Lecture 20: Env. Maps and Tone Mapping – Review Questions

- What is the purpose of environment mapping?   What are the advantages compared to standard ways of specifying light sources?

- Describe how to modify your ray tracer to handle environment mapping.

- Using ray tracing, one can only apply environment mapping to secular surfaces. Why?   In Paul Debevec's Rendering with Natural Light movie, the diffuse surfaces are also lit with an environment map. How did he do that?

- What approximations are made when an object is lit with an environment map instead of the true lighting?

- Ignoring sampling issues, will an object lit with a spherical env. map look the same as if lit with a cubic env. map? Why, or why not?

- When placing a synthetic object into a real scene, why is it important to capture the a high dynamic range environment map?

- One way to capture an environment map is by photographing a mirrored ball. Does this capture light from all directions? Almost all direction? Only a hemisphere of directions? Explain by drawing a picture.

- If mirrored balls are so great for capturing environment maps, why aren't people using the same idea to capture panoramic photographs?

- What is the goal of tone mapping?

- Why is tone mapping even possible? That is, why can we ever hope that a sunset and a picture of a sunset could be made to look the same to a human observer?

- Why won't using an environment map with path tracing work for an outdoor scene on a sunny day?   How can this be solved?

- When inserting a synthetic object into a real scene, the interaction between the object and the scene are done by a three-part model: 1) distance scene, 2) local scene, and 3) synthetic object.   Which of these synthetically models geometry that is present in the actual physical scene?

- Describe the process of rendering synthetic objects into a real scene such that the synthetic objects cast shadows onto the real objects.

- Given an HDR image, what is a simple way to simulate glare?   Why does it work?