The purpose of this homework is to give you more experience with viewing and mapping effects in OpenGL.

This homework is worth a total of 20 points (2%). Upload an electronic copy of the assignment in PDF form (converted from your word processor, or scanned) to your K-State Online (KSOL) drop box before the due date and time.

Acknowledgements
This machine problem was inspired in part by Stanford’s CS148 (fall, 2010): http://bit.ly/fkMGfZ

References
NewTek Lightwave tutorials:

Photoshop rotoscoping tutorial: http://adobe.ly/gtChSN
NeonHelium tutorials: http://nehe.gamedev.net
OpenGL FAQ: http://www.opengl.org/resources/faq/
OpenGL viewing docs: http://www.opengl.org/resources/faq/technical/viewing.htm
OpenGL material smoothness documentation: http://bit.ly/eIVF4d

1. **(20% for 636, 10% for 736) Parsing scene files.** Download the sample scene files from http://bit.ly/gbI9fM and look at the inline specifications. Write a program in C/C++ to read in these scene files. Turn in your parser as part of mp2.c.

2. **(30% for 636, 20% for 736) 3-D low-polygon rendering.** Next, adapt your OpenGL programs from Labs 1 – 2 to do the following:

   a. **(10% / 10%) Vector test render.** Display a wireframe of the mushroom. Turn in your source (mp2.c) and a screenshot (mp2_2a.jpg).

   b. **(20% / 10%) Shading.** Display smooth-shaded versions of the rest, following NeHe tutorials 3 through 5. Turn in your source (mp2_2b.c) and a screenshot (mp2-2b.jpg).

3. Do only the parts that you are required to for the course you are enrolled in. For this machine problem, you will need to download trial versions of NewTek Lightwave 10 and Adobe Photoshop CS5. (You may use your own copy of Lightwave or Creative Suite if you own either one; indicate which version you are using.)
(50%, 636 only) Lighting and rotoscoping.

a. **(20%) Lighting.** Experiment with different colors of light and objects: modify your OpenGL program from MP2-2 above to display a smooth-shaded version of the house that is colored light blue with yellow light, and set the light color to light red with a white house. To experiment with lighting colors and effects using *Lightwave*, follow the tutorials given above; may use any monochrome model and do not have to load the house. Turn in your source (`mp2.c`) and four screenshots: `mp2_3a-gl-BOYL.jpg` and `mp2_3a-gl-ROWL.jpg` for your OpenGL renders, and `mp2_3a-lw-BOYL.jpg` and `mp2_3a-lw-ROWL.jpg` for Lightwave. (Here color ranges over \{R, G, B\}, ‘O’ stands for “object”, and ‘L’ stands for “light”; hence “BOYL” denotes “blue object, yellow light”.)

b. **(30%) Material smoothness and rotoscoping.** In this exercise, you will use a commercial software product in conjunction with your own program to produce the desired visual effect.

   i. Follow the material smoothness and Photoshop-based rotoscoping tutorials given above to incorporate a silver version of your house into this picture: [http://bit.ly/hlXjJy](http://bit.ly/hlXjJy)
      The image is © 2002 Electronic Arts, and is part of a CG still from *SimCity* artwork, and appears in Gino Santa Maria’s tutorial on linear perspective ([http://bit.ly/e2X2AR](http://bit.ly/e2X2AR)).

      This image is © 2009 by Amanda Lavete Architects and appears in the Arch Daily website under tag “amandalavete” ([http://bit.ly/e24yjR](http://bit.ly/e24yjR)).

   Turn in your source (`mp2.c` with rotoscope section identified by comments in your code, or a separate source code listing named `mp2_3b.c`). Also, include a screenshot of your final render (`mp2_3b.jpg`).

(50%, 736 only) Transparency and Mappings.

a. **(20%) Blending and transparency.** Follow NeHe Tutorial 8 ([http://bit.ly/F3AKG](http://bit.ly/F3AKG)) to display an opaque red instance of the house behind a translucent light blue one. The result should be purplish as expected. Turn in your source (`mp2_3a.c`) and a screenshot of the result (`mp2_3a.jpg`).

   Turn in your source code (`mp2_3b.c`) and a screenshot (`mp2-3b.jpg`) of the house after the mapping.

**Extra Credit:** Submit an entry to the Logo Design Contest preliminaries for 636 and 736 – instructions will be posted on K-State Online and the public mirror.

**Class Participation (required):** Consult the project ideas ([http://bit.ly/gCJXAi](http://bit.ly/gCJXAi)) posted by the instructor to the Discussions message board and commit to a term project topic by Fri 18 Feb 2011. Either select one of the options you posted by Fri 11 Feb 2010, or select a new topic based on discussion with the instructor in office hours during the week of Mon 14 Feb 2010. Post a draft proposal in the class mailing list `CIS636-L@listserv.ksu.edu` before you finalize your choice, and ask any questions you like.