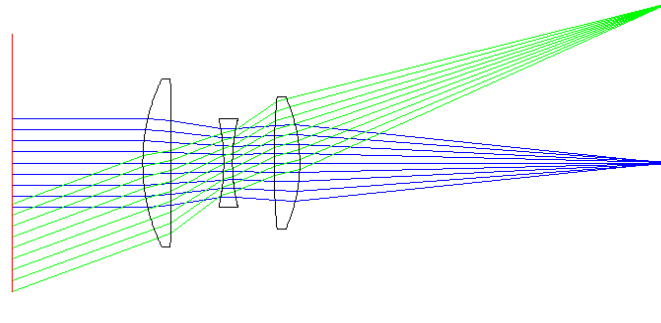


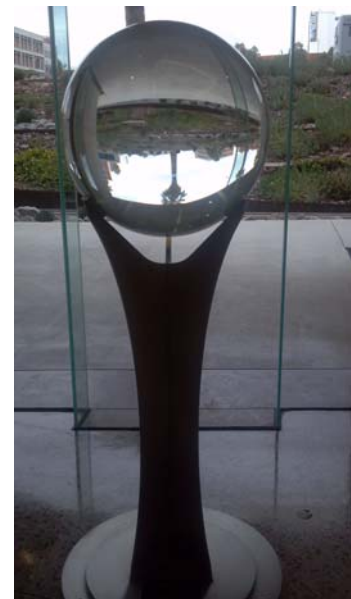
Undergraduates do the first three problems. Graduates Students do all four questions.

1. Below is a raytrace of a Cooke triplet. Which surface is the aperture stop? Which surface is likely to cause vignetting if the field angle is increased?



2. You need to build a machine vision system to inspect a part. You have a 100 mm focal length lens, a 1/3" CCD camera and the working distance needs to be 1 meter. If the part is 39.6 mm in diameter, how far is the CCD sensor from the lens (you can assume a thin lens here).

3. In the lobby of Optical Sciences is a sculpture of a glass sphere. The sphere has a circumference of 1.623 m and is made from S-BSL7 glass. Using raytracing code, find the locations of the cardinal points. Assume $\lambda = 0.5876 \mu\text{m}$.



4. *****Grads Only*****

Create a spreadsheet like the one illustrated in class to do a paraxial raytrace of the system listed in question 3.

Calculate the cardinal points from the spreadsheet and verify they match the results of the raytracing code.