Computer Graphics: Rendering Coursework Report

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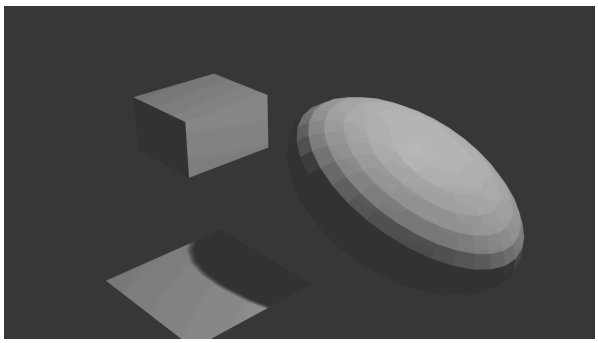
Module 2

For the second module, an intersection test was created for each of the meshes in the scene. A Bounding box hierarchy (BBH) was then created in order to speed up the intersection test process.

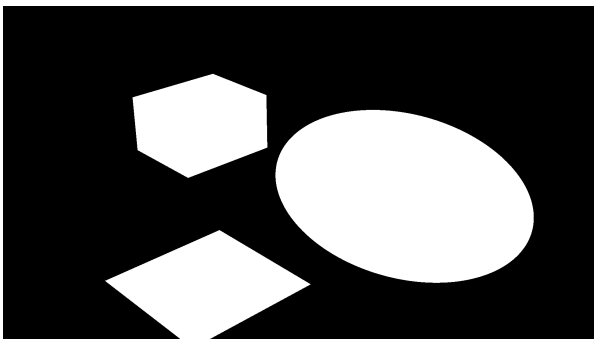
Testing

In order to test the following was done:

- **Intersection test** - for the intersection test, scenes with spheres, cubes and planes were exported from blender and turned into JSON. Then a ray was made for each pixel in the camera's vision, and the ray was checked for intersection. If an intersection was found, the pixel was made white, and if not it would remain black. This made for a very visual test of whether the intersection tests were working, see below:



(a) Blender Render of created scene



(b) PPM file generated from module 2

- **Acceleration test** - for this, two tests were run. One computed the speed of the brute force vs the BBH method in order to show the speed up between the two. The second was another visual test to ensure that the output was the same to ensure correctness. The following is the result showing the clear speedup.

```
-- TESTING NO HIERARCHY --------------
Execution time: 13354 ms
Amount of intersection tests: 103680000
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-- TESTING HIERARCHY --------------
Execution time: 8121 ms
Amount of intersection tests: 110067359
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```