



External Assessment Report 2013

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

In general, candidates maintained the same level of performance as last year, with a small reduction in number of candidates. Markers continue to note both a lack of depth and of appropriate technical language in some responses. In some contexts, candidates do not pay enough attention to the scenario and tend to have rehearsed responses.

Areas in which candidates performed well

- ◆ Question 1b): Most candidates are familiar with aspects of feasibility and managed to relate their answer to the scenario.
- ◆ Question 1e): Majority of candidates answered well and could relate their knowledge of project management techniques to the diagram in the exam paper.
- ◆ Question 2a): A very familiar type of question for candidates with most candidates gaining high marks but still a surprising number of candidates fail to declare a 1-D array of the record structure they have created in part i).
- ◆ Question 2b): Candidates have improved their ability to manipulate a stack with pop and push operations.
- ◆ Question 3d): Markers commented on the higher standard of response that would normally be expected of an algorithm question. However, some candidates who correctly answered part b) with the value 200 went on to use 400 iterations in their algorithm.
- ◆ Question 5c): The majority of candidates understand the use of breakpoints.
- ◆ Question 6a): The majority of candidates understand the mechanics of a bubble sort but with some struggling to convey the concept well.
- ◆ Question 6b)i): Almost all candidates could identify the exchanges for the bubble sort.
- ◆ Question 7): Blocks world problems are relatively simple compared to other areas of the course and this question was well done by the majority of candidates.
- ◆ Question 10b)i): The majority of candidates correctly identified the junction.
- ◆ Question 14a): Most candidates could name and describe the purpose of registers.
- ◆ Question 14b): Most candidates were competent using assembly language instructions including the terms opcode and operand.
- ◆ Question 17b): Most candidates had a good understanding of the difference in throughput of the PCI and PCI-X buses.
- ◆ Question 18c): Many candidates had good quality answers on predication.
- ◆ Question 21a)i): The majority of candidates could identify an HTML error.
- ◆ Question 22c)ii): Most candidates had a good understanding of public key encryption.
- ◆ Question 24a)i): Most candidates could name an appropriate wired network.

Areas which candidates found demanding

- ◆ Question 1c)i) : Many candidates gained 1 mark, but few candidates managed to have enough depth in their answer to get full marks.
- ◆ Question 1d): This question was intended to be a discriminator with only a few candidates gaining a second mark.

- ◆ Question 4a): Many candidates merely reiterated the information in the stem of the question and did not attempt to explain the **purpose** of each section in a class definition.
- ◆ Question 4b)i): More candidates than expected failed to recognise the use of subclasses here.
- ◆ Question 4b)ii): Some candidates restated their answer to part i) instead of identifying benefits.
- ◆ Question 6b)ii): Fewer candidates than hoped recognised that although the list was sorted at the end of the first pass, the swap flag would be true and termination of the loop would not result until no swaps have taken place.
- ◆ Question 6b)iv): A surprising number of candidates chose a score lower than 25 that would not have displaced Senga from the high score table.
- ◆ Question 8f)iii): Writing Prolog rules remains a challenging for many candidates.
- ◆ Question 9a) and b): Although many candidates can name the types of machine learning, there remains a lack of depth in their understanding of the different types.
- ◆ Question 10a): Few candidates could explain 'tri-hedral'. This resulted from the rare sampling of this term in the exam paper.
- ◆ Question 10b)i): Many candidates clearly understood the use of convex, concave and boundary when labelling, but a surprising number of candidates could not name them.
- ◆ Question 12b): Many candidates identified the order of nodes visited but failed to explain the search technique. Some candidates confused the different search techniques.
- ◆ Question 15a): Many candidates struggled with addressing modes despite this being covered practically in the unit assessment.
- ◆ Question 18a): Some candidates confused branch predication with speculative loading of data.
- ◆ Question 19b): Many candidates wrongly think that tasks would enter a multi-level feedback queue at a level dependent on the task's size and complexity. Many also failed to mention that the priority of tasks became lower as they moved from one queue level to another.
- ◆ Question 20b): Many candidates described 'best fit' as a non-contiguous method of storing files rather than having a description of linked or indexed allocation.
- ◆ Question 20c) and d): Few responses of any quality for these questions.
- ◆ Question 22b): Very few candidates could identify characteristics of a tunnelling protocol.
- ◆ Question 23b)i): Few candidates could appropriate identify firewall rules.
- ◆ Question 25c)ii): Candidates continue to have difficulty with the calculation of subnet masks.

Advice to centres for preparation of future candidates

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.

Centres have developed candidates' understanding of records, but should reinforce how to create 1-D arrays of the records.

Candidates have improved in their understanding of the implementation of stacks and queues, and should practice these in a problem solving context.

Centres are to be commended for the improvement of candidates creating algorithms in unfamiliar contexts.

Centres should improve candidates understanding of trace tables in a wider range of scenarios and problem-solving contexts.

Centres should increase candidate understanding of the termination of a bubble sort.

Candidates studying Artificial Intelligence should:

- ◆ develop candidate ability to convert knowledge represented as a semantic net to frames and vice versa
- ◆ be able to exemplify the different types of machine learning
- ◆ develop their ability to write rules in a declarative language
- ◆ improve terminology used in the Waltz algorithm
- ◆ be able to **explain** node selection in the execution of the various heuristic searches such as hill climbing, best-first etc in a problem solving context

Candidates studying Computer Architecture should:

- ◆ complete practical tasks in assembly language and be able to give examples of different types of instructions and of addressing modes
- ◆ improve their understanding of operating system services
- ◆ be clear of the methods to optimise the instruction and data stream such as predication and the speculative loading of data

Candidates studying Computer Networking should:

- ◆ develop their knowledge of CIDR, subnetting and the difference between them — and should be able to apply subnetting to a practical example
- ◆ be able to identify characteristics of a tunnelling protocol
- ◆ be able to identify appropriate firewall rules

Statistical information: update on Courses

Number of resulted entries in 2012	460
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Number of resulted entries in 2013	435
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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	32.6%	32.6%	142	140
B	28.7%	61.4%	125	120
C	21.4%	82.8%	93	100
D	8.3%	91.0%	36	90
No award	9.0%	100.0%	39	-

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.