Case Study:

Phaedrus Debt (PD) is a $1.6Bn private debt fund that has a base currency of USD. PD typically provides debt financing to 15 companies in USD, GBP and EUR. John, who is leading the transaction for the fund and evaluating the possible financial market risks involved, asked for your assistance to have more visibility on GBPEUR and GBPUSD currency pairs. He would like to have a user-friendly tool that he can use to visualise some indicators.

1. Create a database and tables to store currency market data present in the attached Excel spreadsheets.

2. Build a Python Django application capable of:
    a. fetching and displaying the data
    b. calculating and displaying daily returns (see appendix 1)
    c. calculating and displaying 1Y, 2Y, 3Y rolling average (see appendix 2)
    d. calculating and displaying 1Y, 2Y, 3Y rolling standard deviation (see appendix 2)
    e. calculating and displaying 1Y, 2Y, 3Y rolling covariance (see appendix 3)
    f. calculating and displaying 1Y, 2Y, 3Y rolling correlation (see appendix 4)

Appendix:

1. Returns

$$R_{i+1} = \frac{X_{i+1}}{X_i} - 1$$

2. Average:

$$\overline{X} = \frac{1}{N}\sum_{i=1}^{N} X_i$$

3. Standard Deviation

$$\sigma(X) = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(X_i - \overline{X})^2}$$

4. Covariance:

$$cov(X,Y) = \frac{1}{N-1}\sum_{i=1}^{N}(X_i - \overline{X})(Y_i - \overline{Y})$$

5. Correlation:

$$\rho(X,Y) = \frac{cov(X,Y)}{\sigma(X)\,\sigma(Y)}$$