Project 2- Programming for Data Analysis

This document contains the project instructions for Programming for Data Analysis. Please be advised that all students are bound by the Quality Assurance Framework [1] at ATU which includes the Code of Student Conduct and the Policy on Plagiarism. The onus is on the student to ensure they do not, even inadvertently, break the rules. A clean and comprehensive git history (see below) is the best way to demonstrate to the examiner that your submission is your own work. It is, however, expected that you draw on works that are not your own to build your submission and you should systematically reference those works to enhance your submission.

An analysis of paleo-present climate data

- Analyse CO2 vs Temperature Anomaly from 800kyrs – present.
- Examine one other (paleo/modern) features (e.g. CH4 or polar ice-coverage)
- Examine Irish context:
    - Climate change signals: (see Maynooth study: The emergence of a climate change signal in long-term Irish meteorological observations - ScienceDirect)
- Fuse and analyse data from various data sources and format fused data set as a pandas dataframe and export to csv and json formats
- For all of the above variables, analyse the data, the trends and the relationships between them (temporal leads/lags/frequency analysis).
- Predict global temperature anomaly over next few decades (synthesise data) and compare to published climate models if atmospheric CO2 trends continue
- Comment on accelerated warming based on very latest features (e.g. temperature/polar-ice-coverage)

Use a Jupyter notebook for your analysis and track your progress using GitHub.

Use an academic referencing style

Submission

You must use the version control software Git [2] to track your work and you will submit your project by providing a URL to your git repository. It is suggested you use GitHub [3] for this purpose. You must submit the URL of your git repository using the link on the course Moodle page before the deadline. You can do this at any time, as the last commit before the deadline will be used as your submission for this project. Any submission that does not have a full and incremental git history with informative commit messages over the course of the project timeline will be accorded a proportionate mark. It is expected that your repository will have at least tens of commits, with each commit relating to a reasonably small unit of work. In the last week of term, or at any other time, you may be asked by the lecturer to explain the contents of your git repository. While it is encouraged that students will engage in peer learning, any unreferenced documentation and

software that is contained in your submission must have been written by you. You can show this by having a long incremental commit history and by being able to explain your code.

Minimum standard

The minimum standard for this project is a git repository containing a README, a gitignore file and a Jupyter notebook. The README need only contain an explanation of what is contained in the repository and how to run the Jupyter notebook. Your notebook should contain the main body of work and should list all references used in completing the project. You may use any Python libraries that you wish, whether they have been discussed in class or not.

Marking scheme

This project will be worth 50% of your mark for this module. The following marking scheme will be used to mark the project out of 100%. Students should note, however, that in certain circumstances the examiner's overall impression of the project may influence marks in each individual component.

25%	**Research**
25%	**Development**
25%	**Consistency**
25%	**Documentation**

References

[1] ATU. Quality assurance framework. https://www.atu.ie/sites/default/files/2022-08/Student%20Code_Final_ August_2022.pdf.

[2] Software Freedom Conservancy. Git. https://git-scm.com/.

[3] Inc. GitHub. Github. https://github.com/.