Assignment3

Shaders

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Deadline

Wednesday, 9 January 2020 at 23:55.

Task

- Extend the `Node` class with a `PointLightNode` class, which has as additional attributes `lightIntensity` and `lightColor`. (10%)

- Assign a different color for each planet using `glUniform3f`. (10%)

- Implement per-fragment Blinn-Phong local illumination model in the planet fragment shader. (50%)

- Comment the code extensively. (10%)

- **Additional Task**: implement a Cel-Shading effect (adding a colored outline to the planets) and allow switching between the two appearances pressing 1 and 2. (20%)

Tips & Suggestions

- Remember to upload as uniforms the light attributes (position, color and intensity).

- Planets ambient color can be the same as the diffuse color and the specular color can be white.

- Before performing the dot products, both vectors need to be normalized.

- The light should be in the center of the solar system.

- The Cel-Shading (aka Toon Shading) effect consists in a further step of "colour-discretisation" (if colour > threshold then m_colour1 else m_colour2).

- In order to detect a relevant edge you should calculate the dot product between the surface normal and the view direction, if this value is above a threshold assign to that fragment the outlineColour (in this case the relevant outline have normal perpendicular to the view direction).

- **IMPORTANT**: Shaders are written in **GLSL** (OpenGL Shading Language), a C-like language, which is quite easy to approach. Here you can find the reference of GLSL, and for more information you can always schedule a meeting with me via email.