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Section: CPE22S3

Instructions:

Create a Python notebook to answer all shown procedures, exercises and analysis in this section.

Resources:

Download the following datasets: earthquakes-1.csv Download earthquakes-1.csv, fb_stock_prices_2018.csv Download fb_stock_prices_2018.csv

Procedures:

- 9.1 Introduction to Matplotlib
- 9.2 Plotting with Pandas
- 9.3 Pandas Plotting Subpackage

Data Analysis:

Provide comments on output from the procedures above.

Supplementary Activity:

Using the CSV files provided and what we have learned so far in this module complete the following exercises:

1. Plot the rolling 20-day minimum of the Facebook closing price with the pandas plot() method.
2. Create a histogram and KDE of the change from open to close in the price of Facebook stock.
3. Using the earthquake data, create box plots for the magnitudes of each magType used in Indonesia.
4. Make a line plot of the difference between the weekly maximum high price and the weekly minimum low price for Facebook. This should be a single line.
5. Using matplotlib and pandas, create two subplots side-by-side showing the effect that after-hours trading has had on Facebook's stock price:
    - The first subplot will contain a line plot of the daily difference between that day's opening price and the prior day's closing price (be sure to review the Time series section of Aggregating Pandas DataFrames for an easy way to do this).
    - The second subplot will be a bar plot showing the net effect this had monthly, using resample().
    - Bonus #1: Color the bars according to whether they are gains in the stock price (green) or drops in the stock price (red).

- Bonus #2: Modify the x-axis of the bar plot to show the threeletter abbreviation for the month.

Summary/Conclusion:

Provide a summary of your learnings and the conclusion for this activity.

```
import matplotlib.pyplot as plt
import pandas as pd

#Read the csv for fb_stock and earthquake
fb = pd.read_csv('data/fb_stock_prices_2018.csv', index_col='date', parse_dates=True)
eq = pd.read_csv('data/earthquakes-1.csv')
```

```
fb
```

date	open	high	low	close	volume
2018-01-02	177.68	181.58	177.5500	181.42	18151903
2018-01-03	181.88	184.78	181.3300	184.67	16886563
2018-01-04	184.90	186.21	184.0996	184.33	13880896
2018-01-05	185.59	186.90	184.9300	186.85	13574535
2018-01-08	187.20	188.90	186.3300	188.28	17994726
...	...	...	...	...	...
2018-12-24	123.10	129.74	123.0200	124.06	22066002
2018-12-26	126.00	134.24	125.8900	134.18	39723370
2018-12-27	132.44	134.99	129.6700	134.52	31202509
2018-12-28	135.34	135.92	132.2000	133.20	22627569
2018-12-31	134.45	134.64	129.9500	131.09	24625308

251 rows × 5 columns

```
eq
```

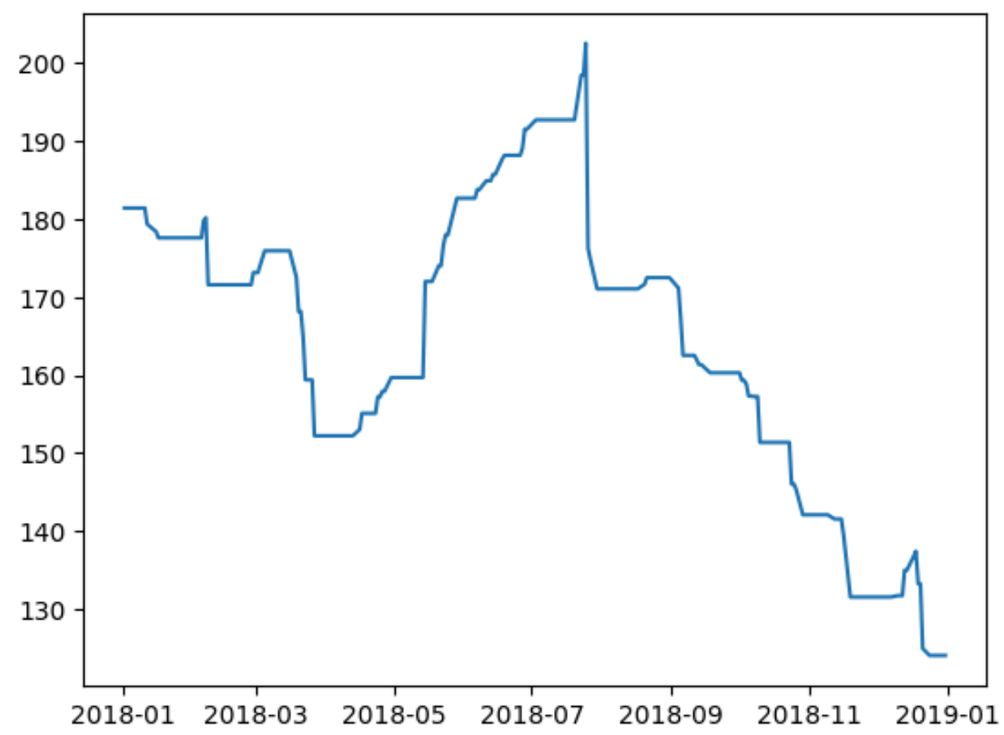
	mag	magType	time	place	tsunami	parsed_place
0	1.35	ml	1539475168010	9km NE of Aguanga, CA	0	California
1	1.29	ml	1539475129610	9km NE of Aguanga, CA	0	California
2	3.42	ml	1539475062610	8km NE of Aguanga, CA	0	California
3	0.44	ml	1539474978070	9km NE of Aguanga, CA	0	California
4	2.16	md	1539474716050	10km NW of Avenal, CA	0	California
...	...	...	...	...	...	...
9327	0.62	md	1537230228060	9km ENE of Mammoth Lakes, CA	0	California
9328	1.00	ml	1537230135130	3km W of Julian, CA	0	California
9329	2.40	md	1537229908180	35km NNE of Hatillo, Puerto Rico	0	Puerto Rico
9330	1.10	ml	1537229545350	9km NE of Aguanga, CA	0	California
9331	0.66	ml	1537228864470	9km NE of Aguanga, CA	0	California

9332 rows × 6 columns

1. Plot the rolling 20-day minimum of the Facebook closing price with the pandas plot() method.

```
plt.plot(fb.close.rolling('20D').min()) #Getting it per 20d
```

```
[<matplotlib.lines.Line2D at 0x7bd9dc05f0a0>]
```



2. Create a histogram and KDE of the change from open to close in the price of Facebook stock.

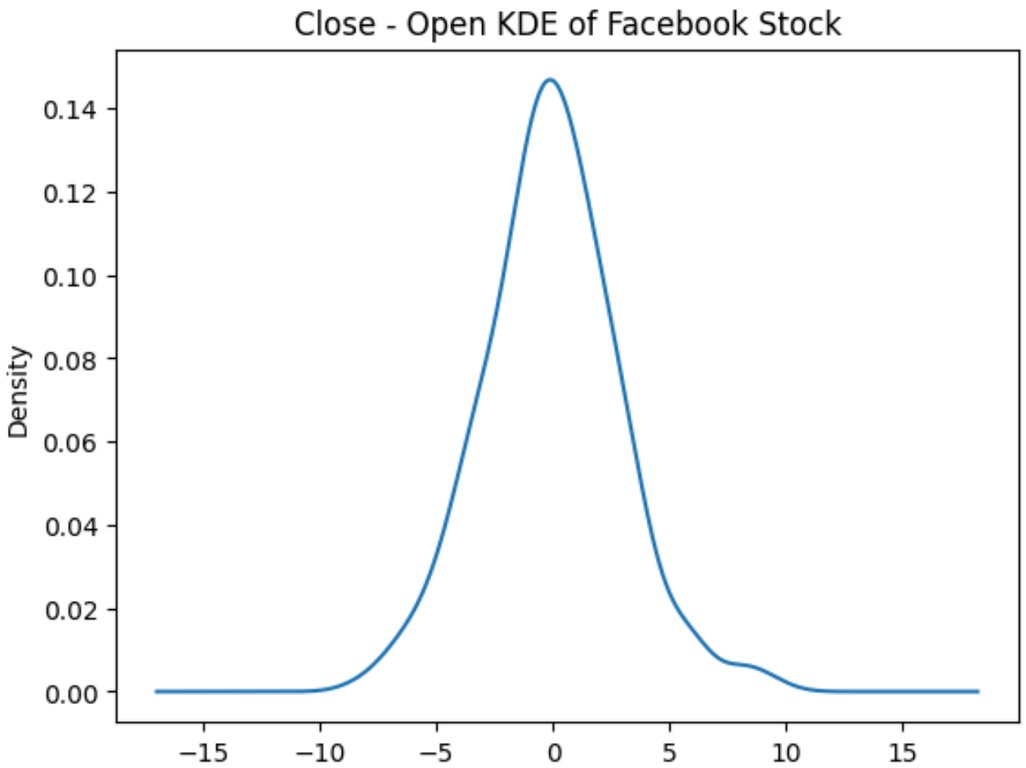
```
fb['DifferenceOC'] = fb['open'] - fb['close'] #Subtracting open and close to get the change

fb.DifferenceOC
```

```
date
2018-01-02   -3.74
2018-01-03   -2.79
2018-01-04    0.57
2018-01-05   -1.26
2018-01-08   -1.08
              ...
2018-12-24   -0.96
2018-12-26   -8.18
2018-12-27   -2.08
2018-12-28    2.14
2018-12-31    3.36
Name: DifferenceOC, Length: 251, dtype: float64
```

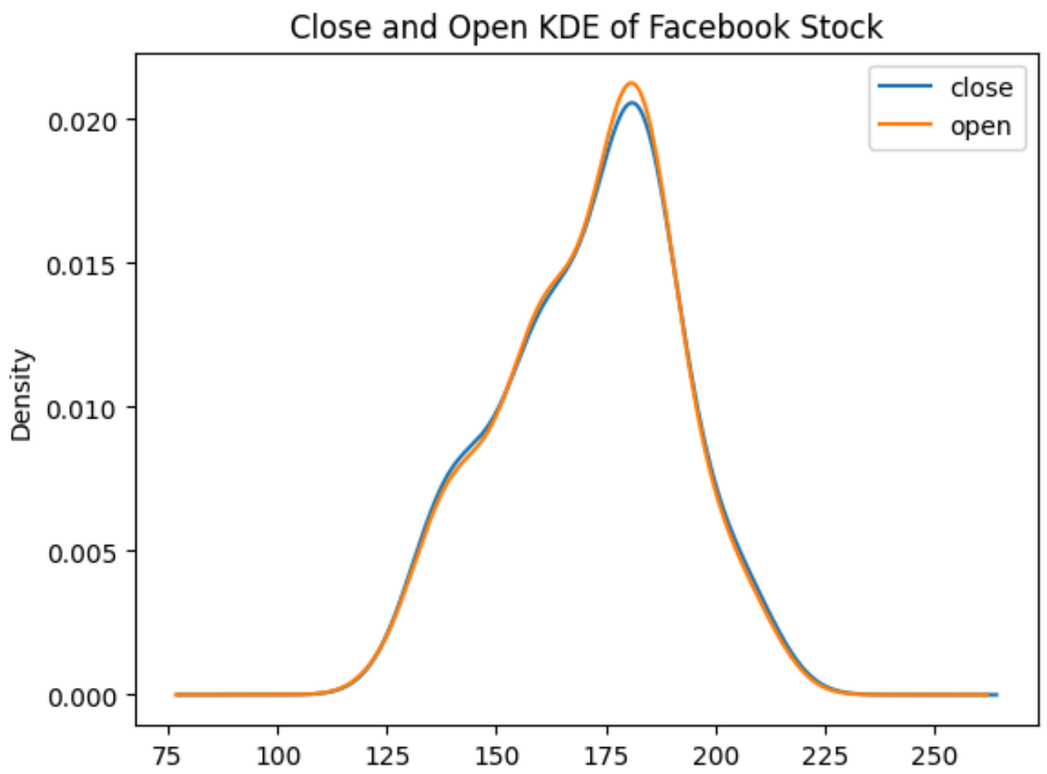
```
fb.DifferenceOC.plot(
    kind='kde',
    title = 'Close - Open KDE of Facebook Stock'
)
```

```
<Axes: title={'center': 'Close - Open KDE of Facebook Stock'}, ylabel='Density'>
```



```
fb.plot(
    kind='kde',
    y = ['close', 'open'],
    title = 'Close and Open KDE of Facebook Stock'
)
```

```
<Axes: title={'center': 'Close and Open KDE of Facebook Stock'}, ylabel='Density'>
```



3. Using the earthquake data, create box plots for the magnitudes of each magType used in Indonesia.

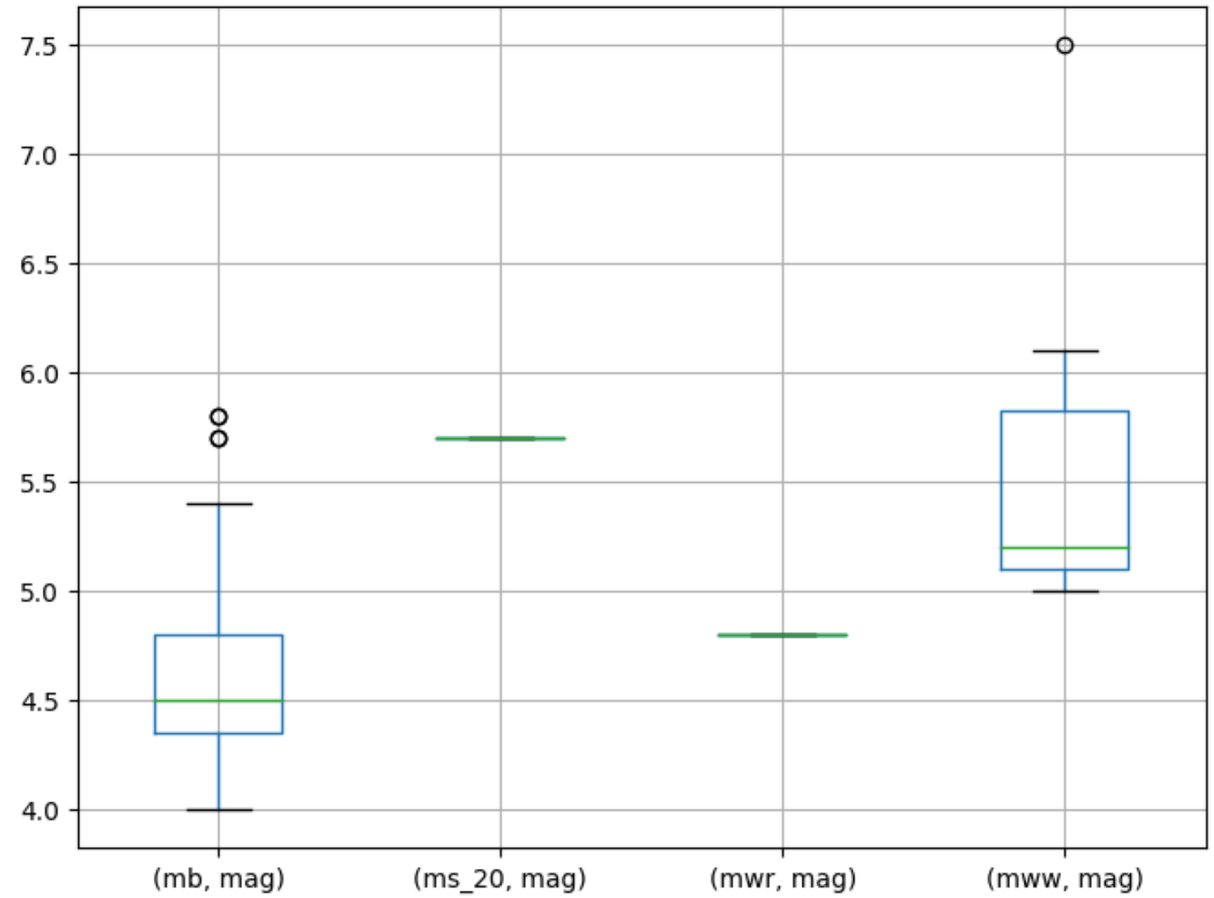
```
indo = eq.query('parsed_place == "Indonesia"')
indo
#simplfiying the data with only Indonesia in parsed_place
```

	mag	magType	time	place	tsunami	parsed_place
9	4.7	mb	1539472814760	219km SSE of Saparua, Indonesia	0	Indonesia
13	4.5	mb	1539470898340	120km SSW of Banda Aceh, Indonesia	0	Indonesia
180	5.2	mww	1539405255580	25km E of Bitung, Indonesia	0	Indonesia
421	4.7	mb	1539331098920	38km SSW of Nggongi Satu, Indonesia	0	Indonesia
660	4.4	mb	1539258833830	51km WSW of Kasiguncu, Indonesia	0	Indonesia
...	...	...	...	...	...	...
9041	4.3	mb	1537296305750	7km WSW of Karangsubagan, Indonesia	0	Indonesia
9075	4.4	mb	1537288723310	103km W of Kuripan, Indonesia	0	Indonesia
9108	4.0	mb	1537280181100	123km NE of Bitung, Indonesia	0	Indonesia
9209	4.7	mb	1537256021950	18km NE of Reuleuet, Indonesia	0	Indonesia
9212	4.7	mb	1537255636260	2km ESE of Lokokrangan, Indonesia	0	Indonesia

147 rows × 6 columns

```
indo[['mag', 'magType']].groupby('magType').boxplot(
    figsize=(8,6), subplots = False
)
```

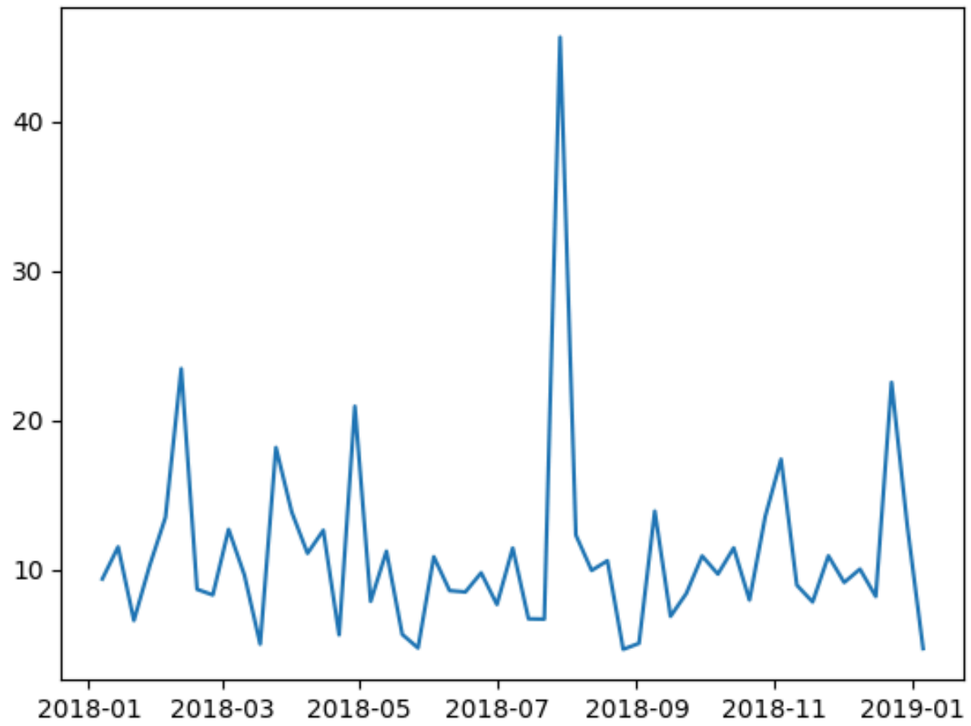
<Axes: >



4.Make a line plot of the difference between the weekly maximum high price and the weekly minimum low price for Facebook. This should be a single line.

```
fbw = fb.resample('W').agg({'high': 'max',
                            'low' : 'min'})
fbw['HL_Diff'] = fbw['high'] - fbw['low']
plt.plot(fbw.HL_Diff)
#Getting the Max/high and Low/Min and get the difference
```

```
[<matplotlib.lines.Line2D at 0x7bd9dbb2cbe0>]
```



5.Using matplotlib and pandas, create two subplots side-by-side showing the effect that after-hours trading has had on Facebook's stock price:

- The first subplot will contain a line plot of the daily difference between that day's opening price and the prior day's closing price (be sure to review the Time series section of Aggregating Pandas DataFrames for an easy way to do this).
    - The second subplot will be a bar plot showing the net effect this had monthly, using resample().
    - Bonus #1: Color the bars according to whether they are gains in the stock price (green) or drops in the stock price (red).
    - Bonus #2: Modify the x-axis of the bar plot to show the threeletter abbreviation for the month.

```
fig, ax = plt.subplots(2, figsize =[15,15])

diff= fb['open']- fb['close']
neteff = diff.resample('M').sum()

diff.plot(ax = ax[0])

ax[0].set_xlabel('dates')
ax[0].set_ylabel('values')
ax[0].set_title('Daily Difference between Opening and Closing Price')

clr=['red', 'green', 'red', 'green', 'red', 'red', 'red', 'green', 'red', 'green', 'red', 'green']
```

```
neteff.plot(kind = 'bar', ax = ax[1], color = clr)

ax[1].set_xlabel('Dates')
ax[1].set_ylabel('Values')
ax[1].set_xticklabels(neteff.index.strftime('%b'))
ax[1].set_title('Monthly Net Effect')
```

```
Text(0.5, 1.0, 'Monthly Net Effect')
```