Coursework commentaries 2015–16

CO3355 Advanced graphics and animation

Coursework assignment 2

General remarks

This was a three-part assignment, covering advanced shading concepts. Students were asked to implement a number of different texturing techniques for their models.

Generally and on par with the first assignment, from a programming perspective the majority of the submissions were of high-quality, including a few with graphical user interfaces to guide the user through the steps. However, there were many cases where the report lacked that quality. Many reports were too short or sometimes even nonexistent, while others merely consisted of a collection of screenshots, failing to give details on the implementation decisions or to provide a critical evaluation of the work carried out. Reporting is a very important aspect of the assignment (see coursework assignment 1's commentary for advice) and should be paid more attention.

Some students did not submit work for all parts of the assignment. A high number of these submissions failed to attract a passing mark. You are strongly advised to attempt all subsections.

Comments on specific questions

Part A

Part A explored texturing using Processing and GLSL and consisted of three questions.

Question 1

Students were asked to generate a simple 2D texture using a sinusoidal function and map it onto a surface using different types of map shapes (namely planar, spherical, cylindrical and cubic), experimenting with them on a number of simple objects.

Successful attempts were based on the use of a procedural texture (i.e. a texture defined mathematically) and chosen so that it demonstrated the effect of using different types of map shapes. The actual implementation of map shapes did not need to be carried out within the shaders and implementing them in Processing was also accepted.

Students performed mostly well here, with the majority successfully implementing planar, spherical and cylindrical mapping; however, only a few did so for cubic mapping.

Unfortunately, this question was sometimes misinterpreted. Some students were confused by the word 'planar', and instead of implementing the so-named map shape (a procedure that entails ignoring or zeroing out one of the dimensions), they used a raster 2D image for mapping and not a procedural texture. Another source of confusion was apparently the use of the word 'shape'; instead of using map shapes some used corresponding

objects to map their textures (i.e. a plane, a sphere, a cylinder and a cube). These terms are clearly defined in the subject guide and it is important that you understand the question fully before attempting to answer it.

Question 2

The requirement here was to experiment with different types of noise. A good answer consisted of experimentation with noise parameters, demonstrating their effect when mapped onto an object and commenting on the result. Despite the fact that it was not a very complicated task, many students chose not to answer this. The vast majority of those who did attempt it provided very good answers.

Question 3

This question asked students to modify their planar mapping implementation so that the direction changed according to the position of the camera. This was a relatively straightforward task, though it was not attempted by many – perhaps due to the relatively low number of marks available.

Part B

This part dealt with edge detection and emphasis on a 2D image and mapping of the result as a texture on a cube. In order to implement the edge detection, students had to use a Laplacian filter and they were provided with the corresponding matrix.

Good answers calculated the edge prominence of each pixel by using the kernel matrix provided to perform convolution (i.e. to multiply the element with its local neighbours, weighted by the kernel). The resulting matrix would then be used to emphasise the pixels on the original image and then map the result on the cube. Ideally, this would be repeated on different images, exploring how the algorithm behaves in each case and commenting on the results.

A few students did not implement the filter as it was defined but rather resorted to ready-made edge detection algorithms, which was not the purpose of the question. Some credit was given where user interfaces were provided that permitted real-time control of detection parameters.

Part C

The last part of the assignment asked students to investigate how nonphotorealistic, cartoon-like effects can be applied to 3D models.

Good answers included short essays describing the methodology chosen, together with the corresponding implementation and an illustration of its effects on a number of 3D objects. Moreover, students were asked to improvise in order to enhance the effect, leaving room for creativity and experimentation with some of the techniques covered in this course, essentially making this an open-ended question.

Unfortunately, the number of students who attempted this was lower than any other part of the assignment. However, those who did took the opportunity to experiment freely, and produced some excellent results.