

UG Exam Performance Feedback

Second Year

2016/2017 Semester 1

COMP26120 Algorithms and Imperative Programming

David Rydeheard
Ian Pratt-Hartmann
Milan Mihajlovic

Comments Q1:

The performance on Question 1 was disappointing. Though some students had marks above 70% many more had marks below 40%. The overall average was 45%. The main reason for this was poor exam technique. The question said clearly that *no marks* would be awarded for standard sorting algorithms (however well they were presented). Many students chose to ignore this and therefore got no marks for parts of the question. Where students designed their own sorting algorithms, there was a range of good ideas, including a modified quicksort which gathered together elements equal to the pivot at each stage. Others used hashing techniques and modified mergesorts. The random selection problem was answered well by a few students, but many gave possibly non-terminating algorithms (!) or algorithms that failed to return enough items. Complexity: some students showed that they could calculate complexity well, but a large number of students either gave no complexity results, or quoted something without explanation, or showed that they didn't understand how to compute complexity.

Q2:

This question was based on one of the lab exercises, thus most of the material should have been known to the students. The introductory part of the question was answered reasonably well by majority of the students, although some of them lacked mathematical finesse (e.g. the bounds on the argument were not considered). The pseudo-codes for finding the discrete algorithm and el-Gamal cryptosystem were done reasonably well, with some exceptions. Most of the problems were encountered in the final part of the question, where the students didn't connect the complexity discussion from the previous parts of the question to draw well-founded conclusions. Instead, the answers were rather vague and not well quantified. However, the overall feel is that the answers were of sufficient quality, which is reflected by reasonably good marks.

Q3:

- a) Almost all candidates got this right.
- B) Most candidates understood binary search well, and were able clearly to explain why it runs in logarithmic time. It sufficed to state that the length of the searched array halved on each iteration, and that the number of times you can halve n is about $\log n$.
- C) It was amazing how many candidates could not give a clear definition of lexicographical ordering (even when the next part indicated that they knew it really). You have to be able to formulate technical definitions correctly.
- D) Surprisingly well done. I expected more candidates to fall down on the case where one string is a prefix of the other. For the complexity, I accepted both $O(|s|+|t|)$ and $O(\min(|s|,|t|))$, with most candidates giving the latter (which is better).
- E) This was poorly done: the question asked clearly for complexity bounds expressed as a function of s and L (i.e. $O(|s| + ||L||)$), and as a function of s , m and n (i.e. $O(\min(|s|,m)\log(n))$ or $O((|s|+m)\log(n))$). The slightly odd formulation took many candidates by surprise.

Generally speaking: a rather straightforward question, generally competently done by those candidates who made a serious attempt.
