University of London International Programmes
Computing coursework assignments 2014–2015
CO3343 Computing art and image effects

Coursework assignment 2

Introduction

A. (15%) (guideline 400 words, plus illustrations)

For the artists you selected in Coursework assignment 1, study their use of colour and surface reflectance properties and write a short essay including appropriate illustrations. Find and compare the views of different sources regarding the artistic merit and the effect of the form of illumination on the artworks and present your own view. Make sure all your sources are properly cited and referenced.

B. (20%) (guideline 500 words, plus illustrations)

Global Illumination algorithms are used in modern 3D graphics applications in order to achieve more realistic lighting. Explore the term online and explain what it refers to. Describe the two main techniques of this area and contrast them in terms of the modelling approach used, the amount of realism achieved and the computational cost entailed. Provide examples of scenes where one would be more appropriate than the other. Make sure that you cite your sources (both for text and illustrations) correctly in-text and give full details in your reference list. A starting point can be found at [1].

C. (30%) (guideline 500 words, in addition to code listings, plus illustrations)

Using the software provided with the subject guide and assuming the Phong reflectance model, demonstrate how the values of *shine*[1] and *glossiness*[1] influence the specular reflectance properties of a surface. Explain how the parameter variations affect reflection appearance. Then, implement a reflectance model where the wavelength of the reflected light varies with the angle of incidence, as in the case of metallic surfaces or CD's (see [2]). Describe your model and experiment with different model parameters and light source colours. Conduct your experiments on: (a) a flat surface; and (b) a facetted approximation of a sphere. Provide screenshots, comment on the quality of the results and describe the implementation issues you addressed.

[1] As described in section 4.2.1 of the *Computing art and image effects* subject guide.

In your submission, provide a listing of any code you develop, with your own contributions highlighted and an attribution for the remaining code (such as that taken from the subject guide).

D. (35%) (guideline 500 words, in addition to code listings, plus illustrations)

Enhance the facetted representation of the sculpture you implemented in Coursework assignment 1 with illumination from a single light source. Demonstrate the scene from several viewpoints and experiment with the surface specular properties. Make your software interactive, to include mouse controlled navigation for the scene viewpoint. If it enhances the artistic effect, animate your scene and explain how this contributes.

Provide a concise description of your modelling approach. Analyse how well the displayed virtual sculpture meets your artistic intentions and suggest what additional computer graphics facilities might enable improvements.

[TOTAL 100%]

Submission

Submit your coursework as a .pdf file; include listings of the software you write. You should also upload all source code files that you have developed for this coursework, with instructions (as comments in the source files, or as a separate readme file) on how to compile them.

References

[1] http://en.wikipedia.org/wiki/Global_illumination

[2] http://www.siggraph.org/education/materials/HyperGraph/illumin/reflect1.htm

[END OF COURSEWORK ASSIGNMENT 2]