

Due: Monday October 6 at 6:00am

Assignment 4—Rendering in Filled Mode

In a nutshell

Extend your interactive 3-D graphics application to render triangle meshes in filled mode with basic shading and lighting.

Details

1. Rendering in filled mode
 - Triangle rasterization
 - Z-buffering by screen space interpolation of vertex depth values
2. Light
 - Point light source
 - 3-D interactive positioning through GUI
 - Visualization with big dot (e.g. 7x7 pixels in size)
3. Lighting
 - Ambient plus diffuse plus white specular highlights
 - The ambient factor and the specular exponent should be parameters that can be set through the GUI
4. Three shading modes
 - SM1: screen space interpolation of vertex colors loaded from model file
 - SM2: screen space interpolation of vertex colors computed by evaluating the lighting expression per vertex
 - SM3: evaluating the lighting expression per pixel by screen space interpolation of vertex normals
 - Allow switching between shading modes through GUI
5. Example
 - Make a simple 3-D scene with a single coarse teapot.
 - Make a 20 second 640x480 30fps movie file showing your three shading modes. In the first 5 seconds use SM1 with a moving camera (and no light). In seconds 6-10 use SM2 with a stationary camera and a moving light source. In seconds 11-15 use SM3 with a stationary camera and a moving light source. In seconds 16-20 show the previous two segments of the video side by side, separated by a vertical bar; segment SM2 should be left and SM3 right; the two segments should be downsampled 2x such that they fit in the 640 x 480 video frame.
6. Extra credit
 - Directional light source (2%)
 - Multiple lights (2%)

- Conic light spot (2%)
- Nice scene, i.e. complex geometry, animation (x%)

Turn in

- Code (source + executables)
- A README.txt description of your GUI
- Movie file

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