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|  | Faculty of Computing, Engineering and Science |  |

**Assessment Cover Sheet and Feedback Form** 2018-19

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| Module Code:  CS3S667 | Module Title:  Artificial Intelligence for Game Developers | | Module Team:  Mike Reddy |
| Assessment Title and Tasks:  AI TestBed Scenario | | | Assessment No.  2 |
| Date Set:  24-Sep-2018 15:00 | | Submission Date:  02-May-2019 23:59 | Return Date:  30-May-2019 23:59 |

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

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| **Marking and Assessment** |
| This assignment will be marked out of 100%  This assignment contributes to 50% of the total module marks. |
| **Learning Outcomes to be assessed** (as specified in the validated module descriptor [https://icis.southwales.ac.uk/](https://icis.southwales.ac.uk/studentmodules/14129/studentmodulespecifications) ):  1) Understand the theory that underpins, and the pragmatic difficulties associated with, the development of a working AI game system Â  2) Evaluate the relative effectiveness of different approaches to AI for a given problem |
| *Provisional mark only: subject to change and / or confirmation by the Assessment Board* |

# Marking Scheme:

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|  | Fail | Narrow Fail | 3rd Class / Pass | Lower 2nd Class / Pass | Upper 2nd Class / Merit | 1st Class / Distinction |
| Scenario Analysis 10% | * No evidence that an understanding of the characteristics of the scenario was reached * The scenario was not adequately explained | * Some indication that the characteristics of the scenario were understood, but failing to identify these correctly * The scenario is poorly understood or explained | * The significant aspects of the scenario are identified in the context of the assessment * Investigation of the scenario may exhibit a few errors | * The significant characteristics of the scenario have been identified * A few of the subtleties have been identified and discussed | * The characteristics of the scenario in the context of the assessment are identified * Some of the subtleties are also identified and discussed | * The characteristics of the scenario have been identified and generalised * The scenarios is compared to other cases and comparisons drawn in relation to the context of implementing AI solutions |
| Scenario Solution 20% | * The selected technique is inappropriate * The selected technique is described incorrectly * Explanation is missing, or contains many significant errors | * A technique which is not wholly inappropriate is selected * Explanation of the technique is lacking * Explanation for the selection may have significant errors | * A technique is selected which is adequate though may not be the most appropriate * An explanation for the selection of the technique is given * The explanation of the technique is over simplified or has significant errors | * Code snippets and test evidence show a successful implementation of the core functionality of the technique * The technique is clearly defined * The explanation has few if any significant errors | * A technique is selected supported by a well-reasoned explanation which shows an understanding of the technique and its applicability * The technique is defined with understanding of implementation issues * The explanation has only minor errors | * A technique is selected supported by a well-reasoned explanation which shows an understanding of the technique, and places this selection into a wider context, perhaps by comparisons or consideration of practical issues * The technique is well defined * The explanation has no errors |
| Scenario Implementation 20% | * No evidence that a working implementation was completed * No evidence of testing has been provided | * Some aspects of the core functionality are in place * Evidence that the technique has been implemented and tested to some degree | * The major aspects of the core functionality are in place * Evidence that the implementation has been tested | * Code snippets and test evidence show a successful implementation of the core functionality of the technique * Some evidence of formal testing is present | * Code snippets show a successful implementation which address more than just core functionality * Evidence is provided of a range of tests | * The code snippets submitted show some sophistication * Clear evidence is provided that the implementation has been tested * Tests illuminate suitable applications for the technique |
| 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 Csharp. See below for details. You should then complete a technical report which discusses your implementation. This technical report will: 1Provide a description and discussion of each of the techniques you have selected. You should ensure this discussion includes: a.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. b.Factors you have identified which might influence its selection for a task (such as complexity/computational demands). 2Include 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. 3Supply 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). 4Clearly 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. 5Documents any implementation details specific to the scenario, such as data representation. 6Use 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 2.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. 3.[optional] Hunt the Hunters Develop your AI to allow Velociraptors to hunt those of other students. Hunting other predators is a complex task. 4.[optional] Purely for fun You can run around DinoPark as a lonely human. You wont survive. This wont 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  Submission Instructions The source code should be submitted via an update on each student's branch or fork on GitHub. Each student's report should be submitted via BlackBoard as a Microsoft Word document only. | | | | | | |