PRACTICAL SESSION

Preliminary

1. Check whether all groups have python and anaconda installed.
2. Show participants how data can be downloaded from ThingSpeak (CSV and JSON formats).
3. Share with participants CSV file to be used for the practical session. This shouldn't be a large file in order to minimize runtime of the notebook.
4. Start the Anaconda terminal.
5. Run the **`jupyter notebook`** command.
6. If a window doesn't automatically open in the browser, copy the URL in the terminal and paste in your browser.
7. Click **`New > Python 3`** on the upper right. This should open up a blank notebook.

Practical

8. Import all the relevant packages i.e. pandas, numpy, datetime, matplotlib, seaborn etc.
9. Read data from csv file and store in a pandas dataframe.
10. Inspect the data using functions such as `head(), tail(), describe(), info()` `isnull.sum()` etc.
11. Rename columns since Thingspeak has generic names.
12. Drop columns that will not be used in the analysis.
13. Specify timezone of the data.
14. Set the 'time_stamp' columns as index.
15. Create 2 columns for 'average PM 2.5' and 'average PM 10' concentrations

Cleaning up coordinates

16. Replace 0 or 1000 with Nan.
17. Backfill the NaN values
18. Show the Null values in each column using the isnull().sum(). Latitude and Longitude columns should have zero null values.

Visualization

19. Plot a graph showing PM 2.5 concentration over time
20. Calculate the mean hourly, daily and monthly summaries for the data
21. Plot a line graph showing monthly averages of PM 2.5 and PM 10 concentrations average