Version 1.1: 01.11

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate in Education

Computing 2510

COMP1 Problem Solving, Programming Data Representation and Practical Exercise

Report on the Examination

2010 examination - June series

Further copies of this Report are available to download from the AQA Website: www.aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334). Registered address: AQA, Devas Street, Manchester M15 6EX

General

Most candidates were well-prepared for this examination and had made good use of the time available between the release of the Preliminary Material and the day of the exam. It was pleasing to see that the majority of candidates attempted all the programming questions and were able to get some marks on them. The theory topics were often not as well answered and definitions often lacked precision.

Candidates should be aware that they will not receive marks for screen captures on programming questions where no evidence of actual code has been included. Also, marks will not be awarded for a screen capture that has not been produced by running the candidate's code – there were some answers this year (especially on Question 9) where candidates had attempted the programming, realized parts of it did not work and removed those parts when completing the tests. Candidates in this case would only obtain marks for tests which would work with the programming code they have included (as well as any marks for their programming code).

Candidates should also be aware that for marks to be awarded for evidence of a test, the data entered for the test and the result of the test need to be shown. If this requires more than one screen capture then more than one screen capture should be provided. Care should be taken that screen captures are not cropped too much.

Prior to the Examination

Following the release of the Preliminary Materials on 1 March centres were asked to contact, if necessary, the relevant AQA Programmer if they needed to make modifications to the Skeleton Program so that it would work in the programming environment being used. Centres are reminded that the role of the Programmer is to confirm that changes made are acceptable; not to actually suggest the changes that need to be made or to provide advice regarding possible questions on the exam. The erratum notice about the Skeleton Programs had clearly been acted upon by centres.

Last year a reminder was given that a copy of the Skeleton Program used by the centre should be included with the scripts sent to the examiner – whether the Skeleton Program was modified or not. Many centres are still not doing this.

Electronic Answer Document

The EAD was made available to centres on 1 March. As last year, there were clearly some candidates who had not seen the EAD until the day of the exam. Centres are encouraged to distribute a copy of the EAD to candidates so that they can practice using it. A fresh copy of the EAD, not used by any candidate, must be used in the actual examination.

On some scripts candidates had taken screen captures of programming code which was sometimes quite hard to read. It is preferable to copy and paste code into the EAD – this is possible in most of the programming environments used.

Most candidates knew how to take a screen capture of just the current window rather than the whole screen, this is something that centres are advised to get candidates to practice prior to the examination.

Question 1

Most candidates were able to answer this question. If mistakes were made they tended to be on the two's complement and hexadecimal questions. Some candidates wrote "10 7" as an answer for part 4 - the bits had been split into blocks of 4 but then converted into decimal values.

Candidates should be encouraged to check their answers carefully as marks were sometimes dropped due to arithmetic errors.

Question 2

There was a wide range in the quality of answers given to this question.
For part 5, many candidates correctly stated that 128 different characters could be represented. The most common incorrect answer to give the highest value that can be represented using 7 bits (127) rather than the number of values that can be represented. Other commonly seen incorrect answers were 256, 255, 65 and 64.

Part 6 was generally well answered, with the most common error arising from candidates not reading the question carefully and using more than 7 bits in their answer. The incorrect number of bits were also sometimes used for part 7 and some candidates gave the ASCII character for 'B' rather than 'A' - again indicating that the question had not been read carefully. Another incorrect answer seen quite often for parts 6 and 7 gave responses as decimal values (even though the number of bits to be used was clearly indicated).

For part 8, a significant number of candidates only had a vague understanding of the parity system and their answers lacked detail and used incorrect terminology. A common misconception was that if the data received had an even number of 1s in it then the data was correct – if an even number of errors have occurred during transmission this would not be true. Quite a few candidates had obviously prepared for a question on Hamming Codes and wrote about this in their answers; others described the odd parity system. Good answers described clearly the roles of both the sender and the receiver.

Question 3

While the majority of candidates were able to answer this question well, a significant number had little understanding of this topic and were unsure what was meant by sampling resolution and sampling rate. The definition of Nyquist's theorem was often vague. Candidates often seemed to have read something about it but couldn't quite remember what it was; answers often indicated that there was little understanding of the sampling process and sound waves in general.

Question 4

This was a straight-forward question. Most candidates got good marks on it although a surprising number of candidates gave incorrect answers.

Question 5

The definition of an algorithm was often unclear. Many candidates described an algorithm as being a set of instructions – a set implies that there is no order to the instructions – without qualifying with, "executed step-by-step". To get full marks candidates had to clearly get across that an algorithm is a sequence of instructions that describe how to solve a problem and that these instructions are independent of any programming language.

The dry run was attempted by most candidates and many got full marks. The MOD operator was not understood by some candidates even though it is explicitly stated in the specification and a reminder of what it does was included in the question. Fewer candidates were able to identify the purpose of the algorithm.

Question 6

Many candidates were able to obtain good marks on this question. Candidates were not penalised for minor typing/transcription errors in prompts but some candidates dropped marks because the prompts/identifiers were substantially different from those give in the question. Candidates should be encouraged to follow exactly a specification given to them. In quite a few answers marks were dropped by candidates who had decided to use a `Repeat` or `While` loop instead of the `For` loop required.

Candidates using Java are allowed to use the Console class provided by AQA with the questions in Section B as well as those in Section D, if they wish to do so.

Question 7

In general, candidates were better prepared for Section C this year and candidates demonstrated a good understanding of the Skeleton Program.

When asked for the name of an identifier a one word answer is expected. A significant number of candidates included an entire line of code that included the name of a relevant identifier in it. Answers for parts 18, 19, 23, 24, 25 that gave a correct answer as part of a declaration were accepted this year; answers that included the identifier as part of some other statement (e.g. within an assignment statement) were rejected. In future examinations, any answer that includes anything other than the name of the identifier will **not** be deemed creditworthy.

Part 20 was generally well-answered though some candidates gave an answer that global variables are declared at the start of a program. This is often true, but it is possible to declare global variables in other places in a program and this was not sufficient (on its own) for a mark.

Most candidates were able to answer part 21. The most common error was stating that the instructions would stop being repeated when an 'X' or 'Y' is entered (instead of 'X' or 'O'). Some candidates just copied and pasted code from the Skeleton Program rather than describe the stopping condition.

Most candidates seemed to be aware of the role of variables. More were able to identify stepper role variables than fixed-value role variables. The most common incorrect answers for the fixed-role variables were `PlayerOneSymbol` (this is given a value inside a loop and so its value can change several times) and `StartSymbol` (which changes value after each game).

Part 26 was answered well, but some candidates gave a declaration rather than an assignment statement and others copied in several lines of code rather than just the assignment statement. A few candidates copied in the code for the entire subroutine which showed that they did not understand what an assignment statement was.

Good answers for part 27 referred to how the value 'X'/'O' would be assigned to the variable `WhoStarts`. Most answers obtained some marks, but often referred to how a value of

'X'/'O' would be returned – this was not a description of the selection statement, but the subroutine as a whole.

Question 8

The definition of boundary data was often unclear and most answers for part 28 did not get the mark available. Very few candidates stated that boundary data is that which is at the limit of what is allowed, just before the limit and just after the limit. Some candidates gave answers in which they wrote about boundary data being data which is only just allowed and then gave a (correct) example of boundary data as being 4 (which would not be allowed).

Some candidates did not get the mark for the screen capture of the test as their test did not show **both** the data entered **and** the behaviour that resulted from their test.

Question 9

The checks for a valid `YCoordinate` were done correctly by most candidates. Some candidates dropped marks by having code that would not return the correct value from the function (by adding the validation checks after the value was assigned to the function) or by combining the `XCoordinate` and `YCoordinate` checks in one statement with an `AND` operator (this would not work unless brackets were added in the correct places).

The check for overwriting moves was harder and was not done as well as the `YCoordinate` check. Code that would not compile was often seen. Many candidates did not ensure that the overwriting of moves was only checked for if the coordinates were valid – this would result in checking an out-of-bounds position on an array which could cause the program to crash when run (e.g. VB.Net) or to return spurious results by checking a different memory location (e.g. Pascal). A few candidates (mostly in Java and C#) used exception handling to deal with this problem. While this was not on the mark scheme it was deemed to be worthy of the mark available, though it would be better practice to write code where exception handling was not needed.

Some candidates had either code that would not compile for the overwriting check or code that would crash when tested with an out-of-bounds coordinate but they had included screen captures for part 32. Marks were not awarded for part 32 in these cases as the marks were dependent on the code from part 31 – these candidates had run a different version of their code for their testing from that they had included for part 31.

Question 10

Most candidates did very well on this question and had obviously anticipated that this would be asked and prepared for it accordingly.

Some answers clearly demonstrated that checking for a win on a row/column being in a loop had not been understood, as they put the check for a line in a diagonal in a loop that repeated three times unnecessarily e.g.

```
For Diagonal = 1 To 3
  Do
    If Board(1,1)= Board(2,2) And Board(2,2) = Board(3,3)
      And Board(2,2) <> " " Then XorOHasWon := True
```

Question 11

Most candidates answered this question well. A few dropped marks for part 38 by showing a drawn position for a second or third game in a match. Part 37 asked for the code for the selection structure used in the Skeleton Program – if this was not included (i.e. candidate only included the code for adding to the scores) then only one mark could be awarded. Some candidates added a new selection structure rather than amending the existing structure as asked for in the question – again only one mark was awarded in this case.

Question 12

Answers to this question were generally good with many candidates getting full marks for parts 39 to 44. The most common incorrect answer for part 40 was to change the maximum number of moves to 12, not 16. Part 45 was more challenging and many candidates dropped marks here. Many incorrectly gave (correct) code for 4-in-a-row rather than 3-in-a-row. Another common error was to add a second loop for the rows that went from 2 to 4 instead of 1 to 4. Some candidates did not read the question carefully and gave an answer that checked for a win in a column not a row. Part 46 was done well by those who had done part 45; some candidates did not read the question carefully and did not test for a winning row in the position asked for. There were a lot of correct answers for part 47 although some dropped a mark by stating the change and not describing it as well. It is important that candidates recognise key words used in questions, like describe and explain, and understand how these should be answered. The most common correct answer was actually the one not on the specification about using a 3D array. A significant number of candidates did not describe how the data structure could be represented and instead wrote about how the displaying of the board would have to be modified.

Grade boundaries and cumulative percentage grades are available on the **Results Statistics** page of the AQA Website.