



GCSE
2015

Computer Science

TN

Component 3: Non-exam assessment

Teachers' Notes

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1 Introduction

These Teachers' Notes (referred to throughout as Notes) are for your instruction and guidance. They are intended to support information from section 3.9 of the GCSE Computer Science specification and not act as a replacement for it.

It is important that you are familiar with all of the materials available for the non-exam assessment (NEA) including the specification and exemplar materials which are used to exemplify the standards. Section 3.9 of the GCSE Computer Science specification provides information regarding the taking and marking of the NEA task. Information from the specification will be referenced in this document. If you have any problems that are not resolved by either the specification or these Notes you are encouraged to contact us for further clarification by emailing us at computerscience@aqa.org.uk

Your centre will be assigned a Subject Adviser who will be available to help you with any specific matters relating to NEA. Details of how to contact your Subject Adviser will be provided when you tell us that your centre is taking the specification.

The NEA task and any other information, such as data files, relevant to the NEA will be made available to your centre via e-AQA¹.

Students must be prepared for NEA that relates to the year in which they are to be entered for the examination (eg, if a student is taking the examination in 2018, they should complete the NEA for 2018).

¹ e-AQA is the secure area of the AQA website. You will need to obtain a login ID and password by either submitting the online form or by asking your Examinations Officer to provide you with one.

2 General guidance for Non-exam assessment (NEA)

2.1 The NEA task

We will produce a new NEA task each year. The NEA task will be available in September of the final year of the course and should be used for only one cohort. For example the NEA task released in September 2017 will be for candidates taking their assessment in summer 2018.

The task will be marked by you using the generic marking criteria in the GCSE Computer Science specification (see section 3.9: Non-exam assessment). We will moderate the work in line with our standard procedures.

2.2 The help you can give to students

You are advised to familiarise yourself with the requirements of the NEA in advance of students commencing their work. You are permitted to explain or amplify any of the language used in the NEA but in doing so, you must **not**, however, explain the computing specific terminology used. Any assistance of this nature must be recorded on the *Candidate Record Form*.

Students should be advised to tackle the whole of the NEA as far as they can, rather than concentrating on only one aspect of the work. This will enable them to demonstrate the range of skills they have developed during the course.

See also paragraph 4.2.3: Feedback to students

2.3 General guidance on completing the NEA sections

2.3.1 Designing the solution (0–9 marks available)

This section should refer to the needs of the user. Students should articulate their design in a manner appropriate to the task and with sufficient clarity for a third party to understand how the key aspects of the solution are structured. The emphasis is on communicating the design: it is acceptable to provide a prose description of the design or a combination of prose and diagrams. This could include flowcharts, as appropriate, as well as a description of algorithms, data structures, text file/database structures as appropriate, or using relevant technical description languages, such as pseudo-code. Where design of a user interface is relevant, screen shots of actual screens are acceptable.

Students should provide (as appropriate):

- a prose description of the design or a combination of prose and diagrams, including flowcharts as appropriate
- a description of the algorithms, either in pseudo-code or a flowchart
- a description of any data structures to be used
- a description of any text/database file structures to be used
- the user interfaces design, where appropriate.

The above items, when taken together should, for the higher marks, provide:

- a developed and well-planned annotated design with sufficient detail so that a fully working solution could be developed from the design.
- a detailed explanation showing an understanding of what the problem involves and how the proposed solution meets the needs of the user.

2.3.2 Creating the solution (0–30 marks available)

This section should contain enough evidence to show that the student has used a range of appropriate programming techniques to solve the problem and that the student has understood what they have done. The marks in this section could be awarded by inspection of the final program code itself. Marks are awarded for two areas:

2.3.2.1 Completeness of solution (0-15 marks available)

This element considers how well the solution has met its requirements. Students should understand that the use of structured programming techniques and techniques to increase the robustness of the code are important if the higher marks are to be awarded.

Students should present their complete code listing here. Students need to annotate their code listing either by using comments within the code or by annotating the listing in some other way. To gain marks in any particular level it must be clear from looking at the code listing and reading the comments that the solution demonstrates the requirements of that level.

2.3.2.2 Programming techniques used (0-15 marks available)

This element considers how the student's programming skills have been used to affect the final solution. Teachers should note that the descriptions of coding skills in the specification are indicative of those required by students working at the level indicated. The lists must not be used as a simple checklist, as some solutions may warrant inclusion at a particular level even if all of the skills for that level are not evident. For example if constants have not been used within the solution because their use is not required/appropriate then the student can still potentially reach level 2 and above. As such teachers must use a best fit approach when deciding the appropriate level for a piece of work.

Students should provide:

1. program listing(s) that demonstrate their technical skill
2. listing(s) that are appropriately annotated and, for the higher marks, self-documenting (an approach that uses meaningful identifiers, with well-structured code whose purpose is apparent without reference to external documentation). Annotation may include narrative text alongside the code or be clearly cross-referenced to lines of code, or comments within the code itself
3. evidence of how their solution has been made robust by using techniques such as input validation, assertions and error handling, as appropriate to the language used.

When presenting their evidence, students should organise their work in a way that will enable a third party to discern the quality and purpose of the coding. This could take the form of:

- explanations of particularly difficult-to-understand code sections
- a careful division of the presentation of the code listing into appropriately labelled sections, to make navigation as easy as possible for a third party reading the code listing.

Achievement of the latter, to an extent, is linked to the skill in applying a structured approach during the course of developing the solution.

2.3.3 Testing the solution (0–21 marks available)

Teachers should note that testing is taken to mean “Does the solution work?” and as such it is important that students plan and execute a selective, representative series of tests to show that the different sections and elements within their solution work as intended.

This section should include a testing plan and testing evidence. Evidence for the testing section may be produced after the system has been fully coded or during the coding process. It is expected that tests will be planned in a test plan. It is important for teachers to recognise that only carefully selected representative samples are required. When carrying out tests it is important that normal (typical), boundary (extreme) and erroneous data should be used as appropriate.

Students must provide and present in a structured way, for example in tabular form, clear evidence of testing. This should take the form of carefully selected and representative samples, which demonstrate the robustness of the complete, or nearly complete, solution and which demonstrate that the requirements of the solution have been achieved.

The emphasis should be on producing a representative sample in a balanced way and not on recording every possible test and test outcome. Students should explain the tests carried out alongside the evidence for them.

This could take the form of:

- the test performed
- its purpose if not self-evident
- the test data
- the expected test outcome
- the actual outcome with a sample of the evidence. For example, screen shots of before and after the test, etc, sampled in order to limit volume.

Where a test ‘fails’ or highlights an issue with the solution it is important that the solution is refined to eliminate the ‘failure’ and/or issue. The test should then be repeated to show that the refinement has succeeded in eliminating the ‘failure’ and/or issue.

Marks are awarded for two areas:

2.3.3.1 Test planning (0-9 marks available)

The marks in this section are for the quality and completeness of the test plan.

2.3.3.2 Testing evidence (0-12 marks available)

The marks in this section are for the quality and completeness of the test evidence, along with the evidence of any remedial action (if required).

Students should include:

1. a test plan which explains the purpose of the tests, shows the test data for each test and the expected results for each test, as outlined above
2. evidence that the tests have been carried out with the results being documented
3. any remedial action (if any was needed) that has been taken as a result of testing.

2.3.4 Potential enhancements and refinements (0-10 marks available)

Teachers should note that evaluation is considered to be “How well does the solution work, and how could it be better?”

Students should consider and assess how well the solution meets the requirements of the problem and how the solution could be improved if the problem were to be revisited.

2.3.5 Overall quality of the report (0-10 marks available)

Teachers should note that ‘Overall quality of the report’ is taken to mean the way in which the report is structured and its overall consistency.

Students should consider how the different sections of the report work together, readability and ease of cross-referencing between the different sections of the report.

Students are free to choose their style and layout, but may wish to consider standard techniques such as a table of contents, numbered sections and subsections, numbered captions for diagrams or screenshots, and, where appropriate, references to any sources used.

Credit will also be given for supporting reasoned judgements with accurate use of appropriate terminology.

2.4 Students' folders

Each student's folder must contain:

1. a completed *Candidate Record Form*
2. a completed log of all websites used during the completion of the NEA task (where applicable)
3. a log of the number of hours the student has spent completing the NEA task
4. a complete solution for the NEA task organised as shown below
5. only the student's own work.

Each piece of students' NEA work must comprise (in the order shown) the following sections:

1. Designing the solution
2. Creating the solution
3. Testing the solution
4. Potential enhancements and refinements

It is vital for assessment and moderation purposes that the **sections are the same as those shown above** and, for paper-based submission, in the same order.

Teachers should note that there is not a separate section entitled 'Overall quality of the report' but that this element should be referred to when marks are being allocated.

2.5 Teacher annotation

Teacher **annotation** when marking students' work and making comments on the NEA documents is vital in order that the moderator can assess accurately your application of the marking criteria for the NEA. Requirements for teacher annotation when marking are that annotation should indicate where a student has achieved the assessment criterion and what aspect of it has been achieved. An example of annotation could be:

Test planning, L2, 5 marks - REASONS

3 Marking the NEA: instructions and guidance

3.1 General information

- 3.1.1 All relevant evidence produced by the student must form part of the student's NEA work.
- 3.1.2 You should keep a record of any help given to students over and above normal teaching in the relevant section of the *Candidate Record Form*, available from the AQA website. You should annotate students' work, where appropriate, to assist the moderator in identifying areas where marks have been awarded. Where a student is unable to produce suitable work in a section and feedback has been provided, this should be clearly recorded on the *Candidate Record Form* and a mark should be awarded which reflects the student's unaided work. This is particularly important where a student has included work in an inappropriate section.
- 3.1.3 When the NEA task has been marked, it is recommended that a final check is made to see that the total mark is warranted by the completed NEA as a whole.
- 3.1.4 Students should spend 20 hours on the NEA task. If any student exceeds 20 hours, this will be considered to be malpractice, for which a penalty will be applied.

3.2 Submitting the NEA to the moderator

You should ensure that when each student's NEA work is submitted for moderation it is organised as follows:

Paper based submission

For each student in the sample, a completed folder of work containing the solution to the NEA must be sent to the moderator on request. The folders must be organised as described in section 2.4.

When submitting paper based evidence work for moderation, centres are reminded that **securely fastened** work using **treasury tags** is recommended.

The use of plastic wallets and bulky ring binders is not permitted.

Electronic submission

See section 5 of these notes.

4 Guidance on NEA

This section contains both instructions and guidance regarding the conducting and marking of the NEA. Further information about the standardising of teachers, moderation and other matters relating to NEA can be found in section 5: *Non-exam assessment administration* of the specification.

4.1 NEA support

Teachers' Standardising will be conducted each year. Each centre will also be assigned a Subject Adviser who will be available to assist centres with any centre specific matters relating to NEA. Details will be provided when we know if you are using the specification. If you have any administrative queries, you are encouraged to email computerscience@aqa.org.uk

4.2 NEA: Task taking

Controls in relation to the taking of a task can be specified in a number of areas:

4.2.1 Authentication

It is essential that you are able to confirm that the work submitted by each student is their own unaided work and has been completed in 20 hours. To ensure that this can be done, all work must be completed under formal supervision. Formal supervision means that teachers must ensure that:

- plagiarism and/or malpractice does not take place
- work can be authenticated as the student's own, and
- sources used by students are clearly recorded and acknowledged.

In practice, what does this mean? Students need to be under the direct supervision of teaching staff at all times. Any work undertaken by the student and which is submitted for assessment must be carried out in the classroom. This is so that you are able to state with confidence that the work being submitted by the student has not been plagiarised or downloaded, without acknowledgement, from an Internet site.

It should be noted that:

- students are **not** allowed to take the NEA tasks home with them
- students are **not** allowed to take work on the NEA task home with them to complete. All work presented for submission **must** have been completed under supervised conditions.

4.2.2 Research

All research undertaken relating to the NEA task must be completed during supervised sessions. Students are **not allowed** to work on the NEA tasks outside of the supervised sessions.

4.2.3 Feedback to students

Students are free to revise and redraft a piece of work before submitting the final piece for assessment. You can review draft work and provide **generic feedback** to ensure that the work is appropriately focussed. In providing generic feedback you **can**:

- provide feedback in oral and/or written form
- explain, if necessary the context of the task
- give general advice on how the task could be approached
- explain syntax in general terms
- advise on resources that could be used
- remind students of the key sections that should be included in their final report (design, creation, testing and enhancements)
- provide general support if the student is not able to carry out sufficient work at one stage to enable them to progress to the next stage.
 - Solution design - sufficient support to allow the student to develop a minimal solution that allows the student to develop a program.
 - Creating the solution – provide explanations of programming code syntax in general terms, however this cannot be related to the work in progress.
 - Testing the solution – provide general indications of aspects of the program that need to be tested so that students are not prevented from carrying out some testing. You must not tell students to use normal, erroneous and boundary data for their tests.
 - Potential enhancements and refinements – no support is allowed.
 - Overall quality of report – no support is allowed.

In providing generic feedback you **cannot**:

- correct a student's work
- provide templates, model answers or writing frames
- provide specific guidance on how to solve the problem
- provide specific feedback to students on how to improve their projects to meet the requirements of the marking criteria
- give examples of how to implement, for example, program loops
- provide any programming code for the scenario or solution
- provide feedback where a student has produced an incomplete stage and this is sufficient to allow progression to the next stage
- tell students to use normal, erroneous and boundary data for their tests.

Whilst students may be guided in general terms, the final outcome must remain their own. Advice can be used to evaluate progress to date. A clear distinction must be drawn between providing feedback to students as part of work in progress and reviewing work once it has been submitted by the student for final assessment. Once work is submitted for final assessment it cannot be revised. It is not acceptable for you to give, either to individual students or to groups, feedback and suggestions as to how the work may be improved in order to meet the marking criteria.

In accordance with the JCQ Instructions for conducting NEAs, any support or feedback given to individual students **which has not been provided to the class as a whole** must be clearly recorded on the *Candidate Record Form* and the student's mark must be **appropriately adjusted** to represent the student's unaided achievement.

4.2.4 Time limits

Students should spend 20 hours on their NEA unless there are specific access requirements that should be considered. It is expected that students will be selective in their choice of material to include in their solutions, will be mindful of the time allocated to it and will manage this time appropriately. Teachers are required to keep a log of the date, time and number of hours spent on the NEA task. This log **must** be submitted to AQA along with the sample for moderation. A template for recording the hours spent on NEA will be made available to centres on eAQA.

4.2.5 Use of resources

Students are permitted to use resources provided by the centre. If there are any students who require the use of any special equipment, the Examinations Officer should contact AQA's Exams Office Support for guidance.

If students use the internet for research purposes at any point during the completion of the NEA task, they **must** submit a log of all the websites that they visited. This log must be submitted alongside their report. There are no marks available for this log but it is a requirement that students submit it. A template for recording the websites used will be made available on eAQA and should be appended to each student's project. If a student has not needed to access the internet, the log should still be submitted but should indicate that the student has not accessed the internet throughout the development of their solution.

AQA will be undertaking regular searches for materials relating to the NEA on the internet. Uploading solutions or downloading and using any that you find will be considered serious malpractice and will be fully investigated.

If your centre's network means that you have to use removable storage devices in order to complete the NEA, these devices **must** be kept in a secure location by a teacher and cannot be removed by students.

5 Electronic submission of work

Centres are able to submit their students' work electronically. However, only one form of submission will be accepted across a centre. Likewise, students must submit all their work either electronically or by printed submission; a mixed submission will not be accepted.

Centres should note the following important points:

1. CD and DVD Recordable discs will be the **only** acceptable forms of media. Rewriteable discs and memory sticks should not be used.
2. Password protection should not be used.
3. Work should be submitted in Microsoft Word, Open Office or Acrobat pdf formats only. This will allow for ease of review by the moderator, irrespective of the software they have.

If evidence has been produced in video format, this must be saved in a standard video format and in a clearly labelled folder along with the rest of the student's submission.

Under no circumstances should executable files be submitted.

4. Signed *Candidate Record Forms* will be required for all students. Centres can choose whether to submit:
 - a. paper copies
 - b. electronic read-only copies
 - c. pdf versions.
5. A signed Centre Declaration Sheet will be required for each centre, in the format of a, b or c above.
6. Each CD/DVD should contain a folder or series of folders, clearly identifiable with the students' details (centre number and student name/number). The CD/DVD may contain the work of several students, but each student's work must be in a separate clearly labelled folder.
7. Students can submit one document (eg a pdf) that comprises all the sections of their portfolio (ie 'Design of solution' etc) or a series of documents covering all these areas. If a student produces a series of documents, then each document must be clearly labelled with the student's details.
8. Each CD/DVD should be clearly labelled, with indelible ink/marker pen, with:
 - a. Centre name
 - b. Centre number
 - c. Component code
 - d. Subject level and name

If it is a CD/DVD for an individual student then it should also be labelled with:

- e. Student name
- f. Student number

9. The CD/DVD should be sent to the moderator in a hard plastic case and padded envelope, by 1st class post. It is not acceptable for the work to be e-mailed to the moderator.
10. Hyperlinks must not be included in the work.
11. Centres may submit teacher annotation of students' work electronically or on paper.
12. Two copies of the CD/DVD should be burned – the master copy should be retained at the centre until the deadline for Enquiries about results has expired. The CD/DVD sent to the moderator will not be returned to centres. It is treated as a copy of the original CD/DVD, which remains in the possession of the centre.
13. Prior to sending a CD/DVD to the moderator, it should be tested to ensure it functions as expected.
14. Centres should check for viruses/malware before sending it to the moderator. The centre will be liable for any failure to do so which leads to any form of virus or malware infecting a moderator's computer.

Should you require any further guidance please contact the Computer Science subject team via e-mail at computerscience@aqa.org.uk

Further details on the administrative procedures for submission can be found at web.aqa.org.uk/admin/p_course.php