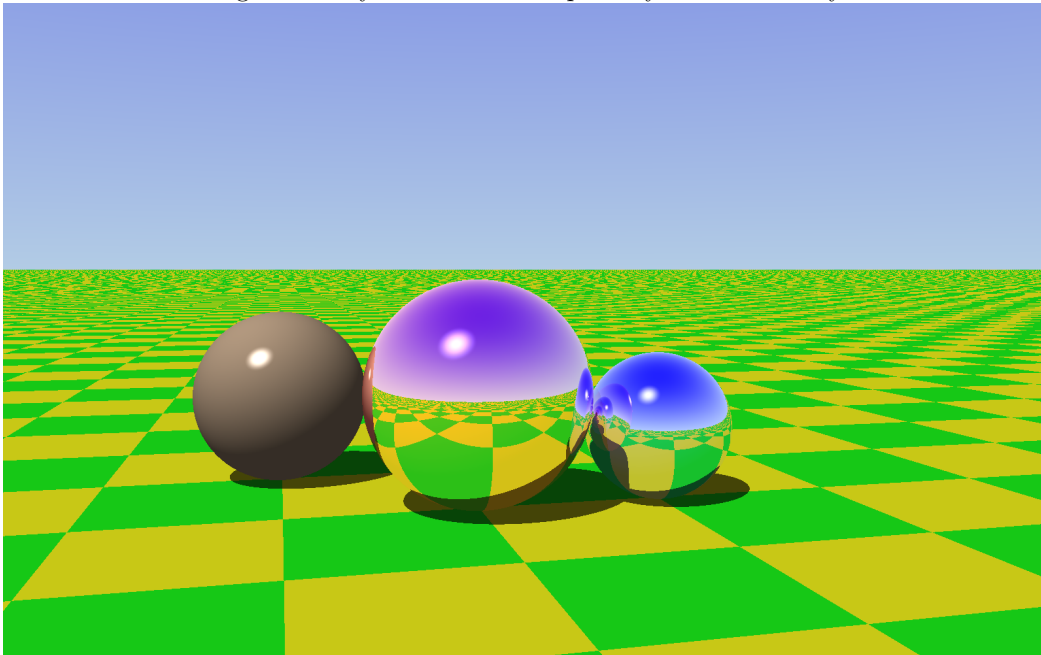


Summer Semester 2022

Assignment on Massively Parallel Algorithms - Sheet 6

Due Date 17. 07. 2022

Figure 1: Ray cast scene with primary reflections only.



Exercise 1 (Dynamic parallelism, 10 Credits)

In this assignment, your task is to enhance a parallel ray tracer with scattered reflections. The provided framework already traces a simple scene and produces an output as shown in Figure 1.

Your task is to implement simple, scattered reflection. To do so, you average the color returned by multiple rays, instead of just following the direct reflection. In this exercise you are supposed to use dynamic parallelism for the scattered rays. Search for the `TODO` keyword in the provided source for a starting point.

- You most likely can not start a new kernel for every pixel you trace. Implement some means of limiting the number of child kernels.
- The child kernels have no access to memory from their parent. You need to implement some way for them to return their result. Remember to use atomic operations when adding the results from the child in parallel.
- Shoot the scattering rays in a dome shaped grid. You can use the thread IDs to adjust the ray direction for each scattered ray.