
Examiners' commentary

2017–2018

CO3325 Data compression – Zone A

General remarks

Data Compression is a technical subject and the examination questions are often precise and specific. Each question may consist of a number of parts and each part may contain a number of sub-questions explicitly or implicitly. Questions are often labelled as “Question 1, Question 2”, and so on. Parts are often labelled as “(a), (b)”, and so on. Explicit sub-questions are often labelled as “i., ii.” And so on. To achieve a good grade, you must understand the examination questions. For example, you would need to know at least how many sub-questions are required, and whether there are any further implicit tasks involved in each part or sub-question.

The examination can be viewed as a one-off written communication between you and the examiners. As such communication gives no second chance for clarification and is highly constrained by time, you would need to demonstrate your knowledge of the subject in the most efficient manner in the examination. For example, you may need to promptly decide on site if it would be better for you to draw a diagram with a short notation as your answer, or you would rather write a long paragraph of descriptions.

As Data compression is a level 6 course, you would also need to demonstrate your competence in problem solving. This sometimes includes sharing your interpretation of given specifics in questions. For example, you may leave a note if necessary to the examiners on your script to clarify certain issues to avoid any potential confusion, or to add assumptions to simplify your solutions.

The questions in the examination do not necessarily have an equal level of complexity. You would want to potentially secure as many marks as possible and as early as possible. For example, you may like to attempt “easy” questions first, or to give only itemised answers first and to add details later if time permits.

If you follow these guidelines as well as those in the subject guide and textbooks, your examination should be an enjoyable experience as it actually is a good opportunity for you to check the level of your knowledge and to celebrate your academic achievements.

The performance of the candidates this year was diverse. The examination grades were distributed from the high first class to the low failure..

Comments on specific questions

Question 1

- a. There are two implied sub-questions and a complete answer should include answers for both. In your answer, the first part should be a Yes/No. The second part should include your justifications.
- b. There are two sub-questions in this part and you should answer them one by one. The first part of your answer should contain the steps of deriving the Huffman codes based on the extended alphabet. The second part should include a comparison of the gap between the average code length and the entropy for the extended alphabet as well as for the original alphabet.

- c. This is a bookwork question. A good solution would consist of two parts, one is the explanation and the other is the illustration in a diagram.
- d. Four codes are given in this part of the question. An easy way to answer the question is to give an individual answer for each of the codes, including the binary tree and comments on reasons.

Question 2

- a. This part of the question tests your understanding of entropy. A good answer would include the mathematical expression of entropy and the explanation of each symbol used.
- b. There are three sub-questions of this part of the question. You should answer them one by one. The first sub-question requires an explanation. The second and the third sub-questions require a calculation and results.
- c. This part of the question requires you to show that the contents of the dictionaries built up by both the encoding and decoding algorithms are identical. A good answer would simply trace the execution of the two algorithms step by step and show that dictionary contents resulting from both algorithms are indeed identical. A better answer would also highlight the contents of both dictionaries and summarise your conclusion.

Question 3

- a. This is a bookwork question consisting of two sub-questions and one further requirement for the second sub-question. An easy way to answer this part of the question is to first give an answer to each sub-question and give an example for the second sub-question.
- b. There are three sub-questions in this part of the question and you should answer them individually. The third sub-question requires an example, and you should trace the algorithm step by step using the given data.
- c. There are two explicit requirements in this part of the question. A good answer would be presented in two parts. The first part of the answer should be the encoding algorithm and the second part should be a trace the values of main variables in each iteration of the decoding algorithm. A better answer would also remember to highlight the final result, e.g. the decoded sequence of symbols.