Final Project: Ray Traced Image

CS148 Fall 2019

Figure 1: Final images from previous CS148 offerings. From left to right, top to bottom: image ranked 10-1 from 2014 by Marianna Neubauer and Yixin Wang; 10-1 image from 2015 by Peter Do Ha and Brennan Preston Shacklett; 10-1 image from 2016 by Shyamal Buch and Wilbur Yang; 10-1 image from 2017 by Christopher Sauer and Kevin Rakestraw; 10-1 image from 2018 by Fang-Yu Lin. Larger versions of these images (and others) can be found under the ‘Showcase’ link on the course webpage.

1 Project

Please read the entire document prior to asking questions. The final project is an image that you create using the cs148 ray tracer. You must put together a coherent scene using geometry that you made and/or found online. Note that you must have one piece of geometry that you made yourself in your scene. Your objects should be positioned, textured, and lit in a way that makes a coherent scene. You are welcome to use any asset provided with the OpenGL renderer or the raytracer as something that you “found online.” Since you will be graded primarily on artistic merit, we recommend you spend a lot of time asking for feedback from the CAs, Ron, friends, family, etc.

2 Required Items

To grade your final ray traced image, we will require four things:

1. Final writeup detailing what you did (electronic copy). You must clearly state what each person in your group did, what assets you got online, what assets you made yourself, any technical contributions, etc. The filename of the electronic copy should be the SUNet ID(s) of everyone in your group concatenated by underscores (e.g. student1_student2.pdf).
2. An electronic copy of your image. The filename should be the SUNet ID(s) of everyone in your group concatenated by underscores (e.g. student1_student2.png).
3. Variant A of your image: render your image from a different camera view.
4. Variant B of your image: render your image from the original camera view and the same exact lighting conditions but with no textures (use a gray, purely-diffuse BRDF, gray in RGB being: (0.5, 0.5, 0.5)).

For the electronic writeup, please use a plain-text file format, a Microsoft Word document (*.doc,*.docx), or a PDF file. Variant A and Variant B of your image can be rendered without any effects (e.g. global illumination) and with only one sample per pixel (and per light if relevant). Additionally, Variant A and Variant B can be rendered at a lower resolution. At a minimum, Variant A and Variant B should have a pixel width of 480 pixels—however, be sure to maintain the aspect ratio of your final image.

3 Logistics

Note that all online submissions will be done via Google forms/Google drive which you should have access to with your Stanford account. If for some reason this is not an option for you, please make a private Piazza post ASAP.

3.1 Submission

We will provide a link on Piazza for submission of the electronic copy of your write-up and image nearing Thanksgiving break. You are welcome to submit multiple times; however, your latest submission before the final electronic submission deadline will be the one used for grading.

4 Important Dates

All times are in PST.

- 12/3, 12/5: CA led classes where we will discuss past images and their strengths and weaknesses as viewed by the CA.
- 12/11 (12pm): Initial electronic submission due.
- 12/12 (12pm): Last opportunity to submit a higher quality image. Final electronic submission due.

In other words, you will submit a version of your final image on December 11, but from that point you can also spend one more day re-rendering the same scene with higher sampling rates and image resolution to get a higher quality final image. **Your image must not change aside from sample count and resolution between the image submitted on 12/11 and the one on 12/12.**

5 Grading

Your image will be graded primarily on artistic merit. All images will be separated into 10 “buckets” where each bucket represents images of around the same quality. Images in bucket 1 are of the poorest quality while images in bucket 10 are of the highest quality. Within each bucket, each image will be ranked. For example, an image that is bucket 10 rank 5 was deemed to be of lower quality than an image that is bucket 10 rank 2. However, both would be of higher quality than any image in bucket 9. Any outstanding technical contributions will be taken into consideration when assigning buckets/ranks. **Technical contributions alone will not net you a good grade.** A letter grade will then be assigned to each bucket. For example, here are examples of grades given to each bucket (along with the bucket descriptions) from previous offerings of the course (Note that these are not the guidelines for this year. Bucket descriptions change based on the pool of images in the current class—only use these as an approximate reference):

1. B. Image lacked complexity and/or exhibits serious artifacts (e.g. a simple box with shapes; black holes all over the image).
2. B. Image has significant problems with texturing, lighting, and/or geometry (e.g. no textures; flat shading).
3. **B+.** Incorporates more sophisticated models and/or custom-made models. Scene is still very simple or suffers from lighting or texturing problems. i.e. simply making a complicated model in Blender/Maya is not enough if the overall scene is sub-par!

4. **A-.** Images in this bucket and higher exhibit an aesthetic appeal through having a focus/narrative. They are distinguished by some artistic merit or technical work, but may still lack complexity or have some problems with lighting or texturing.

5. **A.** Image looks good through effective use of lighting, custom geometry, or good composition.

6. **A.** Images are more complex than those of previous buckets. They contain great attention to detail, effective use of lighting, and/or technical effort. Strong artistic/aesthetic appeal.

7. **A.** Images have good lighting and geometry. Images are cohesive and are more aesthetically appealing than those of previous buckets.

8. **A+.** Excellent scene composition and artistic merit. Few to no visible artifacts. Might have superior technical merit through the effective use of custom geometry and custom shaders.

### 6 A Final Piece of Advice

Please use your CAs to your advantage! We recommend coming to office hours often to get feedback on your project as you develop it. We will give candid feedback to help improve your project grade—we want everyone to succeed and are here to help!