

Assignment 2

Cameras and Lenses

Instruction: This assignment has 2 part of lab problems including part 1 is asking about cameras and lenses and for part 2 is setting camera parameters. Please try to answer all questions in English.

Part 1 : Cameras and Lenses

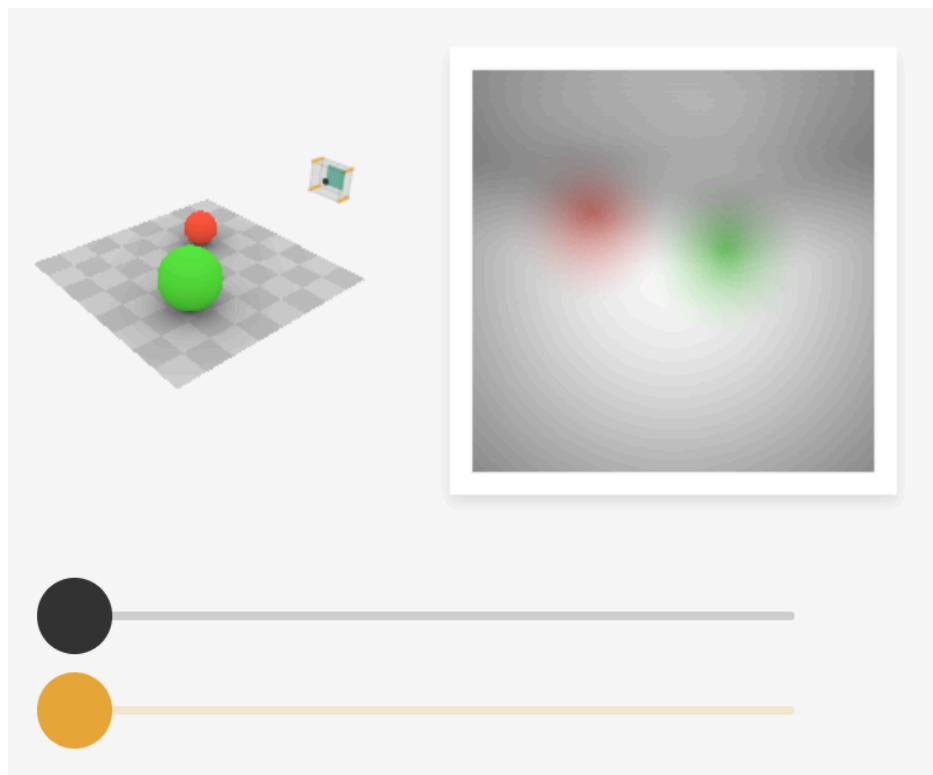
1.1 Exploring Pinhole Camera Configurations: The Effects of Hole Diameter and Sensor Distance on Image Formation

Question 1: How does the size/diameter of the pinhole affect image sharpness and brightness?

Ans :  i think light can pass through a lot and make it more bright and blur.

Question 2: How does the distance between the opening and the sensor change the size of objects and the field of view?

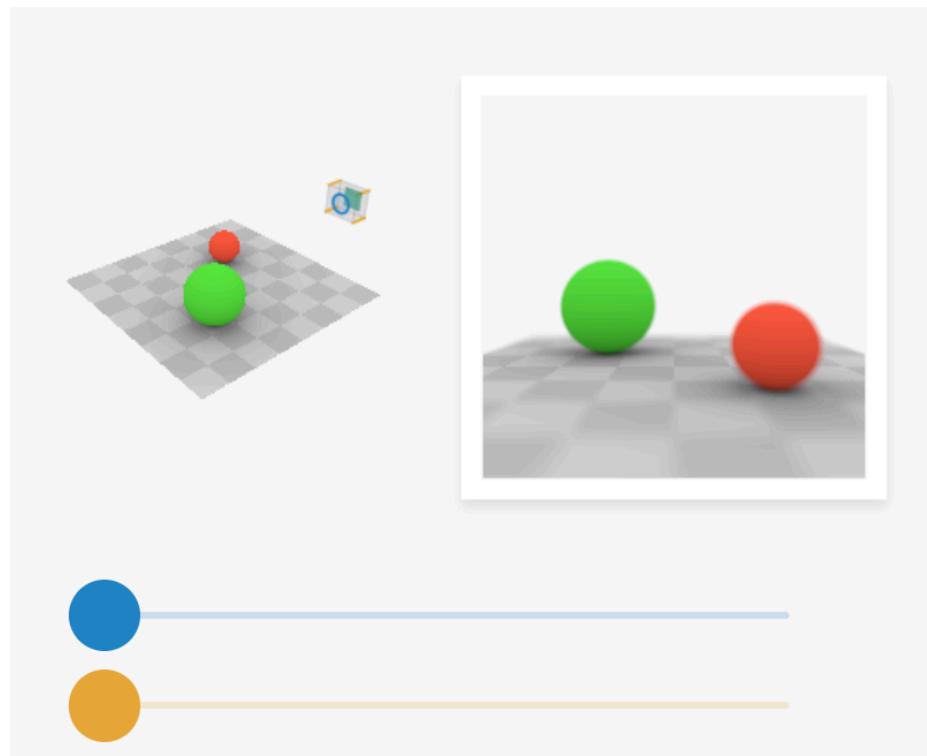
Ans :  if there is a large distance object size is bigger but field is smaller, but if less distance object size is smaller and field is bigger. 



1.2 Camera Configurations

Question 3: What happens to the image when we adjust the distance between the lens and the sensor? How does it affect focus and image clarity?

Ans : Yes, when adjusting the distance between the lens and the sensor can affect sharpness of near and far objects. That means the focus point is changed, followed by the distance between the lens and the sensor. 😊



Question 4: When the object (source) moves further away from the lens:

- Does the image's position become closer to or further from the lens?
- Does the size of the object's image on the sensor become larger or smaller?

$$\frac{1}{S_o} + \frac{1}{S_i} = \frac{1}{f}$$

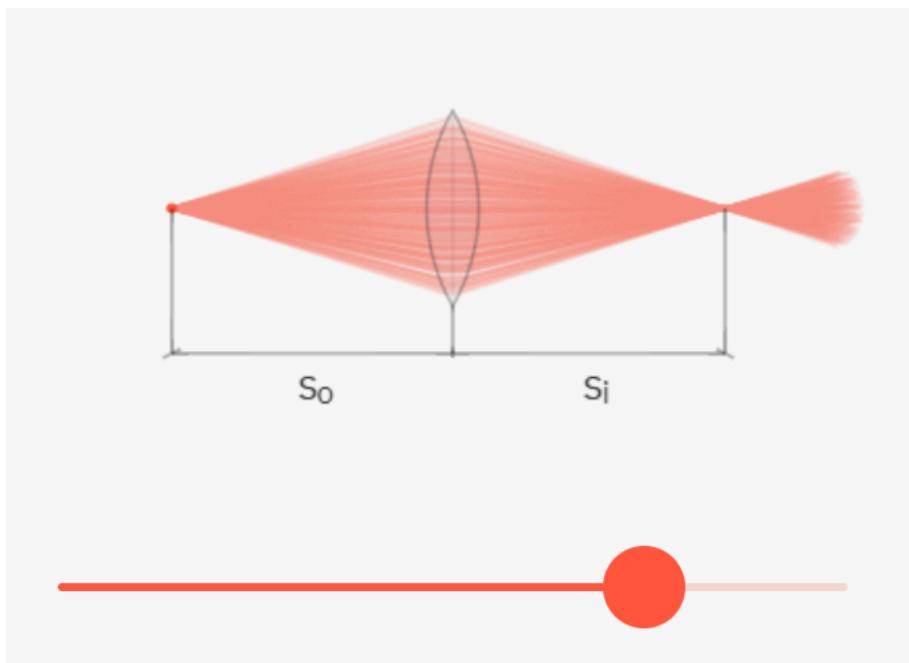
$$M = \frac{S_i}{S_o}$$

S_o : Distance between the object and the lens

S_i : Distance between the image and the lens

f : Focal length

M : Magnification



4.1 Ans : The image's position becomes closer to the lens.

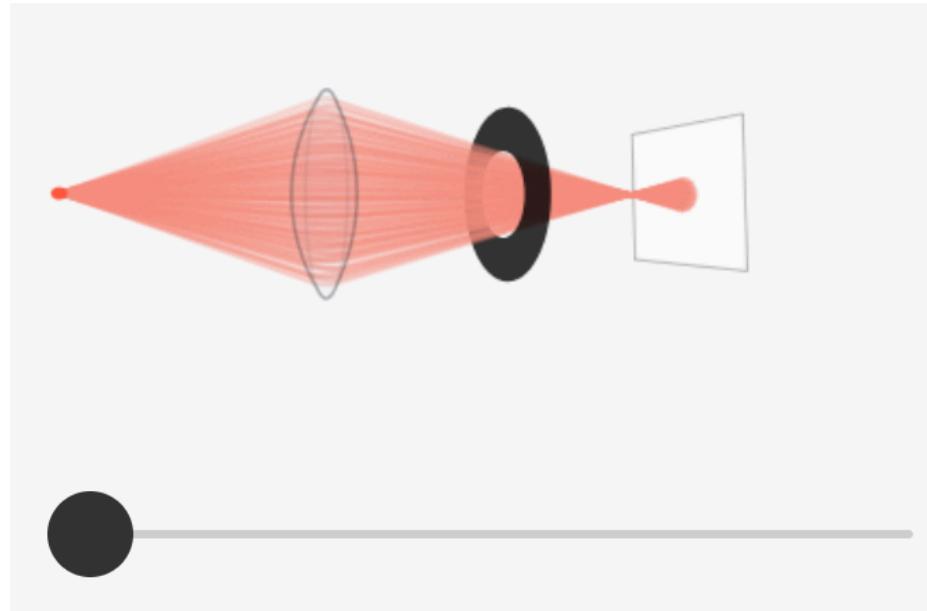
4.2 Ans : The size of the object's image on the sensor becomes smaller.

Question 5: What is depth of field?

Ans : The depth of field means how much of a picture is clear and in focus. It's the distance between the closest and farthest things that look sharp in a photo.

Question 6: How does decreasing the aperture size affect the depth of field?

Ans : When decreasing the aperture size it increases the depth of field.



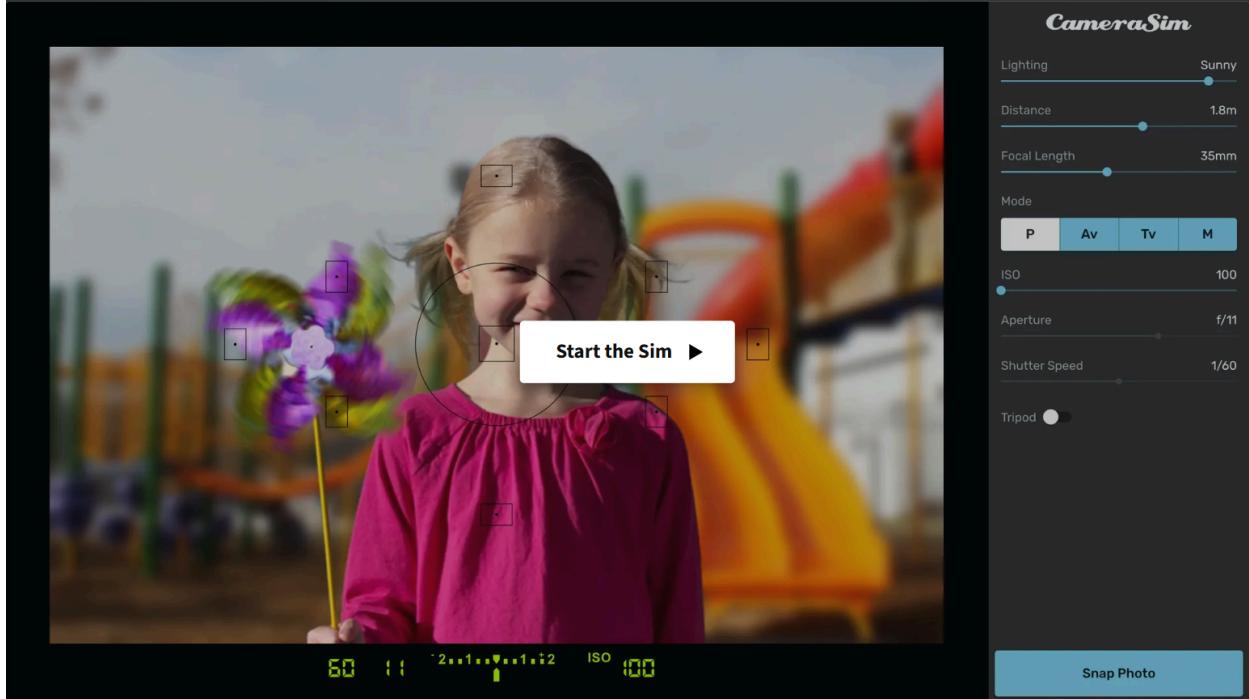
To explore and experiment with the effects, you can refer to the interactive simulations available in the link below. Use the provided controls to find answers and enhance your understanding.

<https://ciechanow.ski/cameras-and-lenses/>

Part 2 : Exposure Triangle

Instruction : For 2nd challenges you'll try to adjust 3 of factors (aperture, shutter speed, ISO) for taking photo of little girl through virtual camera lenses.

Virtual camera lenses : <https://www.camerasim.com/original-camerasim>



Default environment setting :

Distance : 2m.

Focal Length : 35mm.

Challenges problem :

1. Try to adjust camera parameters and get snap photo result that showing the best looking of the girl with blur background and the lowest noise.

1.1 Set **Linghting: Sunny**



1.2 Set **Linghting: Dim indoors**



2. Try to adjust camera parameters and get snap photo result that showing stop the fan motion with the lowest noise photo.

2.1 Set Lingting: Sunny



2.2 Set Lingting: Partly cloudy



2.3 Set Lingting: Bright indoors

