

Jupyter Organization Tips



Introduction

All of these slides are **recommendations**.

Goals:

- Reproducible Analysis
- Readable Code
- Understandable by others (and your future self)

General Guidelines for Python Code

[PEP 8 - Style Guide for Python Code](#)

Guidelines to improve readability and consistency of code.



Recommendations

Name your notebooks!



Files

Running

Clusters

Select items to perform actions on them.



0



/



Untitled.ipynb



Untitled1.ipynb



Untitled2.ipynb



Building_Permits_Issued.csv

Recommendations

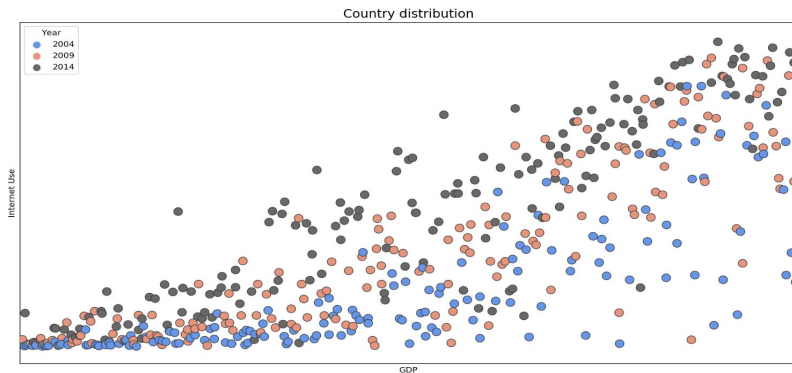
Use Markdown to annotate
your workflow.

Comment code when
appropriate.

Country GDP and internet usage distributions

Plotting of Year with x-axis as GDP_Per_Capita and y-axis as Internet_Users_Pct.

```
In [8]: plt.figure(figsize=(16,8), clear=True);  
  
ax1 = sns.stripplot(x="GDP_Per_Capita",  
                    y="Internet_Users_Pct",  
                    data=df_04_09_14,  
                    jitter=2,  
                    hue="Year",  
                    size=10,  
                    linewidth=.8,  
                    dodge=True);  
  
ax1.set_xlabel('GDP');  
ax1.set_ylabel('Internet Use');  
ax1.set_yticks([]);  
ax1.set_xticks([]);  
ax1.axes.set_title('Country distribution', fontsize=15);
```



Observing the plot ax1 above, we notice that in general, there looks to be a positive correlation between GDP and internet usage. This correlation seems strongest in years 2009 and 2014.

```
In [ ]: # Data contains two lines of description text, skip to avoid errors.  
df = pd.read_csv('data.csv', skiprows=2)
```

Recommendations

Keep imports in
the first cell

```
In [1]: import pandas as pd
import matplotlib.pyplot as plt

%matplotlib inline
```

```
In [2]: crashes = pd.read_csv('crashes_2018.csv')
```

```
In [3]: crashes.head(2)
```

Out[3]:

	Accident Number	Date and Time	Number of Motor Vehicles	Number of Injuries	Number of Fatalities	Property Damage	Hit and Run	Reporting Officer	Collision Type Code	Collision Type Description	...	Harmful Code Description	Street Address
0	20181075326	12/31/2018 11:10:00 PM	1.0	0	0	NaN	N	240964.0	0.0	NOT COLLISION W/MOTOR VEHICLE-TRANSPORT	...	CURB;SHRUBBERY	ROCKWOOD DR & SADDLESTONE DR
1	20181075323	12/31/2018 11:09:00 PM	3.0	1	0	NaN	N	110062.0	4.0	ANGLE	...	MOTOR VEHICLE IN TRANSPORT;PARKED MOTOR VEHICLE	SPRING ST & N 1ST ST

2 rows x 25 columns

```
In [5]: crashes = crashes.drop(columns = 'Weather Code')
```

```
In [7]: crashes.head(2)
```

Out[7]:

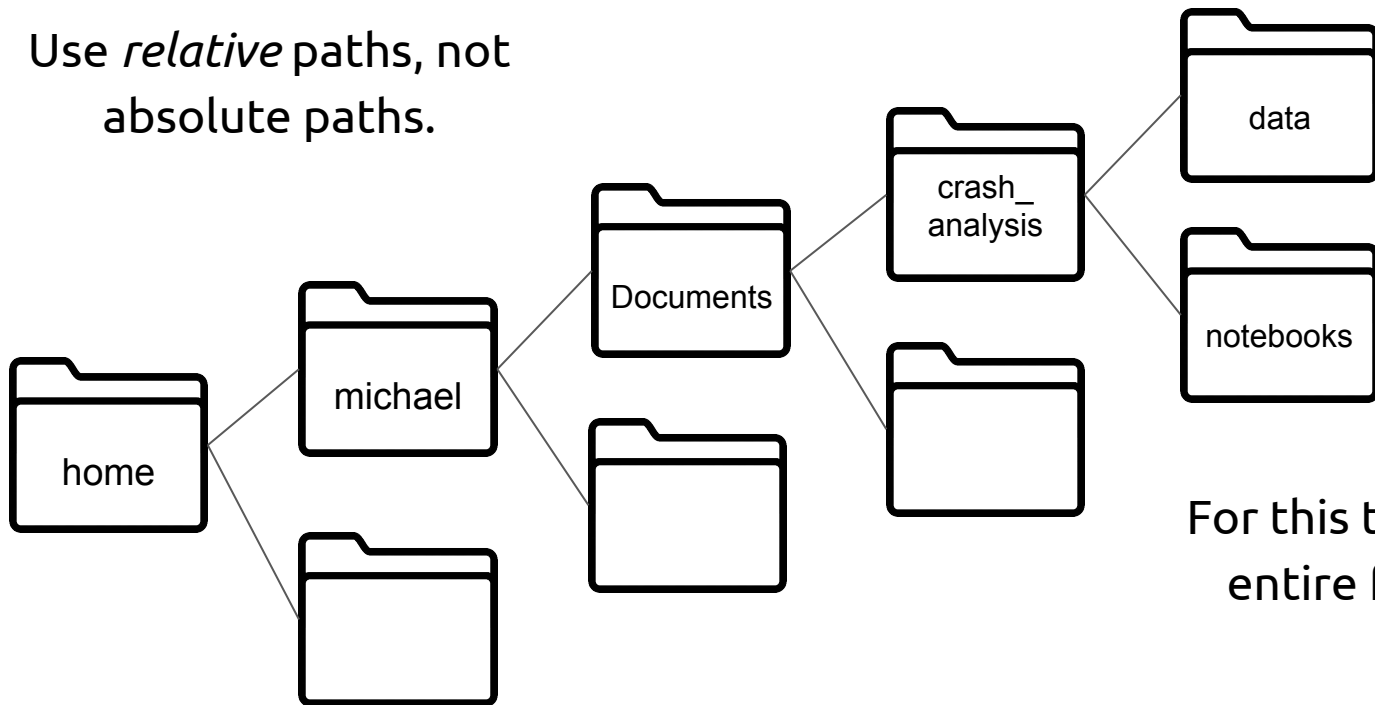
	Accident Number	Date and Time	Number of Motor Vehicles	Number of Injuries	Number of Fatalities	Property Damage	Hit and Run	Reporting Officer	Collision Type Code	Collision Type Description	...	Harmful Code Description	Street Address
										NOT			ROCKWOOD

Remove
old/unnecessary
code

Recommendations

```
crashes = pd.read_csv('/home/michael/Documents/crash_analysis/data/crashes_2018.csv')
```

Use *relative* paths, not absolute paths.

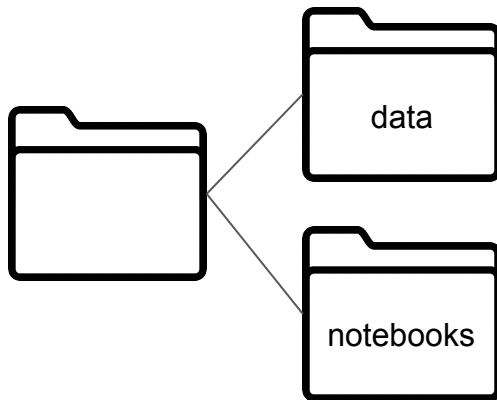


For this to work, I need the entire folder structure!

Recommendations

```
crashes = pd.read_csv('../data/crashes_2018.csv')
```

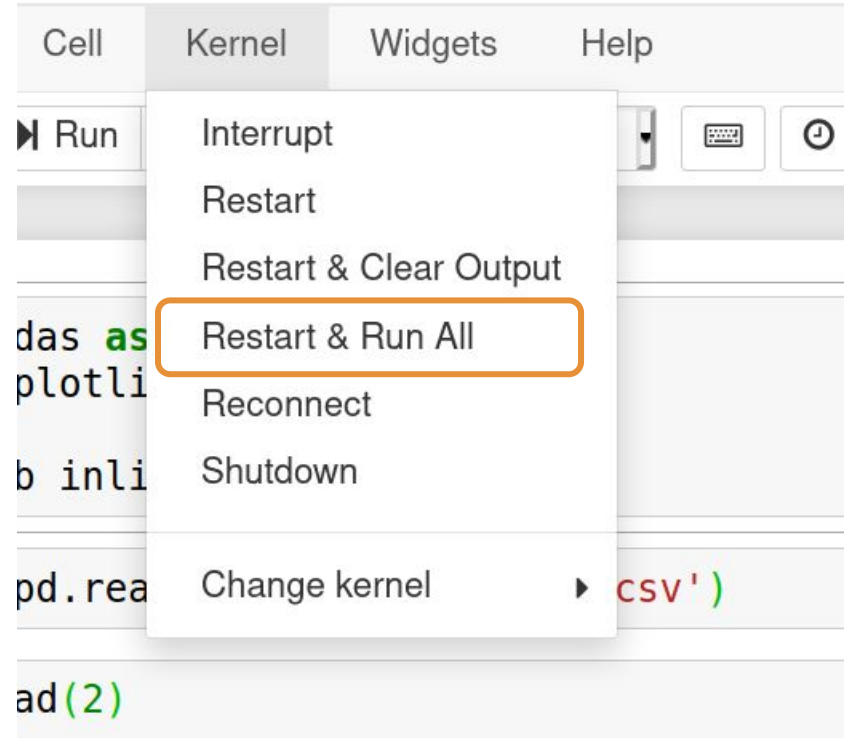
Use *relative* paths, not absolute paths.



For this to work, I only need the folder structure within the project folder.

Recommendations

Periodically check that
you can Restart & Run All
error-free.



Recommendations

- Combine together multiple cells if they don't produce output
- Take advantage of method chaining

```
In [4]: crashes = crashes.drop(columns = ['Weather Code', 'Illumination Code', 'Harmful Code', 'Mapped Location'])
```

```
In [5]: crashes = crashes.rename(columns = lambda col: col.lower().replace(' ', '_'))
```

```
In [6]: crashes = crashes.dropna(subset = ['latitude', 'longitude'])
```



```
In [4]: crashes = crashes.drop(columns = ['Weather Code', 'Illumination Code', 'Harmful Code', 'Mapped Location'])  
crashes = crashes.rename(columns = lambda col: col.lower().replace(' ', '_'))  
crashes = crashes.dropna(subset = ['latitude', 'longitude'])
```

Recommendations

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```
In [4]: crashes = (crashes
    .drop(columns = ['Weather Code', 'Illumination Code', 'Harmful Code', 'Mapped Location'])
    .rename(columns = lambda col: col.lower().replace(' ', '_'))
    .dropna(subset = ['latitude', 'longitude'])
    )
```

Recommendations

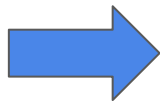
- Think carefully about **exploration** vs **explanation**.
 - Exploration: Preparing/getting to know the data
 - Explanation: What you want to show to other people
- Consider multiple notebooks for different tasks:
 - Initial cleaning and preparation
 - Exploratory Analysis
 - Model Building
 - Presentation

Recommendations

DRY: Don't Repeat Yourself:

- Covert repetitive code blocks into reusable functions.
- Avoid Copy/Paste
- Utilize for loops and list comprehensions
- Use functions to abstract away complexity.

```
# ugly example  
pd.qcut(df['Fare'], q=4, retbins=True)[1]  
# returns array([0., 7.8958, 14.4542, 31.275, 512.3292])  
  
df.loc[ df['Fare'] <= 7.90, 'FareBand'] = 0  
df.loc[(df['Fare'] > 7.90) & (df['Fare'] <= 14.454), 'FareBand'] = 1  
df.loc[(df['Fare'] > 14.454) & (df['Fare'] <= 31.275), 'FareBand'] = 2  
df.loc[ df['Fare'] > 31.275, 'FareBand'] = 3
```



```
# after refactoring into a function  
df['FareBand'] = categorize_column(df['Fare'],  
                                   num_bins=4)
```

Other Recommendations

This notebook on creating reproducible research in Jupyter:

<https://www.kaggle.com/rtatman/reproducible-research-best-practices-jupyterc>
[on](#)

Cookiecutter Data Science:

<https://drivendata.github.io/cookiecutter-data-science/>

- A template for data science/analytics work
- Probably overkill for us, but there are some useful principles that I recommend adopting (eg. a folder for data and a folder for notebooks, using sensible naming conventions for your notebooks).