ISGB 79AA – Advanced Python for Financial Programming
Assignment 4 – Web Services

This assignment has 2 parts. Submit your answers as

- two Jupyter Notebooks, one for each part, named like:
  - LastnameFirstnameAsn4<part>.ipynb, for example SmithJohnAsn4a.ipynb

In addition to Python code, place your answers to specific questions as comments in your Notebook. Also include a first line of your notebook(s) a comment like:

```
# Firstname Lastname Assignment4a
```

In support of parts A and, B, use a file called env_vars.env, with the keys needed to access the data. Use the dotenv and os packages to load and access properties defined in this file (see Appendix A). Include your env_vars.env file as an attachment in your submission. For Quandl and Alpha Vantage, it is suggested that you create accounts and get your own keys. An example env_vars.env file is posted in Blackboard in this assignment's folder.

Part A – Accessing a web service via Python types - Quandl

A.1 Using the Quandl web site (www.quandl.com), identify a set of time series of that you are interested in, which are available for several countries (or currencies) for several years. The data should be for a consistent measure, e.g., all GDP or another measure of interest.

A.2 Access the data using the appropriate Quandl identifiers and the quandl.get() function.

A.3 Consolidate the data into a pandas DataFrame.

A.4 Visualize the data as a multi-line time series plot.

Part B – Accessing a web service via REST (requests) calls – Alpha Vantage

B.1 For two stocks of interest, access their intraday data using Alpha Vantage and the requests package. Use 5 minute intervals.

B.2 Consolidate the data into a pandas DataFrame.

B.3 Visualize the data in one chart containing two separate lines (one line for each stock). Use two Y axes (a left and right Y axis), where the left axis corresponds to one stock, and the right Y axis corresponds to the other stock, so that the chart is not compressed for one of the series.

B.4 Calculate the correlation of the 5min returns of the two price series.

Appendix A – Getting Properties from a .env File

Instead of placing username, passwords, keys, and other user- and account-specific information in a program, a better practice is to place these properties and their values in a file. This file (often with filetype as .env), can be read by the program into corresponding environment variables, and then accessed at program runtime. The file is often called a .env or property file.

As this is a common practice, there are packages that make reading these property files easy. For example, the python-dotenv package has the function load_dotenv(), for reading and parsing a file of properties and their values. The property file should have lines of the form:

```
PROPERTYNAME='propertyvalue'
```

A property file can have properties related to different uses, for example, keys for both Quandl and AlphaVantage. As an example, a property file called env_vars.env might contain:

```
QUANDL_KEY='xyz123'
ALPHAVANTAGE_KEY='abc456'
```

Environment variables can be accessed with the Python os.getenv() function. Here are example Python statements:

```
import os
from dotenv import load_dotenv
load_dotenv('env_vars.env') # assumes this particular filename
quandl_key = os.getenv('QUANDL_KEY') # assumes property name is in file
```