Assignment 2:

1. Get 1-day trading data (open, close, high, low and volume) with 1 minute interval for Therma Bright Inc. (THRM.V).

**Plot candle stick plot and VWAP in one figure using the 1-day data above. [20 points]**

**(10 points for candle stick plot and 10 points for VWAP)**

**Scoring criteria:**

1. **points:**

* **10 points for plotting candle stick**

1. **5 points for python code**
2. **5 points for the plot (2 points deduction for plots without clearly labelled x-axis and y axis)**

* **10 points for plotting VWAP**

1. **5 points for python code**
2. **5 points for the plot (2 points deduction for plots without clearly labelled x-axis and y axis)**
3. Get daily trading data (open, close, high, low and volume) from 2018-01-01 to 2020-12-31 for Therma Bright Inc. (THRM.V).

**Plot candle stick plot and 30-day and 100-day exponential moving averages on one figure. [20 points]**

**(10 points for candle stick plot and 10 points for moving averages)**

**Scoring criteria:**

1. **points:**

* **10 points for plotting candle stick**

1. **5 points for python code**
2. **5 points for the plot (2 points deduction for plots without clearly labelled x-axis and y axis)**

* **10 points for plotting the moving average**

**(If you don’t know how to calculate exponential moving average, you can use simple moving average instead but you will get 3 points deduction due to this)**

1. **5 points for python code**
2. **5 points for the plot (2 points deduction for plots without clearly labelled x-axis and y axis)**
3. Use the same data in Question 2.

**(1) Calculate daily return (return = log(today close/previous close)) [5 points]**

**(2) Conduct the hypothesis testing to check if the distribution of daily return is normal. [15 points]**

**Scoring criteria:**

**20 points**

* **5 points for python code calculating log return**
* **15 points for conducting hypothesis testing**

1. **2 points - Clearly state which test you choose to check the normality**
2. **2 points - Clearly state the result you get from the test (e.g. p-value )**
3. **2 points - Clearly state the conclusion (normal or nor normal distribution )**
4. **9 points for python code**
5. Take 10 stocks in S&P500 and collect daily close price from 2020-06-01 to 2020-12-31 for selected stocks.
6. **) Calculate daily return (return = log(today close/previous close)) for each of 10 stocks [5 points]**
7. **Run PCA on calculated daily return and find the first principal component. [15 points]**
8. **Plot first principal component and daily return of S&P500 in one figure[10 points]**
9. **Calculate the correlation coefficient between first principal component and daily return of S&P500 index. [10 points]**

Scoring criteria

40 points

* 5 points for (1) python code calculating log return
* 15 points for (2)

1. 5 points for calling python package to run PCA
2. 10 points for calculating first principal

* 10 points for (3)

1. 5 points for plotting first principal
2. 5 points for plotting daily return of S&P 500

(Clearly label which one is first principal and which one is daily return of S&P 500)

* 10 points for (4)

1. 5 points are given as long as there are some codes for calculating correlation
2. Another 5 points for correctly calculating correlation

Extra Credit:

1. Pick 2 companies in the same industry, collect close, open, high and low for each company from 2020-06 to 202012.

Variable set 1 = company A’s close, open, high and low

Variable set 2 = company B’s close, open, high and low

[10 points]

1. Run canonical analysis using data stated above
2. Give some conclusion or findings from your analysis

**Note: This question is open ended. Feel free to choose variables you are interested in and questions you want to answer.**

**Scoring criteria:**

**10 points**

* **5 points for running canonical correlation analysis**
* **5 points for clearly stating the conclusion and how you obtain the conclusion.**