Course Report 2016

Subject	Computing Science
Level	Advanced 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: project

The marks gained in the project were higher than would be expected when compared with the performance in the question paper. A minor typing error was identified in Question 4 of this question paper. This inconsistency, in the naming of a database file, was discussed at our Grade Boundary setting meeting and was determined not to have affected candidate performance.

In the marking scheme, there was an expectation that all criteria within a banding would be complete, partial or minimal. There was also a weighting given to ‘reflective commentary’ and ‘record of progress’. The marking instructions will be revised for next year to make assessment judgements clearer.

Component 2: question paper

The question paper consists of one section totalling 60 marks and was structured in the same way as the specimen question paper (SQP) and exemplar question paper (EQP). The question paper is composed of four questions of 15 marks each.

Feedback from the examining team suggested that the question paper was fair in terms of course coverage and overall level of demand. However, candidate responses were, generally, well below the standard expected at Advanced Higher level.

Section 2: Comments on candidate performance

Areas in which candidates performed well

Component 1: project

The majority of candidates showed excellent programming skills in a wide range of projects. Many candidates showed an enthusiasm to learn new skills and programming languages.

Component 2: question paper

Although the overall performance of candidates was poor in all aspects of course content, the strongest candidate performances in the question paper were associated with content that would be familiar to centres who had previously presented candidates for the predecessor Advanced Higher Computing qualification.

Question 2 (a) Most candidates were able to explain the terms ‘scope’ and ‘constraints’ by making appropriate reference to the scenario.

Question 3 (d) (i) Most candidates were able to list the correct stack operations required to perform the task described.

Question 3 (e) Most candidates were able to accurately describe an appropriate benefit that could be made of (big data) analytics by referring to one of the sources stated in the scenario.

Question 4 (c) Most candidates correctly identified the bubble sort algorithm and provided the correct comparison statement needed to complete the algorithm.

Areas which candidates found demanding

Component 1: project

Some candidates found the reflective commentary demanding.

Some candidates did not seem to carry out any research. This is an important part of the analysis as mentioned on page 26 of 'Appendix 1: instructions and guidance for candidates'.

Some candidates found it difficult to construct a design for their coding. They used a large amount of language-specific commands and lacked evidence of data flow. The designs should be fully developed using a recommended design notation/methodology.

When the candidates are designing their test plan they should consider all elements of testing that are appropriate to the problem being solved — end-user testing, user interface testing, component testing — rather than testing that just covers normal, extreme and exceptional testing. The testing should be problem-focused and throughout the whole implementation. Candidates should also be able to evidence all of their testing.

Component 2: question paper

Feedback from the examining team reported that candidate performance was poor in all areas of the course content. Knowledge of content associated with the predecessor Advanced Higher Information Systems qualification was especially poor, and candidates demonstrated incomplete knowledge of content associated with the predecessor Advanced Higher Computing qualification, namely programming data structures and standard algorithms.

In addition, new content introduced to the Advanced Higher Computing Science Course seemed to be unfamiliar to many candidates: UML diagrams, exemplification of object-oriented programming, and implications (social, legal, ethical and economic).

Question 1 (a) Few candidates demonstrated knowledge of UML use case diagrams, with the majority not attempting a response. Most candidates who did provide a response failed to use the standard notation for actors, associations and use cases.

Question 1 (b) (ii) Most candidates were unable to correctly apply an insertion sort to the example provided. In addition, the majority of candidates failed to notice that the required order was chronological, even though a statement explaining this had been provided.

Question 1 (c) (i) Many candidates had no knowledge of the tags (FORM and INPUT) used to create straightforward HTML forms and failed to make use of information provided in the question stem and the form itself to complete the necessary attributes of the required tags.

Question 1 (c) (ii) Although candidates demonstrated incomplete knowledge of server-side form processing, the majority of candidates did attempt a response. The majority of candidates received partial marks for steps 1 and 4 of the script but failed to achieve any marks for steps 2 and 3 (connection with database server and execution of SQL query needed to add the submitted details to the database).

Question 2 (b) (i) A number of candidates simply described generic issues associated with the Copyright, Design and Patents Act, rather than referring to specific issues associated with intellectual property rights.

Question 2 (b) (ii) Most candidates failed to recognise the use made of test cases, personas or scenarios as part of usability testing. Instead, responses simply described difficulties for the user rather than focusing on how the results of testing would be used to determine accessibility of the site.

Question 2 (c) (i) Most candidates were unable to demonstrate correct use of SQL CREATE statement for the scenario described.

Question 2 (d) Few candidates were able to write a correct algorithm to remove an item from a queue (dequeue). The majority of candidates who received partial marks for their response had failed to check for an empty queue before removing the item from the queue.

Question 3 (a) (i) Most candidates simply descried the required object-oriented terminology without making any reference to the UML class diagram provided.

Question 3 (c) (ii) Explanations provided by the majority of candidates who provided a response were vague and generic rather than referring to relevant object-oriented concepts exemplified by the procedure call.

Question 3 (d) (ii) A number of candidates failed to mention the term ‘node’ in their descriptions of how to insert the required item into the linked list.

Question 4 (a) (i) Most candidates were unable to create a top level design that met the requirements described in the stem of the question.

Question 4 (a) (ii) Most candidates were unable to write an algorithm for the binary search used to display the required pupil details.

Question 4 (b) A number of candidates failed to make any response to this question. The majority of candidates who did make a response failed to acknowledge that the file to be updated was a database file and not a sequential file.

Section 3: Advice for the preparation of future candidates

Component 1: project

Assessors should ensure that candidates use and follow the ‘Appendix 1: instructions and guidance for candidates’.

Assessors and candidates should ensure that the project uses an appropriate range of techniques at Advanced Higher as outlined at the bottom of page 22 of ‘Appendix 1: instructions and guidance for candidates’.

Component 2: question paper

Overall candidate performance in the question paper was poor. In several areas of the course, candidates demonstrated little or no knowledge of the content. This was noticeably so in areas of the course that also featured in the predecessor Advanced Higher Information Systems qualification.

Centres should ensure that candidates are familiar with the use made of HTML tags used to create simple data collection forms (the FORM tag and its ACTION and METHOD attributes with the INPUT tag and its TYPE, NAME and VALUE attributes) and the use made of server-side scripts to process any data submitted by those forms (assignment of form data, connection to the database server – requiring a user name, password, server name and database name, execution of an appropriate SQL statement and closure of database connection). All of this content is associated with Outcome 1 of the ISDD unit of the AH Computing Science course.

Centres should also ensure that candidates understand how usability testing is carried out (by creating personas and test cases and observation of task completion) and how the results of that testing are used to improve the system. This content is introduced in Higher Computing Science; at Advanced Higher level, candidates are expected to understand and appreciate the role of usability testing in ensuring that a user-centred design is achieved. Many candidates confused usability testing with acceptance (beta) testing. This content is associated with Outcome 3 of the ISDD of the new course.

Although candidates were more familiar with the content of the predecessor Advanced Higher Computing qualification, centres should ensure that candidates have a clear understanding of all of the advanced data structures (queues, stacks, linked lists, 2D arrays and arrays of objects) that are required knowledge for Outcome 1 of the SDD unit. Similarly, candidates should have knowledge of the advanced algorithms (sort algorithm and binary search) that are required knowledge for Outcome 2 of the SDD unit.

Candidates must pay more attention to the wording of each question. Frequently, responses failed to answer the question that had been asked. For example, in Question 3 (a) (i), the majority of candidates simply provided a rote-learned description of the object oriented terminology required and failed to relate that learning to the actual scenario as had been stated in the question.

Descriptions provided in many responses were simply not appropriate for Advanced Higher level. For example, in Question 2 (b) (i), responses were generic and failed to refer to relevant IPR content of the Advanced Higher course. Similarly, in Question 4 (d), the majority of responses simply stated that quicksort was ‘quicker’ or ‘faster’, without making any attempt to justify the statement. Candidates must provide explanations that go beyond simple statements of fact.

Grade Boundary and Statistical information:

Statistical information: update on Courses

Number of resulted entries in 2015	0

Number of resulted entries in 2016	485

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	26.2%	26.2%	127	105
B	24.5%	50.7%	119	90
C	23.9%	74.6%	116	75
D	7.8%	82.5%	38	67
No award	17.5%	-	85	0

Decision Making Record Statement:

The combination of changes in demand had a different effect on the grade boundaries.

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.