**Project 3 - Shading**

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**What’s implemented?**

*All requirements implemented.* Simple lighting and shading (Blinn shading) for an object have been implemented with functionalities to rotate & zoom the object and rotate the light around the object (using two angles).

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| Fig 1. Rotate light around the object using CTRL + left mouse button (click and drag) | |

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| *Surface Normal* | *Ambient + Diffuse* |
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| *Spectral* | *Ambient + Diffuse + Spectral* |
| Fig 2. Different lighting components | |

**What could not be implemented?**

*The optional requirement:*

* *Display the light as a separate object.*

**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.

**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.

**How to use implementation?**

g++ main.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. The folder structure for the headers in include is as follows:

-> include

-> GL / all FreeGLUT and GLEW headers

-> cyCodeBase / all cyCodeBase headers

**OS and Compiler**

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| *Operating System* | Windows 11 (x64) |
| *Compiler* | g++ |

**External libraries and additional requirements**

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