Computer Graphics **Comprehensive Examination, Fall 1999**

Sign the exam with your student number - not your name _____

Select three (3) of the following questions to answer. Do not answer more than three.

1. (33 $\frac{1}{3}$ pts) You are to Gouraud shading a triangle. Determine the color (red, green, blue) assigned to pixel (5, 5) given the following information.

   - The triangle has vertices (1, 3), (9, 3), (5, 7).
   - At these vertices, the triangle has color (0, 0, 0.5), (0, 0.5, 0), (0.5, 0, 0).

2. (33 $\frac{1}{3}$ pts) Explain why, where, and how homogeneous (x, y, z, w) coordinates are used in computer graphics. Give several examples showing their usefulness.

3. (33 $\frac{1}{3}$ pts) Normal vectors and inner products are useful in computer graphics. Explain where and how edge and surface normals are used. Explain where and how inner products are used.

4. (33 $\frac{1}{3}$ pts) Provide and overview of the graphics pipeline. What "spaces" occur in it? How does data map from one space to another? What types of algorithms are performed in each space?