August Resit Assessment: Data Visualisation & Analytics

F21DV – Data Visualisation & Analytics 2023-24

The August resit assessment will enable you to demonstrate a variety of skills, such as, problem solving, communication skills and time-management. The assessment is structured to encourage a mix of active learning, innovative development, critical thinking and knowledge-based expertise of the subject. The assessment requires you to discuss/explain and justify your implementation details (also extra check to verify that you understand concepts/reasons/limitations).

This assessment is designed to focus on designing and developing dynamic and interactive visualisation concepts based on the provided datasets. The assessment is worth 100% of the marks for the August resit examination diet.

Resources:

- F21DV course materials (https://canvas.hw.ac.uk/courses/25226/modules)
- D3 Homepage/Documentation (https://d3js.org/)
- D3 in Depth (https://www.d3indepth.com/)
- D3 Gallery (https://d3-graph-gallery.com/)

Assessment Overview

The assessment consists of understanding, designing, developing, implementing and testing visualisation scenarios. The requirements for the coursework is to:

1. Make use of the datasets provided (part 1)
2. Conceptualise, develop, and test a **prototype of your visualisations**
3. Plan, implement and debug **prototype of your visualisations**
4. Incorporate these tested visualisations into designs and demonstrate/discuss/**present them**
5. Write a report to explain your visualisations and to include your critical reflection of your visualisation and analysis techniques
6. Submit a video to present your visualisations and your code
7. The course tutors might contact you to conduct an **online viva** (demonstration) after you submit your coursework. Please check your university email in the days following the submission deadline.

More details regarding the requirements are covered in the following sections:

1. Part 1
    1a. Task
    1b. Datasets
    1c. Requirements
2. Core Requirements

This coursework will be marked using the Marking Rubric.

Submission Details

The deadline for submitting the report is on **Wednesday 7th August 2024 at 2359.** You should submit an electronic version of your report and your code via Canvas. Your video should be saved in your OneDrive or your private repository (e.g. Youtube). Share the link to the video with your respective course tutors Pierre.Le_Bras (Edinburgh) or R.Soobhany (Dubai), and put the **link to your video in your report** on the first page. It is the responsibility of the student to ensure that access to the video is granted to their respective course tutor.

Late submissions will be subject to the normal penalties as defined below.

Important notes:

- If you fail to submit either your report, code or video then you get **0 marks**
- Any video submission longer than 2 minutes will be awarded **0 marks**
- You have to use d3.js version 7+ for the implementation of your visualization (if you use a different version or an alternative visualization library you will be awarded **0 marks**)
- You have to ensure that your code will run on the latest version of either Chrome or Firefox browser
- Any test data or resources used for the project, should be included when you submit the final report/code

If you have any questions or queries about the assessment, please do not hesitate to contact Pierre.Le_Bras@hw.ac.uk (Edinburgh) or r.soobhany@hw.ac.uk (Dubai).

Late Submissions

Late submissions will be subject to the normal penalties as defined in the late coursework policy.

The University recognises that, on occasion, students may be unable to submit coursework on the submission date or be unable to present their work on the submission date. In these cases, the University's Submission of Coursework Policy outlines are:

- No individual extensions are permitted under any circumstances.
- Standard 30% deduction from the mark awarded (maximum of five working days).
- In the case where a student submits coursework up to five working days late, and the student has valid mitigating circumstances, the mitigating circumstances policy will apply, and appropriate mitigation will be applied.
- Any coursework submitted after five working days of the set submission date shall be automatically awarded a no grade with no formative feedback provided.

Please contact your Personal Tutor or Counsellor if you are unable to meet the deadlines or need information for Mitigating Circumstances or Temporal Suspensions of Studies.

1. Part 1

1a. Task

You must narrate the timeline of the COVID-19 pandemic around the world, and the effect the vaccines had on the scale of the outbreak.
Importantly, you should try to illustrate these aspects:

1. How did the COVID-19 pandemic grow over countries and continents throughout the world from its start?
2. Choosing some specific (between 4 to 6) countries, how successfully did they manage the outbreak?
3. Choosing some specific (between 4 to 6) countries, is there a relationship between the relative "wealth" (e.g. GDP) of a population and the spread of the pandemic?
4. What effect did vaccinations have on the spread of cases/deaths? Did booster jabs also have an impact on the spread/transmissibility of the virus?
5. How might the geographical position of a country change how the pandemic impacted them?

Your dashboard should meet the Application requirements (1c), while you are trying to answer the 5 questions above.

1b. Datasets

The dataset that you will be using is the public COVID-19 dataset by 'Our World in Data'. The csv file can be downloaded from the GitHub repository:
https://github.com/owid/covid-19-data/tree/master/public/data
The COVID-19 Vaccinations dataset link:
https://github.com/owid/covid-19-data/tree/master/public/data/vaccinations
All exercises in this coursework should be attempted using the datasets provided.

1c. Application Requirements

Your application must use the provided datasets and meet the following 10 requirements:

A1. Your application should only require a single HTML page called index.html, that is within the root of the project. You are free to create as many additional CSS and JS files as you feel are necessary to support your application. i.e. All visualisations should be loaded on the single HTML page.

A2. Use at least four different visualisation types.

A3. When the data of a single visualisation is updated, all axes of that visualisation should also update/rescale accordingly.

A4. For any two visualisations, mousing over a datapoint in one visualisation highlights multiple associated datapoints in another visualisation.

A5. Inclusion of a faceted selection interaction between two visualisations — where a mouseover or a click in one visualisation results in the data of a different visualisation being filtered.

A6. Use of a map visualisation which must interact with at least one visualisation.

A7. Use of scalar data over a map to indicate the distribution of scale over a geographical area — for example, use of circles of different sizes to indicate scales.

A8. Use of cross-visualisation brushing where dragging a rectangle of several datapoints in one visualisation highlights multiple associated datapoints in another visualisation

A9. Showcase an interactive example of a tree layout, or treemap, or circular packing.

A10. Appropriate data analytics techniques, as explained in the course materials, must be implemented.

2. Core & Submission Requirements

Core Requirements

You must meet these Core requirements to get a passing grade (40%).

C1. Create a web-based application written in d3.js using version 7+. No PHP or server-side code should be used. JavaScript compiled from other languages (e.g. TypeScript) is not allowed

C2. Your application must consist of a **single HTML page**, with scripts and styles implemented that load, transform, display and interact with data dynamically.

C3. Transitions and/or animations must be used to indicate what data are new, changing, or exiting

C4. Your user interface must be intuitive to use

C5. You must demonstrate consideration of accessibility when designing your user interface

C6. Source code must be comprehensively documented

C7. You must explain your design and implementation choices in your report

C8. You must demonstrate your application with a submitted video

Submission Requirements

S1. Your video should be **no longer than 2 minutes**.

S2. Your video must be available to the instructors — you can upload to YouTube as an unlisted video or upload to OneDrive.

S3. Your video should demonstrate that you have implemented the various application requirements of the application.

S4. The front page of your report should state your name, Heriot-Watt ID (e.g. HXXXXXXXX), the title of this coursework AND a link to your video.

S5. Your report should include a section on how your application has illustrated the questions from the tasks (part 1 and part 2). Feel free to include as many subsections and images as necessary to concisely demonstrate how you have addressed the various questions above.

S6. Your report should include a section **which explicitly shows how your application has met each of the application requirements**. Feel free to include as many subsections and screenshots as you wish to ensure you concisely explain how your application has met the requirements.

S7. When demonstrating how you met the application requirements, you should also include screenshots from your code to demonstrate quality and modularity.

S8. Your final report and your code should be put into a ZIP file and submitted on Canvas. Your ZIP file should contain a single PDF in the root of it called “report.pdf”. There should be no other PDF files. All code should be structured within the ZIP file, within a subdirectory called “code”.

Marking Rubric

Sections	Marks	Poor	Basic	Proficient	Excellent
Exercises/Visualisation Prototype(s) *In this section your ability to complete/develop/extend exercises/prototype will be assessed.*	**45**	0-8 Fails to meet the requirements. Incomplete and/or unfocused. Little or no understanding of concepts, code or tools.	8-20 Some knowledge (has gaps). Minimal development of exercises, and/or unrelated details. Trivial visuals with little originality.	20-35 No gaps and understands core concepts (unelaborated idea development, could use more details and depth with information to supported relevant visuals). Basic interactions.	35-45 No gaps while demonstrating a detailed and comprehensive understanding (depth and complexity of work supported by rich, engaging and/or pertinent visuals/comments; evidence, analysis, reflection and insights). Exceeds standards, well thought out design, engaging, animated and interactive.
Communication, Analysis, Presentation Visualisation *Marks will be awarded for demonstrating creative thinking, feedback and concept used. Show understanding of the material and the appropriateness and effectiveness of associated visualisation and analysis techniques. Critically reflect of the visualisation and analysis techniques/design patterns..*	**45**	0-8 Little effort has been made to show creative thinking, lacking appropriate analysis techniques or critical knowledge of the design patterns.	8-20 Some effort has been made, but is mostly trivial with significant gaps. Lacks depth and does not demonstrate or show a solid understanding of all the key concepts.	20-35 Original and innovative, targets audiences and addresses key points, however, areas for improvement (or lacking details/clarity in places).	35-45 A high standard appropriate for this level. The theme/visualization/story has been expertly crafted and is consistent/easy to use and follow, utilizes appropriately complex analytical techniques. The visualization and submission includes all of the core requirements and information. In addition, unique and informative visualization that demonstrates an in depth awareness and critical thinking.
Management and documentation *A couple of marks will be awarded for management, documentation and organisation of the tasks/code*	**10**	0-2.5 Documentation, report, video and/or poorly explained, inconsistent, unclear or missing.	2.5-5 Basic and shows some understanding, inconsistences and gaps in places.	5-7.5 Provides good documentation, structured and comprehensive (relevant information and mostly complete).	7.5-10 A high standard. Clear and contains all the information (documentation/data/presentation is maintainable, industry standard, tested, scalable).
	100				

FAQ

So, do you want a dashboard?

Data visualisation is about considering how best to illustrate the patterns from data for a non-technical audience that has not spent the time reviewing the raw data in depth. Therefore, you are technically summarising and telling a story.

Looking at some of the best visualisations out there notice how it is not just graphs where the user must try to navigate it and figure out the notes. Instead, they use a mixture of text, image, and visualisations to illustrate patterns within the data. You should aim to do the same — do not *just* use D3 visualisations alone.

You can present the information with a dashboard-style interface.

What does "comprehensive documentation" mean?

You do not need to comment every single line of code. You should comment sections of code where the logic is not immediately apparent on reading.

What does "intuitive" mean?

We recommend reading the F21DV materials on Canvas. You can also find a comprehensive overview of standard UX laws here (https://lawsofux.com). You can refer to them in your report, however you must reference your sources for each.

How *do you recommend that* I approach/manage this project?

Start with a sketch or a diagram of your application, and ensure that your plan will allow you to meet the various requirements. We highly recommend doing this before you begin programming. You can use Figma or pen-and-paper to create an outline of your application. Note that you do not need to submit your sketch.