CS4085: COMPUTER GRAPHICS II: TOOLS AND TECHNIQUES

LAB SERIES I: WEEK02 – WEEK04

Introduction to 3D modeling using POV-Ray

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1 Introduction

In this lab session you will be introduced to the open source 3D modeling application called ”POV-Ray.

POV-Ray is a very powerful tool that will allow us to create 3D models which can be used in 3D game environments. It can also be used to develop other types of content, for example animations. It also features in such commercial products as AC3D, `http://www.inivis.com/`.

The following pictures give an idea of what is possible with the tool. Some of these you will have seen before.

Figure 1: Some POV-Ray renderings stolen from the internet.

And my favourite rendering, shown in Figure 2.

It will not be possible to cover all aspects of POV-Ray’s functionality so we will be focusing on those that help us achieve the objectives listed in section 2 below.

POV-Ray is installed on all lab machines but feel free to download and install it on your own computer if you wish. When I ran it on the lab machines one point to note is that it chokes if it doesn’t find a configuration file, `povray.conf`. The file just has to be present even if it is the null file, 0-size. To satisfy POV-Ray you will need to do the following:

```
mkdir -p ~/.povray/3.7              # also makes parent dirs if needed
touch  ~/.povray/3.7/povray.conf    # will be 0-size
```

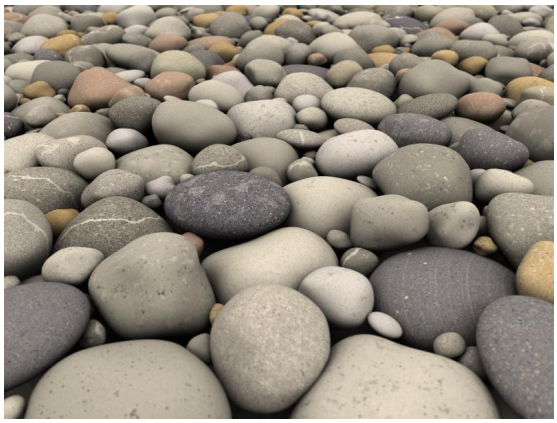

Figure 2: Another highly detailed POV-Ray rendering.

If you have edited a file `first.pov` with your POV-Ray commands then you should then be able to render the scene with
`povray first.`

In the class directory `~cs4085/labs/week02` I have placed a sample file `yinyang.pov`. Copy this to your own file system with (say)

```
mkdir -p ~/labs/week02
cd !$                          # change to place given in last command
cp ~cs4085/labs/week02/yinyang.pov .
```

You can now run povray on this file with

```
povray yinyang.pov
```

2 Objectives

The main objectives of this series of lab sessions are:

- Gain an understanding of the main functionality and operations available in POV-Ray;
- Become comfortable navigating the interface, switching modes and performing basic modeling operations;
- Use modeling techniques to create a model of medium level complexity;
- Complete and submit for marking an animated model similar to the one shown in Figure 3.

3 Resources

To learn POV-Ray you should consult and read (in its entirety – it's not that long) the official documentation at `http://www.povray.org/documentation/3.7.0/t2_0.html`. Googling "POV-Ray tutorial" gave me several other useful links including some youtube videos.

4 Deliverables

The deliverable for this series of lab sessions is to develop a POV-Ray model as outlined below. You will be assessed as to the quality of the rendering and how well it is animated.

Task: You should develop a sphere similar the one shown below in Figure 3. Your model should have

- some type of marbling or woodgrain or some other non-uniform texture (as opposed to, say, a uniform color throughout);
- lighting in a location different from the camera so that shadows are visible;
- a section removed from it so that it demonstrates your ability to use the CSG features of POV-Ray;
- an animation feature that simulates the sphere rolling across a flat surface;
- optionally (for extra marks), the "cleverness" to stop rolling once the "flat part" of the sphere (resulting from removing a section of the sphere) comes in contact with the surface; your solution should be general and not rely on the starting orientation of the sphere.

The project is due in Week04 and is worth 10% of your final grade in the class.

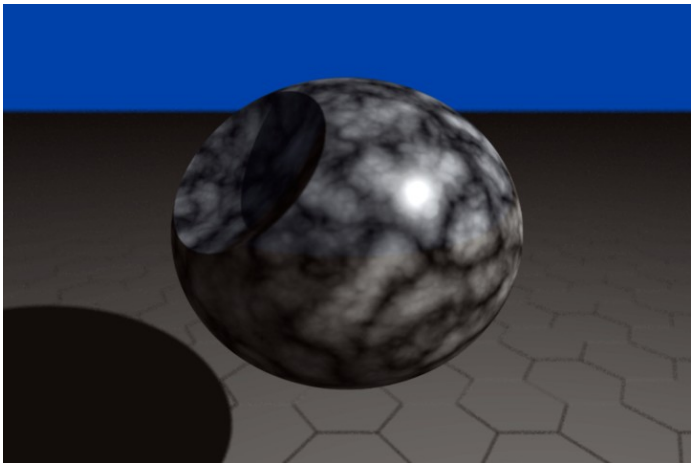

Figure 3: A textured sphere with an indentation.