

University of London International Programmes
CO3355 Advanced graphics and animation
Coursework assignments 2016–2017

Coursework assignment 1

Very often in computer graphics we need to represent composite objects or object collections that base their behaviour on relationships between their parts. In order to do so, we usually model these objects as hierarchies. *Processing* facilitates such modelling by providing a stack of transform matrices that are controlled with the `pushMatrix` and `popMatrix` commands.

Familiarise yourself with hierarchical modelling and the matrix stack using Chapter 4 of the subject guide, suggested reading [1] and online sources.

- A. (15%) (Guideline: 300 words plus illustrations.) Make a hand drawn sketch of a dynamic scene of your choice, consisting of an object or an organisation of objects. Describe the selection process; expose the transformations that will take place during animation; and explain how the scene is appropriate for hierarchical modelling. Note that while proficiency in drawing is not a primary determinant for assessment, your sketches should clearly show your intention.
- B. (30%) Implement your scene in *Processing*. Make the object parts move according to your intention by applying appropriate transforms. Make the scene interactive by letting the user control aspects of the movement in real time. Use a camera such as `peasycam` [2] to enable navigation.
- C. (25%) Incorporate basic GLSL vertex and fragment shaders to render your scene. Now modify the vertex shader so that it changes the size of the object it is applied to, as a sinusoidal function of time. Make different objects of your scene grow and shrink in different phases.
- D. (30%) Create a vertex shader that implements a 'damage' effect that distorts the shape of an object according to a mathematical function of your choice. Experiment with different types of damage, and demonstrate the effect on different objects/parts of the scene. Improvise and see what other distortion effects you can produce.

[TOTAL 100%]

Notes

For every step of the coursework assignment, remember to provide screenshots from multiple viewpoints. Describe your modelling approach; expose the problems you faced and the design decisions you made. Also, include an assessment of how well the techniques you used apply to what you are trying to do, and identifying the advantages and disadvantages.

You may choose to construct your models relying on primitive shapes generated in *Processing* or to employ more complex objects; for example, those created

using external 3D modelling tools. Striving for realistic representation is appreciated, but the assessment on this part focuses on hierarchical modelling.

Submission

Submit a single .zip file which contains:

- your coursework as a single .pdf. This should include listings of the software you have developed, with your own contributions highlighted and an attribution for the remaining code (such as code taken from the subject guide or external sources)
- all source code files that you have developed for this coursework assignment, with instructions (as comments in the source files, or as a separate readme file) on how to run them.

When naming your zip file ensure that you include your full name, student number, course code and assignment number

e.g. FamilyName_SRN_COxxxxcw#.pdf (e.g. Zuckerberg_920000000_CO3355cw1.zip)

- **FamilyName** is your family name (also known as last name or surname) as it appears in your student record (check your student portal)
- **SRN** is your Student Reference Number, for example 920000000
- **COXXXX** is the course number, for example CO3355, and
- **cw#** is either cw1 (coursework 1) or cw2 (coursework 2)

References

- [1] Angel, E. and D. Shreiner *Interactive Computer Graphics*. 2011, Chapter 8.
[2] <http://mrfeinberg.com/peasycam/>

[END OF COURSEWORK ASSIGNMENT 1]