Course Report 2017

Subject	Computing Science
Level	Higher

The statistics used in this report have been compiled before the completion of any Post Results Services.

This report provides information on the performance of candidates which it is hoped will be useful to teachers, lecturers and assessors in their preparation of candidates for future assessment. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published assessment documents and marking instructions.

Section 1: Comments on the assessment

Component 1: question paper

Overall, based on the item-level statistical data and feedback from the marking team, the question paper was more demanding than intended. This was taken into account when setting grade boundaries.

Component 2: assignment

The marks gained in the assignment were higher than would be expected when compared with the performance in the question paper. The average mark in the assignment had increased compared to last year, and the marks at the extreme high end had greatly increased. This was taken into account when setting grade boundaries.

Section 2: Comments on candidate performance

There has been an improvement in candidate performance in content that has been consistently sampled in previous exam papers — particularly in the ISDD topic. This is noticeably true for entity relationship diagrams, and in the identification of tables and fields when required.

However, content sampled from the predecessor qualification proved to be challenging for many candidates. Examples include the fetch-execute cycle and the range of two's complement using a fixed number of bits, which are clearly stated in the Course Assessment Specification.

Candidate performance in certain areas that were introduced to the Higher course 2015, and which have since been sampled regularly, such as records and object-oriented languages, have not improved to the standard expected.

Areas in which candidates performed well

Component 1: question paper

Question 3: The majority of candidates correctly calculated the file size, but the most common mistake was not taking account of the term 'stereo' in the question.

Question 6: Many candidates knew the role of public and private keys in encryption.

Question 7(a) and (b): Many candidates were able to state features that could help people with visual and hearing impairments.

Question 10(a): Candidates had a good understanding of the standard algorithms and applied ‘finding the minimum’ in an unfamiliar context.

Question 10(c)(i): The majority of candidates were able to complete the trace table for the given algorithm.

Question 11(a): The majority of candidates created an appropriate entity relationship diagram to show the relationship between the given tables.

Question 11(b)(i): The majority of candidates identified the tables and fields used in the report.

Question 11(f): Many candidates knew the section of HTML code in which to place a link to an external cascading style sheet.

Question 12(b): An encouraging number of candidates identified the reason for the incorrect output and explained why parameter passing resulted in this error.

Question 12(d): Many candidates understood local variables and provided one benefit. More able candidates provided two benefits.

Question 15(b)(i):The majority of candidates understood the use of cache to improve performance.

Component 2: assignment

The assignments were well attempted by the majority of candidates sampled.

The majority of candidates who were sampled performed extremely well in the implementation sections of the assignments and produced excellent computer programs, databases and webpages.

Areas which candidates found demanding

Component 1: question paper

Question 1: Surprisingly few candidates were able to calculate the range of two’s complement using a fixed number of bits.

Question 2: Many candidates failed to get a second mark for the analysis stage of software development because they struggled to express tasks undertaken during analysis in the appropriate technical language.

Question 5: Many candidates understood the use of ‘cookies’ but failed to express the security implication of tracking cookies.

Question 8: Few candidates had any understanding of the key characteristics of object-oriented languages and could not use any of the terminology of this programming paradigm eg classes, instances, methods, etc using the appropriate technical language.

Question 9: The majority of candidates could not create a record structure for a given scenario and did not go onto create a variable based on their record structure, although many candidates identified the need for an array.

Question 10(b): Although some candidates identified a function of the operating system, they did not describe a function it would perform in the creation of a file.

Question 10(e): Most candidates answered in a trivial manner about heating systems and paid no attention to the computing science 'intelligence' present in such systems.

Question 11(d): Very few candidates understood the composition of a metatag or identified the missing components.

Question 12(c): Most candidates did not have a clear understanding of watchpoints and answered instead about a breakpoint.

Question 13(c): Few candidates understood the underlying process of querying a database-driven website and how the result of the query is used.

Question 14(b)(ii): Fewer candidates than expected understood that changing the colour of pixels in a bitmap to change the graphic has no effect on file size.

Question 15(a): Fewer candidates than expected knew the steps of the fetch-execute cycle.

Component 2: assignment

Many candidates did not analyse the task as a whole, but split it into two parts. They did not always give the detail required, even though the requirements are listed in the assignment.

Candidates were not always able to show the program design correctly. Candidates too often used large amounts of code and there was evidence that the design was done after the code had been written.

Candidates can be confused regarding data-flow in programming design. They tend to confuse it with the requirements for their programming language or with inputs and outputs to the program. Candidates should understand that data-flow simply shows which variables are passed into the sub-program and those that need to be passed out of the sub-program.

Candidates did not always remember to provide evidence of all their testing.

Many candidates did not ensure that they had evidence of all the requirements for the implementation of the information system. Assessors should remind candidates to use the candidate checklist.

Section 3: Advice for the preparation of future candidates

Component 1: question paper

Candidate performance has improved in several areas of the course, particularly in content that has been frequently sampled before such as the standard algorithms, calculation of file size, ER diagrams and identification of the elements present in a database report. However, performance in new content (ie not previously sampled in predecessor qualifications) proved challenging — for example, understanding of object-oriented languages, exemplification of the use of records, and the understanding of database-driven websites. These are all are areas that have been present in most question papers since 2015.

It is understood that candidates use different programming environments and that some of these may not lend themselves to the exemplification and implementation of data structures such as arrays of records, but centres should prepare candidates in this content area. Centres should also understand that the concepts are more important than syntax, and the marking of the question paper reflects this.

The Course Assessment Specification requires that candidates describe various language types including object-oriented languages. It is understood that many candidates will not implement programs of this type, but they must be able to demonstrate some knowledge and understanding of the nature of this programming paradigm.

Centres are clearly preparing candidates in various testing techniques such as dry runs and trace tables, but they should also ensure that candidates can differentiate between watchpoints and breakpoints.

Centres should prepare candidates to have a deeper understanding of a database-driven website which includes steps such as connection to the server, selection of the database, querying the database and the role of server-side scripting in the generation of a webpage.

Centres should ensure that candidates have a clear understanding of the composition of metatags. Centres should also emphasize the role of the computer system when teaching environmental implications.

Component 2: assignment

It is important that candidates are able to evidence each part of the assignment. Assessors should support the candidates by ensuring that they use the checklists within the assignments.

It should be noted that program designs should not be written in SQA reference language, as this is not a contemporary design notation but a language that is used in the exam paper to test understanding of coding.

Assessors should ensure that there is evidence for each requirement within each stage of the assignment.

Centres should ensure that they are using the most up-to-date version of the assignment.

Whilst it was pleasing to see that the conditions of assessment for coursework were adhered to in the majority of centres, there were a small number of examples where this may not have been the case. Following feedback from teachers, we have strengthened the conditions of assessment criteria for National 5 subjects and will do so for Higher and Advanced Higher. The criteria are published clearly on our website and in course materials and must be adhered to. SQA takes very seriously its obligation to ensure fairness and equity for all candidates in all qualifications through consistent application of assessment conditions and investigates all cases alerted to us where conditions may not have been met.

Grade Boundary and Statistical information

Statistical information: update on courses

Number of resulted entries in 2016	4454

Number of resulted entries in 2017	4476

Statistical information: Performance of candidates

Distribution of course awards including grade boundaries

Distribution of course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark -				
A	19.1%	19.1%	854	104
B	20.2%	39.2%	902	90
C	25.3%	64.5%	1131	76
D	12.1%	76.6%	542	69
No award	23.4%	-	1047	-

General commentary on grade boundaries

- While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.

- Each year, SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.

- The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.

- The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.

- Where standards are comparable to previous years, similar grade boundaries are maintained.

- An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in, say, Higher Chemistry, this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related, as they do not contain identical questions.

- SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.