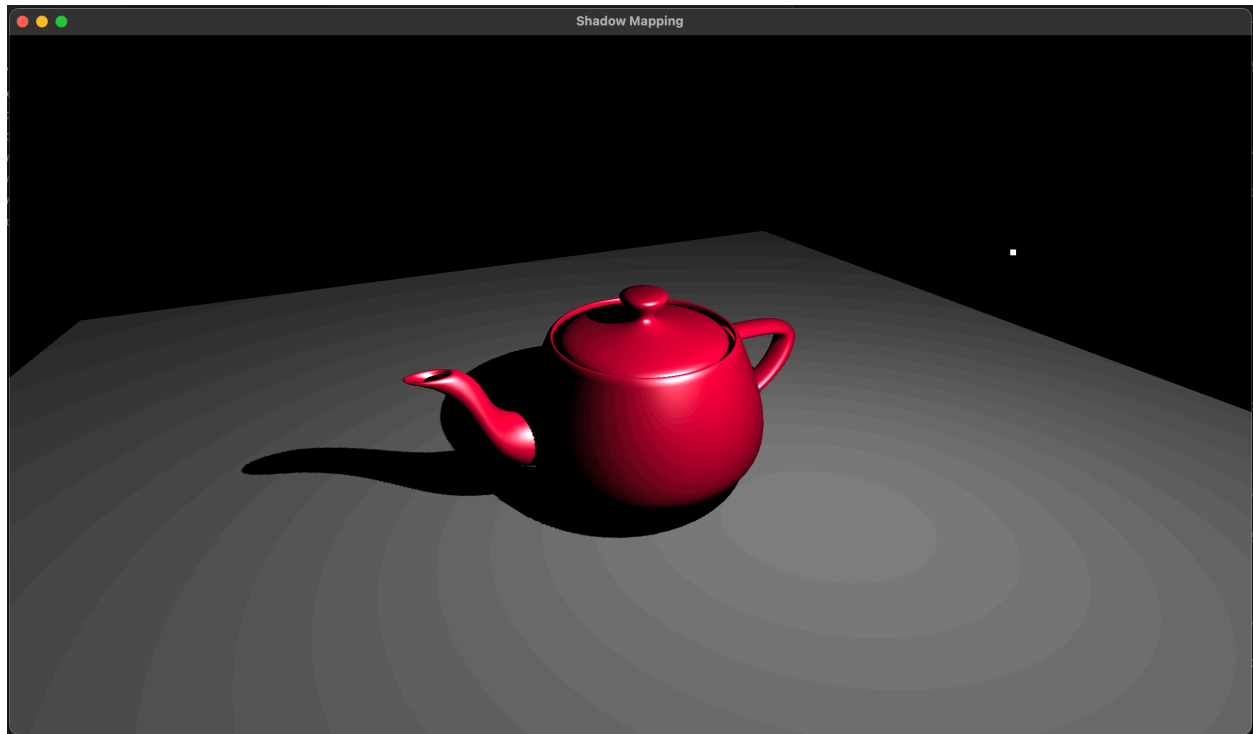


## James Youngblood, CS 6610, Project 7



I am resubmitting this on Mar 24, in order to fix the errors in my previous submission.

### What I implemented

I load the teapot, the plane, and the light (as a `GL_POINT`) for rendering, each with its own shader program. You can move the point light by holding L-CTRL and dragging the first or second mouse buttons. I set up a depth buffer and render the teapot and the plane to it. I sample from that depth buffer in the second pass for shadows, with some bias so that self shadows don't occur. Lighting in the shaders checks light direction based on point lighting, not directional lighting. The plane has only diffuse shading, while the teapot has both diffuse and specular shading.

### What I could not implement

Anything outside of the light's view/depth buffer is completely black. Additionally, when the light is close to the teapot, the shadows of the handle and spout specifically can produce weird artifacts at certain rotations. This may be an issue with my projection for rendering the depth buffer, but I didn't have time to look into this issue.

### Additional functionalities

None.

### How to use the code

My code is a single `.cpp` file, with shaders included as string literals in the code, so it should be easy to compile and execute.

### **What operating and compiler system did I use?**

I used gcc as the compiler, on the latest version of macOS.

### **External libraries and other requirements for compilation**

The use the following dependencies.

- GLFW (include GLFW/glfw3.h)
- GLEW (include GL/glew.h)
- OpenGL >= 3.3
- C++11 standard lib
- cyCodeBase headers cyVector.h, cyTriMesh.h, cyGL.h, and cyMatrix.h.

To compile on my Mac M1, I installed GLFW and GLEW using homebrew (a package manager for Mac), including them and linking to their libraries using flags `-I`, `-L`, `-l`, for each when compiling with gcc. I also included the cyCodeBase headers in a similar way. I linked to the pre-installed OpenGL distribution on macOS using the flag `-framework OpenGL`. Finally, I included the C++ standard lib using the flags `-std=c++11` `-lc++`.

Here is the compilation command I used:

```
gcc -std=c++11 \  
-I /opt/homebrew/Cellar/glfw/3.3.8/include \  
-L /opt/homebrew/Cellar/glfw/3.3.8/lib \  
-l GLFW \  
-I /opt/homebrew/Cellar/glew/2.2.0_1/include \  
-L /opt/homebrew/Cellar/glew/2.2.0_1/lib \  
-l GLEW \  
-I ../cyCodeBase/ \  
-I ../LodePNG/  
-framework OpenGL \  
-lc++ \  
shadow_mapping.cpp -o shadow_mapping
```