More on Texturing

Box mapping

POV-Ray

```plaintext
texture {
  pigment {
    uv_mapping
    image_map {
      sys "SomeImage.bmp"
    }
  }
}
```
sphere {
    2*y, 1
    pigment { color rgb <1, 1, 1> }
    finish { ambient 0.2 diffuse 0 reflection 0.6 }
}
sky_sphere {
    pigment {
        gradient y
        color_map {
            [0 color Red]
            [1 color Blue]
        }
        scale 2
        translate -1
    }
}
Patterns

- Marble
- Wood
- Onion
- Spiral
- Radial
- Crackle
- Mandel
- Cell
- Leopard
- Bozo

for reference: gradient
Modifying patterns

- Translate, rotate, scale
- Frequency and phase
- Waveforms
- Random noise
Waveforms: Sine Wave

Waveforms: Triangle Wave

Other Waveforms
  - Cubic Wave
  - Poly Wave (poly_wave 3)
Noise

- Can't just call rand()
- Controllable
  - Repeatable
  - Create patterns
What's noise (.5,0)?
What's noise (.5,1)?

What's noise (.5,.5)?
Noise

- Frequency
- Amplitude
- Number of terms
Color vertex P as follows:
- take random walk starting at P: ends at Q
- use color of Q to color P

**Influences on Random Walk**
- **Lambda:** change of direction in each step
  - 1: straight path, 2: lots of changes
- **Omega:** factor by which each step gets shorter
- **Octaves:** Number of steps
Creating noise in POV

- Turbulence amount
  - turbulence 0
  - turbulence 1
  - turbulence <0,1,0.5>
- Turbulence parameters
  - Octaves -- 6
  - Lambda -- .5
  - Omega -- 2
Turbulence

Use with
- any previous pattern
- Image Maps!

\[
\begin{align*}
\text{turbulence 1} \\
\text{versus} \\
\text{warp \{turbulence 1\}}
\end{align*}
\]

Octaves affect turbulence

- Second row has constant turbulence, decreasing octaves
With turbulence presets

- Granite
  - 1/f noise
- Agate
  - Banding like marble
  - Different turbulence function

granite
Layers

Object (myobject ...
    texture [T1] // lowest layer
    texture [T2]
)

#declare PinkAlabaster =
// Underlying surface is very subtly mottled with bozo
texture {
    pigment {
        bozo
turbulence 0.25
color_map {
            [0 rgb <0.9, 0.75, 0.75>]
            [1 rgb <0.6, 0.6, 0.6>]
        }
scale 0.4
    }
texture {
    pigment {
        granite
color_map {
            [0 rgb <0.52, 0.39, 0.39, 1.0>]
            [0.9 rgb <0.52, 0.39, 0.39, 0.5>]
            [0.9 rgb <0.42, 0.14, 0.55, 0.0>]
        }
scale 2
    }
}
Even if they aren't transparent..
For pigment types, we’ve had

- Color
- Image maps
- Color list patterns
- Color mapped patterns
What we did with colors

- We can also do with texture
- Use a pigment map

```plaintext
pigment {
    gradient y
    pigment_map {
        [0.1  Tan_Wood]
        [0.3  Tan_Wood]
        [0.3  Jade]
        [0.6  Jade]
        [0.6  marble turbulence 1]
        [0.8  marble turbulence 1]
        [0.8  color rgb <.7, 0., .7>]
        [0.99 color rgb <.7, 0., .7>]
    }
}
```
Material Map

- Instead of color
- Instead of pigment
- Use entire texture
- Controlled by an image

Flowers.gif
texture {
    material_map {
        gif "flowers.gif"
        map_type 2
        once

        /* Now a list of textures instead of colors */

        texture {
            pigment {rgb <.9, .9, 1>}
            finish {ambient .05 diffuse .3
                     reflection 0.6 specular 0.6}
        }
        texture {
            pigment {color red 0.3 green 0.1 blue 1}
            normal (ripples 0.85 frequency 20 )
            finish (specular 0.75)
        }
    } // Last texture in material map
} // end material_map
} // end texture

texture {Brushed_Aluminum }

texture {
    pigment {rgb <.9, .9, 1>}
    finish {ambient .05 diffuse .3
            reflection 0.6 specular 0.6}
} // Last texture in material map
} // end texture
Materials for you

- textures.inc
- woods.inc
- stones1.inc
- stones2.inc
- metals.inc