Homework 1 – Foundation of Computer Graphics
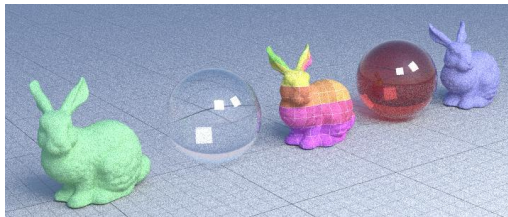
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- **Refraction extra credit:**

To done this point I decided to create another shader. I started to add inside the enum "`raytrace_shader_type`" the refractor parameter. After that I added inside "`raytrace_shader_names`" the respective string name for the enum. The next step was create a function called "`shade_refract`" and add it inside the switch on the "`get_shader`" function. This function is equal to "`shade_raytrace`" function with the difference that inside the case of "`material_type`::`transparent`" we have 2 more parameters: ior and eta. Now we calculate the Fresnel term and we made a compare it with a random picking in order to not re-weights the Fresnel term. We want that the ray going on scatting light reflecting it or transmitting. We calculate the reflect with function "`reflect`" and we calculate the refract with function "`refract`".

All the information for doing it was on the slides given by the professor and on the yocto documentation.

RESULT:

SCRIPT FOR TEST IT:

./bin/yraytrace --scene tests/08_glass/glass.json --output out/lowres/0x_refract_720_9.jpg --samples 256 --shader refractor --resolution 720

- **Cell shading extra credit:**

To done this point I decided to create another shader. I started to add inside the enum "`raytrace_shader_type`" the ownshader parameter. After that I added inside "`raytrace_shader_names`" the respective string name for the enum. The next step was create a function called "`own_shader`" and add it inside the switch on the "`get_shader`" function. Inside this shader I reuse the code of "`shade_raytrace`" and added steps for done the toon effect. I decided to create a new function called "`get_toon_magic`". For the implementation of this function I follow the steps described on the site: https://roystan.net/articles/toon-shader.html. It was fundamental to understand and set world position of the light, colors, ambient light and glossness. I've also search on internet more information to understand how do it but the way all the code was implemented following the site linked before.

RESULT:
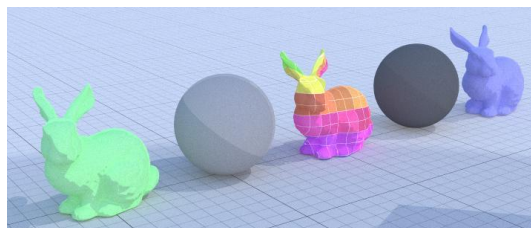
SCRIPT FOR TEST IT:

./bin/yraytrace --scene tests/07_plastic/plastic.json --output out/lowres/0x_ownshader_720_9.jpg --samples 256 --shader ownshader --resolution 720