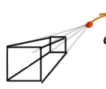
4- image formation

pinhole camera = based on perspective projection  → camera obscura

↳ far away objects appear smaller ↳ using homogeneous coordinates

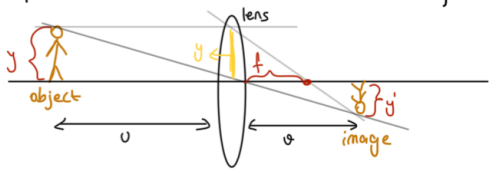
vanishing points = where all the parallel lines intersects 

always on the horizon

orthographic projection = parallel projection

↳ as if camera is at constant distance from the scene

lens:



$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

$$\frac{y'}{y} = \frac{v}{u} = \frac{v-f}{f}$$

depth of field = the distance between the nearest and the furthest objects in a photo that appearts acceptably sharp. narrow → object is focused, background is blur

aperture = pinhole size small → less objects are focused

* lenses make pinhole model practical

↳ without lenses in pinhole model no blur, it is not focused to any specific distance

↳ objects from different distances draw a sharp image → smaller hole sharper image