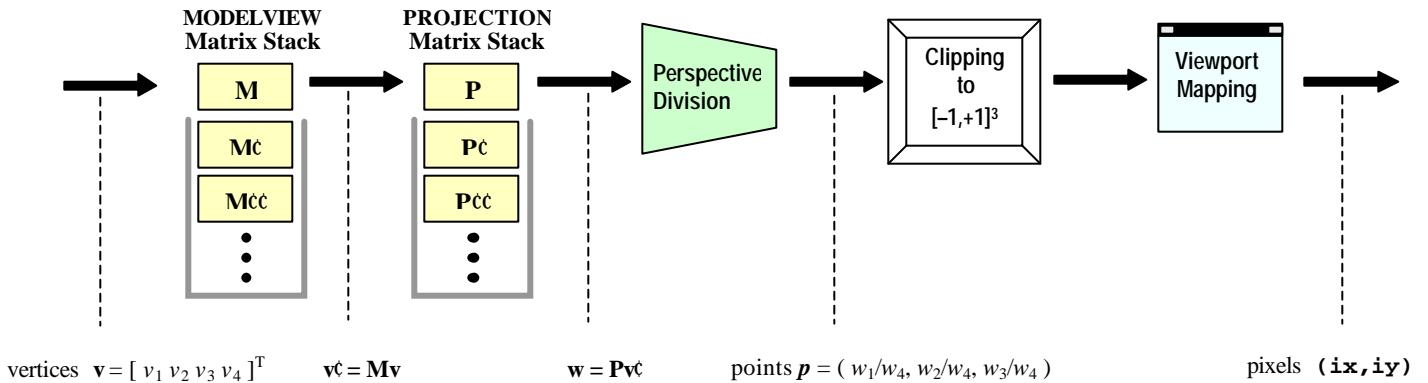


OpenGL Quick Reference #2

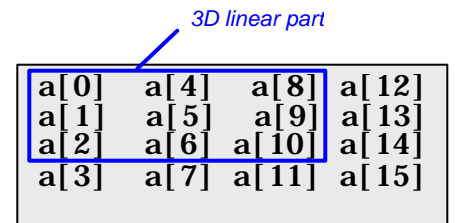
Matrices and OpenGL



Commands to set the current matrix type...

```
glMatrixMode( GL_MODELVIEW );
glMatrixMode( GL_PROJECTION );
```

...to the modelview matrix
...to the projection matrix

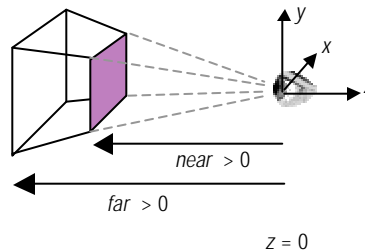
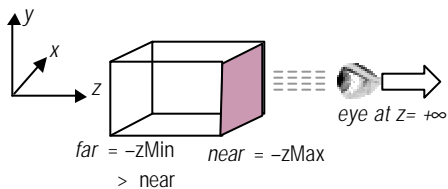


Commands to set/get the matrix at the top of the stack (for the current matrix type)

```
glLoadIdentity();           sets top matrix to I (4x4)
glLoadMatrixd( a );         sets top matrix to a, a 4x4 matrix stored in (column-major) double a[16]
glGetDoublev( GL_MODELVIEW_MATRIX, m ); gets modelview matrix, returning it in your column-major double m[16]
glGetDoublev( GL_PROJECTION_MATRIX, p ); gets projection matrix, returning it in your column-major double p[16]
```

Commands to multiply the top matrix (of the current matrix type) on the right by a 4x4 matrix that...

```
glRotated( theta, x, y, z ); ...rotates by theta degrees around ray from the origin to (x,y,z)
glScaled( sx, sy, sz );     ...scales each direction
glTranslated( dx, dy, dz ); ...does an arbitrary spatial translation
glMultMatrixd( a );        ...is an arbitrary matrix (column-major) double m[16]
glOrtho( left, right, bottom, top, near, far ); ...maps a box into cube [-1,1]^3, an orthographic projection; see picture below left
glFrustum( left, right, bottom, top, near, far ); ...maps a frustum into cube [-1,1]^3, a perspective projection; see picture below right
```



Commands to manipulate the stack (for the current matrix type). Initially the stacks hold one matrix each.

```
glPushMatrix();           push a copy of the top matrix onto the stack
glPopMatrix();            pop off the top matrix (and discard)
```