AQA qualification training

A-level Computer Science

Focus on Non Exam Assessment

BOOKLET 1

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Contacts/Administration

Contact points for A-level Computer Science

Please contact the subject department for further help and advice about the above specification and any information about standardisation.

Customer support team

A-level Computer Science
AQA, Manchester, M15 6EX

Telephone: 0161 957 3980

email: ict-subjects@aqa.org.uk

For help with Support Meeting Information, please contact:

Teacher Support Manager

Diane Frisk
AQA, Manchester, M15 6EX

Telephone: 0203 671 8014

email: teachercpd@aqa.org.uk

Websites

AQA: www.aqa.org.uk
JCQ: www.jcq.org.uk

AQA

Administration

Entries:

Direct Line: 0161 455 5482

Fax: 0161 455 5408

email: entries@aqa.org.uk

Web: http://web.aqa.org.uk/exams-office/entries.php

Pre Exam Services – Access Arrangements/Special Consideration/ Modified Question Papers

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email: specialneeds@aqa.org.uk

Post Results Services

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Fax: 01483 556 344

email: resultsenquiries-s@aqa.org.uk (Guildford office)
resultsenquiries-n@aqa.org.uk (Manchester office)

Web: http://web.aqa.org.uk/exams-office/about-results/re-marks.php

Website navigation and AQA support

For general queries about additional AQA support; follow these web links:

e-aqa: http://web.aqa.org.uk/help/eaqa.php

Secure Key Materials (SKM) can be accessed through the above e-AQA link. You will find copies of some of the materials that we have used in this meeting on this site, as well as selected items that have been used at previous Teacher Support Meetings.

Online Booking Service: https://coursesandevents.aqa.org.uk

In-school CPD: http://web.aqa.org.uk/qual/cpd/cpd_inschool_guidelines.php

For subject coursework and controlled assessment standardisation meetings; please contact either the Internal Assessment Standardisation team or relevant subject departments.

For further guidance on standardisation please refer to:
http://web.aqa.org.uk/support/teacher-online-standardisation
http://store.aqa.org.uk/support/pdf/AQA-TOLS-GUIDE.PDF

PowerPoint slides

An electronic copy of this PowerPoint presentation can be located on the Secure Materials area of the AQA web site. Please see the '*Website navigation and AQA support*' page of this booklet for details of how to access this area of the web site.

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A-level Computer Science

NEA

Martyn Colliver

This presentation has been created before standardisation of the first cohort of 7517 has taken place, and is not a precise definition of standards.

Today's session

What do you hope to gain from today's session?

What key questions / topics and concerns do you hope to have addressed?

Schedule for the day

Session One:	Managing the NEA
Session Two:	The ANALYSIS stage and four exemplars
Session Three:	DOCUMENTED DESIGN and TECHNICAL SOLUTION
Session Four:	Looking further at the exemplars
Session Five:	TESTING and EVALUATION
Session Six:	Final look at the exemplars
Session Seven:	Further Support / Final Questions

Managing the NEA

The non-examined assessment (NEA) is the opportunity for a student to take on a project over a long period of time.

For success it is crucial that the student 'signs up' to their project so that they can:

- Fully understand the problem area
- Set realistic and appropriate objectives for an A-level project
- Understand the challenges that will have to be overcome for the technical solution

- The more 'excited' a student is by the project the better
- Crucial that we support/monitor each student across the period of time

New spec vs Old spec

NEW	**OLD**
20% of the A-level	20% of the A-level
Marked out of 75	Marked out of 75
42 marks for technical solution	20 marks for technical solution
Problem based project OR investigatory	Problem based
Can be based on different methodologies	Based on 'waterfall' methodology
Less requirement on documentation: Analysis, Design, Testing, Evaluation	Big requirement for documentation: Analysis, Design, Testing, Evaluation User Manual, System Maintenance

Timeline for the NEA

Many possibilities:

Start in Lower 6th	vs	Start in Upper 6th
Take in at Christmas in Upper 6th	vs	Take in before Easter of Upper 6th

Also depends on whether students are being entered for AS exams.

Would encourage students to definitely be thinking about the project by end of Lower 6th.

How much lesson time to provide for the NEA?

Monitoring throughout the period of the NEA

Project Ideas

Problem Based	Investigatory

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Project Ideas

Problem Based	Investigatory
Simulations (maths/physics)	Investigation into AI for solving Connect 4
2D game (tower defense)	Investigation into the compression of a bitmap
Control of boiler (Raspberry Pi)	
Parent evening appointment system	
Encrypted messaging app	
Simulations (Turing machine / Logic circuits)	

Projects might make use of:
  Data storage (DB, files), use of OO paradigm, interfacing with hardware, simulations, programs that
  learn / adapt, sharing of data (JSON, XML), simulations

NOTE: Even from a project idea it is hard to fully understand whether a project is suitable or not.
  A more detailed description and initial objectives are often needed before it can be classed
  suitable for A-level.

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Project Ideas

The project should be chosen by the student.

Centres could encourage all students to use a particular 'environment' to make managing easier but the projects should have minimal overlap.

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Project Ideas

Which environment to use?

Python — good opportunity to also link in libraries such as PyGame,NumPy,SciPy

Visual Studio (C#, VB)

Unity / Unreal / GameMaker / Monkey X
- keep a focus on the algorithms required

PHP / MySQL — opportunity to also link in libraries such as JQuery
- ideas such as AJAX
- linking to other APIs

and many others….

Contact your NEA advisor for advice if needed.

A-level standard

Project tasks that are not of A-level standard
If the task (problem or investigation) selected for a project is **not of A-level standard**, mark the project against the criteria given, but adjust, the mark awarded **downwards by two marking levels** (two marks in the case of evaluation) in each section for all but the technical solution

Why might a project not be A-level standard?

- Check against objectives

- Check against data model / algorithms

If you are not sure whether a project is A-level standard please contact your NEA advisor.

The Analysis Stage

- A critical stage in setting out the aims of the project

A good analysis will:

- Clearly set out the background for the problem
- Give a feel for the complexity of the technical solution needed
- Provide objectives that are suitable for the candidate and also A-level
- Provide evidence of research / analysis into the problem area

- There is flexibility over the content of analysis to reflect the wider range of projects that students have started to produce

NOTE: The objectives have to remain challenging enough for the project to be classed suitable for an A-level otherwise the marking has to be penalised as detailed in the specification.

The Analysis Stage

How to provide evidence of analysis:

- Log   (table of activities performed)
- Links to websites (plus overview of relevance to project -
                          perhaps suitable for investigatory project)
- Transcripts
- Paper evidence

A well written evidence should, by itself, also be able to demonstrate that analysis has clearly been performed for this project.

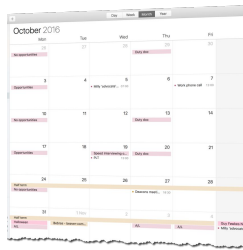## Setting Objectives

A good set of objectives is critical for the success of a project.

Design

Evaluation   Objectives   Technical Solution

Testing
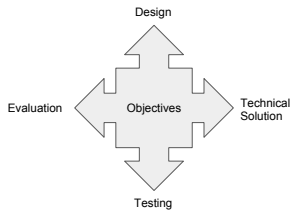
ACTIVITY - Setting Objectives

What are the objectives for a calendar application?

ACTIVITY - Exemplar Analysis

Assess the 4 exemplar analysis sections

- What level would you place each one in?

- What are the weaknesses?
- What are the strengths?
- How could they be improved?

Note any other comments/queries that occur during your assessment.

Documented Design

Can be done before, during and/or after implementing the solution.

However these might be best before implementation:

- Database structure design
- Identification of any object model
- Identification of key algorithms to be used

- There is flexibility over the content of the documented design to reflect the wider range of projects that students have started to produce

Documented Design

Samples of SQL statements

File structures and processing
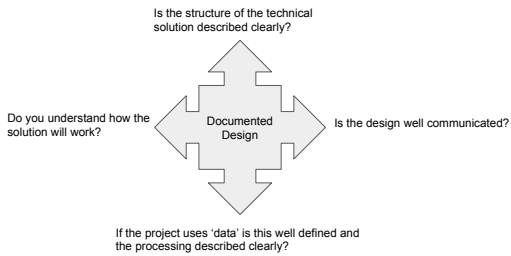
Data Dictionary

Pseudo-code

User interface design

Use of data structures

Key algorithms explained

Use of libraries and integration to solution

Documented Design

Is the structure of the technical solution described clearly?

Do you understand how the solution will work?

Documented Design

Is the design well communicated?

If the project uses 'data' is this well defined and the processing described clearly?

Technical Solution

No 'tick box' way of assigning the marks so:

- Considering the code as a whole - how 'complex' does it feel?

- Can you identify any specific complex parts of the project?
  [see the list in the specification]

- Did it satisfy the objectives / problem background?
  [taking into account that it should be an A-level standard project]
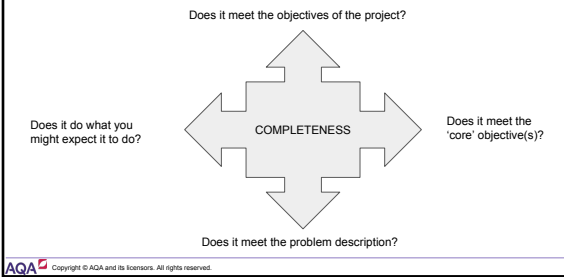
- Is the code 'good'?

Technical Solution - Overview Guide

- A short document to help the student, teacher and moderator navigate the technical solution
- Could identify:
  - Key complex algorithms
  - Key variables / subroutines / objects
  - Provide a copy, for example, of the database schema

- Other evidence for the technical solution:
  - In testing section - demonstrating complexity of solution / showing that it works
  - In design section - design of key algorithms can be matched up against technical solution

Technical Solution - Completeness

Does it meet the objectives of the project?

Does it do what you
might expect it to do?

COMPLETENESS

Does it meet the
'core' objective(s)?

Does it meet the problem description?

Technical Solution - Techniques used

What level are the most complex parts of
the project?

Is the complexity
similar across the
whole project?

TECHNIQUES
USED

What good elements
are there in the
coding style?

What level is the coding style?
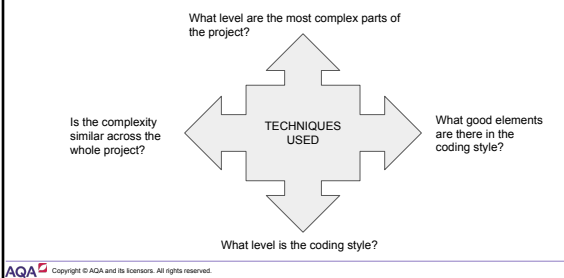
Technical Solution - An example

Problem Brief:
Create a table that will allow 4 adults to sit around it.

Objectives:
- Table should have 4 legs
- Table should be rectangular with a min length of 1m and a max length of 1.5m
- Table should make use of high quality wood
- Table should be level and not wobble

Extension Objective:
- Should have ability to open up
  to a larger size

Technical Solution - An example

What if?

- The solution was never finished and the objectives are altered to become much simpler….

- The solution has one complex leg joint but the rest of the solution is of a much lower standard….

- The main objectives are clearly met by the solution but the extension objective is not achieved. To reach the objectives the code is consistently of a high standard.

Technical Solution - An example

What if?

- The solution was never finished and the objectives are altered to become much simpler….
  - If the project has now become 'not of A-level standard' this will severely affect the marks. Could actually be beneficial to keep the original objectives.

- The solution has one complex leg joint but the rest of the solution is of a much lower standard….
  - Some previous COMP4 projects might have been submitted as 'complex' as they hit a few criteria. Whilst we are looking for complex skills there is also a need for a holistic view.

- The main objectives are clearly met by the solution but the extension objective is not achieved. To reach the objectives the code is consistently of a high standard.
  - If the extension objectives are clearly very advanced for an A-level project then the project can still be marked highly for completeness and techniques used.
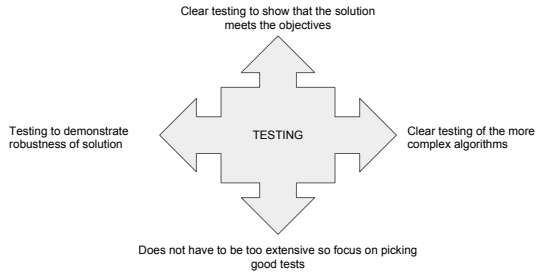

Documented Design and Technical Solution

Assess the 4 exemplar documented design and technical solution sections

- What level would you place each one in?

- What are the weaknesses?
- What are the strengths?
- How could they be improved?

Note any other comments/queries that occur during your assessment.

Testing

Clear testing to show that the solution
meets the objectives

Testing to demonstrate
robustness of solution

TESTING

Clear testing of the more
complex algorithms

Does not have to be too extensive so focus on picking
good tests

Testing

- If some testing takes place in the documented design then refer to this in the testing section

    This could be very appropriate for an investigatory project or a problem based solution
    that has been built in modules / stages.

- Testing could include a video of the solution being used

    This could be appropriate for a project such as a game. Would be good to include a
    table of key timings that demonstrate particular tests.

- Does not need to be extensive

    For example it is not necessary to show that a login system works correctly through a
    large series of tests when this is not the key objective of the project.

Testing

4.14.3.5 Testing (8 marks)

Level	Mark range	Description
4	7–8	Clear evidence, in the form of carefully selected representative samples, that thorough testing has been carried out. This demonstrates the robustness of the complete or nearly complete solution/thoroughness of investigation and that the requirements of the solution/investigation have been achieved.
3	5–6	Extensive testing has been carried out, but the evidence presented in the form of representative samples does not make clear that all of the core requirements of the solution/investigation have been achieved. This may be due to some key aspects not being tested or because the evidence is not always presented clearly.
2	3–4	Evidence in the form of representative samples of moderately extensive testing, but falling short of demonstrating that the requirements of the solution/investigation have been achieved and the solution is robust/investigation thorough. The evidence presented is explained.
1	1–2	A small number of tests have been carried out, which demonstrate that some parts of the solution work/some outcomes of the investigation are achieved. The evidence presented may not be entirely clear.

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 either be planned in a test plan or that the tests will be fully explained alongside the evidence for them. Only carefully selected representative samples are required.

Evaluation

- An evaluation against the objectives set in the analysis stage
- An evaluation of the 'whole solution' against the problem/investigation
- Feedback from others
- Analysis of feedback
- Final considerations as to extensions/improvements

Evaluation

4.14.3.6 Evaluation (4 marks)

Level	Mark	Description
4	4	Full consideration given to how well the outcome meets all of its requirements.
		How the outcome could be improved if the problem was revisited is discussed and given detailed consideration.
		Independent feedback obtained of a useful and realistic nature, evaluated and discussed in a meaningful way.
3	3	Full or nearly full consideration given to how well the outcome meets all of its requirements.
		How the outcome could be improved if the problem was revisited is discussed but consideration given is limited.
		Independent feedback obtained of a useful and realistic nature but is not evaluated and discussed in a meaningful way, if at all.
2	2	The outcome is discussed but not all aspects are fully addressed either by omission or because some of the requirements have not been met and those requirements not met have been ignored in the evaluation.
		No independent feedback obtained or if obtained is not sufficiently useful or realistic to be evaluated in a meaningfully way even if attempted.
1	1	Some of the outcomes are assessed but only in a superficial way.
		No independent feedback obtained or if obtained is so basic as to be not worthy of evaluation.

Testing and Evaluation

Assess the 4 exemplar testing and evaluation sections

- What level would you place each one in?

- What are the weaknesses?
- What are the strengths?
- How could they be improved?

Note any other comments/queries that occur during your assessment.

On-going supervision

- Discuss the mark scheme with the students

- Encourage students to 'showcase the complexity' throughout their project

- Consider the use of Google Docs, or similar, to allow close monitoring of documentation progress

- Consider the use of GitHub, or similar, to allow close monitoring of the technical solution (alongside ability to have version control, access across devices)

Further Support / Final Questions

- Other local centres / CAS hubs

- Contact your NEA advisor with questions

- CAS discussion forums and resources

Further Support / Final Questions

Any questions?

AQA

Thank you