Exam Performance Feedback Form

COMP11212—Section A

2011/2012

The following only concerns Section A of this exam.

General remarks: 182 students answered questions from this part.

Comments on exam technique: Firstly I am rather surprised at how few students answered Question 3. This makes me wonder whether many students just do the first two questions for no better reason that they appear first on the script, or whether they do not prepare for questions on context-free grammars. Students should always read all the questions and then decide which ones they're best equipped to answer. While working on past papers it would be a good idea to keep track of what kind of questions you do particularly well on and which ones you tend to struggle with. That will help making decisions when you are sitting the actual exam.

Again it was good to see students starting to use sample words to test their solutions, and I noticed a few cases where students managed to correct their answer based on such tests. Other students, however, were not very creative in coming up with sample words, so this technique didn't help them.

Question 1. 178 students attempted this question. The average mark was 5.1 out of 10. 35 students received 2 marks or fewer (14 had a mark of 0), 53 students got 8 marks or higher. Compared with last year the average is lower, and the proportion of very low marks has increased, but so has the proportion of very high marks. If students who got 0 marks for this question are excluded the average increases to 5.5. Quite a few students had fairly long calculations that didn't go anywhere, and then suddenly seemed to realize that this wasn't so difficult and came up with something quite short and at least partially correct.

a) Many students did not seem to know what 'precede' means, namely 'comes before' (not 'comes after', which many students seemed to assume). As a consequence there were a lot of wrong answers here. Also, many students had automata where as had to come in pairs immediately one after the other, which is not general enough. The smallest automaton that works has four states and it can be generated as the product of two automata with two states each.

b) Typical mistakes were not to allow any words not containing a at all, or not allowing for an arbitrary number of bs and bcs freely mixed before, between, and after any as. Some students tried to use Algorithm 2 to do this, but they typically made mistakes and started from an incorrect automaton.

c) A few students did not even try this part, making me wonder why they chose to answer Question 1 rather than one of the other two. Where students were making obviously the same mistake as in part b) (typically using cb instead of bc) I did not count it against them again. However, those who used an answer to a previous part to help with this did not seem to spend any time in checking whether that answer was correct!

Question 2. This question was attempted by 160 students. The average mark was 5.4 out of ten, very similar to last year. Twelve students received a mark of 2 or lower, while 41 students got a mark of eight or more. Only two students got a mark of 0 so removing them does not change the average by much.

a) Most students found the three words of length four accepted by the automaton and got all three marks. Quite a few missed out one of the words, and a handful wrote down what seemed a random collection of four letter words.

b) The vast majority of students who tried to read off a regular expression from the automaton did not succeed, missing out substantial parts. Many of those who did use Algorithm 2 made mistakes with the indices and got a non-sensical answer. Those who were able to use the algorithm correctly but made minor mistakes along the way typically received at least five out of the seven marks available (it did not seem to matter too much which indices had been chosen for which state). Most common mistake: The number of the state that appears in the cycle was set to the highest number currently available, when it has to be one more than that.

Question 3. This question was attempted by only 32 students. It had an average mark of 4.2 out of 10. Nine students received a mark of at most 2, while four managed 8 or more. If we again remove the students who got 0 we have an average of 4.9.

a) Many students wrote something correct here. Popular choices where that every such words contains the substring ab (or bab), or that every such string ends in b. Some students gave trivial properties or incorrect ones and received 0.

b) There were a fair number of incorrect answers. The language is regular, and this is most easily demonstrated by producing a regular expression for it. For some reason quite a few people could give the right answer but could not give a valid reason. One student gave an NFA instead and that was okay too.

c) I was a bit surprised that almost no one could answer this correctly. Most students started with a rule that said $S \to TaT$ and then had rules for T, but this won't work because those rules can then be used to have the first T turn into a larger word than the second, and the a generated in the first step will then no longer be the middle symbol. There are two fairly easy grammars that do this. The first of these has one non-terminal symbol and five clauses, the second has two non-terminal symbols, and two clauses for the start symbols and two for the other non-terminal.

d) The language can not be regular since we would have to count how many symbols we have seen so far which is not possible using, say, a DFA. Again there were a lot of wrong answers or wrong reasons.