External Assessment Report 2012

Subject(s)	**Computing**
Level(s)	**Advanced Higher**

The statistics used in this report are pre-appeal.

This report provides information on the performance of candidates which it is hoped will be useful to teachers/lecturers in their preparation of candidates for future examinations. 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 question papers and marking instructions for the examination.

Comments on candidate performance

General comments

There was an improvement in the candidates' performances this year resulting in a higher percentage of the cohort gaining a pass. Markers also commented that there were fewer candidates with a very poor exam performance, although there continues to be a poor level of technical language in some responses. It was also pleasing to see problem solving questions requiring algorithms being attempted well.

Areas in which candidates performed well

Question 1 (a): Most candidates could identify technical feasibility and identified other hardware characteristics.

Question 1 (b) (ii): Most candidates could identify reasons for referring to the functional requirements at a later stage.

Question 1 (d) (ii): Most candidates gave good descriptions of setting breakpoints or watching variable values.

Question 3 (b): Most candidates could identify the reason for the poorer performance of the linear search algorithm but the quality of explanation varied.

Question 4 (b) (ii): More candidates could correctly identify the new state of the queue than in previous years.

Question 4 (d): There was an improvement in the standard of responses on object-oriented language with more candidates relating their response to the scenario. However, some candidates continue to treat this type of question as a reason to respond with everything they know about object-oriented languages.

Question 5 (a) (i): Most candidates could re-arrange the array using the simple sort.

Question 5 (b) (i): Most candidates could re-arrange the array using the bubble sort.

Question 6 (c): Most candidates were able to apply the Waltz algorithm but some candidates left edges blank or labelled an edge twice.

Question 8: Most candidates had a clear understanding of the blocks world question and answered all parts correctly.

Question 11 (e) (i): Most candidates could identify the limitation of hill-climbing when searching for a solution.

Question 12 (c): Most candidates could create a semantic net using frames.

Question 12 (f) (i): Most candidates understood what is meant by a conflict set.

Question 13 (a): Most candidates could describe the fetch–execute cycle in context.

Question 15: Most candidates could describe DMA and explain its improvement in performance.

Question 18 (a) (i): Most candidates could name a method of allocating memory to a process.

Question 19 (a): Most candidates knew the contents of the header of an e-mail.

Question 19 (c): Most candidates could state benefits of software working with existing standards.

Question 19 (d): Most candidates could name the appropriate layer of both TCP/IP and OSI models.

Question 20 (a): Most candidates could explain the benefit of CIDR over the class-based system for the allocation of IP addresses.

Question 22 (b) (i): Most candidates could describe the exchange of files using public-key encryption.

Question 23 (a): Most candidates could formulate a suitable backup schedule.

Areas which candidates found demanding

Question 1 (d) (i): Some candidates confused a trace table with a table of test data.

Question 3 (a): A disappointing number of candidates understood how to create an array of records despite the number of times this has been examined.

Question 3 (d): The quality of responses expressing the binary search algorithm in pseudocode varied greatly.

Question 4 (a): Some candidates did not understand that a class contains states as well as behaviours or methods.

Question 7 (c) (ii): Many candidates understood how to parse a sentence but did not understand this involves matching words to lists of nouns, verbs or matching to rules.

Question 7 (d): Many candidates understand ambiguity in language but struggle to identify different types of ambiguity, eg a verb with two different meanings causes ambiguity during semantic analysis but not during syntactic analysis.

Question 9: Some candidates had a poor understanding of machine learning.

Question 10: A small number of candidates could construct an AND/OR graph despite clearly having been taught this (as they did attempt to use arcs).

Question 13 (b): Many candidates could not give an example of assembly language instructions.

Question 13 (c): Very few candidates answered this challenging question well.

Question 14 (a) (i): Many answers were trivial, indicating that many candidates do not understand the mechanism by which cache memory works.

Question 15: Although candidates understood that DMA improves performance, their depictions of its operation lacked technical detail.

Question 17 (a): Few candidates knew what is meant by a service or a benefit of using them.

Question 17 (d): A number of candidates did not know the functions of an operating system.

Advice to centres for preparation of future candidates

General

Centres should continue to improve candidates understanding of object-oriented programming and should encourage candidates to relate their answer to the scenario of the question. Some candidates explain concepts such as inheritance and encapsulation even when they are not relevant to the question asked.

Candidates should be able to exemplify the binary search algorithm as well as explain its operation.

Candidates need a clearer understanding of trace tables. Some candidates confused trace tables with a table of test data.

Candidates studying Artificial Intelligence should:

- be able to use AND/OR graphs in a problem solving context, not merely know the correct syntax for their use
- be able to exemplify the different types of machine learning
- develop their ability to write rules in a declarative language

Candidates studying Computer Architecture should:

- complete practical tasks in assembly language and be able to give examples of different types of instructions
- learn the main functions of an operating system such as file management and memory management and improve their understanding of operating system services
- be able to describe the use of cache

Candidates studying Computer Networking should:

- develop their knowledge of CIDR, subnetting and the difference between them — they should be able to apply subnetting to a practical example
- develop their understanding of tunnelling and video sampling

Statistical information: update on Courses

Number of resulted entries in 2011	461

Number of resulted entries in 2012	460

Statistical information: performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 200				
A	33.7%	33.7%	155	140
B	28.0%	61.7%	129	120
C	21.1%	82.8%	97	100
D	7.8%	90.7%	36	90
No award	9.3%	100.0%	43	-

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.