

REVIEW

In the last few chapters, you learned about colors, the Phong lighting model (which includes ambient, diffuse, and specular lighting), object materials, configurable light properties, diffuse and specular maps, different types of lights, and how to combine all the knowledge into a single, fully lit scene.

Try to create your own environment with the knowledge you've gained thus far.

Glossary

Learning the vocabulary can help your understanding and makes communication much more streamlined (and is essential for interviews).

Try to define everything on your own. After you've defined a word, go to the [Vocabulary](#) subpage, expand the word you defined, and compare your definition to the one there to see if you missed anything important.

CONCEPTS

- **Color Vector:**
- **Phong Lighting Model:**
- **Ambient Lighting:**
- **Diffuse Shading:**
- **Normal Vector:**
- **Normal Matrix:**
- **Specular Lighting:**
- **Phong Shading:**
- **Gouraud Shading:**
- **GLSL Struct:**
- **Material:**
- **Light (properties):**
- **Diffuse Map:**
- **Specular Map:**
- **Directional Light:**
- **Point Light:**
- **Attenuation:**
- **Spotlight:**
- **Flashlight:**
- **GLSL Uniform Array:**

CONCEPTS

- **Color Vector:**
 - A vector portraying most of the real world colors via a combination of red, green, and blue components (RGB). The color of an object is the reflected color components that an object did not absorb.
- **Phong Lighting Model:**
 - A model for approximating real-world lighting by computing an ambient, diffuse, and specular component.
- **Ambient Lighting:**
 - Approximation of global illumination by giving each object a small brightness so that objects aren't completely dark if not directly lit.
- **Diffuse Shading:**
 - Lighting that gets stronger the more a vertex/fragment is aligned to a light source. Makes use of normal vectors to calculate the angles.
- **Normal Vector:**
 - A unit vector that is perpendicular to a surface.
- **Normal Matrix:**
 - A 3x3 matrix that is the model (or model-view) matrix without translation. It is also modified in such a way (inverse-transpose) that it keeps normal vectors facing in the correct direction when applying non-uniform scaling. Without a normal matrix, normal vectors would get distorted when using non-uniform scaling.
- **Specular Lighting:**
 - Sets a specular highlight the closer the viewer is looking at the reflection of a light source on a surface. The intensity of the highlight is based on the viewer's direction, the light's direction, and a shininess value that sets the amount of scattering of the highlight.
- **Phong Shading:**
 - The Phong lighting model applied in the fragment shader.
- **Gouraud Shading:**
 - The Phong shading model applied in the vertex shader. Produces noticeable artifacts when using a small number of vertices. Gains efficiency for loss of visual quality.
- **GLSL Struct:**
 - A C-like struct that acts as a container for shader variables. Mostly used for organizing input, output, and uniforms.
- **Material:**
 - The ambient, diffuse, and specular color an object reflects. These set the colors an object has.
- **Light (properties):**
 - The ambient, diffuse, and specular intensity of a light. These can take any color value and define at what color/intensity a light source shines for each specific Phong component.
- **Diffuse Map:**
 - A texture image that sets the diffuse color per fragment.
- **Specular Map:**
 - A texture map that sets the specular intensity/color per fragment. Allows for specular highlights only on certain areas of an object.
- **Directional Light:**
 - A light source with only a direction. It is modeled to be at an infinite distance which has the effect that all its light rays seem parallel and its direction vector thus stays the same over the entire scene.
- **Point Light:**
 - A light source with a location in a scene with light that fades out over distance.
- **Attenuation:**
 - The process of light reducing its intensity over distance. This is used in point lights and spotlights.
- **Spotlight:**
 - A light source that is defined by a cone in one specific direction.
- **Flashlight:**
 - A spotlight positioned from the viewer's perspective.
- **GLSL Uniform Array:**
 - An array of uniform values. Works just like a C-array, except that they can't be dynamically allocated.