**Project 4 - Textures**

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**What’s implemented?**

*All requirements implemented.* Textures have been added to introduce color variations to the object. Ambient, diffuse and specular textures have been successfully added and displayed.

*Optional* - Support for objects with multiple materials has also been implemented.

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| *No Texture* | *Ambient + Diffuse* |
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| *Specular* | *Ambient + Diffuse + Specular* |
| Fig 1. Different texture components | |

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| Fig 2. Different textures on “yoda.obj” | |

**What could not be implemented?**

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**Additional functionalities**

**Window resizing:**

I’ve also implemented a resize function and mapped it to the glutReshapeFunc() callback. Whenever the window is resized, the viewport size is changed, and the object’s size is preserved by adjusting the field-of-view (FOV) and the aspect ratio.

**View big objects:**

To view big objects such as “yoda.obj”, I have mapped the B and S keys to change the zoom speed to view big and small objects respectively.

**Previous projects’ functionalities:**

* Left mouse button to rotate and right mouse button to zoom in/out (click and drag).
* Centering the object on the window based on its boundary values.
* Re-compiling shaders on pressing F6 key.
* Ctrl + left mouse button to rotate the light source.

**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

*Note: While testing with “yoda.obj” file, I found the object to be much larger than “teapot.obj”. Therefore, I had to change the zoom in/out speed to comfortably view the object. Use B key to increase the zoom speed and S key to decrease it.*

**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.