Lab 04: Open GL Viewing (Chapter 8, 10)

I. 2D viewing projection with GL utility (glu)

\[
\text{gluOrtho2D}(\text{xmin}, \text{xmax}, \text{ymin}, \text{ymax}) \quad \text{(Projection matrix)}
\]

II. Viewport

\[
\text{glViewport}(\text{xmin}, \text{ymin}, \text{width}, \text{height})
\]

see chapter 8 for glt window method details, but multiple Viewports/windows allowed w/ gl+glut

III. 3D view

\[
\text{gluLookAt}(\text{vx}, \text{vy}, \text{vz}, \text{ox}, \text{oy}, \text{oz}, \text{ux}, \text{uy}, \text{uz}) \quad \text{(Model/view matrix)}
\]

*Note* glu functions just manually set matrix we learned in gl.

IV. 3D projection

A. Orthogonal Projection

\[
\text{glOrtho}(\text{xmin}, \text{xmax}, \text{ymin}, \text{ymax}, \text{zfar}) \quad \text{(Projection matrix)}
\]

Near clip plane is always the viewpoint! For simplicity in computations.

*Note* there is no oblique projection in gl. Would need to manually set matrix

B. Symmetric Perspective Projection

\[
\text{gluPerspective}(\text{theta}, \text{aspect}, \text{near}, \text{far})
\]

C. General Perspective Projection

\[
\text{glFrustum}(\text{tnear}, \text{tfar}, \text{znear}, \text{zfar}) \quad \text{(Projection)}
\]

Near plane is the view plane

IV. (can specify) Additional clipping planes in scene - see ch. 10-12.

\[
\text{glClipPlane}(\text{id}, \text{planeparams})
\]

deletes
permanently

\[
\text{glEnable}(\text{id}) \quad \text{to enable} \quad \text{glDisable}(\text{id}) \quad \text{to turn off}
\]