

CIS 560 Quiz 8: Advanced Path Tracing

Question 1

Describe a scene layout in which bidirectional path tracing would be particularly useful, and explain why this is the case. Your answer should be no more than **two sentences**.

A scene in which the light source is occluded from nearly all angles would converge much more quickly if bidirectional path tracing were used to render it. This is because paths that light rays take from the light source into the scene will be partially traced, and eventually connected to paths that rays take from the camera into the scene, increasing the energy that any one path to the camera collects.

Question 2

Describe the difference in shape between an isotropic glossy BRDF and an anisotropic glossy BRDF. Recall that an isotropic surface reflects light symmetrically about a particular axis, while anisotropic surfaces reflect light asymmetrically. An example of an anisotropic material would be brushed metal. Your answer should be no more than **one sentence**.

An isotropic glossy BRDF has a lobe that is symmetrical about the specular reflection of ω_o about the surface normal, while an anisotropic glossy BRDF has a similar lobe, but it is stretched along some arbitrary axis that is perpendicular to the specular reflected direction of ω_o (the shape of this stretched lobe also changes as ω_o gets further from the surface normal).

Question 3

Describe how one might implement motion blur in a raytracer/pathtracer. Your answer should be no more than **one sentence**.

Jitter each camera ray by some amount in *time*, then sample the scene at that point in time for that ray (weighting rays more heavily when they have a time value closer to the current frame).