PINHOLE AND PERSPECTIVE PROJECTION

CALEB MCANUFF

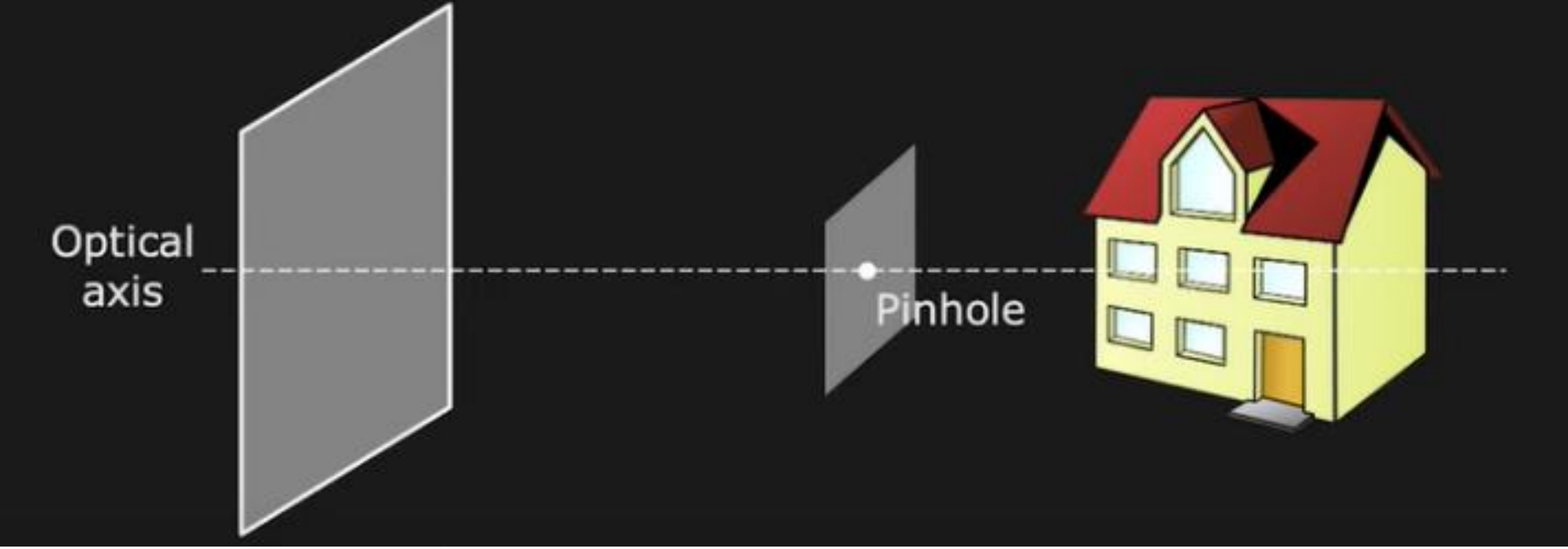
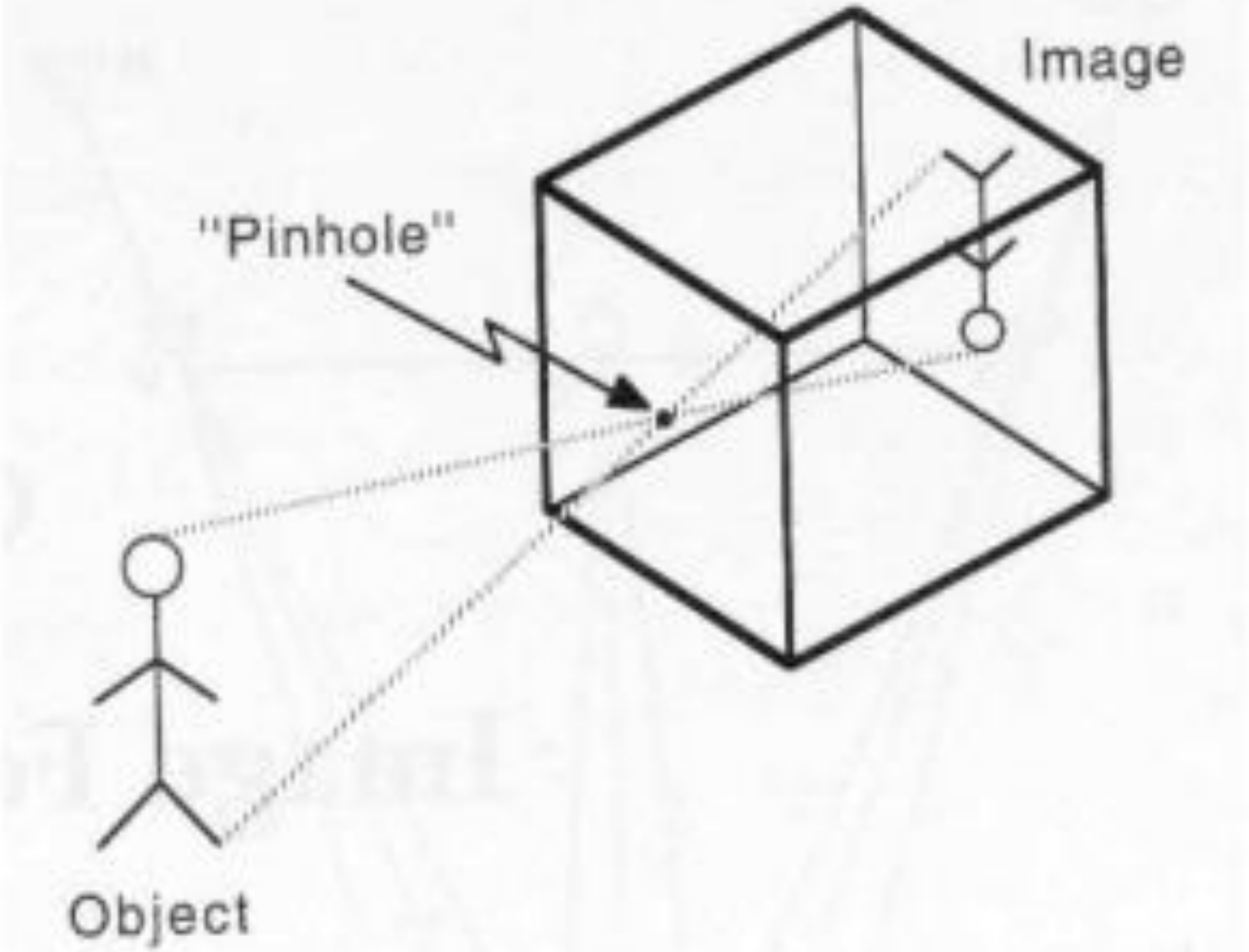


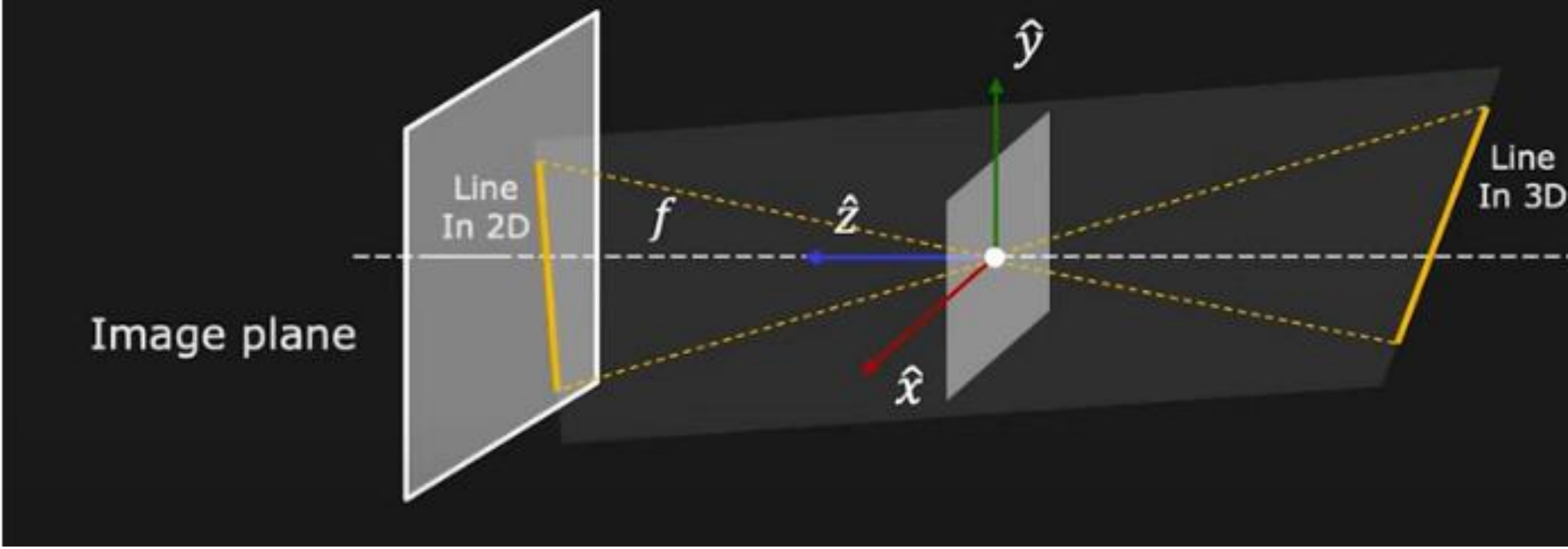
IMAGE FORMATION

- Geometric Relations
- Photometric Relations



PINHOLE MODEL

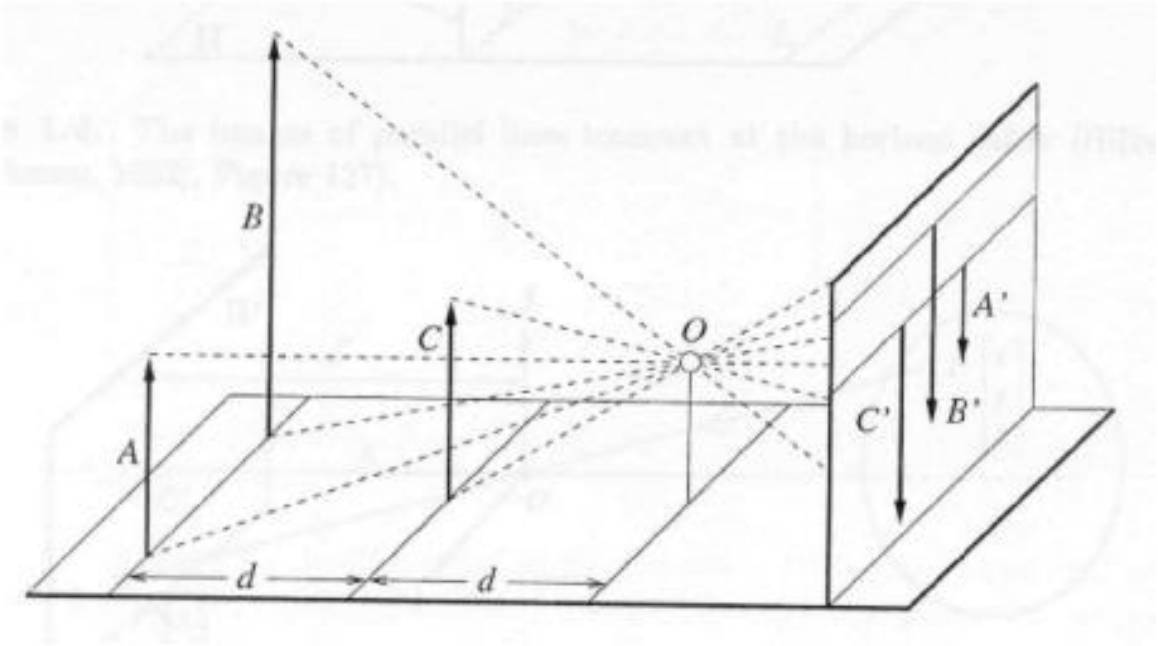
- Simplest Imaging device
- Light enters through a small aperture
- Intersection of light rays with the image plane forms the image of the object

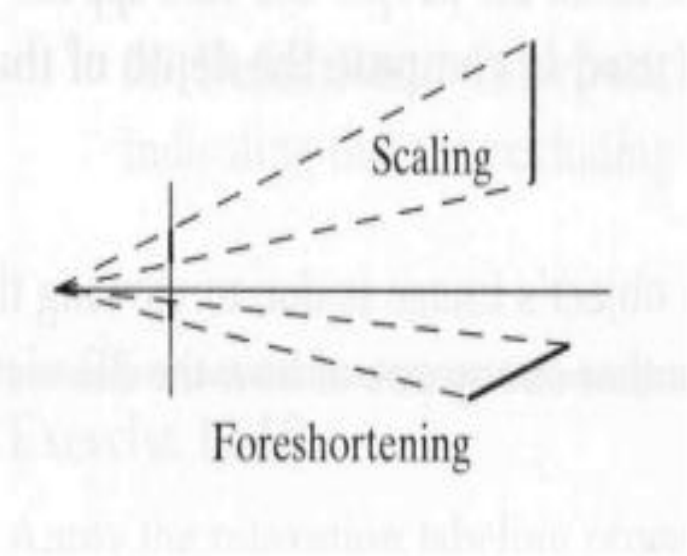


PERSPECTIVE PROJECTION

- The process of mapping the 3 dimensional world onto 2 dimensional surface while preserving relative position and distance from the viewer

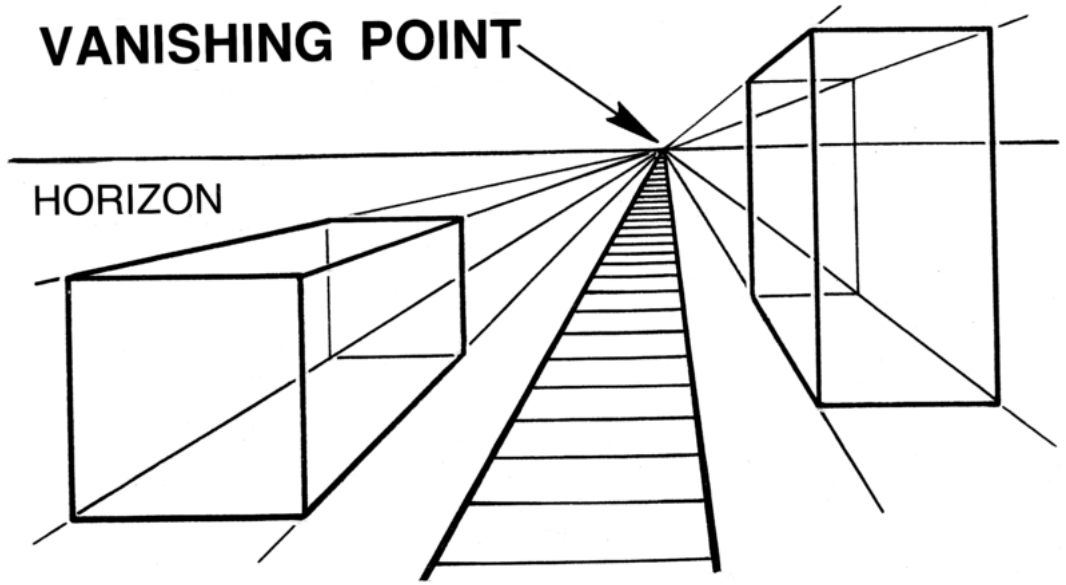
IMAGE MAGNIFICATION





VANISHING POINTS

- Parallel Lines
- Convergence
- Art and Architecture
- Photography
- Computer Graphics



PINHOLE DIAMETER

$$d = 2\sqrt{f\lambda}$$

APPLICATIONS & LIMITATIONS

- Astronomy
- Art
- Computer Graphics and Animation
- Surveillance
- Limatations: Image quality, impractical, distortion, complexity

SUMMARY

- Pinhole Projection: A simple method showing how light passing through an aperture can form an image
- Perspective Projection: Mapping a 3D object onto a 2D screen
- Applications: photography, cinematography, computer graphics.
- Limitations: Diffraction, and distortion

REFERENCES

- https://datahacker.rs/012-3d-face-modeling-pinhole-camera-and-perspective-projection/
- https://www.cse.unr.edu/~bebis/CS791E/Notes/PerspectiveProjection.pdf
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