Case Study

The analytics team will release a new assay, and you are tasked with developing an App to process the data.

Description of the Assay

qPCR (quantitative polymerase chain reaction) measures the quantity of viral DNA present in a sample.

A standard curve is prepared with a known quantity of DNA in a series of consecutive dilutions. The response obtained is modelled through a linear equation of the format:

$$response = slope*concentration+intercept$$

The following parameters are used as specifications to validate the assay:

Parameter	Specification
Efficiency	90-100 %
RSQ	>0.95

Where Efficiency = $-1+10^{(-1/slope)}$

Samples are diluted and quantified based on the modelled standard curve. The result for a sample is given as the average of all dilutions and replicates. Sample validity is assessed through the coefficient of variation.

Feature details

Excel will be used to process and visualize the results. The worksheet should contain 3 sheets:

- Plate Layout: user can input the name and dilution of the contents in a well.
- Standards: user can import raw data, process, visualize and assess the validity of the standard curve. An excel button should be created for users to import CT values of standards and process the standard curve.
- Samples: user can import raw data and process not excluded samples. Two excel buttons should be created: A button to import CT results and a second button to process not excluded samples.

Files provided by the user

The following files are provided by the user:

- RawDataFile.xlsx : contains the response measured in a 96-well plate for standards and samples
- AnalysisExample.xlsx: provides name, location and dilution for each well. Contains the analysis performed manually by the users.

Please use python to solve the case study and use excel as the user interface. **We recommend using xlwings.**