

Shadows on the Ground

- Despite the difficulty of general purpose shadowing, casting shadows to a *specific* surface — in this example, a simulated “ground” — remains doable, and doable in real time
- The key observation is this: a shadow is actually a *perspective projection*, with the light source serving as the camera or eye point, and the “ground” serving as the near plane
- Suppose that the ground is at some y_g value of a light source is at some location (x_l, y_l, z_l)
- If we translate the light source to the origin, the projection matrix that projects onto $y = 0.0$ is actually fairly simple — see Angel Section 5.10
- The algorithm summarizes to:
 1. Translate the origin to the “ground” (y_g)
 2. Translate the light source to the origin
 3. Multiply by the shadow projection matrix
 4. Translate the light source back to its location
 5. Draw the object
- This produces an image of the object as if it were projected onto a flat surface (which is precisely what the projection matrix does) — thus, a simple shadow