Data Science Toolbox Portfolio Questions

09 Algorithms for Data Science

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Block 9

Portfolio 09

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 R09.1: From Georgy Gimel'farb's Lecture or otherwise giving your sources, define, prove and explain with clear exposition and examples, the Algorithmic complexity of Quicksort in the average and worst case scenarios.

Question R09.2: For the Hash Table defined in Lecture 9.2, provide a clear explanation of both the average, amortized and worst case complexity for insertion. A formal proof is not required - focus instead on the clarity of exposition, for example, providing an appropriate figure.

Question R09.3: Extend the analysis of algorithmic complexity in Workshop 9.3 with other algorithms that we've discussed. Your code should be an appendix, and you should use your space for one figure, plus an explanation of what the algorithmic complexity is meant to be, and how it matches your experiments. It might be needed to extend the axes of the graph (and hence run longer) in order to see the patterns. Be careful with any parallelisation that might be silently being performed.