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overall submission

For part A, the team did all of the required features.
For part B, the team implemented reflection and shadow. The team chose to do BSP with AABB(Axis aligned bounding box). For the 9 additional features, the team implemented Anti-aliasing, Depth of field, Soft shadow and texture-mapping.

the code, and the file structure

Important implementations are placed in the following files
In raytracer.cpp
To enable BSP

- Change variable ***turn_on_BSP*** to 1

To enable reflection:

- Change variable ***d_end*** from 1 to 2

To enable anti-aliasing:

- Change variable ***SA_times*** from 1 to 2 (2x AA), or 3(3X AA)

To enable depth of field:

- Change variable ***turn_on_depth_of_field*** to 20 (desired number of samples)

what we have implemented and what external resources you have used

We have implemented all the required features for Part A, and the following for part B:

- reflections and shadows
- BSP
- Area light and soft shadow
- Texture mapping
- Anti aliasing
- Depth of field

The features we implemented does not require additional resources, they only require modifications to the given source code.

The role of each member on the project

Chengjie Jiang:

- Part A: casting ray, ray-sphere intersection, phong shading
- Part B: Depth of field and BSP(binary space partition with AABB binary tree)

Mingen Sheng:

- Part A: ray-square intersection

- Part B: Reflection, Area light and soft shadow, Texture mapping, Anti aliasing

BSP: with BSP turn on render 3 balls one square at 1920x1080 resolution with 40 Depth of Field sample time: elapsed time: 1849.95s

BSP: without BSP turn on render 3 balls one square at 1920x1080 resolution with 40 Depth of Field sample time: elapsed_seconds 2505.563924 seconds