Computer Graphics **Comprehensive Examination, Fall 2002**

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

Answer the following questions to the best of your ability.

1. (40 pts) Fill in the blank on the left with the number on the right to best match the left phrase with the right description. Numbers may be used more than once.

___ Model Space	1. Handle the common case quickly.
___ World Space	2. Where objects are defined.
___ View Space	3. (x, y, z, w), $w \neq 0$
___ Perspective Space	4. A closed piecewise linear curve.
___ Clip Space	5. (0, 1, 1)
___ Normalized Space	6. Intensity interpolation.
___ Device Space	7. $(v_1w_2 - v_2w_1,\ v_2w_0 - v_0w_2,\ v_0w_1 - v_1w_0)$
___ Homogeneous Coordinates	8. Where non-visible objects are discarded.
___ Gouraud Shading	9. Where geometry is distorted.
___ Phong Shading	10. Where objects are collected.
___ Cyan	11. Where camera shots are taken.
___ DDA	12. $x = x + 1, y = y + m$
___ Inner Product	13. $\sum_{i=1}^{4} x_i y_i$
___ Cross Product	14. Normal interpolation.
___ Line Formula	15. How objects are transformed
___ Polygon	16. Device independent storage.
___ Incremental Algorithm	17. Where the pixels are.
___ Linear Interpolation	18. $Pt + Q(1 - t)$
___ Triage	
___ 4×4 Matrix	

2. (40 pts) The active edge list data structure is useful for filling polygons and other tasks in the graphics pipeline. Details of how it's implemented vary, for example, filling from top-to-bottom or bottom-to-top. Explain the following: state any and all assumptions you need to make.

   - Why are horizontal edges not included?

   - Given a polygon, its edges are processed and information about them is stored in a data structure. How is this data structure organized and what is stored there? To be specific, pretend an edge is defined by vertices (5, 8) and (12, 20).

   - Once all of the edges are pre-processed the polygon is filled a scanline at a time using another data structure. How is this data structure organized and how does it change from scanline to scanline?

   - Explain how the basic active-edge data structure can be augmented to support color interpolation.

3. (20 pts) Pick a topic about computer graphics that you know well and write a description of it.