

Homework #7, Due on Friday, March 18th

In this homework you will be drawing a robot with reasonable lighting conditions. In addition, the robot will now have material properties. Instead of using `glutWireCube`, you will be using `glutSolidCube` to display the parts of the robot, to demonstrate the effects of the lighting conditions.

Project Requirements:

1. Keep all the elements that you've used for your running robot except, change your `glutWireCube` to `glutSolidCube`.
2. Enable a positional white spot light in your scene.
3. The position of the light may be determined by the command line using a `-l` flag. For example if I run `./basic -l 1 1 1`, this should set the position of the light to (1,1,1). This option allows us to move the light at the command line to see different effects. The user should also allow the user to hit a key (perhaps l) to change the position of the light as well. Use the local viewer lighting model. The system should prompt the user to type in the x,y,z position values of the light. This will allow us to see the difference in light positions at run time. If there is no `-l` flag, the system should use a 'good' default for the light's position value.
4. Display a small yellow sphere at the light position of the light.
5. To see the effects of the spot light, allow the user to press another key (perhaps s), to change the SPOT CUTOFF, the SPOT DIRECTION, and the SPOT EXPONENT. The system should again prompt the user for these three values.
6. Allow the user to change the CONSTANT, LINEAR and QUADRATIC ATTENUATION constants by hitting yet another key (perhaps a). Again, prompt the user for these three values.
7. Allow the user to *zoom* in and out by pressing a key (perhaps z and Z). This will likely be done by a `glTranslate` just after `gluLookAt` in your display function.
8. Lastly, attach some material elements for ambient, diffuse, specular and shininess to simulate a metallic robot. To create a silver robot, these values will probably have the same elements for red, green, and blue in each of these calls. For a gold robot, the blue component should be roughly one third of the R and G components (1,1,3). For copper you might use scalars of (1,.36,.11). For polished metal materials, the shininess variable is often greater than 70. For unpolished materials, this value may be between 10-50, although it depends on the type of material.
9. To make it look as if your robot is running past lights, you could attach the light to some of the geometry that is moving by your robot. You should be able to see the highlights change on the robot. Parts of him may grow dark as well. You could do this for several lights to get the effect of street lamps.