COMP2231 – SM Computer Graphics
Summative Assignment

This coursework gives you an opportunity to develop a small 3D environment based on your selected part of Durham City by applying your computer graphics knowledge and skills. There are different aspects for constructing a 3D environment, including object modeling, object transformation, scene graph construction, lighting, virtual camera setting, etc. Under each aspect, a variety of techniques could be used. You are expected to implement a good selection of aspects as above with WebGL, demonstrating your competence in developing a computer graphics application. The deadline for submission is the 15th March 2019 (2pm) through DUO. This assessment contributes 12.5% of the overall COMP2231 module marks.

Requirements:

1. Construct your own 3D models based on your selected part of Durham City. [20 marks]

2. Use the 3D models in part 1 above to create a 3D environment representing the selected part of Durham City. The environment should include at least one building, a landscape modeling the surroundings of that building, and some meaningful objects enriching the surroundings. [20 marks]

3. Apply geometric transformation operations to construct movable models. The number of these models should contribute roughly at least 10% of all models you have created. A movable model can be a standalone object itself or being a part of a non-movable model. To achieve higher marks, you should focus on producing good quality movable models rather than spending time creating many low-quality ones. [20 marks]

4. Apply suitable lighting, virtual camera transformation and shader programs to support 3D environment rendering. [20 marks]

5. Use suitable coloring or texture mapping techniques to improve model appearance. [20 marks]

Deliverables:

Develop a computer graphics application according to the above requirements. You are expected to use native WebGL for the implementation. No other high-level graphics API should be used, e.g., three.js. For the 3D model construction, you can build complicated 3D models based on the composition of primitive objects together with geometric transformations. If you alternatively resort to a modeling software, such as Blender, for 3D model construction, you are required to identify a suitable way on your own about how to incorporate the constructed 3D models into your WebGL program.

For submission, you should pack all program source codes and required files into a single .zip file, which is to be uploaded to DUO. You should also include a readme file in the submission, showing essential instructions how to run your program and providing a 200-word description to highlight the main application features you have provided. Finally, you should also include a picture in your submission showing the actual environment of your selected part of Durham City as a reference.

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Mark Sheet

Student ID: _____

Total mark: _____

Level of Achievement	Modeling [20 marks]	3D Environment Construction [20 marks]	Movable Models [20 marks]	Rendering [20 marks]	Appearance [20 marks]
81-100%	Implement with comprehensive and complex 3D modeling	Comprehensive and complex 3D environment constructed	Support extensive or complicated model motion or movements	Support a variety of lighting effects and virtual camera transformation. Also incorporate comprehensive shader programming	Implement with a variety of texture mapping techniques
60-80%	Good number of nice quality 3D models incorporated	Good quality of 3D environment constructed in terms of optimal scene graph construction	Good quality of movable models constructed in terms of optimal use of geometric transformation	Good use of lighting, virtual camera transformation and shader programming	Good quality appearance provided with a good use of coloring and texture mapping
40-59%	Limited 3D models incorporated	Simple 3D environment constructed	Limited construction of movable models	Limited use of lighting, camera transformation and shader programming	Satisfactory appearance with limited use of coloring
1-39%	Inadequate 3D model construction	Inadequate 3D environment construction	Implementation did work properly	Implementation did not work properly	Inadequate appearance construction
0%	No / irrelevant submission	No / irrelevant submission	No / irrelevant submission	No / irrelevant submission	No / irrelevant submission
Marks Obtained	/20	/20	/20	/20	/20

Other comments: _____