Project 8 – Tesselation

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What's implemented?

All requirements implemented. Implemented simple normal mapping and displacement mapping including independent control of the light position (using CTRL + mouse button to move and zoom in/out) and the display of light position. Instead of pure black, an ambient colour is given to the shadows. The Left/Right arrow keys can be used to decrease/increase tesselation levels respectively. The Spacebar can be used to switch triangulation ON/OFF.

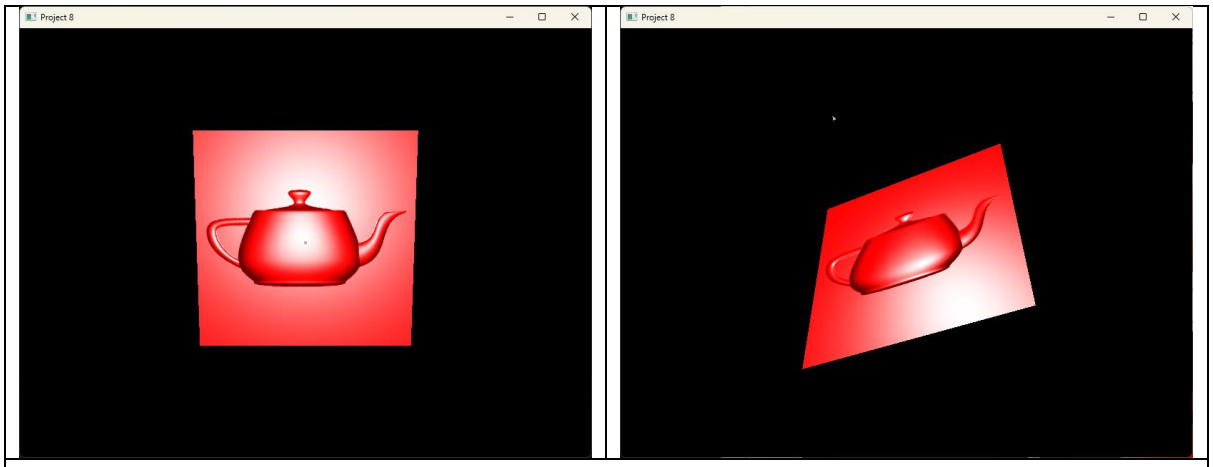

Fig 1. Normal Mapping (different camera angles)

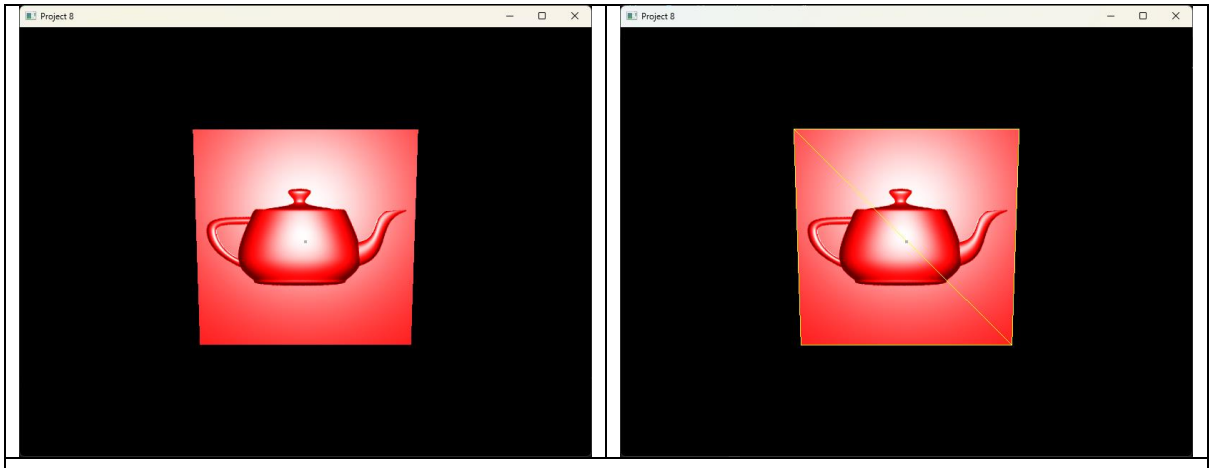

Fig 2. Triangulation ON/OFF (Normal Mapping)

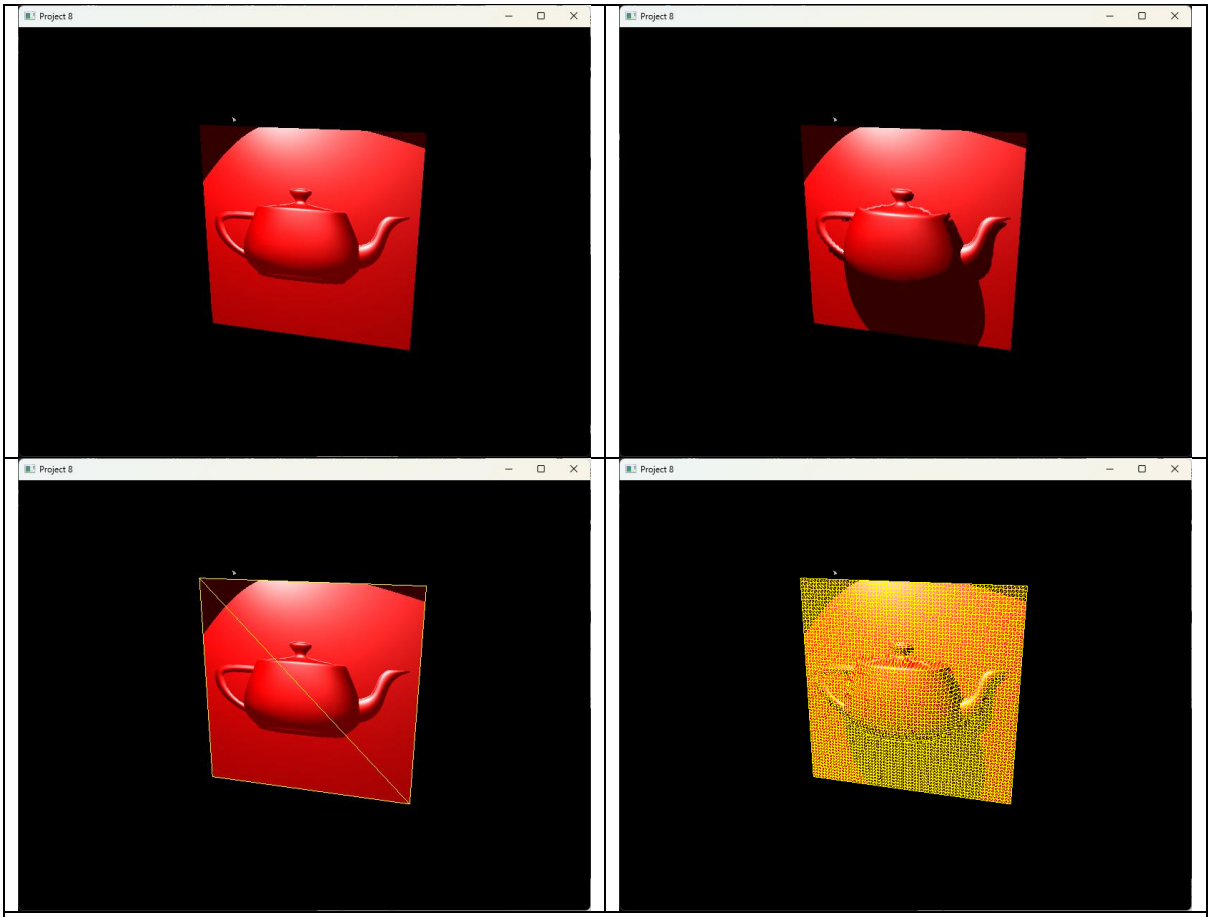

Fig 3. Displacement Mapping (different tesselation levels)

What could not be implemented?

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Additional functionalities

Plane shadow:

The shadows cast by the plane are also calculated along with the shadows cast by the object.

Ambient shadow color:

Instead of pure black, an ambient color is given to the shadows of both the object and the plane.

Previous projects' functionalities:

- Left mouse button to rotate and right mouse button to zoom in/out (click and drag).
- Re-compiling shaders on pressing F6 key.
- Quitting the program on pressing Esc key.

How to use implementation?

```
g++ main.cpp lodepng.cpp -o main -lfreeglut -lglu32 -lopengl32 -lglew32
```

This command will generate the output file “main” (“main.exe” in Windows) in the working directory. This command includes the GLEW 32-bit linker. I didn’t use an IDE and had all the libraries and headers globally installed, so I didn’t have to use `-I` and `-L` tags to specify paths to headers and DLLs. Place “lodepng.cpp” file in the same directory as the “main.cpp” file.

All texture maps, .obj files and .mtl files are expected to be in the same directory as the executable file.

The folder structure for the headers in `include` is as follows:

```
-> include
      -> GL / all FreeGLUT and GLEW headers
      -> cyCodeBase / all cyCodeBase headers
      -> lodepng.h
```

OS and Compiler

Operating System	Windows 11 (x64)
Compiler	g++

External libraries and additional requirements

Apart from FreeGLUT, GLEW, cyCodeBase and LodePNG have been used for this implementation.
