LAB 6: GLOBAL ILLUMINATION

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LAB TASK

1. Reflection in POV-Ray: use the *reflection* parameter in the finish statement to generate photorealistic reflective surfaces (as in the scene below)

2. Refraction in POV-Ray: use the *interior* definition and *ior* values to generate photorealistic refraction (not shown here – make your own scene)

3. Combine a bump map/normal map with global illumination (not shown here)
ALSO TRY (OPTIONAL)

1. Environment Map (sky_sphere)
2. Transmissive objects with caustics
3. Depth of Field
4. Area Light Source
POVray has a built-in `sky_sphere` object for a spherical sky environment map.

```plaintext
sky_sphere
{
    pigment
    {
        agate
turbulence .3
        color_map
        {
            [0.0 rgb <0, 0, 1>]
            [1.0 rgb <.7, .6, 1>]
        }
    }
}
```

Can use any pigment / pattern

- Blue and white colours with agate or bozo pattern work well for skies

Some readymade patterns provided in `skies.inc`

```
#include "skies.inc"
sky_sphere
{
    pigment
    {
        P_Cloud4
    }
}
```

TRANSMISSIVE OBJECTS

pigment
{
  rgbf <1, 1, 1, .8>
}

interior
{
  ior 3
  caustics 1
}

Use rgbf or rgbt to specify transparency. The last number defines how transparent an object is.

The interior modifier sets up parameters for refraction.

ior sets the index of refraction i.e. how much light bends on refraction: e.g. air-to-glass is \(~1.6\), air to water is \(~1.3\).

The caustics keyboard enables focused light. The value affects the strength of the caustic and should be between 0 and 1.

For details: http://www.povray.org/documentation/view/3.6.1/414/
DEPTH OF FIELD

N.B. This will increase rendering time

camera
{
    location <3, 3, -5>
    look_at <0, 0, 0>
    aperture 0.3
    blur_samples 50
    focal_point <0.5,0,-4>
}

For details: http://www.povray.org/documentation/view/3.6.1/248/

- Between 0 and 1: affects how big the sharply focussed region is. High numbers mean more blurry regions.
- Overall quality of blurring ~ bigger numbers are better but slower.
- This point will be in sharp focus with increased blurring away from it.
AREA LIGHT SOURCE

N.B. This will increase rendering time

light_source
{
  <10, 7, -5>
  color <1, 1, 1>
  area_light
    <1,0,0><0,1,0>,
    4, 4
}

Axes of rectangle: determines angle and orientation

Samples across: effectively lots of regularly spaced point lights repeated this many times along the rectangle