Perspective Projections

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Matrix

\[
\begin{pmatrix}
1 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 \\
\end{pmatrix}
\]
Matrix and Vector

\[
\begin{pmatrix}
1 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0
\end{pmatrix}
\begin{pmatrix}
x \\
y \\
z \\
1
\end{pmatrix}
\]
Product

\[
\begin{pmatrix}
1 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 \\
\end{pmatrix}
\begin{pmatrix}
x \\
y \\
z \\
1 \\
\end{pmatrix}
= 
\begin{pmatrix}
x \\
y \\
0 \\
z \\
\end{pmatrix}
\]
Implication to 3D co-ordinates

\[
\begin{pmatrix}
x \\
y \\
0 \\
z
\end{pmatrix}
\]

Yields the following 3-tuple

\[
\begin{pmatrix}
x/z \\
y/z \\
0
\end{pmatrix}
\]

- \(z\) better not be zero
- farther \(z\) co-ordinate is larger \(z\) value and reduces \(x\) and \(y\) more than a closer \(z\) co-ordinate does.