

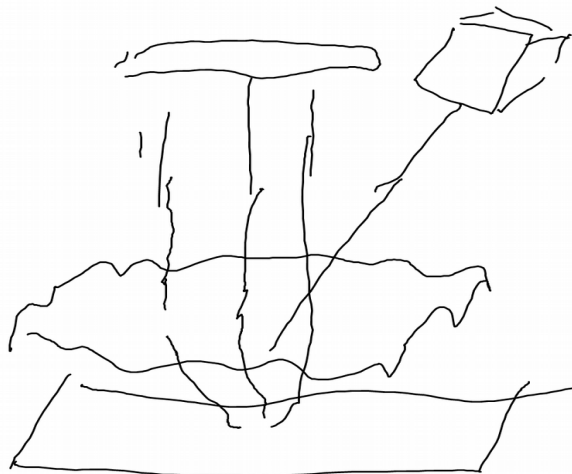
Part 1) Caustics seem to be an interesting topic to approach. One way caustics is implemented is through photon mapping. From the research I have done, photon mapping is a two pass global illumination shader that requires a light source and the camera to both be tracked independently then calculated together to produce a radiance value. Another way this can be implemented is through volumetric path tracing, which combines path tracing with light scattering.

With photon mapping, a light source sends out photons and intersects with any surface it encounters. Any interactions are stored on a photon map which will be used in a second pass. During the second pass, each pixel is colored by tracing until the closest intersection is found. This refracted ray is compared to the photon map, which then calculates the color of the pixel compared to another texture, such as an environment map. Sketch of how I think it works below.

Through GLSL, I think this can be implemented with a plane, a surface, and the camera. From the plane which will serve as our light source, we can send rays to the surface I want to calculate caustics for, be it glass or a body of water. The angle of refraction will be calculated from the normal of the surface and the incident angle of array. Then, I guess a ray cast from the camera will intersect the resultant ray from the refraction and calculate a map as a texture for calculating the radiance and color. The more rays landing on a spot, then the brighter the color.



Part 2) The team we have decided on is currently Spencer Witkin, Bryce Newbury, Jolina Lam and Wilbur Li. We were thinking of a scene of a food platter ala Monster Hunter, so it will contain a ridiculous amount of various foods. Currently, we were thinking of caustics and condensation for the drink, smoke simulation for the piping hot meat, maybe ambient occlusion and god rays.



Reference: http://developer.download.nvidia.com/books/HTML/gpugems/gpugems_ch02.html