3D Transformations

Something really helpful when creating animations !

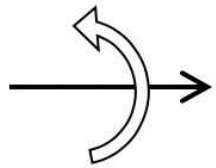
We've already encountered these in 2D
3D transformations are similar, although...

Slightly more complex due to extra dimension
As such they require us to use 3x3 matrices
(4x4 if using homogeneous coordinates !)

Let's take a look at rotation...

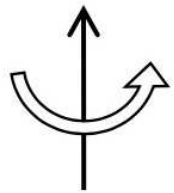
3D Rotation Matrices

Rotation about X axis



$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & -\sin\theta \\ 0 & \sin\theta & \cos\theta \end{bmatrix}$$

Rotation about Y axis



$$\begin{bmatrix} \cos\theta & 0 & \sin\theta \\ 0 & 1 & 0 \\ -\sin\theta & 0 & \cos\theta \end{bmatrix}$$

Rotation about Z axis

$$\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Translation

Translation in 3D is practically identical to 2D

The only difference is that we can also shift z

In addition to x and y !