEs
- Packages
- Python and Microsoft
- Demos


Source: https://www.python.org/community/logos/

# Introduction to Python

## Why Python?



- Expansive Open Source Library of Data Science Tools (Giant Ecosystem)
- Easy language for new programmers
- Microsoft Support in tools like Azure Machine Learning, SQL Server 2017, Microsoft Machine Learning Server
- You can code on a Raspberry Pi (Who doesn't like Pi!)
- One of the most popular program languages (IEEE/GitHub ranked Python #3 in 2016)
- Interpreted language, saves you time, no compilation and linking is necessary

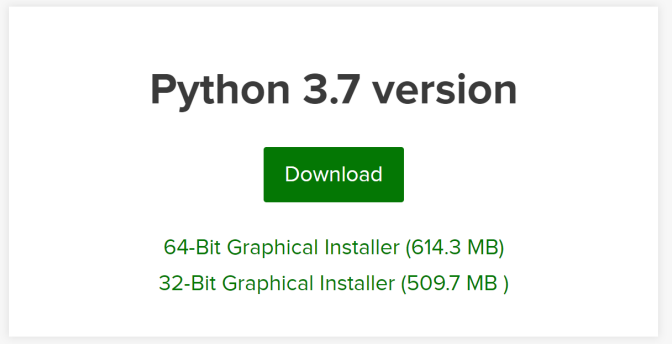
# Anaconda


Source: http://www.anaconda.com

## Anaconda

https://www.anaconda.com/download/

Download the 64-bit Python 3.7 version (still can setup Python 2.7 environments)




You can use miniconda if you don't want the full environment. (I have switched to it).

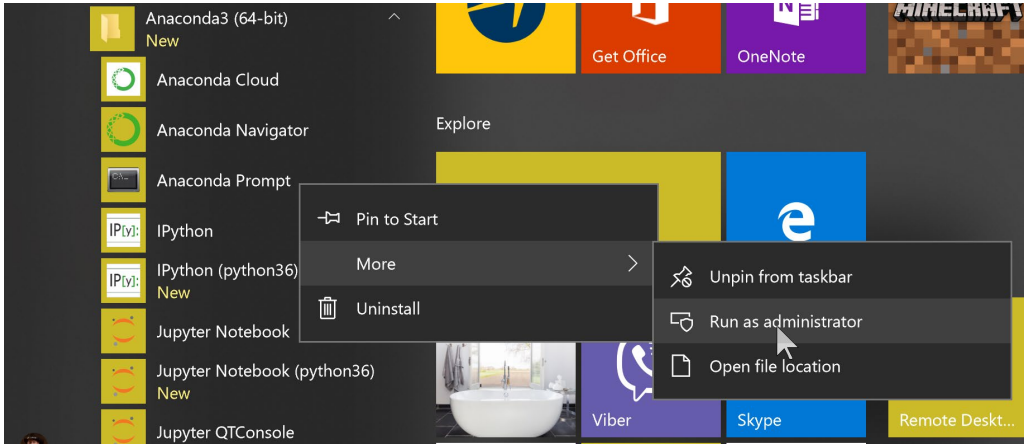
https://docs.conda.io/en/latest/miniconda.html

# Anaconda

## Conda

Open Source Package Management System and Environment Management System

Launch the “Anaconda Prompt” as Administrator to Manage Anaconda Environment



# Anaconda

## Conda Commands

- Upgrade All Anaconda
  - `conda update --all`
  - `conda update -n <env> --all`
- Setup New Environment (e.g. Python 3.7)
  1. `conda create --name python37 python=3.7`
  2. `conda activate python37`
  3. Install Packages (few examples below)
     1. `conda install seaborn`
     2. `conda install spyder`
     3. `conda install jupyter`
- Setup a Python 2.7 Environment: Use above steps and change 36 to 27 and 3.7 to 2.7

# Anaconda

## Conda Commands

- List Environments
  - `conda env list`
  - * indicates active environment
- List Packages in Environment
  - `conda list`
- Remove an Environment
  - `conda env remove --name deleteme`
- Update Package
  - `conda update PACKAGENAME`

https://conda.io/docs/_downloads/conda-cheatsheet.pdf

# Anaconda

## Conda Commands

- Export Conda Environment to YAML file to build a new environment
  - `conda env export > <filename>.yml`
  - * activate the environment to export first
- Create Conda environment from YAML file
  - `conda env create -f <filename>.yml –n <ENV NAME>`

https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html

# Packages

## pip

PyPA recommended tool for installing Python packages

Some packages are not in the conda repository (e.g. latest tensorflow packages)

```
pip install tensorflow
```

## conda

Anaconda Distribution package manager (Use conda if using Anaconda)

Generally, try conda first before pip but always look at the package instructions first.

```
conda install pyodbc
```

# Packages

## Import Module from Package

Import sys and show Python version/distribution

```
import sys
sys.version
```

PYODBC/Pandas Example

```
import pyodbc
import pandas.io.sql as psql
```

# Packages

## Popular Packages

| PACKAGE | DETAILS |
| --- | --- |
| pandas | High performance, easy use data structures and analysis (DataFrames) |
| pyodbc | Open Source Python Module for ODBC data sources |
| matplotlib | 2D Plotting library |
| scikit-learn | Simple tool for data mining and data analysis / statistics |
| numpy | N-dimensional arrays, linear algebra, random numbers |
| SciPy | Math, Stats, Science and Engineering package |

# Packages

- Demo

# Conda

- Demo

# Python IDE

## PyCharm

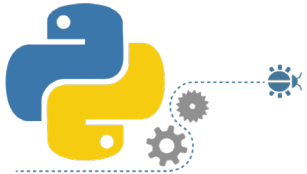
https://www.jetbrains.com/pycharm/


## Spyder

Included in Anaconda Distribution


## Visual Studio Code

https://code.visualstudio.com/docs/languages/python
https://code.visualstudio.com/docs/python/python-tutorial
https://marketplace.visualstudio.com/items?itemName=ms-python.python

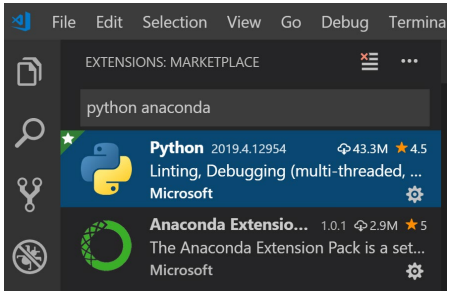


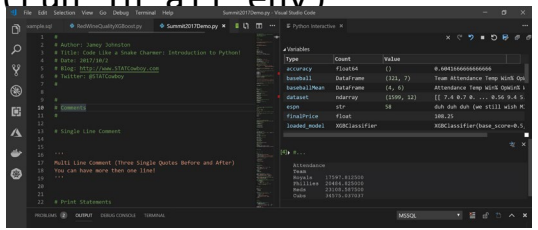
# Visual Studio Code

## VS Code Python Shortcuts

https://code.visualstudio.com/docs/python/python-tutorial

- Command Palette (CP) – `Ctl+Shift+P`
- Select Python Interpreter (in CP) – `Python: Select Interpreter`
- Run Selection/Line in Python Terminal – `Shift+Enter`
- Install pylint for Highlighting Syntax – `conda install pylint (run in all env)`
- Install Python and Anaconda Extensions
- IPython console support in Python Interactive window



# PyCharm


## PyCharm Shortcuts

https://www.jetbrains.com/help/pycharm/2016.1/keyboard-shortcuts-you-cannot-miss.html

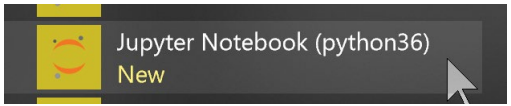
https://www.jetbrains.com/help/pycharm/keyboard-shortcuts-by-category.html

- Run – `Alt+Shift+F10`
- Run Selection / Current Line – `Alt+Shift+E`
- Comment / Uncomment Code – `Ctrl+Slash / Ctl+Shift+Slash`
- Invoke Code Completion – `Ctl+Space`
- Indent / Un-indent (selection of code) – `Tab / Ctl+Tab`

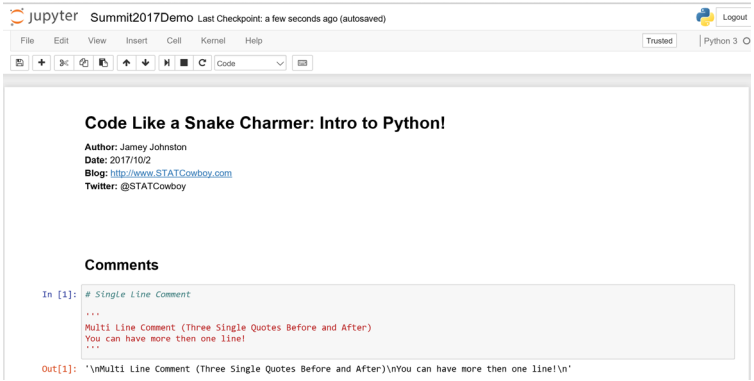
# Jupyter Notebooks


## Computer Code and Rich Text

http://jupyter-notebook.readthedocs.io/en/latest/




- Activate desired environment first
- Then to Start a Notebook – `jupyter notebook`



# IDE / Tools

- Demo

# Python and Microsoft SQL Server 2017

## sp_execute_external_script

Executes Python via T-SQL in MSSQL 2017

Install Machine Learning Services (In-Database)

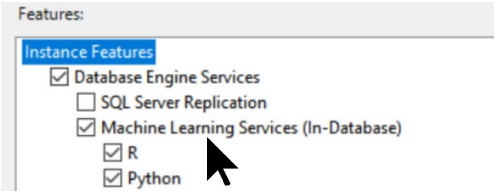
Anaconda Distribution installed with MLS

New revoscalepy library – scale and performance

Executes outside the SQL Server process

Data returned as a pandas data frame

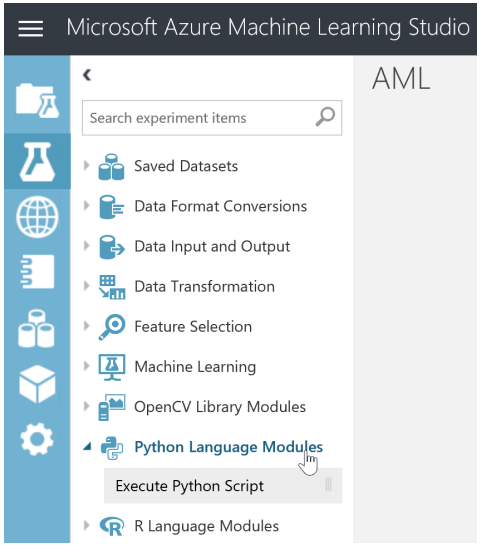
Also, supports R

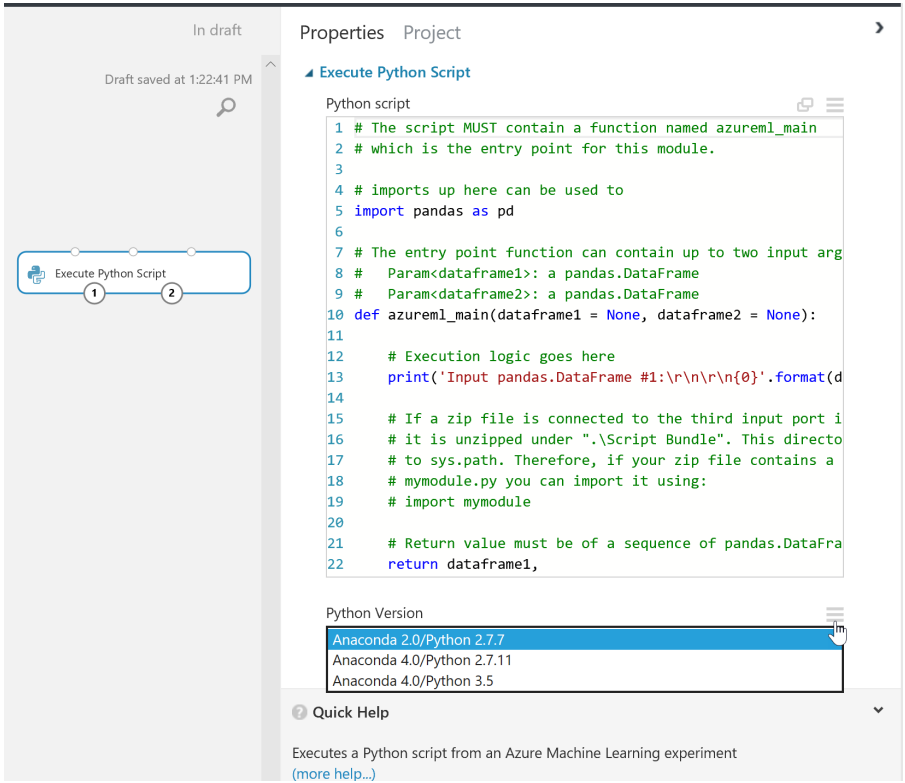



```
sp_execute_external_script
    @language = N'language' ,
    @script = N'script',

    @input_data_1 = ] 'input_data_1'
    [ , @input_data_1_name = ] N'input_data_1_name' ]
    [ , @output_data_1_name = 'output_data_1_name' ]
    [ , @parallel = 0 | 1 ]
    [ , @params = ] N'@parameter_name data_type [ OUT | OUTPUT ] [ ,...n ]'
    [ , @parameter1 = ] 'value1' [ OUT | OUTPUT ] [ ,...n ]
    [ WITH <execute_option> ]
[;]

<execute_option>::=
{
      { RESULT SETS UNDEFINED }
    | { RESULT SETS NONE }
    | { RESULT SETS ( <result_sets_definition> ) }
}

<result_sets_definition> ::=
{
    (
        { column_name
          data_type
        [ COLLATE collation_name ]
        [ NULL | NOT NULL ] }
        [,...n ]
    )
    | AS OBJECT
       [ db_name . [ schema_name ] . | schema_name . ]
       {table_name | view_name | table_valued_function_name }
    | AS TYPE [ schema_name.]table_type_name
}
```

# Python and Azure Machine Learning

## Execute Python Script



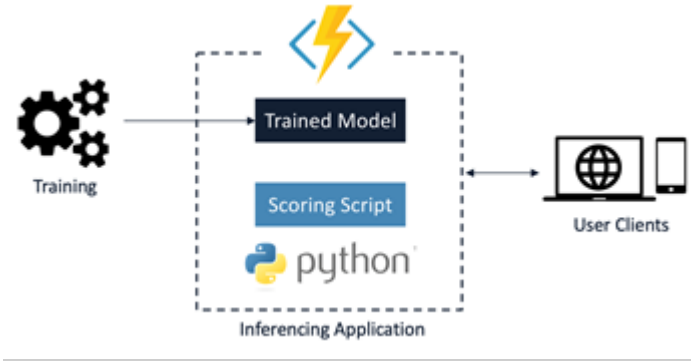



# Python and Azure Functions

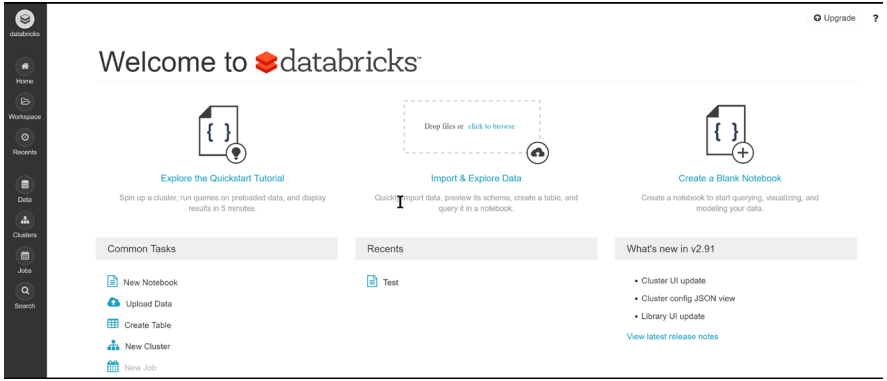
## Serverless Compute Platform

https://azure.microsoft.com/en-us/services/functions/

https://azure.microsoft.com/en-us/blog/announcing-the-general-availability-of-python-support-in-azure-functions/



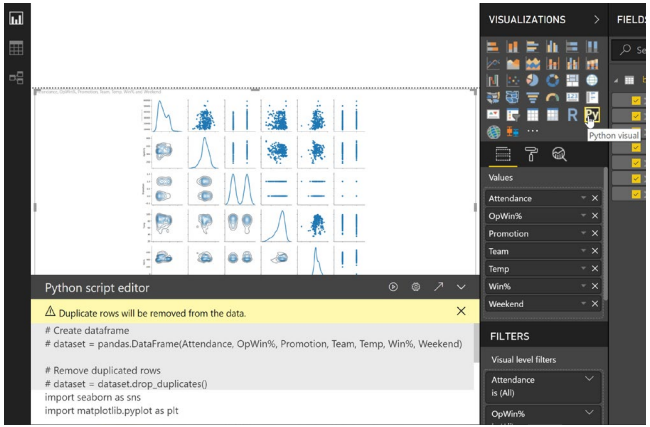
# Python and Azure Databricks

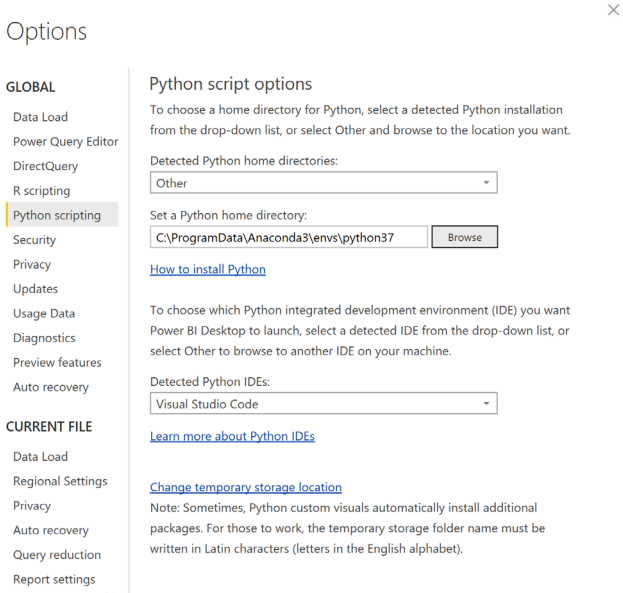




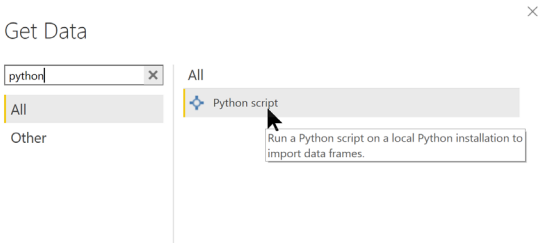
## Workbooks

# Python and Power BI




## Visuals/Scripts





## Set Env

24HOURS OF PASS

# MS & Python

- Demo

# References

## Python Docs

https://docs.python.org/3/reference/introduction.html

## Coursera

https://www.coursera.org/specializations/python

## MS Academy

https://academy.microsoft.com/en-us/professional-program/tracks/data-science/

# References

## The Hitchhiker's Guide to Python!

http://docs.python-guide.org/en/latest/

## Code Academy

https://www.codecademy.com/en/tracks/python

## Google

https://developers.google.com/edu/python/?hl=en

# Questions?


# Coming up next…

## AI Builder for Automated Form Processing in Power Apps and Flow

Leila Etaati

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# Thank you for attending

## Learn more from Jamey Johnston

@STATCowboy

@sqlpass
#sqlpass

@PASScommunity


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