

## Assessment 3

**This assessment deals with object oriented programming and unit tests in Python and R using S3 classes.** Use a test driven development approach as stated in the questions. Question 1 is on Python, Question 2 is on R. It should take approximately 4 hours of effort to complete, but the time required can vary depending on your familiarity with Python or R. The available marks are indicated in brackets for each question.

Note that this assessment will count **30%** towards the final grade for this module. This assessment will be marked, and feedback will be provided.

### Instructions

You are provided with the files `PDS_A3_Q1.ipynb`, `PDS_A3_Q2.Rmd`, as well as with the csv files `trips.csv` and `time_series_data.csv`. Modify the code files according to the questions contained there, filling in the appropriate cells/code blocks. Please carefully consider the following important points:

- **Do not load any additional libraries in R and Python that are not already explicitly mentioned in the provided notebooks.**
- Answer in each cell/code block only the corresponding subpart (e.g., only answer D in the cell below the heading Part D). The markers will try, where possible, not to penalise answers to parts for errors in previous parts.
- You may use code and variables from previous subparts in your answers of a particular part, e.g., Part D can use code or variables from Part C.
- **Any question with a print request should be answered by an explicit informative print statement. Do not print unrequested output, but you may print dataframes and other variables to check that they are as required during processing.**

### Submission

Create a zip file containing the `.ipynb` and `.Rmd` files, **as well as the csv files**. Make sure that your name and college CID are included as comments in both files. Submit the zip file on Blackboard in the Assessment 3 submission tab on the module page. The deadline is **Monday 24 November 2025 at 09:00am** UK time.

Please note Imperial College's policy on the [late submission of assessments](#).

The assessment must be attempted individually. It must be your own, unaided work. Candidates are prohibited from discussing assessed coursework, and must abide by [Imperial College's rules](#). Enabling other candidates to plagiarise your work constitutes an examination offence. To ensure quality assurance is maintained, departments may choose to invite a random selection of students to an 'authenticity interview'.