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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:  CS4S764 | Module Title:  Advanced Real-time Rendering Techniques | | Module Lecturer:  Carl Jones |
| Assessment Title:  Real-Time Dynamic Reflection in DirectX | | | Assessment No.  1 |
| No. of pages submitted in total including this page:  **N/A** | | | Word Count of submission  (if applicable): **N/A** |
| Date Set:  12-Oct-2017 | | Submission Date:  09-Nov-2017 | Return Date:  07-Dec-2017 |

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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 Centre 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 Centre 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):  **14009730** |

**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 |
| **Learning Outcomes to be assessed** (as specified in the validated module descriptor <https://icis.southwales.ac.uk/> ):  *1) Demonstrate the ability to critically evaluate techniques for multi-threaded rendering and the management of low-level resources to maximise GPU / CPU usage 2) Demonstrate the ability to analyse techniques and construct and evaluate GPU shaders in order to render effects in real-time* |

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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:** |  |

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|  | Fail | Narrow Fail | 3rd Class / Pass | Lower 2nd Class / Pass | Upper 2nd Class / Merit | 1st Class / Distinction |
| Setup of objects 15% | * A very basic 3D scene has been implemented with a single object and no environment.Setup of objects | * A very basic 3D scene has been implemented with a single object and no environment | * A 3D scene has been implemented that shows only a few basic objects with a background rendered | * A good 3D scene has been implemented that shows only a few basic objects with a background rendered | * A detailed 3D scene with detailed models has been implemented based on a coherent theme | * A detailed 3D scene with detailed models has been implemented based on a coherent theme and shows dynamic reflection to good effect |
| Setup of lights 15% | * Lights not setup correctly or not workingSetup of lights | * Lights not setup correctly or not working | * A single light source is setup and working correctly but per pixel secular lighting may not be implemented or working correctly | * Multiple light sources are setup and working correctly but per pixel secular lighting may not be implemented or working correctly | * Multiple light sources are setup and working correctly and per pixel secular lighting is implemented correctly | * Multiple light sources are setup and working correctly and per pixel secular lighting is implemented correctly. Multiple light types used ( e.g. point, directional and spot) |
| Interaction / animation 10% | * Little to no animation of objects is present and no moveable camera has been implemented. Interaction / animation | * Little to no animation of objects is present and no moveable camera has been implemented | * Some animation of objects is present in the scene but this needs to be expanded. The camera is interactive or animated | * Some animation of objects is present in the scene as well as a fully functioning first-person camera | * Good animation of objects and light sources is present in the scene as well as a fully functioning first-person camera | * Very good animation of objects and light sources is present in the scene as well as a fully functioning first-person camera |
| Setup of render target(s) 15% | * Appropriate render targets have not been set up correctly or are not working. Setup of render target(s) | * Appropriate render targets have not been set up correctly or are not working | * At least 1 off screen render target has been set up correctly and is working (is rendered to and used as a texture ). But reflection is not correct | * At least 1 off screen render target has been set up correctly and is working. It correctly demonstrates the reflection of scene objects (like a mirror) | * Six off screen render targets have been set up correctly and are working. They have been rendered to and used to generate reflections but the reflections are incorrect | * Six off screen render targets have been set up correctly and are working. They have been rendered to and used to generate accurate reflections on an object in the scene |
| Implementation 25% | * No functioning static or dynamic reflection effect is evident. Implementation | * No functioning static or dynamic reflection effect is evident | * The dynamic reflection technique has been implemented and is working | * The dynamic reflection technique has been implemented and is working | * The dynamic reflection technique has been implemented to good effect and some attempt to minimise the number of rendering passes needed is evident | * The dynamic reflection technique has been implemented to good effect, making excellent use of different shaders to minimise the number of rendering passes needed to create the effect |
| Code Demo 20% | * Presentation was very unclear. Did not answer questions well. Little to no understanding of the implementation is evident in the code demo.Code Demo | * Presentation was very unclear. Did not answer questions well. Little to no understanding of the implementation is evident in the code demo | * Presentation was clear but more detail required. Not all questions answered.Only a basic understanding is evident | * Good presentation - some aspects could have been better explained.Uncertain in answering some questions.Good understanding evident | * Presentation was clear.Answered questions well.Very good understanding evident | * Presentation was very clear.Answered questions very well.Excellent understanding evident |
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# Real-Time, Dynamic Reflection in DirectX

You are required to create a 3D scene using the DirectX modelling and rendering techniques youve looked at on the course. The scene should contain a reflective object near the centre of the scene that dynamically shows the environment reflected off the object. The assignment is split into the following tasks

1)Using the techniques discussed in lectures, setup a number of objects and light sources to model a 3D scene. The scene should contain at least one reflective object to show the use of dynamic reflection during rendering. The scene must be interactive by allowing objects to move around the scene either automatically or under user control.

2)Implement a first person camera to allow the user to view the scene from different positions.

3)Using the techniques discussed in lectures, implement the necessary render targets and the required number of rendering passes to create the dynamic reflection effect. You can use as many rendering passes and render targets as you think necessary to implement your algorithm.

4)You will also be required to explain your design and implementation in a short 5-10 minute code demo which will take place in the tutorial sessions after the assignment has been submitted. As part of the code demo you will be required to justify the approach taken and discuss the results obtained. The code demo is mandatory. The above sections will be marked according to how well you demonstrate your understanding of them in the code demo.

## Deliverables

1)A zip containing the source code and executable of your implementation. This is to be submitted to Blackboard no later than the submission date shown on the assignment front sheet. Please name your zip file with your enrolment number (e.g. 12345678.zip).

2)A copy of this document is also to be included in your zip file, with your Student Enrolment Number filled in on the front sheet.

3)A 5-10 minute code demo discussing your implementation, the results obtained and the problems you faced in implementing the assignment.

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)