

Lab 3: Dataset Visualisation & Analytics

F21DV - Data Visualization and Analytics

The labs enable you to demonstrate a variety of skills, such as, problem solving, communication skills, time-management and so on. The labs are structured to encourage a mix of guided and active learning, innovative development, critical thinking and knowledge-based expertise of the subject.

Each lab requires you to discuss/explain and justify your implementation details (also extra check to verify that you understand concepts/reasons/limitations). The lab also offers you the chance to discuss or ask any questions while getting guided feedback on your progress/lab work.

1. Each lab **must be demonstrated** during lab session (multiple sessions/opportunities each week)
2. Report and code must be submitted on CANVAS (evidence) for each lab (after the demonstration to a lab helper/staff)
3. After demonstrating your work (you have until the end of the week to submit a report and code - single zip as evidence/check on CANVAS)

Note – If you fail to have your work demonstrated/discussed/explained then you get 0% (even if a report is submitted). The report is a 'check' while the demonstration/discussion formulates the mark. If circumstances prevent you from demonstrating or attending the lab session, please inform the lecturer. Important, there are multiple sessions that give you an opportunity to demonstrate/complete the task early (don't leave it until the last minute).

Each lab/code must be to the highest standard (e.g., commented code, naming convention, structured, organized, tested, ...).

This lab is designed to focus on developing dynamic and interactive visualizations based on a given dataset. You should work on this lab in your own time, not just the scheduled assessed lab sessions. During the lab sessions, once you have completed the exercises on this sheet, show it a lab helper or lecturer who will discuss and mark your work. **This is worth 25% of the marks for this course**. Check the timetable for the scheduled sessions for this lab.

Resources:

- F20/21DV Material (<https://f21dv.github.io/>)
- D3 Homepage/Documentation (<https://d3js.org/>)

Overview, by the end of this **lab 3**, the students should have

- Researched and developed a suitably complex interactive visualization solution based on the dataset provided.

FAQ

1. How should I manage my work/exercises?

As you work through the exercises in each lab you should keep a record of your progress (e.g., separate files, comments in code, name/date at the top of each file, ...). You should manage your files/folders and logs.

2. What should I include in my report? What format?

Your report should be formatted to a professional standard which documents your progress/exercise results (e.g., lab report structure that detailing each exercise/results and reason/reflection). At the top of the report on the first page, you should include your name, which lab, the date and who you demonstrated your work to during the lab session

3. Do the exercises have to be completed in the order they're given?

Each exercise increases in complexity and builds upon previous tasks (hence, you need to work through them in order)

4. The answer isn't in the lab worksheet?

In addition to the lab notes, you'll also have to refer to the lectures, recommended resources/documentation/support material (i.e., not just copy and repeating each lab exercise – you also have to demonstrate active learning, understanding, problem solving and original thinking). Some exercises may require you to demonstrate basic knowledge and problem solving while other exercises more critical thinking/analysis of the task

5. Do I only get one chance to demonstrate my lab work?

There are multiple lab sessions allocated to each lab (multiple weeks), so you have several chances to complete and demonstrate your work (i.e., not a single deadline). You can demonstrate and complete the lab exercise early (don't leave it until the very end). Recommended that you start early and this way if there are any issues or problems you'll have time to address these and resolve them for your final demonstration/submission.

6. Which version of D3 do I need to use?

Your lab exercises should run using v7+ of d3.js

7. When will I get feedback/mark for my lab coursework?

After the deadline has passed, your preliminary mark will be released with your submitted report on CANVAS (i.e., you need to have demonstrated/discussed your work during the lab session).

8. How many marks are each lab worth?

25% each.

9. How many lab courseworks are there?

There are 4 lab courseworks.

Assessment Breakdown

Task

The assessed lab courseworks consist of understanding, designing, developing, implementing and testing visualization scenarios. The requirements for the courseworks are:

1. **You should attend and contribute** to the labs.
2. You need to conceptualise, develop, and test a **prototype of your visualizations**.
3. You need to plan, implement and debug **prototype of your visualizations**.
4. You need to incorporate these tested visualizations into designs and demonstrate/discuss/**presented them**.

Each assessed labs is worth 25% of your overall course mark. The concepts necessary to complete the assessment are available and covered during the lectures/support material/recommended texts.

This lab coursework will be marked as following:

Sections	Description	Marks
Exercises/Visualization Prototype(s)	In this section your ability to complete/develop/extend exercises/prototype will be assessed.	18
Communication, Analysis, Presentation Visualization	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	5
Management and documentation	A couple of mark will be awarded for management, documentation and organisation of the tasks/code	2
Total Marks F2xDV Assessment		25

Marking Details

Below are the marking guidelines for the lab coursework.

There are allocated **sessions** for demonstrating your exercises in the timetable (lab sessions).

The demonstration sessions are run over multiple weeks, you should organise and prepare for your demonstration (i.e., organised and able to show your work/exercises/answers in addition to being able to answer questions, e.g., results, concepts used, modifications).

Note: You will need to both demonstrate your work during one of the assigned lab sessions; after this, you also need to submit a report and your code (single file zipped together) on CANVAS (evidence).

Late submissions will be subject to the normal penalties as defined in the late coursework policy. If you have any questions or queries about the assessment, please do not hesitate to contact B.kenwright@hw.ac.uk (Edinburgh) or r.soobhany@hw.ac.uk (Dubai).

Feedback and your marks: you will receive feedback for this coursework during the demonstration/discussion.

Late Submissions

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 calendar 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.

Part 1. Dataset

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>

The datasets will also be made available on the F21DV Canvas page. All exercises in this lab should be attempted using the datasets listed in part 1.

Part 2. Overview Requirements

You should be familiar with the D3 library and its capabilities. For this lab, you are provided with the datasets (Part 1) and you have to implement an interactive web-based application in D3. You need to explain and justify your selection of visualisation in the report. Any test data or resources used for the project, should be included when you submit the final report/code.

Exercise: Key requirements of the lab

1. Web-based application written in D3 (vs 7) is required. No php or server-side code should be used.
2. You must be able to explain/demonstrate your code during one of the assigned lab sessions.
3. The layout and user interaction should be intuitive to the user .
4. In particular, transitions should be used to let the viewer know what data are new, changing, or exiting.
5. Marks are awarded for creativity of Visualisation techniques (Not for the website design) .
6. The student/project should show evidence of having detailed and critical knowledge of design patterns presented in the course and applied in the project.
7. The student/project should provide a critical analysis of the developed application (e.g. what are the limitations, improvements).
8. You must use version 7+ of D3. You will get 0 marks if you use an older version (e.g., v4/5/6).
9. JavaScript compiled from other languages (e.g. TypeScript) is not allowed. If such compilation is used, the project will be disqualified and awarded a mark of 0.
10. Your project (code) and report must be comprehensively documented and detailed.

Exercise: Requirements Assessment

Your application should meet the requirements listed in the table below:

Number	Requirement
R1	Use of three different D3 layouts in a single dashboard
R2	Use of automatic scaling of all axes in a single layout during data update.
R3	Use of cross-layout brushing in which mousing over one data point in one chart highlights multiple associated data points in another chart.
R4	Use of bidirectional interaction between three charts
R5	Faceted selection interaction between two layouts (in which mouseover or click in one layout results in data being filtered in a second layout).
R6	Use of a map layout that has interaction with another layout.
R7	Use of scalar data on a map (e.g. circles of different sizes to indicate different weightage).
R8	Use of cross-layout brushing in which dragging a rectangle over several data points in one chart highlights multiple associated data points in another chart.
R9	Use of a clustering analysis

Part 3. Queries

Exercise: Answer the following queries in your application

You are required to answer the queries in this part of the lab to meet the requirements stated in part2. The queries should be answered by designing and implementing visualisation output in a dashboard, related to the COVID-19 datasets (part 1).

1. Narrate the evolution of the COVID-19 pandemic over the continents and specific countries (you can provide the narration for a selection of countries).
2. Is there a relation between the relative 'wealth' of a population and the evolution of the pandemic.
3. What is the effect of vaccinations on the spread of cases/deaths and display any effect (if any) that booster jabs have on the cases/deaths.
4. How does the geographical position of a country affect the evolution of COVID-19.

End of Lab 3