CGIP

2001 p6q4 P13q4 NAD
solution notes

(a) Store both colour & depth at each pixel.

Initialise all ~~colours to~~ pixels to the background colour & maximum depth,

Process each polygon in turn.

Using the standard 2D polygon scan conversion algorithm we process each pixel as follows:

calculate a depth value (remember to interpolate $\frac{1}{z}$ & not z)

if it is ~~greater~~ closer than the current depth value for that pixel then store the depth & colour
otherwise do nothing.

That's it.

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(b) $\sum_i I_i k_d (L_i \cdot N)$ is trying to model diffuse (Lambertian) reflection & is accurate for perfect Lambertian reflectors

$\sum_i I_i k_s (R_i \cdot V)^n$ is trying to model specular reflection, it is an ~~coarse~~ approximation but performs reasonably well.

$I_a k_a$ is trying to model all of the interreflections between objects & is a gross approximation.

I is the calculated illumination at the point in question
I_a is the "ambient illumination" — a fiddle factor
i loops over all lights in the scene
I_i is the intensity of light i AT THE POINT IN QUESTION
k_a is the ambient reflection co-efficient of the object
k_d " " diffuse " " " "
k_s " " specular " " " "
L_i is a unit vector pointing at light i from the point in question
N is a unit normal vector from the object at " " "
R_i is a unit vector pointing in the direction that light from light i would be reflected at the point in question
V is a unit vector pointing from the ~~[illegible]~~ " " " to the camera
n is Phong's "specular co-efficient" which determines the ~~[illegible]~~ spread of the specular reflection