**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.

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| Fig 1. Normal Mapping (different camera angles) | |

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| A computer screen shot of a teapot  Description automatically generated |  |
| Fig 2. Triangulation ON/OFF (Normal Mapping) | |

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| 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**

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| *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.