Midterm Review

The midterm will be a D2L exam that I assign on March 16, you'll have until March 20 to complete it. Review these topics to study for the exam.

Midterm questions may directly reference labs 1-4 or program 1. Make sure you have access to all code you worked on.

If you can answer these questions in a few sentences or less, you're in good shape.

What are barycentric coordinates? What are they used for?

What makes a graphics card (GPU) so much more efficient at processing graphics calculations than your main processor (CPU)?

What is a vertex shader?
What is a fragment shader?
How do you pass data from your vertex shader to your fragment shader?
What does OpenGL do with the data passed from your vertex shader to your fragment shader that is helpful?

What is a vertex array object (VAO)?
What is a vertex buffer object (VBO)?
How are they related?

What is a uniform variable?
What is a vertex attribute?

How do you upload data to your graphics card?
How do you tell OpenGL how your data maps to your shader variables?

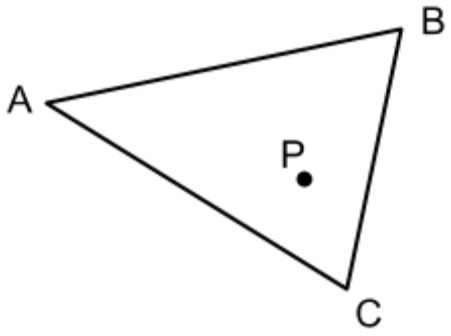
What is an orthographic projection matrix?
What is a perspective matrix?

What are homogeneous coordinates? Why are they useful in graphics?

What is a rotation matrix?
What is a scale matrix?
What is a translation matrix?
How do you combine matrices?
How do you transform a vector with a matrix?

Math problems you're expected to be able to solve include (but are not limited to) the following

Given the barycentric coordinate (b_A, b_B, b_C) at P for triangle ABC, compute a combined color at P, given the colors at points A, B and C. Show your work.



Color at A = (.5, .2, .1)
Color at B = (1,1,1)
Color at C = (0,0,0)
(b_A, b_B, b_C) = (.2, .2, .6)

Convert the mouse click coordinate, M, to normalized device coordinates given the provided window size. Show your work.

Window width = 600
Window height = 400
M = (400, 250)

The untransformed shape below is modeled in local space. A model transform was applied to the shape. Using C++ and glm, construct a scale matrix, a translation matrix, and a rotation matrix and combine them in the correct order to recreate the transformation.