

# Exam Performance Feedback Form

## COMP11212—Section A

2012/2013

First some general remarks. 139 students sat the exam. The median mark was 31 out of 60 (or 55%), and the average 30.3. Forty-one student had a failing mark. However, a significant proportion of these are close to the border, and if they have good coursework marks they should pass the unit. Seventeen student had a mark below 15 (which is below 30%), with a lowest mark of 1. On the top end, twenty-five students achieved first class marks with a top mark of 55, which is 92%.

Looking at the distribution among questions, 138 students answered Question 1, 131 Question 2, 94 Question 3 and 45 Question 4. Since Question 4 had a higher average mark than Question 3 (and a higher average than Question 1) one has to wonder whether students could accurately judge their knowledge.

Statistical analysis of individual questions:

**Question 1.** This had an average mark of 10.5 (52.5%), with 35 students on a failing and 37 students on a first class mark.

**Question 2.** This had an average mark of 12 (60%), with 29 students on a failing and 58 students on a first class mark.

**Question 3.** This had an average of 7.5 (37.5%), with 50 students on a failing, and 15 on a first class mark.

**Question 4.** This had an average of 11.2 (56.1%), with 16 students on a failing, and 20 students on a first class mark.

Comments on exam technique: I'm not sure students necessarily made a good choice regarding which question to answer. I saw very few students use sample words to check the correctness of their answer. Also, where I asked for different descriptions of the same language it would have been prudent to check whether the given solutions agreed, and I couldn't see much sign that students were doing this.

### Questions from Section A.

More detailed comments on answers to questions from Section A.

**Question 1.** Overall I was disappointed with the average quality of answer to this question, in particular regarding part b).

- a) The majority of students did not include words of length 0 or 1 in the response to i), and lost a mark. If they repeated only that mistake in their answers to ii)-iv), they didn't lose any further marks. The majority of answers to ii) were correct (the smallest solution has seven states), but some students managed to introduce additional mistakes (usually by drawing an automaton with a lot of states, or one that returned to the start state and so didn't allow one to check that the last letter was truly equal to the first). Some students only gave an NFA here. The answers to iii) were also correct for the most part, and some students used their automaton from ii) to create a response. I only expected the few students who had worked through the Appendix of the notes to be able to do iv) correctly, and indeed there was only a handful of full marks. (But this were the only marks that relied on the Appendix.) A typical mark was 5 out of 8 for this part.

- b) There were a lot of mistakes here, either when drawing up automata for the languages  $ab^*c^*$  and  $a^*b^*c$ , or when carrying out one of the algorithms. A handful of students mis-parsed the given expression. Very few students managed 7 or 8 out of 8, but some of those gave the automaton directly without using any of the algorithms. Typical mistakes in the final answer were not allowing  $a^*$  or  $b^*$  to be matched by the empty pattern. Students with incorrect beginnings could still gain some marks for correctly carrying out the algorithms, but often there were additional mistakes, or the algorithm became trivial due to earlier mistakes. Some students gave an NFA in response.
- c) The majority of students could correctly answer that the first language is regular, and give either a regular expression or a three-state automaton (some had additional states but were still correct) to justify their answer. Students who didn't give a concrete automaton or regular expression lost the second mark. The second language is also regular (and the smallest automaton proving that has three states as well), but almost all students incorrectly decided that this language was not regular.

**Question 2.** By and large the quality of answers for this question was good.

- a) The vast majority of students could give a word that has two parse trees (the shortest such is  $cbc$ ) although some lost one of the four marks because they were not able to give a proper parse tree (as in the notes). Also, the majority of students got the next two marks, recognizing that every  $b$  has to be paired with a  $c$  either immediately before or after (some even gave a regular expression for the language). Almost nobody was able to give an unambiguous grammar for the same language. In many cases, either the language was considerably smaller, or the grammar again had short words with different parse trees (or both), and I awarded very few marks for these efforts. Some students had the very good idea that they could give an automaton for the language, and then read off a correct grammar from that, but many of the automata drawn here were unfortunately incorrect. For these reasons typical marks were 5 or 6 out of 10 for this part.
- b) I was very pleased with the fact that the majority of students could sensibly describe the complement of the given language. I accepted a variety of descriptions here, including regular expressions. Most students could then give a correct automaton for the language, although some students gave an automaton for the original language instead and lost both marks. Lots of students got all four out of the four marks here.
- c) Again there were a lot of correct answers for this part (in one of the marked exercises we had a grammar for a language with one kind of bracket, and this can be quite easily modified for two kinds of brackets). Again there were some improperly drawn parse trees, which again lost a mark. Typically students with an incorrect answer but correct parse trees had grammars that wouldn't have allowed them to generate something like  $(())()$ .