Overview of Data Analysis with Python

Follow along at: http://bit.ly/data-analysis-python

See the code at: http://bit.ly/data-analysis-python-code

What is Python?

- Open-source programming langage
- Useful in standalone scripts or powering fully-featured applications
- Strong support for data analysis and visualization, as well as other programming tasks

Using Jupyter Notebook

- Type code into a block and run the block
- You can also press Shift + Enter to run a block
- The output (if any) will print below
- You can type as much or as little code as you'd like
- You can re-run the block as many times as you'd like

Your student number is:__________

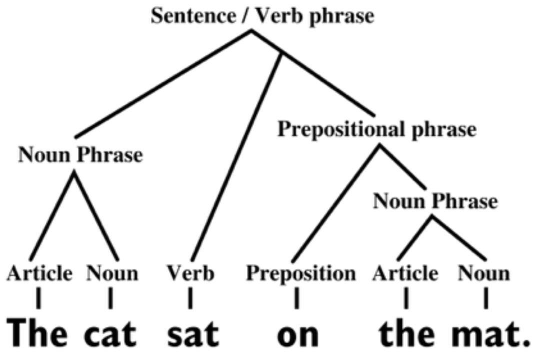
Your weblink is: **http://student   .datapolitan.com/julia**

Username: **rstudio**

Password: **rstudio**

What is Syntax?

Basic constituent structure analysis of a sentence:



Python Syntax

- Variables hold some value
- We create variables and assign a value using the = sign
- We can perform operations with mathematical operators
- We can use built-in functions for operations
- Reference a particular column like df['Column Name’]
- Use a dot (.) to call a function on an object

Analyzing the Old Faithful Data

- Import the data
- Inspect the data
- Count the number of rows
- Find the range of values
- Find the mean (average)
- Find the median (middle)

Function Chaining

- We can string operations together using the dot method
- This means we can chain operations using a dot between operations
- Python executes these from left to right (like we read)
- This is a paradigm called object-oriented programming
- You don't need to fully understand this to program in Python but it helps

Your Turn

- How many columns are in the data?
- How many rows are in the data?
- What is the time range of the data?
- Which borough has the most complaints?
- Which Complaint Type has the most service requests?
- And why might that be a little misleading?
- Bonus Question: Find the Location Type that has the most rodent complaints

Key pandas Functions

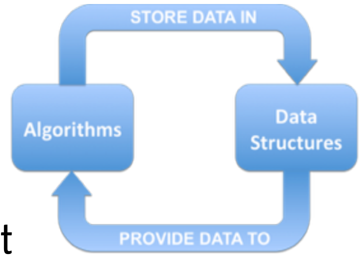
- **read_csv()** - import file from CSV (**read_excel()**)
- **head()** & **tail()** - first and last 5 rows of data frame
- **count()** - count of all rows in column
- **max()** & **min()** - max and min values in column
- **mean()** & **median()** - mean and median values of numbers in column
- **describe()** - summary statistics for data frame
- **hist()** - create a histogram of values
- **groupby()** - group values together in data frame
- **sort_values()** - sort by values

What we've covered

- Basic Python syntax
- Working in Jupyter
- Opening a dataset
- Exploring a dataset
- Visualizing a dataset

What we haven't covered

- Data Structures
- Algorithms
- More Packages and there are a lot of packages
- How to be Pythonic
- How to use APIs
- So much more...



Final Thoughts

- Python is a powerful tool for cleaning, analyzing, and visualizing data
- Integrating it into your workflow takes practice and a commitment to not giving up (Google is your friend)
- Distributions like Anaconda make it easy to get started (and you should be able to install it on your work computer)
- It's best if you just start off with Python 3 (what we've been using)

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Resources

- Python for Data Analysis (http://shop.oreilly.com/product/0636920023784.do) - The textbook on using pandas for data analysis (2nd edition coming soon)
- Beginner's Python Tutorial (https://en.wikibooks.org/wiki/A_Beginner%27s_Python_Tutorial)- A good way to get started with basic tasks
- Stack Overflow (http://stackoverflow.com/)- One of the best Q&A sites for technical questions of all kinds