Raytracer 1

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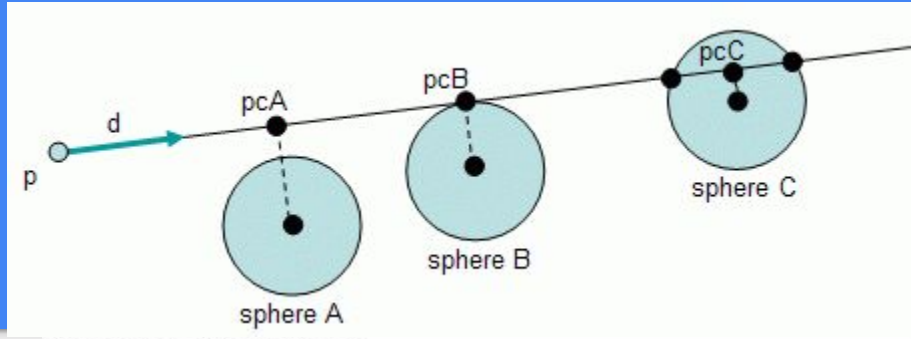
Sphere Intersection

- 0, 1 or 2 intersections
- Pythagoras
- ABC-formula for intersections
- Z = depth from Origin
- Normal: O + (D *t) - C



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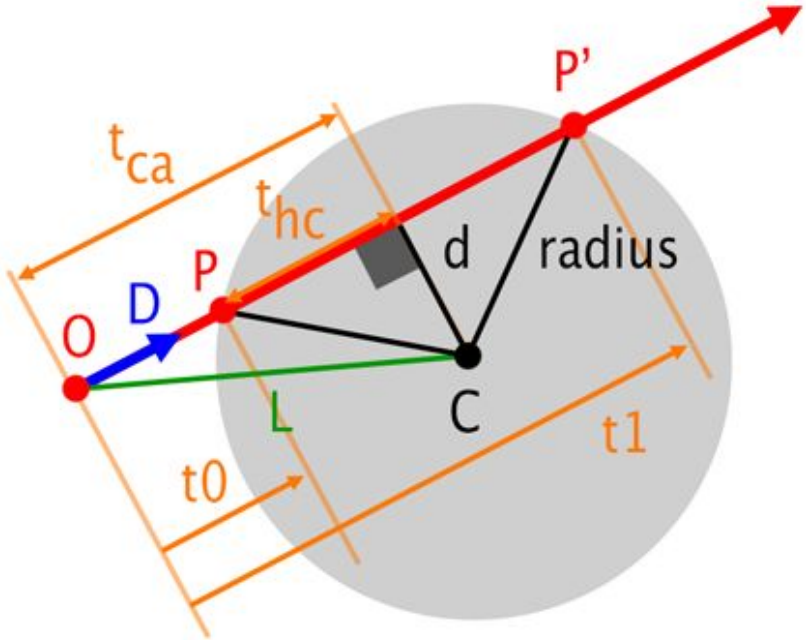
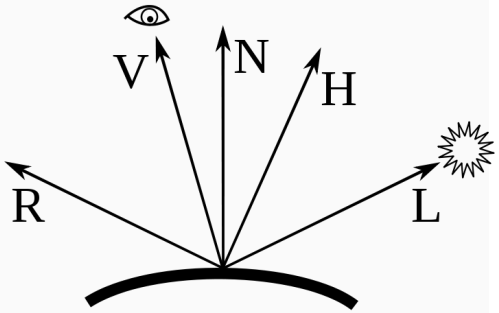
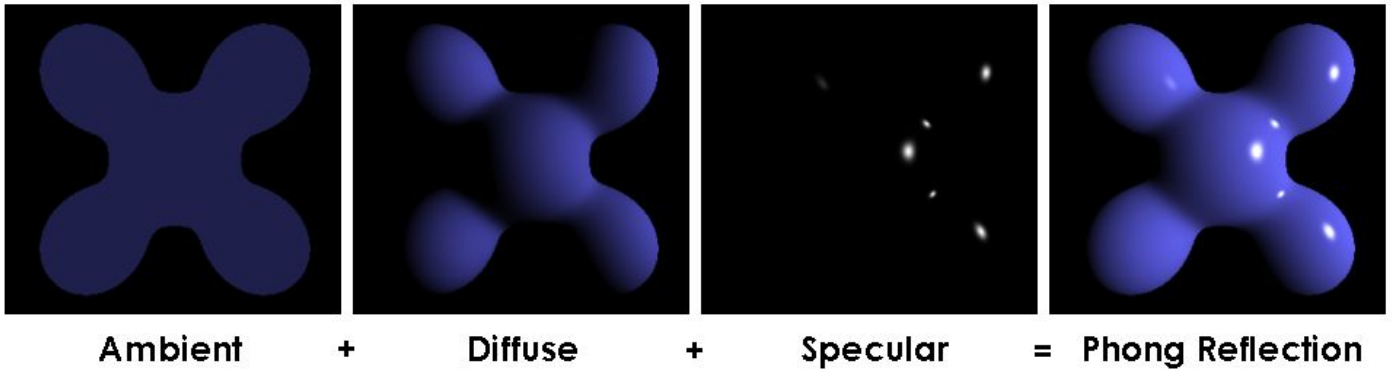


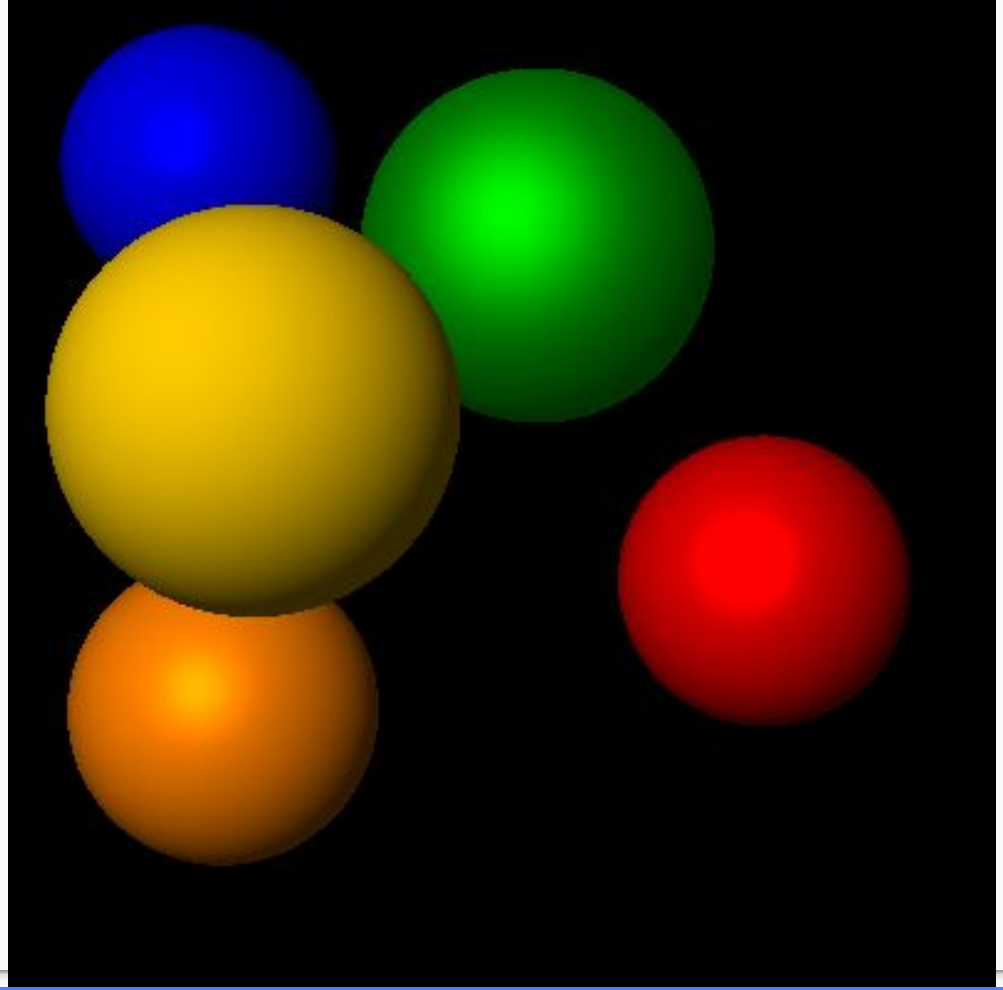
Phong shading

Combine Ambient, Diffuse, Specular and multiply by color of material.



$$I = I_a k_a + I_i(k_d(L \cdot N) + k_s(R \cdot V)^n)$$

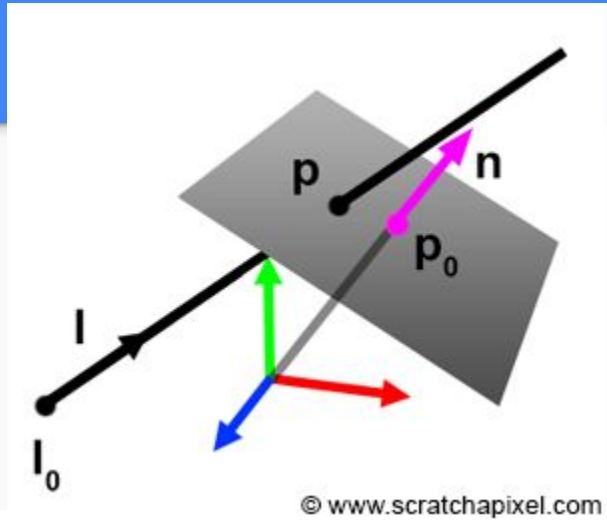




scene01 phong shading

Plane Intersection

- 4 Points (also uses min and max positions)
- Normal: AB x AC (crosspoduct)
- if N · D > epsilon ⇒ no hit

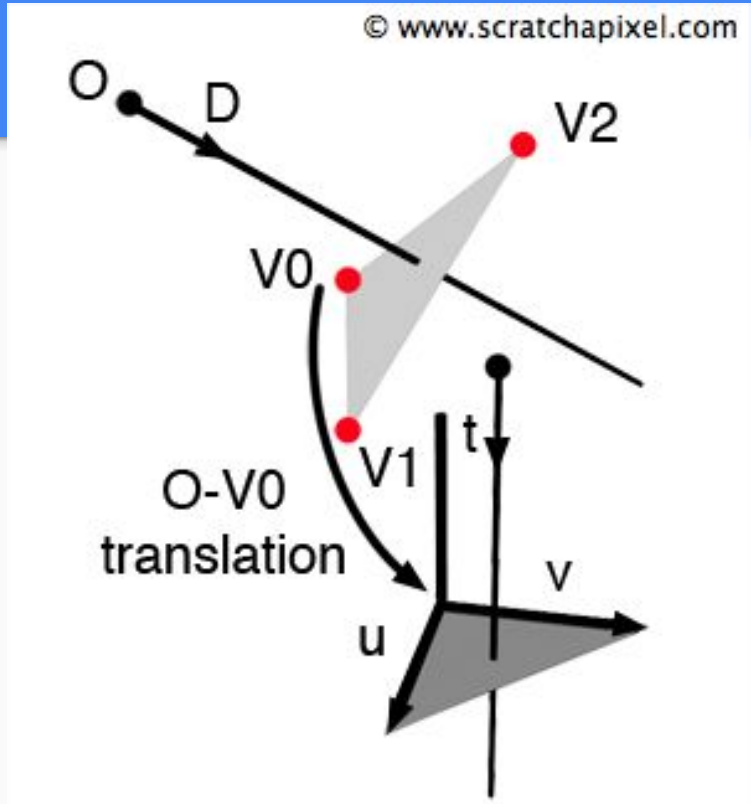


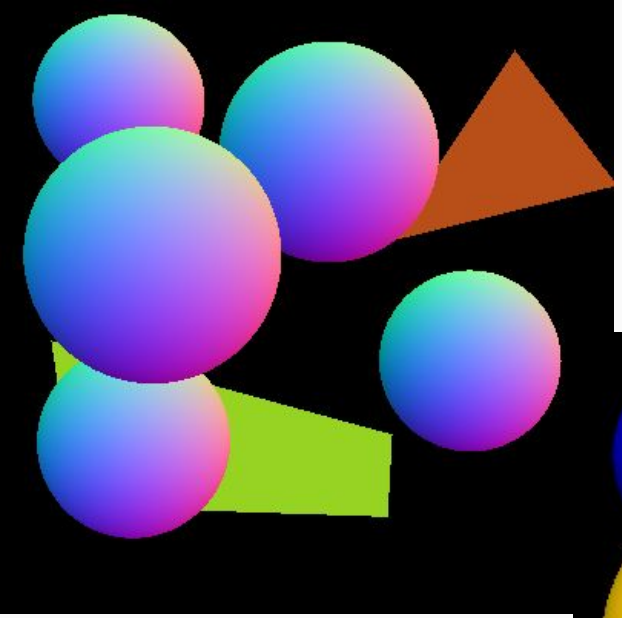
$$l * t \cdot n + (l_0 - p_o) \cdot n = 0$$

$$t = -\frac{(l_0 - p_0) \cdot n}{l \cdot n} = \frac{(p_0 - l_0) \cdot n}{l \cdot n}$$

Triangle Intersection (Möller–Trumbore intersection algorithm)

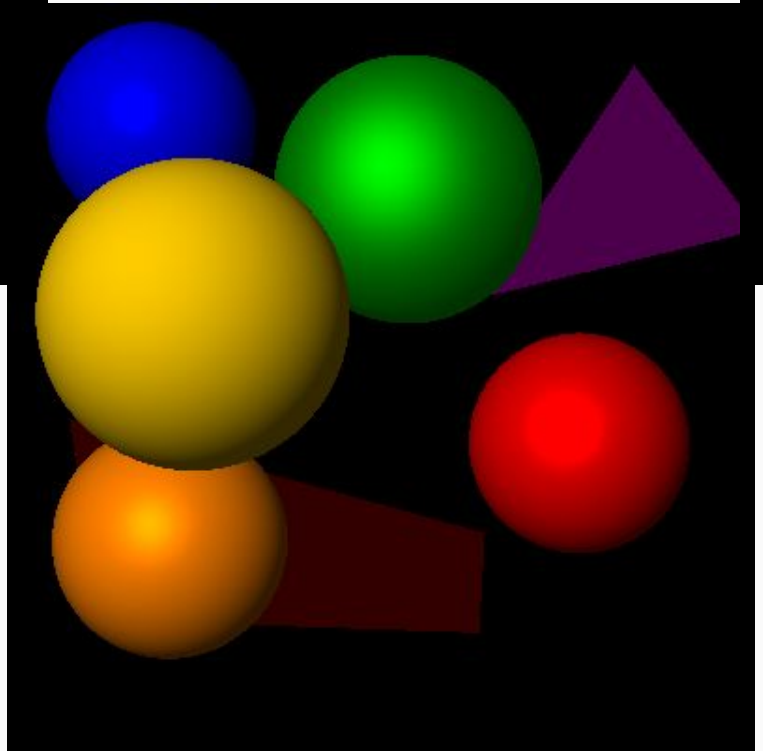
- 3 Coordinates
- project int different coordinate system [u,v,t]
- Normal: same as plane (2 triangles)

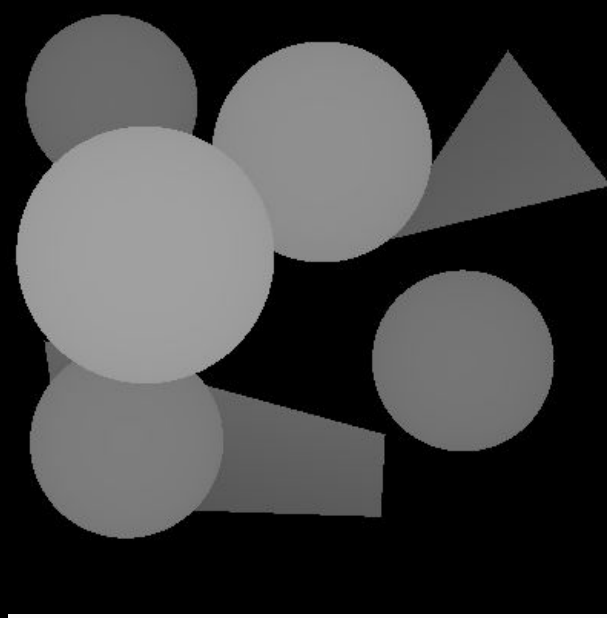




normals

phong shading





Z-buffer