2014-12472 오흥연

1. Materials

With this project I tried to represent the following materials

brushed copper, silver, gold, black rubber, cyan plastic, white chalk

1.1 Brushed Copper

For it is metal, it should be good at specular reflection. Because it is brushed, diffuse light will be the second priority. For a metal to reflect ambient light to ambient direction is quite hard, which is our last priority. The shininess is rather small for a metal, since it is brushed.

AMBIENT : 0.33, 0.22, 0.22

DIFFUSE : 0.77, 0.55, 0.11

SPECULAR : 0.99, 0.94, 0.80

SHININESS : 14

1.2 Silver

Very similar approach from the brushed copper, only less diffuse and color neutral.

AMBIENT : 0.3, 0.3, 0.3

DIFFUSE : 0.42, 0.42, 0.42

SPECULAR : 0.98, 0.98, 0.98

SHININESS : 100

1.3 Gold

Again, similar to silver. Though personally gold looks less shiny, so general decrease for all coefficients. Also it must have a preference for yellow light.

AMBIENT : 0.12, 0.12, 0.06

DIFFUSE : 0.36, 0.24, 0.04

SPECULAR : 0.80, 0.72, 0.20

SHININESS : 93

1.4 Black Rubber

Rubber consists of big molecules, so it would have a large spectrum of light it may absorb. So weak ambient light should mostly be absorbed. Rubber is usually made under high pressure, so its surface should be somewhat smooth. So specular terms are not negligible.

AMBIENT : 0, 0, 0

DIFFUSE : 0.01, 0.01, 0.01

SPECULAR : 0.5, 0.5, 0.5

SHININESS : 32

1.5 Cyan Plastic

Similar approach from rubber, only thinking plastic should be less shiny and diffuse more.

AMBIENT : 0, 0.05, 0.05

DIFFUSE : 0.4, 0.5, 0.5

SPECULAR : 0.04, 0.7, 0.7

SHININESS : 10

1.6 White Chalk

Chalk should have numerous holes, which makes light from all direction reflect to all direction. So high coefficients for ambient light.

AMBIENT : 0.28, 0.28, 0.28

DIFFUSE : 0.2, 0.2, 0.2

SPECULAR : 0.2, 0.2, 0.2

SHININESS : 4

2. Lights

A total of 4 lights are used, all lights are default types.

Light 0 : Ambient white light. Like ordinary fluorescent light. From above.

Light 1 : Specular yellow light. Some what like halogen light. From right.

Light 2 : Ambient cyan light. From behind.

Light 3 : Diffuse red light. Some what like RF heat sources. From left, behind, below.

3. Ordering

The scene only contains transparent cubes, and they never intersect. Because cubes are convex, it’s easy to order them. All I did was draw the opaque objects first, draw cubes in order of distance. Cubes can determine their back surfaces using the dot product of each surface’s normal and the vector of camera’s view. The distance of the cube can be calculated by using the dot product of the camera’s position and the cube’s position.

4. Setup and Controls

Setup using the following command

. ./setup.sh

as before, it needs virtualenv and pip.

To run the code use the below command

python viewer.py models/jellyfish.txt

To control the camera, left-click drag to rotate, right-click drag to translate, scroll to dolly, up, down keys to zoom, home key to return to initial state