

MIPSRAY: A Ray Tracer

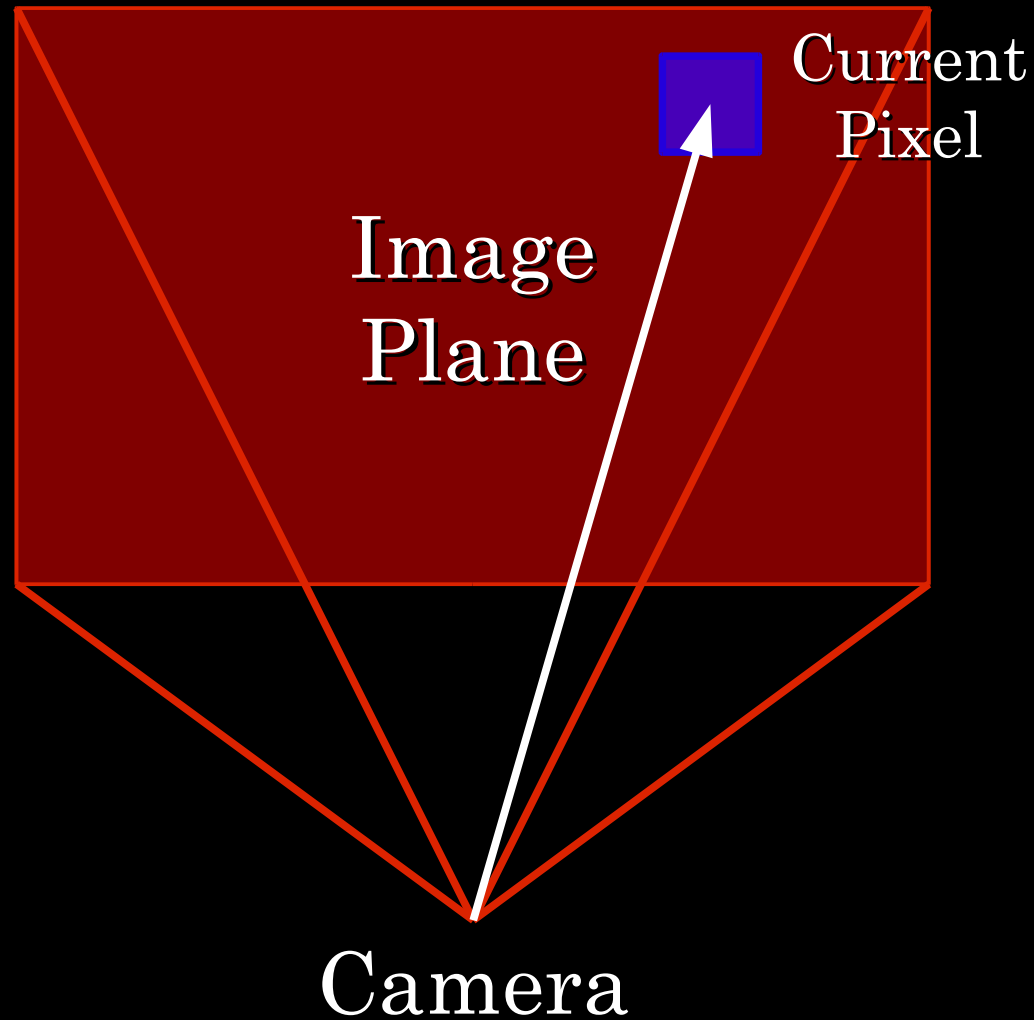
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EECS 314: Computer Architecture



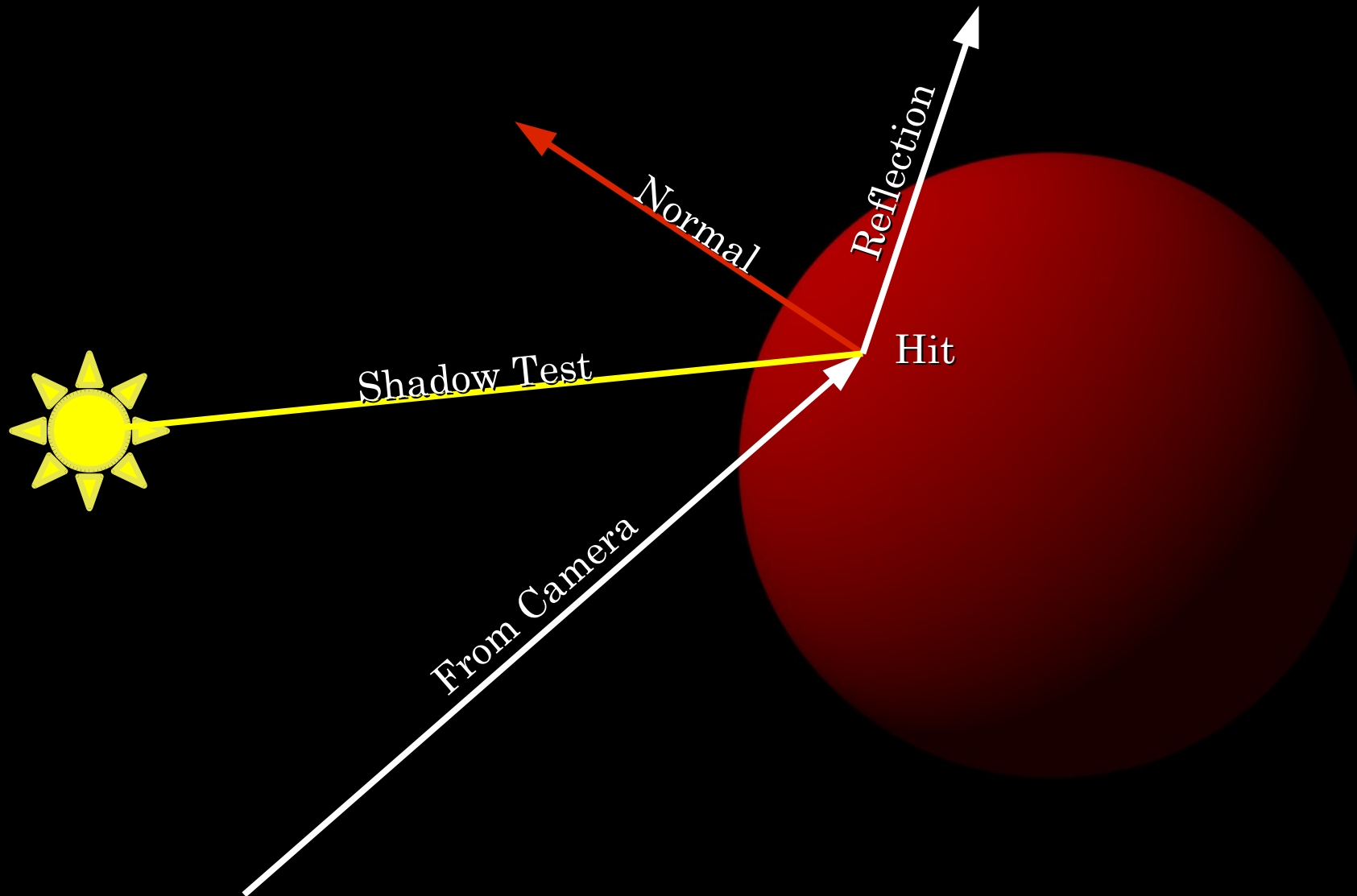
Ray Tracer Overview



The Camera Ray



The Ray Tracing Algorithm



The Ray Tracing Algorithm

Start with a ray...

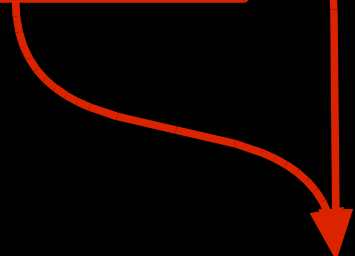
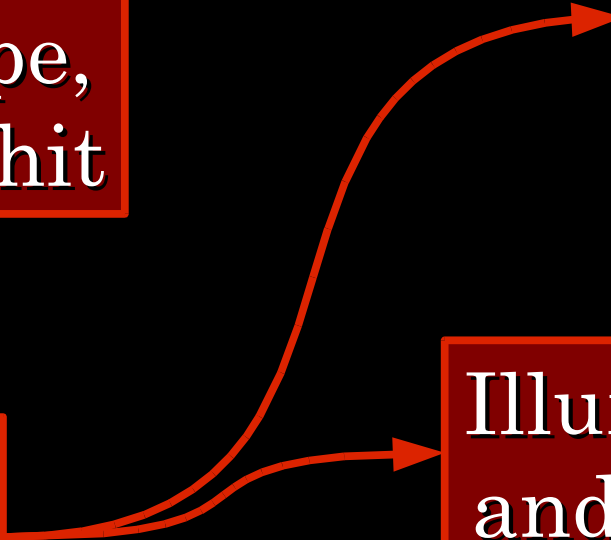
For each shape,
Compute the hit

Take the
closest hit

Recursive call
for reflect/refract

Illuminate
and shade

...and return a color



Implementation Challenges

- Repeated vector arithmetic
 - Module (add, subtract, scalar, cross, dot, norm)
- Root solvers (linear, quadratic)
- Shape solvers (sphere, plane)
- BMP file format
- Debugging

Missing Features

- More shapes!
 - Polynomials of higher and higher degree
- Anti-aliasing
- Textures
- Transformations

Pretty pictures!

