Hands-on Activity 9.2 Customized Visualizations using Seaborn

Procedures:

- 9.4 Introduction to Seaborn
- 9.5 Formatting Plots
- 9.6 Customizing Visualizations

Data Analysis:

Provide comments on output from the procedures.

Supplementary Activity:

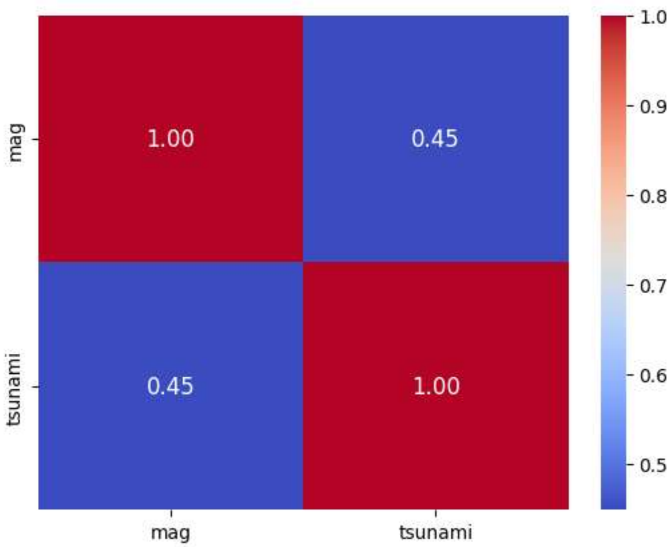
Using the CSV files provided and what we have learned so far in this module complete the following exercises:

1. Using seaborn, create a heatmap to visualize the correlation coefficients between earthquake magnitude and whether there was a tsunami with the magType of mb.
2. Create a box plot of Facebook volume traded and closing prices, and draw reference lines for the bounds of a Tukey fence with a multiplier of 1.5. The bounds will be at Q1 - 1.5 * IQR and Q3 + 1.5 * IQR. Be sure to use the quantile() method on the data to make this easier. (Pick whichever orientation you prefer for the plot, but make sure to use subplots.)
3. Fill in the area between the bounds in the plot from exercise #2.
4. Use axvspan() to shade a rectangle from '2018-07-25' to '2018-07-31', which marks the large decline in Facebook price on a line plot of the closing price.
5. Using the Facebook stock price data, annotate the following three events on a line plot of the closing price:
   - Disappointing user growth announced after close on July 25, 2018
   - Cambridge Analytica story breaks on March 19, 2018 (when it affected the market)
   - FTC launches investigation on March 20, 2018
6. Modify the reg_resid_plots() function to use a matplotlib colormap instead of cycling between two colors. Remember, for this use case, we should pick a qualitative colormap or make our own.

```
%matplotlib inline
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
import pandas as pd
fb = pd.read_csv(
 '/content/fb_stock_prices_2018.csv', index_col='date', parse_dates=True
)
quakes = pd.read_csv('/content/earthquakes-1.csv')
```

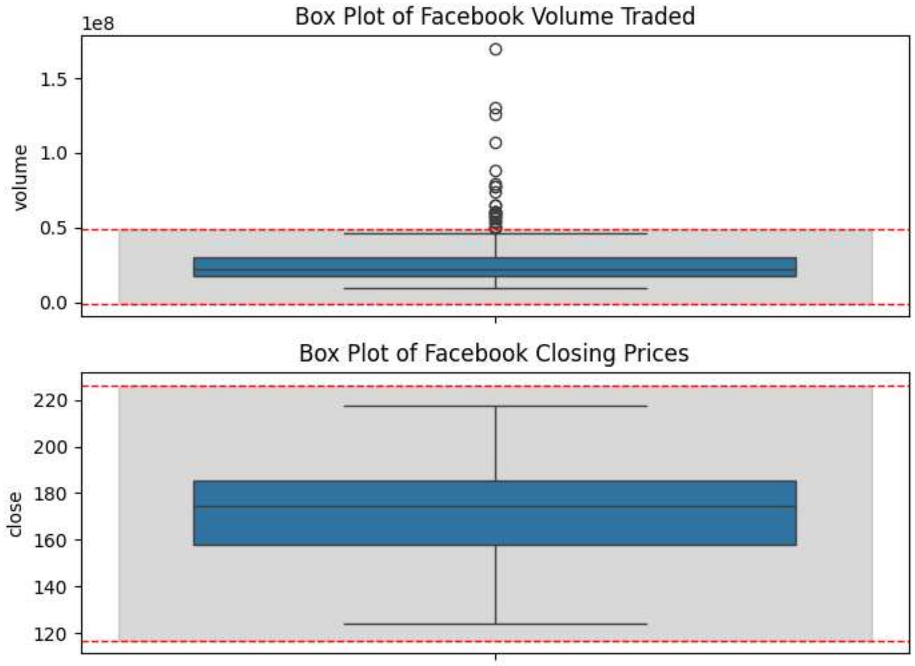
```
subset_quakes = quakes[quakes['magType'] == 'mb'][['mag','tsunami']]
correlation = subset_quakes.corr()
sns.heatmap(
    correlation,
    annot=True,
    cmap='coolwarm',
    fmt=".2f",
    annot_kws={"size": 12}
)
```

```
<Axes: >
```



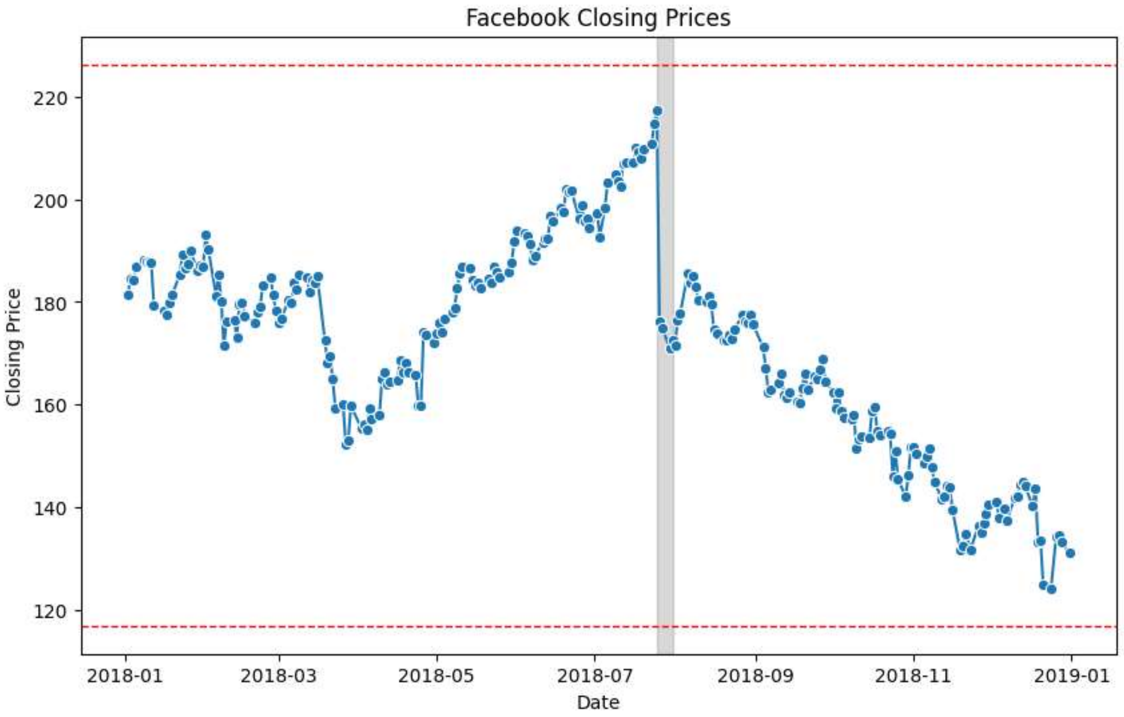
```
Q1 = fb.quantile(0.25)
Q3 = fb.quantile(0.75)
IQR = Q3 - Q1
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

# Create subplots
fig, axes = plt.subplots(2, 1, figsize=(8, 6))

# Box plot for Volume
sns.boxplot(ax=axes[0], y=fb['volume'])
axes[0].axhline(y=lower_bound['volume'], color='r', linestyle='--', linewidth=1)
axes[0].axhline(y=upper_bound['volume'], color='r', linestyle='--', linewidth=1)
axes[0].fill_between([-0.5, 0.5], lower_bound['volume'], upper_bound['volume'], color='gray', alpha=0.3) #Fill the area between the bounds in the plot
axes[0].set_title('Box Plot of Facebook Volume Traded')

# Box plot for Closing Price
sns.boxplot(ax=axes[1], y=fb['close'])
axes[1].axhline(y=lower_bound['close'], color='r', linestyle='--', linewidth=1)
axes[1].axhline(y=upper_bound['close'], color='r', linestyle='--', linewidth=1)
axes[1].fill_between([-0.5, 0.5], lower_bound['close'], upper_bound['close'], color='gray', alpha=0.3) #Fill the area between the bounds in the plot
axes[1].set_title('Box Plot of Facebook Closing Prices')
```

```
Text(0.5, 1.0, 'Box Plot of Facebook Closing Prices')
```



```
Q1 = fb['close'].quantile(0.25)
Q3 = fb['close'].quantile(0.75)
IQR = Q3 - Q1
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

# Create subplots
fig, axes = plt.subplots(1, 1, figsize=(10, 6))

# Line plot for Closing Price
sns.lineplot(ax=axes, x='date', y='close', data=fb, marker='o')
axes.axhline(y=lower_bound, color='r', linestyle='--', linewidth=1)
axes.axhline(y=upper_bound, color='r', linestyle='--', linewidth=1)

# Shade rectangle for large decline
axes.axvspan(pd.Timestamp('2018-07-25'), pd.Timestamp('2018-07-31'), color='gray', alpha=0.3)

axes.set_title('Facebook Closing Prices')
axes.set_xlabel('Date')
axes.set_ylabel('Closing Price')
```

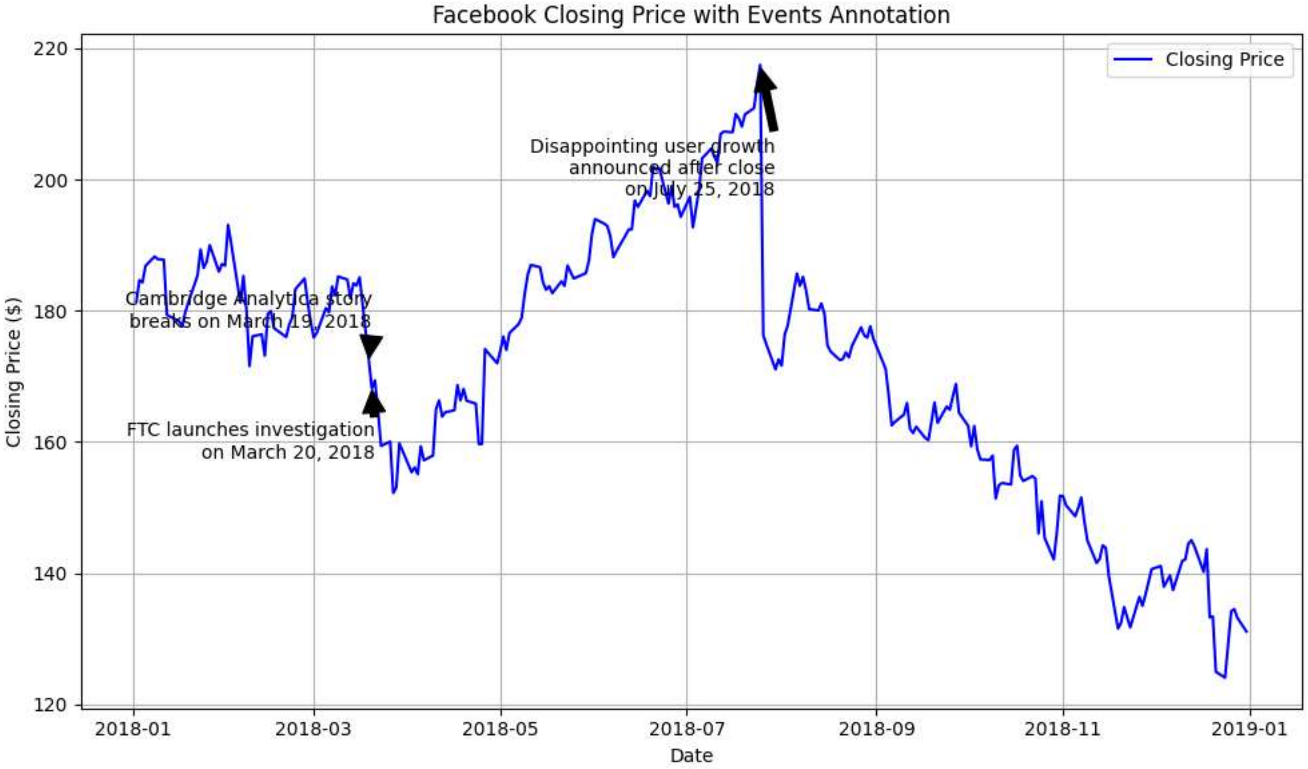
```
    Text(0, 0.5, 'Closing Price')
```



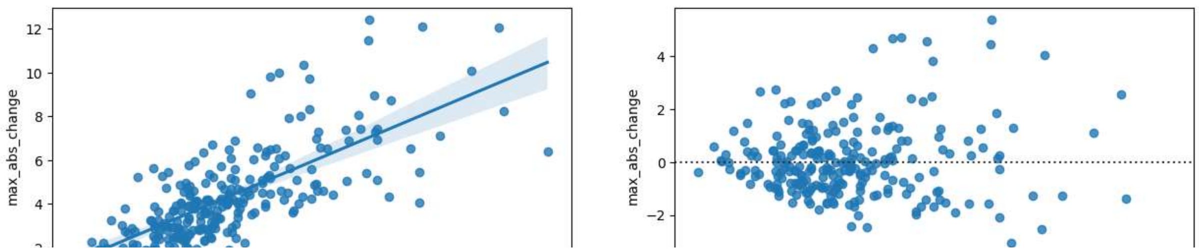
```
plt.figure(figsize=(10, 6))
plt.plot(fb.index, fb['close'], label='Closing Price', color='blue')

# Annotation for disappointing user growth announced after close on July 25, 2018
plt.annotate('Disappointing user growth\nannounced after close\non July 25, 2018',
             xy=(pd.Timestamp('2018-07-25'), fb.loc['2018-07-25', 'close']),
```

]

```
             xytext=(pd.Timestamp('2018-07-30'), fb['close'].max() - 20),
             arrowprops=dict(facecolor='black', shrink=0.05),
             fontsize=10,
             horizontalalignment='right')

# Annotation for Cambridge Analytica story breaks on March 19, 2018
plt.annotate('Cambridge Analytica story\nbreaks on March 19, 2018',
             xy=(pd.Timestamp('2018-03-19'), fb.loc['2018-03-19', 'close']),
             xytext=(pd.Timestamp('2018-03-20'), fb['close'].max() - 40),
             arrowprops=dict(facecolor='black', shrink=0.05),
             fontsize=10,
             horizontalalignment='right')

# Annotation for FTC launches investigation on March 20, 2018
plt.annotate('FTC launches investigation\non March 20, 2018',
             xy=(pd.Timestamp('2018-03-20'), fb.loc['2018-03-20', 'close']),
             xytext=(pd.Timestamp('2018-03-21'), fb['close'].max() - 60),
             arrowprops=dict(facecolor='black', shrink=0.05),
             fontsize=10,
             horizontalalignment='right')

plt.title('Facebook Closing Price with Events Annotation')
plt.xlabel('Date')
plt.ylabel('Closing Price ($)')
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()
```


Facebook Closing Price with Events Annotation
Closing Price
Disappointing user growth
announced after close
on July 25, 2018
Cambridge Analytica story
breaks on March 19, 2018
FTC launches investigation
on March 20, 2018
Closing Price ($)
220
200
180
160
140
120
2018-01
2018-03
2018-05
2018-07
2018-09
2018-11
2019-01
Date

```
import itertools
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np

def reg_resid_plots(data):
    """
    Using seaborn, plot the regression and residuals
    plots side-by-side for every permutation of 2 columns
    in the data.
fb_reg_data = fb.assign(
 volume=np.log(fb.volume),
 max_abs_change=fb.high - fb.low
).iloc[:,-2:]
reg_resid_plots(fb_reg_data)
```


max_abs_change
max_abs_change