CPSC 352 Final Exam Information

- Date: **Wednesday, April 27, 9am**
- Exam is **cumulative**. There will be more emphasis on the last 1/3.
- Format: Similar to tests 1 and 2. Short answer (e.g. “Explain the Gouraud Shading algorithm”); some more concrete problems (e.g. show how to find the angle between two vectors [given] using the dot product, show homogeneous transformation matrices for scaling around the point [1, 2, 3])
- Use the review sheets from tests 1 and 2 (linked on the syllabus web page)
- If you don’t understand a topic on a PowerPoint slide, there should be a voice thread on Moodle where you can hear an explanation

**Additional topics since Test 2**

**Chapter 7 (Last parts)**
1. Sprites
2. Normal mapping
3. Displacement mapping
4. Specular mapping
5. Blending. Problems with depth buffering. Screen-door transparency
6. Billboardng
7. Particle systems
8. Antialiasing
9. OpenGL’s buffers: Color, depth, stencil. What each is used for. How (conceptually) you would do things like fog, depth of field, etc. with buffers.

**Chapter 8: The Rendering Pipeline**
1. Front-end vs. back-end processing: what is done in each?
2. Coordinate systems: object, eye, clip, NDC, screen
3. Clipping (conceptual, not algorithms)
   1. Trivial accept-reject
   4. Scissoring
   5. Rasterizing a line
      a. DDA Algorithm
   6. Rasterizing polygons
      a. Scan-line approach
      b. Winding number, inside-outside rules
   7. Anti-aliasing, temporal anti-aliasing
   8. Color systems: RGB, CMYK, YIQ, HLS.
   9. Gamma correction.
   10. Dynamic range, HDR
   11. Halftoning
   12. Dithering
      (1) Floyd-Steinberg error-diffusion dithering algorithm
   13. Color quantization
Chapter 9: Hierarchical graphics, modeling, and animation

(mostly understanding of terms)

1. Primitives such as points, lines, polygons, ellipses, NURBS, particles, meshes, skin and bones, subdivision surfaces, algorithmic primitives
2. Meshes and mesh deformations: e.g. modeling landscapes, cloth
3. Hierarchical models, parenting
4. Animation with skin and bones
5. Kinematics; inverse kinematics
6. Rigging
7. Keyframe animation
8. Motion capture, morphing

Sample Questions

1. What is texture mapping? Why do we have to give texture coordinates when using texture mapping? Explain the methods that WebGL uses to deal with aliasing.
2. Explain how billboarding might be used to render a tree with only one polygon. How does this technique use the stencil buffer?
3. Explain normal mapping.
4. Why are hierarchical DAG models used to represent complex objects? What is the purpose of the transformation associated with each edge of the DAG? What is the algorithm for rendering such models?
5. What is the difference between kinematics and inverse kinematics? How would inverse kinematics be combined with keyframing for animating the model?
6. What is motion capture? How might it be combined with inverse kinematics and/or biomedical simulation to make realistic character animation?
7. How could you use keyframing to animate a 3D morph of an object defined with curved surfaces such as NURBS?
8. What is “scissoring” when would you want to (or not want to) use it?