BLENDER PORTFOLIO

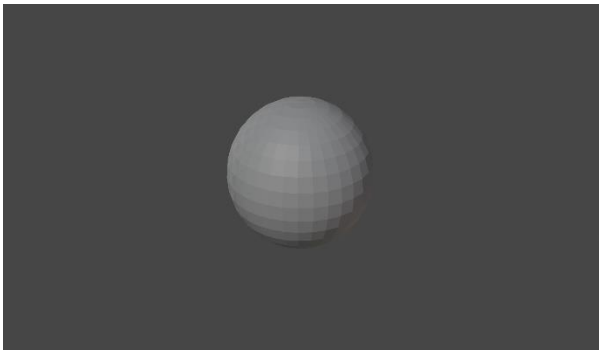
Raghad Alghamdi

ACTIVITY 1

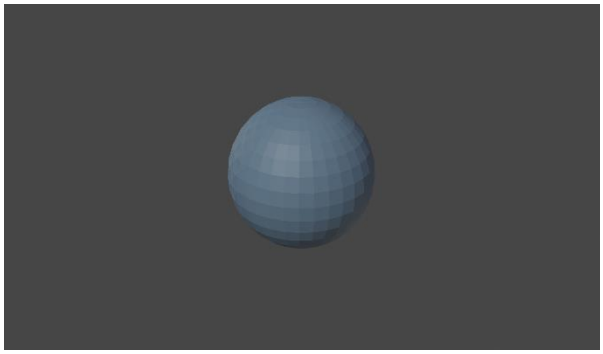
Raghad Alghamdi

Activity 1

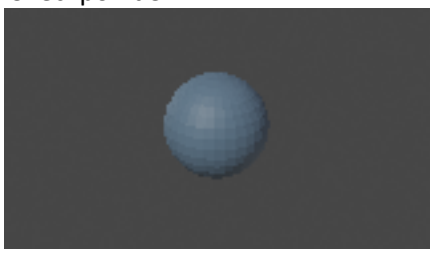
Checkpoint 1:



Checkpoint 2:



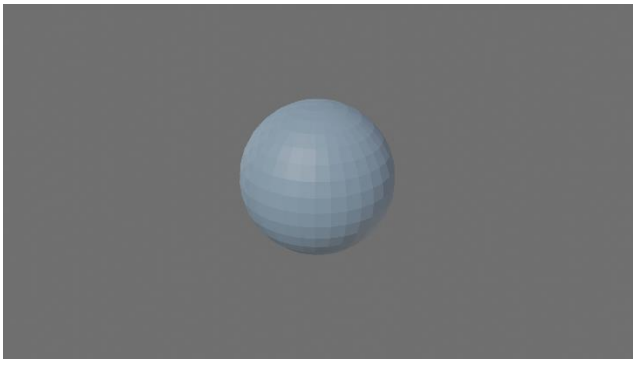
Checkpoint 3:



Checkpoint 4:

Checkpoint 3 is smaller than Checkpoint 2 since it tries to maintain a high level of quality. This means the quality varies as the resolution is changed.

Checkpoint 5:



Checkpoint 6:

Checkpoint 2 is darker than Checkpoint 5, and Checkpoint 5 is brighter because the gamma value is more than Checkpoint 2 gamma value. This means that when the gamma value is high, the brighter the image is. The lower the gamma value, the darker the image is.

Questions:

1. How does light interact differently with different objects in real life? Give three examples?
   - When the light wave with a single frequency impacts an item, a variety of things can happen. For example, a black shirt would absorb the heat if the light was exposed to the surface. The light wave may be absorbed by the object, in which case its energy is transformed to heat. In another case, the light wave might be reflected by the item. Also, the light wave may be transmitted by the item.

2. Why do objects appear to have different colors to our eyes?
   - Due to the retina being covered with millions of light-sensitive cells called rods and cones, we are able to see different colors. Also, the color of the object can be seen in different shades due to the light exposer. When an object is exposed to much light, it may seem vibrant, but it may seem darker when exposed to little light.

3. What's the advantage of using YUV color space?
   - Some benefits of using YUV include color television transmissions that are meant to be backward compatible with black-and-white television, which also applies to computers.

4. How are colors added differently for lights compared to paint? What does R+G+B equal to in each case?
   - The R+G+B differentiation creates colors for light added that create white. In paint, other colors like yellow are added to show the R+G+B, and the R+G+B creates black.

5. Why are green screens green? Hint: think about the arrangement of color filters in front of the camera sensor.
   - Green screens are green because it does not match any natural skin tone or hair color, where it is going to be easy to edit out.

6. Why is tone mapping needed for HDR images?
   - Tone Mapping is used to simulate the look of pictures with a greater dynamic range than the reproducing media, such as prints or ordinary monitors.

7. What is the relationship between the wavelength of the light and the color of the light. E.g., why is the wavelength of 700nm associated with red, and 400nm associated with purple?
    - Each color has a different wavelength which creates different colors. When they all get together, they make white. The wavelength of 700nm has a longer wavelength, which creates the color red, and 400nm has short wavelength and creates the color purple.

ACTIVITY 2

Raghad Alghamdi

Activity 2

Checkpoint 1:

$$p_{xy} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\left(\frac{\pi}{4}\right) & -\sin\left(\frac{\pi}{4}\right) \\ 0 & \sin\left(\frac{\pi}{4}\right) & \cos\left(\frac{\pi}{4}\right) \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ \sqrt{2} \end{bmatrix}$$

$$\begin{bmatrix} \cos\left(\frac{\pi}{4}\right) & 0 & \sin\left(\frac{\pi}{4}\right) \\ 0 & 1 & 0 \\ -\sin\left(\frac{\pi}{4}\right) & 0 & \cos\left(\frac{\pi}{4}\right) \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ \sqrt{2} \end{bmatrix} = \begin{pmatrix} \frac{1+\sqrt{2}}{\sqrt{2}} \\ 0 \\ \frac{-1+\sqrt{2}}{\sqrt{2}} \end{pmatrix}$$

Checkpoint 2:

$$p_{yx} = \begin{bmatrix} \cos\left(\frac{\pi}{4}\right) & 0 & \sin\left(\frac{\pi}{4}\right) \\ 0 & 1 & 0 \\ -\sin\left(\frac{\pi}{4}\right) & 0 & \cos\left(\frac{\pi}{4}\right) \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} \sqrt{2} \\ 1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\left(\frac{\pi}{4}\right) & -\sin\left(\frac{\pi}{4}\right) \\ 0 & \sin\left(\frac{\pi}{4}\right) & \cos\left(\frac{\pi}{4}\right) \end{bmatrix} \begin{bmatrix} \sqrt{2} \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} \sqrt{2} \\ \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} \end{bmatrix}$$

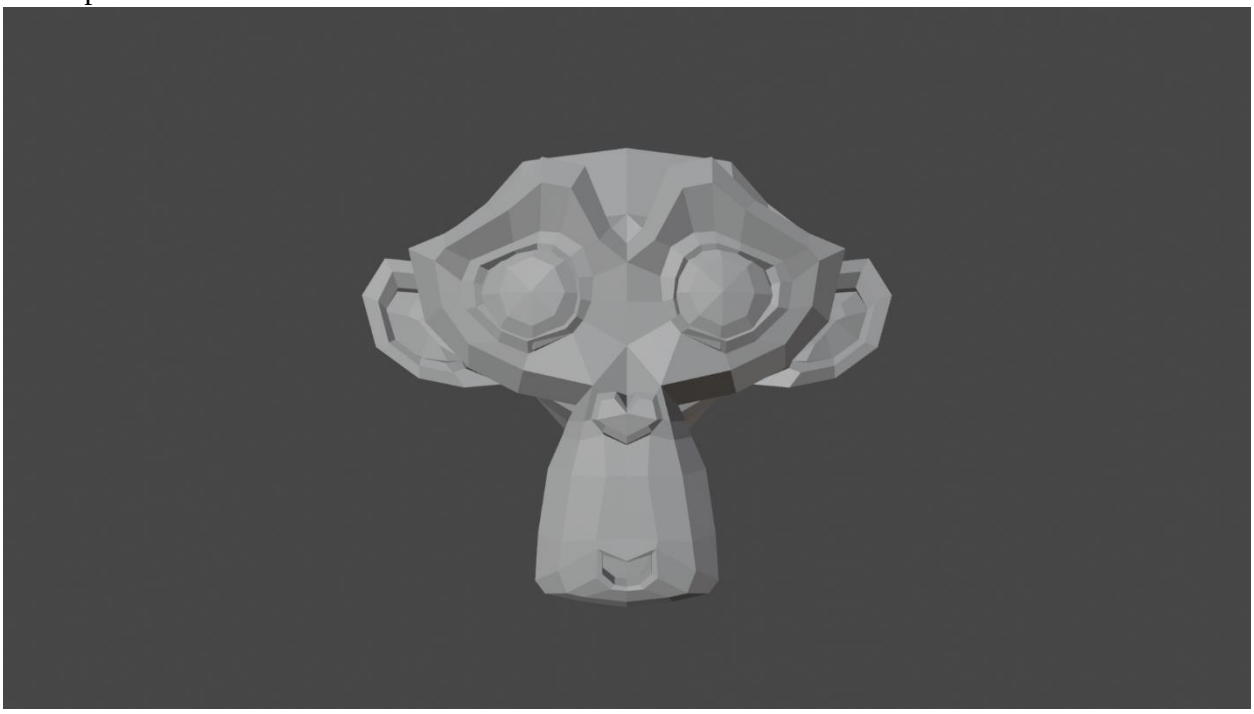
Checkpoint 3:

$$t_1 = \begin{pmatrix} 2 \\ -1 \\ 1 \end{pmatrix} + \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} = \begin{pmatrix} 3 \\ 0 \\ 3 \end{pmatrix}$$

Checkpoint 4:

$$t_2 = \begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & 1 \\ 0 & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 \\ 0 & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Checkpoint 5:

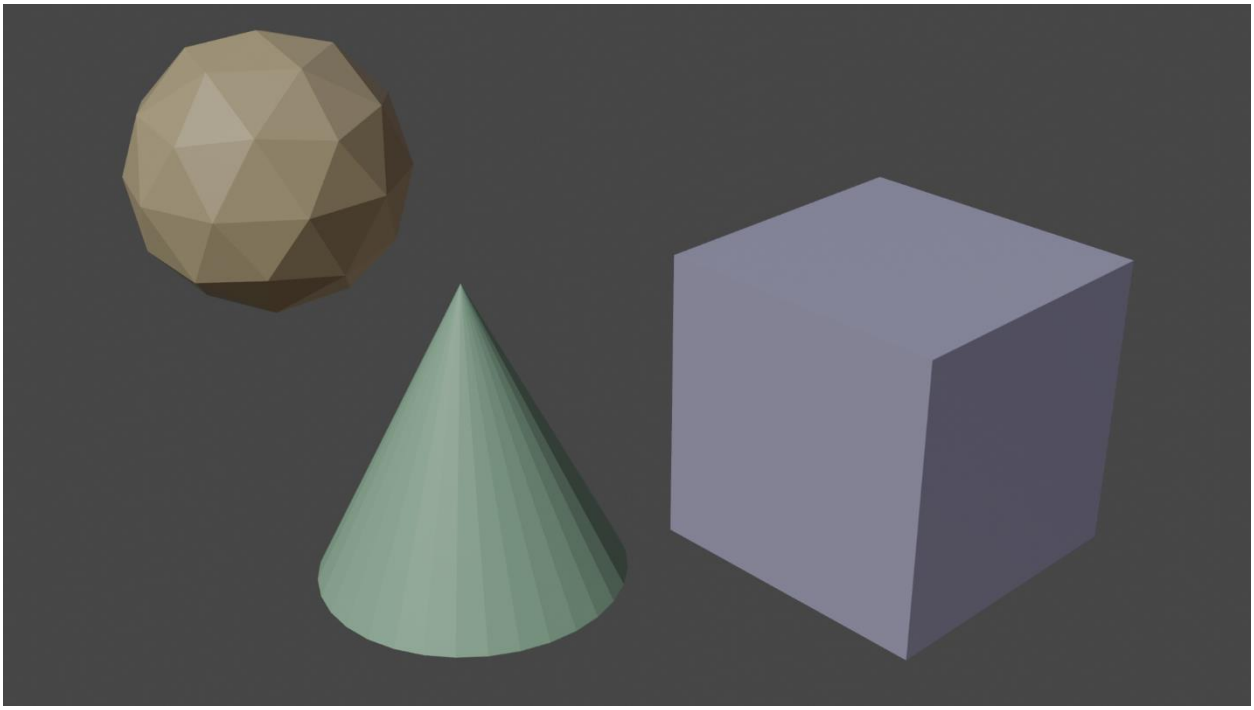


Checkpoint 6:

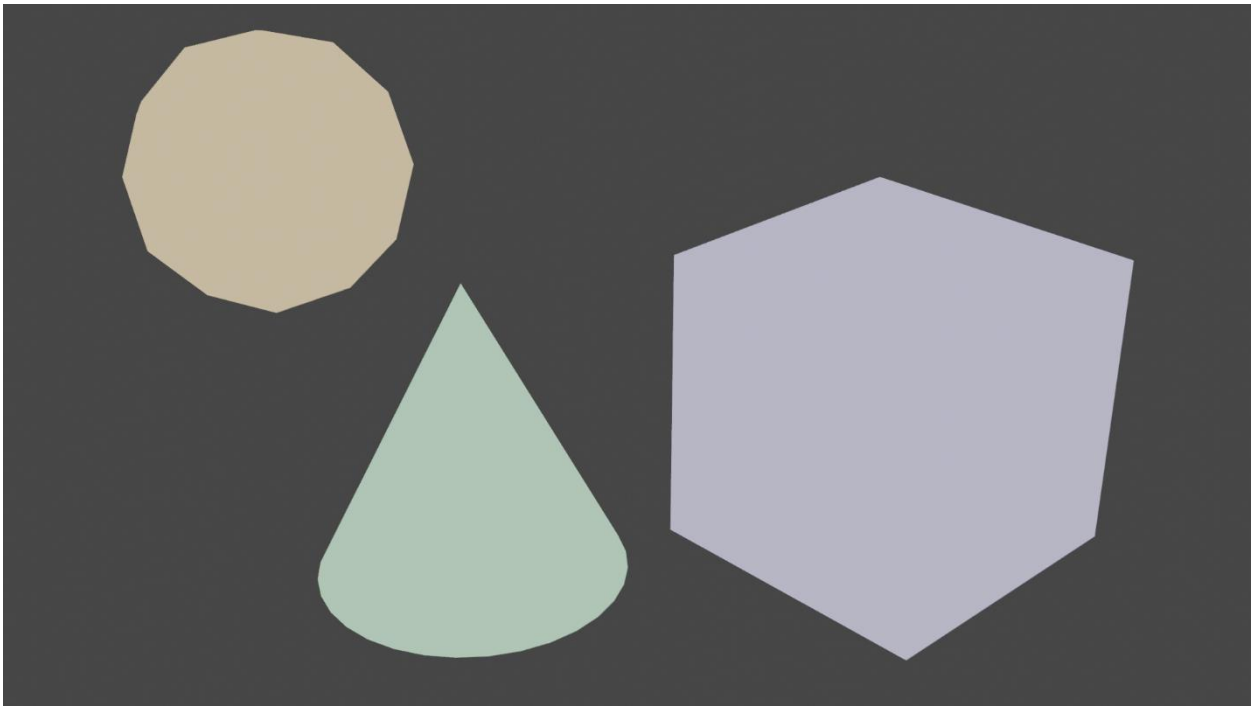
The location and focal of the camera led us to see different perspectives angles which caused an illusion to shift the structure of the monkey, zooms in the face, and highlight different spots. For example, in the first image, the camera is at a position that eliminates the top view of the monkey's head, unlike the two images where the monkeys show more defined features for the head.

Checkpoint 7:

With **normal** lighting settings:



With **flat** lighting:

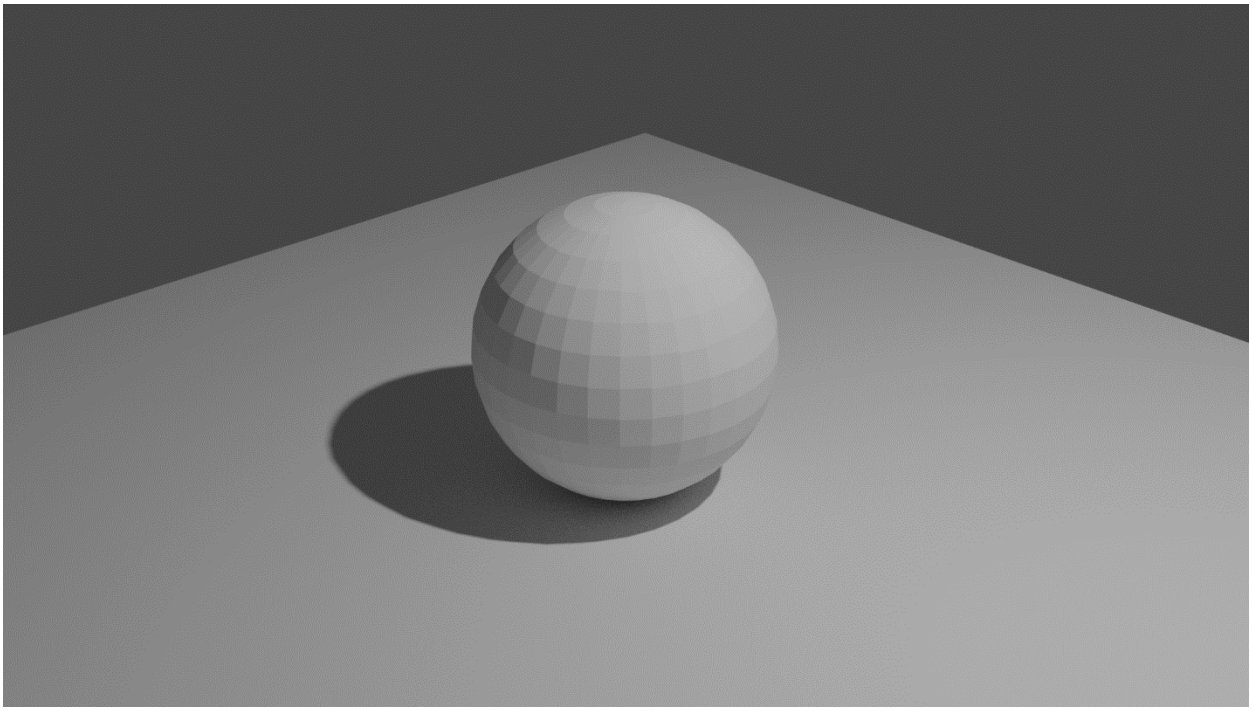


ACTIVITY 3

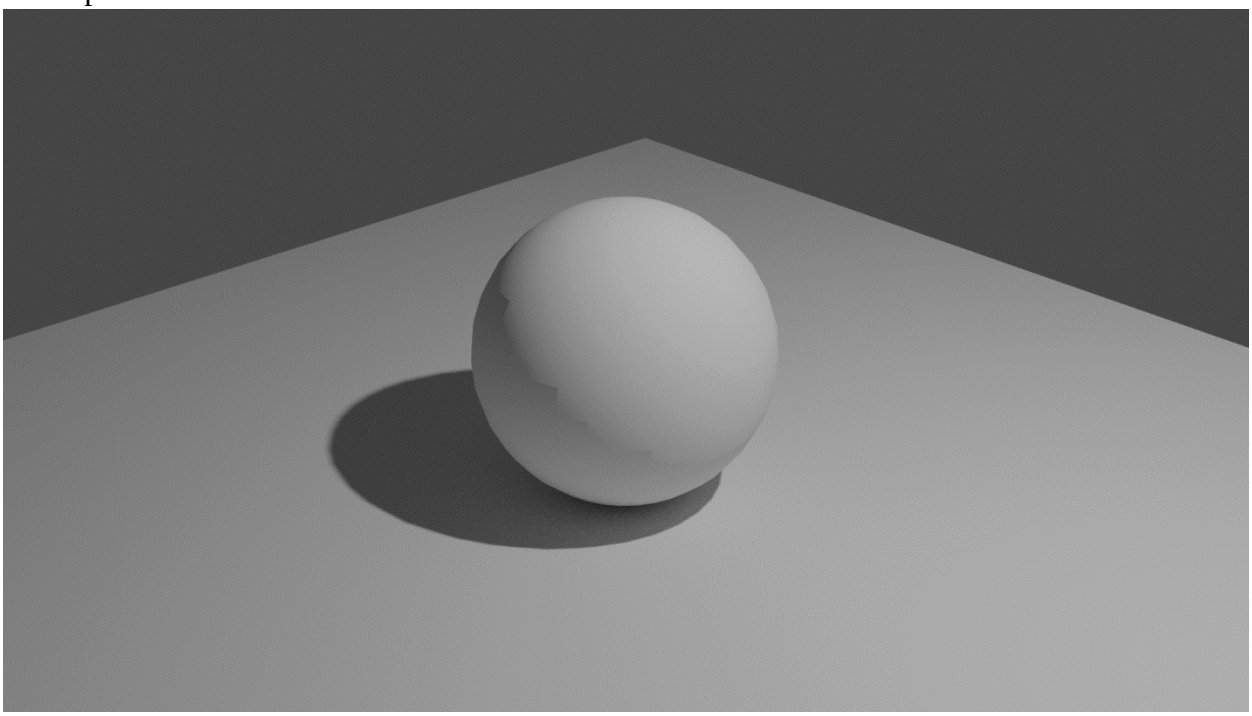
Raghad Alghamdi

Activity 3

Checkpoint 1.1:



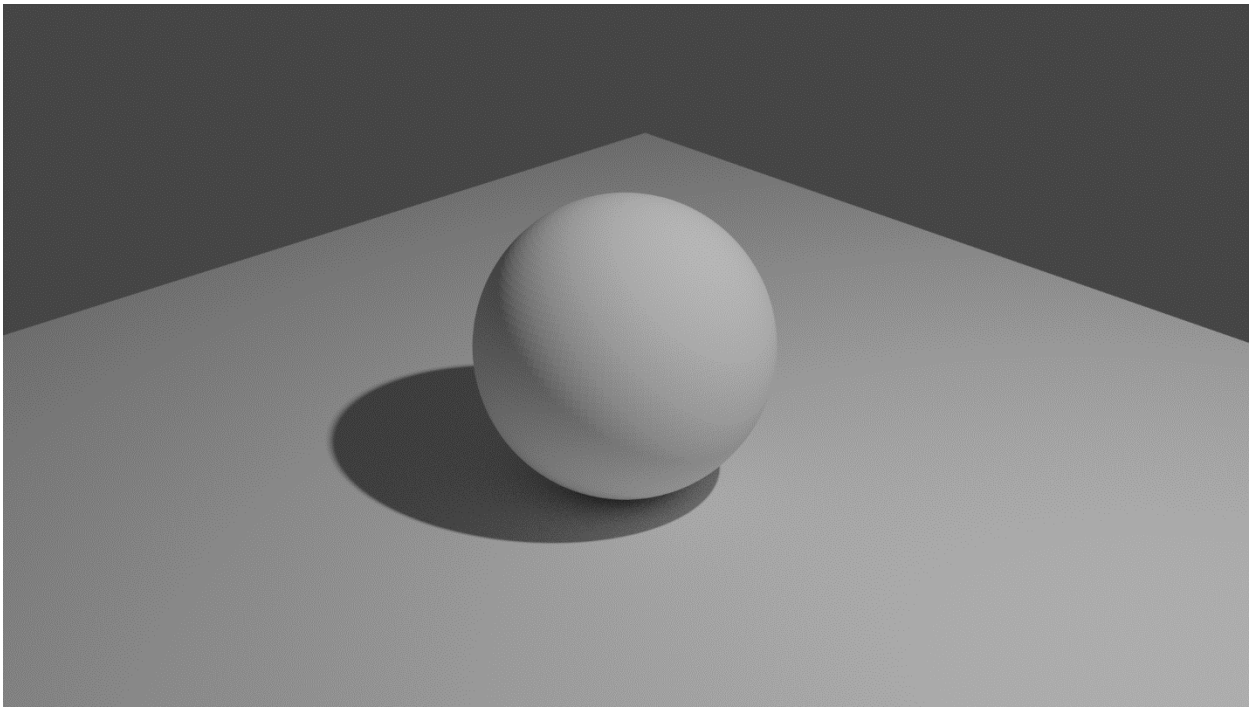
Checkpoint 1.2:



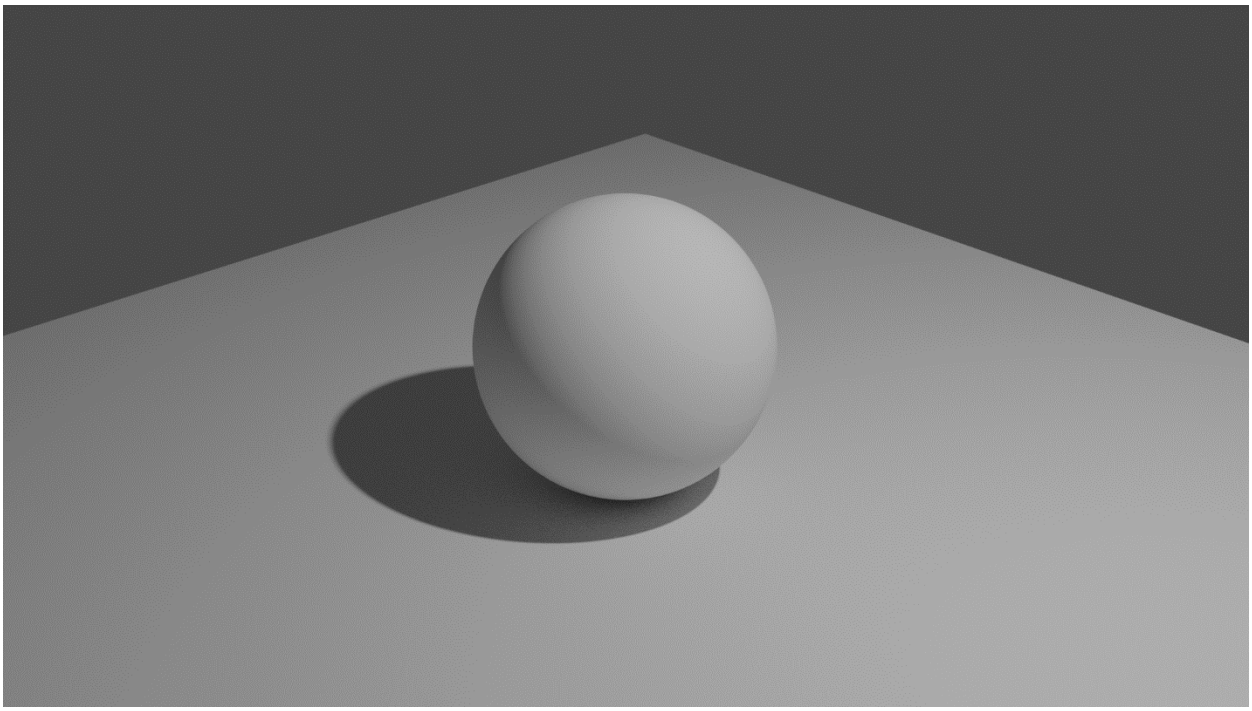
Checkpoint 1.3:

The flat shading has visible edges, while smooth shading does not have visible edges.

Checkpoint 1.4:



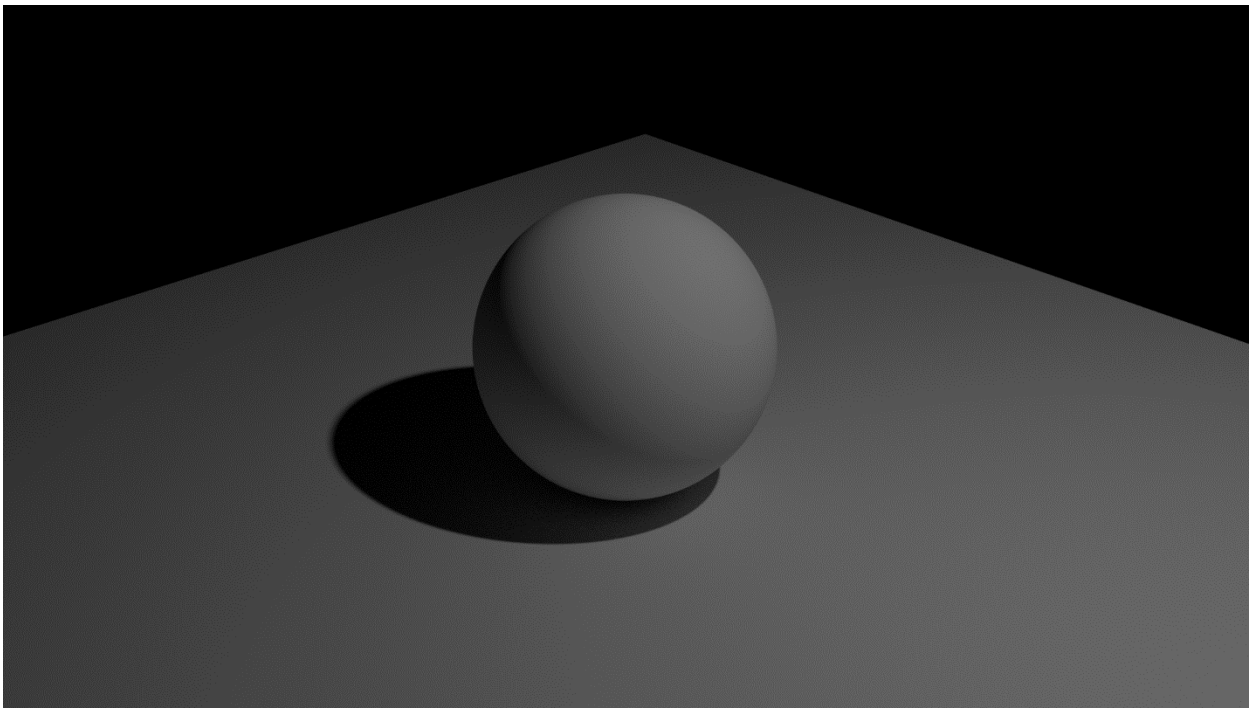
Checkpoint 1.5:



Checkpoint 1.6:

Subdivision vs. smooth shading clarifies the image by smoothing off any rough edges using the subdivision modifier.

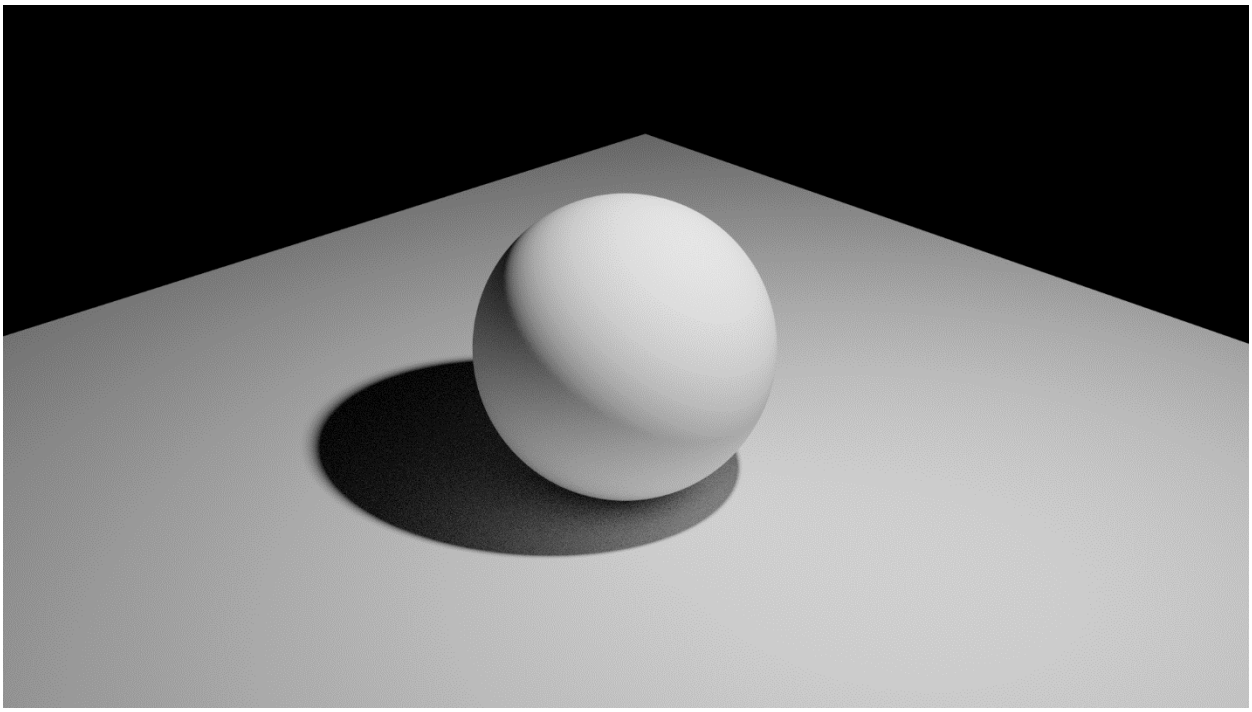
Checkpoint 2.1:



Checkpoint 2.2:

The relationship between light power and irradiance is as follows: the lower the light level, the darker the image, and the higher the light level, the brighter the picture.

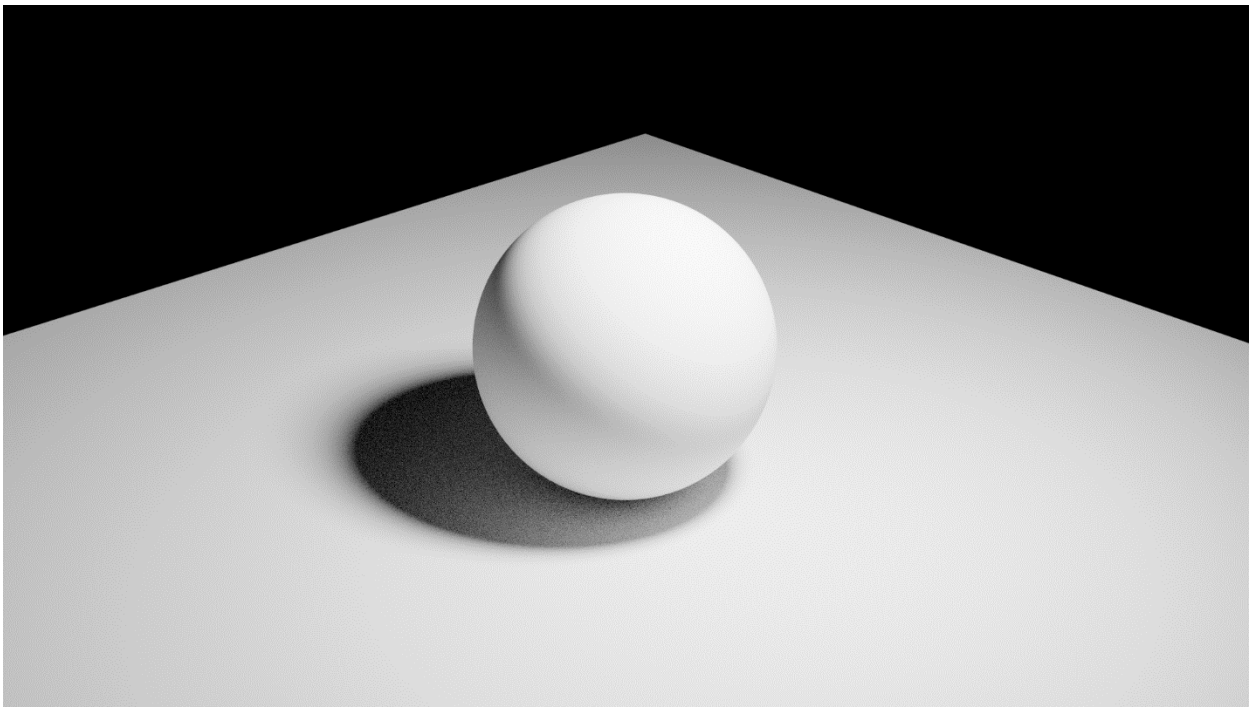
Checkpoint 2.3:



Checkpoint 2.4:

In 1.5 images, it shows that the light is at a farther distance which reduces the light. However, in the second image (2.3), the light is closer, making the object brighter with a darker shadow.

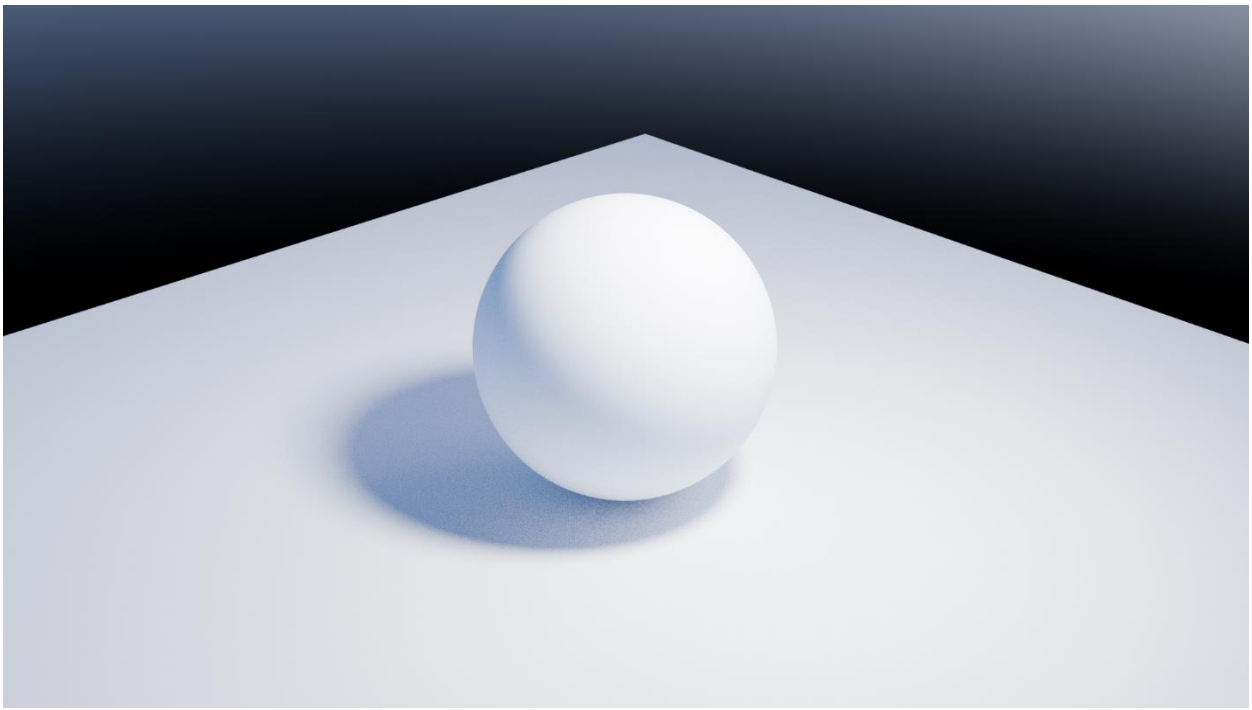
Checkpoint 2.5:



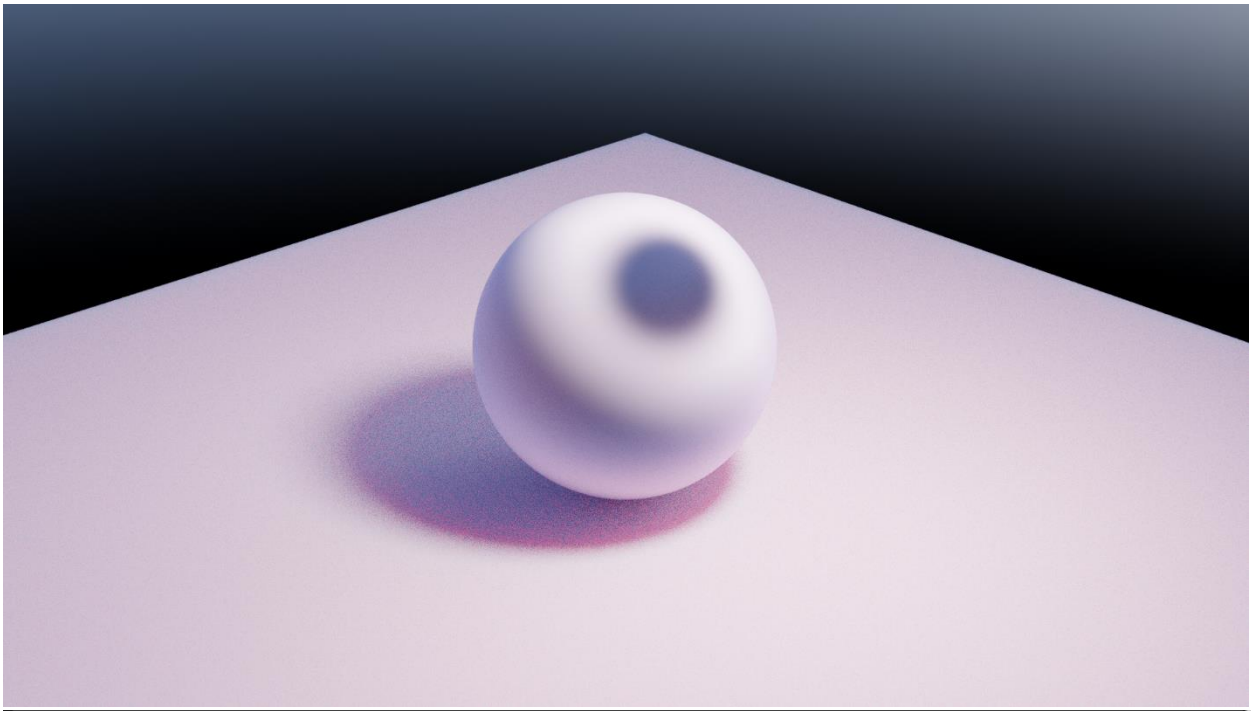
Checkpoint 2.6:

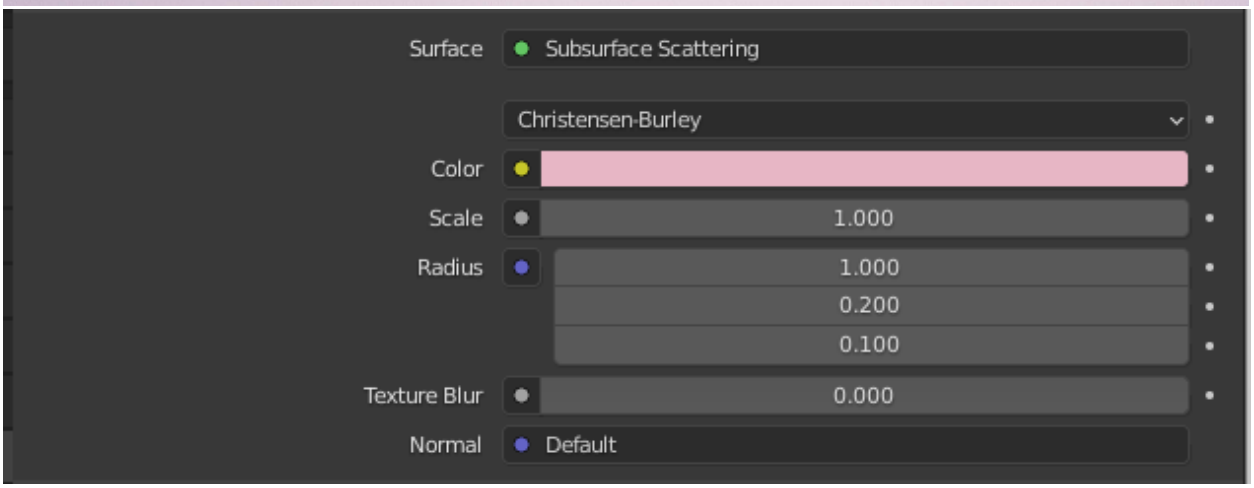
Light covers a larger area when there is more surrounding lighting. Therefore the shadow appears in a smaller area.

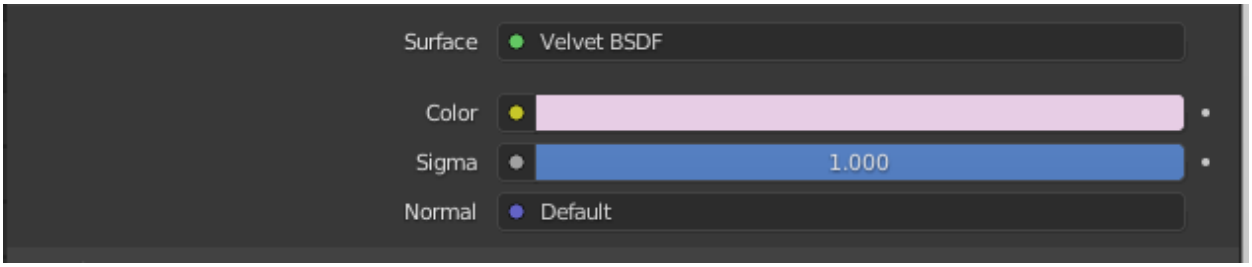
Checkpoint 3:

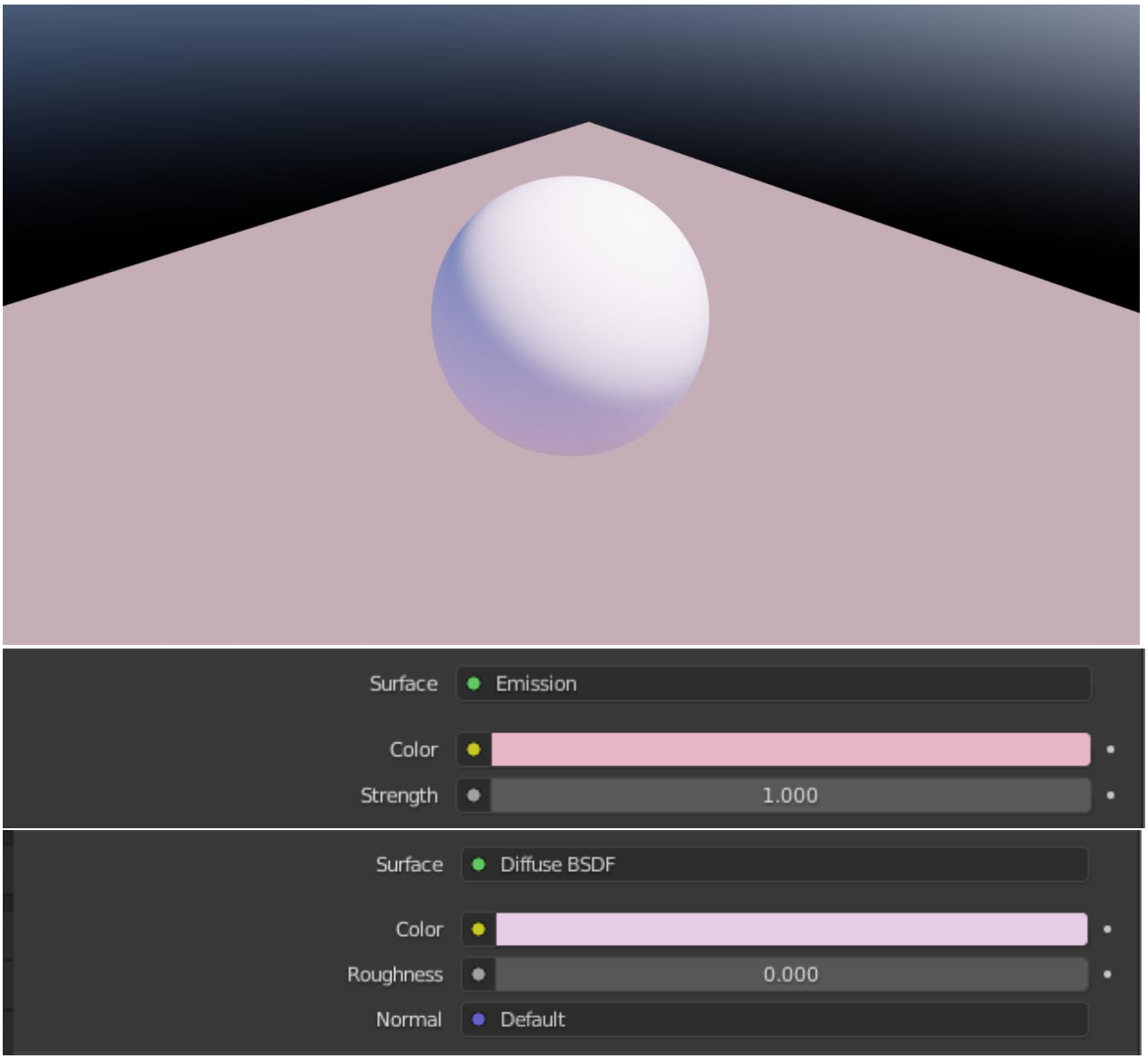


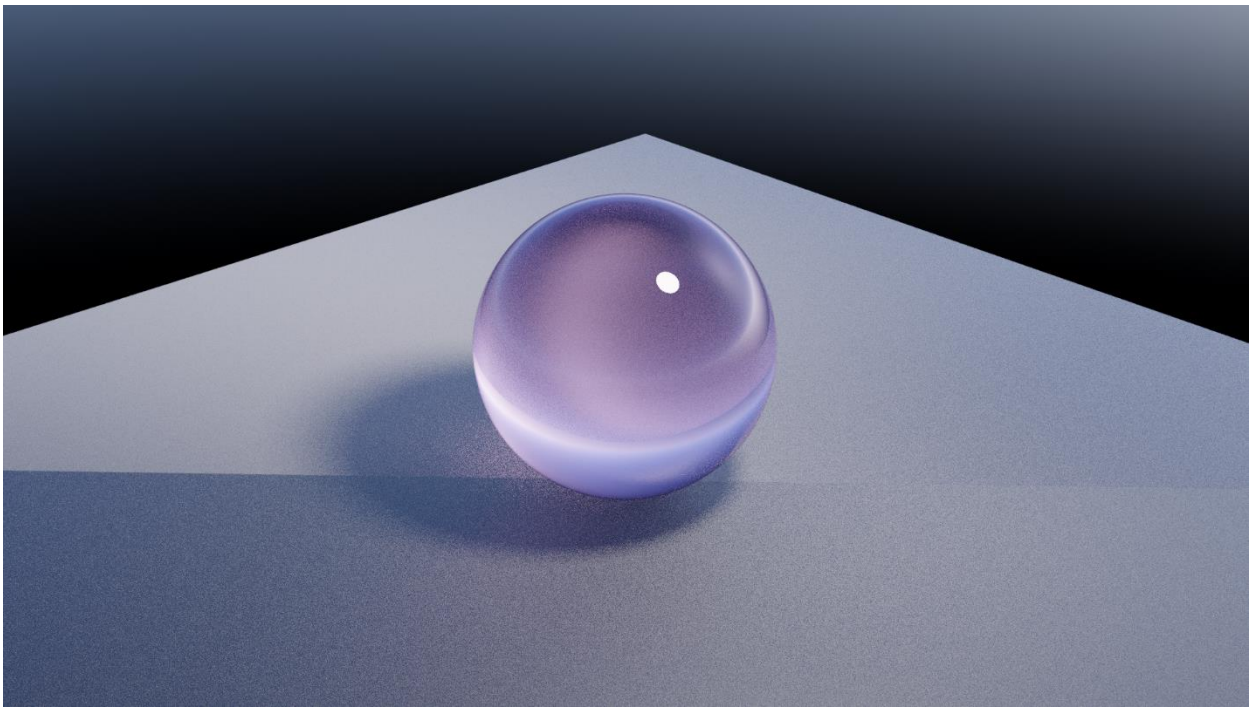
Checkpoint 4:








Surface
Emission
Color
Strength
1.000
Surface
Diffuse BSDF
Color
Roughness
0.000
Normal
Default



Surface: Principled Hair BSDF

Direct Coloring

Color

Roughness: 0.300

Radial Roughness: 0.300

Coat: 0.000

IOR: 1.550

Offset: 2°

Random Roughness: 0.000

Random: Default

Surface: Glass BSDF

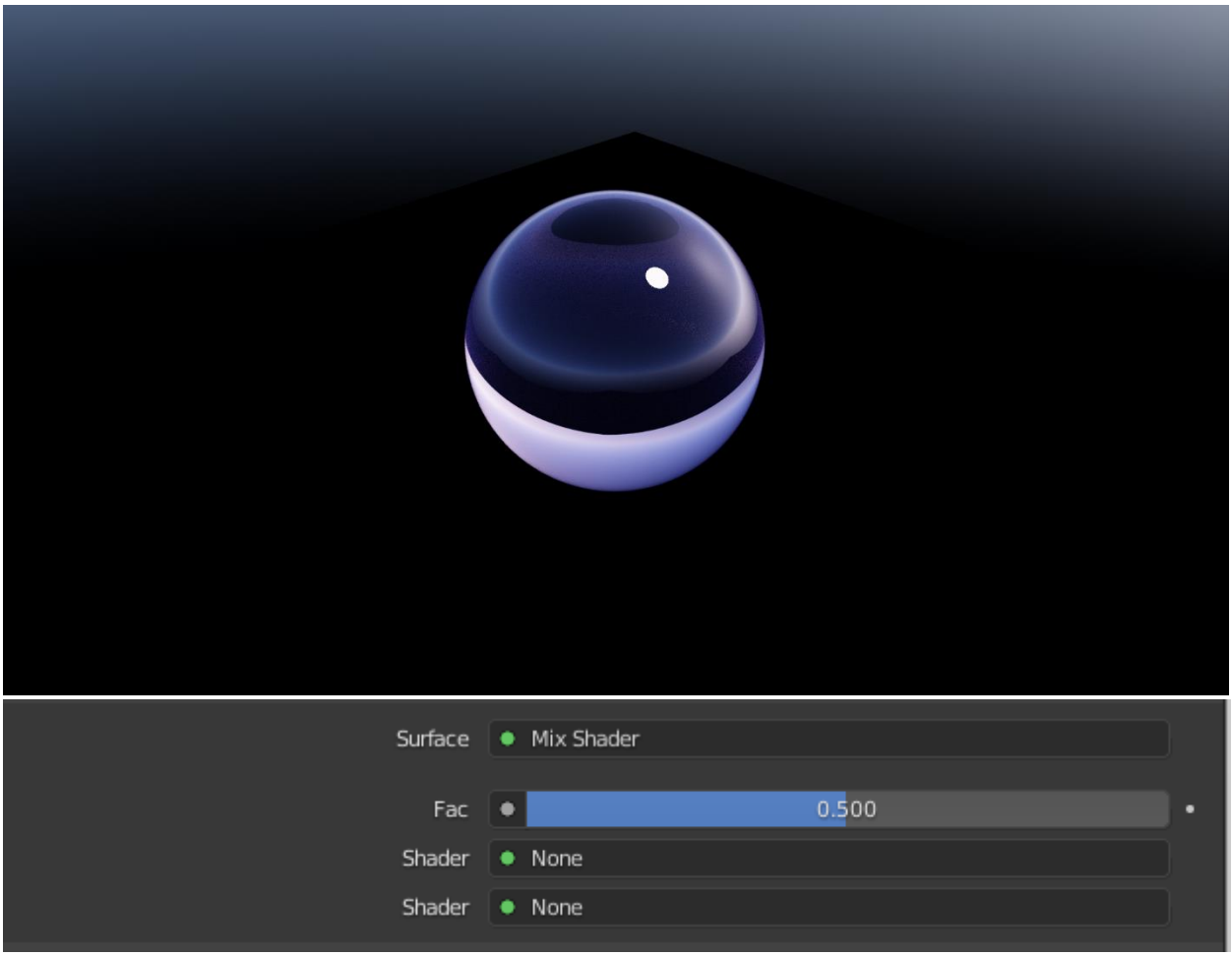
Beckmann

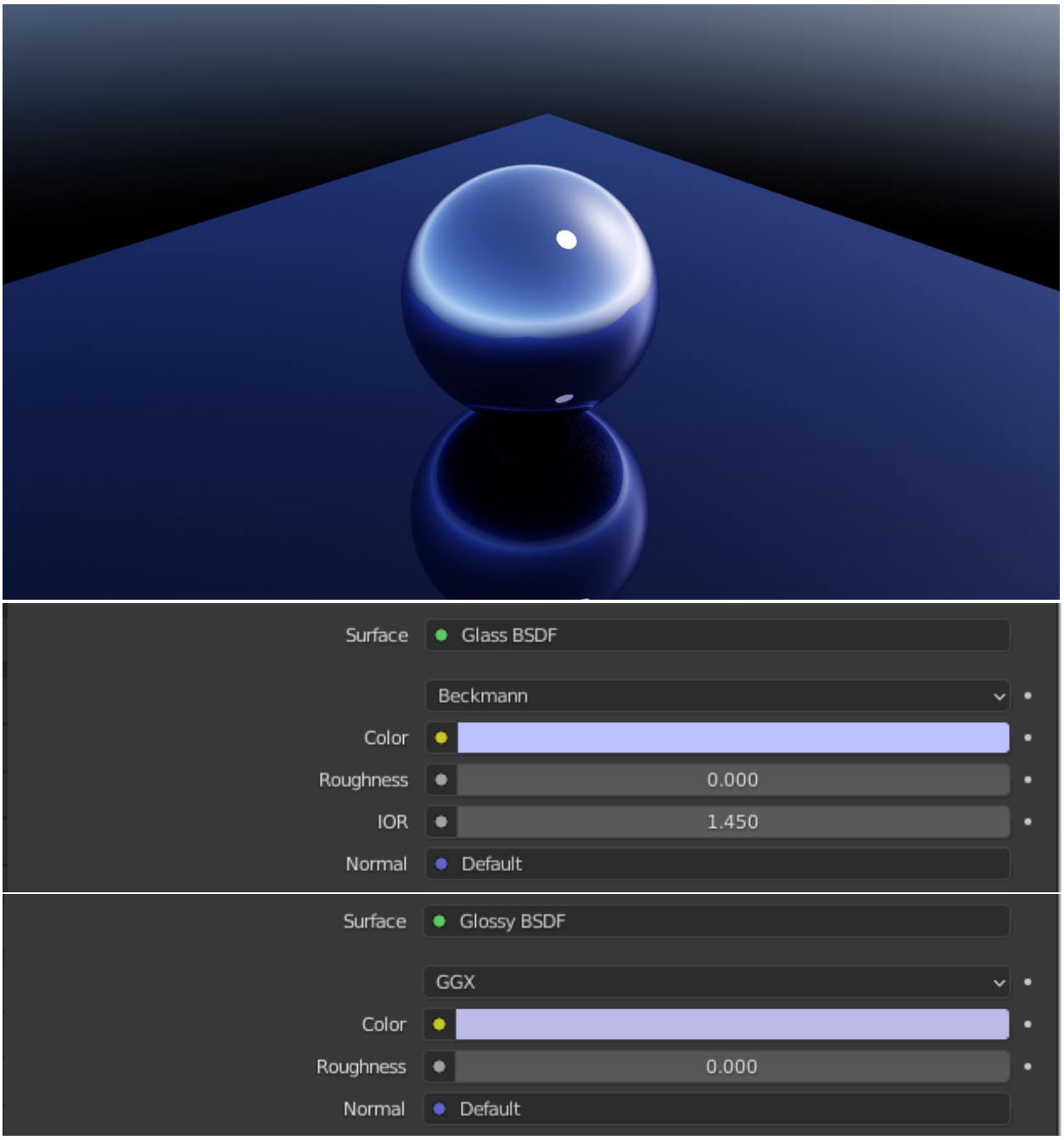
Color

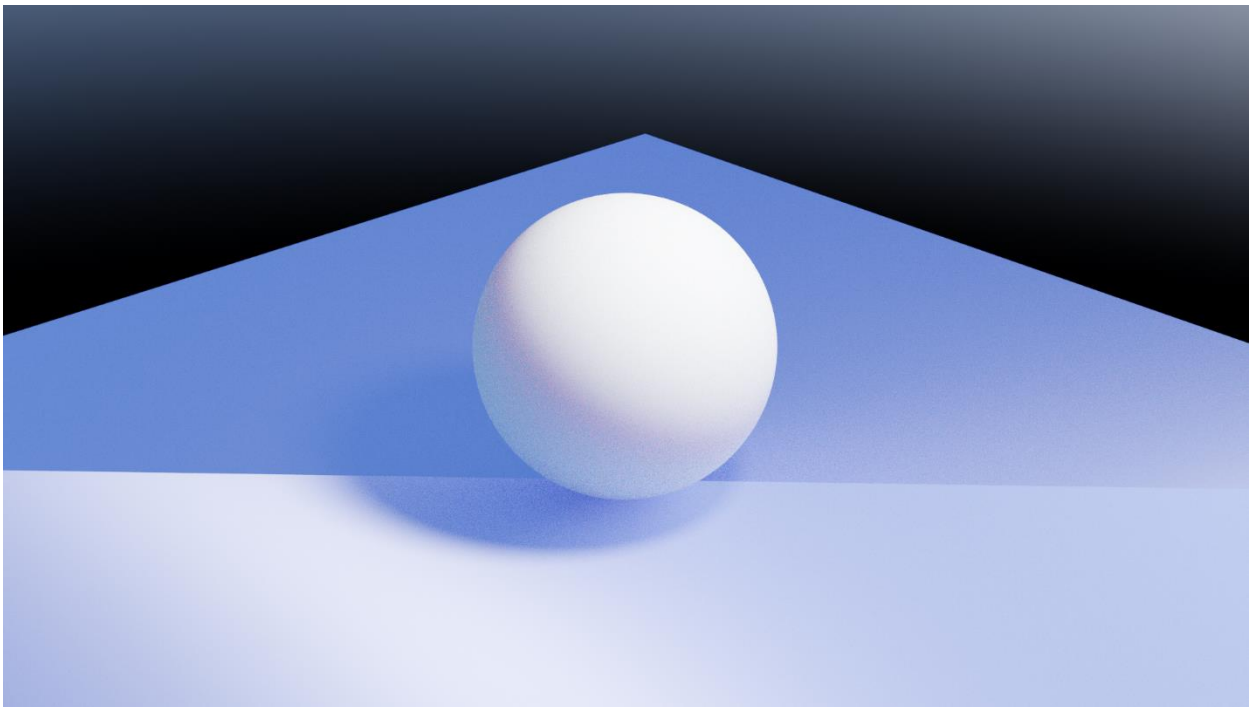
Roughness: 0.000

IOR: 1.450

Normal: Default


Surface
Mix Shader
Fac
0.500
Shader
None
Shader
None


Surface
Glass BSDF
Beckmann
Color
Roughness
0.000
IOR
1.450
Normal
Default
Surface
Glossy BSDF
GGX
Color
Roughness
0.000
Normal
Default



Surface: Hair BSDF

Reflection

Color

Offset: 0°

RoughnessU: 0.100

RoughnessV: 1.000

Tangent: Default

Surface: Subsurface Scattering

Christensen-Burley

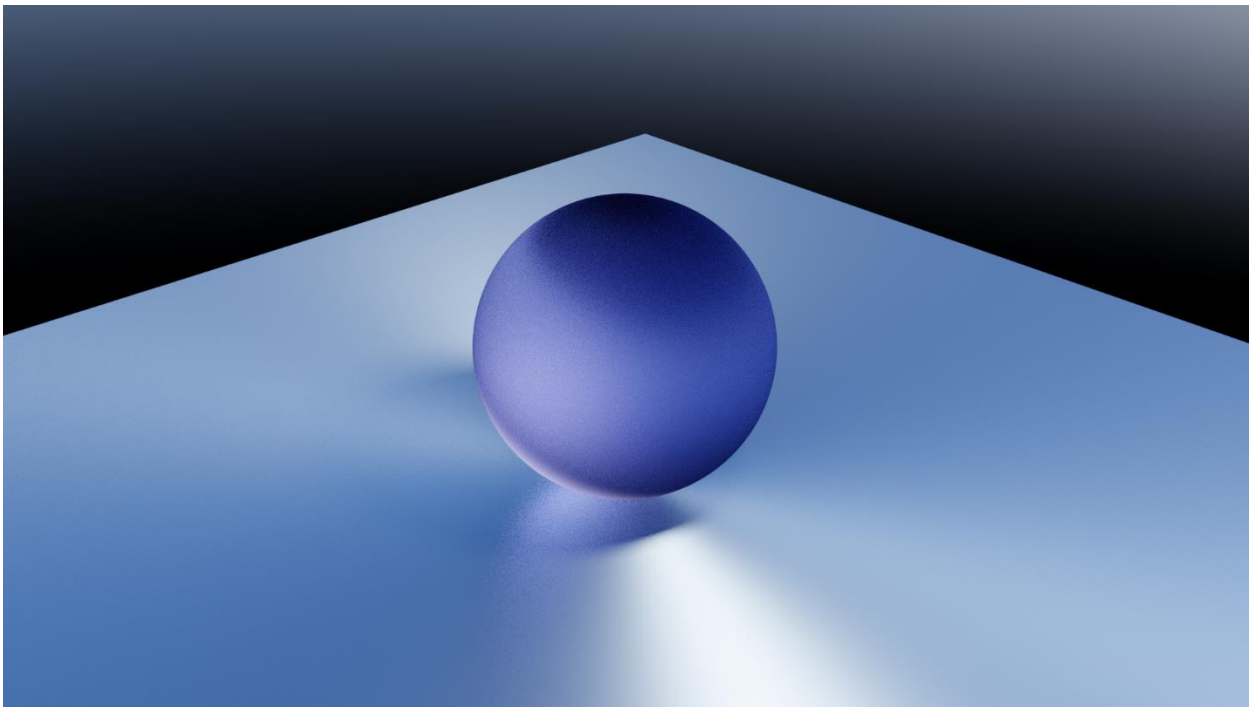
Color

Scale: 1.000

Radius: 1.000, 0.200, 0.100

Texture Blur: 0.000

Normal: Default



Surface: Anisotropic BSDF

GGX

Color

Roughness: 0.500

Anisotropy: 0.500

Rotation: 0.000

Normal: Default

Tangent: Default

Surface: Refraction BSDF

Beckmann

Color

Roughness: 0.216

IOR: 12.350

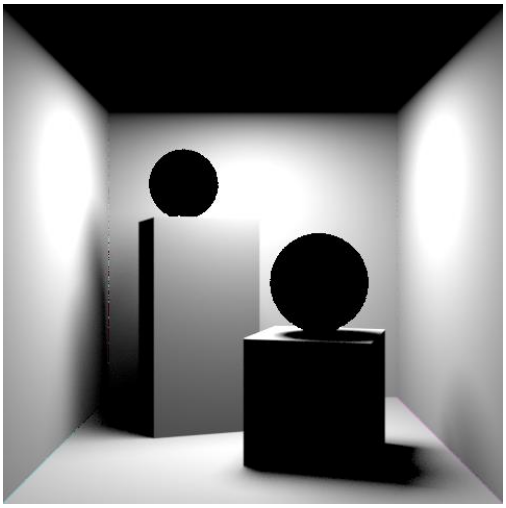
Normal: Default

ACTIVITY 4

Raghad Alghamdi

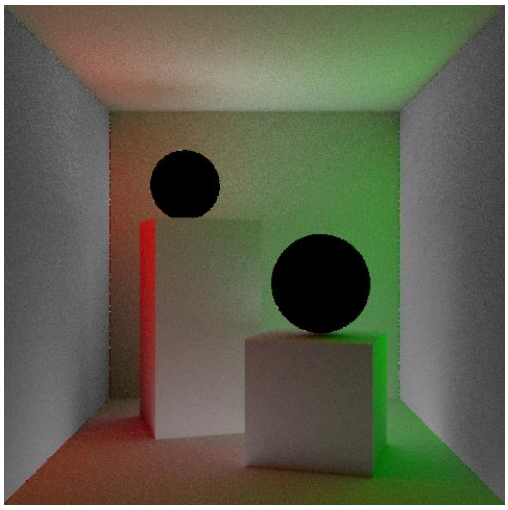
Activity 4

Checkpoint 1:



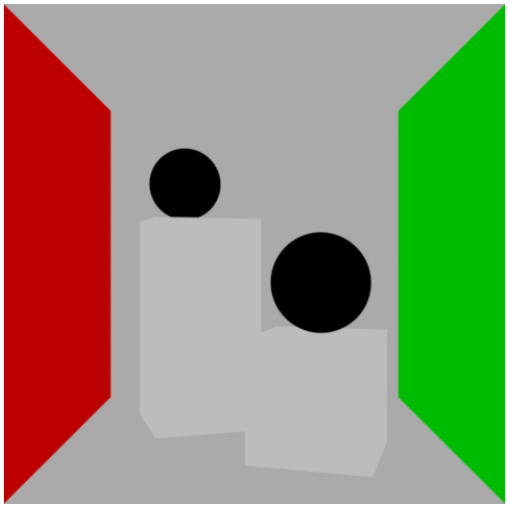
- DiffDir:

  The light is spread out over an area where the lighting falls directly in the direction of the rays from the light source, displaying the only kind of this lighting.



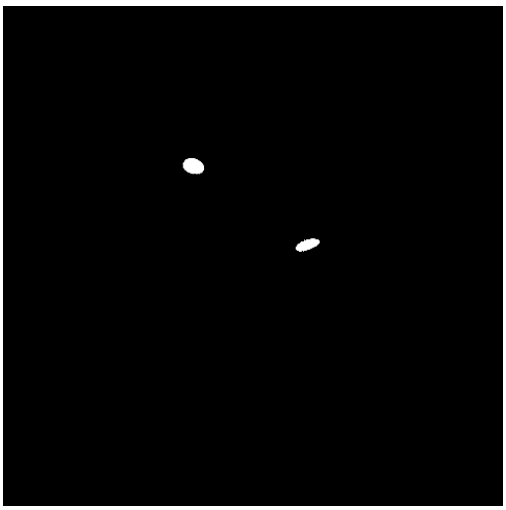
- DiffInd:

  The light is spread out over an area where the lighting falls directly in the direction of the rays from the light source, displaying the only kind of this lighting. Showing the spheres in black.



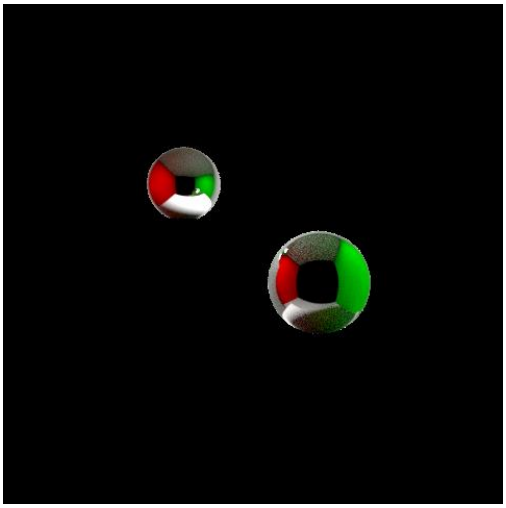
- DiffCol:

  The colors are shown in their basic states, and the spheres are shown in black.



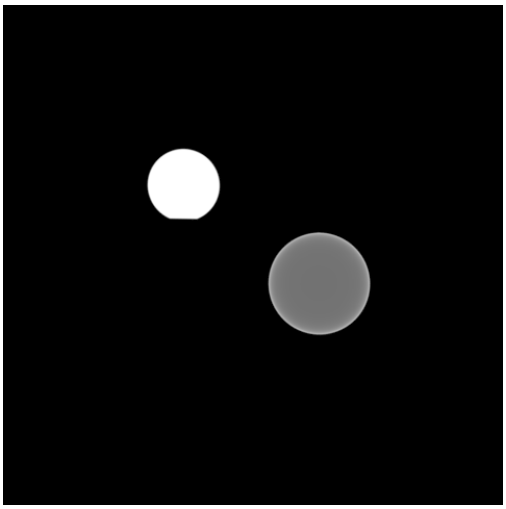
- GlossDir:

  The light is reflected on part of both spheres.



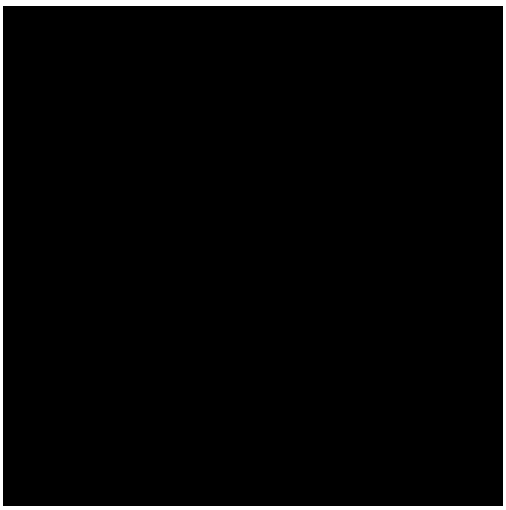
- GlossInd:

  The light is reflected on the surface of both spheres.



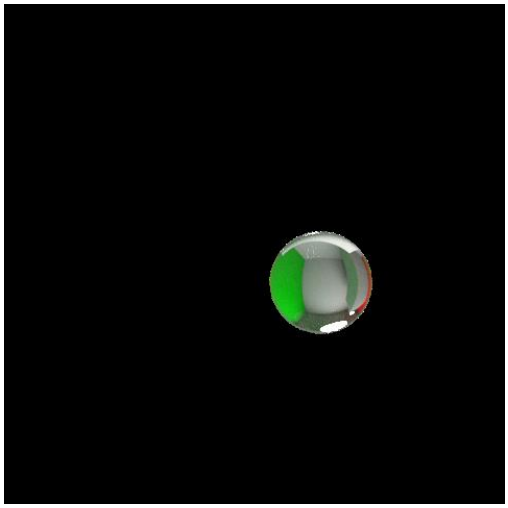
- GlossCol:

  The spheres are shown in grayscale colors, where sphere 1 is whit and sphere 2 is gray



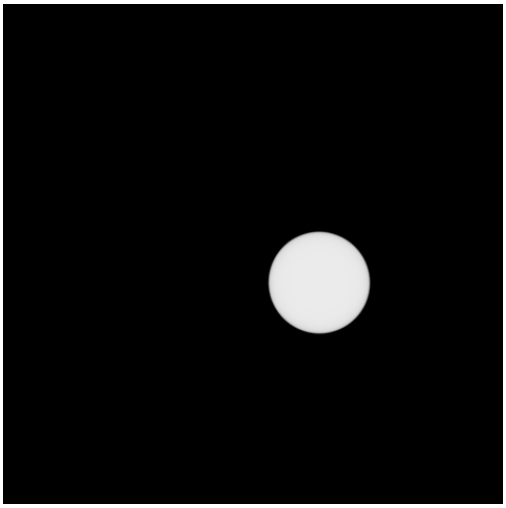
- TransDir:

  The light is reflecting on anything.



- TransInd:

  The light is reflected on only one sphere.

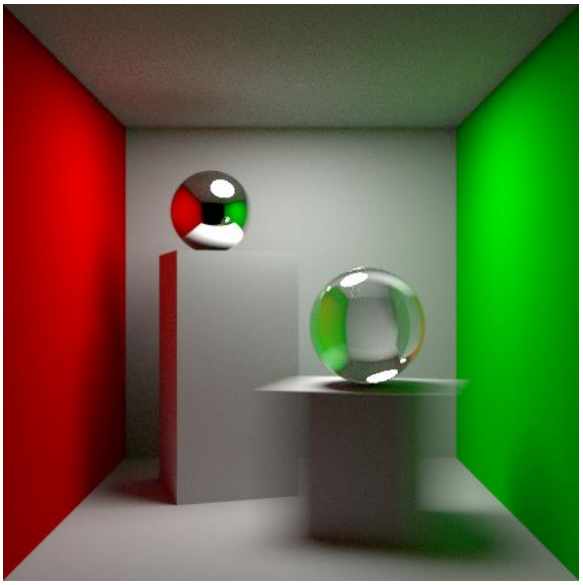


- TransCol:

  The sphere transfers a gray color.

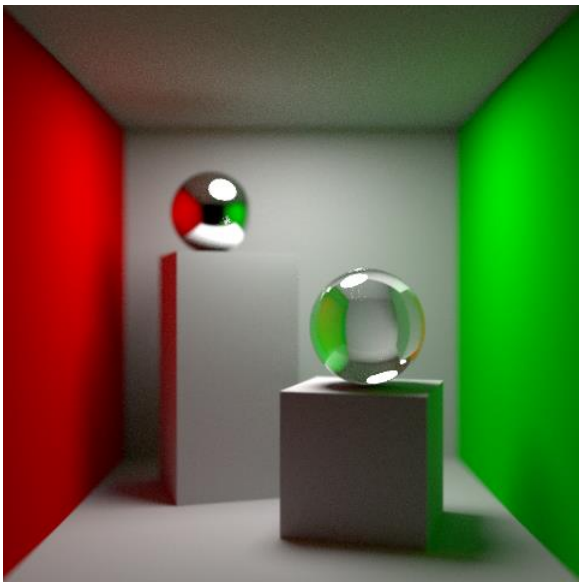
Checkpoint 2:

The image is shown with a blurry cube because the motion blur have been created for three frames for the small cube.



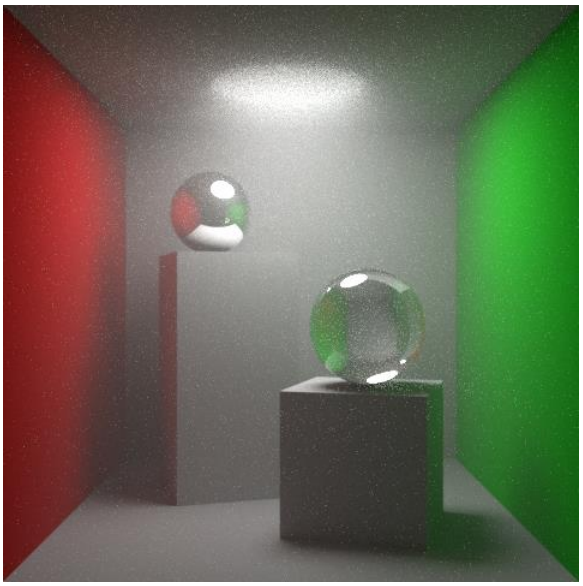
Checkpoint 3:

The small cube and the front sphere is shown clearly while things behind the front sphere is blurry.



Checkpoint 4:

The principled volume makes the scene looks different where the image looks not very clear like a translucent screen is in top of the image, where it made a fog in top of the image.



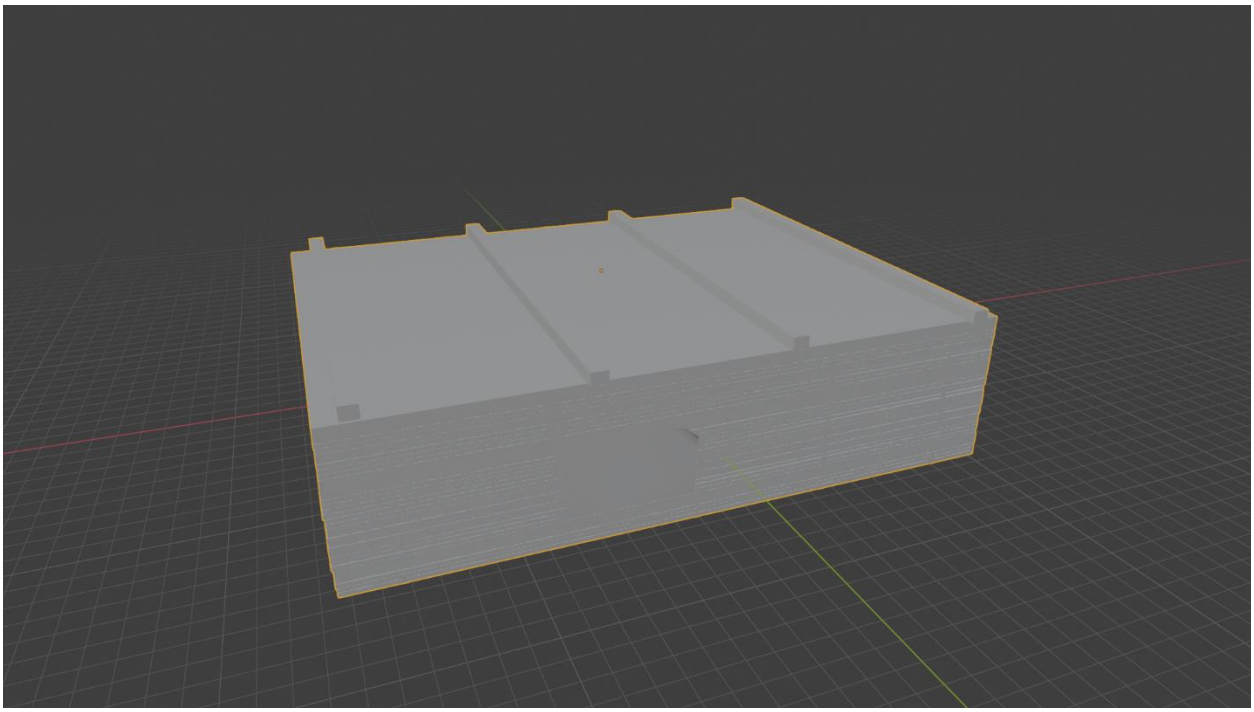
ACTIVITY 5

Raghad Alghamdi

Activity 5

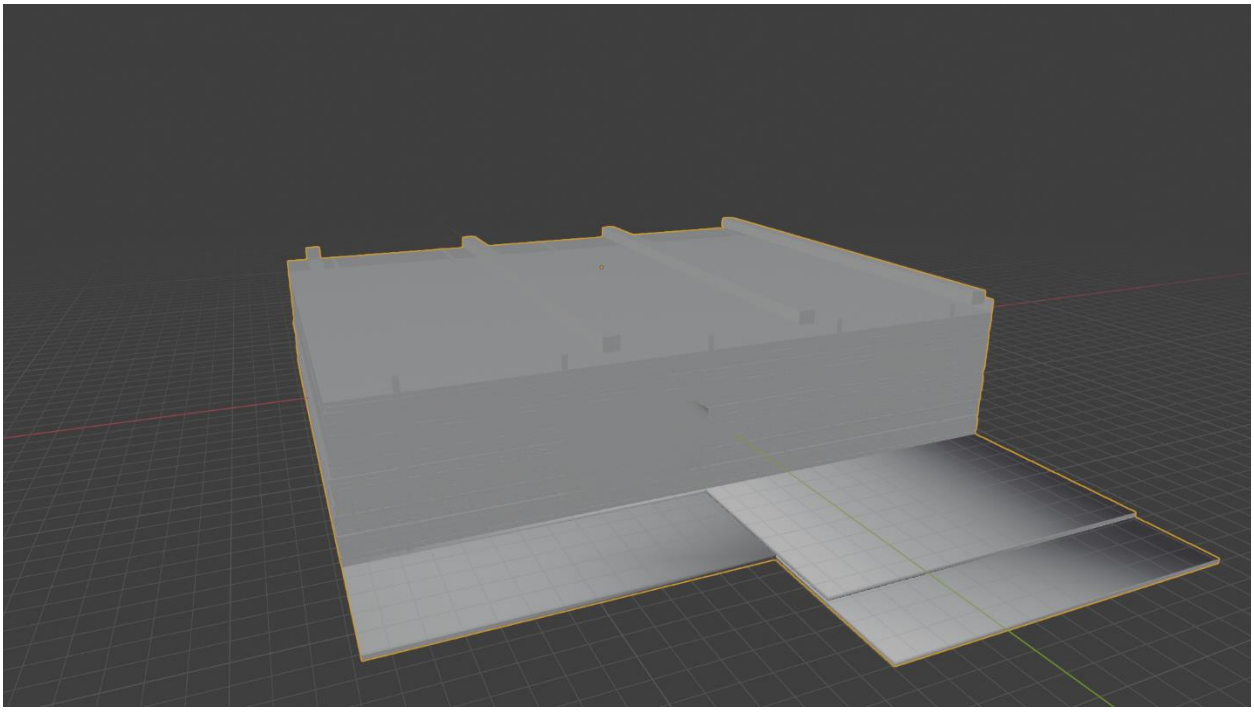
Checkpoint 1:

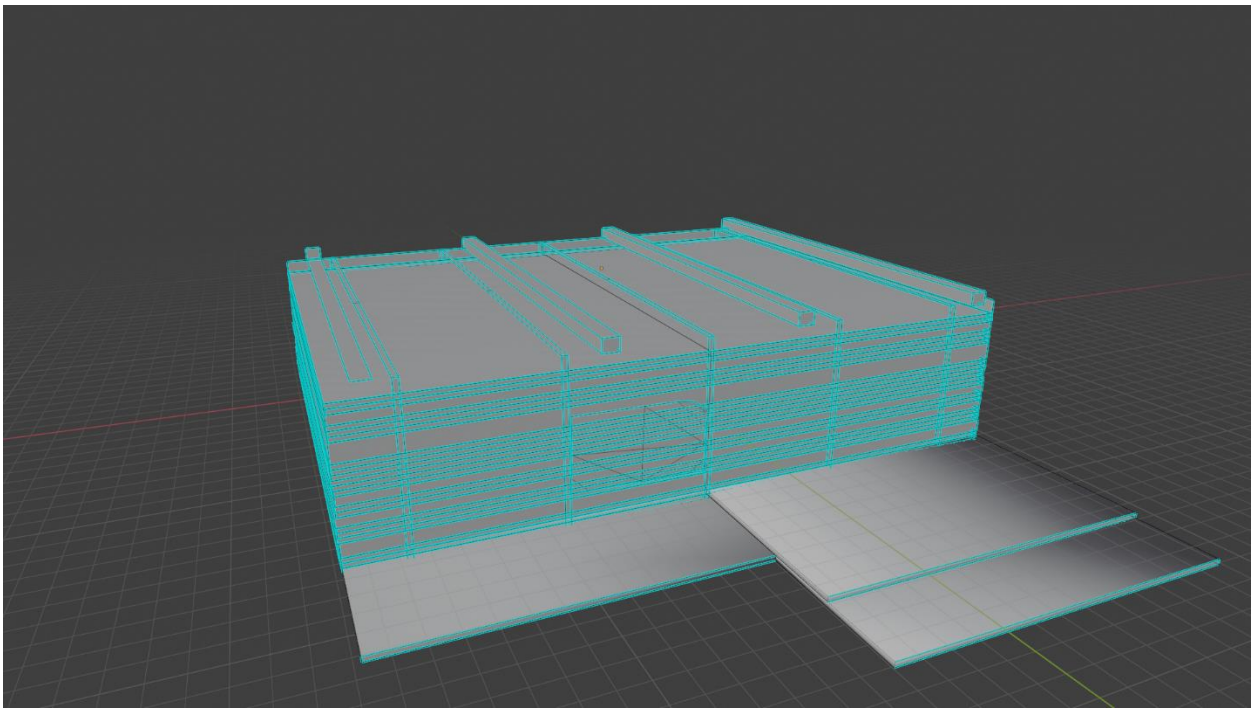
I imported a model from online:



Checkpoint 2:

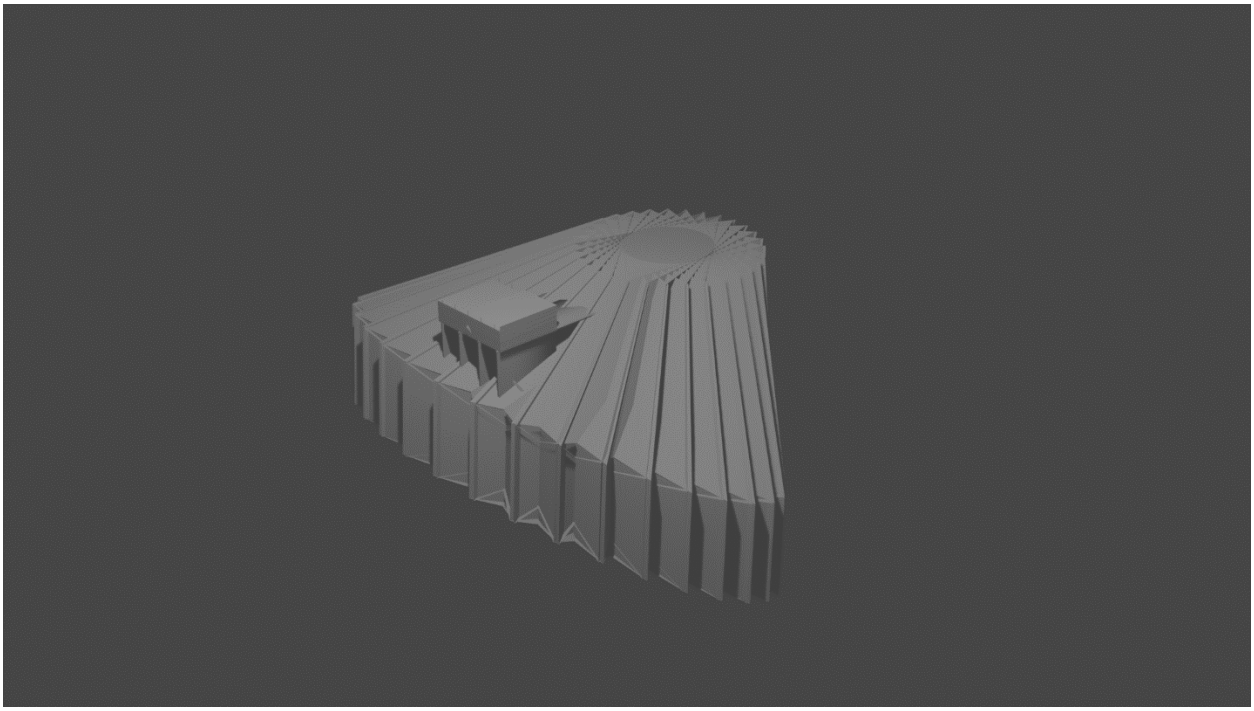
I extruded the model and delete some parts





Checkpoint 3:

I added things to my model and changes some things for the model it self.



Extra:

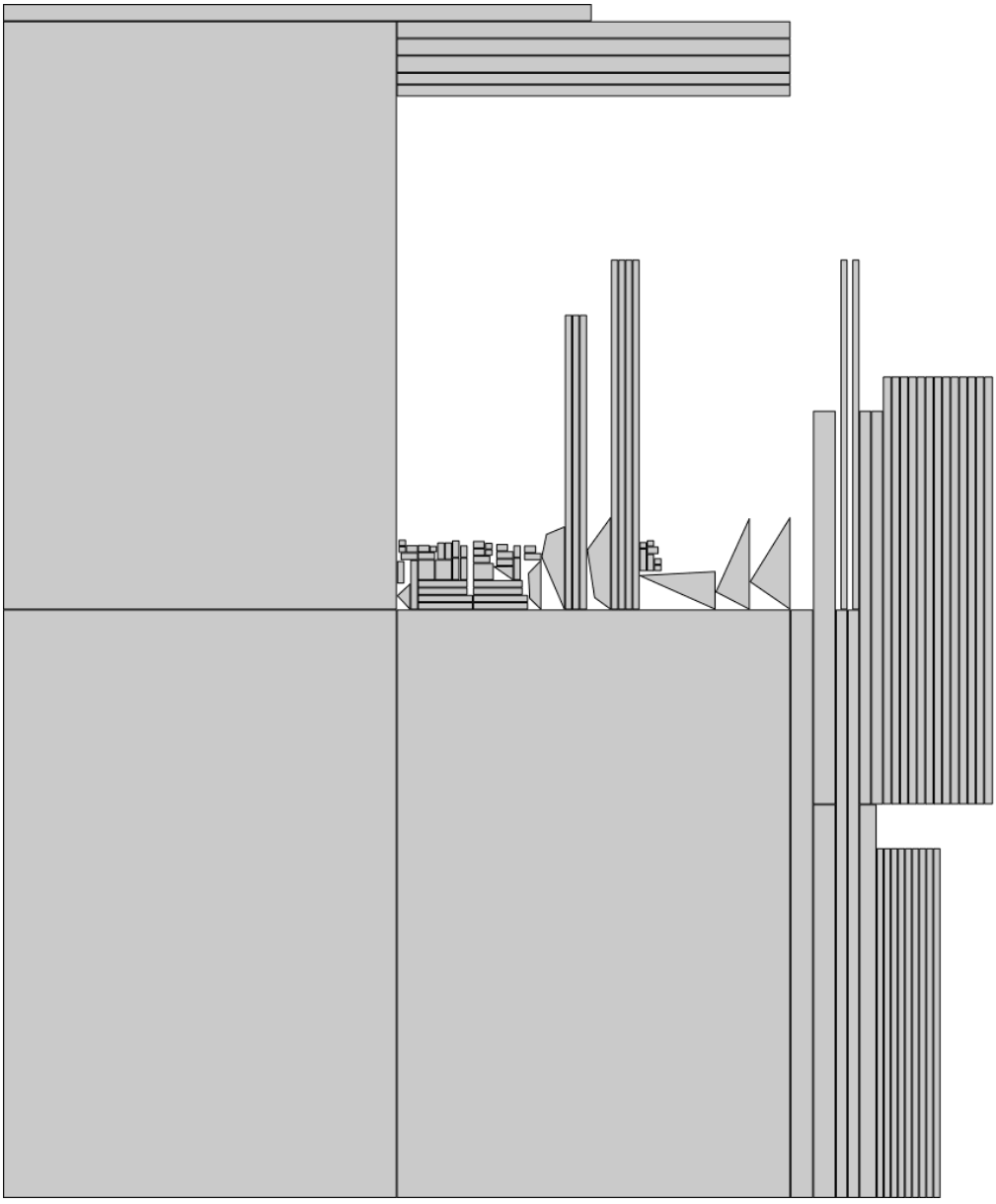
I did the simulation for the monkey and the plane.

ACTIVITY 6

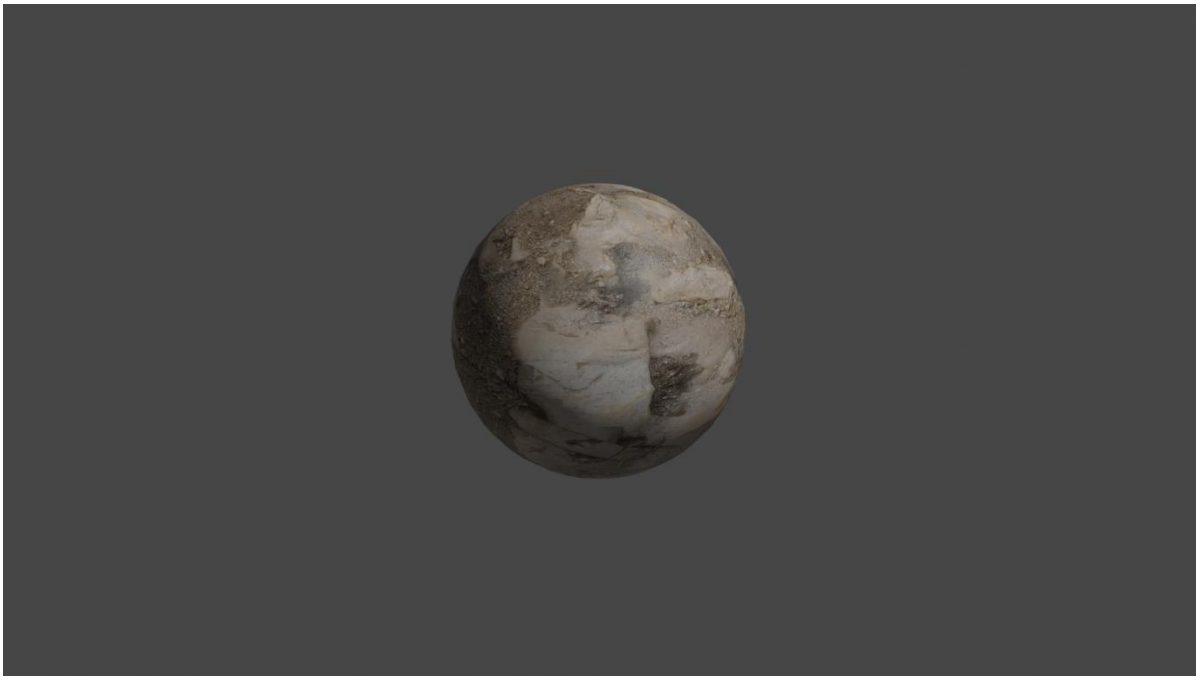
Raghad Alghamdi

Activity 6

Checkpoint 1:



Checkpoint 2.1:



Checkpoint 2.2:

The image with normal map looks more realistic, where it shows the bumps and dents.

Checkpoint 2.3:

Adding the displacement map where it changed the shape of the sphere to make it look more like a rock, where it used texture map to cause the effect to transfer the sphere into a rock.