## AQA Logo

## 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.

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| **Centre number** |  | **Centre name** |
| 64395 |  | Godalming College |
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| **Candidate number** |  | **Candidate’s full name** |
| 3721 |  | James Hearsum |
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**Section one - the project**

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

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| Project title | Investigation into Possibilities of creating an AI to play battleships |
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| Project type | | problem  investigation |
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| **Outline description**  Clearly inspired by the battleships Paper1 task this is an ambitious task to create an AI Player for a fairly complex game. |

To be completed by the teacher:

From the given description the project is at a standard required for A-level Yes/~~No~~

**Section two – project assessment**

To be completed by the teacher

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| **Analysis** | | | |
| **Level** | **Criteria** | **Mark** | **Comments/evidence** |
| 3 | 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. | 7-9 | As appears to be likely for investigations the analysis and design are slightly merged.  This is especially true as the student has tried prototyping algorithms  The analysis of the battleships game is sound and well structured.(🡪Page 10)  The more interesting research into AI techniques clearly strays into undergraduate level techniques but there is a good summary and clearly informs the requirements (page 29) which when combined with the following two pages are detailed, specific .  Comfortably Level 3 and can’t really see why a mark should be dropped. |
| 2 | 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. | 4-6 |
| 1 | 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. | 1-3 |
|  | No evidence presented | 0 | **Mark awarded: 9** |

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| **Documented design** | | | |
| **Level** | **Criteria** | **Mark** | **Comments/evidence** |
| 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 | The design of the actual game is slightly taken for granted being very similar to the analysis of the game.. prototypes on page 16/17 show a system which is stated as being similar to the 2016 skeleton program.. **Credit won’t be given for the game code, but lack of design for that code won’t be penalised**.  A learning algorithm design is honed in on through a detailed discussion(pages 32-47)… The finalised design could have benefited from a summary  Class diagram page 40-41, shows clearly the structure.  No UI required,  The structure of the files that will be required to store the learning data are briefly specified on (page 42), but lacks detail. Data generally in the program could be better specified.  Lack of detail means the design just misses out on Level 4 |
| 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 | **Mark awarded: 9** |

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| **Technical solution – completeness** | | | |
| **Level** | **Criteria** | **Mark** | **Comments/evidence** |
| 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 | The solution does meet the all the requirements.  No reason not to award full marks |
| 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 | **Mark awarded: 15** |

**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.

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| **Technical solution – techniques used** | | | |
| **Level** | **Criteria** | **Mark** | **Comments/evidence** |
| 3 | The techniques used are appropriate and demonstrate a level of technical skill equivalent to those listed in Group A in **Table 1**.  Program(s) demonstrate(s) that the skill required for this level has been applied sufficiently to demonstrate proficiency. | 19-27 | Table 1 Group A techniques:   * Complex OOP model * Complex user defined algorithm * Non trivial file handling   Supported by a raft of Group B Techniques well applied.  Following the requirements of Table 2  The code is well structured, defensive, readable so safely level 3  The only niggle is how effective the final solution is… It works excellently for the test cases but it is still unclear how well it would upscale to a full game and to what extent this would be beyond the scope of and A-Level project..  Certainly the top 1/3rd of level 3, although not full marks, |
| 2 | The techniques used are appropriate and demonstrate a level of technical skill equivalent to those listed in Group B in **Table 1**.  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 **Table 1**.  Program(s) demonstrate(s) that the skill required for this level has been applied sufficiently to demonstrate proficiency. | 1-9 |
|  | No evidence presented | 0 | **Mark awarded: 25** |

**NOTES:**

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

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| **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 | I like the approach of combining testing and evaluation for an investigation.  Pages 60-65 are good demonstrations of the effectiveness of the solution the screenshots through to page 75  The 2 video links on page100:  Appendix 3 shows the learning process  https://youtu.be/AP4lqbiNXk0  The first couple of mins and the last 30 seconds are relevant!  Appendix 4 Shows the game being played manually  https://www.youtube.com/watch?v=qKCeBHJTjXE  I have included the links here in a different font to aid correct reading of characters.  The testing is certainly Extensive, and the thoroughness of the investigation is clear.  Some good white-box showing the development of the values in the learning (page 72) and (page 66)  Penalising 1 mark as the actual testing data isn’t clearly defined |
| 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 |
| 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 | **Mark awarded: 7** |

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| **Evaluation** | | | |
| **Level** | **Criteria** | **Mark** | **Comments/evidence** |
| 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. | 4 | Very strong evaluation of objectives (combined with testing pages 56-76)  The 3rd party feedback is reported on informally (page 77), but I have checked and the investigation was discussed with the teacher in question.  No significant areas of improvement or extensions discussed at the end BUT there are elements discussed throughout the requirements evaluation and briefly in the conculsion (page 76).  Level 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. | 3 |
| 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. | 2 |
| 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. | 1 |
|  | No evidence presented | 0 | **Mark awarded: 3** |

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| **Total mark 68 /75** |
| **Concluding comments:**  This was a very ambitious project. Several realistic reductions in scope had to be applied but the final solution is still impressive for an A-level project.  Thankfully the documentation matched the effort put into the coding. |
| **Signed: Date:** |