Fundamentals of Computer Graphics

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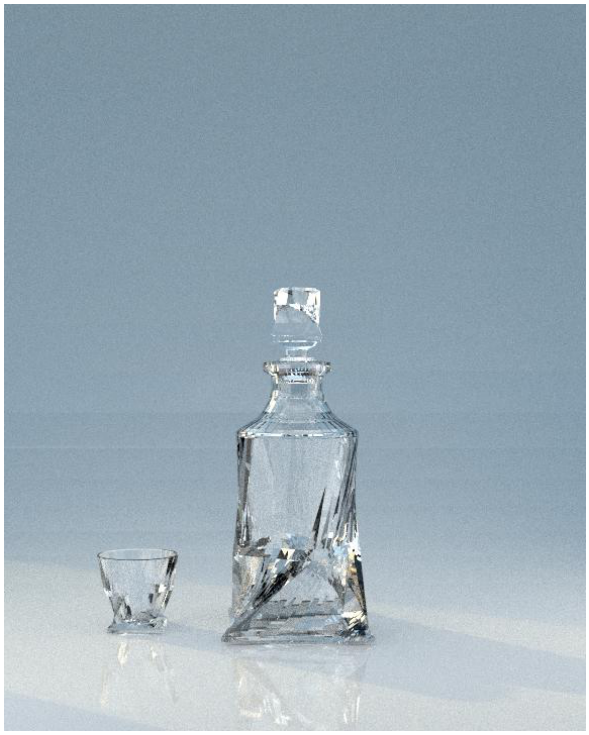
- **Refraction:** The first extra credit I made was adding the refraction material support. I added the refractive material case to all the BRDFs functions. Below the command and the result I've got with a custom scene:

```
./bin/ypathtrace --scene tests/18_refraction/refraction.json --output
out/path/18_refraction_720_256.jpg --shader pathtrace --samples 256 --resolution 720 --
bounces 8
```



- **Denoising:** The second extra credit I did is the implementation of the Intel Open Image Denoiser. I installed everything trying to follow their installation guide, but I had to do some research because it seems that the guide is not updated. To enable the denoiser there is a `YOCTO_DENOISE` variable to be turned to `ON` in the `CMakePresets.json` file. I've then added the needed functions in the `yocto_patrace.cpp` file. The functions that needed to be edited were mainly the `shade_naive and the shade_pathtrace` because they needed to return, not only the radiance but also the albedos, hits and normals that the denoiser needs to work.

  Running the run.sh script with the denoiser produced the results you can find on this link or in the submission: https://drive.google.com/drive/folders/1tzUODl9QMRrld9_WytJ5yKvcWy8FFz4u?usp=sharing

- **Large Scenes:** The third extra credit was the rendering of some of the supplied large scenes. I've rendered both the San Miguel and the Bistro Interior. I've rendered San Miguel with 1024 samples and the Bistro Interior at 2048 samples.

  Running the following commands produced the results below:

```
./bin/ypathtrace --scene tests/sanmiguel/sanmiguel.json --output
out/path/19_sanmiguel_720_1024.jpg --shader pathtrace --samples 1024 --resolution 720 --
bounces 16
```

```
./bin/ypathtrace --scene tests/bistrointerior/bistrointerior.json --output
out/path/21_bistrointerior_720_2048.jpg --shader pathtrace --samples 2048 --resolution 720 --
-bounces 16
```