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| --- | --- | --- | --- | --- |
|  | 1st iteration | 2nd  iteration | 3rd  iteration | Final  Version |
| Analysis  *Min 6 hours lesson/hwk allocation* | Week Beginning  13th Sep | Week Beginning  20th Sep  Homework 1 | Week Beginning  27th Sep  Homework 2 | Week Beginning  28th Mar  Homework 24 |
| Documented Design  *Min 6 hours lesson/hwk allocation* | Week Beginning  11th Oct  Homework 4 | Week Beginning  1st Nov  Homework 6 | Week Beginning  7th Feb  Homework 18 |
| Technical Solution  *Min 20 hours lesson/hwk allocation* | Week Beginning  15th Nov  Homework 8 | Week Beginning  3st Jan  Homework 13 |
| Testing  *Min 5 hours lesson/hwk allocation* |  | |
| Evaluation  *Min 3 hours lesson/hwk allocation* |  | |

NEA Submission Dates Overview

dfgfd



2021-22 Project log

A-level Computer Science (7517) Computing Practical Project (7517/C)

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| --- | --- | --- | --- |
| **Centre number**       54208 |  | **Centre name**  Exeter Mathematics | |
| **Candidate number**    **FILL IN** |  | **Candidate’s full name** |

**Oliver Temple**

Project title **Path-finding Algorithms and Solving Mazes**

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| --- | --- | --- | --- |
|  |  |  |  |
| Project type |  |  | problem ~~investigation~~ |

x

**Using maze generating algorithms to generate mazes and then solving them with path finding algorithms. Visualized on a react website.**

**Outline description**

To be completed by the teacher:

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Analysis** | | | | |
| **L** | **Criteria** | **page** | **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. |  | 7-9 |  |
| * 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. |  |
| 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. |  | 4-6 |
| * 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. |  |
| 1 | * Partly scoped analysis of a problem. |  | 1-3 |
| * 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. |  |  |
|  | No evidence presented |  | 0 | **Mark awarded:** |

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|  | | **Documented design** | | | |
| **L** | **Criteria** | | **page** | **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 |  |
| 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:** |

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| **Technical solution – completeness** | | | | |
| **L** | **Criteria** | **page** | **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 |  |
| 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:** |

# 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 the solution of the problem.**

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| **Technical solution – techniques used** | | | | |
| **L** | **Criteria** | **page** | **mark** | **Comments/evidence** |
| 3 | * The techniques used are appropriate and demonstrate a level of technical skill equivalent to those listed in Group A in the **Table** at the end of this document. * Program(s) demonstrate(s) that the skill required for this level has been applied sufficiently to demonstrate proficiency. |  | 19-27 | **STUDENTS: make sure you highlight the techniques you have used in the table at the end of this document.** |
| 2 | * The techniques used are appropriate and demonstrate a level of technical skill equivalent to those listed in Group B in the **Table** at the end of this document. * 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 the **Table** at the end of this document. * 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:** |

# 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.

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| --- | --- | --- | --- | --- |
| **Testing** | | | | |
| **L** | **Criteria** | **page** | **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 |  |
| 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. |  | 3-4 |
| * The evidence presented is explained. |  |
| 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. |  | 1-3  1-2 |  |
| * The evidence presented may not be entirely clear. |  |  |
|  | No evidence presented |  | 0 | **Mark awarded:** |

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

|  |
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| **Total mark /75** |
| **Concluding comments:** |
| **Signed: Date:** |

**Group A**

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| --- | --- | --- |
| **Model** | **Algorithm** | **Why did you use this skill?** |
| Complex data model in database (eg several interlinked tables) | Cross-table parameterised SQL  Aggregate SQL functions  User/CASE-generated DDL script |  |
| Hash tables  Lists  Stacks  Queues  Graphs  Trees  Structures of equivalent standard      Files(s) organised for direct access | Graph/Tree Traversal    List operations        Linked list maintenance    Stack/Queue Operations Hashing | For maze generation |
| Complex scientific/ mathematical/ robotics/ control/ business model | Advanced matrix operations  Recursive algorithms    Complex user-defined algorithms (eg optimisation, minimisation, scheduling, pattern matching) or equivalent difficulty    Mergesort or similarly efficient sort | Recursive backtracking maze generation |
| Complex user-defined use of object- orientated programming (OOP) model, eg **classes, inheritance, composition, polymorphism, interfaces** | Dynamic generation of objects based on complex user-defined use of OOP model | Grid class, each node is a Node class, different amounts are created depending on the size of the grid. React components inherit from other components and methods are overwritten. |
| Complex client-server model | Server-side scripting using request and response objects and server-side extensions for a complex client-server model  Calling parameterised Web service APIs and parsing JSON/XML to service a complex client-server model | Python API for maze generation and maze solving, returns maze as a JSON object by serializing it. |

**Group B**

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| --- | --- | --- |
| **Model** | **Algorithm** | **Why did you use this skill?** |
| Simple data model in a database (eg. two or three interlinked tables) | Single table or non-parameterised SQL |  |
| Multi-dimensional arrays    Dictionaries    Records | Bubble sort    Binary search | Multi-dimensional arrays for storing maze, dictionaries for serialization in python. |
| Text files    File(s) organised for sequential access | Writing and reading from files |  |
| Simple scientific/mathematical /robotics/ control/business model | Simple user defined algorithms (eg a range of mathematical/statistical calculations) |  |
| Simple OOP model | Generation of objects based on simple OOP model |  |
| Simple client-server model | Server-side scripting using request and response objects and server-side extensions for a simple client-server model    Calling Web service APIs and parsing JSON/ XML to service a simple client-server model |  |

**Group C**

|  |  |  |
| --- | --- | --- |
| **Model** | **Algorithm** | **Why did you use this skill?** |
| Single-dimensional arrays | Linear search |  |
| Appropriate choice of simple data types | Simple mathematical calculations |  |
| Single table database | Non-SQL table access |  |