Lab 3 Lighting

1. Create an application with a rotating cube (remember to add normals to the cube) and a directional light. An example of rendering a cube was shown in the lecture and for best results have it rotate around the Y-axis. Keep the directional light simple give it only a diffuse colour value and a direction. Your light should have a diffuse value of (1.0, 1.0, 1.0, 1.0) and a position/direction of (-1.0, 0.0, 0.0, 0.0). This will produce a white light with the light traveling along the x-axis.
   1. Change the colour of the light (Red, some colour of your own choosing)
   2. Change the direction of the light
      1. Move the light to the right hand side of the cube
      2. Have the light travel negatively down the Z-axis
2. Add ambient lighting to your light (a different colour to the main light). Make sure the ambient light is set to a lower power than the diffuse light.
3. Modify the light so is a point light, this may require re-positioning the light.
   1. Update the application so the point light orbits the cube. Remember we treat lights like any other object and they are subject to transformations in the same way geometry is. It may help to draw an object at the lights location, to help keep track of where the light is.
   2. Add a second light that orbits the cube along a different axis. Make this light a different colour. Be careful when setting the ambient component for both lights, they must match.
4. Create an application with a detailed plane (a plane made up of many many quads/triangles) and create a spot light, similar to that shown in the lecture.
   1. Add keyboard controls to the spot light changing the properties of the light. For example, changing the diffuse or ambient colour, and position, so you can see the effect in real time.
   2. Add keyboard controls to turn the spot light on and off.