

CMSC 435/634: Problem Set 4
Due April 23, 2012 (at beginning of class)

Consider a scene to be rendered. The view is specified by eye point \mathbf{e} at $(10,5,-10)$, the vector $\mathbf{v}=(0,1,0)$ points up, and center of attention $\mathbf{a}=(-1,-1,14)$. There is a point light source at $(10, 7, -10)$ with intensity 1.0 and ambient light with intensity of 0.1. The scene contains a sphere of radius 1 centered at $(-2,-1,14)$, as well as other objects. This sphere has color $(.75, .4, .1)$. Consider the illumination calculations for the intersection point at $\mathbf{p}=(-1, -1, 14)$. Assume $k_a = k_d = 0.5$, $k_s = 0.3$, and $k_e = 16$.

1. Calculate the local illumination at this point. Show all the steps and relevant equations.
2. Calculate the reflection ray at this point. Show your intermediate steps and calculations.
3. Explain how you would use the information above to calculate an artistic illumination model that drew lines along object silhouettes.