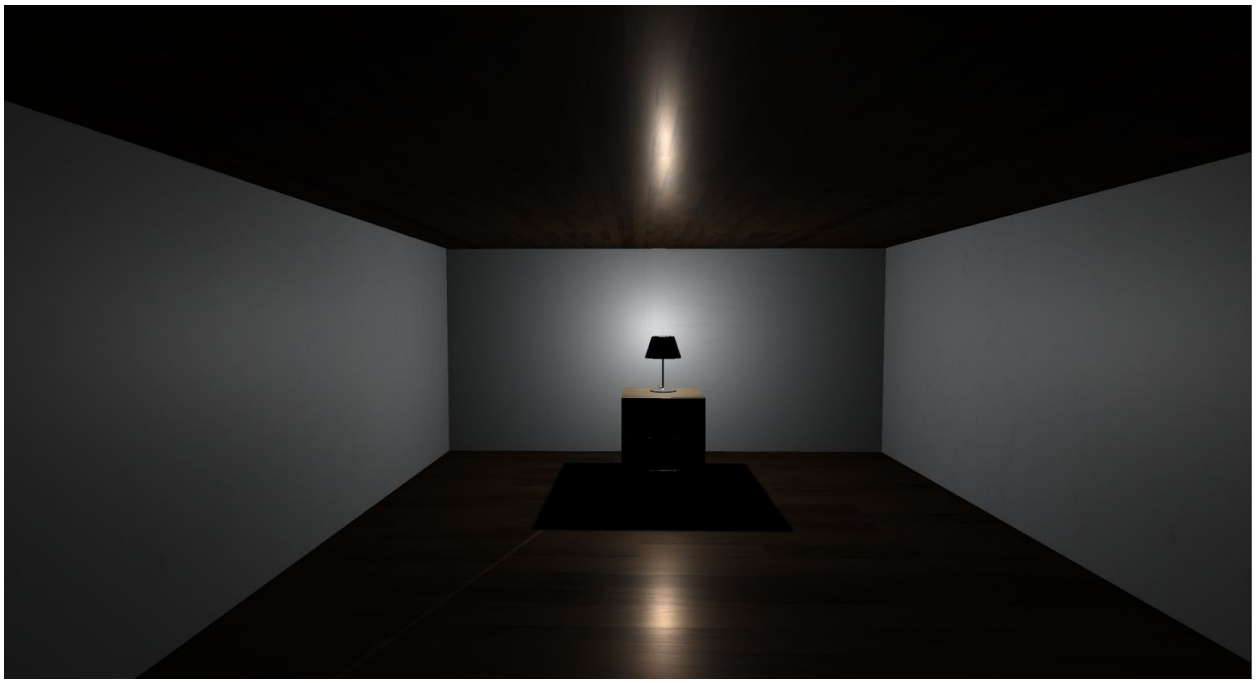
Gevorg Hovakimyan
CS 565 16342
4/5/2020

CS 565 – Light Types Overview

Point Lights

Point lights give off an equal amount of light in every direction. You would use point lights when you want to simulate a light that fills up a room, like a lamp.

My **scene** is simulating a lamp lighting up a room. There is a lamp on a desk in a dark room with no windows. The lamp has a point light on top of it to simulate its light. The user can increase the light's intensity with the left mouse button and decrease with the right mouse button to see how the lamp affects the room.

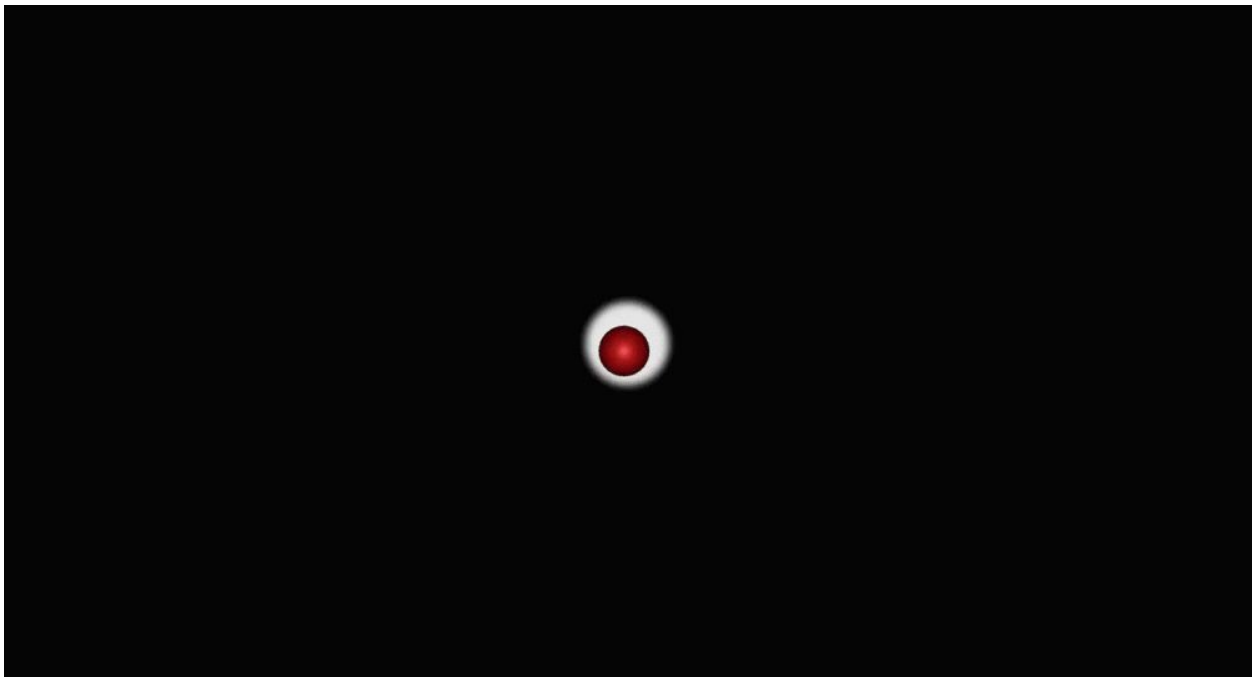


Spot Lights

A spotlight is very similar to a spot light in real life. The light is targeted at a certain location where it is brightest and it does not give off light to surfaces other than that specific spot. The intensity and angle can be adjusted to make the targeted area brighter or bigger.

You would use spotlights to simulate the effects of real life spotlights like flashlights, construction lights and searchlights.

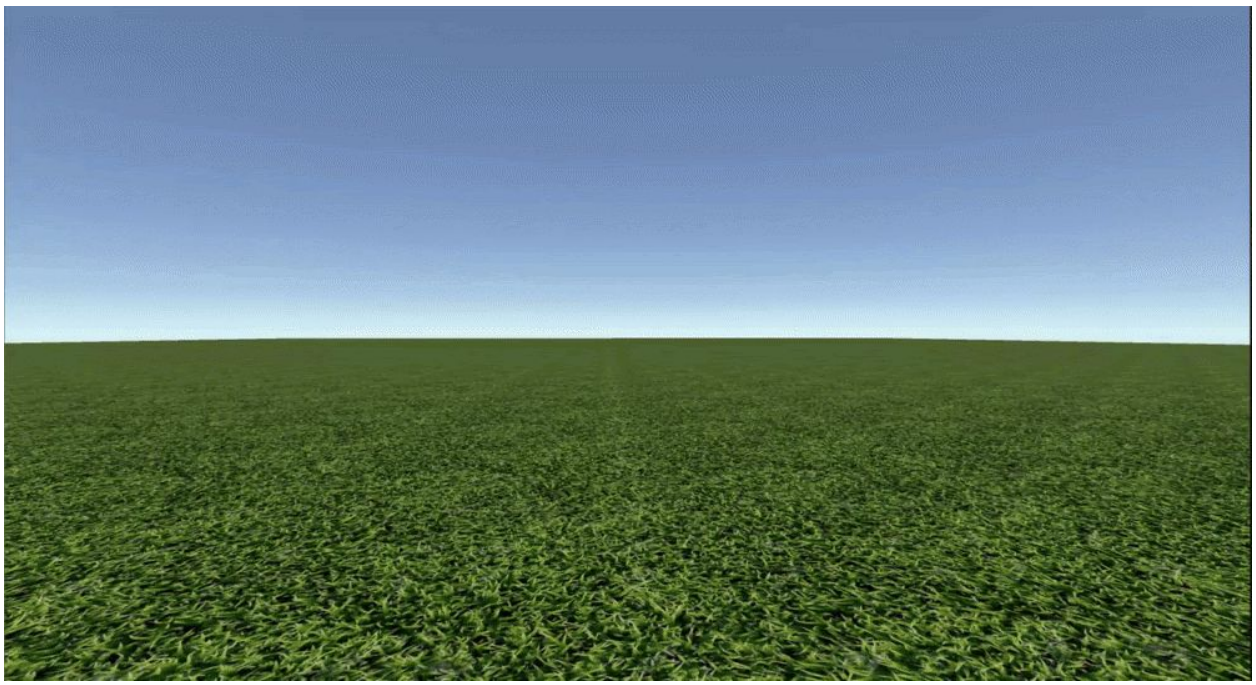
My **scene** has no directional light, the only light present in the scene is a spot light. The spotlight is pointed towards a dark surface that has 3 spheres. I created a small game where the user can use the WASD keys to move the spotlight around to look for the 3 spheres.



Directional Lights

Directional lights are pretty unique because their position and scale do not change what the light is affecting. What matters is the rotation. Directional lights light up the entire scene evenly, regardless of distance. A good use for directional lights is to simulate the sun or other nearby stars.

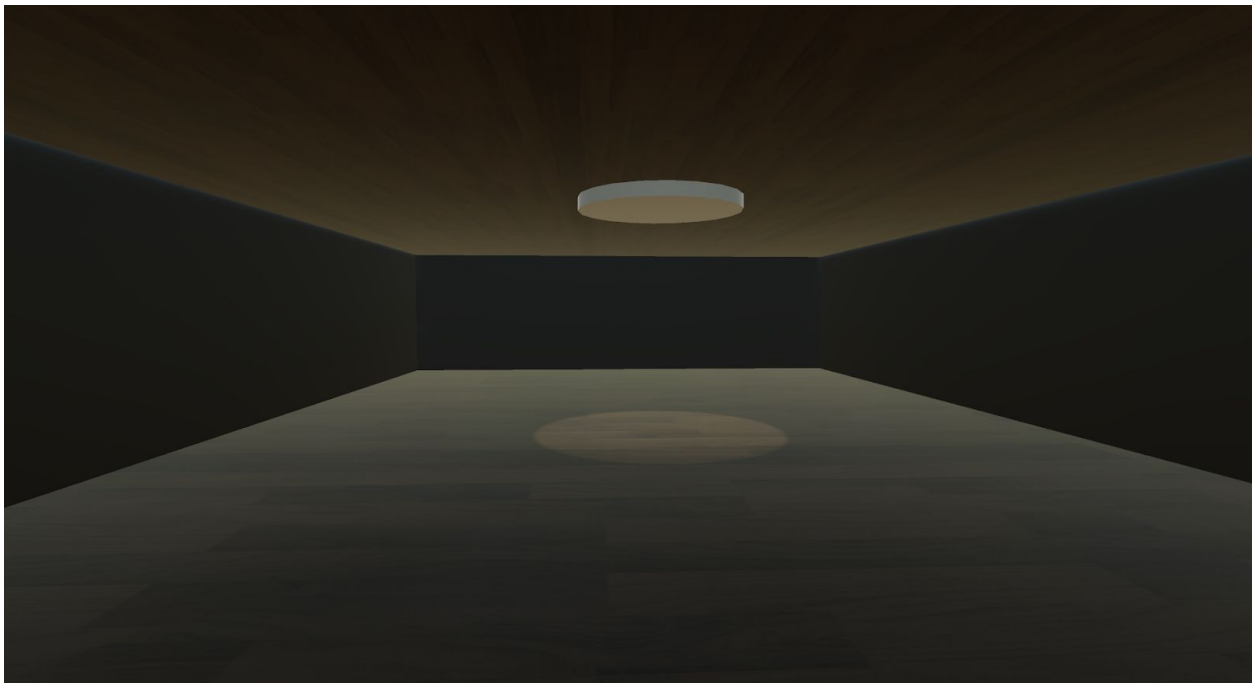
My **scene** simulates a day/night cycle. There is a plane of grass and a rotating directional light. The user can see the sun setting in front of them, creating darkness. Then the sun rises behind them and repeats the cycle continuously.



Area Lights

Area lights are similar to spot lights because they both target light on one area. The difference is that area lights also project some light to areas other than that spot. That surrounding light is noticeably dimmer, and gets even dimmer as the distance increases. You would use area lights to simulate objects like street lights or ceiling lights.

My **scene** is an empty room/warehouse with one area light on the ceiling near the center of the room. The light sheds most of its light directly where it is pointing at (the floor underneath it), but it also illuminates the room, though not as much as the point light.

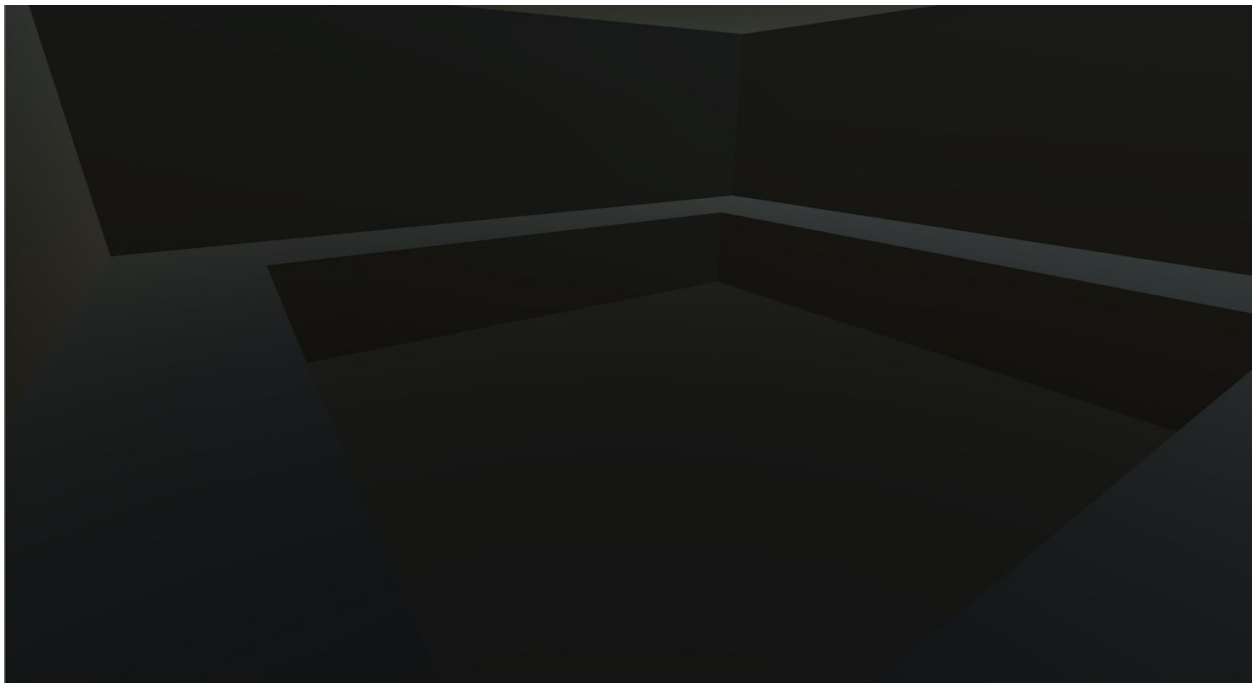


Emissive Materials

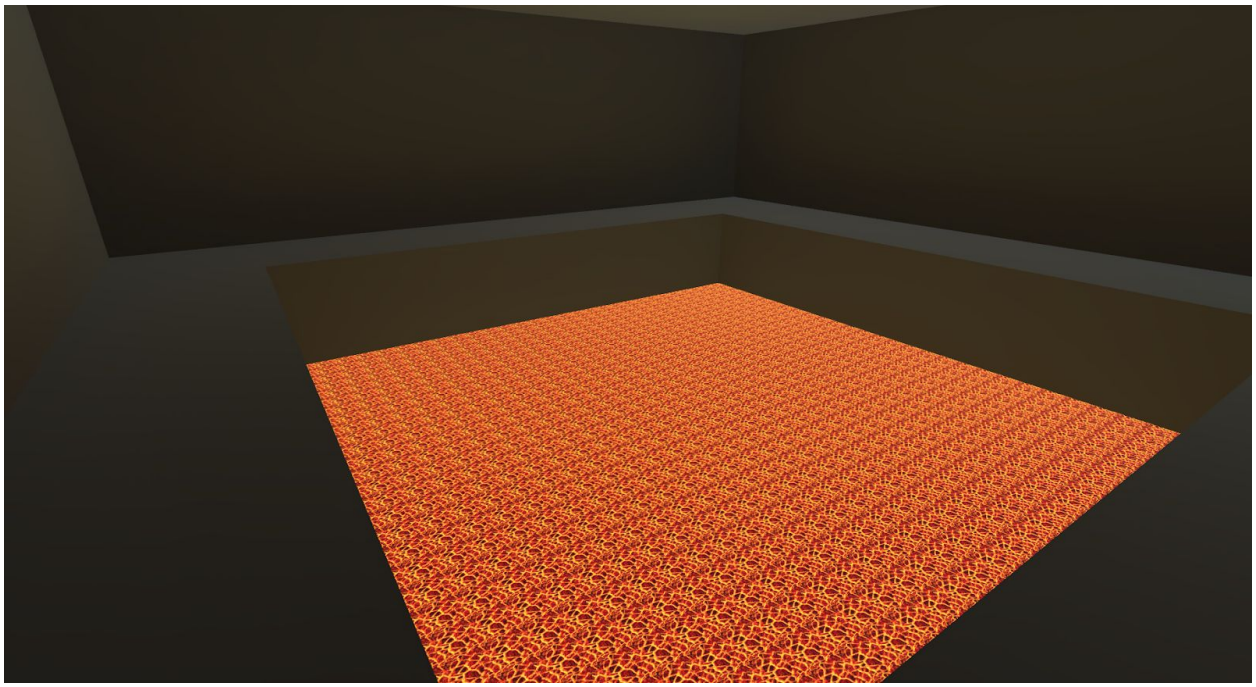
Emissive materials are basically game objects that give off light. You can turn it on by toggling ‘emission’ on the material and choosing a color to emmit. You would use emissision on game objects that give off light or a lot of heat, like a light bulb or lava. Emission only affects static objects.

My **scene** is a dark room with lava. The lava is the only source of light in the scene. The emission decently lights up most of the room.

No emission:



Lava emission:



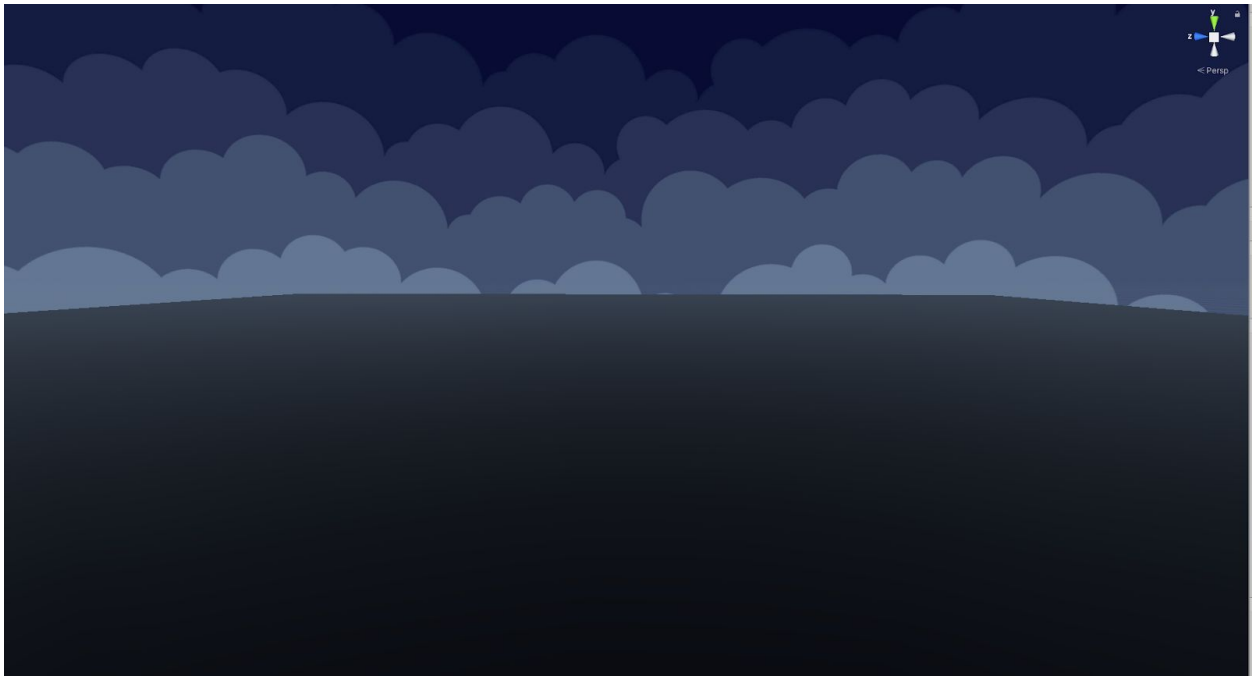
Ambient Light

Ambient light is similar to directional light in that they both give off an equal amount of light to the entire scene. The main difference is that ambient light does not come from any source. You can use ambient lighting to simulate the light the sky (moon/stars) would be giving off to the scene. You can use it to get rid of unwanted shadows by brightening the scene up.

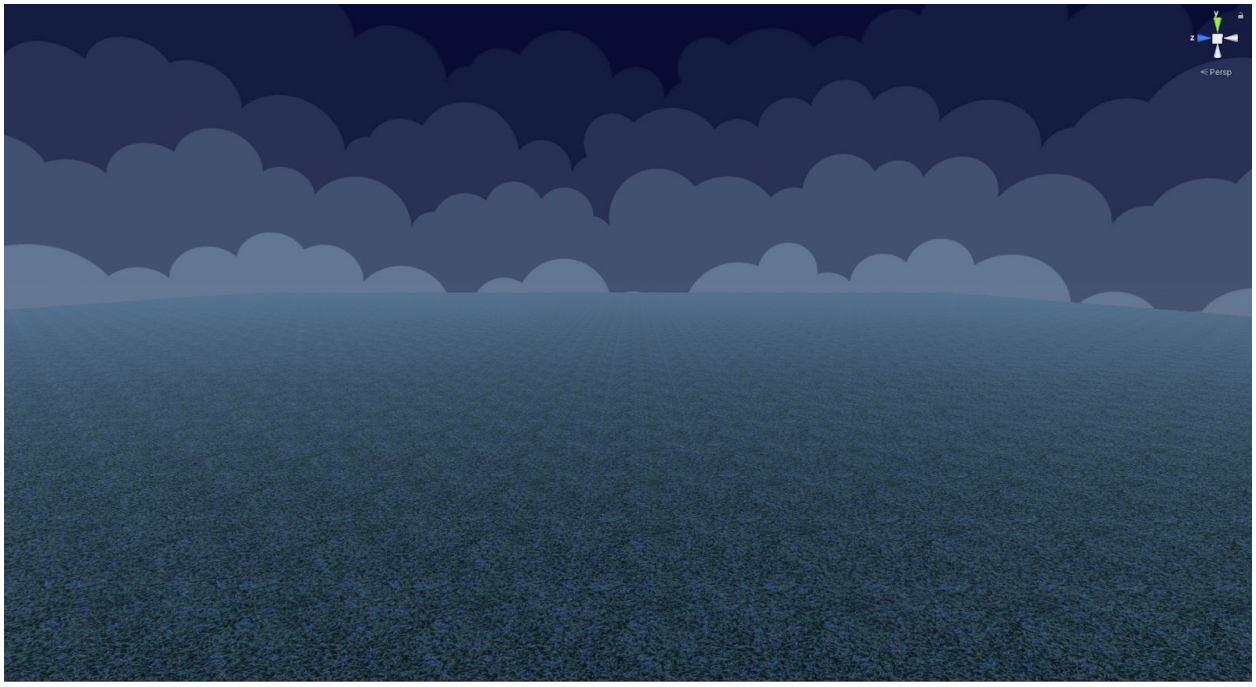
I have two **scenes** for Ambient light, one for day and another for nighttime. There is no light source in the scenes besides the ambient lighting. The ambient light gives off light to the entire scene based on the skybox. In the AmbientLightNight scene, the

ambient light is giving off a moonlight-like appearance based on the skybox. In AmbientLightDay, the scene is lit orange-red to simulate sunrise, based on the skybox.

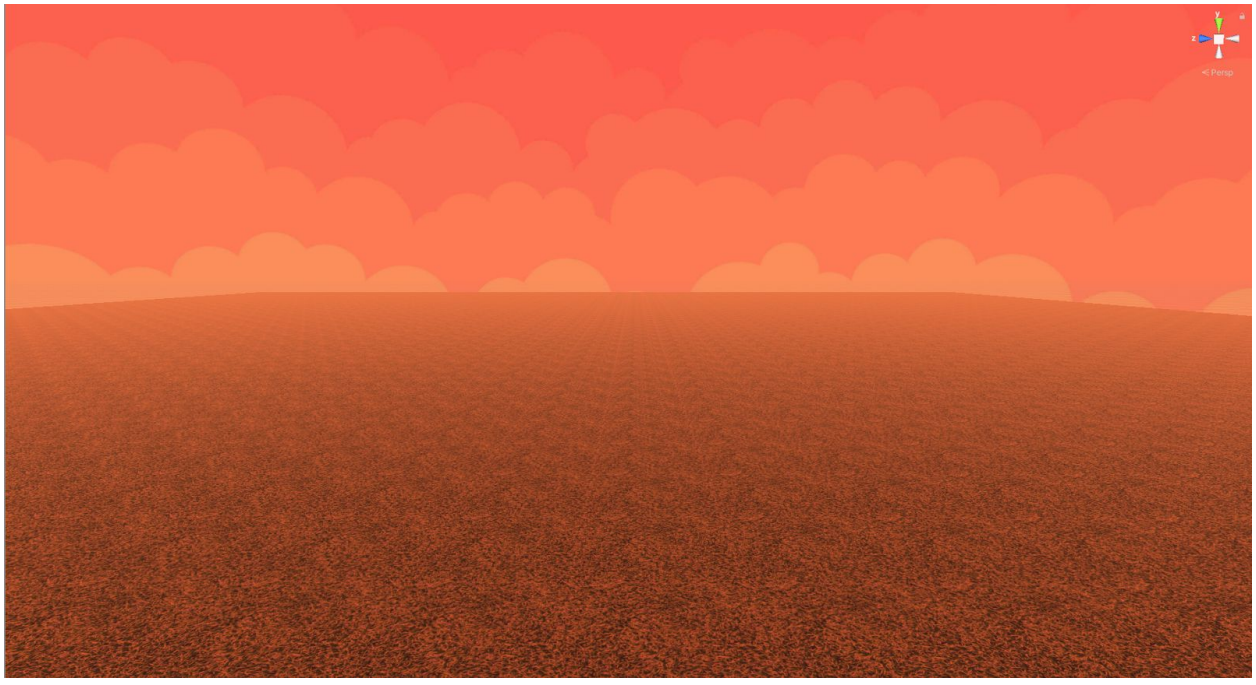
No Light:



Night with Ambient Light:



Sunrise with Ambient Light:



Note:

The point light scene has left mouse button and right mouse button controls.

The spotlight has WASD controls.

Ambient, Emissive and Area Light scenes need to be baked.