Raytracing exercise 1,2

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Ray sphere intersection

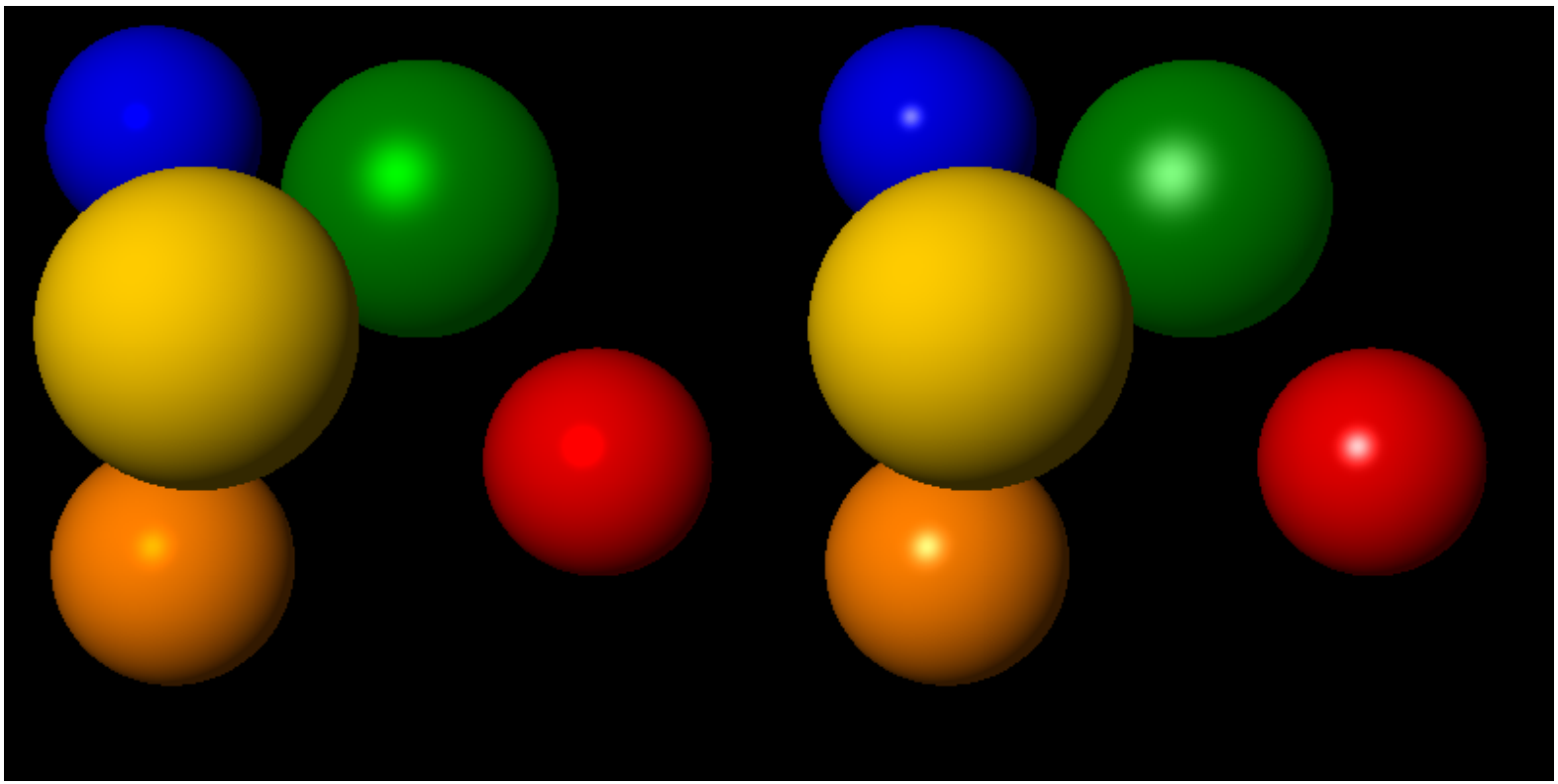
- abc-formula, but with vectors
- dot product $\rightarrow$ discriminant is a single value
- discriminant < 0, no hit
- abc-formula results in distances intersect-ray origin, pick shortest

Normal calculation

- Normal vector is at right angle to surface
- Radius is at right angle to surface
- Radius direction == Normal direction
- Intersect point − sphere position

Phong illumination

- Three components
- Ambient: factor to material and light color
- Diffuse: factor to material and light color, involves Normal vector, must be > 0
- Specular: Nothing to do with material color !!



Zbuffer/Normal rendering

- Different render functions
- Z Buffer: return Distance instead of color
- store min and max distance, another loop to adjust to range 0-1
- Normal: already calculated in intersect()
- Unit vector $\rightarrow [-1, 1] + 1, /2 = [0, 1]$