External Assessment Report 2009

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|---|---|
| Subject | Computing |
| Level | 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 general standard of responses from candidates.and were particular improvements in candidates' answers to questions that required the writing of algorithms and pseudocode. There was also an improvement in the candidate's ability to relate the responses to the particular scenario in the question.

Artificial Intelligence is still the optional section that is answered best by candidates. Computer Architecture is still the weakest section – however there was an overall improvement this year.

# Areas in which candidates performed well

## Software Development and Developing a Software Solution

In Question 1 part (b) most candidates were knowledgeable about types of feasibility and in part (e) explanations of module, component and beta testing were good.

Question 2 was particularly well done with most candidates able to distinguish between a stack and queue. Virtually all candidates were able to state two errors that can occur during the operation of a stack.
In Question 3 most candidates were able to define records and there was an improvement in candidate's ability to write detailed pseudocode.

Many candidates completed the trace table well in Question 4.

## Artificial Intelligence

The representation of the goal state using symbolic representation and the search tree in Question 7 were both completed well.

Candidate's ability to work out the new facts added to memory in Question 11 was well done.

The application of the Waltz algorithm in Question 12(b) was well done with most candidates achieving the available three marks for this question.

## Computer Architecture

In general most parts of Questions 16 were answered well.

Candidates were able to demonstrate their integration of knowledge and awareness of the unifying themes by providing good answers to the travel agent's role in beta testing and explaining syntax and semantics in Question 17.

## Computer Networking

The mapping of the TCP/IP layers to the OSI model layers was well described in Question 19.

In Question 20, the candidate's ability to write HTML code is improving but it is still weak in some **centres**.

In Question 20 (b) (ii) most pupils displayed a sound understanding of the unifying theme of social implications although some candidates' answers were at a very simple level

# Areas which candidates found demanding

## Software Development and Developing a Software Solution

In Question 1(c) there were poor and vague answers with few candidates knowing how the ORD is used in the later stages of development. There is still some confusion over the difference between module and component testing.

Candidate's knowledge of stacks in Question 2 was at a very general level – little mention of the use of pointers. Part (b) (i) and (ii) produced some poor answers with many candidates' answers referring to a forward stack when the question clearly asked the candidates to explain how **this** stack could be used.

Very few candidates defined the Mobile Phone Number as text in Question 3. Phone numbers cannot be an integer because of the leading zero. Candidates were poor on the features of the software development environment that could be used to locate an error.

In Question 4 the explanation of the termination of a bubble sort using the swap variable was surprisingly poor. Most candidates gave a poor description of the purpose of trace table.

Candidates found it difficult to know how to answer Question 6. Asking candidates to describe how the languages differ in the use of data types was intended to make the answering of this topic easier. However it did not seem to help candidates with very poor attempts being made. Very few marks for Question (6)(b) about 4GLs – candidates found this topic difficult.

## Artificial Intelligence

In Question 7 very few candidates labelled the branches of the tree**.**

In general candidates found Question 8 on heuristics and specifically the hill-climbing algorithm difficult and there were very few correct answers to most of this question.

Question 9(b)(i) was not well done with very few candidates including the word MOVE in their alternative operations and in part (b)(ii) candidates gave poor, vague answers.

In question 10(a) candidates had the correct idea of frames but had a poor understanding of default values and clearly lacked experience in creating frames. In Question 10(c) most candidates gave weak answers that lacked detail on the application of recursion. Many answers were simply written as "check head of the list, then check the tail" without any explanation of what was happening.

Candidates found it difficult to apply the formula in Question 11(c) (ii). This seemed to be because candidates are confused over the difference between the certainty factor for a rule and the certainty factor for a condition. In part 11(d)(i), which required integration of knowledge, very few of the candidates' answers linked to the scenario. The unifying themes question in part 11(d) (iii) produced very vague answers.

Very few candidates were able to explain inductive learning in Question 12 or give specific answers about generalising and refining concepts.

## Computer Architecture

Question 14 (b) was poorly answered with candidates not understanding the concept of the effectiveness of the use of interleaving memory.

### Computer Networking

In Question 18(b) candidate's knowledge of subnet masks was weak. Also in Question 18 (c) candidate's description of public key encryption and digital signatures was poor – this is an area that is always badly answered and is not showing any sign of improvement.

Answers to Question 19(b) were weak with very few candidates knowing improvements that make PPP preferable to SLIP.

The technical implication of teleconferencing in Question 21(a) was generally approached at too low a level. A typical answer was "you need a fast internet connection". In Question 21(b) (i) candidate's knowledge of Ultrawideband and HiperLAN2 was not as detailed as expected.

## Advice to centres for preparation of future candidates

- Centres should keep encouraging their candidates to link their answers to the scenario and further develop their knowledge and confidence in the writing and understanding of algorithms and pseudocode.

- Candidates still need to be clearer on all the stages of the SDP with particular focus on the purposes of the ORD.

- Centres need to encourage candidates to improve their knowledge of Stacks and Queues – discussion on different applications of these data structures could be helpful for candidate's understanding.

- Centres could help candidates by doing more discussion on the comparison of languages and the specific features of the languages especially 4GLs.

- Candidates studying Artificial Intelligence should ensure that they always label branches of trees, practise creating frames and writing the explanation for how recursion works using particular examples for clarification.

- Candidates studying Computer Architecture should improve their knowledge of memory interleaving.

- Candidates studying Computer Networking should ensure that they are able to write HTML code. Centres should work on developing candidate's knowledge of public key encryption and digital signatures.

## Statistical information: update on Courses

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| **Number of resulted entries in 2008** | 366 |

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|---|---|
| **Number of resulted entries in 2009** | 411 |

## 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 | 29.2% | 29.2% | 120 | 140 |
| B | 25.1% | 54.3% | 103 | 120 |
| C | 25.3% | 79.6% | 104 | 100 |
| D | 7.8% | 87.3% | 32 | 90 |
| No award | 12.7% | 100.0% | 52 | - |

## 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.