## Time Limit:

4 hours

## Dataset:

The dataset is provided as a .json file containing the **data** key. This is data collected across different types of voltage sensors put inside of a battery used in an Electric Vehicle (EV). To ensure the smooth functioning of the EV, it is important to collect and analyze EV battery readings across different voltage sensors. In the dataset provided, **tid** represents tag\_id of the voltage sensor, **timestamps** is a list/array that contains the consecutive timestamps at which the readings from the voltage sensor were recorded, **values** is a list/array that represents the readings of the voltage sensor at a given timestamp. The value read at a timestamp is linked by the array index. Hence if you need to find what value was read at the timestamp **timestamps[idx]**, it would be simply **values[idx]**.

## Assessment Requirements:

For this assessment, an exploratory data analysis (EDA) is required. Each voltage sensor’s time series should be plotted. The following are also required :

|  |  |  |
| --- | --- | --- |
| Question Number | Question | Answer Format |
| 1 | How many Outliers were removed? | *40,000* |
| 2 | How many Empty values were removed? | *39,641* |
| 3 | What trends did you observe (e.g. minutely/hourly/daily) in each | * *The data is concentrated between two distinct bands: one between approximately 25-26 and another between 28-30. This suggests that the sensor operates within these two ranges frequently, which might indicate different operational modes or states.* * *Within these bands, there is noticeable variability in the readings, especially around 27-28. This could be due to fluctuations in sensor readings, potential noise, or actual variations in the monitored system.* * *There are some vertical lines (almost straight drops or rises) which could indicate sudden changes in the sensor readings.* |
| 4 | What is the mean value for each sensor tid alongwith the spread (standard deviation) | *Available in the Jupyter Notebook file* |
| 5 | Peak voltage times for each sensor tid | *Available in the Jupyter Notebook file* |
| 6 | Low voltage times for each sensor tid | *Available in the Jupyter Notebook file* |
| 7 | How Many potential anomalies were found? Describe your thought process | *40,009* |

Apart from the above, you are open to exploring the dataset and adding in any interesting insights you find as you develop an intuition about the dataset.

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## Submission Instructions:

A Github handle is mandatory for attempting this activity.

All submissions should be provided as a Jupyter Notebook with a requirements.txt file if one is required.  
Please be mindful of the 4-hour deadline. Submissions made beyond won’t be accepted.