Computer Graphics: Assignment 02

Lina Gundelwein, Letitia Parcalabescu, Anushalakshmi Manila

November 6, 2016

1 Preprocessor

With the definition `#define SQUARE(a) a*a` g and h return wrong results, because the macro only does the textual replacement and thus you end up with:

$$g(1) = 1 - 1 * 1 - 1 = -1$$
$$g(2) = 1 - 2 * 1 - 2 = -3$$
$$...$$
$$h(1) = 1./1 * 1 = 1$$
$$h(2) = 1./2 * 2 = 1$$
$$...$$

2 Pointers, Arrays, and All the Rest

The matrix parameter requires a double pointer because it is a pointer to an array and an array is referenced by a pointer. $\rightarrow$ thus a double pointer is needed

3 Output Devices

Generating the whole array may take $T = \frac{1}{50Hz} = 0.02\,s$. Generating one pixel may thus take $T_p = \frac{1}{1000 \cdot 1000 \cdot 50 Hz} = 2 \times 10^{-8}\,s$.

4 Lighting Models

- ambient: The general brightness of the scene, intensity value will be added to each pixel
  diffuse: Light reflection such that an incident ray is reflected at many angles following the lambertian emission law. The surface will have the same radiance from all angles.
  specular: Light reflection such that the angle of incidence roughly equals the angle of reflection

- The exponent describes the decay of reflectivity when differing from the main reflection direction $R = 2N(NL) - L$. A high exponent leads to a mirror-like reflection while a low exponent leads to a rough looking surface.

- To get an intensity gradient, one interpolates between the face normals. To preserve sharp edges, multiple face normals are stored per vertex.