

# 2017 Project log

## A-level Computer Science (7517)

### Computing Practical Project (7517/C)

Please attach a copy of this form securely to the front your candidate's work.

Centre number	Centre name
	AQA
Candidate number	Candidate's full name
	PROJECT E

#### Section one - the project

To be completed by the candidate and returned to the teacher for approval before the project is started

Project title A system to demonstrate cryptography and steganography

Project type problem

#### Outline description

The solution will be a system suitable to cover the elements of cryptography needed to cover the A-level specification suitable for using in class.

To be completed by the teacher:

From the given description the project is at a standard required for A-level

Yes

## Section two – project assessment

To be completed by the teacher

Analysis		Mark	Comments/evidence
Level	Criteria		
3	<p>Fully or nearly fully scoped analysis of a real problem, presented in a way that a third party can understand. Requirements fully documented in a set of measurable and appropriate specific objectives, covering all required functionality of the solution or areas of investigation. Requirements arrived at by considering, through dialogue, the needs of the intended users of the system, or recipients of the outcomes for investigative projects. Problem sufficiently well modelled to be of use in subsequent stages.</p>	7-9	<p>It is clear from the detailed analysis that the solution has been well scoped and presented in a way that a 3<sup>rd</sup> party can understand. There are many details about the cryptography provided, but perhaps RSA could have some more detail.</p> <p>Informal chats with Mr M did happen and helped direct the student to a good list of requirements for the system.</p>
2	<p>Well scoped analysis (but with some omissions that are not serious enough to undermine later design) of a real problem. Most, but not all, requirements documented in a set of, in the main, measurable and appropriate specific objectives that cover most of the required functionality of a solution or areas of investigation. Requirements arrived at, in the main, by considering, through dialogue, the needs of the intended users of the system, or recipients of the outcomes for investigative projects. Problem sufficiently well modelled to be of use in subsequent stages.</p>	4-6	
1	<p>Partly scoped analysis of a problem. Requirements partly documented in a set of specific objectives, not all of which are measurable or appropriate for developing a solution. The required functionality or areas of investigation are only partly addressed. Some attempt to consider, through dialogue, the needs of the intended users of the system, or recipients of the outcomes for investigative projects. Problem partly modelled and of some use in subsequent stages.</p>	1-3	
	No evidence presented	0	<b>Mark awarded: 9</b>

Documented design		
Level	Criteria	Mark
4	Fully or nearly fully articulated design for a real problem, that describes how all or almost all of the key aspects of the solution/investigation are to be structured/are structured.	10-12
3	Adequately articulated design for a real problem that describes how most of the key aspects of the solution/investigation are to be structured/are structured.	7-9
2	Partially articulated design for a real problem that describes how some aspects of the solution/investigation are to be structured/are structured.	4-6
1	Inadequate articulation of the design of the solution so that it is difficult to obtain a picture of how the solution/investigation is to be structured/is structured without resorting to looking directly at the programmed solution.	1-3
	No evidence presented	0
		<b>Mark awarded: 11</b>

There is a lot of detail in this documented design section that shows the student understood both the requirements of the system and how these could be implemented.

The algorithms for the main functions of the solution are described well to a good level of detail (p13 – p18).

The HCI is designed out well and annotated carefully with descriptions provided as to functionality of the elements on each form.

Nice to see a discussion of the libraries to be used but would like to see more detail about the TCP/IP usage and how that was coded.

This documented design is a fully articulated design for nearly all of the key aspects of the solution and it has a good focus on the complex parts of the solution. The initial diagrams (p11,p12) could be discussed to explain the key parts. There is perhaps missing an overview as to how it all fits together.

Technical solution – completeness		
Level	Criteria	Mark
3	A system that meets almost all of the requirements of a solution/an investigation (ignoring any requirements that go beyond the demands of A-level).	11-15
2	A system that achieves many of the requirements but not all. The marks at the top end of the band are for systems that include some of the most important requirements.	6-10
1	A system that tackles some aspects of the problem or investigation.	1-5
	No evidence presented	0
		<b>Mark awarded: 15</b>

**NOTES:**

Completeness is not only about how well a solution meets the objectives set by the student but also what an expected technical solution might perform for this particular project.



Technical solution – techniques used		
Level	Criteria	Mark
3	The techniques used are appropriate and demonstrate a level of technical skill equivalent to those listed in Group A in <b>Table 1</b> . Program(s) demonstrate(s) that the skill required for this level has been applied sufficiently to demonstrate proficiency.	19-27
2	The techniques used are appropriate and demonstrate a level of technical skill equivalent to those listed in Group B in <b>Table 1</b> . Program(s) demonstrate(s) that the skill required for this level has been applied sufficiently to demonstrate proficiency.	10-18
1	The techniques used demonstrate a level of technical skill equivalent to those listed in Group C in <b>Table 1</b> . Program(s) demonstrate(s) that the skill required for this level has been applied sufficiently to demonstrate proficiency.	1-9
<b>NOTES:</b> The mark to be awarded, within the level, should be decided upon using these factors: (1) The extent to which the criteria for the level have been achieved (2) The quality of the coding style that the student has demonstrated (3) The effectiveness of the solution. It would be beneficial for these to also be referred to in the comments/evidence section. Table 1 referred to is on pages 95-96 of the specification (version 1.4 December 2016) Continue on a separate sheet if necessary		<b>Mark awarded: 27</b>

Technical Skills:  
Use of threading for TCP/IP communications.  
Use of OOP and a variety of classes.  
Mathematical bit manipulation of image data for steganography. (p100)  
Implementation of RSA algorithm

Group A – complex user-defined algorithms  
Group A – dynamic generation of objects  
Group A – complex OOP model (good use of swing)  
Group A – TCP/IP implemented for peer-2-peer comms (p78)  
Group A - use of threads to handle TCP/IP (p51)  
Group A – complex maths (p115 onwards)

Coding Style:  
Well commented code.  
Coded defensively (p65, p76)  
Perhaps could be decomposed more in places.

Testing Level		Criteria	Mark	Comments/evidence
4		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.	7-8	A good series of tests with very well annotated screenshots. Tests clearly cover checks that the system is behaving as expected (data supplied and then checked against). For example test 22 goes into detail to prove that the system works.
3		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.	5-6	There is clear evidence that thorough testing has been carried out. It is clear that the initial requirements have been achieved.
2		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.	3-4	
1		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.	1-2	
		No evidence presented	0	<b>Mark awarded: 8</b>

Evaluation		
Level	Criteria	Mark
4	<p>Full consideration given to how well the outcome meets all of its requirements.</p> <p>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.</p>	4
3	<p>Full or nearly full consideration given to how well the outcome meets all of its requirements.</p> <p>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.</p>	3
2	<p>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.</p> <p>No independent feedback obtained or if obtained is not sufficiently useful or realistic to be evaluated in a meaningful way even if attempted.</p>	2
1	<p>Some of the outcomes are assessed but only in a superficial way.</p> <p>No independent feedback obtained or if obtained is so basic as to be not worthy of evaluation.</p>	1
	No evidence presented	0
		<b>Mark awarded: 4</b>

The student clearly comments against each objective that was set in the analysis stage.  
 There is detailed feedback from the end user and then a good reflection upon that feedback.  
 It is also nice to see feedback received from students and reflected upon.  
 The possible extensions are derived from the feedback received and considered as to how these could be implemented.

<b>Total mark</b>	<b>74 / 75</b>
<b>Concluding comments:</b>	<p>A well implemented project that satisfies the requirements set out in the analysis stage. The student initially considered Python as the solution language but after investigation decided on Java and spend a lot of time researching/learning about Swing and TCP/IP. A motivated student who has worked very hard to produce an effective solution showing a high level of technical skills alongside an ability to document the work very well.</p>
<b>Signed:</b>	<b>Date:</b>