
Practical WorkN°04

Lighting

The aim of this lab is to illuminate a 3D scene with direct lighting and to understand how to better structure an object visualization program using OpenGL. It also aims to teach students how to assign materials to objects and how to add/control light sources to illuminate the scene.

Create a 3D scene containing:

- A colored terrain (rectangle) (Texture).
- Add two or more objects to this scene (.obj models).
- Add two light sources (colored spheres). You can use `glutSolidSphere(1,50,50)` to draw the spheres.
- Enable lighting, then enable shading (Gouraud shading) (OpenGL: `GL_SMOOTH`).
- Change the materials of your objects using the `glMaterialfv(faces, features, color)` function.
- Use the Phong lighting model for the lighting:

$$\mathbf{I} = \mathbf{I}_a \cdot \mathbf{K}_a + \mathbf{I}_d \cdot \mathbf{K}_d + \mathbf{I}_s \cdot \mathbf{K}_s.$$

- Use the "k" key to toggle Phong's lighting on and off.
- Use the "m" key to toggle Plat's lighting on and off.
- Use the "h" key to switch between point and directional light sources.
- Use the "f" key to activate only ambient lighting.
- Use the "b" key to activate only diffused lighting.
- Use the "v" key to activate only specular lighting.