2D Orthographic Projections Lecture 7

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Robb T. Koether (Hampden-Sydney College) 2D Orthographic Projections

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Orthographic Projections

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- An orthographic projection projects objects along parallel lines onto a plane.
- We may project orthographicly onto the *xy*-plane simply by setting the *z*-coordinate to 0.

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- The final display window is a "square" with vertices (-1,-1), (1,-1), (1,1), and (-1,1).
- (These are called the normalized device coordinates. More on that later.)
- A 2D orthographic projection matrix will transform any specified viewing rectangle (where the drawing is done) into this square
- The viewing rectangle is described by giving its *left*, *right*, *bottom*, and *top* boundaries.

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The Projection

Orthographic Projections



 The transformation involves a pair of one-dimensional transformations that map x to x' and y to y'.

$$[left, right] \rightarrow [-1, 1]$$

 $[bottom, top] \rightarrow [-1, 1]$

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• The equations are

$$x' = \left(\frac{2}{right - left}\right)x - \frac{right + left}{right - left},$$
$$y' = \left(\frac{2}{top - bottom}\right)y - \frac{top + bottom}{top - bottom}$$

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Assignment

- Read pp. 212 219, User Transformations.
- Read pp. 230 231, Orthographic Projection.

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