600086 Lab Book

# Week 7 – Lab 6 A simple CUDA ray caster

Date: 24th Mar 2022

## Exercise 1. Drawing based on a canvas of size [-1, 1]x[-1, 1]

### Question1: implement a solution using GPU processing to solve the problem

### Solution:

1. Draw the image based on pixel coordinates defined in float type variables in

[-1, 1]x[-1,1]

Text

Description automatically generated

Added in a translation for the pixel location represented by u and v and then added a scale translation to ensure the resultant image matched the aspect ratio of the window to prevent distortion. See Sample Output Ref 1 and 2 for the results.

### Test data:

N/A

### Sample output:

|  |  |
| --- | --- |
| REF | Output |
| 2 |  |
| 2 |  |

### Reflection:

none

### Metadata:

### Further information:

none

## Exercise 2. Write a simple ray caster

### Question1: implement ray casting based on raycasting in a weekend repo

### Solution:

1. Add the necessary header files to the project

Text

Description automatically generated

1. Change the variable names in the ray class to make them more meaningful for the current implementation

Text

Description automatically generated

Changed the A and B variables to be O for origin and Dir for direction.

1. Implement the following functions cuda\_check\_error, castRay, create\_world and free\_world

Text

Description automatically generated

### Text Description automatically generated

### Text Description automatically generated

Text

Description automatically generated

1. Modify the d\_render method so that it will raycast and render the image

Text

Description automatically generated

1. Modify the render() method so that it will create a sphere and pass it into the d\_render method for casting

Text

Description automatically generated

Running the solution at this point renders the image shown in the sample out put section.

### Test data:

none

### Sample output:

Chart, bubble chart

Description automatically generated

### Reflection:

The task above was fairly easy to follow unsure why my red and blue values seem to have switched making my sky tinged red rather than the blue in the example.

### Metadata:

## Exercise 3. Adding multiple spheres to the ray caster

### Question1: modify the previous code to render 10 spheres on the screen

### Solution:

A screenshot of a computer

Description automatically generated with medium confidence

Added in the 10 extra spheres to form a 3\*3 grid of spheres with two larger spheres in the background further back. See sample output for resulting render.

### Test data:

none

### Sample output:

Chart, bubble chart

Description automatically generated