

CS 355 Homework #8:

Lighting

For this homework, suppose that a point on the surface of an object lit by a single light:

- surface normal $\mathbf{n} = [1, 1, -1]^T / \sqrt{3} \approx [0.58, 0.58, -0.58]^T$
- lighting coming from the direction $\mathbf{l} = [2, 3, -1]^T / \sqrt{14} \approx [0.53, 0.80, -0.27]$
- direct light strength (coloring) $\mathbf{s} = 0.9 [1.0, 1.0, 0.8]^T$
(this is slightly yellowish, like an incandescent bulb)
- ambient light strength (coloring) $\mathbf{s}_{\text{amb}} = 0.1 [1.0, 1.0, 0.8]^T$
(like the direct lighting but weaker)
- viewing direction $\mathbf{v} = [0, 0, -1]$
- surface diffuse reflectance coefficients $\mathbf{m}_{\text{diff}} = [0.1, 0.2, 0.5]^T$
(a slightly greenish blue diffuse coloring)
- surface specular reflectance coefficients $\mathbf{m}_{\text{spec}} = [0.5, 0.5, 0.5]^T$
(reflects half the incoming light, no change of lighting color)
- surface specular glossy exponent $\mathbf{m}_{\text{gls}} = 4$
- surface ambient reflectance equal to the diffuse reflectance $\mathbf{m}_{\text{amb}} = \mathbf{m}_{\text{diff}}$

1. What is the RGB triplet for the direct lighting reflected diffusely at that point on the surface?
(In the slides this is \mathbf{c}_{diff} .)

2. What is the RGB triplet for the specular reflection off that point on the surface?
(In the slides this is \mathbf{c}_{spec} .)

3. What is the RGB triplet for the ambient lighting reflected off that point on the surface?
(In the slides this is \mathbf{c}_{amb} .)

4. What is the RGB triplet for the total light reflected off that point on the surface?