reflection and color compositing

Wednesday, November 03, 2010
9:01 AM

```
#define MAX_DIST 100
void ray_trace( model_t&    model,
                vec_t&      pos,
                vec_t&      dir,
                rgb_t<double>& color,
                double      raydist,
                object_t    *(last_hit))
→ if( !(obj = model.find_closest(...)) || raydist > MAX_DIST)
      return;
  ; // implement the phong illum. model
```

ray_trace fills this in

```
light_t   *lgt = NULL; //ptr. to light
vec_t     L, N;
vec_t     V, R;
rgb_t<double> I_d, I_s;
double    r, nDotl = 0.0, n = 32.0;
```

set to each light in scene, in turn (loop)

I_d: diffuse color component

I_s: specular color component

hints regarding local vars that you may need

w' ;

double r, nDotl = 0.0, n = 32.0;

↑ dot. to light

↑ so that I don't have to calculate N.dot(L) multiple times

↑ in specular component, shininess (exponent in $(R\cdot V)^n$)

}

; //for each light
// calculate color

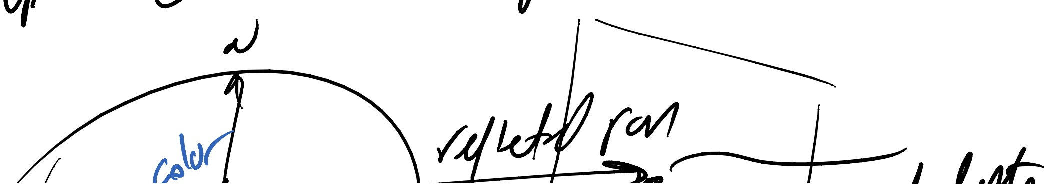
}

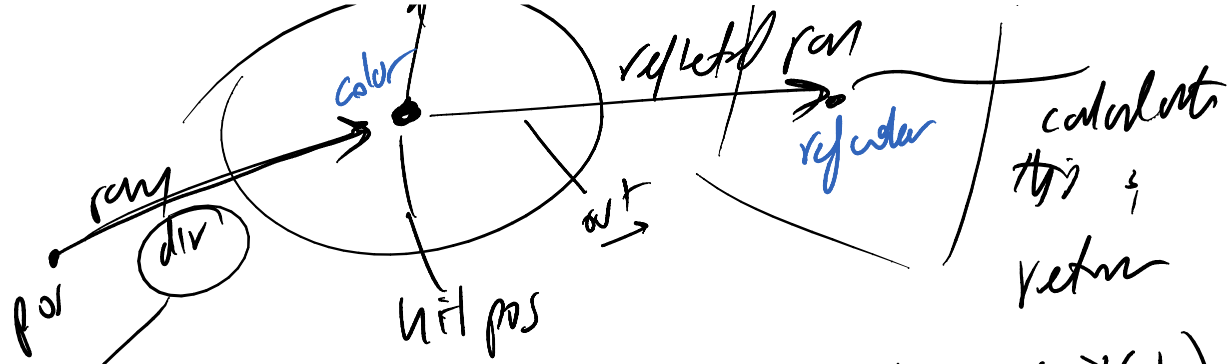
// clamp color — min — max

color.clamp(0.0, 1.0);

this color clamps itself

// after all that, reflect ray,
// compute color at reflected surface





vec_t hitpos(obj->get_last_hit());

↑ calls vec_t copy constructor

vec_t out;

out = dir.reflect(N); — N: calculated above in ray intersection

↳ 2(dir.N)N − dir

out = (dir.reflect(N)).norm();

recursive call to ray_trace !! — ray_trace(model, hitpos, out, refcolor, raydist, obj)

refcolor: vec_t<double> filled in by ray_trace

raydist ← this ray dist.

obj ← object currently intersecting

MUST HAVE THIS IMPLEMENTED: operator*(double, const vec_t<T>&);

overload

color = .5 * color + .5 * rfcolor; }}

rsh_t<double>

templated operators!!

simple way to

another variant;

color = (1.0 - specular) * color + specular * rfcolor;

Composite colors (combine or blend)

assuming 0 < specular < 1

in general,

color = (1-t) color + (t) rfcolor;

linear interpolation

// mostly surface (if spec. small)
// (1-specular) * color + (specular) * rfcolor

// mostly reflection
// (1- specular) * rfcolor + (specular) * color