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**CCT College Dublin Continuous Assessment**

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| **Programme Title:** | L9 Certificate in Data Preparation & Visualisation | | |
| **Delivery Mode:** | PT | | |
| **Cohort Details:** | *L9 Certificate in Data Preparation & Visualisation (Sept 2025 SB+ cohort)* | | |
| **Module Title(s)**: | *Data Prep & Vis*  *Programme schedules are all published on the* [*CCT IQR Provider Profile*](https://irq.ie/providers/cct-college-dublin?id=fec9ea7a-ace4-42c7-9fd5-7fccb6f0a53a&ref=%257B%2522search%2522:%2522cct%2522%257D) | | |
| **Assignment Type:** | *Individual* | **Weighting(s):** | *Data Prep & Vis 50%* |
| **Assignment Title:** | *L9Cert\_DA\_CA2* | | |
| **Lecturer(s)**: | *Muhammad Iqbal*  *David McQuaid* | | |
| **Issue Date:** | *24/11/2025* | | |
| **Submission Deadline Date:** | *04/01/2026* | | |
| **Late Submission Penalty:** | Late submissions will be accepted up to **5** calendar days after the deadline. All late submissions are subject to a penalty of **10%** of the mark awarded.  Submissions received more than 5 calendar days after the deadline above **will not** be accepted and a mark of 0% will be awarded. | | |
| **Method of Submission:** | **Moodle**  **Use the submission link on the Data Visualisation and Preparation Module page** | | |
| **Instructions for Submission:** | *Please do not ZIP your files. ALL files must be uploaded individually (to a maximum of 20 files)*  *Expected files : Written report (word document only, NO PDF’s) ,Code files (Jupyter notebook (.ipynb) ONLY, NO PYTHON FILES), Data Files*  *Note that the maximum number of Jupyter Notebooks is 2* | | |
| **Feedback Method:** | **Results posted in Moodle gradebook** | | |
| **Feedback Date:** | *After exam board Feb 2026* | | |

### Assessment Outline

### Description of Assessment Task

## Note: This is an academic exercise and not a hypothetical report and the most important aspect of this report is evaluating and rationalizing your decisions in the domain of Data Analytics NOT the problem domain.

## All Project files MUST be uploaded into MOODLE, this is your responsibility, if any files are not uploaded to MOODLE, even if they are available on GITHUB, they will NOT BE GRADED.

## Criteria of Analysis (ALL EXPERIMENTAL WORK MUST BE CARRIED OUT USING PYTHON IN JUPYTER NOTEBOOK)

***Scenario***

*“Both utility companies and their customers benefit from energy data analytics. By using data analytics software and energy dashboards, energy managers can monitor and reduce grid downtime, predict changes to fluctuating market demand in real time, balance assets and track environmental objectives. Meanwhile, energy consumers such as managers of office buildings and factories can use energy data analytics to identify areas for potential savings, adjust usage to strategy, and collaborate with site management on energy consumption issues. In all cases, energy data analytics helps users solve complex problems and to make better operational and financial business decisions.”*(Cognizant (2025))

You have been tasked with analysing Ireland's National energy consumption and comparing the Irish Energy sector with other countries worldwide. This analysis should also include a complete rationale of the entire process used to discover your findings. Your Research could include export, import, trade imbalance, types of energy, forecasting etc. (**or any other relevant topic EXCEPT Climate change**) with Ireland as your base line.

**Note:**

* **While topical, Climate Change impact on Energy Consumption SHOULD NOT be chosen as an area of research for this assessment.**
* **The United Kingdom is NOT part of the European Union**

You must source appropriate data sets from any available repository to inform your research (all datasets MUST be referenced, and the relevant licence/permissions detailed).

**Two Data Sets have been Supplied which you may use as you wish (You do not HAVE to use them)**

**LICENSES for supplied datasets**

[**https://data.gov.ie/organization/sustainable-energy-authority-of-ireland**](https://data.gov.ie/organization/sustainable-energy-authority-of-ireland)

*Published by: Sustainable Energy Authority of Ireland*

*Licensed under: Creative Commons Attribution 4.0*

[*https://creativecommons.org/licenses/by/4.0/*](https://creativecommons.org/licenses/by/4.0/)

*Category: Government*

***Criteria of Analysis***

Discuss the choice of project management framework you have deemed suitable for this project.

It is Required that you use GitHub Classroom as your version control repository etc with regular commits of code and report versions. You may be called to a Viva to defend your work.

**All Project files MUST be uploaded into MOODLE, this is your responsibility, if any files are not uploaded to MOODLE, even if they are available on GITHUB, they will NOT BE GRADED.**

Please find the GitHub Classroom link below:

<https://classroom.github.com/a/YVdhY1ji>

**Data Preparation & Visualisation Tasks**

* Discuss in detail the process of acquiring your raw data, detailing the positive and/or negative aspects of your research and acquisition. This should include the relevance and implications of any and all licensing/permissions associated with the data (This will require research outside of class material). **[0-15]**
* Exploratory Data Analysis helps to identify patterns, inconsistencies, anomalies, missing data, and other attributes and issues in data sets so problems can be addressed. Evaluate your raw data and detail, in depth, the various attributes and issues that you find. Your evaluation should reference evidence to support your chosen methodology and use visualizations to illustrate your findings.**[0-25]**
* Use appropriate data cleaning, engineering, extraction and/or other techniques to structure and enrich your data. Rationalize your decisions and implementation, including evidence of how your process has addressed the problems identified in the EDA (Exploratory Data Analysis) stage and how your structured data will assist in the analysis stage. This should include visualizations to illustrate your work and evidence to support your methodology.**[0-30**]
* Modern energy distribution has a great dependence on technology and relies upon visualizations to communicate information, this includes web based, mobile based and many other digital transmission formats. Develop an interactive dashboard tailored to utility companies and their customers, using tufts principles, to showcase the information/evidence gathered following your Analysis. Detail the rationale for approach and visualisation choices made during development making reference to Tufts Principles. **Note you may not use Power BI, RapidMiner, tableau or other such tools to accomplish this.[0-30]**

## Assessment Requirements

Note ALL Students are required to use Git Classroom for any Assignments that they are working on. This assignments Git Classroom link is <https://classroom.github.com/a/YVdhY1ji>

This means that ALL changes must be committed to the assignments Git classroom during your assignment. (Not just a single commit at the end!) This is to allow you to display your incremental progress throughout the assessments, give you practice for your capstone/thesis, allows you to create an online portfolio that can be used to showcase your work and to ensure that there are no problems with final uploads (as all your work will be available on GitHub). It is expected that there will be a minimum of 10 commits (with many of you making very many more).

You may Only use your CCT email for your git account, private/work email-based accounts will not be accepted. You DO NOT NEED TO include your lecturer's CCT email as a collaborator on your submission as they have automatic access.

All assessment submissions must meet the following minimum requirements:

* Be submitted in the format outlined in the assignment summary table.
* 2000 (+/- 10%) words in report (not including code, code comments, titles, references, or citations)
* Report submission MUST be a word document only (No PDF’s!).
* Code in a Jupyter Notebook file (.ipynb) only but may be referenced in the word document.
* Be submitted by the deadline date specified or be subject to late submission penalties.
* Be submitted via Moodle upload
* Use [Harvard Referencing](http://40.115.124.2/sp/subjects/guide.php?subject=harvardref) when citing third party material.
* Be the student’s own work.
* Include the CCT assessment cover page.

## Learning Outcomes:

This assessment addresses the following module learning outcomes for this module:

**Data Preparation & Visualisation**

1. Programmatically Implement graphical methods to identify issues within a data set (missing, out of range, dirty data)(linked to PLO 3, PLO 5)
2. Propose, design, develop, and implement an interactive data visualisation solution, for a given data set and potential audience, detailing the rationale for approach and visualisation choices made during development for a given use case, data characteristics and multiple transmission media (linked to PLO 2, PLO 5)
3. Collaboratively perform a critical analysis of a data set to optimise the data for a given problem space. Document the rationale behind the group’s decisions to peers and stakeholders.(linked to PLO 5, PLO 6)

**Use of Artificial Intelligence**

**Use of Artificial Intelligence is not permitted in this assignment because** **this assignment is designed to assess students’ independent research, critical thinking, and technical skills in the areas of Data Preparation and Visualization. The use of AI tools to generate text or code could compromise the authenticity and originality of the work, and introduces the high risk of:**

* **Misinterpretation of research papers**
* **Incorrect code or logic**
* **Inaccurate conclusions**

**Using AI blindly could introduce errors into your submission, which may affect your grade.**

**By completing the assignment without AI assistance, students develop essential skills in literature review, critical evaluation, and practical implementation, while ensuring academic integrity and fairness. This approach also encourages creative thinking and personal insight, which are key learning outcomes of this course.**

**Please Note Students may have to perform an Individual Q&A Session Regarding their Submission, failure to attend will result in a 0 Grade**

Note: It is important when using these AI tools to consider data protection, privacy, and copyright. As GenAI tools may harvest text/data or images that are used as inputs (or as part of a prompt), you should first consider the provenance of your inputs and ensure that it is ethical and responsible to upload this information. See the following links for guidance from the EU on data protection and from UNESCO on using AI in research and education (section 2.3, Page 15 is relevant).

EU Data regulation

* <https://commission.europa.eu/law/law-topic/data-protection/eu-data-protection-rules_en>
* <https://www.edps.europa.eu/data-protection/our-role-supervisor/first-edps-orientations-euis-using-generative-ai_en>

UNESCO <https://school-education.ec.europa.eu/en/discover/publications/guidance-generative-ai-education-and-research>

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| **Criteria** | ***Criteria 1***  *Discuss the process of acquiring raw data, detailing its positive/negative aspects and licensing/permissions implications.* | ***Criteria 2***  *Evaluate raw data, identify attributes/issues, support methodology with evidence, and use visualizations to illustrate findings.* | ***Criteria 3***  *Address EDA issues using appropriate techniques, rationalize decisions, and demonstrate how structured data aids analysis. Include visualizations and evidence.* | ***Criteria 4***  *Develop an interactive dashboard aligned with Tuft’s principles, clearly explain visualization choices, and address modern farmers' needs.* |
| **Weighting per criteria** | **15 marks** | **25marks** | **30 marks** | **30 marks** |
| *Excellent (+70%)* | Comprehensive and insightful discussion of data acquisition. Explains all positives and negatives, relevance, and licensing/permissions with evidence of thorough external research. | Thorough evaluation of raw data with well-documented attributes/issues. Strong rationale for methodology supported by evidence, using clear and insightful visualizations. | Excellent application of cleaning/engineering techniques. Decisions are well-justified and clearly linked to EDA findings. Strong use of visualizations and evidence to demonstrate process and outcomes. | Fully functional, interactive dashboard tailored to farmers. Choices are expertly justified using Tuft’s principles, with clear and effective visualizations. |
| *Very Good (60 - 69%)* | Clear and detailed discussion of data acquisition. Covers most aspects, including positives, negatives, and licensing implications, supported by moderate research. | Detailed evaluation of raw data, identifying most attributes/issues. Good methodological rationale, supported by relevant visualizations. | Solid application of techniques with clear rationale. Most decisions are linked to EDA findings and supported by appropriate visualizations. | Well-designed dashboard with good interactivity and relevance. Most choices are justified using Tuft’s principles, and visualizations are clear and effective. |
| *Good (50 - 59%)* | Adequate discussion of data acquisition with some gaps in detail or research. Covers positives, negatives, and licensing but lacks depth or clarity in some areas. | Adequate evaluation of raw data, addressing some attributes/issues. Methodology referenced but with limited supporting evidence or visualizations. | Adequate cleaning/engineering with partial justification. Some linkage to EDA findings but may lack clarity or depth. Visualizations are present but could be more insightful. | Adequate dashboard with some interactivity. Justifications reference Tuft’s principles but lack depth. Visualizations are functional but could be improved. |
| *Acceptable (40 - 49%)* | Basic discussion of data acquisition with minimal detail. Mentions positives or negatives superficially, with limited or no reference to licensing implications. | Basic evaluation of raw data with few identified attributes/issues. Minimal or unclear rationale for methodology, with weak or missing visualizations. | Limited application of techniques with minimal justification. Weak or unclear connection to EDA findings. Visualizations may be poorly executed or missing. | Basic dashboard with limited interactivity or relevance. Minimal justification or unclear application of Tuft’s principles. Visualizations are underwhelming. |
| *Fail (> 39%)* | Minimal or incomplete discussion. Little or no reference to positives, negatives, or licensing, with no external research evident. | Minimal or incomplete evaluation of raw data. Lacks clear methodology, supporting evidence, or visualizations. | Minimal or incomplete application of techniques. No clear rationale or connection to EDA. Lacks meaningful visualizations. | Incomplete or poorly designed dashboard. No justification of visualization choices or reference to Tuft’s principles. |

## Grading Criteria Data Preparation & Visualisation

**The Irish Grading System**

The grading system in CCT is the QQI percentage grading system and is in common use in higher education institutions in Ireland. The pass mark and thresholds for different grade bands may be different from what you have experienced in the higher education system in other countries. CCT grades must be considered in the context of the grading system in Irish higher education and not assumed to represent the same standard the percentage grade reflects when awarded in an international context.

Please review the CCT Grade Descriptor available on the module Moodle page for a detailed description of the standard of work required for each grade band and review the marking criteria outlined in this assignment brief for a breakdown of the marking criteria for this specific assignment.

**Additional Information**

* Lecturers are not required to review draft assessment submissions. This may be offered at the lecturer’s discretion.
* In accordance with CCT policy, feedback to learners may be provided in written, audio or video format and can be provided as individual learner feedback, small group feedback or whole class feedback.
* Results and feedback will only be issued when assessments have been marked and moderated / reviewed by a second examiner.
* Additional feedback may be provided as individual, small group or whole class feedback. Lecturers are not obliged to respond to email requests for additional feedback where this is not the specified process or to respond to further requests for feedback following the additional feedback.
* Following receipt of feedback, where a student believes there has been an error in the marks or feedback received, they should avail of the recheck and review process and should not attempt to get a revised mark / feedback by directly approaching the lecturer. Lecturers are not authorised to amend published marks outside of the recheck and review process or the Board of Examiners process.
* Students are advised that disagreement with an academic judgement is not grounds for review.
* For additional support with academic writing and referencing students are advised to contact the CCT Library Service.
* For additional support with subject matter content students are advised to contact the [CCT Student Mentoring Academy](https://moodle.cct.ie/course/view.php?id=827)
* For additional support with IT subject content, students are advised to access the [CCT Support Hub](https://moodle.cct.ie/course/view.php?id=1861)