Olympoids: lighting and rendering

Modelling clean geometry is only the first step to creating realistic computer graphics. The real world is not populated with grey objects and diffuse lighting: it is a vibrant array of colours and textures, lit by bold neon lamps, the golden glow of electric bulbs or shafts of pure daylight. For the second assessment on COMS31000 you will now use the geometry that you created for the Olympoids submission as a base to produce a high quality render of your film character; that could be used as part of a publicity press kit for the fictional film.

Use Autodesk Maya to texture, light and render your Olympic character. Use procedural shading networks, shader presets and/or external texture files and maps to add colour and texture information to the component parts of your character design. Colour, displacement, bump and reflection maps will all enable you to add complex surface details to create the illusion of solid texture and surface elevation and depression. Be sure to position and fix your camera early in the process as this will help define the focus, resolution and detail needed in surfaces and objects close to and far away from the point of view. Design your lighting using either standard Maya Software direct lighting or Arnold physical lights. If you decide to place your character in an Olympic environment using an image back-plate, place close attention to the lighting in the scene that you select. You can of course add additional geometry to your scene or rebuild parts of your character. For complex environmental effects it may be necessary to add additional geometry to distort shadows but you are not required to model a complete environment as geometry. Focus on the hero. Feel free to take artistic license with the lighting but remember that we are primarily looking for a semi-realist 3D style and not a flat 2D cartoon look: *please do not toon shade or use any non-photorealistic, painterly or other abstract or highly stylised technique. Think Pixar and not the Simpsons.* We are particularly keen that you experiment with, and demonstrate, your understanding of texture projection and or UV space. Avoid stretched or distorted patterns, and pay close attention to the relative size of your textures in relation to your character, objects and the environment: *a common mistake to is apply texture information at the wrong scale*. Pose your character to create a dynamic Olympic hero character.

Assessment and Submission

Your render should again be submitted as a JPG file. Choose a camera angle that best shows off your lighting shading and surface design, this time render a landscape HD_1080 1920x1080 pixel image (in full colour). Your Maya binary file must be available *on request* but you do not need to submit it to Blackboard. Submit your JPG file and a PDF design report. The report should introduce your character, and outline everything you did to texture, light and render the press kit picture. The Lighting and Rendering assessment represents 40% of the unit. **It should be submitted online in Blackboard by 12.00 midday on Thursday 12th December 2019;** *the Thursday of week 11.*

There are three main objectives on which your mark will be based:

1. Texturing the scene

To start (now that you are lighting your scene) you will need to remove and delete the ambient occlusion shader from every object in your scene. Maya and Arnold both provide lots of ways in which to apply colour, texture information, reflection, and detail to your geometry. The goal of this assignment is to create an image which is passably realistic as a 3D film character, and hence textures will play an important role. For many surfaces you will be able to texture them using standard Maya procedural shaders, or by adapting presets to the Arnold ai standard surface shader - but some will require you to project or place external maps and photographs. If they are a distance from the camera not every object in your scene needs to be perfectly textured at a high 4k resolution; *please ensure that none are left as default diffuse grey*. Building complex shader networks, using advanced techniques such as displacement maps and properly UV mapping objects to minimise texture distortion will help you to achieve the highest marks.

II. Lighting and rendering the scene

Lighting design plays an important role in any graphics project; whether for one rendered publicity image, or a fully animated production shot. Experiment with your lighting design. Combine multiple light sources in a controllable studio setup. Creating a truly photo-realistic shot can be a time-consuming and difficult task; but good lighting setup is essential. It is possible that one Arnold Skydome light will appear to create an instant, high-quality film look but you should experiment with the use of more than one light type. Carefully balance light levels and colour to create a lighting design that fits exactly with any background environment or textures that you use. When it comes to rendering, consider the settings of the camera you are using, and how they combine with your sampling rates and render settings to produce the final image to remove artefacts. Ensure that you document any experimentation in your report:

III. the Report

As usual you must explain your lighting design, texturing and rendering process clearly in a report. There is no strict page restriction for this submission but as a guide we would expect about six pages (with an optional appendix of additional rendered or development images). Put simply your report needs to tell us the highs and lows from design to final render and composition: it should be structured clearly into two sections and populated with illustrative screenshots:

1. Challenges and highlights

In this section, you should discuss in detail any aspects of your scene you feel were particularly complex to create, and why. How did you place the textures you used? Did you overcome any difficulties through experimentation and research? Did you achieve the lighting effect you were after? Talk us through any lessons learned from your experimentation, and tell us about any research that you did. *Please reference correctly any online tutorials you followed*, or any shader (or image) banks used to download external textures and files. Highlight the parts of your character that you are most proud of, explaining why and how you made the resulting surface effect. Don't forget to discuss the decisions you made during the design process; justifying your choices. Focus on aspects of texturing, lighting and rendering, but also detail and discuss any re-modelling or rebuild of geometry - *why was a rebuild necessary?*

II. Discussion and conclusion:

In this section, sum up your thoughts on the process and your final rendered output. **Personally evaluate your submission**. How could it be improved with more time? What would you do differently if you did it all again? If you had to repeat the entire project - *now that you understand the lighting and shading pipeline* - would you model your geometry differently, or at a different resolution?