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3/1/2015

EGP-300-52

Assignment 3 - Material Render & Shaders

**Main purpose of the exercise:**

•Move to shader rendering and basic shader system (goodbye to the fixed pipeline)

•Learn about D3DXMESH class data structure.

•Implement and connect a basic material

•Implement both Gouraud and Phong shading - each partner is required to implement one technique (vertex and pixel shader) for your existing primitives

•Support Texture and the generic lighting model.

**Controls:**

* Mouse – move camera
* Mouse Wheel – zoom in/out
* Y/H – zoom in/out
* X, C, Z to invert X, Y, Z camera axis
* W – toggle wireframe mode
* S – toggle specular lighting
* D – toggle diffuse lighting
* T – toggle texture rendering
* P – switch to Phong shading
* G – switch to Gourad shading
* O – switch between objects
* [1-0] – switch between objects

**Lighting Equation:**

***The following steps make up our program’s lighting equation:***

1. Computing the vector from the vertex to the eye position in world space by normalizing the eye position subtracted by the vertex position.
2. Compute the reflection vector of the lighting using the normal and negative of the light direction according to the world view.
3. Get the dot matrix of the light’s reflection vector and the vector from the vertex to the eye position, and put it to the power of the value that represents the strength of the specular lighting to determine how much specular light is visible to the viewer.
4. Determine the diffuse light intensity that strikes the vertex by determining the dot matrix of the normal and light direction according to the world view.
5. Compute the ambient, diffuse and specular lighting by multiplying the color of the material and lighting for each different method material separately. For specular lighting, multiply the resulting product by the specular light the viewer can see. For diffuse lighting, multiply the resulting product by the diffuse light intensity that strikes the vertex.
6. Lastly, add the ambient and diffuse values together and copy over the diffuse alpha.