Computer Graphics Assignment 3

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1 Goal

- Setting up lighting for a scene
- Experimenting with lights
- Experimenting with Gouraud and Phong shading models
- Using quaternions for rotation

2 Code

2.1 Step 1

- The 4 models created in blender are imported.
- 4 spheres to represent point light are also generated and imported.

2.2 Step 2

- The models are placed at certain points and their bounding boxes are calculated.
- The bounding boxes are loosely bound. That is I have taken the maximum coordinate of x,y,z then take max of this and assume a cube of double that final length as the bounding box.
- Also I have given some buffer space over this cube space(Explained more in demo).
- The lights are initially placed at the edge of a cube 1.25 times the bounding box.
- The light source can move any where between the two bounding cubes.

2.3 Step 3

- Using 4,5,6,7 keys we can select any of the 4 models.

2.4   Step 4

- Press m to enter mesh-transformation mode

- The selected models can undergo affine transformations.

- When the selected model translates the light source corresponding to the model also translates.

- The rotation can be done using the left mouse click and is implemented using trackball and quaternions.

- Using + and - We can scale the selected mesh, but they can only be scaled if the light is within its bounding box.

2.5   Step 5

- Using the key s we can toggle between shading model of the selected mesh to Phong shading or Gouraud, Gouraud is the default.

2.6   Step 6

- Press l to enter the illuminator mode

- Now All model are locally illuminated using blinn phong.

- We can translate the light source corresponding to the selected mesh while sticking to the bounding constraint.

- We can switch off the light source corresponding to the selected mesh using key 0 and switch on using 1.

3   Questions

1.What are your observations of the distance attenuation terms used for lighting?

Ans. The attenuation terms increase or decrease the intensity. Higher the value of attenuation lower the intensity and vice versa.

2.   What are your observations about the change in the shading model?

Ans. The Phong model is better at shading the specular and diffused regions as compared to Gouraud

3.You are now able to generate different sizes of specular highlights using different settings for lighting, shading, and materials. When do you see focused sharper and smaller specular highlights, and when do you see larger ones?

Ans. When the specular reflectance exponential value, is larger, the specular highlights are focused. ANd for smaller values it is large.

4. What are your comments about your choice of mesh models for this assignment?

Ans. I have used sphere, humanid made of elongate spheres, cube and monkey. With finally implementing lighting the monkey looks much better as compared to previous assignments. The spherical objects have curvaturs which help notice the specular regions.