COMP11212 Exam Performance Feedback
AY-18-19

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June 2018

General Remarks

This is the second year that the exam was taken as a "hybrid" – with two sections online via Blackboard, and two sections taken on traditional paper books. No serious issues were encountered.

A total of 232 students sat the exam, with a mean mark of 68.9%.

There were 6 students with a mark below 40%, 3 of these being below 30%. Some of these students *may* be able to pass the unit with suitable coursework marks. There were 144 students who achieved first class marks of 70% or above in the exam.

Table 1 below gives an overview of the performance across questions while Figure 1 shows the overall performance of the cohort.

Question		Marks Mean	Marks %
Online (Sections A and B)		23.8 (30)	79
C	Q1	1.8 (3)	59
	Q2	3.7 (6)	62
	Q3	4.5 (6)	74
D	Q1	3.7 (5)	74
	Q2	2.8 (5)	57
	Q3	2.9 (5)	58

Table 1: Performance breakdown

Sections A and B

Sections A and B were completed online. The overall performance on this section was good, with a mean score of 23.8 (79%) and a median of 24 (80%). This was to be expected, as the online section contained more questions focused on recall of material as opposed to analysis or application of concepts. Blackboard provides an Item Analysis, including an assessment of the Discrimination power of questions and the Difficulty of questions. Discrimination indicates how well a question differentiates between students who know the subject matter and those who don't. A question is a good discriminator when students who answer the question correctly also do well on the test. The Difficulty value assesses how many students answered correctly.

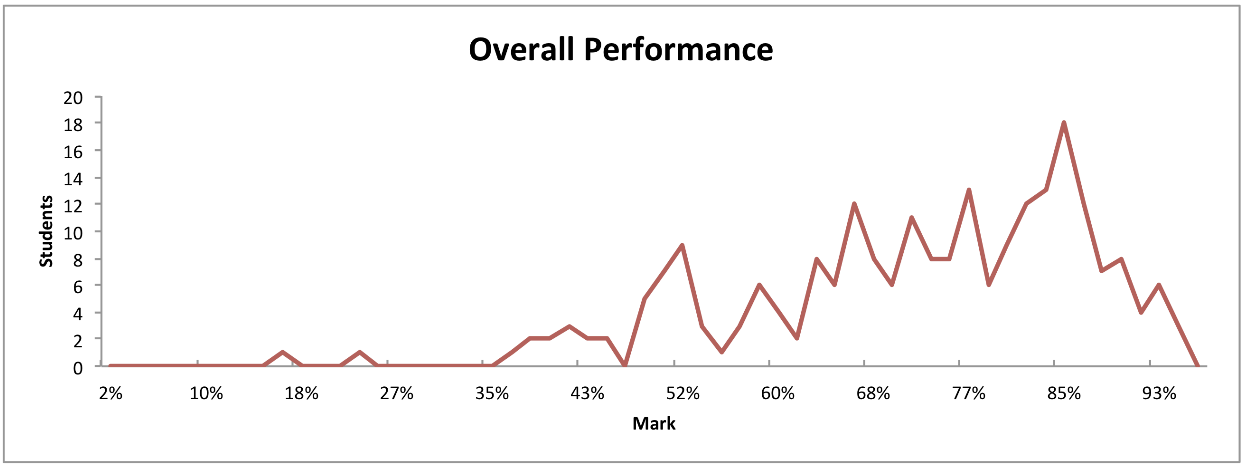

Figure 1: Overall Exam Performance

Blackboard's analysis suggests that 12 questions were *good* and 10 were *fair* in terms of discrimination. There were 14 *easy* questions, 8 *medium*. The *medium* questions were largely in Section B.

Section C

Question 1

Mean: 1.8 (35%), Median: 1 (20%).

This question was not answered particularly well. Many answers correctly stated that the proposition was false, but failed to provide a convincing proof. A common error was to consider the expression $(p_1^*|p_2^*)$ and apply an argument that said something like "this can only match words of the form $p_1p_1p_1\ldots$ and thus will not match words of the form $p_1p_2p_1\ldots$". The error here is that p_1 is not a *word*, but a pattern and we cannot just say in *general* that this is the case. For example, if p_1 and p_2 are the same, it is not true.

The answer expected here was to use a concrete counter-example. A simple example is to consider the alphabet $\Sigma = \{a, b\}$, p_1 as the single character a and p_2 as the single character b. Thus we have the regular expressions $(a|b)^*$ and $(a^*|b^*)$. The word ab will match the former, and not the latter and the languages that the expressions define are not equivalent.

Question 2

Mean 3.7 (62%), Median: 4 (67%).

This question expected a DFA and a grammar. Overall, the question was answered reasonably.

A common error was to produce a DFA (or a grammar) that didn't accept/generate the word c – which does meet conditions a) and b)ii) and should thus be in the language. Other issues involved automata that were (strictly) NFAs rather than DFAs.

For the grammar, many answers applied the algorithm as taught. Others provided the grammar from scratch.

Where there were errors, these were more common in the DFA than the grammar.

Some students misinterpreted the question and provided two solutions for parts b)i) and b)ii). These were given partial credit.

Question 3

Mean 4.5 (74%), Median: 6 (100%).

A straightforward question that could be solved using Algorithm 2. Correct answers with no working received full marks and just over half of the students provided a correct answer to the question. Incorrect answers with no working received some credit if the answer was close, but additional partial credit was given to answers that showed working but were flawed.

Very few students made any obvious attempts to test or validate their answers with example words that would/would not be accepted by the automaton.

A common error was to neglect that fact that there are three loops involving the state at the top right: c, bb and bac.

Section D

Question 1

Mean: 3.7 (74%), Median: 4 (80%)

This question required you to provide the Big-O notation and a justification for the notation for the five programs. Simply stating the time complexity (i.e. constant, linear, quadratic, etc) was not classed as a justification for this question. For those cases partial credit was given if the notation was correct but the justification was unsuitable.

This was the most well answered question from section D with some quick marks available if you knew the notations and how to work them out. The most common mistake was thinking that $e.$ was $O(n \log n)$ where it was $O(n^2)$.

Question 2

Mean: 2.8 (57%), Median: 3 (60%)

You were asked to state what the halting problem was and generally this was done well by most. The majority of marks were lost as not enough detail was provided. Many students simply provided a sentence for undecidable and one for partially decidable.

To obtain the full 5 available marks you needed to go into detail as to why the halting problem is undecidable and the use of diagrams for this questions really helps.

Question 3

Mean: 2.9 (58%), Median: 3 (60%)

Finally, you were to provide a suitable specification for the program provided. If you used $min(x, y)$ then as stated in the lecture you must ensure that you define what min in this context actually is. Failure to do this meant that full marks for the question were not given.

For part b you were to use the axiomatic rules to prove the program is correct. For the most part this part was well attempted but many failed to complete the full proof and it was often hard to tell where the proof started and ended. As with part a, if min was not defined previously then your proof would require you to do this at some point.

Many students gave a very simple answer to part c as to why the program was either partially correct, totally correct or both. This part only required one sentence so a lot of detail was not required but you should refer back to your proof from the previous parts to justify why it is partially or totally correct.