Solutions

About the Data

In this notebook, we will be working with 2 datasets:

- Facebook's stock price throughout 2018 (obtained using the `stock_analysis` package)
- Earthquake data from September 18, 2018 - October 13, 2018 (obtained from the US Geological Survey (USGS) using the USGS API)

Setup

```
%matplotlib inline
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd

fb = pd.read_csv('../../ch_05/data/fb_stock_prices_2018.csv',
index_col='date', parse_dates=True)
quakes = pd.read_csv('../../ch_05/data/earthquakes.csv')
```
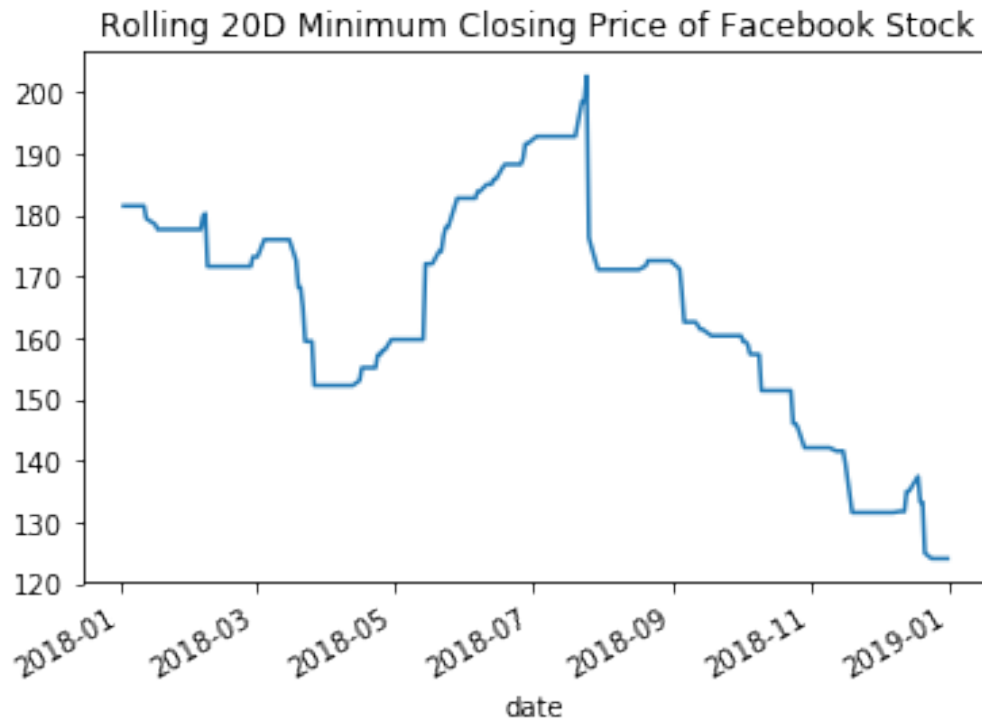
Exercise 1

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

```
fb.close.rolling('20D').min().plot(title='Rolling 20D Minimum Closing
Price of Facebook Stock')

<matplotlib.axes._subplots.AxesSubplot at 0xfde50b0>
```

Rolling 20D Minimum Closing Price of Facebook Stock

Exercise 2

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

```
series = fb.assign(differential=fb.open - fb.close).differential
ax = series.plot(kind='hist', density=True, alpha=0.3)
series.plot(kind='kde', color='blue', ax=ax, title='Facebook Stock
Price\'s Daily Change from Open to Close')

<matplotlib.axes._subplots.AxesSubplot at 0x11231df0>
```

Facebook Stock Price's Daily Change from Open to Close
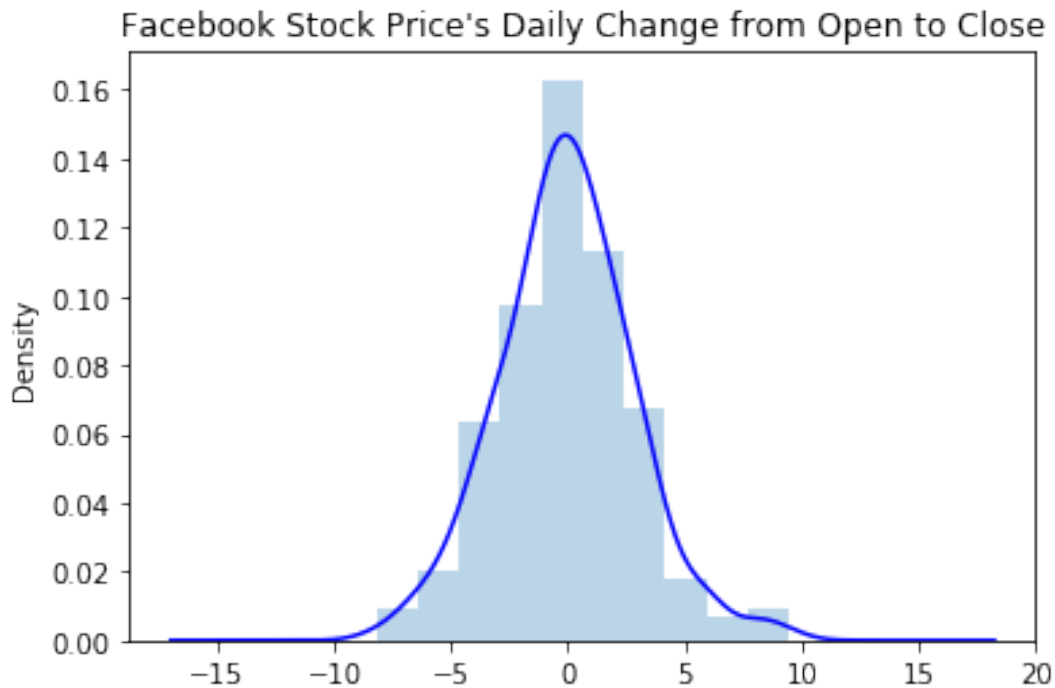
Exercise 3

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

```
quakes.query(
    'parsed_place == "Indonesia"'
)[['mag', 'magType']].groupby('magType').boxplot(
    layout=(1, 4), figsize=(15, 3)
)

mb           AxesSubplot(0.1,0.15;0.173913x0.75)
ms_20     AxesSubplot(0.308696,0.15;0.173913x0.75)
mwr       AxesSubplot(0.517391,0.15;0.173913x0.75)
mww       AxesSubplot(0.726087,0.15;0.173913x0.75)
dtype: object
```
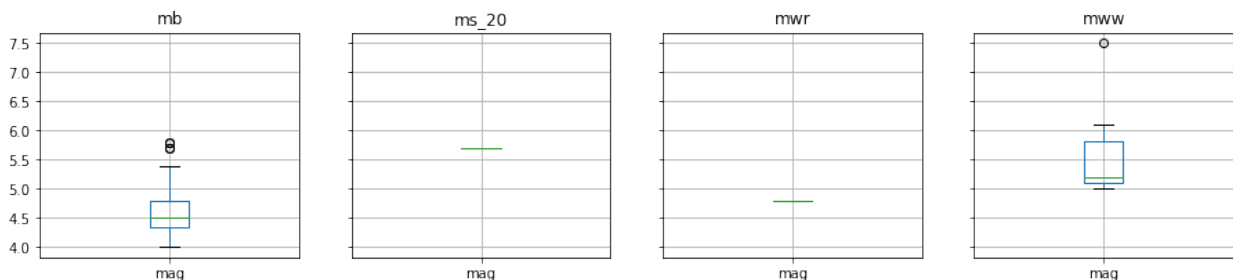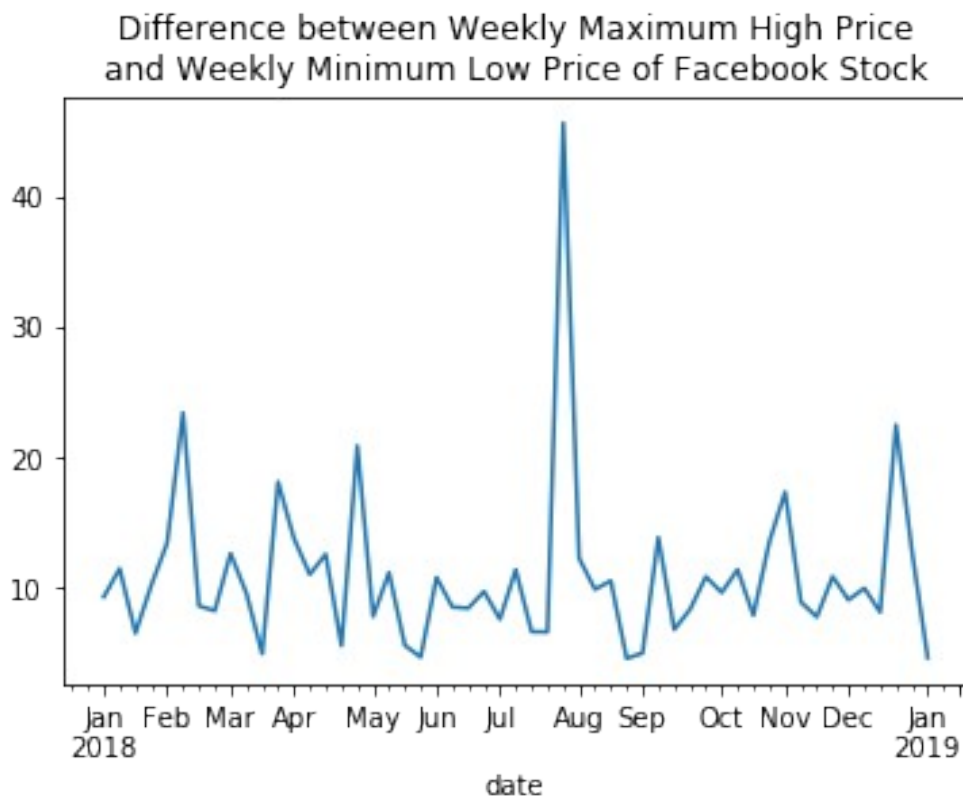
Exercise 4

Make a line plot of the difference between the weekly maximum high price and the weekly minimum low price for Facebook.

```
fb.resample('1W').agg(
    dict(high='max', low='min')
).assign(
    max_change_weekly=lambda x: x.high - x.low
).max_change_weekly.plot(
    title='Difference between Weekly Maximum High Price\nand Weekly
Minimum Low Price of Facebook Stock'
)

<matplotlib.axes._subplots.AxesSubplot at 0x1e114550>
```


Exercise 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:

1. 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 last chapter's time series section for an easy way to do this).

2. The second subplot will be a bar plot showing the net effect this had monthly.
3. Bonus 1: Color the bars by whether they are gains in the stock price (green) or drops in the stock price (red).
4. Bonus 2: Modify the x axis of the bar plot to show the three-letter abbreviation for the month.

```python
series = (fb.open - fb.close.shift())
monthly_effect = series.resample('1M').sum()

fig, axes = plt.subplots(1, 2, figsize=(10, 3))

series.plot(
    ax=axes[0],
    title='After hours trading\n(Open Price - Prior Day\'s Close)'
)

monthly_effect.index = monthly_effect.index.strftime('%b')
monthly_effect.plot(
    ax=axes[1],
    kind='bar',
    title='After hours trading monthly effect',
    color=np.where(monthly_effect >= 0, 'g', 'r'),
    rot=0
)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x1e07f050>
```