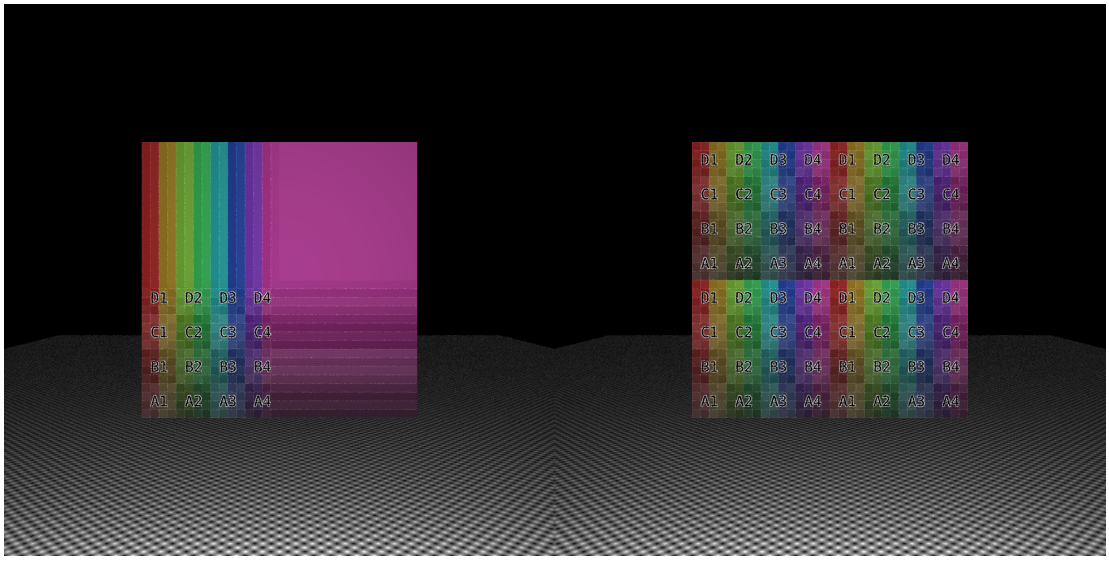
Assignment 04 Jing Li and Zhen Ma
Report and Read me

We add the isBlurry bool, isMipmap bool, isRussian, depth_of_field bool in the scene; we also add the normal_mapping in the Material.

1 Texture tiling [2.5 points].

Left: 01_textured_nontiling.png
without tiling effect

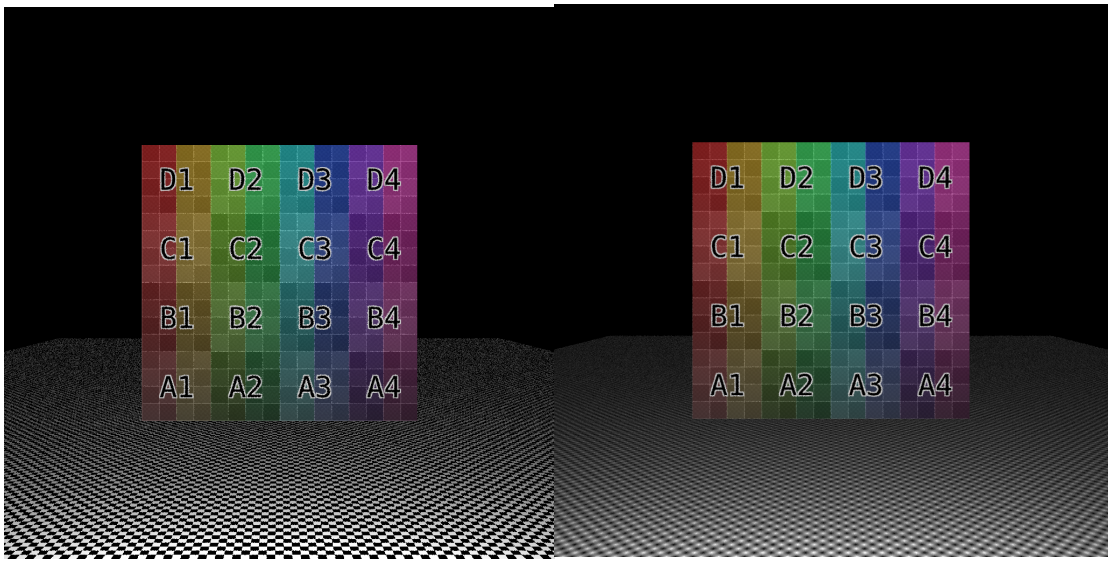
Right: 01_textured_tiling.png
with tiling effect



2 Texture filtering [2.5 points].

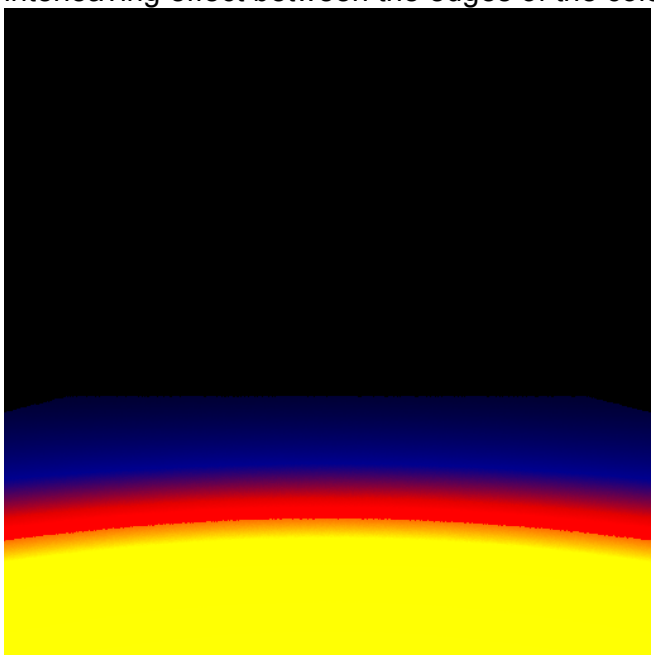
Left: 01_simply_clamp.png
without texture filtering

Right: 01_textured.png
with text filtering

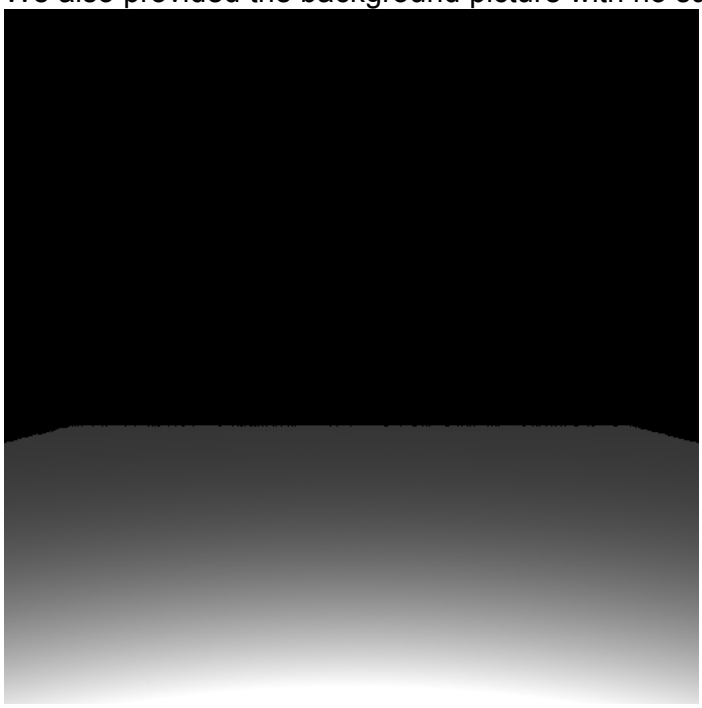


3 Mip-map with texture filtering [5 points].

We created three different color pictures, blue, red and yellow. You could see the interleaving effect between the edges of the colors.

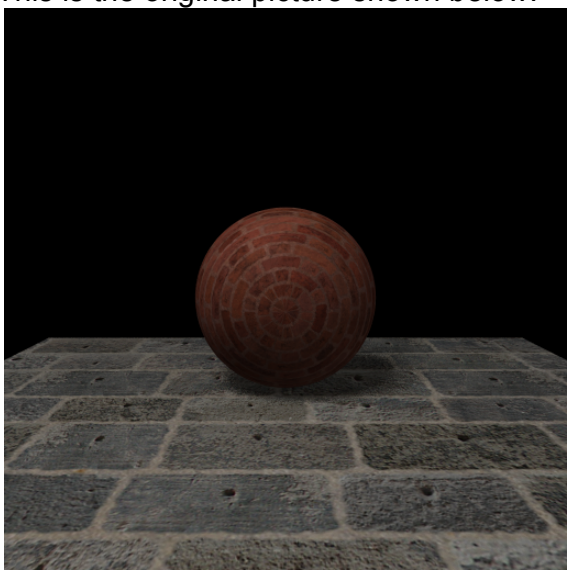


We also provided the background picture with no such color pictures for review.

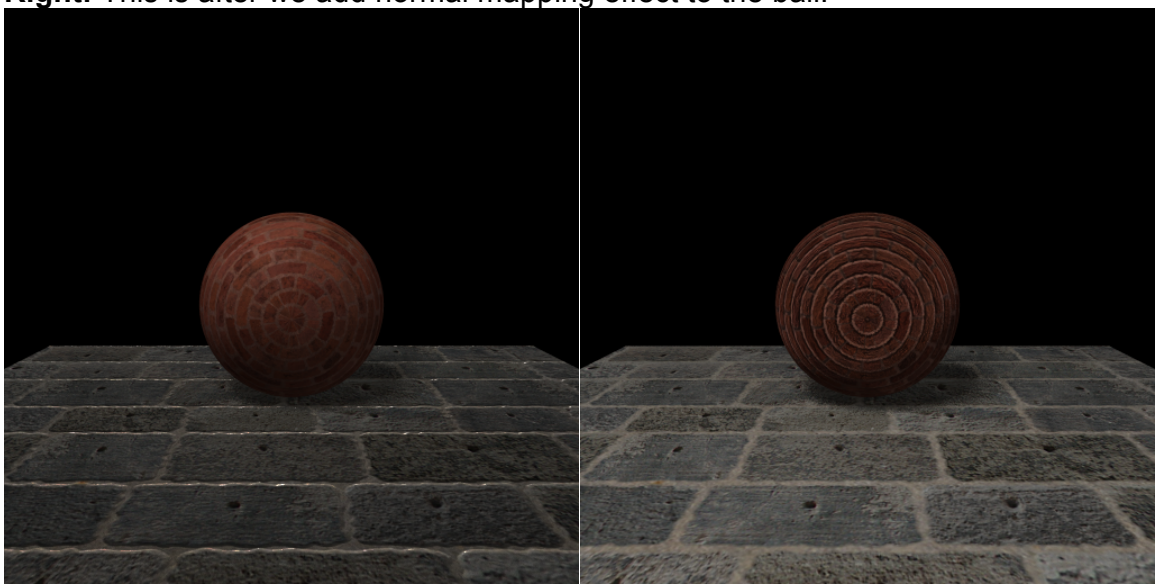


4 Normal mapping [2.5 points].

We added the isMipmap bool to the scene to turn in on/off.
This is the original picture shown below.

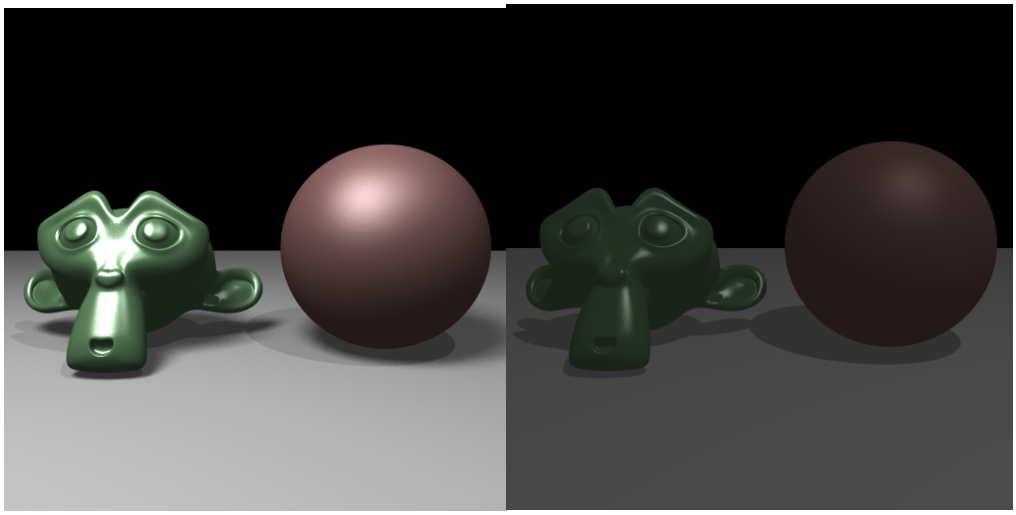


Left: This is after we add normal mapping effect on the floor.
Right: This is after we add normal mapping effect to the ball.

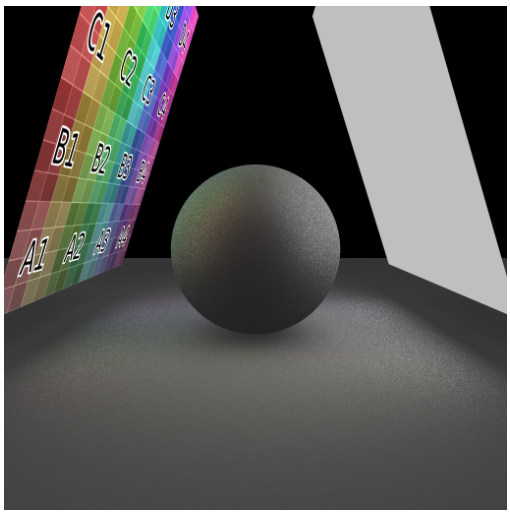


5 Quad area lights [2.5 points].

Left: with quad area lights
Right: without quad area lights



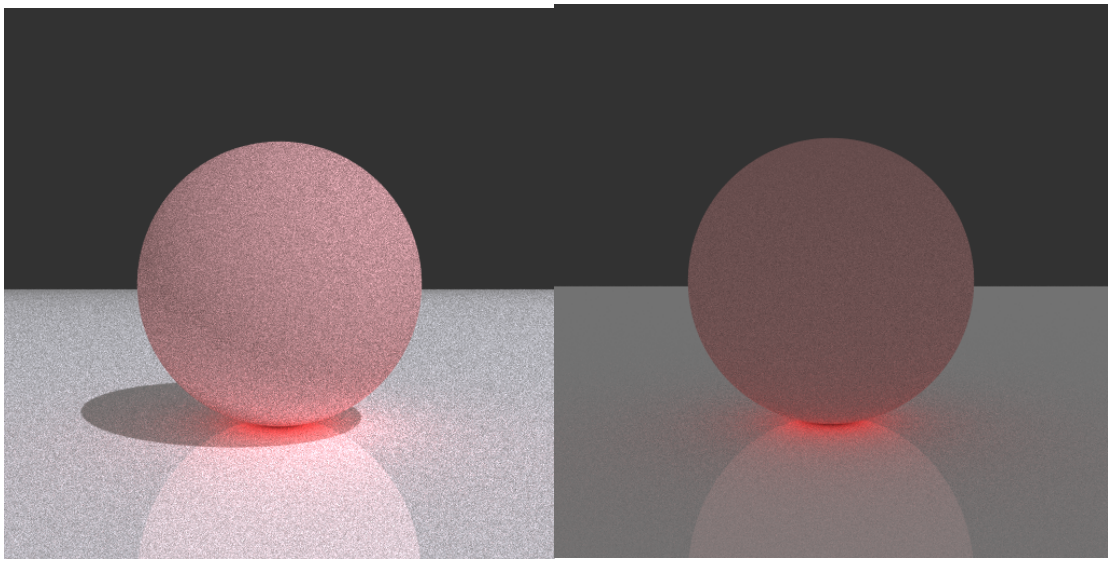
Below: with quad area lights



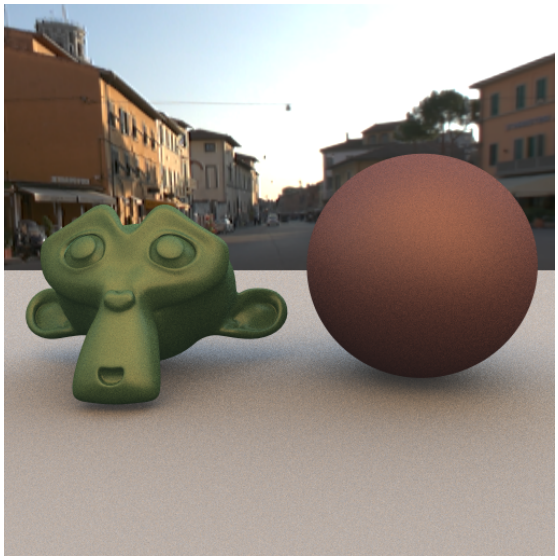
6 Sphere lights [2.5 points].

Left: with sphere light as 04_sphere_light_after.png

Right: without sphere light as 04_sphere_light_before.png



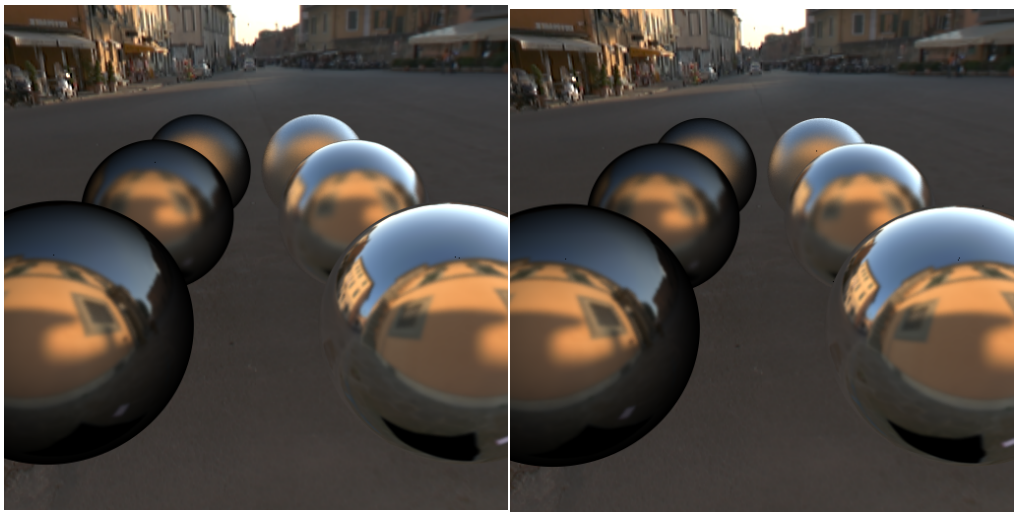
7 Environment illumination [2.5 points].
Here is a picture generated by using the environment illumination.



Here is a picture without environment illumination.

8 Microfacet materials [5 points].

Left: with microfacet materials, with material reflection
Right: provided as reference

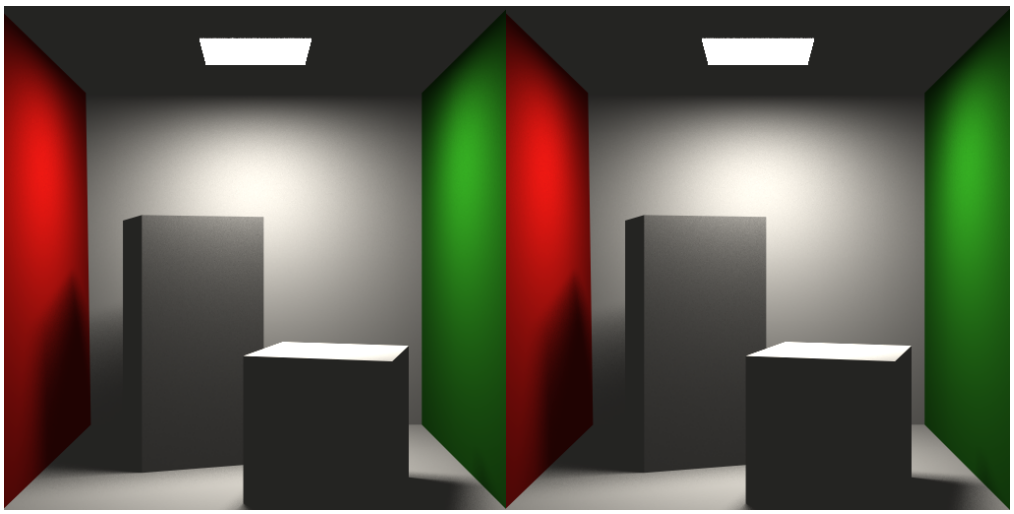


Left: with microfacet materials
Right: provided as reference

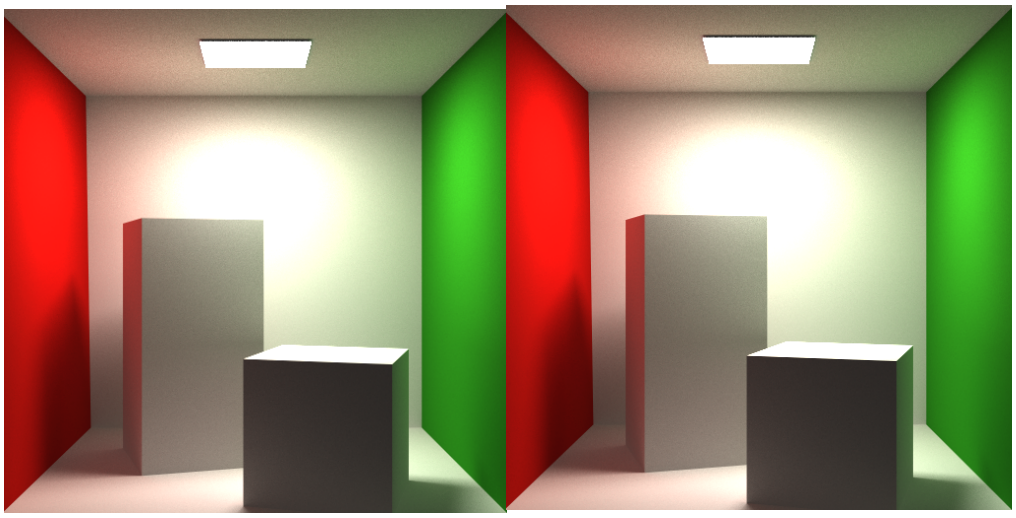
9 Indirect illumination [2.5 points].

We are showing three different result pictures here. First one is showing the indirect reflection. Second one is showing the indirect reflection.

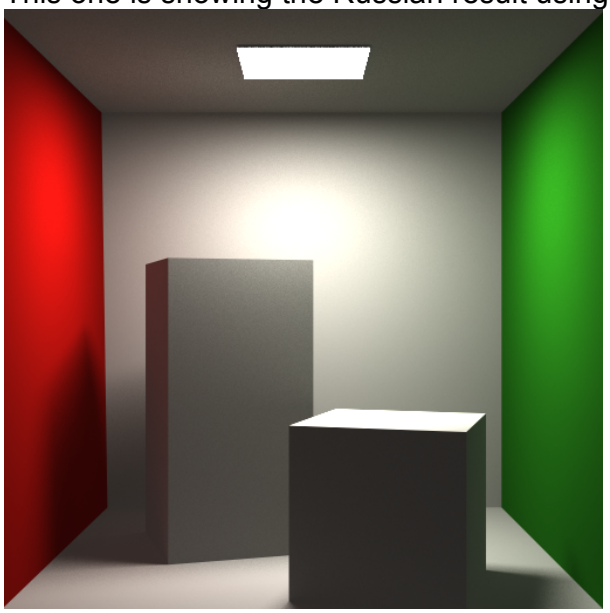
Left: direct reflection as 06_cb_direct.png
Right: provided as reference



Left: indirect reflection as 07_cb_indirect.png
Right: provided as reference

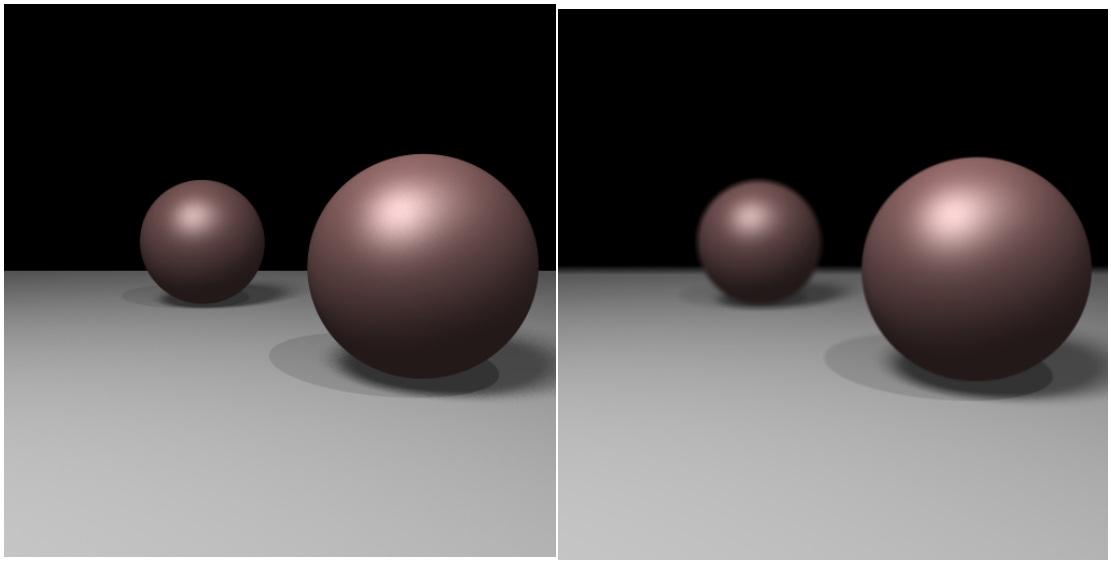


10 Russian roulette [2.5 points].
This one is showing the Russian result using 0.1 as the threshold.



11 Depth of field [2.5 points].

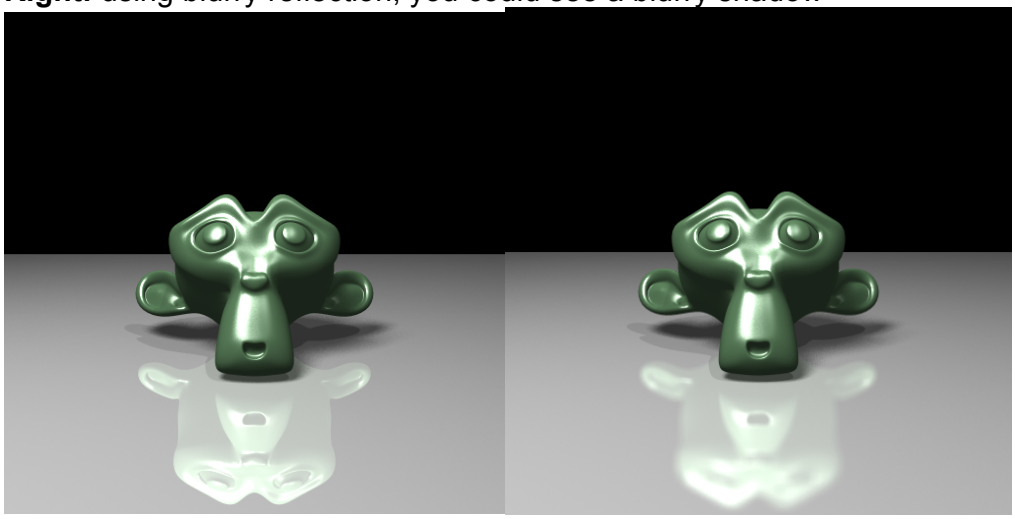
Left: without using depth of field, you could see a clear small ball.
Right: using depth of field, you could see a blurry small ball



12 Motion blur [5 points].
We did not do this part☹

13 Blurry reflections [2.5 points].

Left: without using blurry reflection, you could see a clear shadow
Right: using blurry reflection, you could see a blurry shadow



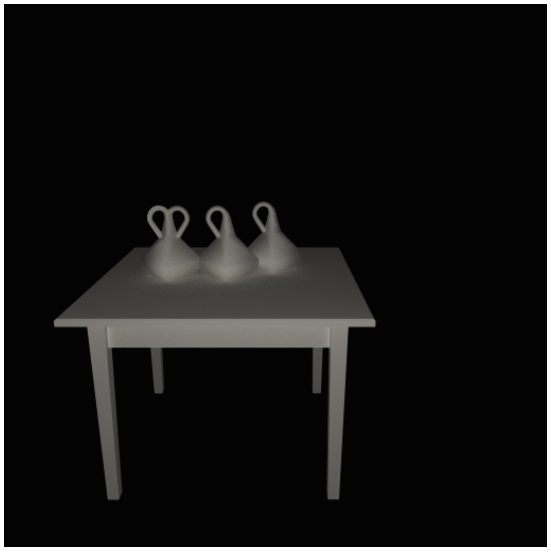
14 kd-tree acceleration [10 points].

We have read this paper. https://graphics.stanford.edu/papers/gpu_kdtree/
We understand the basic idea of it. However, we are not be able to fully implement it.
We are thinking to implement a GPU analyzer into it.

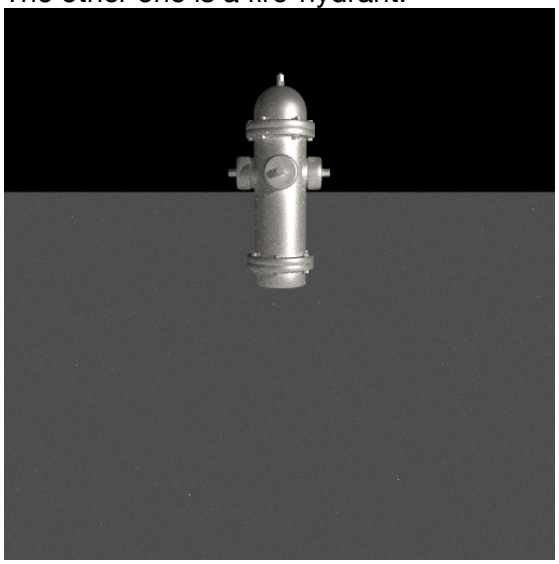
15 Cool Scene [2.5 points].

We download several pictures from http://www.blendswap.com. And we used the provided script to change the PLY to JSON.

One is a table with several chemical bottles.



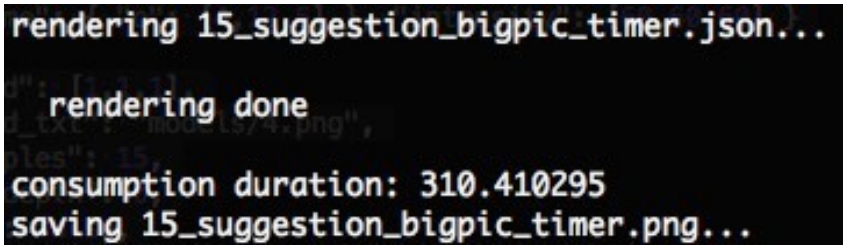
The other one is a fire-hydrant.



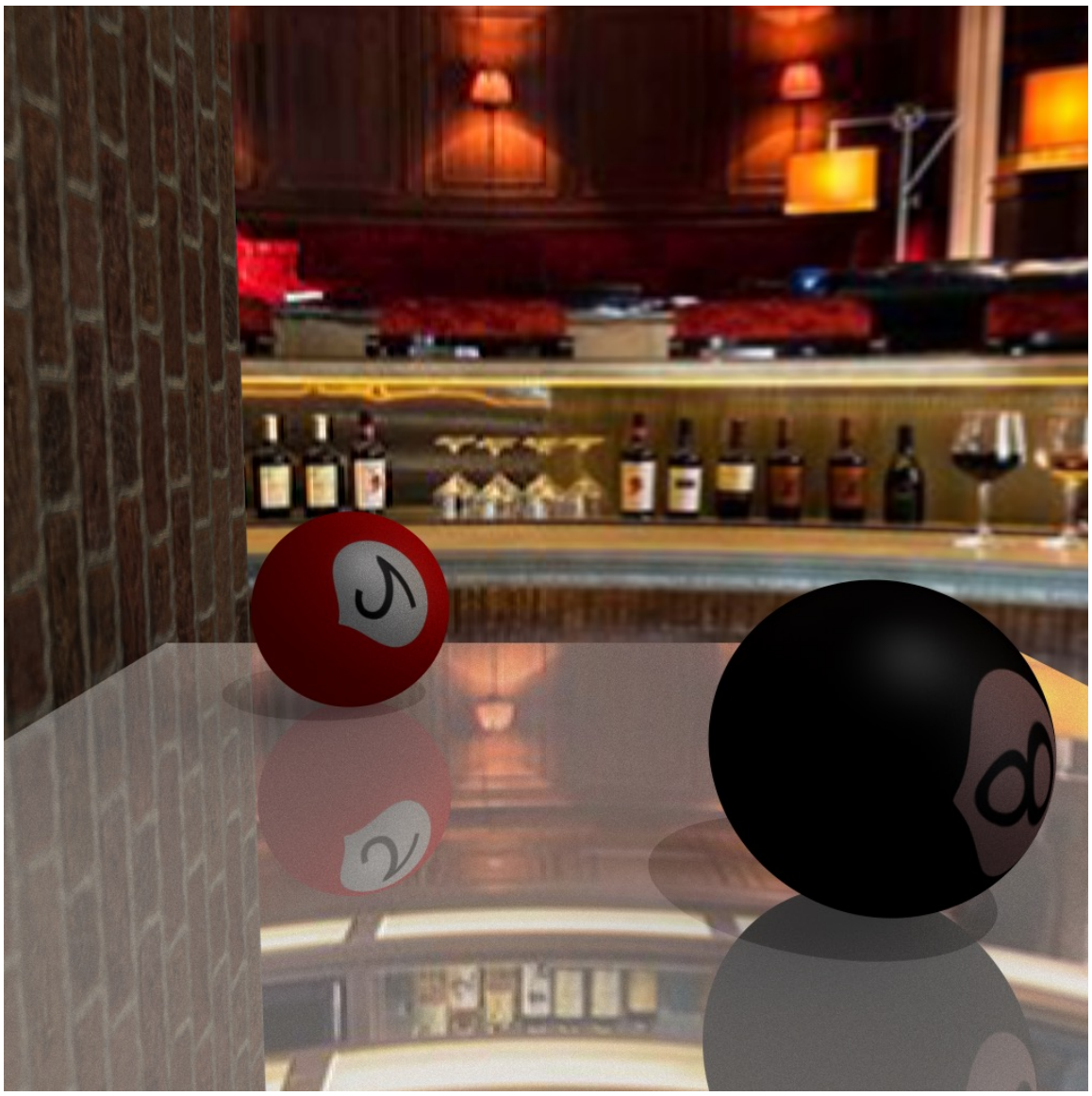
16 Suggestion [? points].

1) We implemented the timer that could time the different time to run different recursive constraints.

Below we are showing when running the picture with the normal mapping function on, the duration is shown.

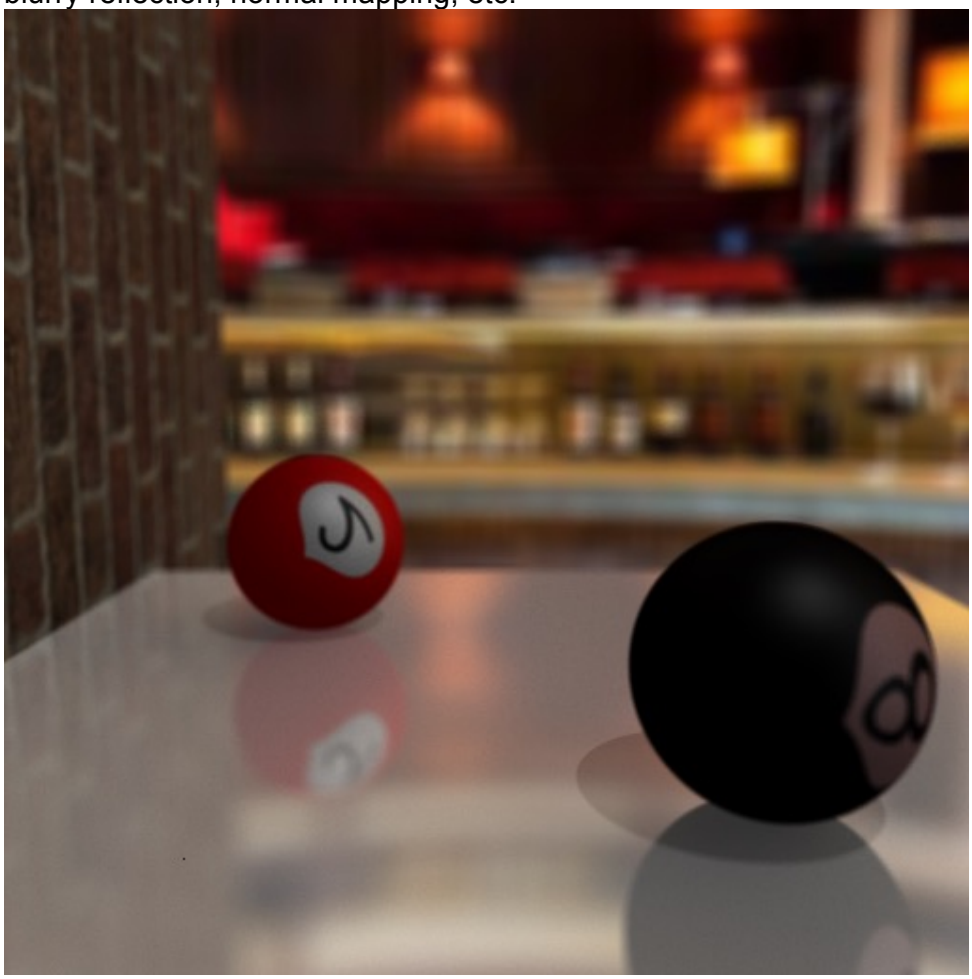


2) We also at the end built our picture by running a large picture. 1024x1024 instead of 256x256.

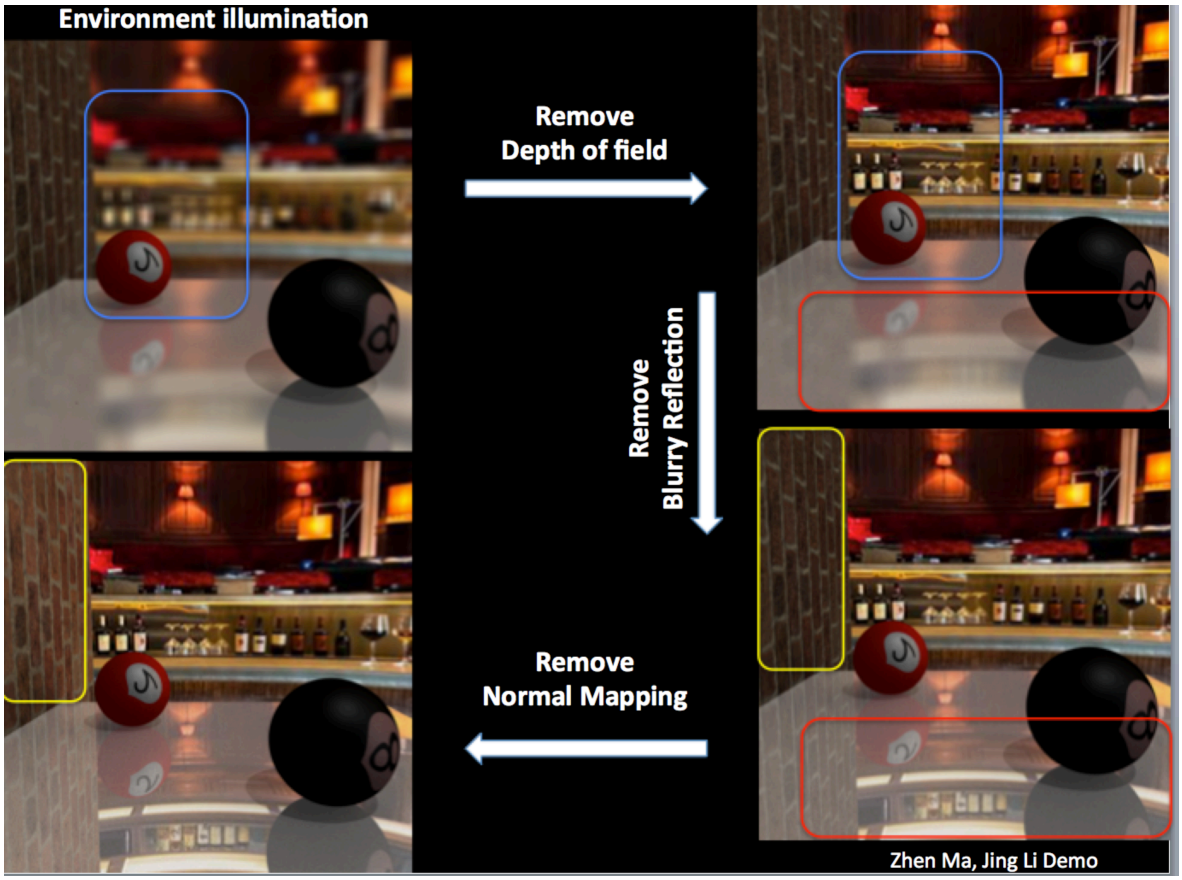


3) We implemented a new scene for a better demo that could show several features together.

This below picture includes the environment illumination, cool scene, depth of field, blurry reflection, normal mapping, etc.



We are also showing the changing of pictures when removing each of the feature accordingly. We demoed this during the final demo.


Environment illumination
Remove
Depth of field
Remove
Blurry Reflection
Remove
Normal Mapping
Zhen Ma, Jing Li Demo