

## **Assignment 3—due Thursday September 28**

In a nutshell, this assignment asks you to enhance your renderer with triangle rasterization, z-buffering, Gouraud shading, and a video player/recorder.

Enhance the application from A2 with the following features:

- **Rasterization**—fill in your triangles using the edge equation method.
- **Screen-space interpolation of rasterization parameters**—use this feature for z-buffering (the quantity interpolated should be proportional to  $1/z$ ), and for Gouraud shading, which is the process of setting the color of a pixel interior to a triangle by interpolating the vertex colors. Assign random colors to the vertices of your shared vertex triangle mesh once you load the geometry from file.
- **Change of field of view**—allow the user to increase/decrease the field of view.
- **Change of resolution**—allow the user to increase/decrease the resolution, uniformly (height and width of image multiplied by the same number).
- **Video recorder and player**
  - allow the user to record a path that consists of a series of views;
  - play back a path by moving the desired view along the path; let the user choose the number of intermediate views between two consecutive nodes of the path;
  - a flag should get the program to save each image to a file; the file names should be numbered consecutively as follows: `<pathName>0000.<ext>`, `<pathName>0001.<ext>`, ..., `<pathName>0100.<ext>`, ..., where `<pathName>` is the name you want to give to your path, and `<ext>` designates your preferred non-lossy image file type;
  - have buttons that pause/play/stop/rewind/fastForward/reset the path; the buttons should (obviously) be responsive during play back;
  - make a video file with your favorite video editing software (e.g. Adobe Premiere, MS Windows Movie Maker); Unix users can download an mpeg library from the web.

### **Extra credit**

- Make a nice scene, with other objects than the teapot, make a nice path that shows off the scene; there are models with color per vertex (x% according to scene)
- Implement a non-linear interpolator of your path (2%)
- Animate the objects in your scene (2%)
- Anything else that makes a compelling visual experience (x%)

### **What to turn in**

- Turn in your assignments via the web; email me and the TA a URL with your assignment archive; let us know if you do not have access to web space

- Implementation source files and project; use relative paths; we should be able to build your project easily
- A report that includes the coolest image you made, as well as instructions on how to use the Graphical User Interface (GUI)

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