Program 8

Advanced Computer Graphics II
Instructor: Steven Parker

Due: Midnight, March 28, 2005

Add volume rendering in your ray tracer. Your ray tracer will also need to support the features from Program 7. This assignment is worth 100 points with up to 25 extra credit points available.

1. **Required Image(s)** (80 points): Your ray tracer should reproduce the image posted on the web page demonstrating your ray tracer's ability to render volumetric datasets. The image is 512x512 resolution. If the image matches, you will get all of the points. If you want partial credit you must provide your source code.

   The code that constructed the image is linked from the website as "req8.h". The files containing the volume data have been linked from the website as "CThead.hdr", "ct.raw", and "CThead.cmap". We have also provided the code necessary to read the volume data ("PhongVolumeMaterial.cc"), as well as the code to create the colormap ("Colormap.{h,cc}").

2. **Performance template** (10 points): Fill out the performance reporting template on the web page, including the times required to preprocess, render, and finalize the required image. You will not be graded on the performance of your code, just your ability to fill out the form. A utility class that can be used for timing your code is found on the web page. It will work on most Unix machines.

3. **Creative Image(s)**: There are no creative images for this assignment.

4. **Design Choices** (10 points): Your web page should describe any design choices that you made while implementing volume rendering in your ray tracer. You will not be graded on your choices, only on the completeness of your description. Describe the choice and a justification (a few sentences will suffice).

5. **Extra credit** (25 points): For extra credit, implement attenuated shadows or hypertextures. In either case, create an image demonstrating the added feature you have chosen, and post a link to this image on your web page. Provide a brief description of the choices you made while implementing these additional features.

What to turn in:

By midnight on the due date, you should send e-mail to teach-cs6620@cs.utah.edu with the following information:

1. **URL:** A pointer to a web page containing the following information:
   (a) The required image
   (b) A link to a text file containing a completed performance template for the required image
   (c) A description of your design choices
   (d) For the extra credit, an image demonstrating either attenuated shadows or hypertextures.
2. **Time required:** How many hours did it take you to complete this assignment?
3. **Difficulty of assignment:** Was the assignment difficult or not? Feel free to expound or to be brief.

You will not be graded on these last two items. They will be used to help improve the class in future assignments and in future years if I teach it again.