Assignment 0420
This is a quick-turnaround assignment meant to give you some direct practice with mathematics that is similar to (though simpler than) what we’ve done for projection and setting up the “camera.” That’s not to say that this is all you should do for this class this week — make sure you put in some quality time for your gallery objects, too.

Not for Submission
We are still on these readings, and they are worth re-reading for additional/deeper understanding (especially in conjunction with doing the homework for submission):
• The remainder of Angel Chapter 4
• Angel Appendix C
• Red book Appendices E and F
• And, though you’ve already read this, red book Chapter 3 is worth reading again now that you know the theory and mathematics behind the APIs in that chapter
And, as mentioned, keep working on your gallery objects. Target some functionality implementation for this week.

For Submission
Figure out the mathematics behind the gluPerspective and glViewport functions:
• gluPerspective can be implemented as a call to glFrustum — it converts its y-axis field of view and aspect ratio parameters into the corresponding left, top, right, and bottom boundaries of the frustum viewing volume. The near and far distances are passed unchanged. Show how left, top, right, and bottom are calculated from y-axis field of view and aspect ratio.
• glViewport performs a two-dimensional transform, from normalized device coordinates to window coordinates. Consult the OpenGL reference documentation for the precise behavior of glViewport and derive the $3 \times 3$ matrix that mimics this behavior.
Submit hardcopy showing your mathematics and/or geometry for gluPerspective and glViewport, including any relevant diagrams and proofs.

Extra Credit
This time, a LaTeX document that shows your derivation will get extra credit. Commit your work to /homework/cmsi371/derivations.