Data Science Toolbox Portfolio Questions

01 Exploratory Data Analysis

Daniel Lawson — University of Bristol

Block 1

Portfolio 0

This is the **formative** component of the portfolio designed for giving immediate feedback on writing style and expectations. It considers content from Block 1 only.

Part of Data Science Toolbox.

Deadline: Wednesday Noon, Week 3 (October)

Specific brief:

Choose **one question** and write up to **one page** about it. You are free to conduct further experiments to add weight to your results, and any additional material you generate can be submitted as an appendix. See The Assessment Page for advice.

These questions may make reference to the content from the current block.

Question R01.1: This is a placeholder only, we will discuss the structure of the assessments in the first lecture.

Question R01.2: Consider the role of **expert knowledge** in interpreting exploratory data analysis. Referencing your work in Block 1 and Group Assessment 0, as well as external literature, contrast contributions from a) what an expert knows, b) what data analysis and visualisation can extract without expert knowledge, and c) the combination of the two?

Question R01.3: Imagine that you performed the work in Workshop 1.3.2 as a data science consultant for a cyber security firm. Extend the analysis with your opinion about the most important remaining uncertainties or complications (your analysis forms an appendix). From this, make recommendations about how the firm should invest in additional information about the attacks for the purpose of keeping "normal" traffic flowing, addressing concerns that this dataset was generated in an artificial environment.

Generic Guidance on Portfolios

Guidance on Individual Portfolios

The Portfolio is assessed on each block from 2-11. Block 1 is marked similarly but is formative, i.e. does not contribute to your mark. In each block you will do two activities:

1. Multiple choice questions submitted via Noteable (log in via Blackboard). These should be straightforward, either direct from your notes or with very simple experiments you can conduct as extensions of the Workshop. These are worth 20% of the Portfolio mark.
2. Long-form reflective questions that should require a deeper understanding of the course material and may require you to undertake further reading or experimentation. These are worth 80% of the Portfolio mark.

You may take the multiple-choice component at any time and it is recommended that you do this when you work through the Workshop content. The long-form content is submitted at the end of the course, and you are recommended to make a first draft/note form attempt when you first see the content, and reflect back on it in a finessing stage during the examination preparation time (in lieu of an exam).

Length and format of long-form portfolio

Your (full) Portfolio should give a **one-page** answer to one question of your choice from each Block. Therefore the whole Portfolio is only 5 pages long. However:

- The goal is not to make you undertake a length-finessing exercise. If the content you provide appears as if it would fit on one page after such an exercise, you can submit is anyway. **There is a strict limit of 8 pages** for the portfolio content, with answers that are clearly too long being penalised.
- You can however submit **Supporting Evidence** as an appendix to the portfolio. It will not be directly assessed but may be used as evidence to support your claims, i.e. any statements you make with supporting evidence will be more favourably interpreted, but if your statements are carefully given and correct the evidence is not essential. This is not limited. Appropriate content is RMarkdown files knitted to pdf, Jupyter Notebooks, etc.

For Portfolio 0 the expectation is 1 page and the limit is 1.5 pages.

Marking Criteria

The mark ranges and descriptions in normal type below are the University of Bristol Generic Marking criteria that apply to any assessment at the University - these can be found at https://www.bristol.ac.uk/academic-quality. The descriptions in bold type are additional maths-specific criteria introduced primarily to clarify the descriptors in the case of marking maths examinations.

0-100 scale	**Criteria to be satisfied** University generic marking criteria in normal type, **Maths-specific marking criteria in bold**
100 94 89	• Work would be worthy of dissemination under appropriate conditions • Mastery of advanced methods and techniques at a level beyond that explicitly taught • Ability to synthesise and employ in an original way ideas from across the subject • In group work, there is evidence of an outstanding individual contribution • Excellent presentation • Outstanding command of critical analysis and judgement **and** • **Work develops concepts not directly presented in course material or uses known concepts to answer hard, unfamiliar questions that require calculations/methods not similar to any course material** • **An elegance of mathematical work beyond that expected for the level of the course** • **Of a quality that could be distributed to fellow students as an example of exceptional work**
83 78 72	• Excellent range and depth of attainment of intended learning outcomes • Mastery of a wide range of methods and techniques • Evidence of study and originality clearly beyond the bounds of what has been taught • In group work, there is evidence of an excellent individual contribution • Excellent presentation **and** • **On standard but unfamiliar problems, carrying out calculations with no errors of understanding** • **Demonstrates a high level of technical competence with very few mistakes of any kind** • **Great clarity in mathematical arguments**
68 65 62	• Attained all the intended learning outcomes • Able to use well a range of methods and techniques to come to conclusions • Evidence of study, comprehension and synthesis beyond the bounds of what has been explicitly taught • Very good presentation of material • Able to employ critical analysis and judgement • Where group work is involved there is evidence of a productive individual contribution **and** • **Able to make a good attempt at standard but unfamiliar problems, with some minor errors** • **Demonstrates technical competence, perhaps with some shortcomings** • **Clear mathematical arguments**

0-100 scale	Criteria to be satisfied University generic marking criteria in normal type, **Maths-specific marking criteria in bold**
58 55 52	• Some limitations in attainment of learning objectives, but has managed to grasp most of them • Able to use most of the methods and techniques taught • Evidence of study and comprehension of what has been taught • Adequate presentation of material • Some grasp of issues and concepts underlying the techniques and material taught • Where group work is involved there is evidence of a positive individual contribution **and** • **Able to start standard but unfamiliar problems but with significant errors** • **Able to complete competently "bookwork" questions that have been seen in the course material**
48 45 42	• Limited attainment of intended learning outcomes • Able to use a proportion of the basic methods and techniques taught • Evidence of study and comprehension of what has been taught, but grasp insecure • Poorly presented • Some grasp of the issues and concepts underlying the techniques and material taught, but weak and incomplete **and** • **Able to complete "bookwork" questions that have been seen in course material with few errors** • **Gaps or inconsistencies in the mathematical argument**
35	• Attainment of only a minority of the learning outcomes • Able to demonstrate a clear but limited use of some of the basic methods and techniques taught • Weak and incomplete grasp of what has been taught • Deficient understanding of the issues and concepts underlying the techniques and material taught **and** • **Able to reproduce work seen in course material, but with some errors**
7-29	• Attainment of nearly all the intended learning outcomes deficient • Lack of ability to use at all or the right methods and techniques taught • Inadequately and incoherently presented • Wholly deficient grasp of what has been taught • Lack of understanding of the issues and concepts underlying the techniques and material taught **and** • **Unable to reproduce satisfactorily even "bookwork" questions that have been seen in course material**
0	• No significant assessable material, absent or assessment missing a "must pass" component