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|  | **Faculty of Computing, Engineering and Science** | Final mark awarded:\_\_\_\_\_ |

**Assessment Cover Sheet and Feedback Form 2017/18**

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| Module Code:  CS3S667 | Module Title:  Artificial Intelligence for Game Developers | | Module Lecturer:  Mike Reddy |
| Assessment Title and Tasks:  Applying AI Techniques | | | Assessment No.  e.g. 2 of 2 |
| No. of pages submitted in total including this page:  Completed by student | | | Word Count of submission  (if applicable): Completed by student |
| Date Set:  15 January 2018 | | Submission Date:  23 March 2018 | Return Date:  23 April 2018 |

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| ***Part A: Record of Submission (to be completed by Student)*** | |
| **Extenuating Circumstances**  If there are any exceptional circumstances that may have affected your ability to undertake or submit this assignment, make sure you contact the Advice Zone on your campus prior to your submission deadline. | |
| **Fit to sit policy**:  The University operates a fit to sit policy whereby you, in submitting or presenting yourself for an assessment, are declaring that you are fit to sit the assessment. You cannot subsequently claim that your performance in this assessment was affected by extenuating factors. | |
| **Plagiarism and Unfair Practice Declaration:**  By submitting this assessment, you declare that it is your own work and that the sources of information and material you have used (including the internet) have been fully identified and properly acknowledged as required[[1]](#footnote-1). Additionally, the work presented has not been submitted for any other assessment. You also understand that the Faculty reserves the right to investigate allegations of plagiarism or unfair practice which, if proven, could result in a fail in this assessment and may affect your progress. | |
| **Intellectual Property and Retention of Student Work:**  You understand that the University will retain a copy of any assessments submitted electronically for evidence and quality assurance purposes; requests for the removal of assessments will only be considered if the work contains information that is either politically and/or commercially sensitive (as determined by the University) and where requests are made by the relevant module leader or dissertation supervisor. | |
| **Details of Submission:**  Note that all work handed in after the submission date and within 5 working days will be capped at 40%[[2]](#footnote-2). No marks will be awarded if the assessment is submitted after the late submission date unless extenuating circumstances are applied for and accepted (Advice Zone to be consulted). | |
| You are required to acknowledge that you have read the above statements by writing your student number(s) in the box: | Student Number(s): |

**IT IS YOUR RESPONSIBILITY TO KEEP RECORDS OF ALL WORK SUBMITTED**

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| **Part B: Marking and Assessment**  **(to be completed by Module Lecturer)** |
| This assignment will be marked out of 100%  This assignment contributes to 50% of the total module marks.  This assignment is bonded ~~/ non- bonded~~. Details: |
| **Assessment Task:**  During the autumn term, you explored a range of AI algorithms before completing two summative tasks: route planning for NPCs, and an Artificial Life Simulation. For this coursework, you will be competing in a shared environment, to pit your own AI implementations (or bots) against those of other students, in a predator-prey scenario using the Unity engine and C#. See below for details.  You should then complete a technical report which discusses your implementation. This technical report will:   1. Provide a description and discussion of each of the techniques you have selected. You should ensure this discussion includes:    1. Relevant evaluation of the technique in terms of tasks to which it is suited, or is perhaps definitely not suited, this should be placed in the context of the given scenarios.    2. Factors you have identified which might influence its selection for a task (such as complexity/computational demands). 2. Include all unique source code in an appendix (assuming the implementations will form part of a pre-existing testbed; consider using annotated snippets in the body of the report to illustrate operation). The intention is to demonstrate your successful application of the abstract concepts in an Industry standard game engine. 3. Supply evidence of the operation of the implementation, such as experimental results and screen shots (you do not need to implement the full scenario, which will be provided for you in the DinoPark testbed, merely demonstrate the technique has been correctly implemented). 4. Clearly indicates how the strengths of the technique in general terms (point 1 above) apply to the specific scenarios described below. This will require you to present your understanding of the requirements of the scenario. 5. Documents any implementation details specific to the scenario, such as data representation. 6. Use appropriate diagrams and figures to support your explanation.   **Introduction – DinoPark:**  “Life uh… finds a way!” – Ian Malcolm, Jurassic Park  DinoPark is an incomplete simulation of a dinosaur infested island. What it lacks is the AI to control the various inhabitants; for this simple testbed, Velociraptors <http://islanublar.jurassicworld.com/dinosaurs/velociraptor/> and Ankylosaurs <http://islanublar.jurassicworld.com/dinosaurs/ankylosaurus/> will suffice. This testbed just needs the bot brains that can use pre-defined sensor information to determine the best strategy to survive in a harsh environment.  **Operation “Swift Thief”:**  “Your scientists were so preoccupied with whether they could, they didn't stop to think if they should.” – Ian Malcolm, Jurassic Park  **Select a technique to:**   1. **Control the Hunter(s)** – Velociraptors were communal hunters, but you can choose to control either a single raptor or a pack of up to three, each with identical or bespoke AI. Their (your?) task will be to hunt down the Hunted. How well your Raptors perform will influence your final grade.   **And/Or**   1. **Control the Hunted** – Ankylosaurs are no push over, with their spiky armour and club tails. While they act alone, they have a melee attack to defend themselves. Your challenge will be to help them survive against attack from the Raptors. The longer yours survive, the better your mark. 2. [optional] Hunt the Hunters – Develop your AI to allow Velociraptors to hunt those of other students. Hunting other predators is a complex task. 3. [optional] Purely for fun – You can run around DinoPark as a lonely human. You won’t survive. This won’t affect your grade 😊   The DinoPark testbed will be developed by you and the tutor to implement already learned AI techniques learned in the first half of the module, such as NPC route planning, and finite state automata to determine bot behaviour. Your bots will need to choose what to do, where to go, and how to react. Any AI technique – Genetic Algorithms, Neural Networks, Fuzzy Logic, etc – can be used to control your predators and/or your prey, but must only use pre-defined sensor information; being super complicated might earn you technical credit, but performance and effectiveness is critical. So, remember KISS!  **Group working:**  This is an individual assignment. There is no direct scope for group working. However, there will be the capacity for limited collaboration through shared testing of your bots. This will not include the sharing of code. The formative aspect of this assessment – the co-development of the testbed by all the students – will not be formally assessed, and collaboration is encouraged.  **Notes and Hints**:  In the scheduled workshop sessions there will be opportunities for students to discuss and obtain formative feedback on implementing previously learned techniques in Unity. Students are encouraged to consider how this feedback can be used to improve their submission for this assessment. It may appear that the report requires more than the recommended word count, but you can and should try to “cut to the chase” on each element; avoid unnecessary detail and divergences and remember the ABC of report writing: Accuracy, Brevity and Clarity. You must however demonstrate achievement of the learning outcomes.  Use the Grading criteria to guide your writing |
| **Learning Outcomes to be assessed** (as specified in the validated module descriptor <https://icis.southwales.ac.uk/> ):   1. Understand the theory that underpins, and the pragmatic difficulties associated with, the development of a working AI game system 2. Evaluate the relative effectiveness of different approaches to AI for a given problem |
| **Grading Criteria:**  Each scenario will be assessed and the scores aggregated by finding the mean. Implementation and report will be addressed  **Scale**  In line with university policy this assessment should be of 3000 words or equivalent. Due to the nature of the assessment this should be taken as a guide, not a hard limit.   |  |  |  |  | | --- | --- | --- | --- | | **Band** | **Characteristics of Supplied implementation** | **Characteristics of report (technique selection and description)** | **Characteristics of report (Scenario analysis)** | | A | The code submitted show some sophistication. Clear evidence is provided that implementations have been tested. Tests illuminate suitable applications for the techniques | Techniques are selected supported by a well-reasoned explanation which shows an understanding of the techniques, and places this selection into a wider context, perhaps by comparisons or consideration of practical issues. The techniques are well defined. | The characteristics have been identified and generalised. The scenarios are compared to other cases and comparisons drawn in relation to the context of implementing AI | | B | Code shows successful implementation, which address more than just core functionality.  Evidence of a range of tests is provided. | Techniques selected are supported by well-reasoned explanations, which show an understanding of the techniques and their applicability.  The techniques are defined with understanding of implementation issues. | The characteristics of the scenarios in the context of the assessment are identified.Additionally some of the subtleties are also identified discussed | | C | Code and test evidence show successful implementations of the core functionality of the techniques. | Techniques selected are supported by an explanation, which shows an understanding of the techniques. Techniques are clearly defined. | The significant characteristics of the scenarios have been identified. | | D | Evidence that the techniques have been implemented and tested. The major aspects of the core functionalities are in place | Techniques selected are adequate, though may not be the most appropriate.  The explanation of the techniques is over simplified or has significant errors.  An explanation for selection of techniques is given | The significant aspects of the scenarios are identified in the context of the assessment. May exhibit some errors | | E | Evidence that the techniques have been implemented and tested. Some aspects of the core functionalities are in place | Techniques that are not wholly inappropriate are selected. Explanation of the techniques is lacking.  Explanation for the selection may have significant errors | Some indication that the characteristics of the scenarios were understood, but failing to identify these correctly | | F | No evidence that a working implementation was completed | The selected techniques are inappropriate or described incorrectly | No evidence that an understanding of the characteristics of the scenarios was shown | |

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| **Feedback/feed-forward** (linked to assessment criteria):   * Areas where you have done well: * Feedback from this assessment to help you to improve future assessments: * Other comments | | |
| **Mark:** | **Marker’s Signature:** | **Date:** |
| **Work on this module has been marked, double marked/moderated in**  **line with USW procedures.** | | |
| *Provisional mark only: subject to change and / or confirmation by*  *the Assessment Board* | | |

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| **Part C: Reflections on Assessment**  **(to be completed by student – optional)** | |
| **Use of previous feedback:**  In this assessment, I have taken/took note of the following points in feedback on previous work: | |
| **Please indicate which of the following you feel/felt applies/applied to your submitted work**   * A reasonable attempt. I could have developed some of the   sections further.   * A good attempt, displaying my understanding and learning, with   analysis in some parts.   * A very good attempt. The work demonstrates my clear   understanding of the learning supported by relevant literature and scholarly work with good analysis and evaluation.   * An excellent attempt, with clear application of literature and   scholarly work, demonstrating significant analysis and evaluation. | |
| **What I found most difficult about this assessment:** |  |
| **The areas where I would value/would have valued feedback:** |  |

1. University Academic Misconduct Regulations [↑](#footnote-ref-1)
2. Information on exclusions to this rule is available from the Advice Centre at each Campus [↑](#footnote-ref-2)