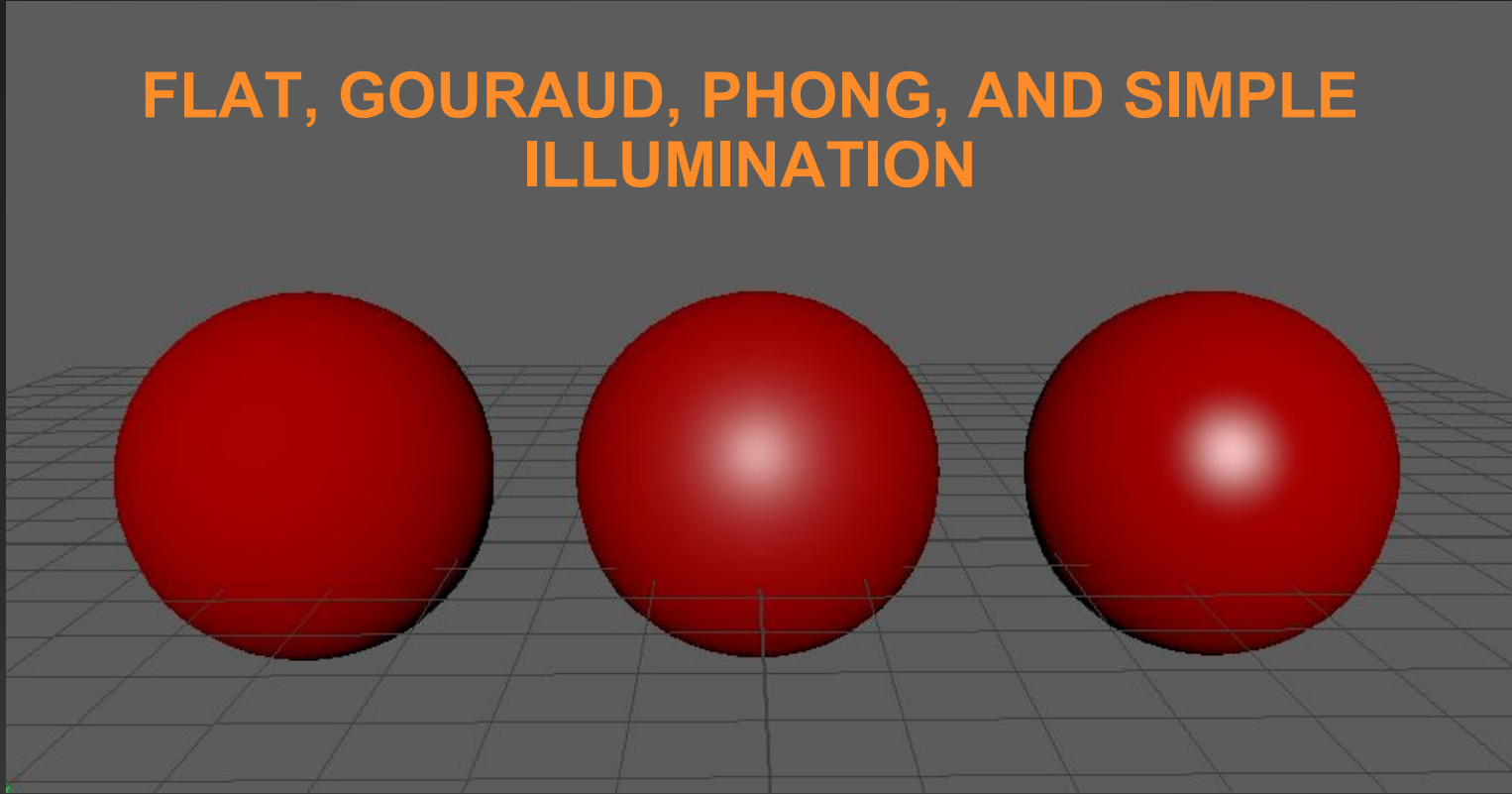


# SHADING MODELS:

FLAT, GOURAUD, PHONG, AND SIMPLE  
ILLUMINATION



# OVERVIEW

- Light Sources
- Light Reflection Models
- Shading Models



# Light Behavior in Real Life

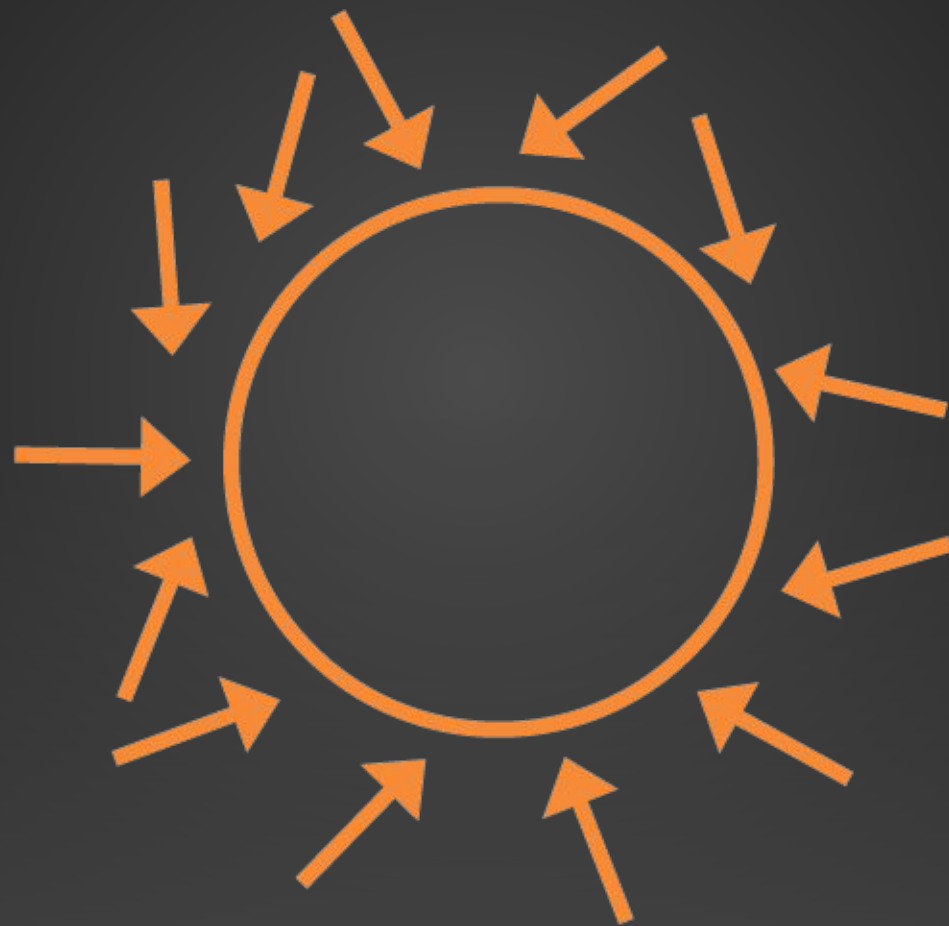


# LIGHT REFLECTION MODELS

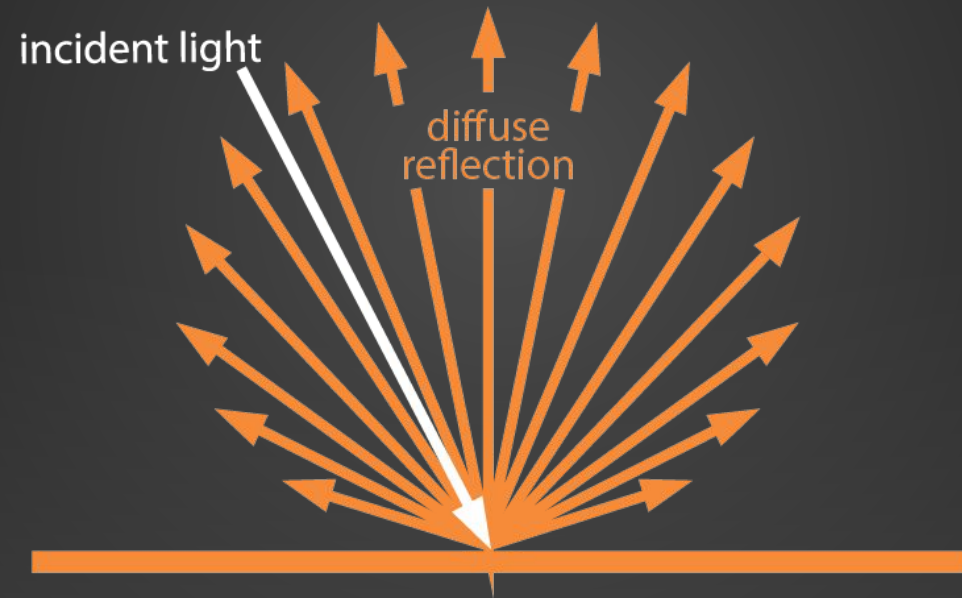




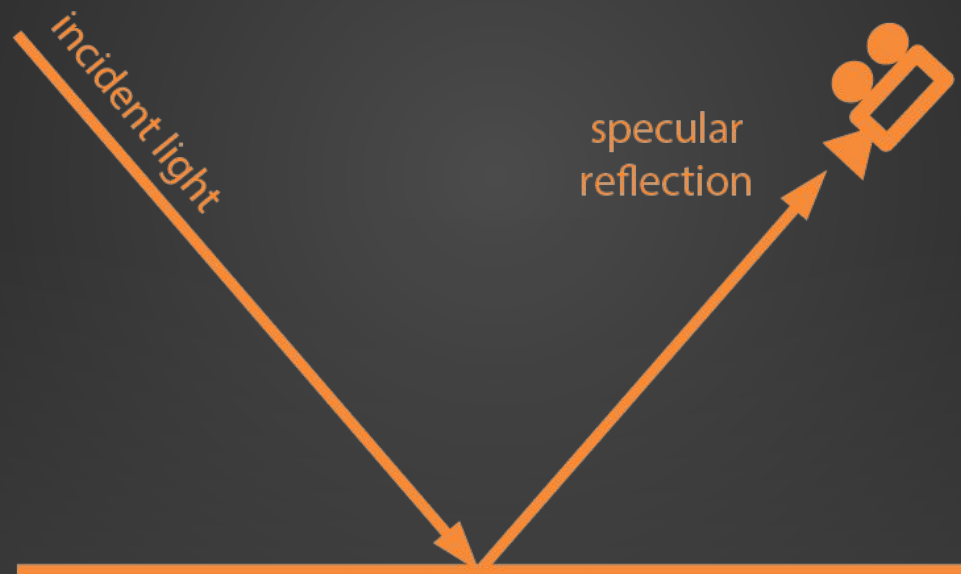
# Ambient Light



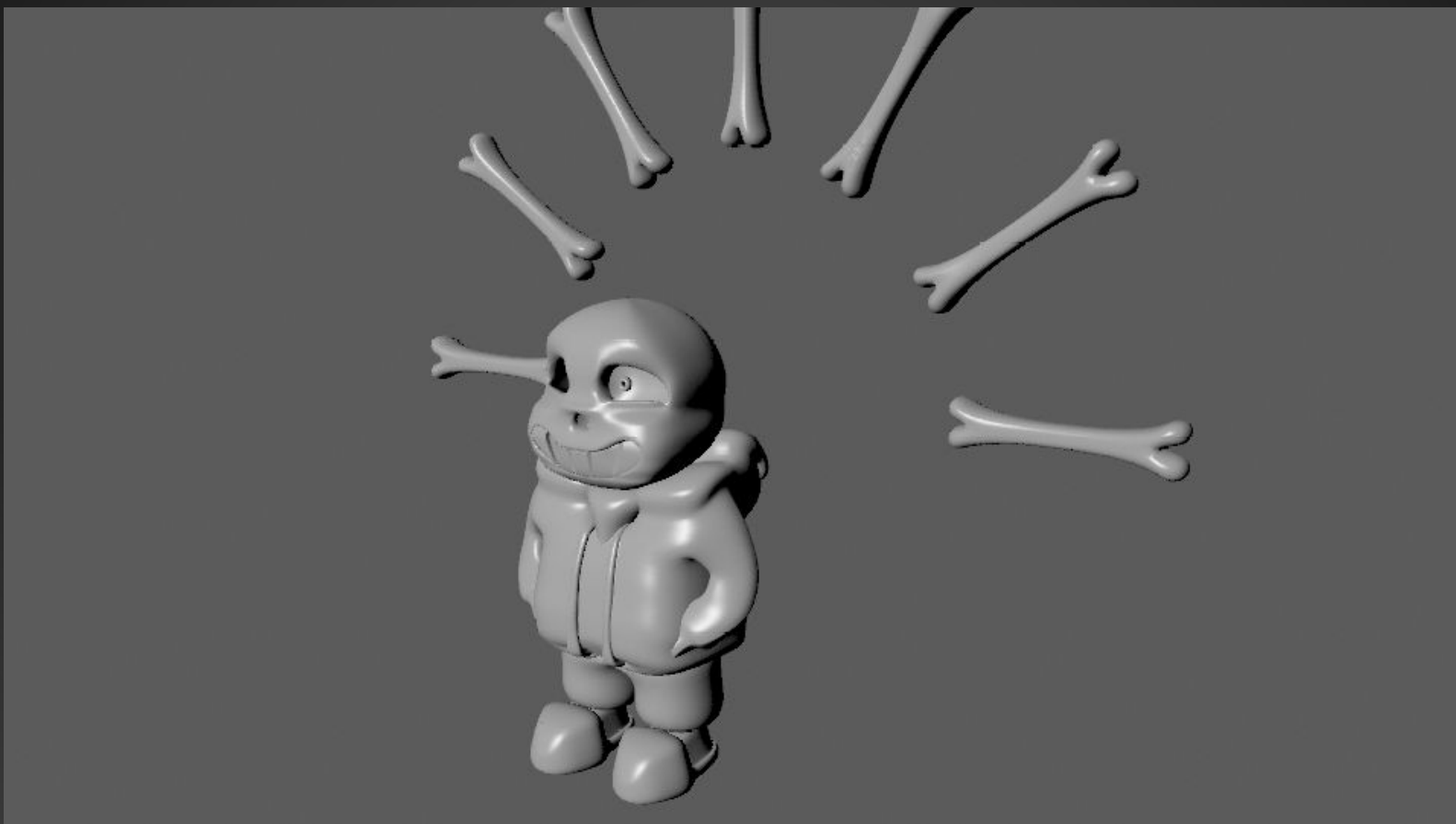
# Diffuse Reflection



# Specular Reflection



## Ambient + Diffuse + Specular

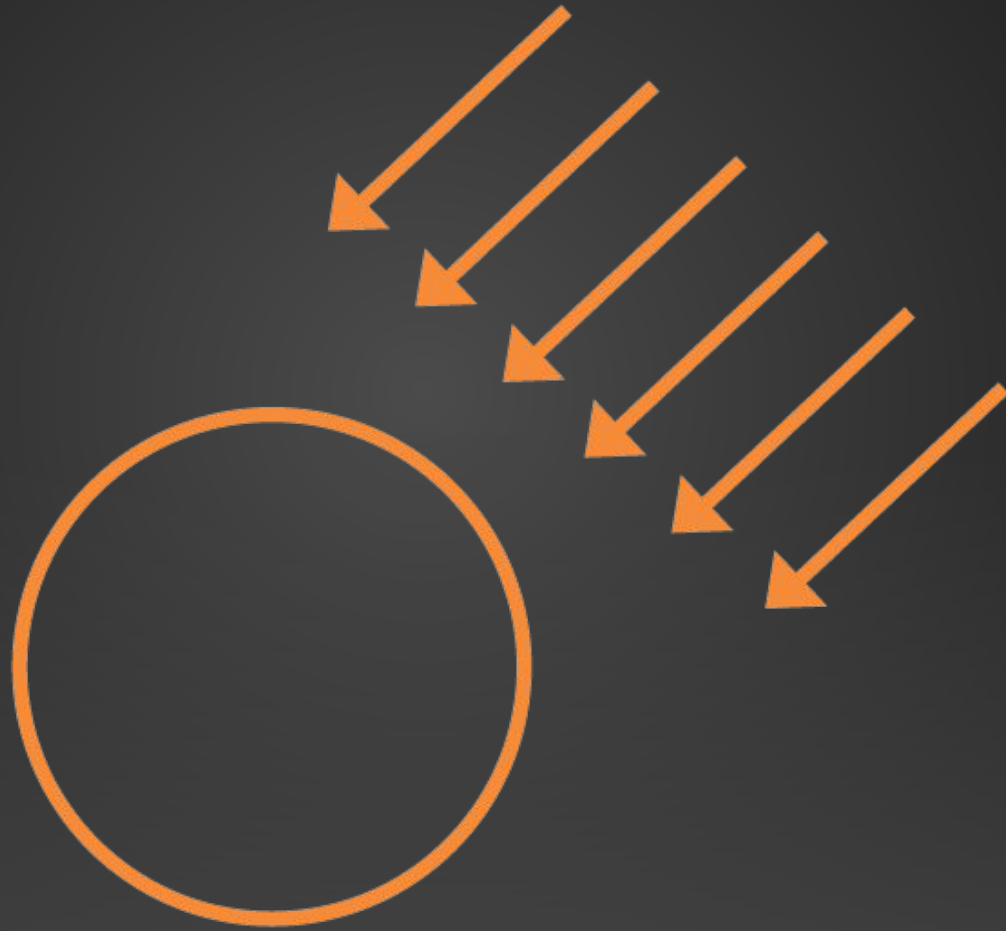




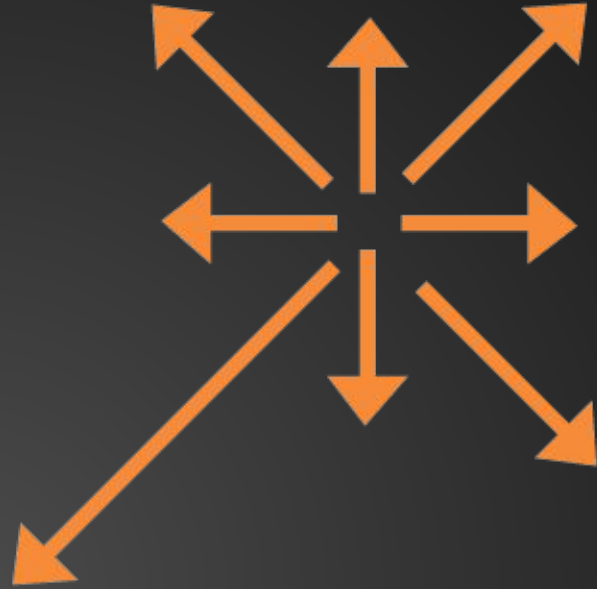
# LIGHT SOURCES IN GRAPHICS



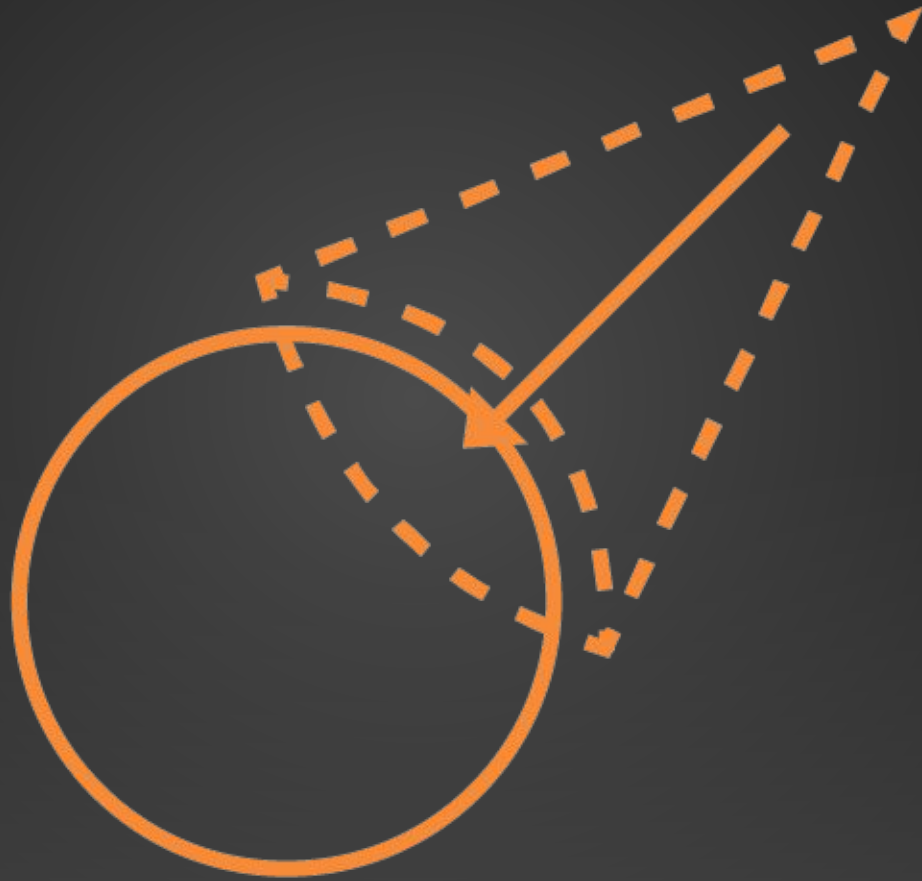
# Directional Light



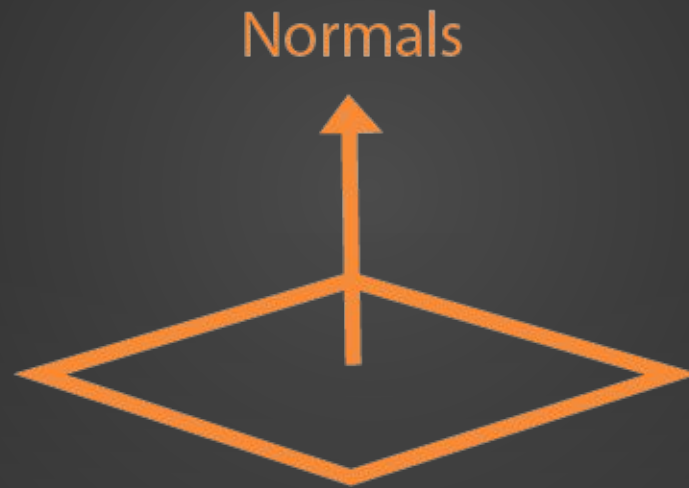
**Point Light**



# Spot Light



# NORMAL VECTORS

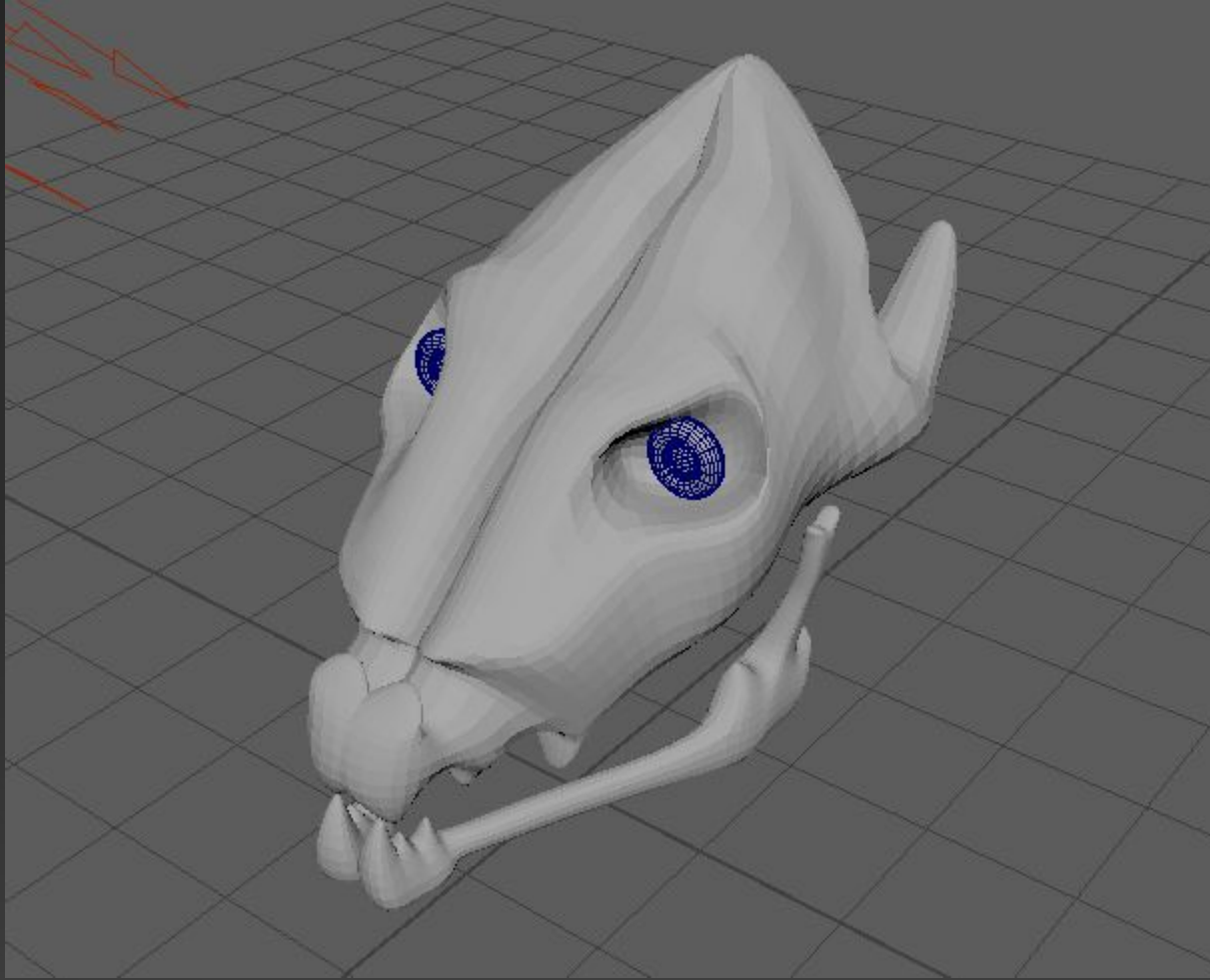




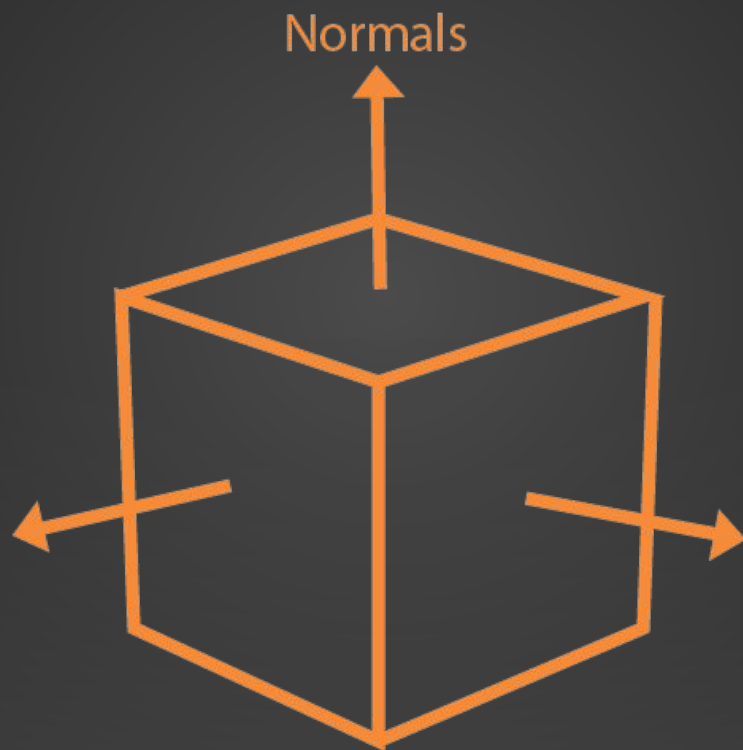
# SHADING MODELS IN GRAPHICS



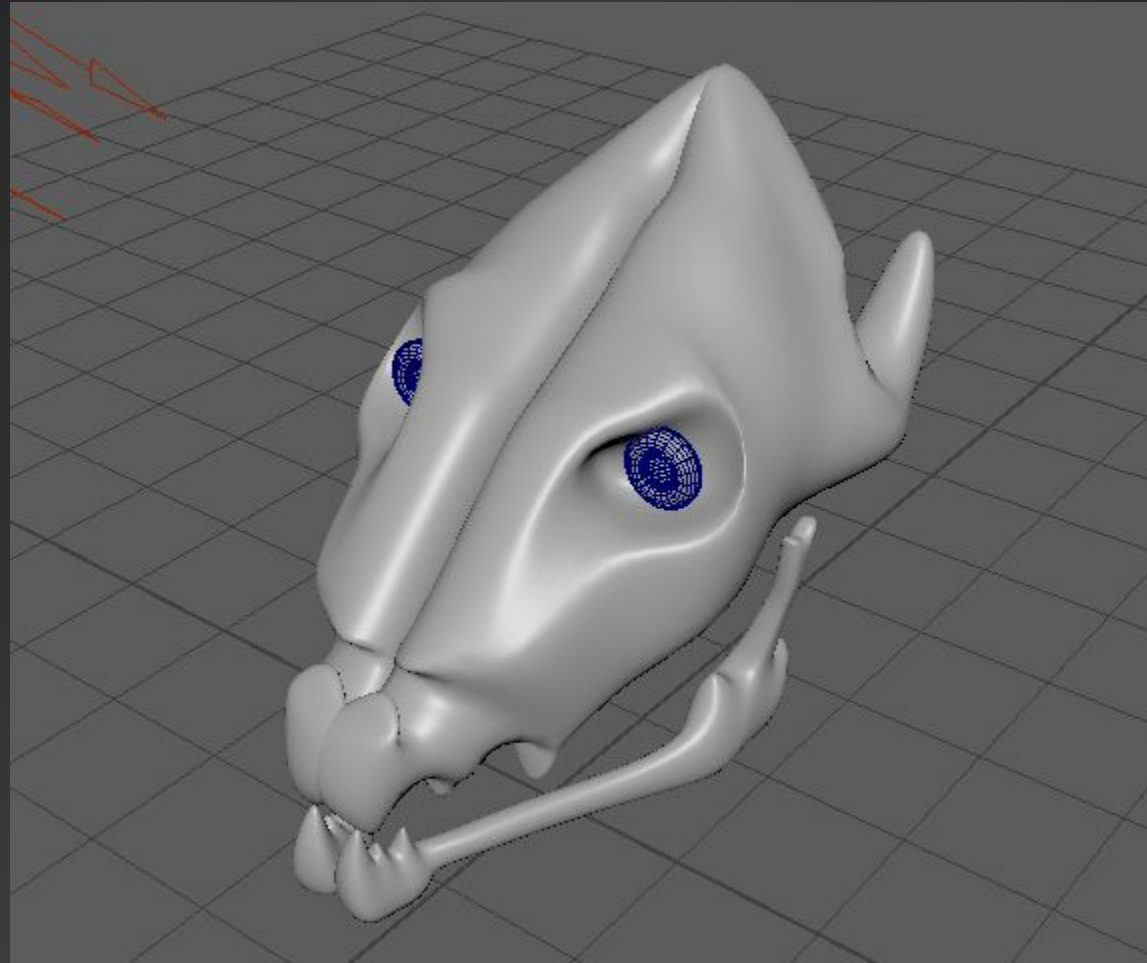
# FLAT SHADING



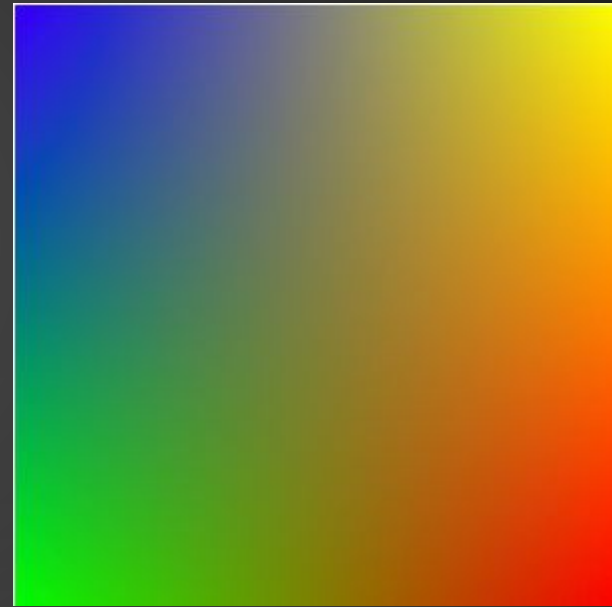
# Flat Shading



# GOURAUD SHADING

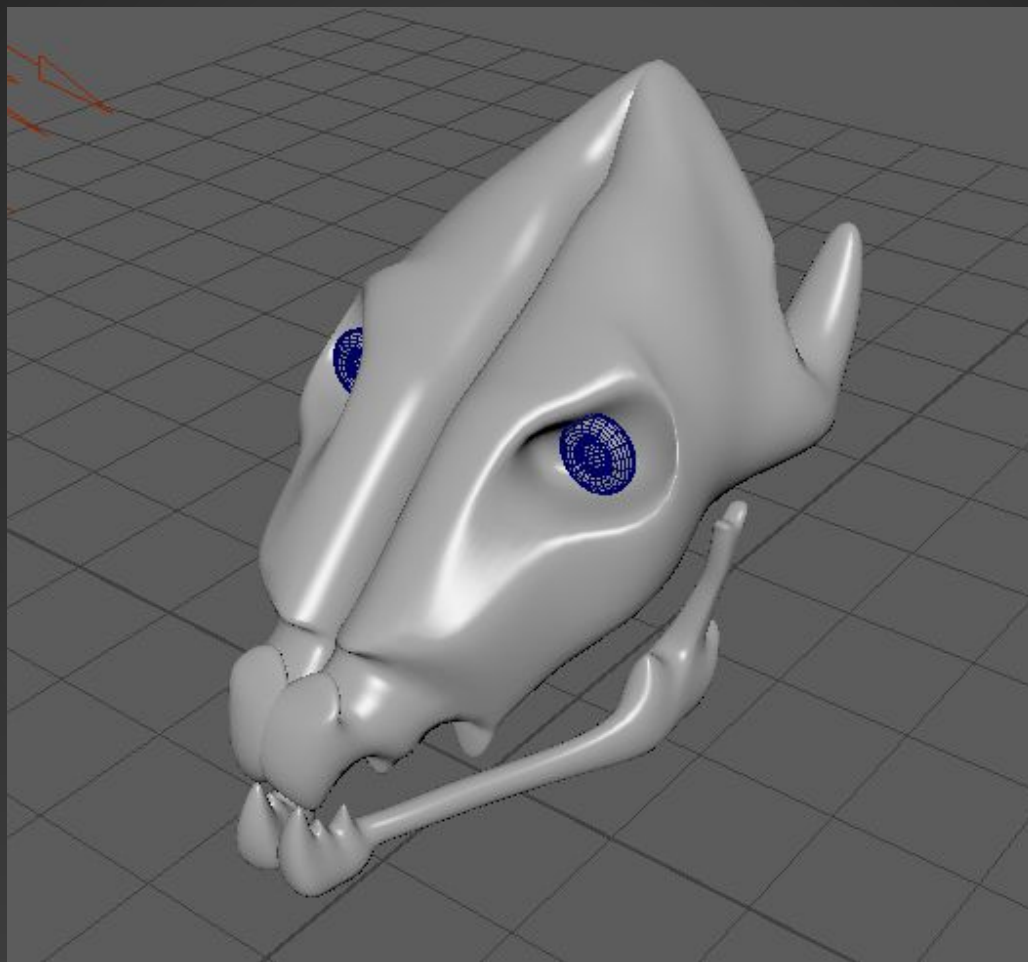


# Gouraud Shading



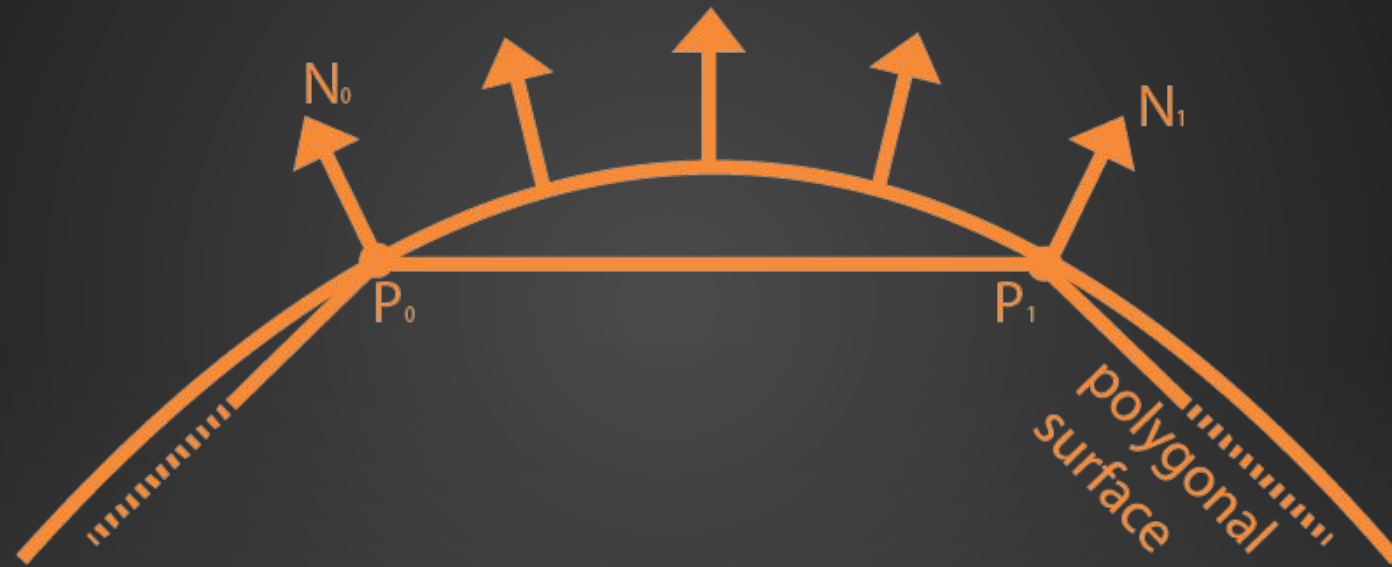


# PHONG SHADING



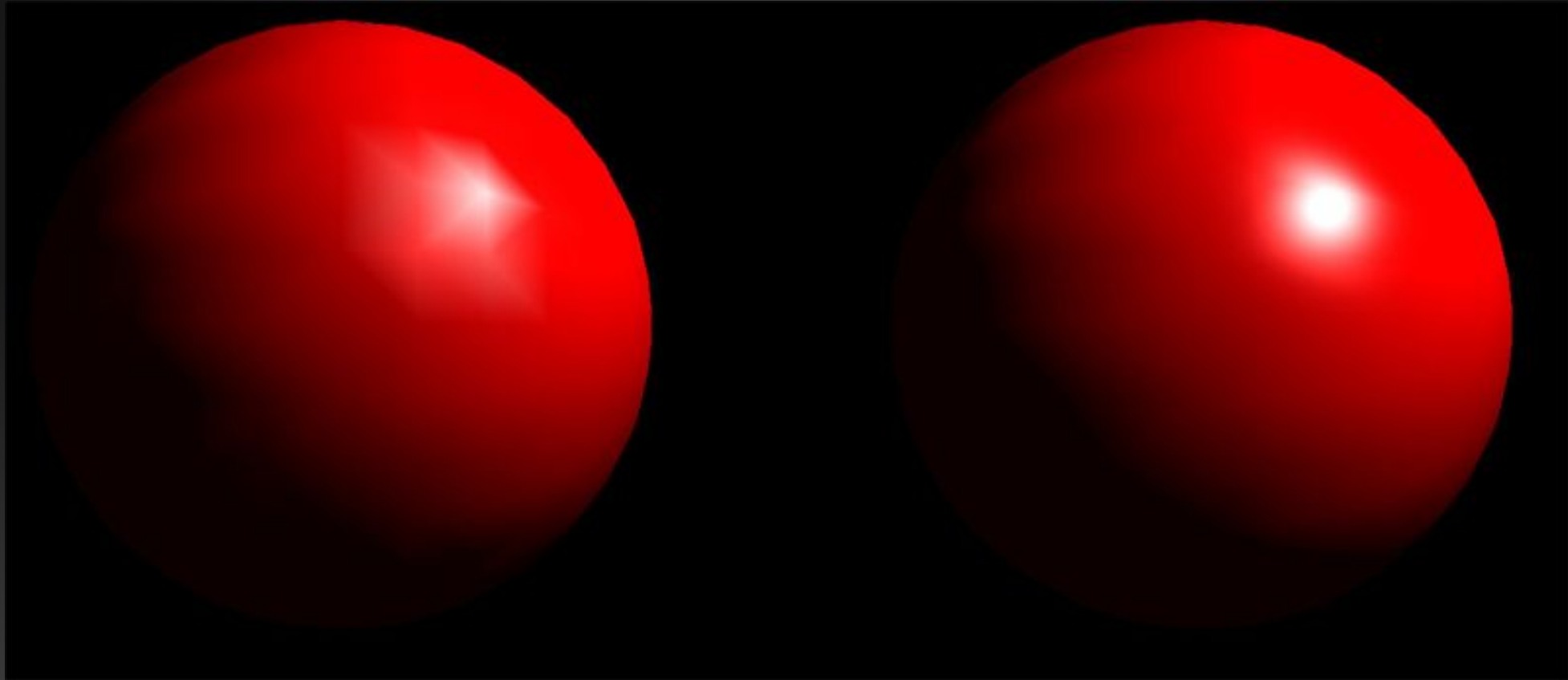
# Phong Shading

(per-pixel lighting)

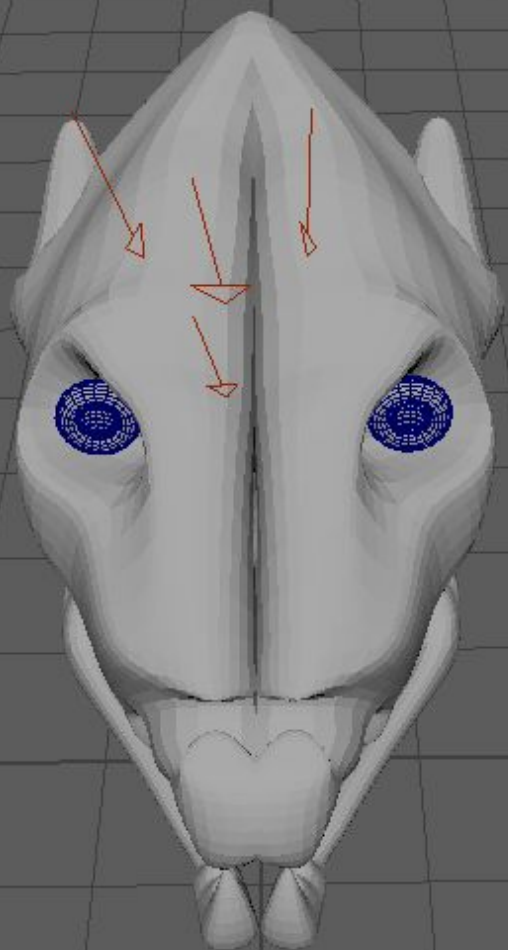


Vertex normals are interpolated across the face for each pixel

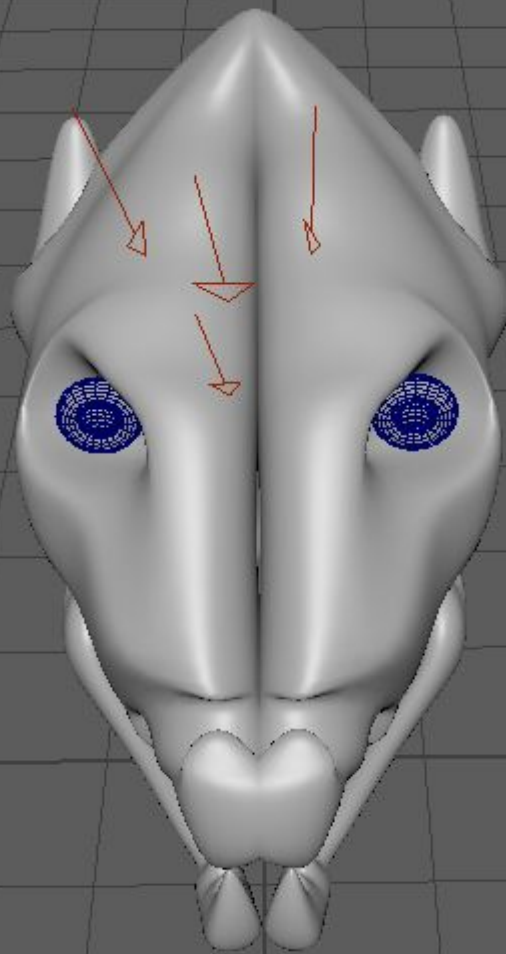
# Gouraud Vs. Phong



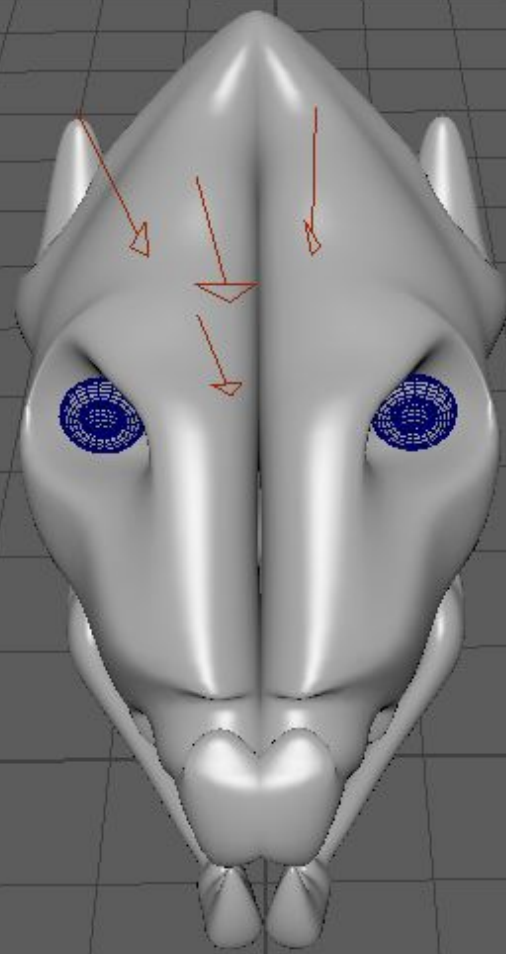
**FLAT**



**GOURAUD**



**PHONG**





# What We Covered

- Light Sources
- Lighting Models
- Shading Models





QUESTIONS?

