7M836 – Animation and Rendering

Exercise 6a: Ambient light and area light sources

In this exercise
- acquaint you with the effects of ambient lighting,
- familiarize you with area lights.

Background information in the on-line documentation:
- *3.7 The Light Source*
- *6.5.7 Light Sources*

Open the files ch8/corner.pov and ch8/mug.inc. Make the file corner.pov the active file.

The first activity involves changing the ambient settings in the scene. In POV-Ray the ambient light level is specified in the finish statement. Searching through a file to find and change every ambient value can be tedious and time consuming. Fortunately, there is a better way. Inspect the contents of corner.pov and find the following statement:

```
#declare ambient_light_level = 0.0;
```

This is an example of the *declare* statement, which associates a value with a name. In this case ambient_light_level has a value of 0.0. Now look for a finish statement in corner.pov. You will notice that they all look similar to this:

```
finish {diffuse 0.6 ambient ambient_light_level}
```

POV_Ray substitutes the value 0.0 for any occurrence of the name ambient_light_level before rendering the scene.
Render the scene. Note the black shadows.

At present there is no ambient light in the scene, which makes it look very dark. To add ambient light, all you have to do is to change the value of ambient_light_level. Adjust its value until your image looks similar to the next image. Which ambient level did you use? What happened to the color of the shadows? Try to explain.

In your last image, the shadow from the mug has knife-sharp edges. To create soft shadows, you can use an area light. Convert the light source into an area light that is 3 units long in x and 3 units long in z-direction. Experiment with the statement (the number of rays, the adaptive sampling, and jitter) until you create an image that is similar to the image below.

What is the light source statement you used? How many rays did you have to shoot to get nice soft shadows?

Exercise 6b: Radiosity

This exercise
* shows the effects of radiosity.

We can add indirect illumination with the radiosity method. POV-Ray has integrated the radiosity computations within the ray tracer. Radiosity within POV-Ray is experimental, and the way indirect illumination is computed might change in future versions. Therefore, we only want to show the effects of radiosity.
Remember that ambient light was an inaccurate replacement for indirect illumination. Therefore, set ambient light to zero. Add the following statement to corner.pov (including the area light source from exercise 5a) to enable radiosity:

```
global_settings {
    radiosity {
        // use default values
    }
}
```

Render the scene. The effect that the colors of the wall are visible on floor and mug is called color bleeding. Color bleeding is a typical radiosity effect. What you can also see is that the brightness of the image is much larger than without radiosity. The contribution of indirect illumination on the overall illumination of a (closed) scene is considerable. The intensity of the light sources in your scene can be lower, than when radiosity is not used. Adjust the intensity of your light source and re-render the scene until the resulting images resembles the image below. What is the intensity of the light source?