PA7 Solar System Instruction Manual

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CS 480-680 Computer Graphics

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Sections

Overview

Dependencies

For operating systems to run this project, installation of these five programs are required:

GLEW (http://glew.sourceforge.net/)

GLM (http://glm.g-truc.net/0.9.7/index.html)

SDL2 (https://wiki.libsdl.org/Tutorials)

Assimp (http://assimp.sourceforge.net/main_downloads.html)

ImageMagick (https://sourceforge.net/projects/imagemagick/).

This project uses OpenGL 3.3. Some computers, such as virtual machines in the ECC, can not run this version. In in order to run OpenGL 2.7 follow the instructions at:

https://github.com/HPC-Vis/computer-graphics/wiki/Using-OpenGL-2.7

Extra Credit

Live adjustment of simulation speed was implemented in this project, the =/+ key will increase the simulation speed by a factor of 2 while the -/_ key will decrease the speed by a factor of 2. The option to go from actual data to a scaled view and vise versa was also added and can be done by pressing p. Rings were also added on Uranus and Neptune. It should be noted that we did not implement proper axis tilt for planets as it was not required for the project. As a result, the size and texture of the rings is correct, but the rings may not be placed at the proper angle (Ex: the rotation of Uranus is more horizontal which would make the ring more vertical).

User Manual

Build Instructions

This project was built and run using a cmake file in Linux/Ubuntu. To run the application, enter the following in the PA7 directory:

```
mkdir build
cd build
cmake ..
make
./PA7
```

Keyboard Inputs

Camera Controls

N	- Enable normal viewing mode
T	- Enable top down view mode
WASD	- Move camera (top down view mode only)
E	- Zoom in camera (top down view mode only)
Q	- Zoom out camera (top down view mode only)
1	- View Mercury
2	- View Venus
3	- View Earth
4	- View Mars
5	- View Jupiter
6	- View Saturn
7	- View Uranus
8	- View Neptune
9	- View Pluto

Simulation Controls

+	- Speed up simulation
-	- Slow down simulation
P	- Change scale of Solar System

Figures

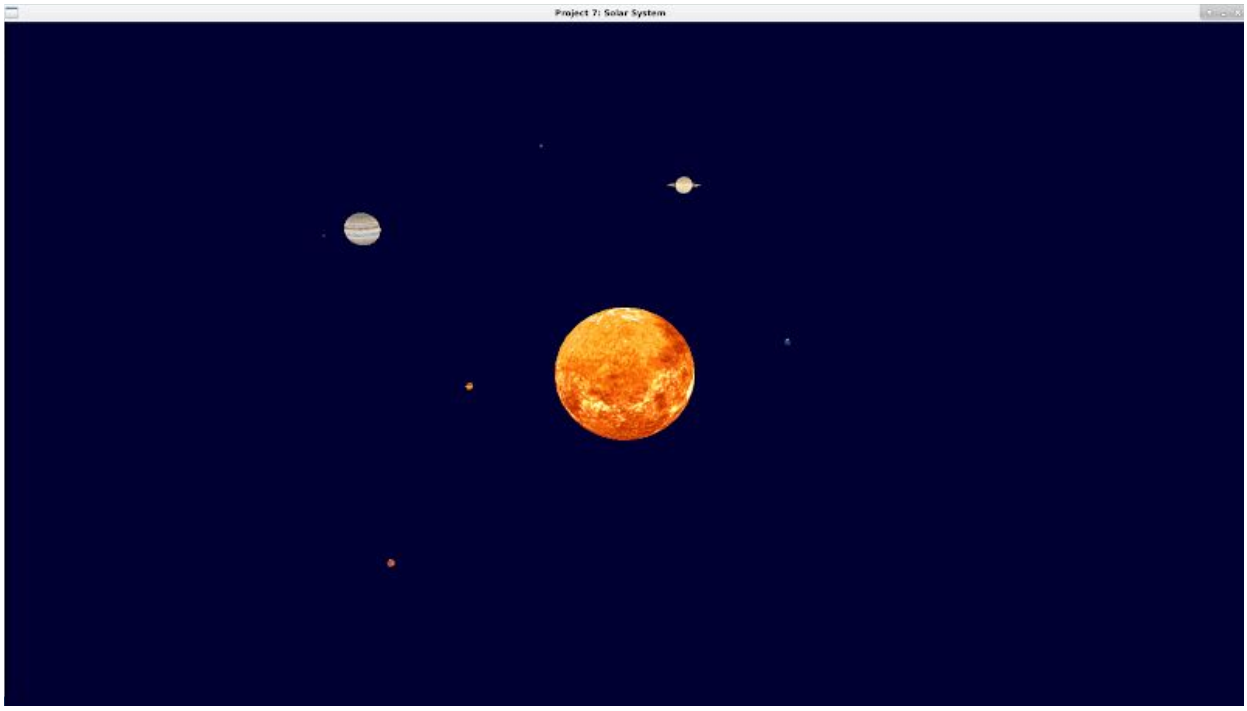

Figure 1: Screenshot of a normal view of our Solar System (actual data).

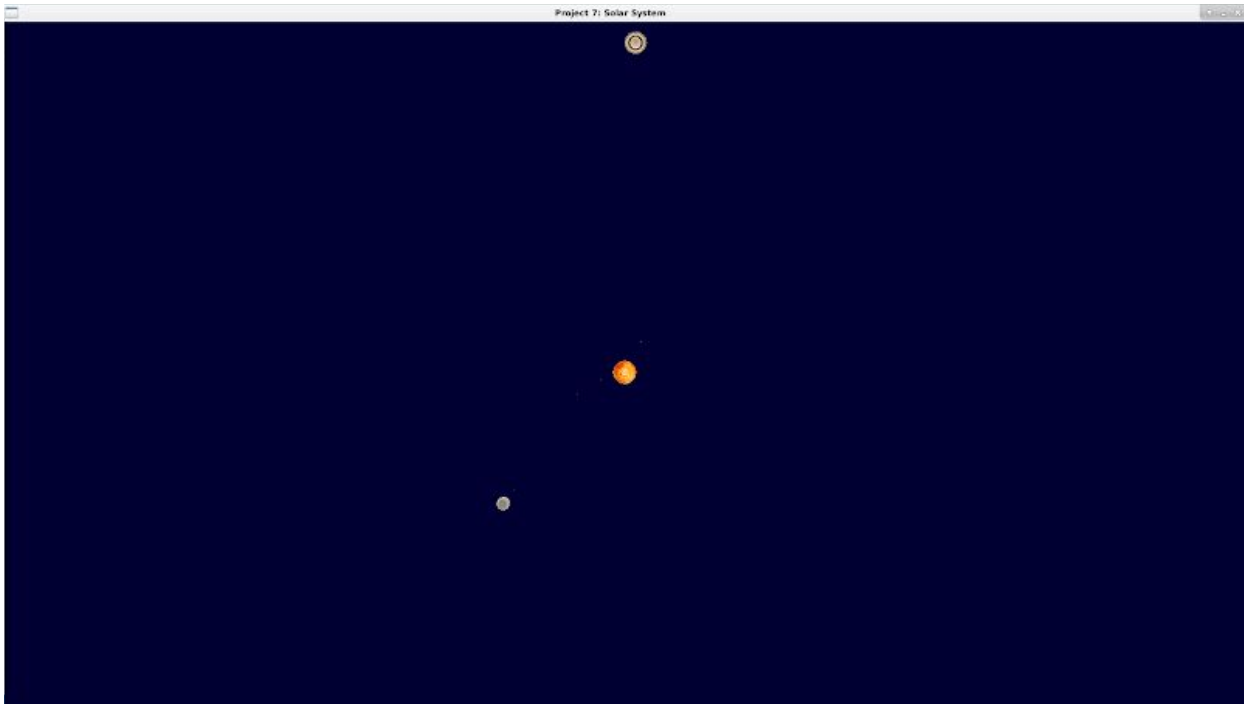

Figure 2: Screenshot of a top down view of our Solar System (actual data).

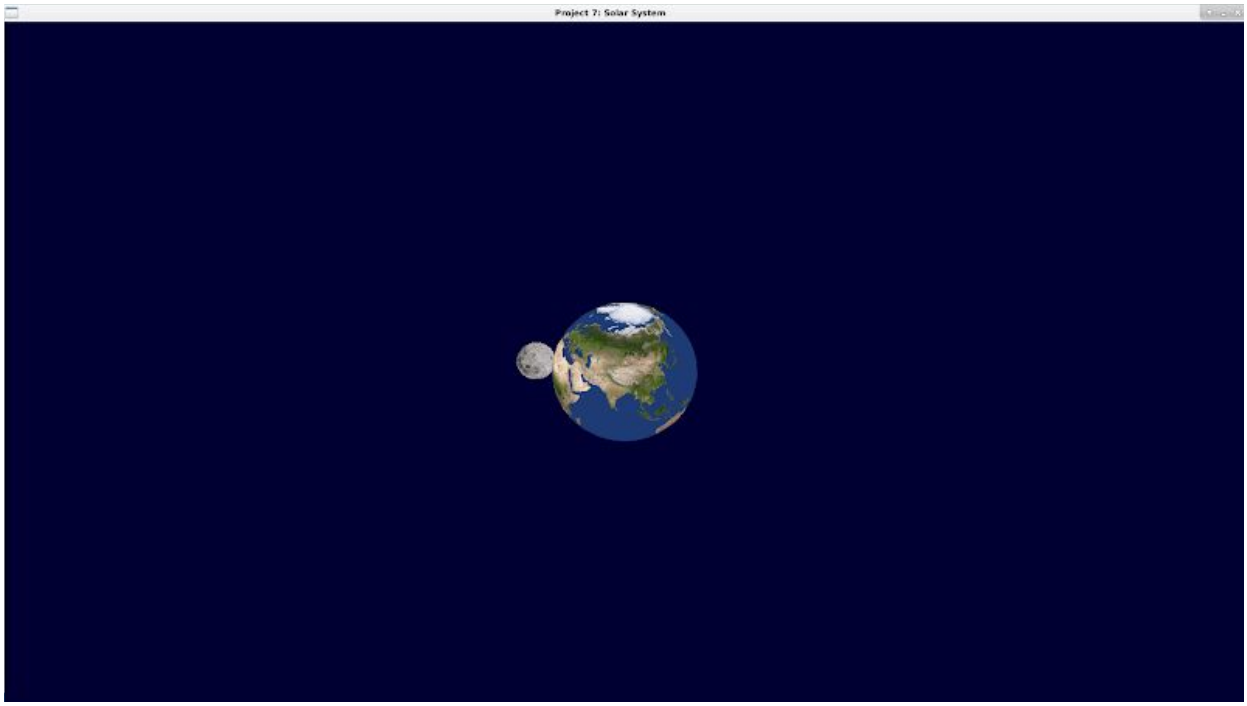

Figure 3: Screenshot of Earth and the Moon from our Solar System.

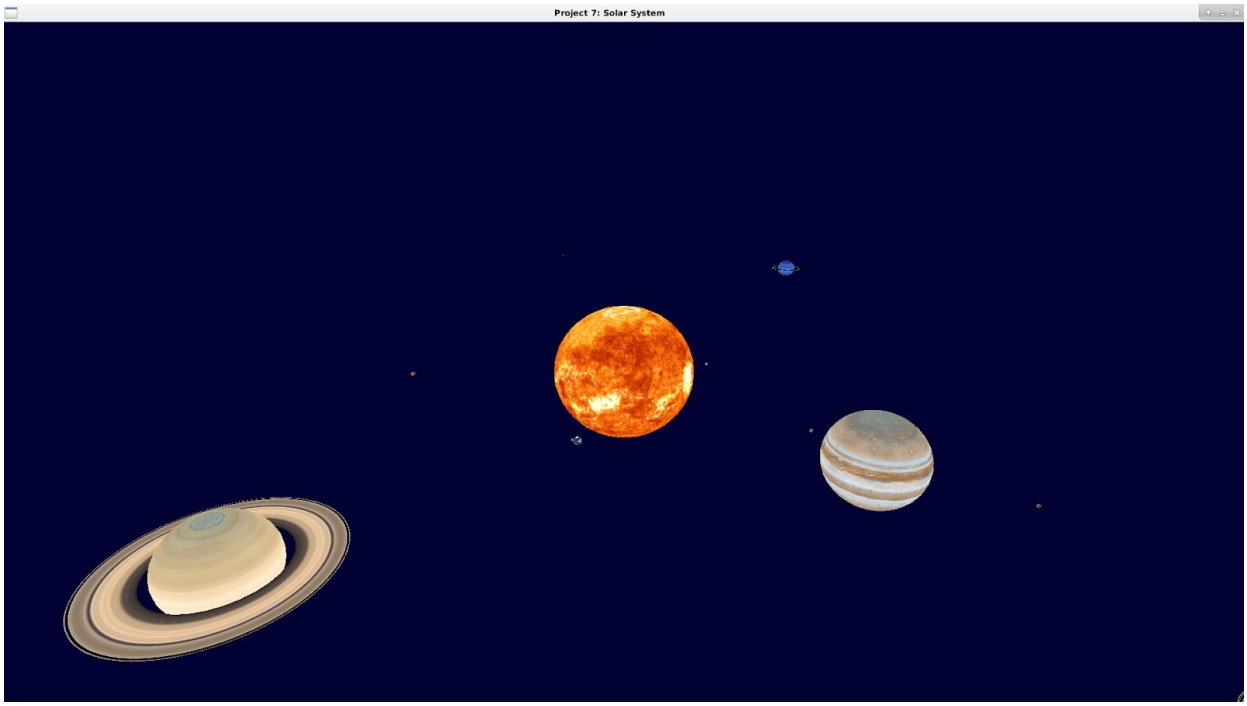

Figure 4: Screenshot of a normal view of our solar system (scaled data).

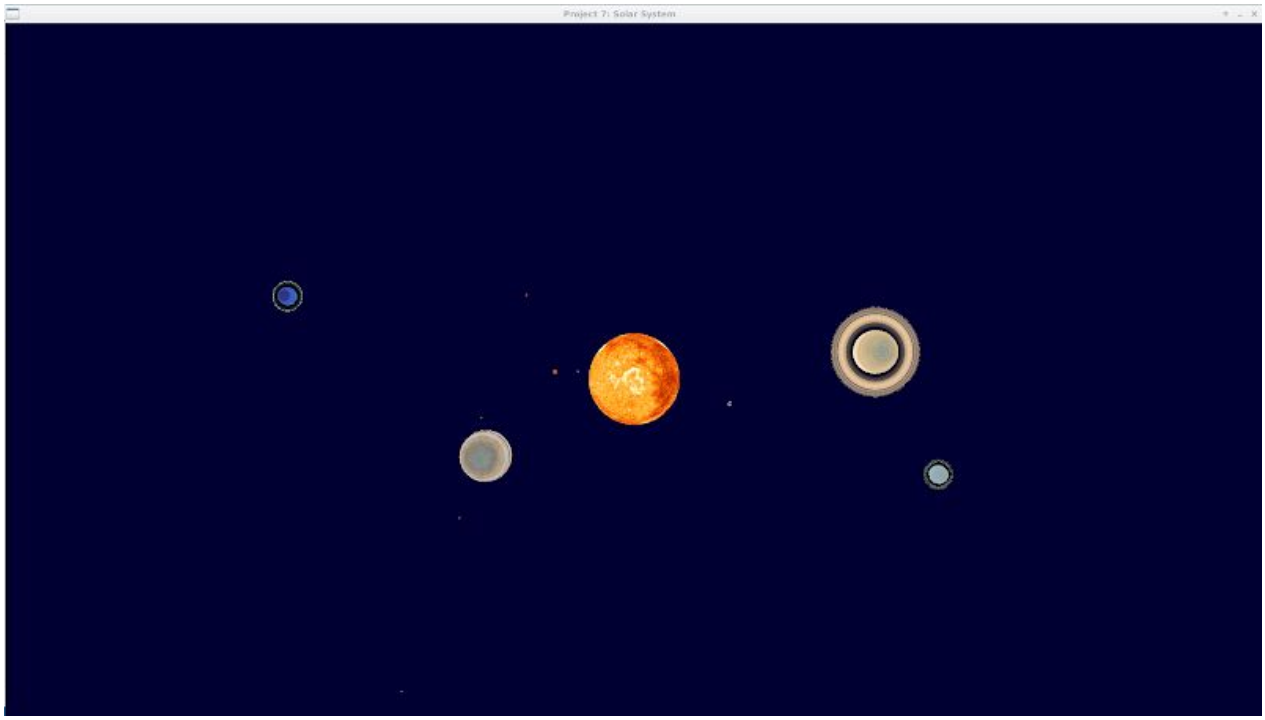

Figure 5: Screenshot of a top down view of our solar system (scaled data).

Technical Manual

Issues

Overall, there were not many major issues in the creation of this simulation. There were some initial issues with creating a makefile that allowed the project to use ImageMagick, however this was quickly resolved by making an equivalent c make file that allowed us to compile the ImageMagick libraries needed for the project. Another minor issue was drawing orbit paths of planets. We ran into some operational errors when trying to draw lines using glBegin and glEnd and as a result, could not implement drawing orbit paths due to this and time constraints.

Things we would have done different

One thing we could have done differently is keep planets within an array of objects. This could have made other aspects of the project such as user interaction easier to implement as well as contributed to more organized and readable code. This also could have made reading from a configuration file easier if we chose to implement this at a later date.