

CS 480 Computer Graphics

3D Pinball Game

Technical Manual

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Overview

Dependencies

This assignment was designed and tested on a Linux operating system, and requires the use of third party packages and libraries. Instructions to install these packages on Ubuntu are found below.

GLEW, SDL2, GLM:

```
sudo apt-get install libglew-dev libsdl2-dev libglm-dev
```

Assimp:

```
sudo apt-get install libassimp-dev
```

ImageMagick and Magick++:

```
sudo apt-get install imagemagick libmagick++-dev
```

Bullet Physics:

```
sudo apt-get install libbullet-dev
```

Extra Credit

- Changeable plunger strength

User Manual

Build Instructions

This assignment was compiled using the CMake build system. All the necessary CMake modules are on the project's repository, as well as the CMakeLists.txt file. The instructions to build and run the program are found below:

```
mkdir build
cd build
cmake ..
make
```

Game Controls

DOWN : Launch ball

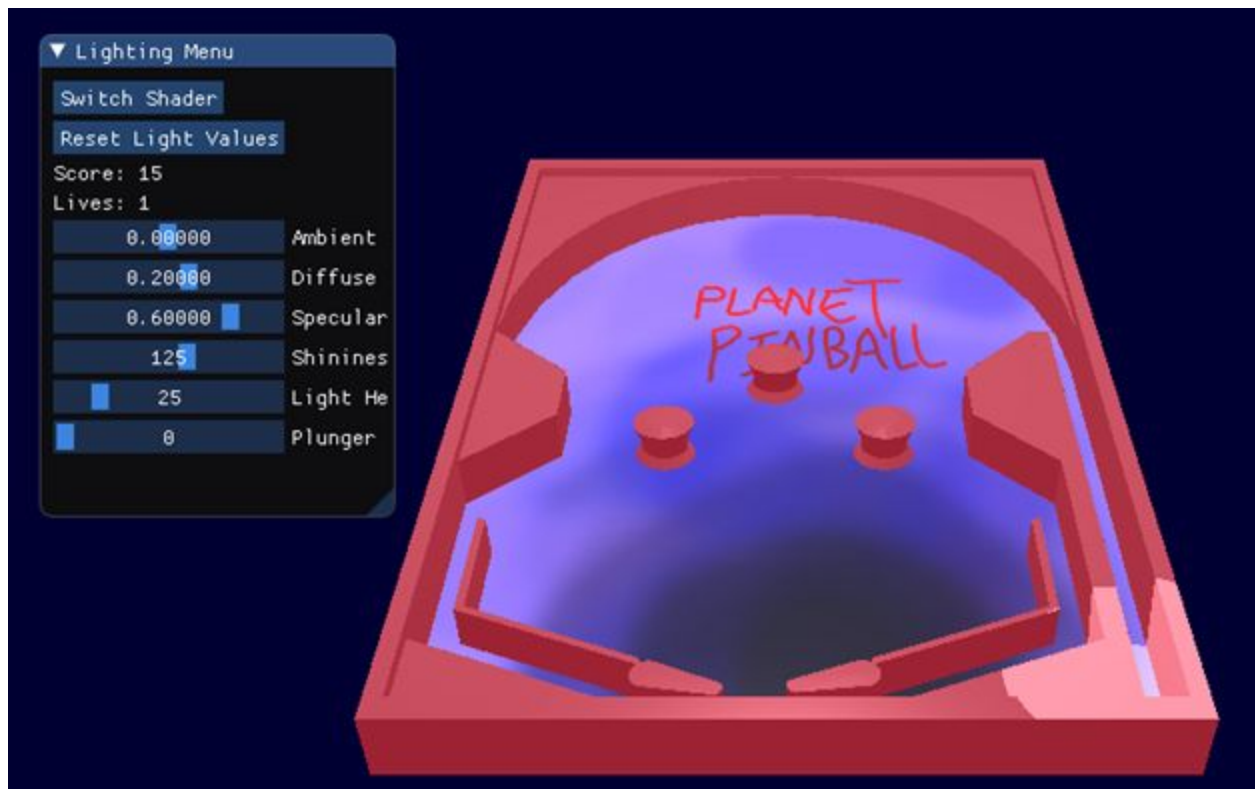
LEFT : Left paddle

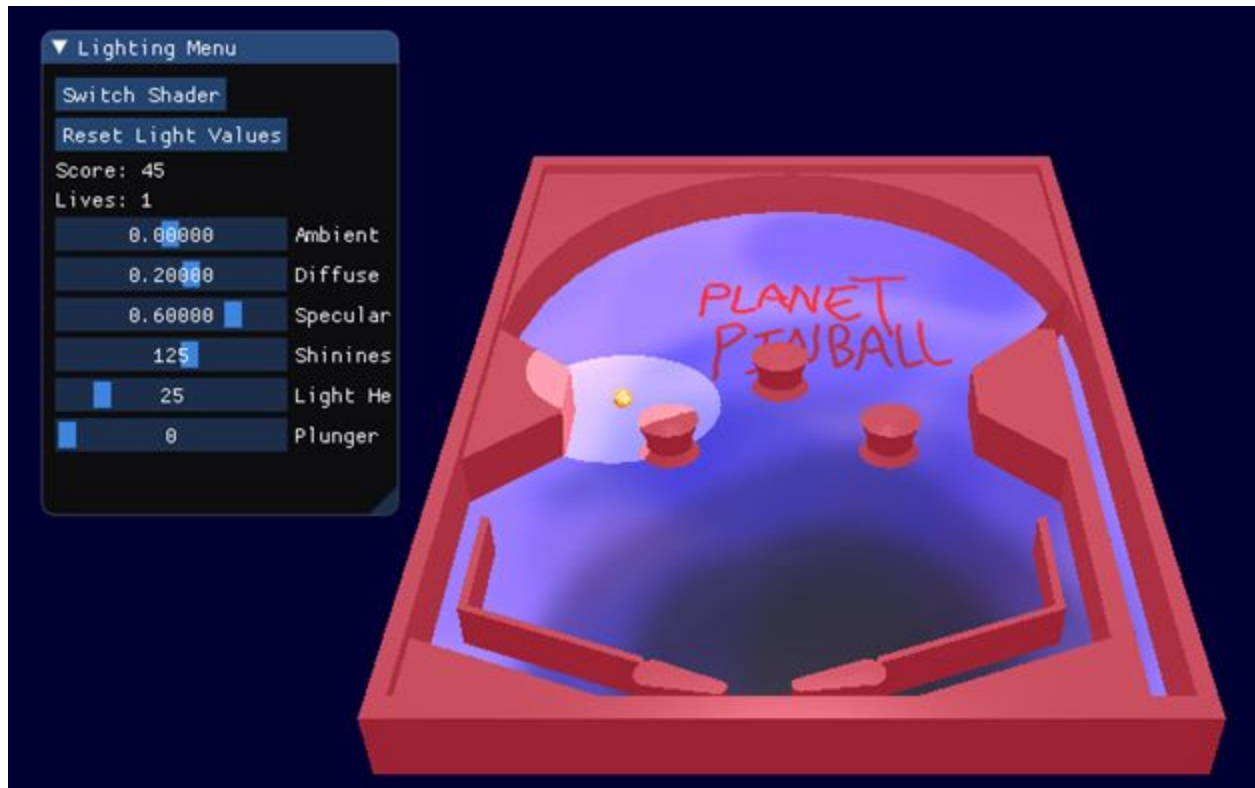
RIGHT : Right paddle

Camera Controls

w : Pan up
a : Pan left
s : Pan down
d : Pan right
q : Pan in
e : Pan out

Figures





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Issues

The first issue we ran into while programming pinball was learning how to use Bullet. Once we got past the learning curve, adding rigid body objects to interact with in our game became simple. The second issue we had was getting the Phong lighting model to work correctly and adding a spotlight that follows the ball. The Phong shader worked but there was a bug with the specular value that caused some very weird behavior. After adding the spotlight, we parameterized the height and made it adjustable within our menu. The final issue we had while putting everything together was getting the mechanics for the paddles to work properly. At first, they were terrible and did not do a good job at hitting the ball. However, after changing their rotations and adding impulses to their model, we were able to get them to work flawlessly.

Things we would do differently

Overall, we're satisfied with the looks and the playability of our project. If we had more time, we would make the pinball table more complex and difficult by adding more obstacles. Another couple things that would make this game better is adding menu options for changing themes with textures and adding a physical plunger animation.

Changes

- Small changes to exported bumper models
- Improved mechanics and range of rotation for paddles
- Smoother new game prompt
- Uploaded tech manual