

Worksheet II

Answer all the problems completely on a separate sheet of paper. Read all the problems closely, and ask if you have any questions on what a problem means. This worksheet is due at the start of class on Mon, Sep 22.

Problem 1 (2 pts)

What is the difference between a **uniform** variable and an **attribute** variable in GLSL?

Problem 2 (4 pts)

Consider the scalars $a = 3, b = -4$ and vectors $u = \langle 11, 3, 6 \rangle, v = \langle 7, 4, 13 \rangle$. Calculate the following values (if an operation is not allowed, mark as “undefined”).

- (i) $b * u - a * v$
- (ii) $\|v\|$
- (iii) The angle between u and v
- (iv) $v \times u$

Problem 3 (6 pts)

Given a set of points (and remember, in graphics we deal with *a lot* of points), find a test to determine if they are co-planar. Write a pseudocode algorithm for this test that explains the process and why it works. Be specific about mathematical operations you would perform.

Problem 4 (5 pts)

Consider a triangle (diagrammed below). The triangle’s vertices are colored so that the vertex at $(0,0)$ is pure 100 red% (**#ff0000**), the vertex at $(0,1)$ is pure green (**#00ff00**), and the vertex at $(1,0)$ is pure blue (**#0000ff**). Using **barycentric interpolation**, determine the interpolated color at point $(1/2, 1/3)$.

