CS4351 Real-Time Graphics (2018/2019 Semester 1)

Programming Assignment #4

Release Date: 19 October 2018, Friday

Submission Deadline: 4 November 2018, Sunday, 11:59 PM

TASK 1: Complete the Raytracer

You are to complete a Shadertoy GLSL fragment shader that implements the Whitted Ray Tracing algorithm. Your completed shader is to be run at https://www.shadertoy.com/new. The following images show sample views of the result that your program is expected to produce:

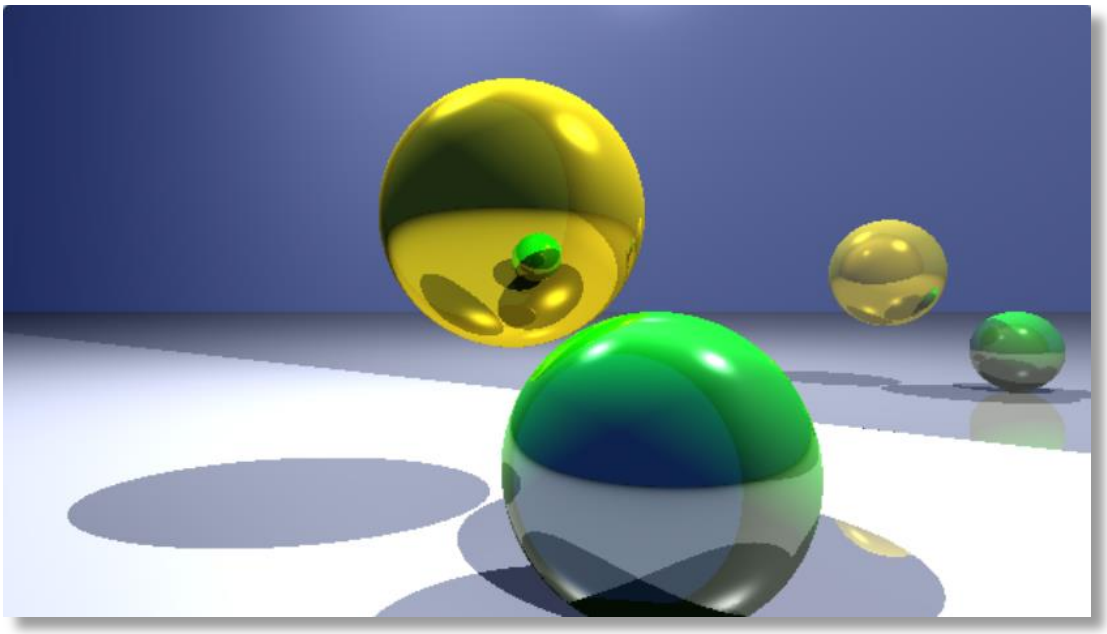

Figure 1

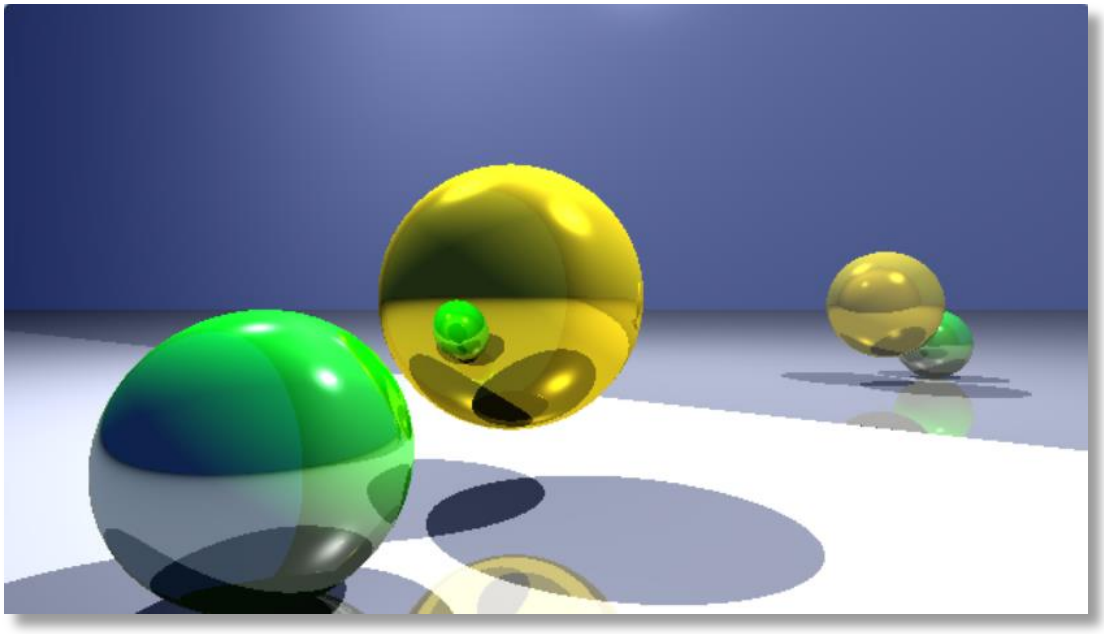

Figure 2

The scene consists of a silvery horizontal plane, a silvery vertical plane (in the background), a bouncing golden yellow ball, and a revolving shiny green ball. There are two point light sources. The images above were produced using 2 levels of ray tracing (recursion level = 2).

Please download the ZIP file **cs4351_1819S1_assign4_todo.zip** from the **Assignments** folder in the IVLE Workbin.

You need to complete the Shadertoy GLSL fragment shader **raytracer_1.frag**. To run your shader, you need to copy-and-paste the shader source code to the source editing window at https://www.shadertoy.com/new. To run or rerun your shader, you just need to click the small black triangle at the bottom-left corner of the source editing window, and the result will be shown in the rendered image on the left of the page. You can do your coding and editing in the Shadertoy webpage, but make sure you copy the updated source back to the file **raytracer_1.frag**.

The detailed instructions and requirements for completing the fragment shader can be found in the given source code.

TASK 2: Design Your New Scene

For this task, you are to model and render a new 3D scene by modifying the shader you have completed for Task 1. Your new scene should not look similar to the original scene in **raytracer_1.frag**. Moreover, at least one of the objects, at least one of the light sources, and the camera **must be animated**. The animation must be perpetual.

Put your completed shader code in the file **raytracer_2.frag**. Your work will be assessed by the aesthetics and creativeness of the new scene and the animation.

GRADING

The maximum marks for this programming assignment is **100**, and it constitutes **8%** of your total marks for CS4351. The marks are allocated as follows:

- **Task 1 — 80 marks,**
- **Task 2 — 20 marks.**

Note that marks will be deducted for bad coding style. If your program cannot be compiled successfully, you get 0 (zero) mark.

Good coding style. Comment your code adequately, use meaningful names for functions and variables (adhere to the new variable naming convention), and indent your code properly. You must fill in your **name**, **student number**, and **NUS email address** in the **header comment**.

SUBMISSION

For this assignment, you need to **submit only**

- Your completed **raytracer_1.frag** that contains the Shadertoy shader code for Task 1;
- Your completed **raytracer_2.frag** that contains the Shadertoy shader code for Task 2.

You must put it in a ZIP file and name your ZIP file **<*matric_no.*>_assign4.zip**. For example, **A0123456X_assign4.zip**. All letters in your matric. number must be capitalized.

Submit your ZIP file to the **Assignment #4 Submission** folder in the IVLE Workbin. Before the submission deadline, you may upload your ZIP file as many times as you want to the correct folder. **We will take only your latest submission.** Once you have uploaded a new version to the folder, you **must delete the old versions**. Note that when your file is uploaded to the Workbin folder, the filename may be automatically appended with a number. This is fine, and there is no need to worry about it.

DEADLINE

Late submissions will NOT be accepted. The submission folder in the IVLE Workbin will automatically close at the deadline.

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