CMCS427 Midterm prep

Questions on the midterm will be from Quiz1, Hw2, Hw3, Hw4 and the labs as appropriate. No detailed questions about OpenGL or Processing. Questions could include:

1. Using the dot product to compute a vector projection, the distance of a point to a line, the scalar projection and the vector rejection. And the angle between two vectors.
2. Computing the camera matrix from the standard at, lookAt and up data, and modifying same to move the camera in given patterns.
3. Computing with, explaining, and modifying the standard shading equations.
4. Find the perp vector to a line in 2D, and in 3D (although the last is not unique).
5. Giving homogeneous transformation matrices for rotation, scale, shear and translation in 2D, and the same in 3D but
7. Composing matrices for particular operations, like rotating around a point or translating to a position.
8. Working with homogenous vectors, including normalizing them.
9. Computing the perspective equations for a given configuration of focal point and image plane and then putting that into
10. Give the perspectvie
11. Sketch and work with algorithms to determine properties of polygons including simple, convex/concave, and winding direction.
12. Given points in space determine the parametric line and line segment, the perpendicular bisector line, the ray in one direction (eg, $t>0$ or $t<1$).
13. Use triangle_strip and triangle_fan with a polygon.
14. Compute the approximate Frenet frame for a parametric curve.
15 Compute the parametric normal at a point on a surface given the equation for the surface.
16. Work with the indexed data structure for a polygonal mesh (eg, the barn).
17. Find normal vector by inspection on a mesh.
18. Find normal vectors by cross product (and compute the cross product.)
19. Determining if four points are on the same plane (co-planar)
20. Finding the bilinear surface between four points.
21. Explain why we use parametric curves, and implicit curves – identify each.

You don't need to know how to compute the projection matrix for a frustrum (but you should know what the frustrum is). And there won't be anything on animating a transformation.