Course report 2023

National 5 Computing Science

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report is intended to be constructive and informative, and to promote better understanding. You should read the report in conjunction with the published assessment documents and marking instructions.

The statistics in the report were compiled before any appeals were completed.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2022:   6,440

Number of resulted entries in 2023:   6,795

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

A	Number of candidates	2,879	Percentage	42.4	Cumulative percentage	42.4	Minimum mark required	84
B	Number of candidates	1,327	Percentage	19.5	Cumulative percentage	61.9	Minimum mark required	70
C	Number of candidates	1,144	Percentage	16.8	Cumulative percentage	78.7	Minimum mark required	56
D	Number of candidates	772	Percentage	11.4	Cumulative percentage	90.1	Minimum mark required	42
No award	Number of candidates	673	Percentage	9.9	Cumulative percentage	100	Minimum mark required	N/A

Please note that rounding has not been applied to these statistics.

You can read the general commentary on grade boundaries in the appendix.

In this report:

♦ 'most' means greater than 70%
♦ 'many' means 50% to 69%
♦ 'some' means 25% to 49%
♦ 'a few' means less than 25%

You can find more statistical reports on the <u>statistics and information</u> page of SQA's website.

Section 1: comments on the assessment

In both the question paper and the assignment, 55% of candidates completed the 'Database design and development' section and 45% of candidates completed the 'Web design and development' section.

Question paper

The question paper performed as expected. There were no adjustments to the grade boundaries in relation to this assessment.

Assignment

Feedback and analysis on statistical data indicated that the 'Software design and development' task was more challenging than intended. The complexity of the structure diagram over multiple pages proved to be challenging for some candidates, meaning that marks designed to be 'C' marks were not as accessible as intended. Many candidates tackled the testing question by running their code, and candidates who had not been able to produce a working solution lost further marks. The grade 'C' boundary was adjusted to account for this.

The 'Database design and development' and 'Web design and development' tasks performed as intended.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Software design and development, and computer systems

Question 1(a):   Most candidates were able to identify the attributes of a polygon.

Question 1(b):   Most candidates were able to state the name of one other object from the given logo.

Question 2:   Most candidates were able to describe how the email was transferred securely.

Question 3:   Most candidates were able to describe how to reduce energy consumption.

Question 4:   Most candidates could problem solve to identify the extreme and exceptional test data.

Question 5:   Most candidates could identify the given design technique.

Question 6(a)(i): Most candidates could calculate the number of bits required.

Question 6(a)(ii): Many candidates could answer this computer systems question on temporary storage, which was framed in the context of a complex coding question.

Question 6(b):   Many candidates could identify the predefined function to count characters.

Question 7(a):   Many candidates could identify the error type in code provided and explain how it could be corrected.

Question 7(b):   Many candidates could answer this computer systems question on temporary storage, which was framed in the context of a complex coding question.

Question 8(a):   Many candidates could write the code to perform a calculation and update the total cost.

Question 8(b):   Many candidates could write the code to display the text output given using the variable provided.

Question 8(c):   Most candidates were able to convert decimal to binary.

Question 9(a):   Many candidates could identify inputs and outputs for a given problem.

Question 9(b):   Most candidates could identify why the user interface is not fit for purpose.

Question 9(d):   Most candidates could identify the data structure and the data type required to be used in the given problem.

Question 9(e):   Many candidates could describe how bit-mapped graphics are stored.

Question 10(a):   Most candidates could identify the mantissa and exponent from the given floating-point representation.

Question 10(d)(i):   Many candidates could identify a logical operator used.

Question 10(d)(ii): Most candidates could identify the type of error and how it could be corrected.

Question 11(a):   Many candidates could identify a process carried out.

Question 11(c):   Many candidates could identify the type of translators.

Database design and development

Question 12(a):   Most candidates could identify the type of validation required.

Question 12(b):   Most candidates could identify the database attribute types.

Question 13:   Many candidates could problem solve to code the SQL.

Question 14(a):   Many candidates could add the key attribute, and draw and name the relationship between the two entities by using the information given.

Question 14(b)(i):   Many candidates could complete the SQL for the problem given.

Question 14(b)(ii): Many candidates could complete the SQL for the problem given.

Question 15(a):   Most candidates could design a query from the information provided.

Question 15(c)(i):   Many candidates could identify why the SQL statement is not fit for purpose.

Question 15(c)(ii): Most candidates could complete the SQL for the problem given.

Web design and development

Question 16(a):   Most candidates could identify why a web page was not fit for purpose.

Question 16(b):   Most candidates could explain what an internal hyperlink is.

Question 17(a):   Most candidates could identify a standard file format for animated images.

Question 17(b):   Many candidates could understand the rights of the creator under the Copyright, Designs and Patents Act.

Question 19(b)(i):   Most candidates could apply the information given to provide the code for playing the sound.

Question 19(c):   Most candidates could identify the computer language used to implement the problem.

Question 20(a):   Many candidates could explain why both wireframes and low-fidelity prototypes are required.

Question 20(b):   Many candidates could apply the information given to draw a navigational structure.

Areas that candidates found demanding

Question paper

Software design and development, and computer systems

Question 9(c):   Many candidates could not write the code to carry out the calculation for this problem. Candidates need to apply their knowledge to the context of the question.

Question 10(b):   Many candidates could not design a solution to a problem using the running total algorithm within a loop. Candidates need to apply their knowledge of standard algorithms to the context of the question.

Question 10(c):   Many candidates could identify the pre-defined function round, but most could not apply it in their chosen programming language.

Question 11(b)(i):   Many candidates could not identify the most suitable data type for the given problem. Candidates should be aware of how all data types are used.

Question 11(b)(ii):   Many candidates could not design a solution to the problem using the input validation algorithm. Candidates did not identify that a loop and an input were required. Candidates need to apply their knowledge of standard algorithms to the context of the question.

Question 11(d):   Many candidates could identify the pre-defined function random, but most could not apply it with the correct parameters and the array.

Database design and development

Question 14(c):   Most candidates could not explain why the relationship did not allow the record to be inserted, with many giving the answer 'referential integrity', rather than providing an explanation.

Question 15(b):   Most candidates were able to write the code for insertion into the correct table, but most candidates could not apply the correct data to be added from the question.

Web design and development

Question 18:   Many candidates could not describe a benefit of external CSS.

Question 19(a):   Many candidates were unable to identify a functional requirement.

Question 19(b)(ii):   Most candidates could not describe how to reduce the file size for the MP3 file that related to the sound. Candidates need to apply their knowledge to the context of the question.

Question 19(d):   Many candidates could not apply the HTML and CSS provided to draw how the web page would look in a browser. Candidates need to apply their knowledge of CSS and HTML code by reading, understanding and explaining what the code does.

Question 20(c):   Many candidates could not write an external CSS class and then provide the edited HTML to apply this CSS class.

Areas that candidates performed well in or found demanding

Assignment

Software design and development

Task 1(a):   Many candidates could design an input validation using a conditional loop. Some candidates designed the required input validation using an if statement instead of a conditional loop.

Task 1(b):   Many candidates implemented a working program using the correct loops, data structures and calculations. Some candidates did not identify that the solution required two loops. Some candidates did not use arrays to store the data, instead implementing running totals after each input.

Task 1(c)(i):   Most candidates, with a working program, included test data with the correct output.

Task 1(c)(ii):   Many candidates used their program code to calculate the expected output from the test data rather than calculating the output manually. Where their program did not calculate the correct output, this led to further errors.

Task 1(c)(iii):   Many candidates could not describe how to make the code fit for purpose.

Task 1(d):   Many candidates used pre-prepared answers and did not refer to their own code when evaluating their solution.

Database design and development

Task 2(a):   Many candidates could identify the missing staff and problem details.

Task 2(b):   Most candidates could identify the primary keys in each table, the foreign key and the required validation.

Task 2(c):   Most candidates provided evidence that they had implemented the required restricted choice validation.

Task 2(d)(i):   Most candidates implemented the SQL update statement.

Task 2(d)(ii):   Most candidates correctly identified the fields to output, the two conditions and the required sort. Many candidates did not include a join statement in their SQL solution.

Task 2(e)(i):   Many candidates identified that the supplied SQL would delete more than one record.

Task 2(e)(ii):   Many candidates identified that the primary key should have been used in the search criteria.

Web design and development

Task 3(a):   Many candidates could identify two functional requirements with an appropriate level of detail. However, some candidates were not able to access marks as their responses did not include specific reference to the required functions, such as 'display', 'show' and 'play'.

Task 3(b):   Most candidates successfully implemented all four HTML requirements. Many candidates did not consider using the elements included in the webpage when implementing the required styles, instead implementing many of their own classes and IDs.

Task 3(c):   Most candidates included working code for the text and sound file.

Task 3(d):   Most candidates did not compare the completed web page against the functional requirements, identifying that the web page was not fit for purpose.

Task 3(e):   Most candidates could identify how JavaScript was being used in the web page.

Task 3(f):   Most candidates could redesign the web page as a four-page website.
                  Some candidates did not include the external link in their design.

Section 3: preparing candidates for future assessment

Question paper

Candidates should be encouraged to read the questions carefully and look at the number of marks assigned to the question. They must answer according to the command word, for example 'identify', 'describe', 'explain'. For 'describe' and 'explain' questions, the number of marks assigned will guide candidates as to how many points they need to make (usually either one or two).

Teachers and lecturers should aim to further develop candidates in problem-solving skills and application of the standard algorithms to unfamiliar contexts for both 'design' and 'write code' questions.

Candidates should read the 3, 4 and 5-mark questions carefully to:

♦ make sure that they answer using a 'design technique' or 'programming language of their choice', as required by the question
♦ identify which standard algorithm they need to apply
♦ ensure they use any variable or data structures provided in the question

In 'Web design and development', candidates should ensure they can read both CSS and HTML and know how the code is represented in a browser. Candidates should be able to describe the factors affecting standard file formats.

Assignment

Candidates should be encouraged to break down the program design into achievable stages. They should take particular note of the overall structure of the program in terms of loops, along with the code that should be included inside each loop.

Candidates should include examples of their own code when evaluating their program. Many candidates are still making generic statements that do not demonstrate an understanding of where their own code is efficient, robust or readable. Candidates should avoid pre-prepared answers unless they can adapt this knowledge to discuss their own code.

Candidates should be aware that when fields are used from both tables in a SELECT statement, a join will be required.

Candidates should look for where CSS can be applied to existing code, aiming for a simple efficient implementation of required styles.

In the 'Database design and development' and 'Web design and development' sections, candidates should spend time checking that each functional requirement has been implemented. This should result in a response indicating that the solution is or is not fit for purpose, and a description of why this is the case.

Appendix: general commentary on grade boundaries

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

For most National Courses, SQA aims to set examinations and other external assessments and create marking instructions that allow:

♦ a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
♦ a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade A boundary)

It is very challenging to get the standard on target every year, in every subject at every level. Therefore, SQA holds a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of SQA's Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. SQA can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

♦ The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
♦ The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
♦ Where levels of difficulty are comparable to previous years, similar grade boundaries are maintained.

Grade boundaries from question papers in the same subject at the same level tend to be marginally different year on year. This is because the specific questions, and the mix of questions, are different and this has an impact on candidate performance.

This year, a package of support measures was developed to support learners and centres. This included modifications to course assessment, retained from the 2021–22 session. This support was designed to address the ongoing disruption to learning and teaching that young people have experienced as a result of the COVID-19 pandemic while recognising a lessening of the impact of disruption to learning and teaching as a result of the pandemic. The revision support that was available for the 2021–22 session was not offered to learners in 2022–23.

In addition, SQA adopted a sensitive approach to grading for National 5, Higher and Advanced Higher courses, to help ensure fairness for candidates while maintaining

standards. This is in recognition of the fact that those preparing for and sitting exams continue to do so in different circumstances from those who sat exams in 2019 and 2022.

The key difference this year is that decisions about where the grade boundaries have been set have also been influenced, where necessary and where appropriate, by the unique circumstances in 2023 and the ongoing impact the disruption from the pandemic has had on learners. On a course-by-course basis, SQA has determined grade boundaries in a way that is fair to candidates, taking into account how the assessment (exams and coursework) has functioned and the impact of assessment modifications and the removal of revision support.

The grade boundaries used in 2023 relate to the specific experience of this year's cohort and should not be used by centres if these assessments are used in the future for exam preparation.

For full details of the approach please refer to the National Qualifications 2023 Awarding — Methodology Report.