CS4102 Practical 5

080008164

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1 Introduction

My solution implements all the required features of the practical and also implements all the extensions plus some extra features.

2 Usage

The program can be run by opening it in Xcode and running it. The program was tested using Xcode 4 on Mac OS X 10.6.8. There is also a video, `Practical5.mp4` of the program running.
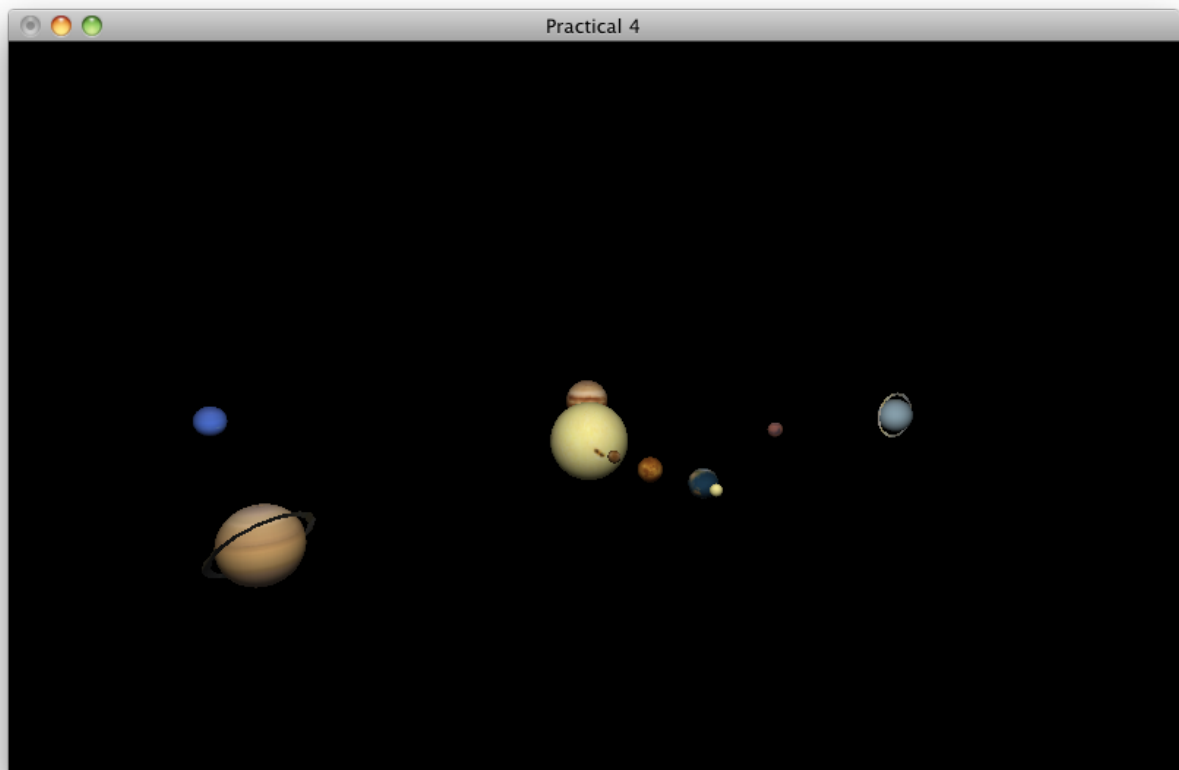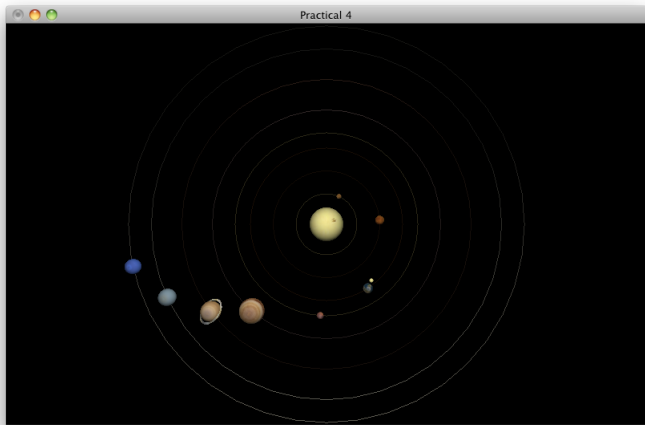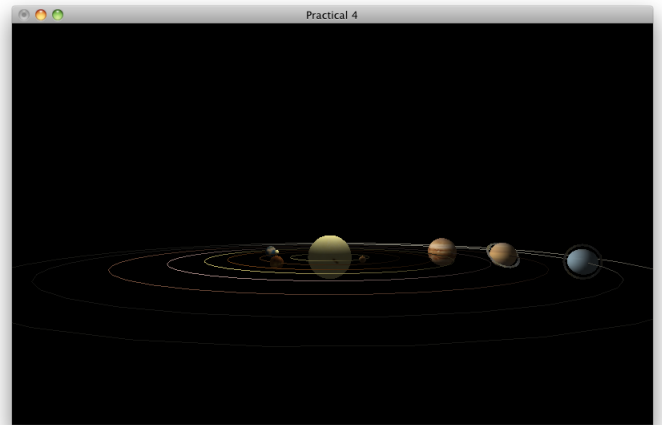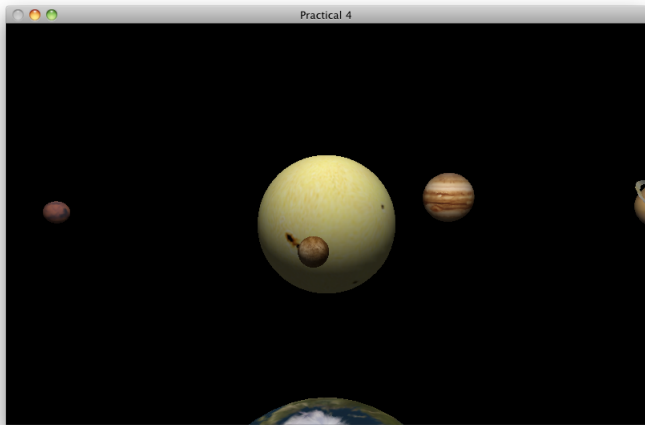
3 Implementation

Figure 1: Shows all the planets, the earth has a moon orbiting it. Saturn and Uranus have rings around them.
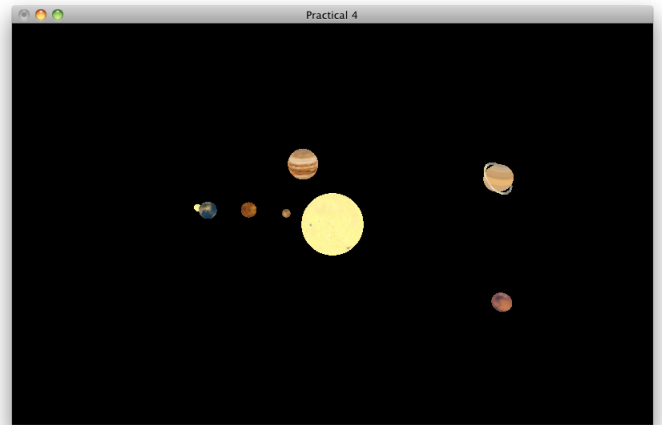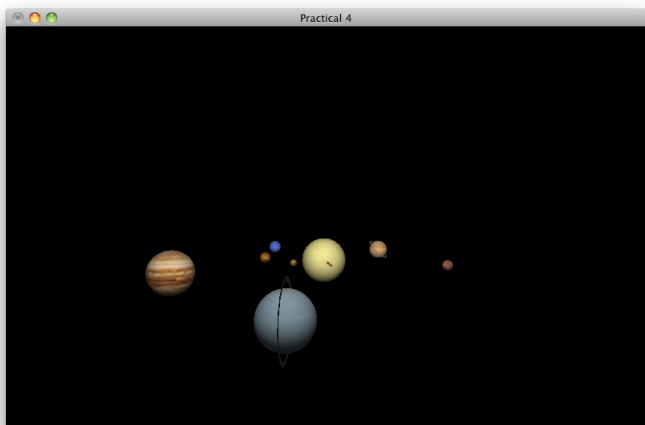
(a) Top Down View with Orbits turned on.

(b) Different lighting, shows the rings of the Saturn and Uranus.
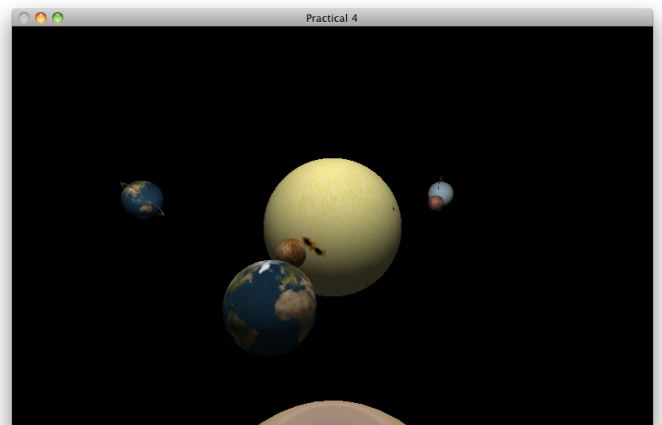

(c) Shows the camera attached to a planet.

(d) No lighting.

(e) Side view, Most of the planets are hidden by the sun.

(f) The materials of some of the planets have also been changed.

The solution has the key binding specified in Practical 4 plus extra keybindings. The solution also handles window resizing on which more/less of the model is shown. The speed that the planets move can be increased or decreased using the '-' or '+' keys. 'l' goes through different lighting configurations (including no lighting). 'v' goes through a series of predefined viewports. The spacebar toggles the movement of the planets and [and] can be used to zoom out/zoom in.

The textures of the planets can be done either by right clicking or clicking on a planet then pressing 'm' as shown in figure 2(f), the textures were taken from [1] . The camera can be attached to planet as shown in figure 2(c), this is done by clicking on a planet then pressing 'a', The camera can rotate when attached to a planet as shown below, by using the arrow keys.
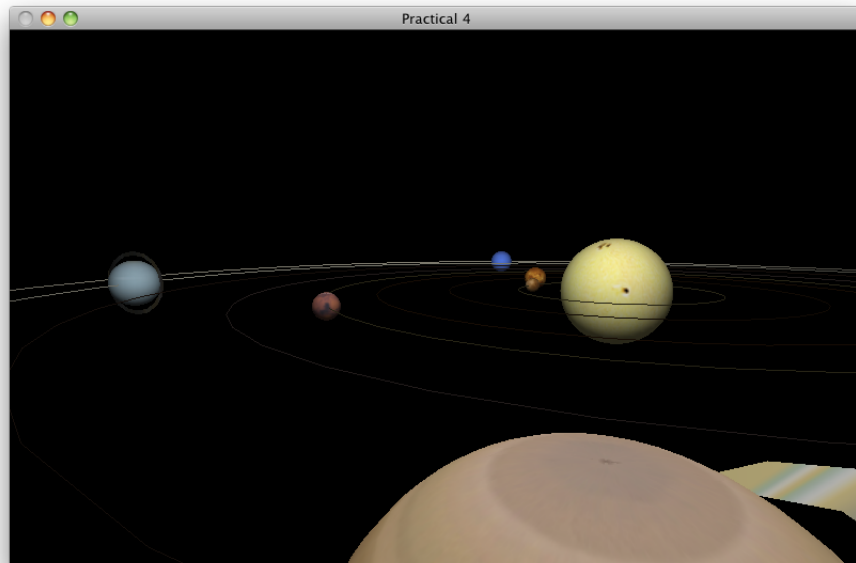

Figure 2: Shows the circling camera when using the arrow keys after attaching the camera to Saturn.

All the planets (and the moon) rotate as they move around their orbit, Saturn and Uranus have rings around them. The solution uses a hierarchical model that allows modelling of an aberrantly Solar System.

The model allows planets to have other celestial bodies orbiting them. Planets can have any number of 'Drawable' objects attached to them, which allows rings around the planets.

4 Video

The video shows the features of the program, the viewpoints, rotating planets as they orbit, showing/hide orbits, the different lighting configurations, changing the textures of the planets and also shows attaching the camera to different planets. It also shows zooming in/zooming out.

References

[1] Jht's planetary pixel emporium. [Online]. Available: http://planetpixelemporium.com

[2] Opengl, D. Shreiner, M. Woo, J. Neider, and T. Davis, *OpenGL(R) Programming Guide : The Official Guide to Learning OpenGL(R), Version 2 (5th Edition)*.   Addison-Wesley Professional, Aug. 2005.

[3] Independent jpeg group. [Online]. Available: http://www.ijg.org/