UNIVERSITY OF MALTA
Institute of Digital Games

Creating Virtual Worlds

Lecture 3

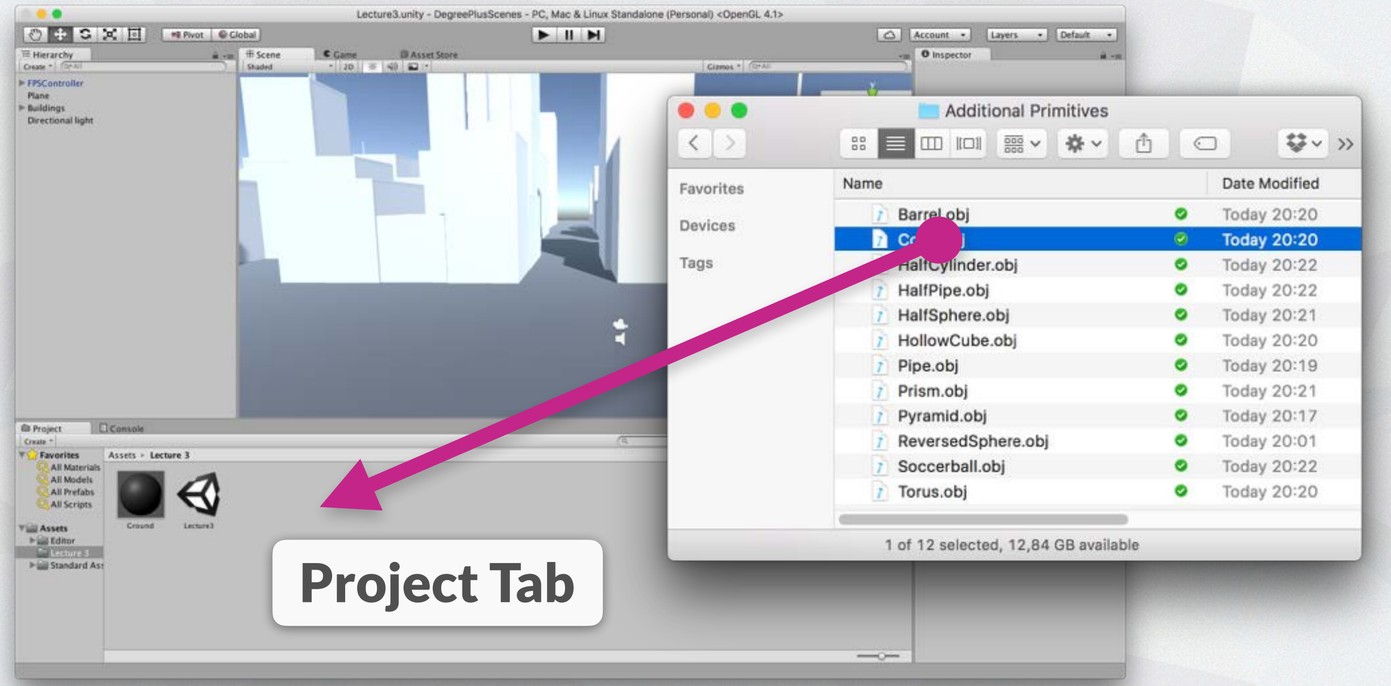
Imports, Cameras & Lights

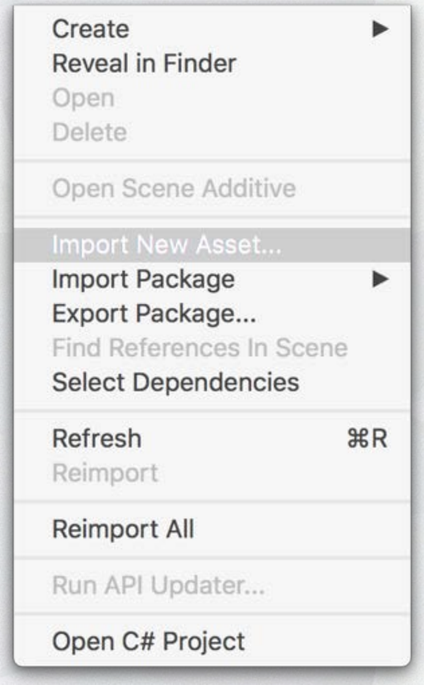
Our topics today …

- **Importing Assets**
  Adding building blocks to the project
- **Cameras**
  Modifying how users see the environment
- **Lights**
  Illuminating the environment
- **Baking**
  Saving complex light setups into lightmaps

Importing Assets

Import media files (images, 3D objects, sounds) and scripts for use in Unity: Drag and drop — or via menu

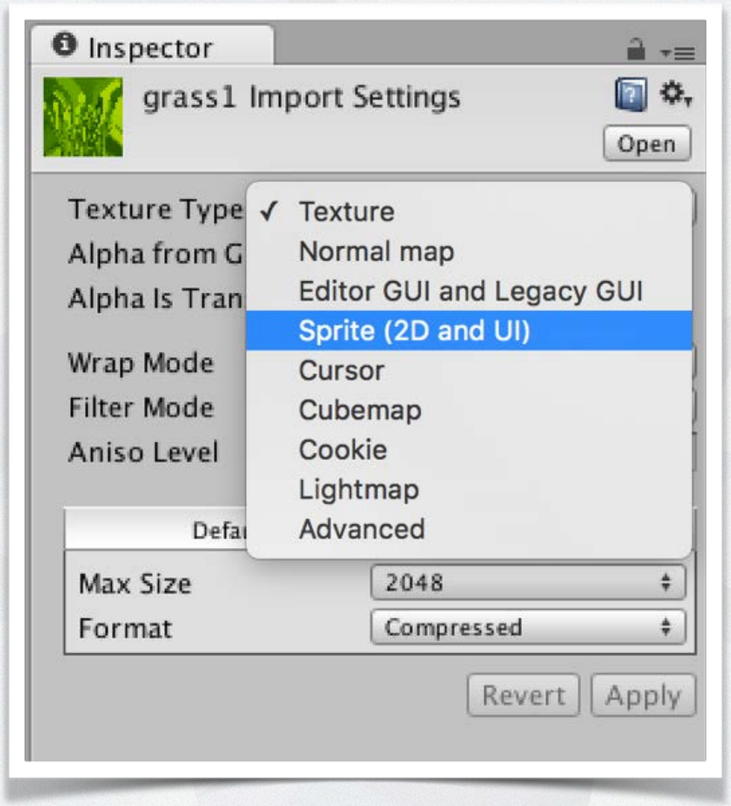


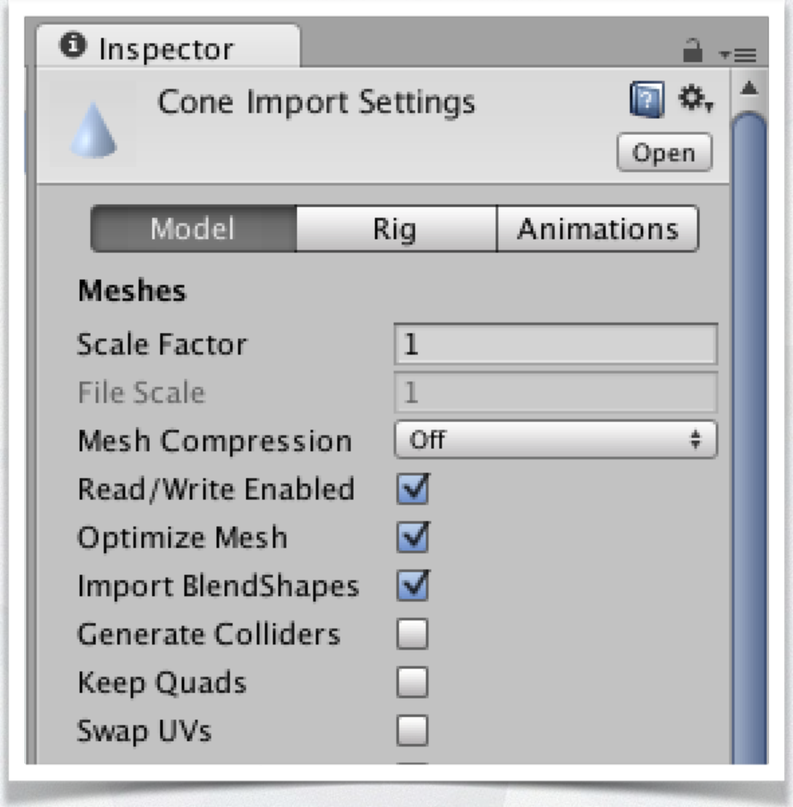


Assets > Import New Asset

Imported files are copied into the project folder.

After the import, you can click on the imported file for further adjustments:





Changes need to be saved by clicking the Apply button!

Imported files can (and should be) be organised in folders!

Some imports automatically create additional files or even folders in the Unity project (e.g. adding 3D objects automatically adds a material)

You can modify imported files by saving over them; Unity will refresh them automatically

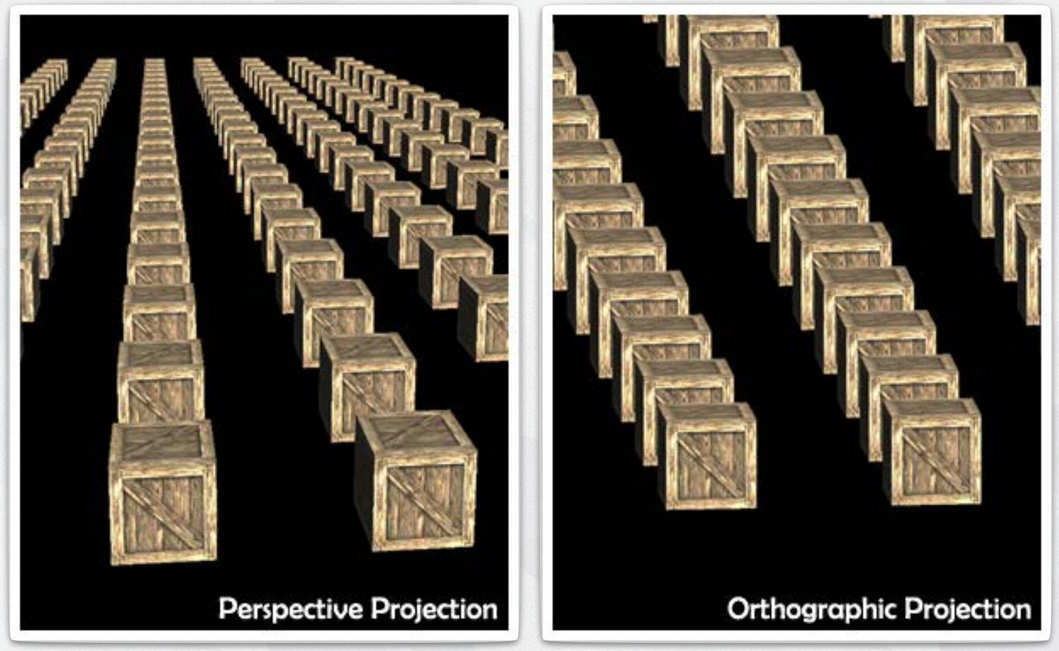
Typical asset files:

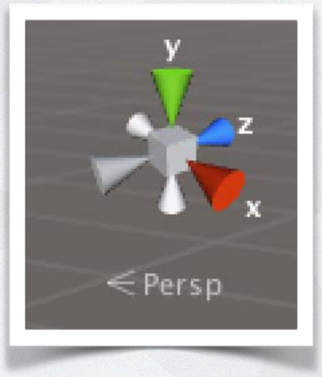
- **OBJ, FBX** — 3D Model Files
- **PNG, TIF, TGA, JPG** — Image Files
- **WAV, MP3, OGG, AIF(F)** — Audio Files
- **MP4, MOV, AVI** — Video Files
- **CS, JS** — Script Files

Many other file formats are supported as well

Cameras

Typically using **perspective projection** — orthographic or isometric view can be useful for arranging objects



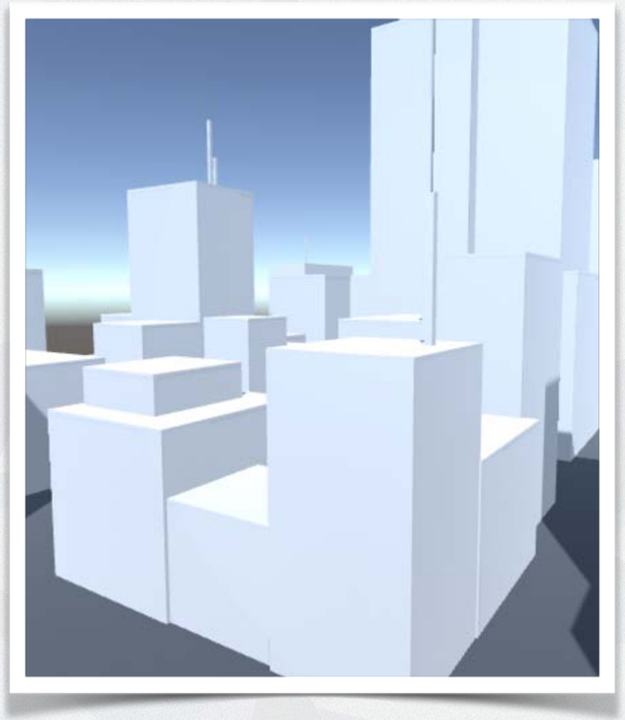


In Unity, there is a **scene view camera** used for working in the editor. This camera is not used during runtime!

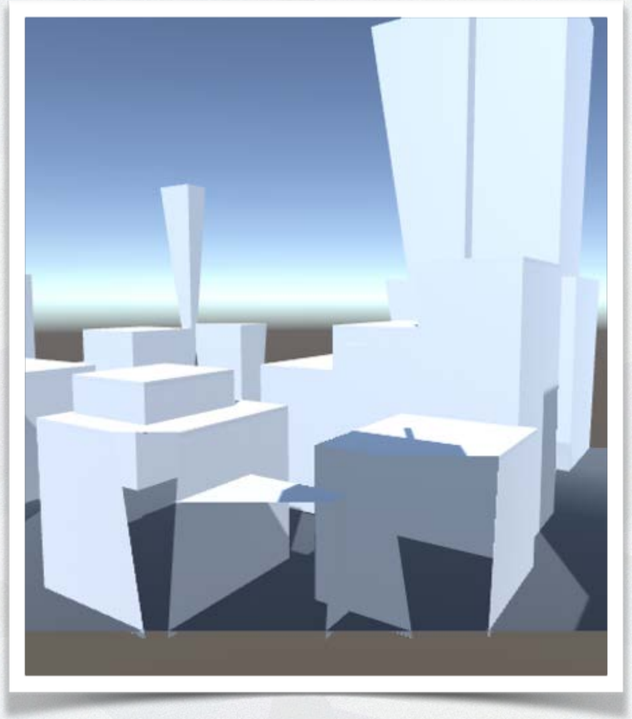
Cameras in Unity

GameObject > Camera

To keep things simple, use only one camera per scene!

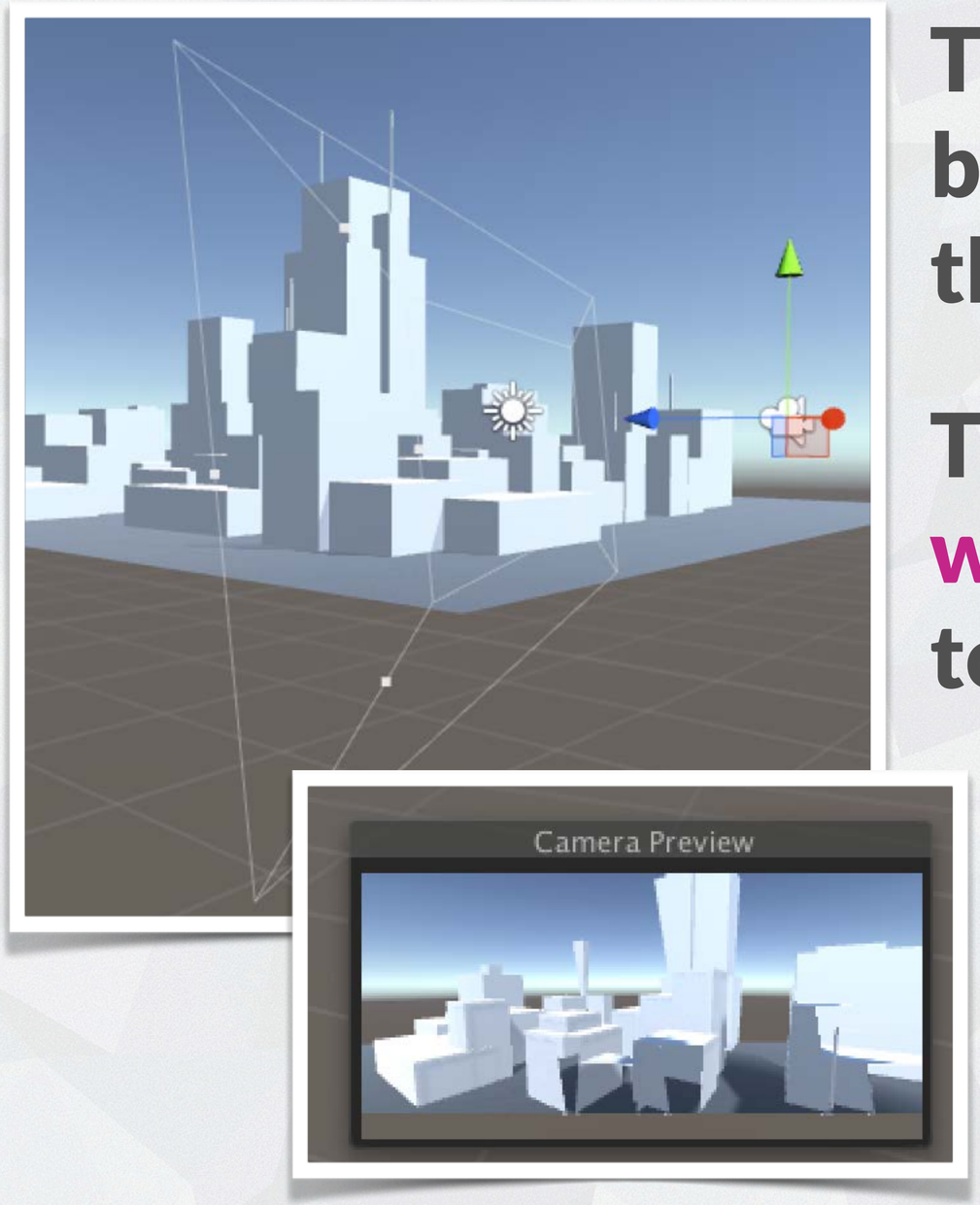


Large Range



Small Range

Cameras cannot render an infinitely close or far distance. The range is defined through clipping planes



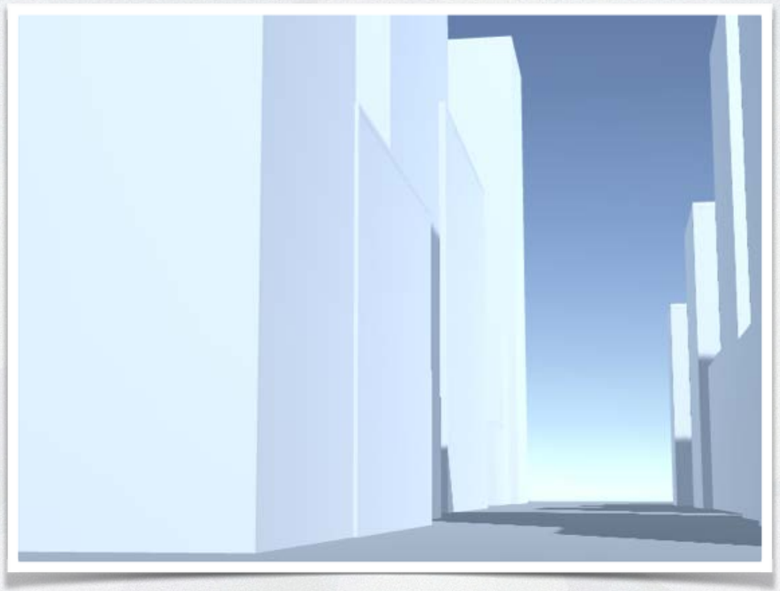
The range of the clipping planes can be seen by selecting the camera in the scene hierarchy.

This also shows a small preview window of what the camera is going to render.

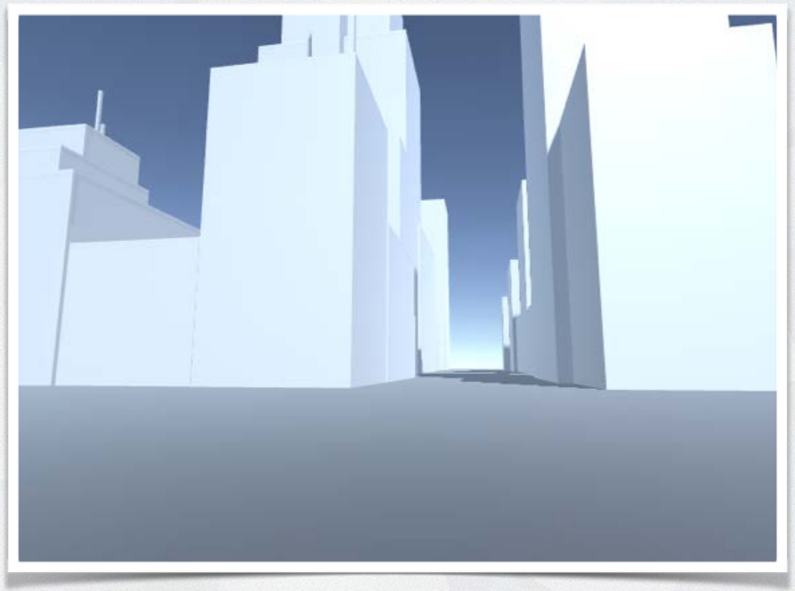
Default settings will usually be fine — but be aware of this, especially with objects close to the camera

Field of View (FOV)

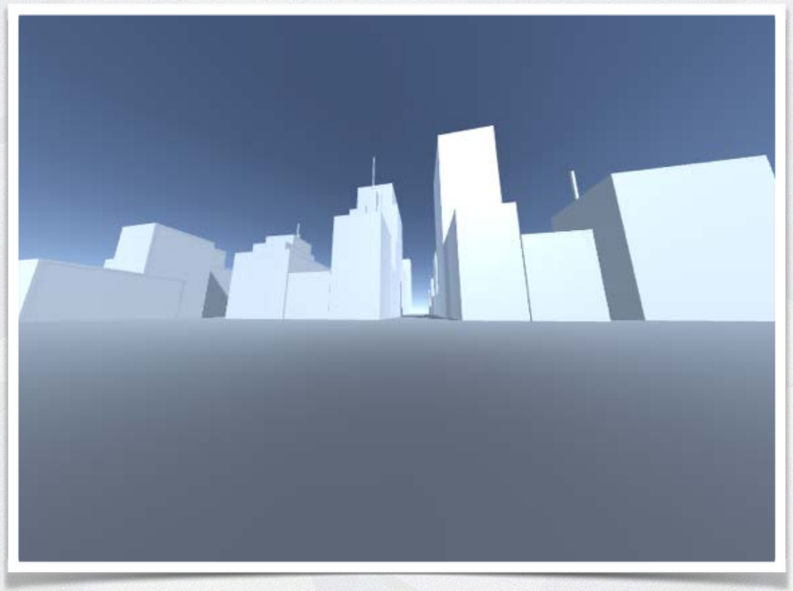
Defines the viewing angle that is captured by the camera.
A powerful option to emphasise a sense of scale or speed!



FOV = 20



FOV = 60

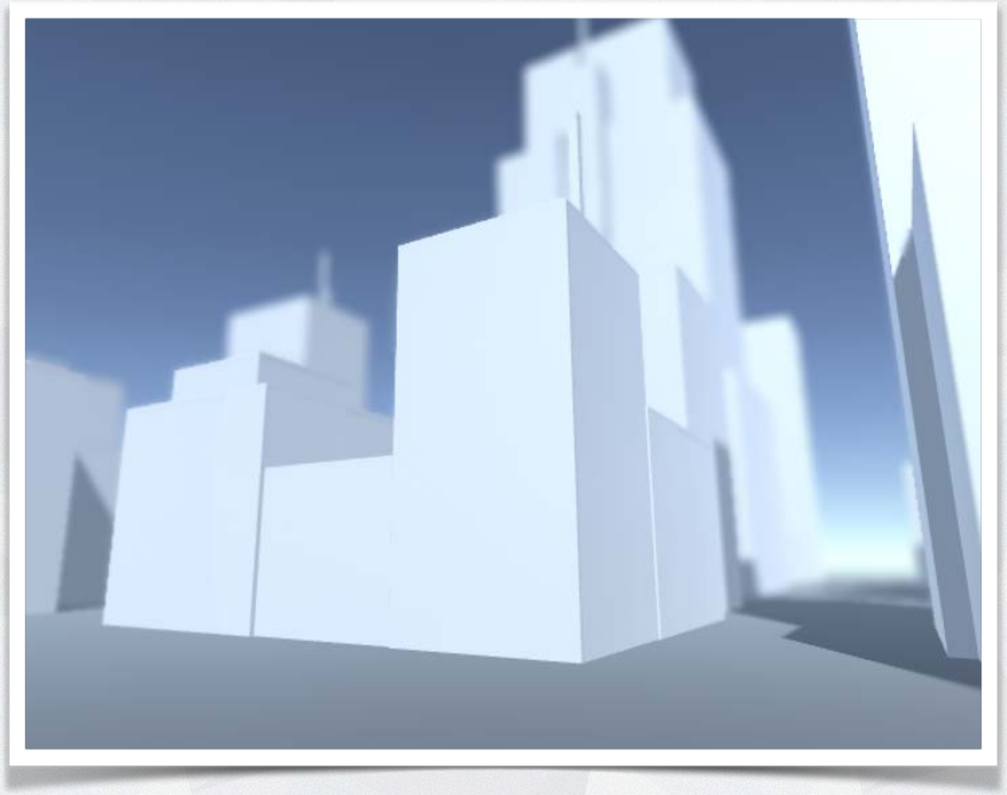


FOV = 120

Note that the position and rotation of the camera is the same!

Image Effects

The Standard Assets in Unity offer a few useful image effects. They are however not always supported!

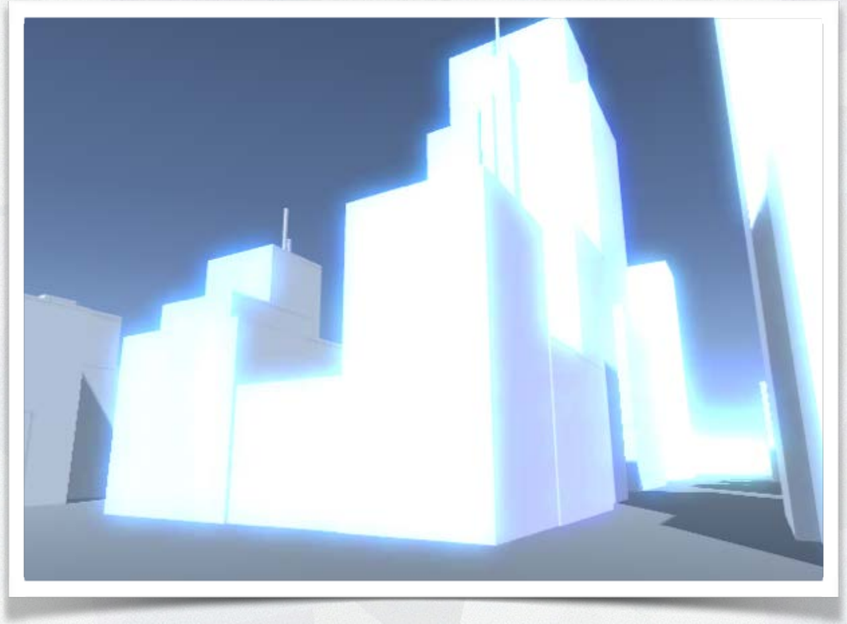


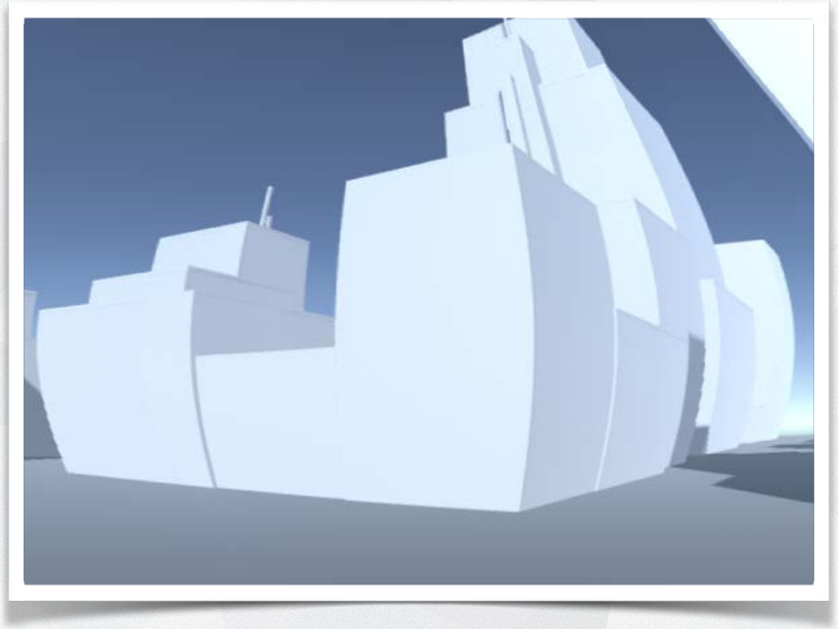
Depth of Field

Simulates the effect of focusing on an object close to the camera

Bloom

Overemphasises bright parts of a scene to make them seem glaringly bright

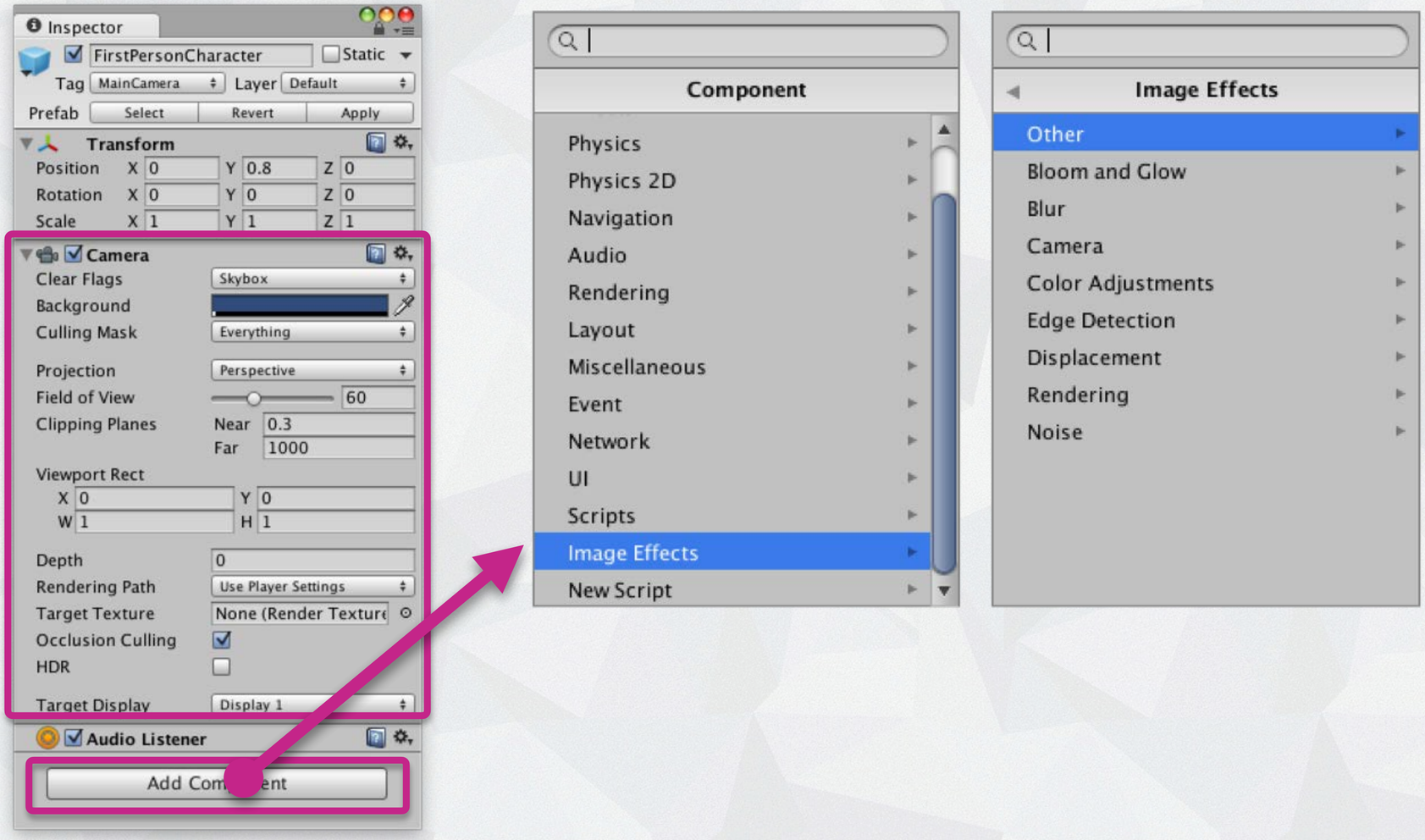




Fisheye

Distorts the camera view as if using a fisheye lens

Image effects need to be attached to the camera object!



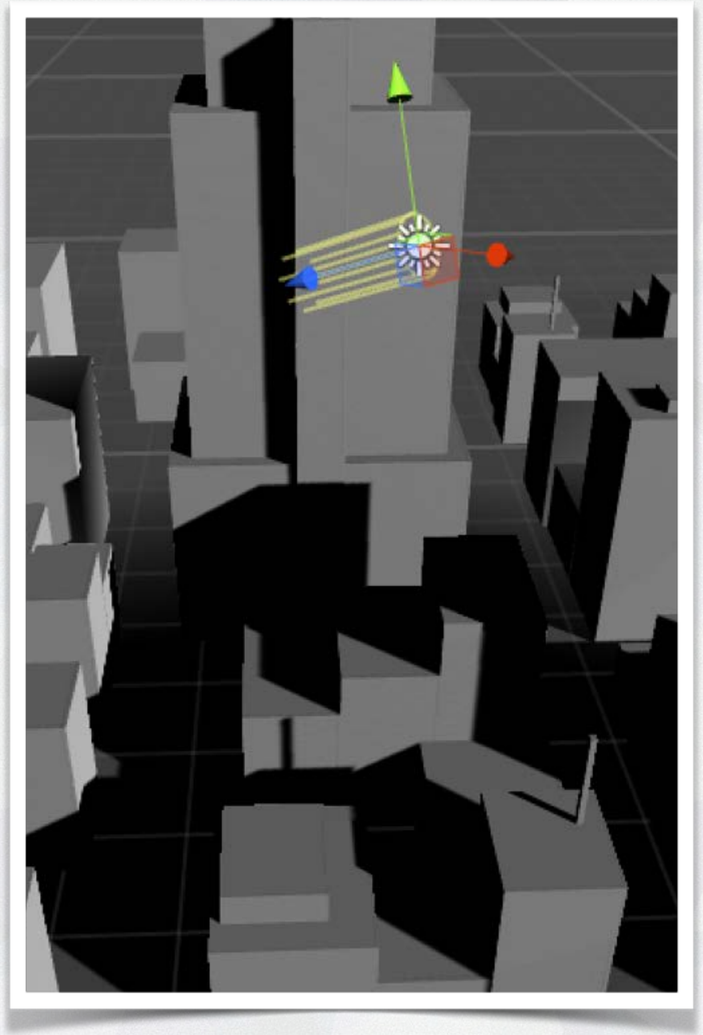
Lights

GameObject > Light

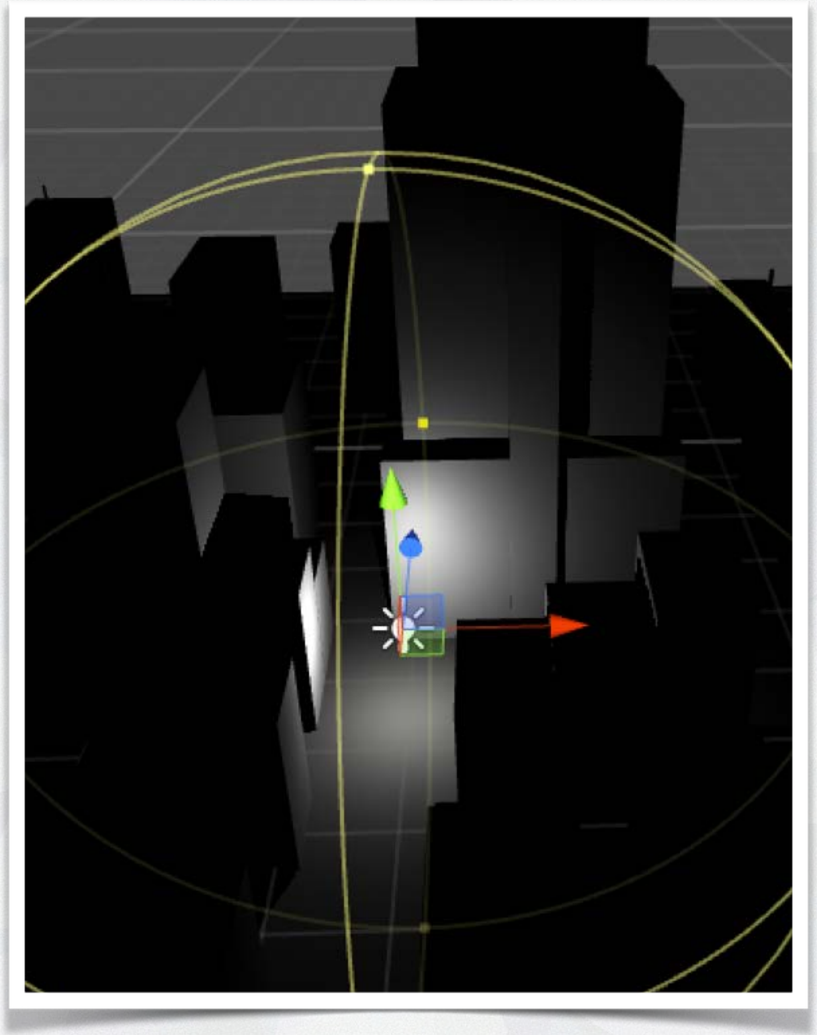
Not much to see without — but in Unity a scene is not just illuminated by light assets

Scenes are by default lit with a directional light and a skybox as ambient light source. This can be changed in lighting setup of a scene

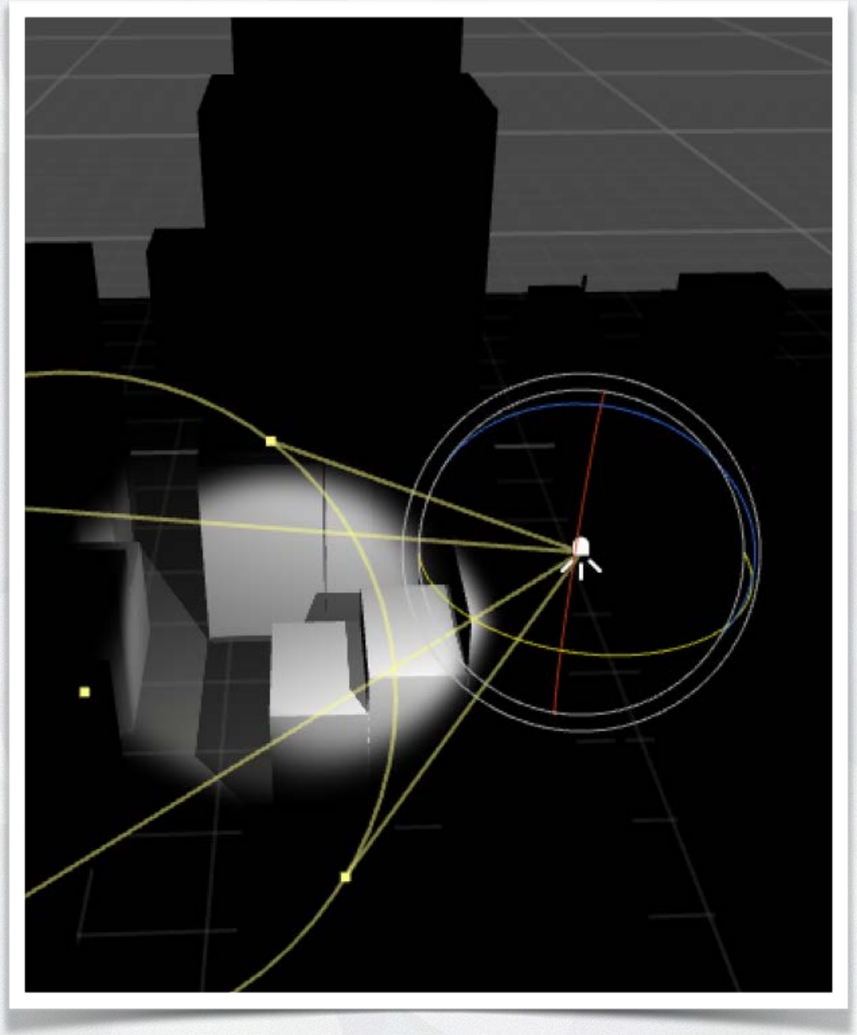
Ambient light determines the color of everything that is not lit — it is the darkest shade in the scene



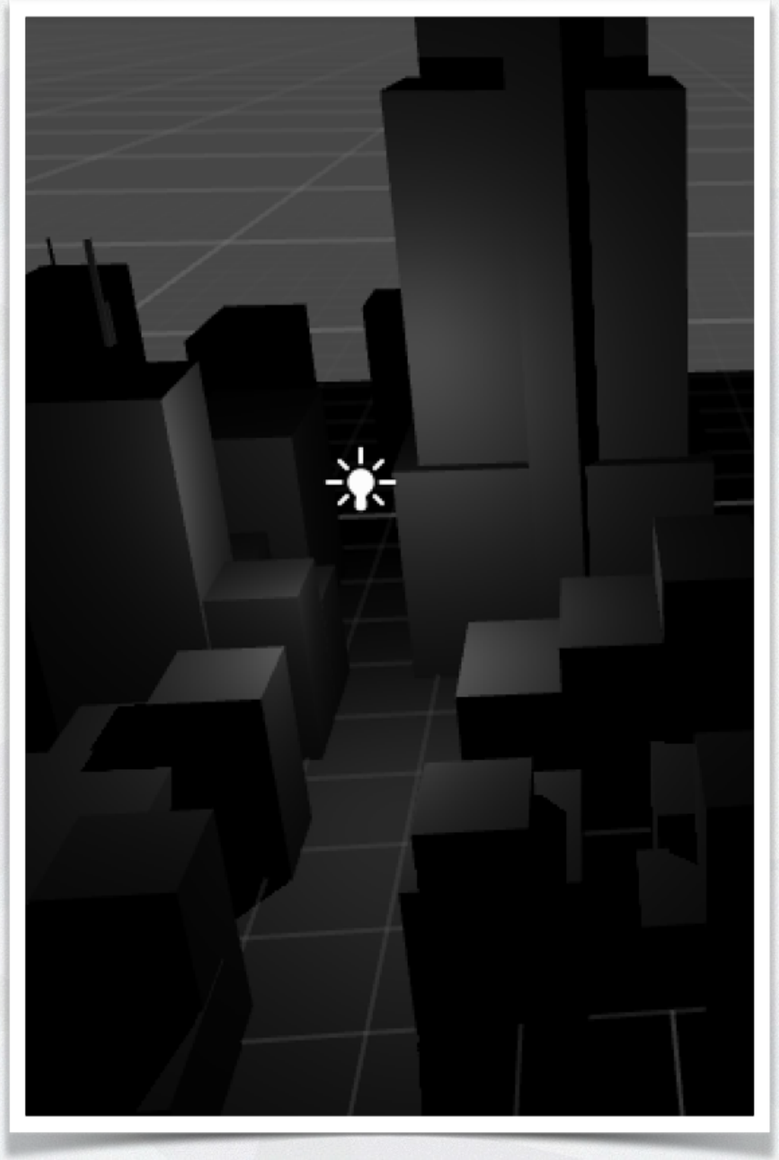
Directional Light

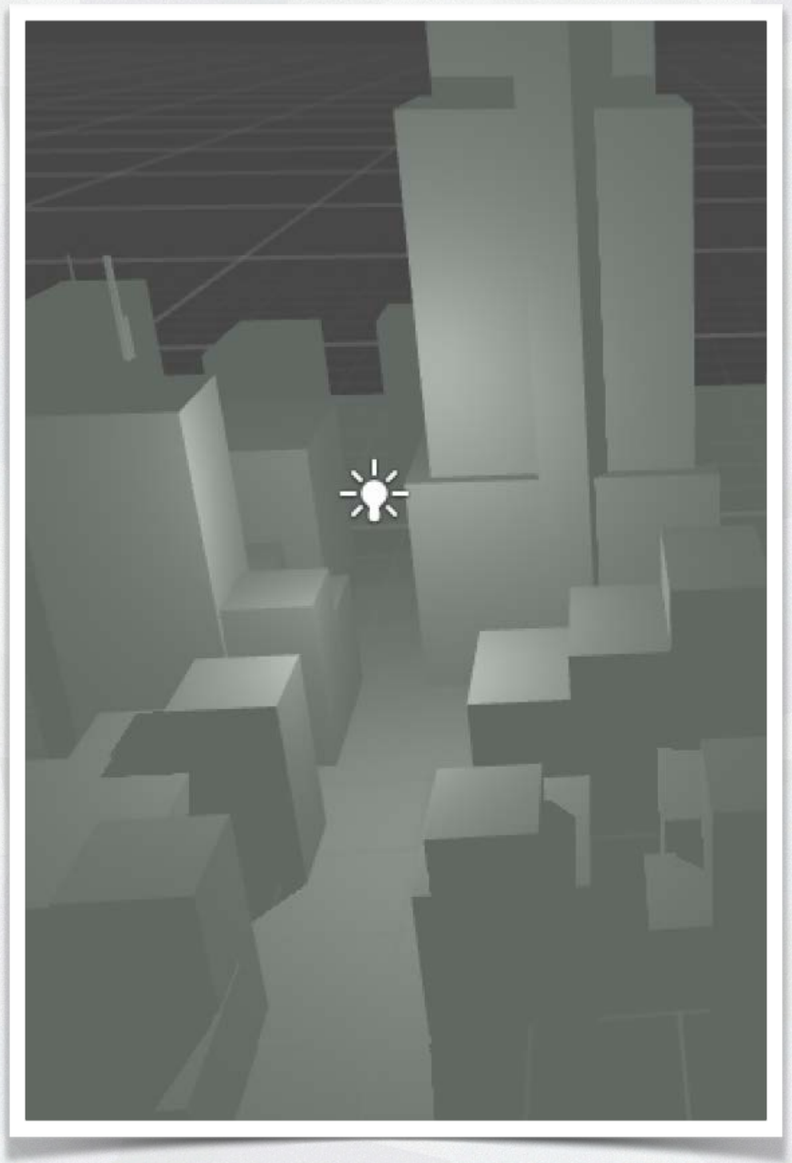


Point Light



Spot Light

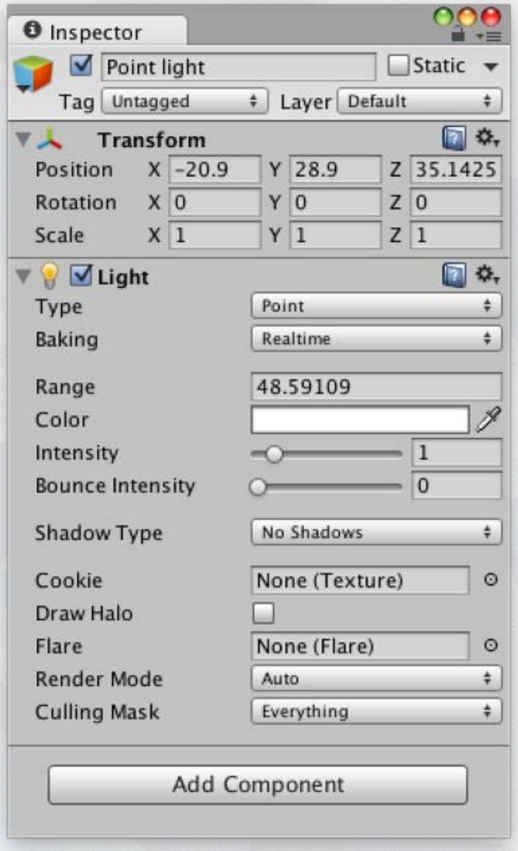




Changes in ambient color affect the whole scene

Light Settings

In general you need to focus on these properties:

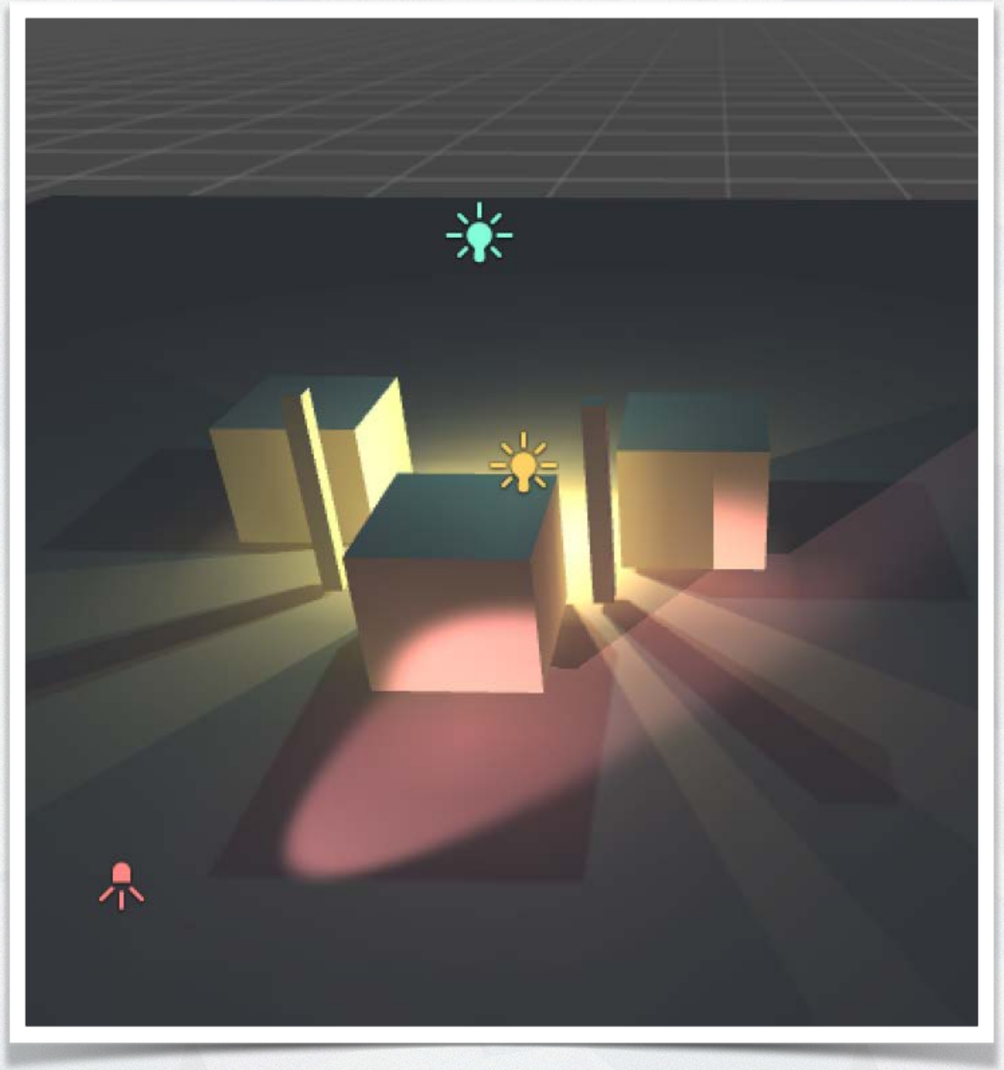


- **Color** — The color of the light (this determines the brightest visible material color)
- **Intensity** — How bright a light shines
- **Range** — Determines how far a light reaches in spot and point lights

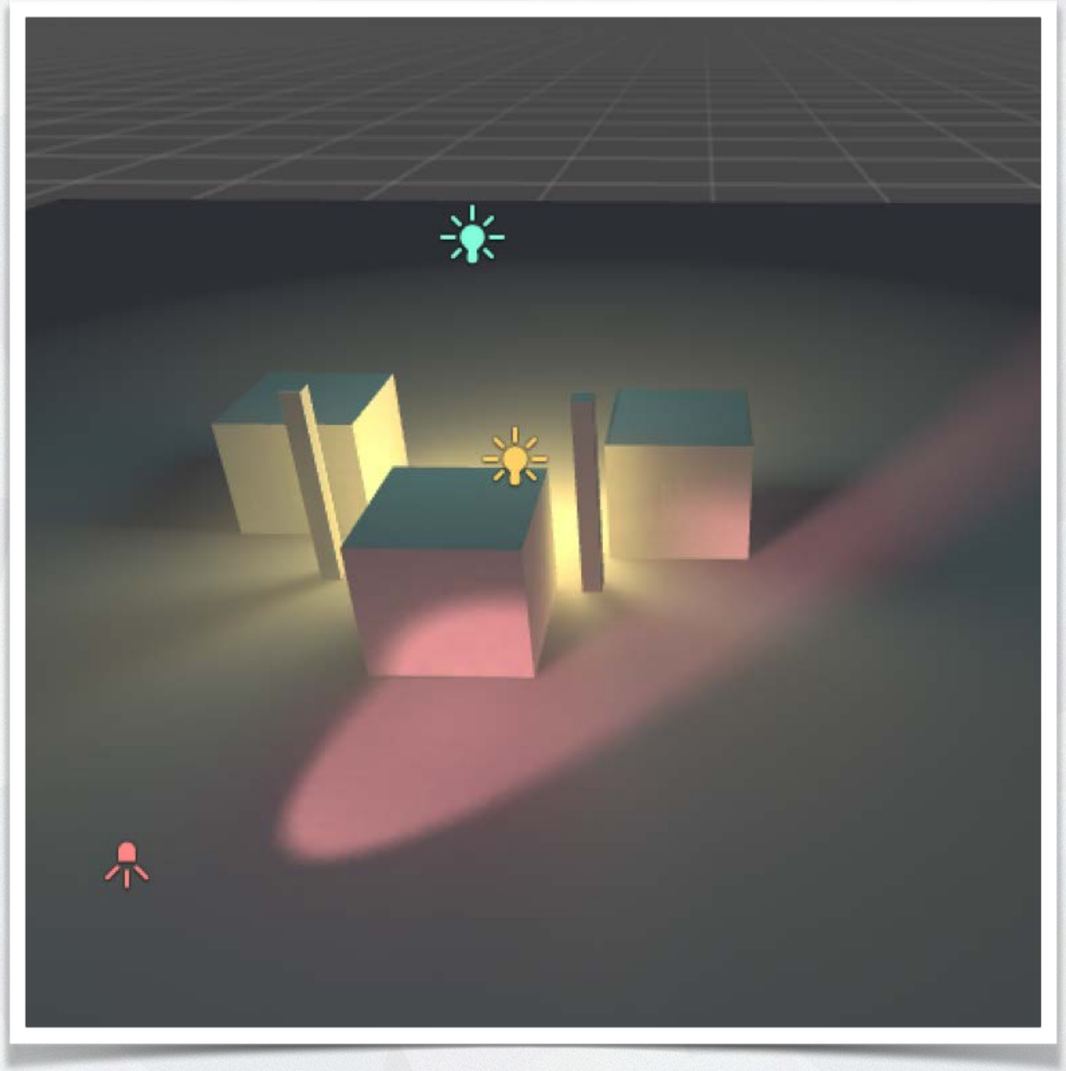
Baking and Lightmaps

Baked lights are not dynamic but rather light information that is saved into lightmaps and overlaid over the texture.

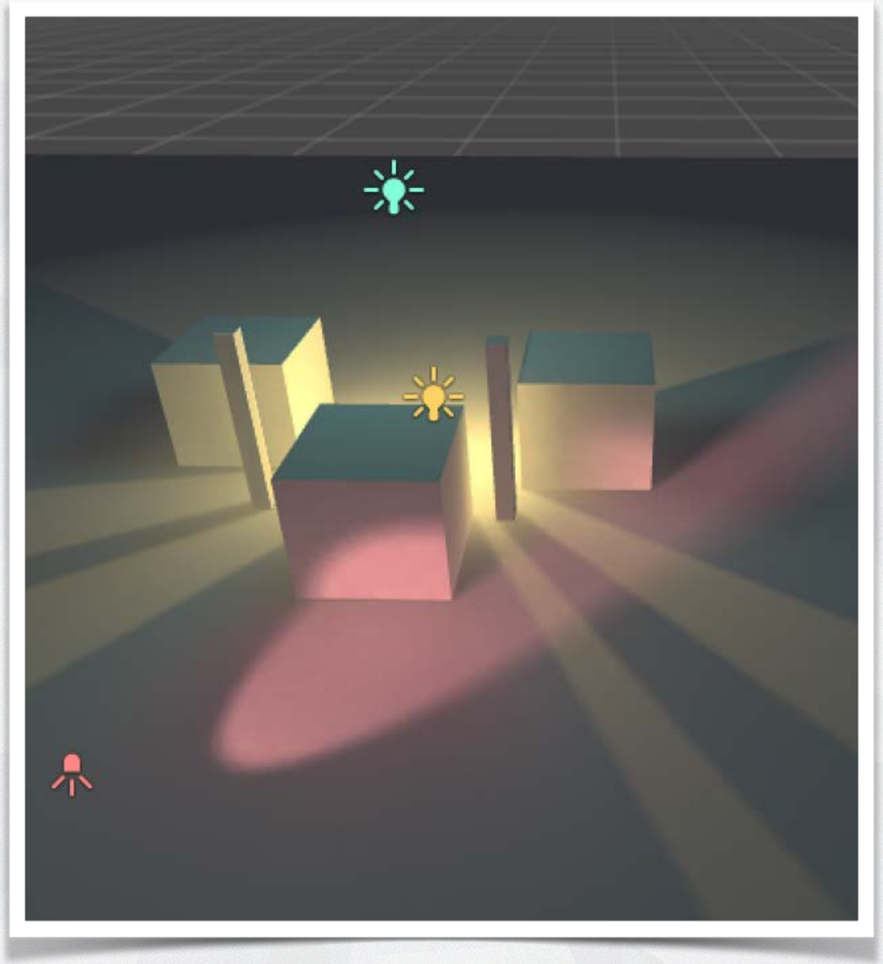
Baking lights can take a long time, but is useful for complex scenes with many light influences.
Baking is also the only way in which light emitting materials can influence the lighting of other objects.



Realtime



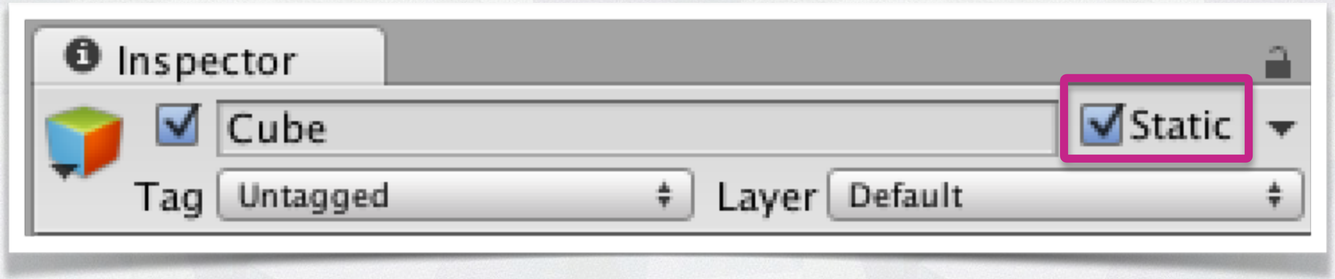
Mixed



Baked lights with yellow light set to hard shadows

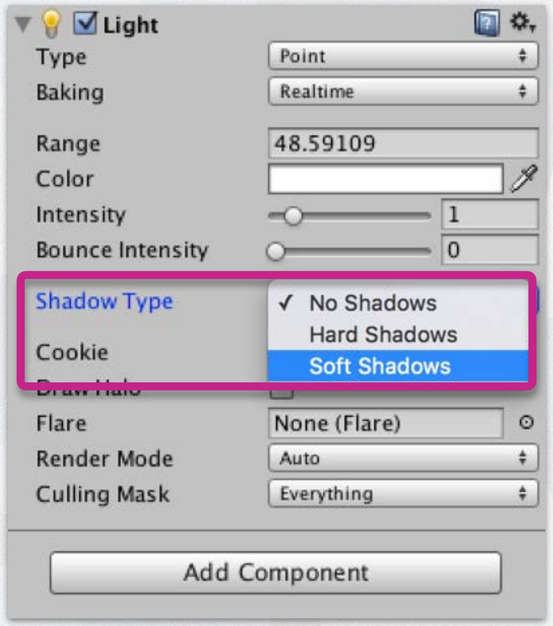
Light baking can take up to several hours for complex scenes!

It only affects objects that are set to static in the object inspector.



Shadows

By default, only the directional light already present in the scene casts shadows — otherwise needs to be activated



Soft shadows look more realistic, but take longer to render. If your scene is very complex you might want to use hard shadows

For baked lights the choice is more based on artistic considerations

Break Time!
Any questions?

After the break:

Unity Practice — Importing assets and experimenting with lights