

# | 3D Computer Graphics

The Tech that Powers Video Games

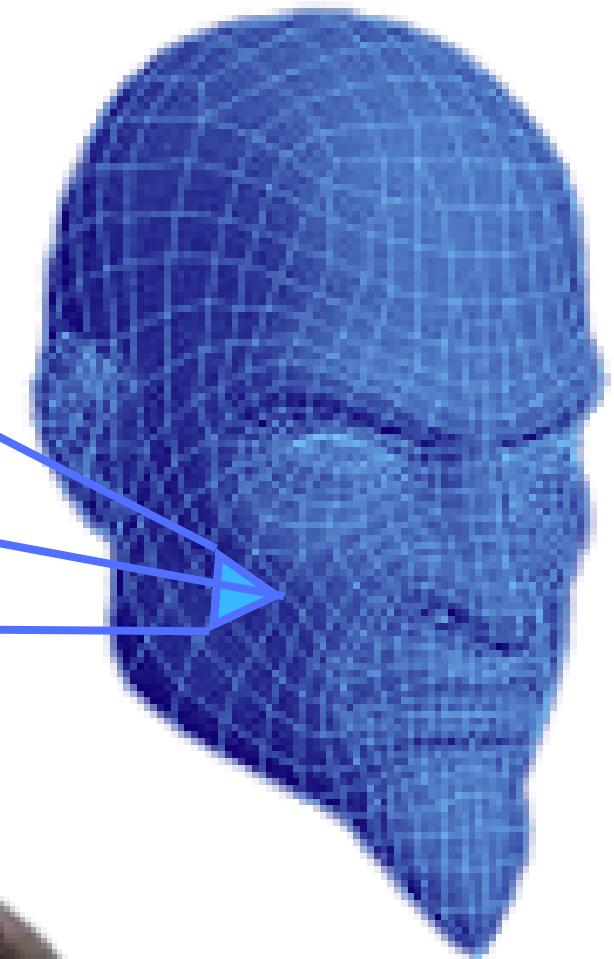
By Maaz Malik

# Everything, is a bunch of triangles

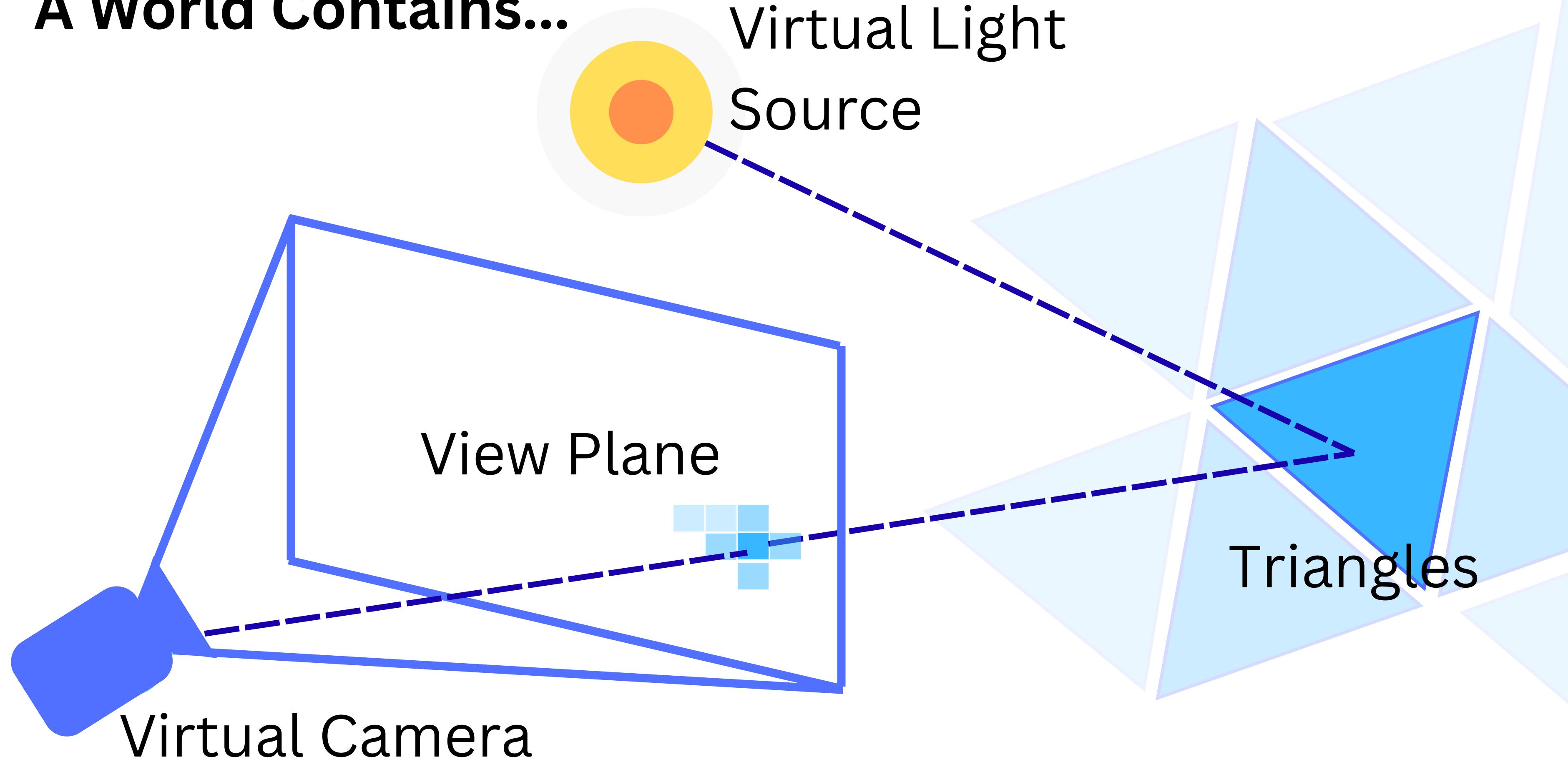
$(x_3, y_3, z_3)$

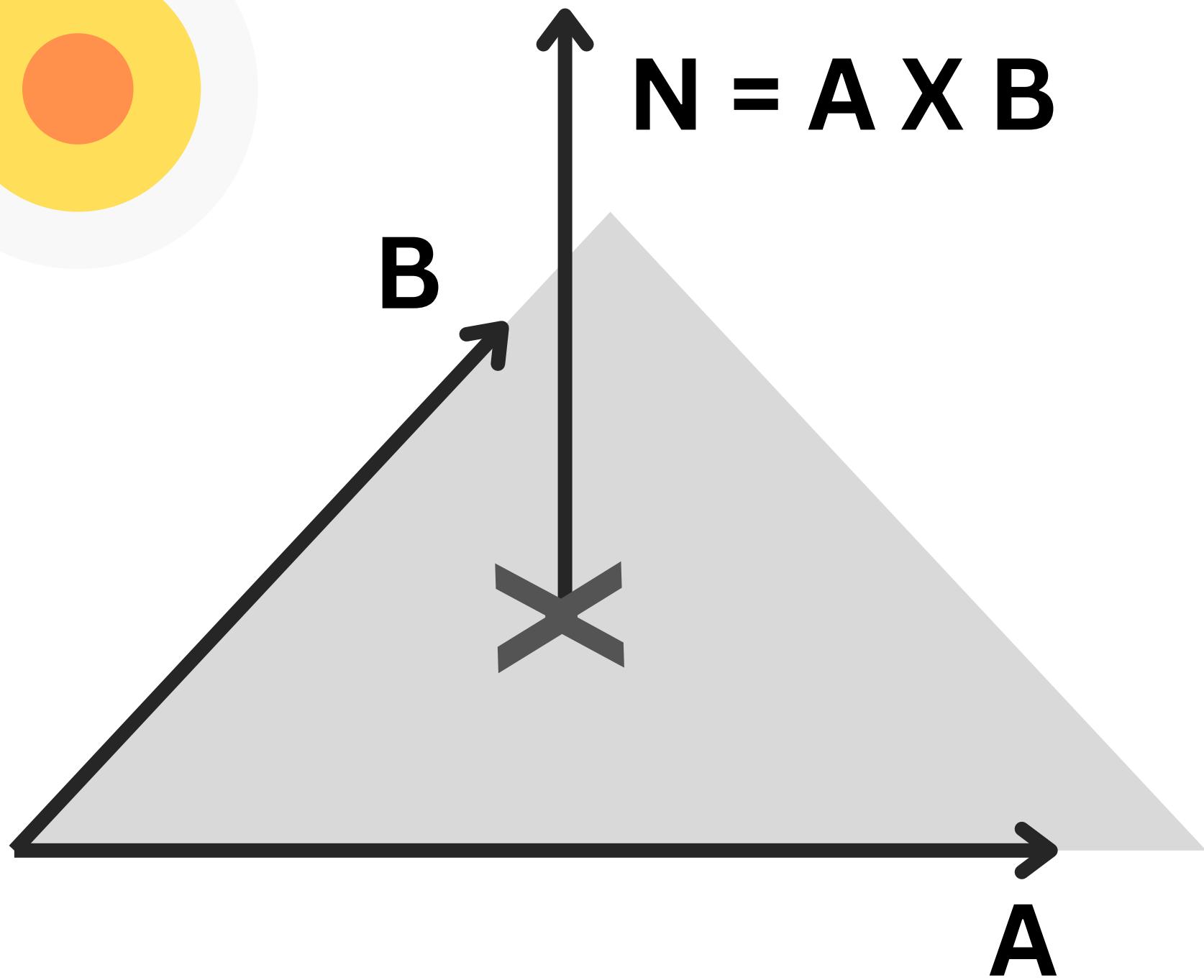
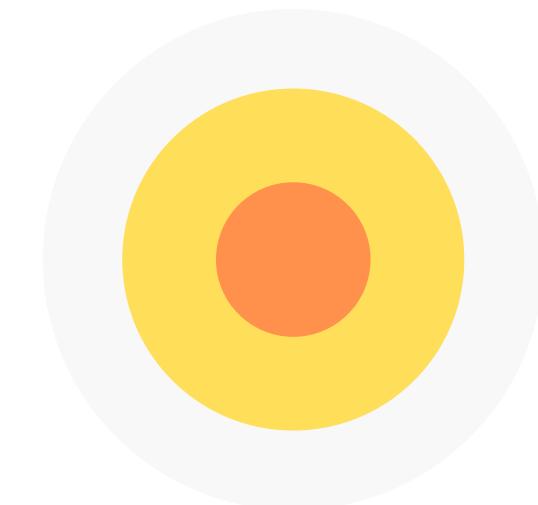
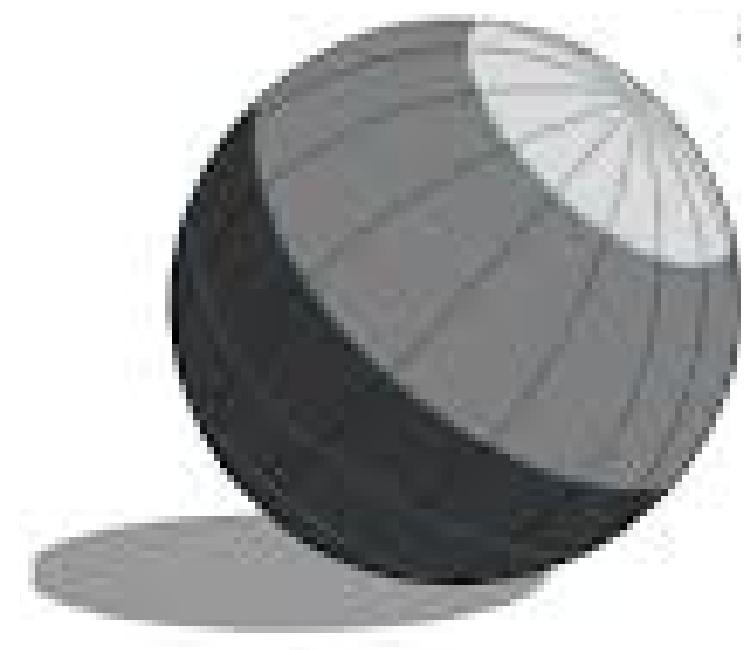
$(x_1, y_1, z_1)$

$(x_2, y_2, z_2)$

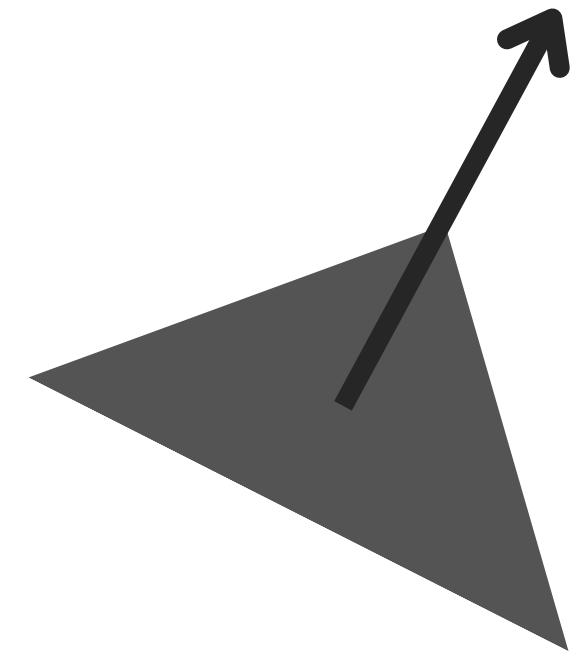


# A World Contains...

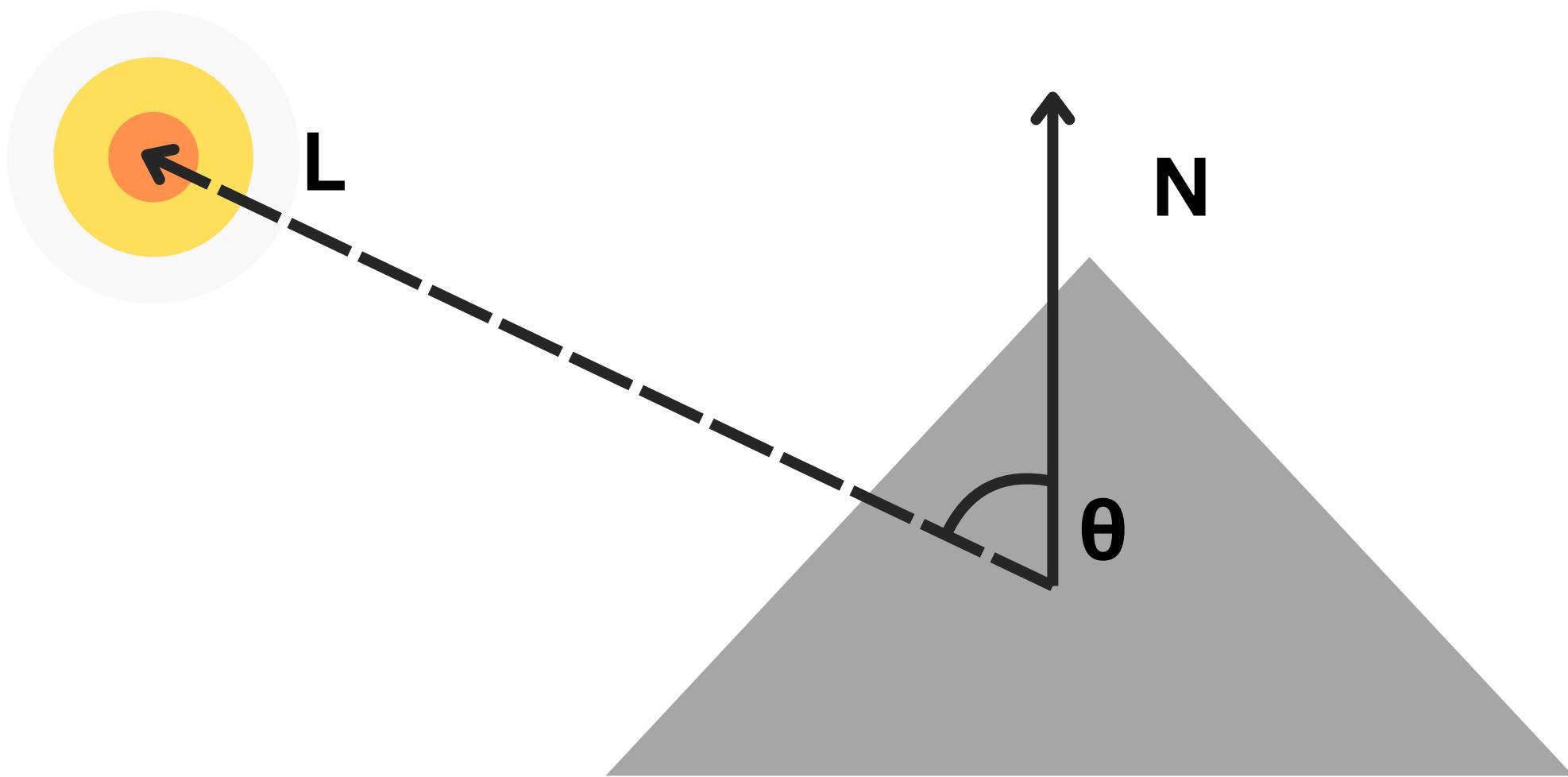




**Where is it facing?**



# Where is it facing?



$$\cos \theta = \frac{\mathbf{N} \cdot \mathbf{L}}{\|\mathbf{N}\| \|\mathbf{L}\|}$$

$$\mathbf{N} \mathbf{L}^T$$

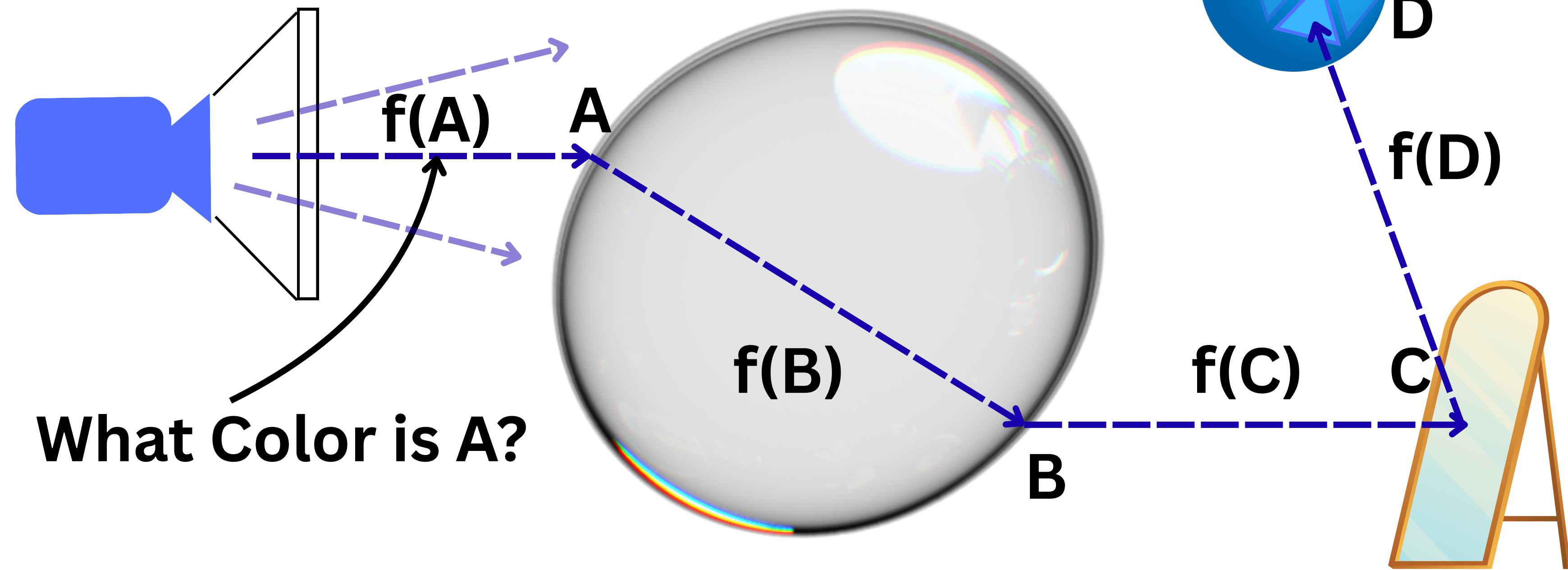
$$[n_x \ n_y \ n_z] \begin{bmatrix} l_x \\ l_y \\ l_z \end{bmatrix}$$

# Just One Task...

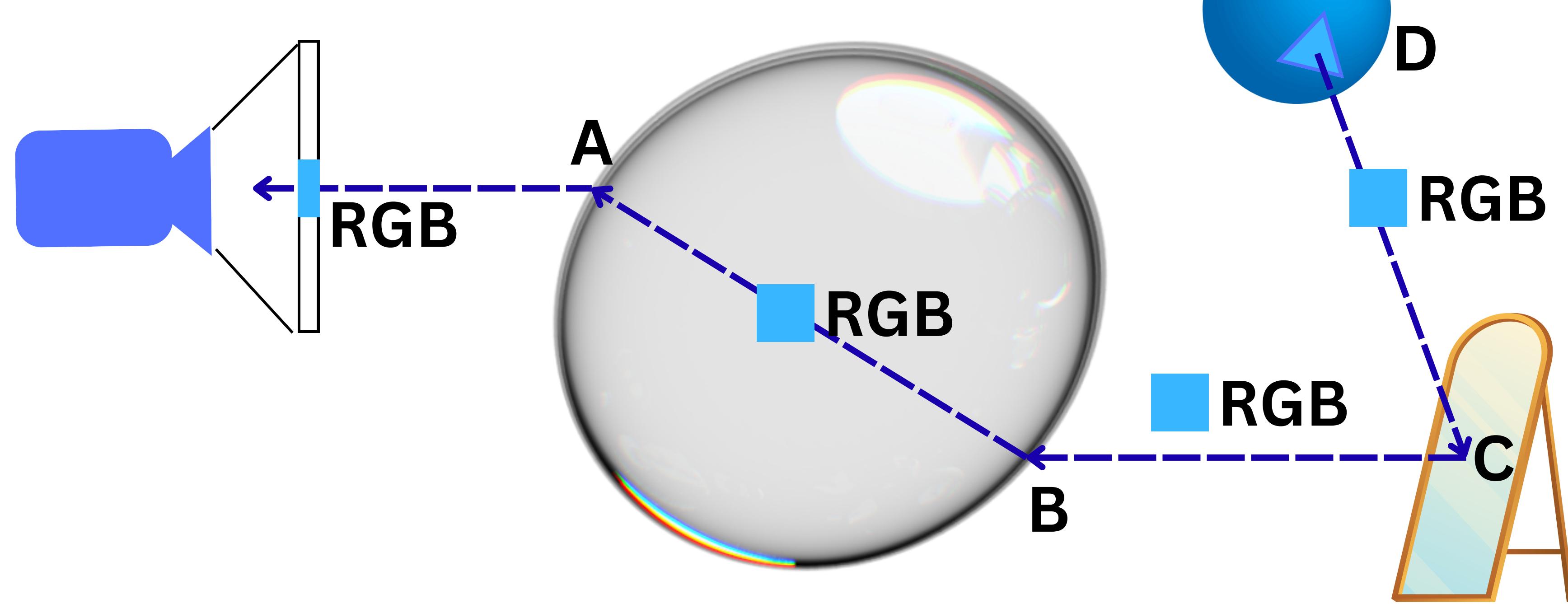
$$\begin{bmatrix} nx & ny & nz \\ nx & ny & nz \\ \dots \\ nx & ny & nz \end{bmatrix} \begin{bmatrix} lx & lx & lx \\ ly & ly & ly \\ lz & lz & lz \end{bmatrix}$$

Matrix Multiplication

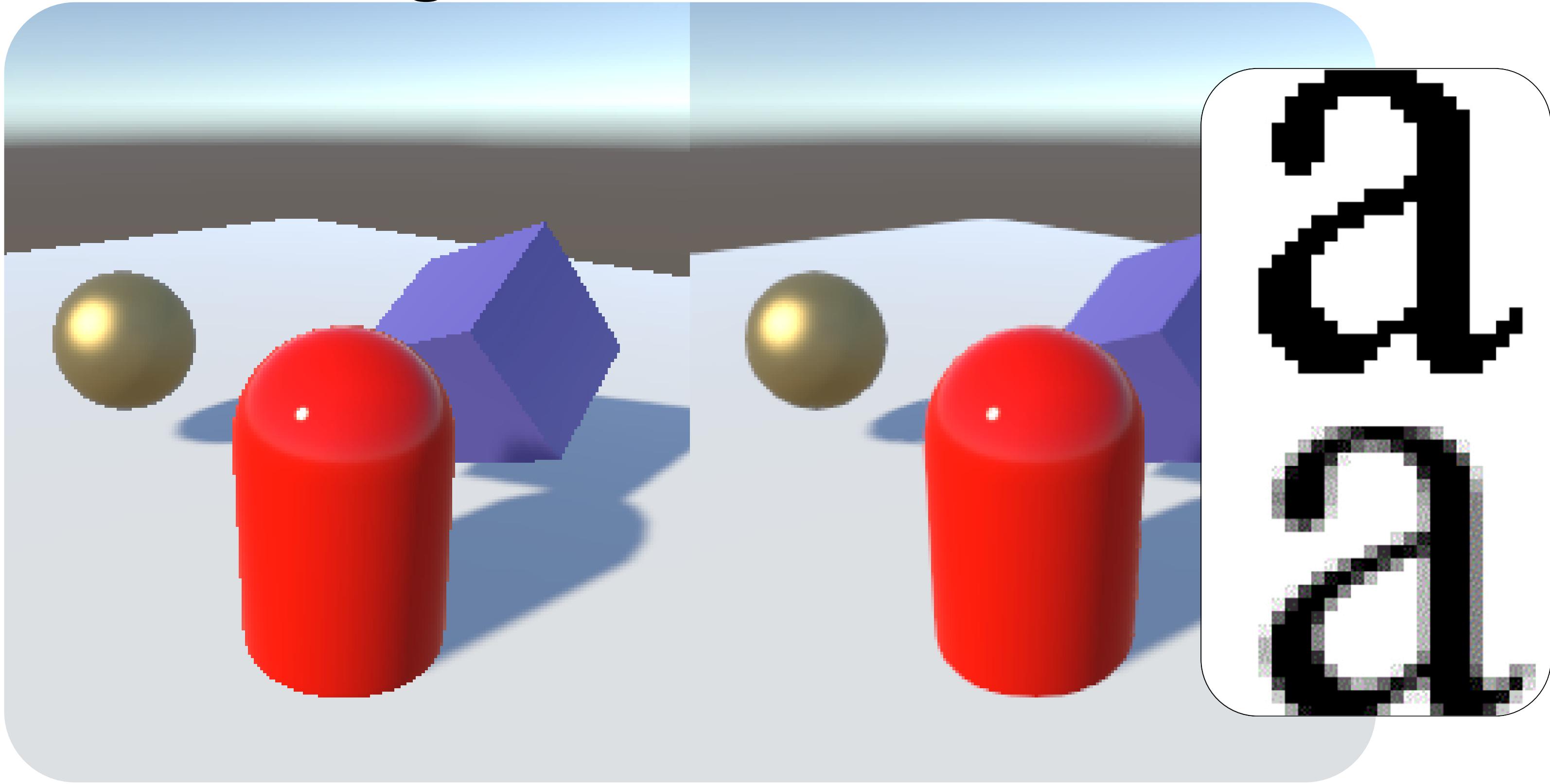
# More Interactions, More Computation...



# More Interactions, More Computation...



# Anti Aliasing



g v | ← | → | ↗

3D Computer Graphics

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Antialiasing

The slide illustrates the concept of antialiasing. It shows a 3D rendering of two red cylinders on a surface with a purple cube and two gold spheres. Above the cylinders is a circular checkerboard pattern. To the right of the scene, there are two large, pixelated letters 'aa'. The top letter 'a' is rendered with a smooth, anti-aliased edge, while the bottom letter 'a' is a simple, unrendered pixelated version. This visual comparison demonstrates how antialiasing improves the quality of rendered edges.

1

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▼

# Thank you



By Maaz Malik