

# CSC418 Computer Graphics

- Scan conversion
- Simple Camera model
- Display techniques
  - Z Buffer
  - Ray Tracing

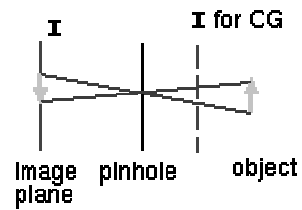


## Scan Conversion

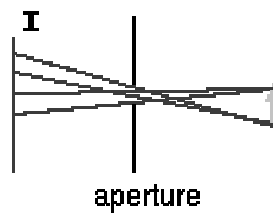
- Convex versus concave polygons?
- Triangulating a polygon
- Scan Converting a triangle
- Pattern Filling a polygon
- Flood filling a polygon

## Camera model

- Pin hole camera

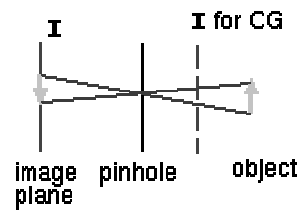


- Aperture and lens

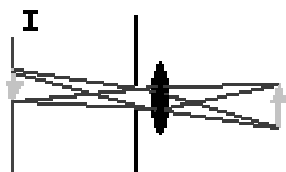


## Camera model

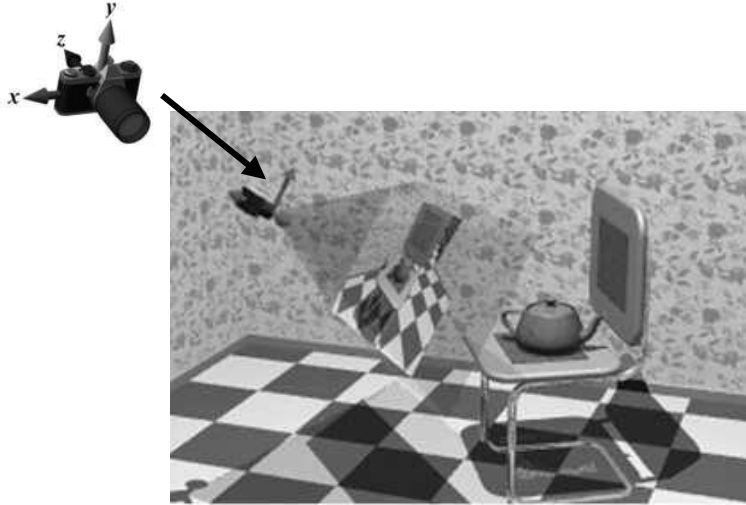
- Pin hole camera



- Aperture and lens

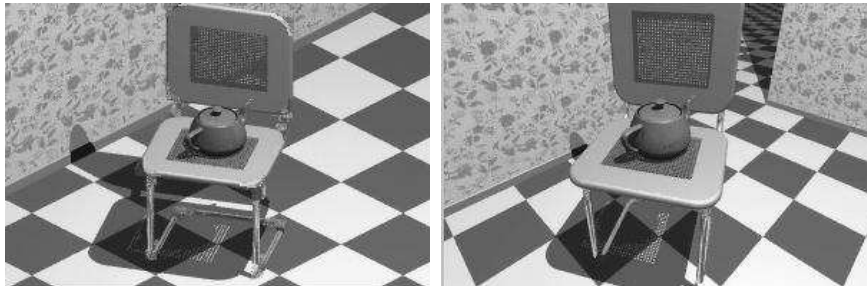


## Camera model



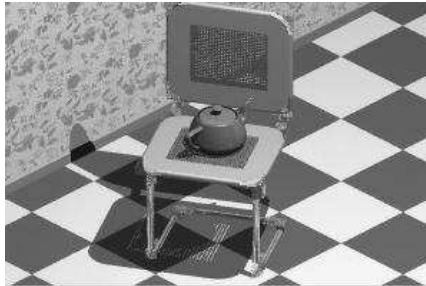
## Camera model

What is the difference between these images?

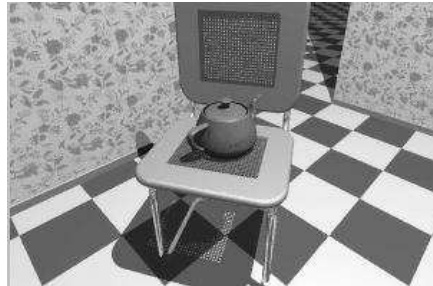


## Camera model

What is the difference between these images?



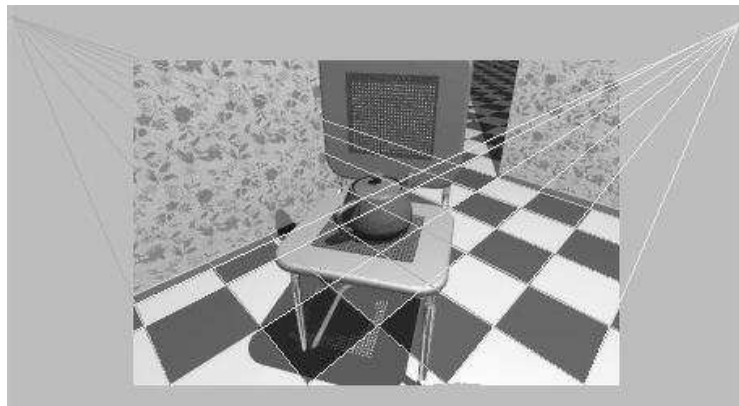
Orthographic



Perspective

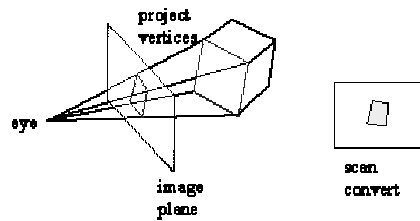
## Camera model

Perspective Projection



## Display Algorithms

### Z-buffer

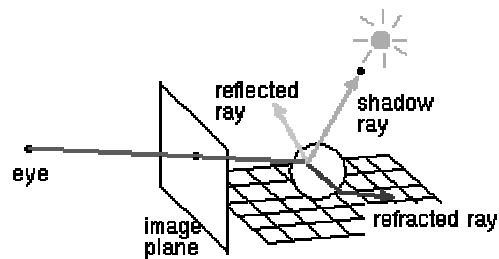


```

for each polygon in model
{
    project vertices of polygon onto viewing plane
    for each pixel inside the projected polygon
    {
        calculate pixel colour, pixel z-value
        compare pixel z-value to value stored for pixel in z-buffer
        if pixel is closer, draw it in frame-buffer and z-buffer
    }
}
    
```

## Display Algorithms

### Ray tracing



```

for each pixel on screen
{
    determine ray from eye through pixel
    find closest intersection of ray with an object
    cast off reflected and refracted ray
    recursively calculate pixel colour
    draw pixel
}
    
```

# **CSC418 Computer Graphics**

**Next Lecture....**

- **Polygon clipping**
- **Introduction to geometric transformations**