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General Certificate of Education (A-level)
January 2012

Computing COMP2

(Specification 2510)

Unit 2: Computer Components, The Stored Program Concept and The Internet

Report on the Examination

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General comments

The January 2012 paper continued to follow the pattern set by previous years' papers and it was pleasing to see students' responses to the questions on CD-Rs and the TCP/IP stack. Strong students were able to explain carefully the workings of both of these systems. It is to be noted that students do need to be able to describe the principles of operation of a list of hardware components that can be found online in the AQA Teacher Resource Bank.

Students still need to be encouraged to read questions very carefully and look out for directions to use full names when answering.

Question 1

The majority of students correctly identified that it was a third generation programming language for question part 1a. Incorrect answers included students just writing 'high level languages' alongside the wrong answers of fourth and second generation.

The majority of students could also identify that the machine code was written in hexadecimal format. Students did struggle to provide a reason for using this format with 'easier to understand' being a common accepted answer. It does seem to be a common misunderstanding that hexadecimal uses less memory than binary / machine code.

Whilst hexadecimal memory addressing is included in the specification students struggled to identify the lowest and highest memory addresses that would be available. This was a question part that required the student to identify the op-code and operand part of the instruction and to know that hexadecimal characters range from 0 to F. Responses written in hexadecimal were appropriate; there is no requirement to convert from hexadecimal to denary in COMP2.

Asking students to provide a situation where it would be appropriate to use a low level language gave rise to lots of varied answers. Strong students identified programs that needed to be optimised for speed of execution or object code memory size. Whilst parts of an operating system might be written in a low level language, this was not awarded a mark on its own. However, students who identified device drivers or code used to directly manipulate hardware were awarded a mark.

The idea of compilers translating all in one go and interpreters translating and executing line by line is well known. Students also often secured a mark by stating that a compiler produces object code.
Marks were not awarded when students simply repeated parts of the question for example: 'a compiler compiles…' or, 'an interpreter interprets….'. It was quite common to see, 'an interpreter compiles…'

Across the papers it was evident that a group of students were confused over the terms machine code, object code and source code. It was also evident that some students are confused over machine code, assembly code and high-level languages.

It should be noted that students need to be careful when writing about execution speed. It was common to see students write about compilers executing code fast. Students need to be aware that it is the machine code of the compiled program that executes faster compared with interpreting the same program.

Question 2

On previous papers students have always done well in identifying logic gates but on this paper only around half correctly identified the XOR gate by writing a correct expression.

Over 90% of students correctly wrote the second expression and this highlights the case for further work on XOR gates. Based on the evidence seen in this and previous papers, students seem to be less familiar with XOR, NAND and NOR gates than OR, AND and NOT gates.

The truth table was completed well by the majority of students with only a small number of students not scoring any marks.

Identifying the arithmetic function was asked to probe students' understanding and it was pleasing to see students supplying the correct answer of addition with some students recognising that the circuit was a half-adder.

Part 2d was asked in order to test the students' ability to simplify a Boolean expression using known identities. Students went down various routes to attempt to simplify the expression with expanding the brackets being the most common. It was pleasing to see a group of students solve by starting with the distributive identity and this usually meant that a full solution was found very quickly. It was common for weaker students just to remove completely the brackets and to then start working with the expression.

Very few students did not attempt to solve this question part using the required method. It is important to note that the specification states that students should, 'Be familiar with the use of De Morgan's laws and Boolean identities to manipulate and simplify simple Boolean expressions.' Truth tables can also be useful tools for simplification, but they only work well in quite specific circumstances and the specification requires that students are aware of how to simplify using Boolean identities.

Question 3

Question part 3a was answered well. A common mistake was for students to write MAR instead of Memory Address Register. Students need to make sure that they read questions carefully and write full names when requested.

Part 3b was less well known with weaker students just repeating back the question in forms such as, 'it controls the processor.' Students who described the control unit's role in fetching, decoding and executing instructions picked up the mark.

Students seemed to struggle more than expected with part 3c. Whilst a large number of students did identify the Arithmetic and Logic Unit, we saw a variety of responses using the initials A, L and U. The accumulator was also a common wrong answer.

Part 3d has been asked previously and we are looking for two points to appear in the answer. In terms of the processor, a register is a fast memory location located within the processor. A group of students could identify the memory location aspect of the response, but did not situate it within the processor and therefore could not gain any credit.

The status register is clearly mentioned in the specification, but students struggled to provide an example of when a bit within it might be set. Common incorrect answers were based around instructions completing or the computer being switched on or off. It was pleasing to see some students answer with overflow, underflow.

Question 4

Students generally scored very well when completing the table of different storage media. Students who dropped marks tended to place CD media into the 3GB row and therefore not appreciate fully the different storage capacities.

When describing the workings of a CD drive it was clear that the majority of students appreciate that it uses a laser to read and write the data. To secure two marks, however, students needed to differentiate between the power of the laser being used in the read and write processes. Students who clearly described the difference on the physical media to represent binary 0s and 1s picked up the mechanism mark. Weaker students provided answers along the line of, 'pits store 0s and 1s,' and did not distinguish between pits and lands. A minority of students continue to mix up optical and magnetic media and wrote about magnets being used to write or read data. A few students described needles being used to scratch data onto the disk perhaps remembering vinyl records.

Question part 4c was generally answered well with the majority of students securing at least one mark. The most common answer was along the lines of the CD becoming damaged or scratched. Students need to be aware, however, that to gain a second mark they need to identify a different point from the first. A CD becoming scratched and a CD becoming damaged are not different enough to secure two marks. Students who recognised that the file format might no longer be supported secured a mark. There was slight confusion for a few students who stated that a DVD drive would not be able to open a CD.

Question 5

When describing the role of a router it was common for weaker students simply to point out that it, 'routes information,' and, 'passes information from the client to the server.' Answers tended to be vague perhaps indicating that this is currently an area of subject matter that is not particularly well known. Students who identified that a router forwards packets from one network to another and who stated that it inspected the destination IP address were awarded the marks.

It was pleasing to see that the majority of students could name a protocol associated with e-mail. Incorrect answers included Telnet, FTP and HTTP but the majority correctly answered with SMTP or POP.

When describing the TCP/IP stack it was clear that the stronger students could place a few points into each of the layers and they were rewarded with high marks. It was common for weaker students to mix points up between layers or to fail to provide enough information.

Question 6

This question was generally well answered.

Parts 6a and 6b were very well answered by students, with part 6c being correctly answered by the majority.

In question part 6d, to gain the mark for the <h1> tag students needed to identify clearly the text as larger by either labelling it as such or drawing it a lot larger than any other text. Labelling the text as just 'h1' is not enough to secure the mark. The majority of students missed scoring full marks as it was not clear that they appreciated how line spaces are formed when using block level tags. The hyperlinks were surrounded by <p> tags and the examiners were looking for clear evidence of spaces between the three links.

Question 7

Whilst most students provided answers for 7a, it was quite common to see the stem of the question simply repeated. The answer, 'an ISP provides an Internet service,' was not enough to secure a mark. Students secured the mark by describing how an ISP supplies a connection or access to the Internet to their clients.

It is usual for question papers to now ask students to state the full name of a law and a few students lost marks in question 7 by not following this instruction..

The answer of simply, 'copyright,' is not enough to secure a mark and this led to around half of all students securing a mark for part 7b.

The term 'personal data' has appeared on past papers and it is still evident that students struggle to define this well enough to secure the mark. We are looking for personal data from which it is possible to identify a living individual.

Question part 7d asked students to identify two further laws and the majority of students secured both marks. More students secured the mark for identifying the Data Protection Act over the Computer Misuse Act. Occasionally students answered with ‘Data Misuse Act’ or ‘Computer Protection Act’ which perhaps identifies that they have heard about the laws but are not able to state the names correctly.

Question 8

Question 8 allowed students to provide many varied answers and the majority of students managed to secure some marks. Most students identified that the spraying of car bodies is a repetitive task and stronger students then discussed this as being in a controlled environment with little deviation to a set routine. The automatic car control did fire up students’ imaginations but some did not link this very well to how computers and robots work. Stronger students identified the need to measure many inputs and the variety of sensors needed. Students who described the environment as unpredictable also secured a mark.

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