

CS6610 PROJECT 5 – Render Buffers

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Implemented features:

All the requirements as well as the additional requirements for CS6610 listed in the Project 5 has been implemented.

1. The object was rendered using the diffuse texture as specified in the mtl file.
2. The object is first rendered to a texture using a render buffer instead of directly rendering to a viewport.
3. The rendered texture (diffuse teapot) is displayed on a square-shaped plane.
4. A constant color is added to the plane to distinguish it from the background.
5. The rendered texture uses bilinear filtering for magnification and mip-mapping with anisotropic filtering for minification.

Implemented features:

I also added the specular texture to the teapot as in the previous project. I have screenshots for both with and without specular texture inclusion.

Using the above implementations:

CTRL + Left mouse button: Rotates the light around the teapot object.

Left mouse button: Hold the left mouse button down and drag the cursor to change the camera angle (rotation) for the teapot texture.

Right mouse button: Hold the right mouse button down and drag the cursor to change the camera distance (zoom-in and zoom-out) for the teapot texture.

ALT + Left mouse button: Hold down the ALT key followed by the left mouse button (and drag the cursor) to change the camera angle (rotation) for the plane.

ALT + Right mouse button: Hold down the ALT key followed by the right mouse button (and drag the cursor) to change the camera distance (zoom-in and zoom-out) for the plane.

OS Used: Windows 10

IDE: Visual Studio 2013

Libraries and dependencies:

All the libraries used in the project are included under the *lib* folder within the zip file. They include: opengl32.lib, glu32.lib and freeglut.lib

All the header files are included within the GL folder contained in an include folder within the zip file. They have been included as `#include <GL/gl.h>`, `#include <GL/freeglut.h>`, `#include <GL/vmath.h>`, `#include <GL/glfw3.h>` in the code. All the header files from cyCodeBase recommended for use are included in the cyCodeBase folder in the same include folder that holds the GL folder. The lodepng.h and lodepng.cpp files required to load the PNG images are present in the imageLoader folder of the include folder.

All the DLLs required are placed in the Debug folder of the zip file. The source code itself was created and compiled in Visual Studio and is available as [main.cpp](#) in Shading folder along with the solution.

The executable is available in the Debug folder.

Requirements to compile the project:

Unzip the project zip file and open the solution in Visual Studio.

In the properties of the project, link to the libs, dlls and header files. Make sure to choose “All configurations” in the properties window before adding the dependencies.

As mentioned earlier, all the required libraries, dlls and header files are available in the lib, Debug and include folders respectively of the zip file.

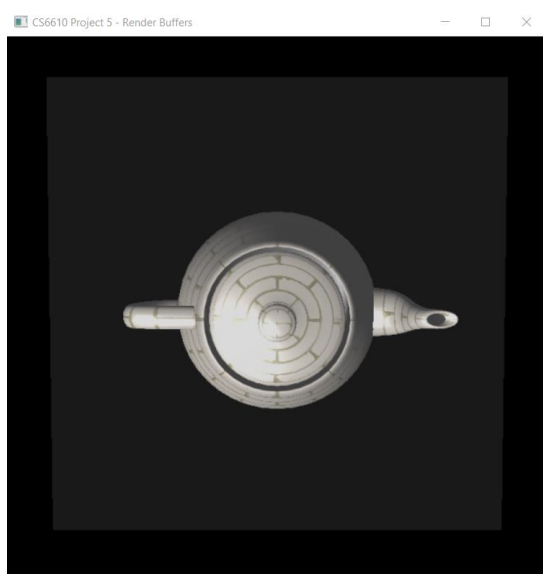
Add the [_CRT_SECURE_NO_WARNINGS](#); to the preprocessor additional requirements in the project properties.

Please let me know if there is any issue in running the code.

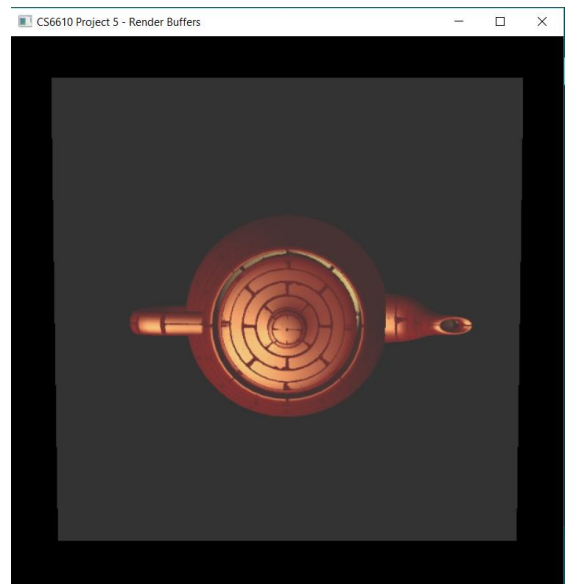
Screenshot of output:

Teapot texture on a plane surface:

Without specular texture:



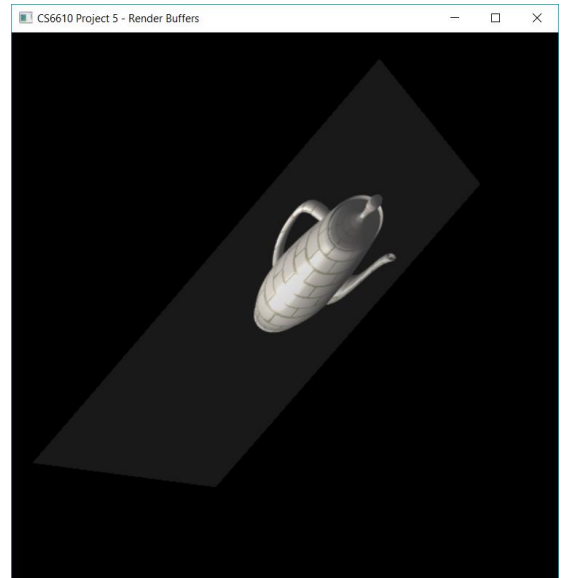
With specular texture and different constant color for plane:



Teapot texture camera angle change
(rotation using left mouse button):



Plane object camera angle change (rotation using ALT + Left mouse button)



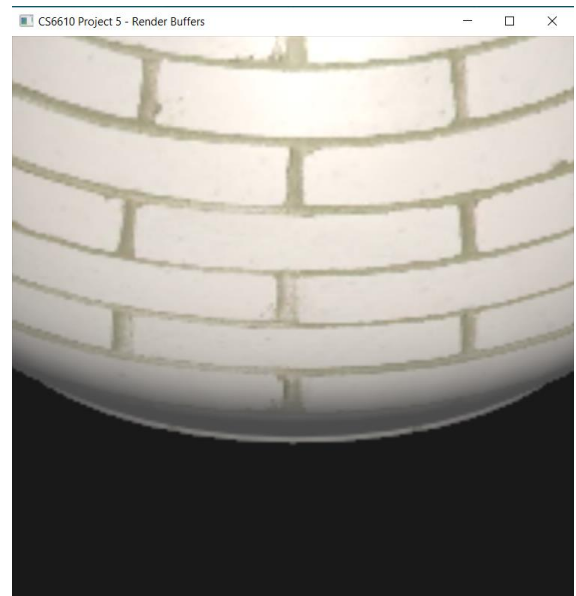
Different light direction to view the teapot lid better (CTRL + Left mouse button):



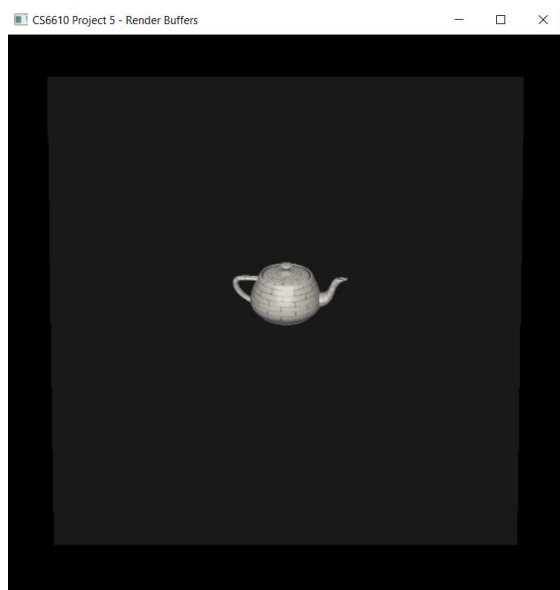
Teapot zoom-in:



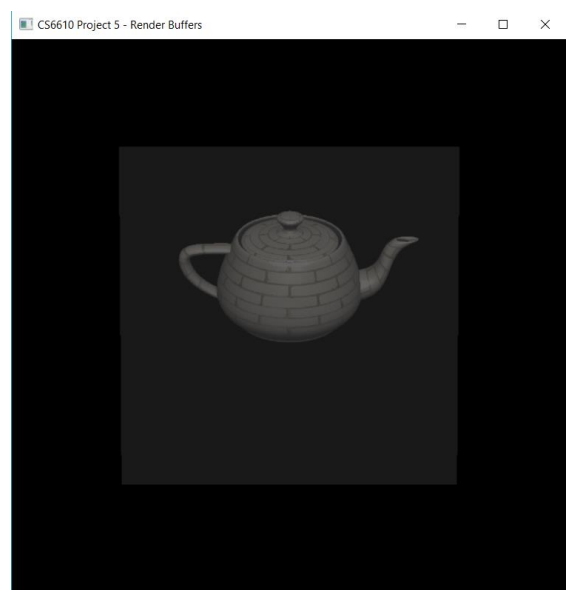
Plane zoom-in:



Teapot zoom-out:



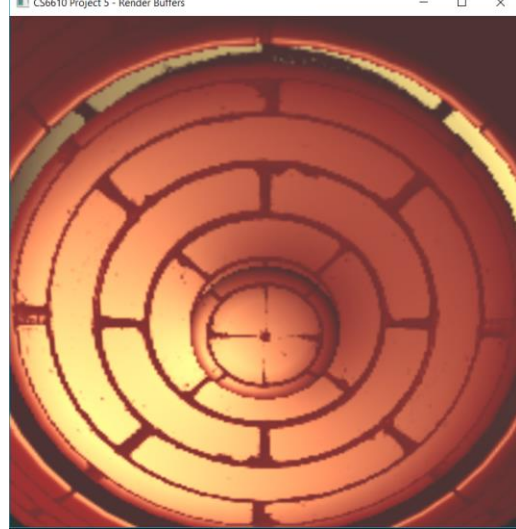
Plane zoom-out:



With GL_NEAREST (Before implementing bilinear filtering for magnification)

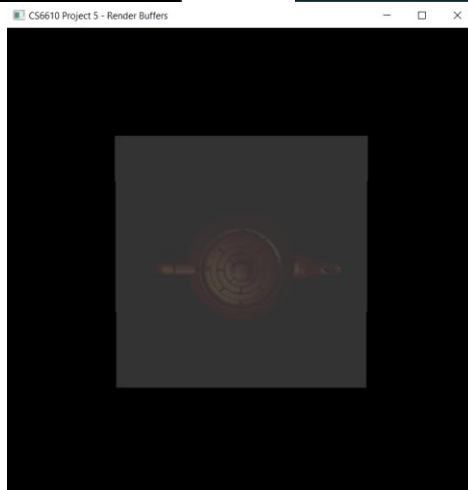
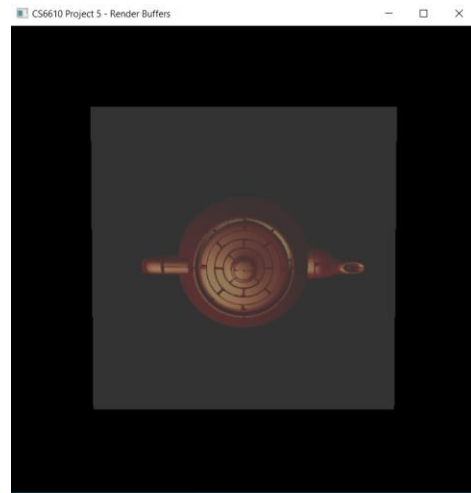
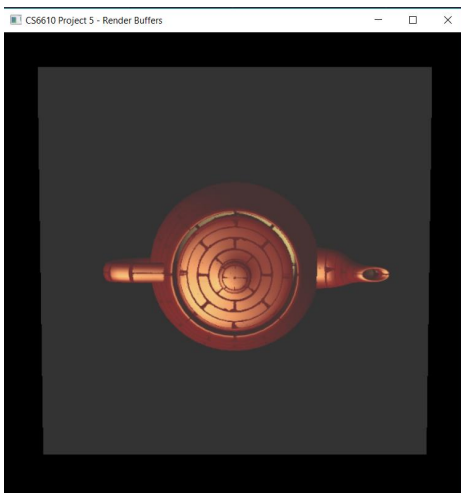


After Implementing bilinear filtering:



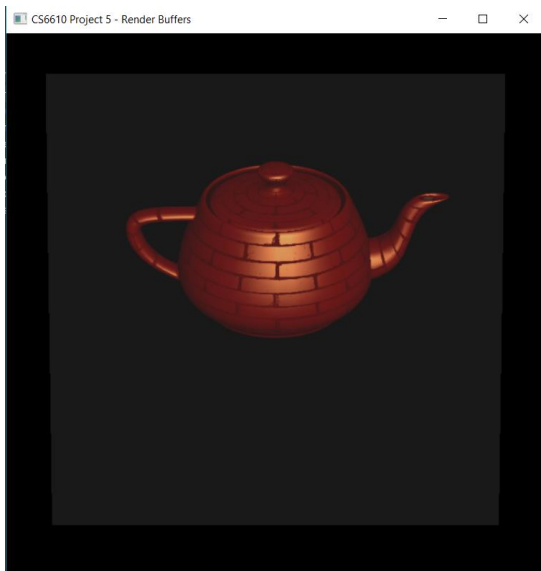
In the above images, the plane is zoomed-in to see the difference

On applying mipmapping, when the plane is zoomed out, the texture starts blurring out:

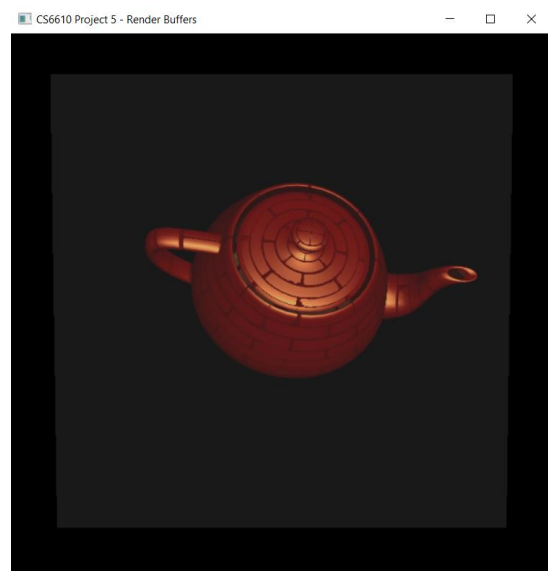


More screenshots with different light direction:

Light rotation:



Teapot rotation:



Plane rotation:

