Exercises

Using the CSV files in the `exercises/` folder and what we have learned so far in this book, complete the following exercises:

1. With the `earthquakes.csv` file, select all the earthquakes in Japan with a `magType` of `mb` and a magnitude of 4.9 or greater.

2. Create bins for each full number of magnitude (for example, the first bin is 0-1, the second is 1-2, and so on) with a `magType` of `ml` and count how many are in each bin.

3. Using the `faang.csv` file, group by the ticker and resample to monthly frequency. Make the following aggregations:
   - Mean of the opening price
   - Maximum of the high price
   - Minimum of the low price
   - Mean of the closing price
   - Sum of the volume traded

4. Build a crosstab with the earthquake data between the `tsunami` column and the `magType` column. Rather than showing the frequency count, show the maximum magnitude that was observed for each combination. Put the `magType` along the columns.

5. Calculate the rolling 60-day aggregations of OHLC data by ticker for the FAANG data. Use the same aggregations as exercise #3.

6. Create a pivot table of the FAANG data that compares the stocks. Put the ticker in the rows and show the averages of the OHLC and volume traded data.

7. Calculate the Z-scores for each numeric column of Netflix's data (`ticker` is NFLX) using `apply()`.

8. Add event descriptions:
   1. Create a dataframe with the following three columns: `ticker`, `date`, and `event`. The columns should have the following values:
      - ticker: `'FB'`
      - date: `['2018-07-25', '2018-03-19', '2018-03-20']`
      - event: `['Disappointing user growth announced after close.', 'Cambridge Analytica story', 'FTC investigation']`
   2. Set the index to `['date', 'ticker']`
   3. Merge this data with the FAANG data using an outer join

9. Use the `transform()` method on the FAANG data to represent all the values in terms of the first date in the data. To do so, divide all the values for each ticker by the values for the first date in the data for that ticker. This is referred to as an index, and the data for the first date is the base (`https://ec.europa.eu/eurostat/statistics-explained/index.php/Beginners:Statistical_concept_-_Index_and_base_year`). When data is in this format, we can easily see growth over time. Hint: `transform()` can take a function name.