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|  | Faculty of Computing, Engineering and Science |  |

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

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| Module Code:  CS3S664 | Module Title:  Real-time Rendering Techniques | | Module Team:  Carl Jones, Marius Miknis |
| Assessment Title and Tasks:  3D Scene using DirectX | | | Assessment No.  2 |
| Date Set:  24-Sep-2018 00:00 | | Submission Date:  10-May-2019 23:59 | Return Date:  07-Jun-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 60% 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/14118/studentmodulespecifications) ):  1) To be able to analyse and critically evaluate techniques used to render 3D scenes in real-time  2) To design, implement and evaluate GPU shaders in order to render effects in real-time |
| *Provisional mark only: subject to change and / or confirmation by the Assessment Board* |

# Task

Assessment Task:

You are required to implement a 3D Castle scene showing a courtyard, tower or dungeon for example that uses some of the rendering techniques discussed in lectures. The rendering techniques you should use in the creation of your scene are as follows

1.Texture mapping filtering, (e.g. anisotropic), normal mapping, environment mapping

2.Water Effect

You should also implement at least 1 of the following...

1.Foliage Effects

2.Particle Systems

3.Lighting and Glow effects

How the techniques are applied within the castle scene is left for the student to decide. For example, water effects can be used to create a moat or lava effect for example. You are required to implement the scene using the DirectX 11 API discussed in lectures and tutorials. Content for your scene can be created using procedural techniques or can be loaded from existing models using mesh import libraries.

You will also be required to explain your design and implementation in a short 5 minute code demo which will take place in the tutorial session after the assignment has been submitted.

You are also required to write a report that discusses the techniques used, and the impact the techniques have on the frame rate. For each technique, discuss different ways the desired effect can be achieved by looking at existing approaches in the literature. Discuss which approach you will implement and show screenshots of the final result. You are to then discuss the frame rate impact after each technique has been implemented. Discuss how the parameters used can be changed to improve frame rate (for example, different resolution textures or numbers of particles), and discuss how the implementation might be improved given more development time.

The report should be no longer that 1500 words, word processed and include appropriate references to the literature used.

Deliverables

1)A zip containing the source code and executable of your implementation. This is to be submitted to UniLearn 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 word processed report discussing your implementation and evaluating the techniques used.

3)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 and the optional Reflection sheet (see Part C below) filled in accordingly.

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

# Marking Scheme:

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|  | Fail | Narrow Fail | 3rd Class / Pass | Lower 2nd Class / Pass | Upper 2nd Class / Merit | 1st Class / Distinction |
| 1. Implementation 50% | * No objects in scene. The overall quality of the final 3D scene is very poor * Only a few of the required rendering techniques have been implemented. A basic implementation showing only a rudimentary understanding of rendering techniques | * Only basic scene is implemented with no animation. The overall quality of the final 3D scene is very poor * Only a few of the required rendering techniques have been implemented. The implementation is basic showing some understanding of rendering techniques | * Only basic scene is implemented with limited animation of objects. The overall quality of the final 3D scene is poor * Most of the required rendering techniques have been implemented. The implementation is basic using only standard techniques | * A reasonable scene is implemented with limited animation of objects. The scene is coherent and is of good visual quality * A good implementation using all of the required techniques is presented showing sound understanding of the techniques | * A comprehensive scene is created with numerous elements animated. The scene is coherent and of high quality * A very good implementation using most of the listed techniques is presented demonstrating a good understanding | * A comprehensive and coherent scene is created with numerous elements animated. The visual appearance is of excellent quality * All of the required rendering techniques have been implemented to good effect in the scene. The techniques implemented have been improved upon the tutorial code. Additional techniques might have been researched and implemented |
| 2.Discussion of each Rendering Techniques 15% | * Very poor 2.Discussion of each Rendering Techniques. . Little or no discussion on how the techniques might be improved upon is given | * Poor 2.Discussion of each Rendering Techniques. . Little or no discussion on how the techniques might be improved upon is given | * Satisfactory 2.Discussion of each Rendering Techniques the student demonstrates a limited understanding of the rendering techniques used. A basic discussion on how the techniques might be improved upon is given | * Good 2.Discussion of each Rendering TechniquesA good discussion on the techniques is presented, showing some understanding of the techniques used. A good discussion on how the techniques might be improved upon is also given | * Very good 2.Discussion of each Rendering Techniques. A detailed discussion on the techniques used is presented. A good discussion on how the techniques might be improved upon is also given | * Excellent 2.Discussion of each Rendering Techniques. An in-depth discussion on the techniques used is presented. A detailed discussion on how the techniques might be improved upon is also presented |
| 3.Discussion of efficiency of techniques Techniques 15% | * . Little or no discussion of the impact on the frame rate for the rendering techniques implemented is given | * . Little or no discussion of the impact on the frame rate for the rendering techniques implemented is given | * A basic discussion of the impact on the frame rate for the rendering techniques implemented is given | * A good discussion of the impact on the frame rate for the rendering techniques implemented is given, showing an understanding of the techniques used | * A good discussion of the impact on the frame rate for the rendering techniques implemented is given, showing an understanding of the techniques used | * A detailed discussion of the impact on the frame rate for the rendering techniques implemented is given, showing a very good understanding of the techniques used |
| Code Demo 20% | * Very poor Code Demo understanding of the code | * Poor Code Demo understanding of the code | * Code Demo satisfactory understanding of the code | * Code Demo good understanding of the code | * Very good Code Demo understanding of the code | * Excellent Code Demo understanding of the code |
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