Einführung in die Informatik für Games Engineering

Tutorials

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What do you remember from last week?

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- Bowling level
- Creating Objects
- Manipulation in a 3D Space
- Get to know SceneView/GameView/Inspector/Hierarchy/Project Tab

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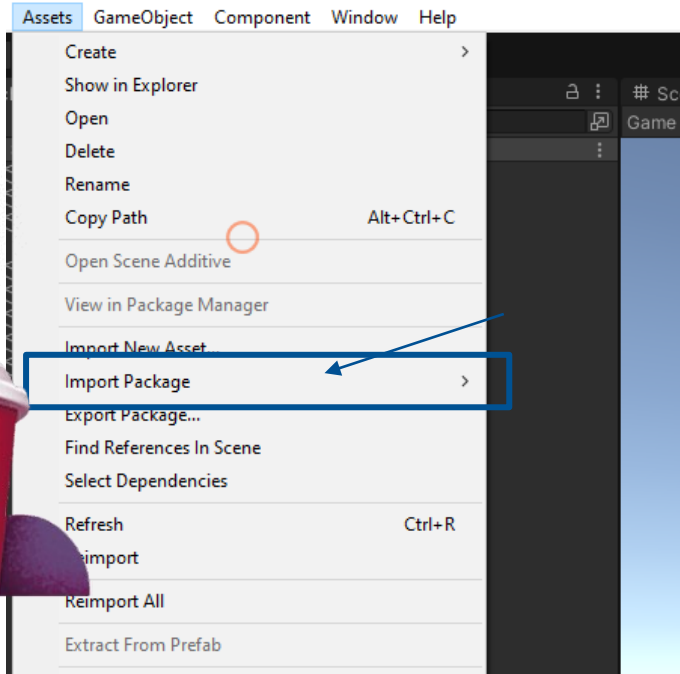
Additional Task (fre k t during tuorial or at home)

#1 Place different light sources t Spot lights are good)

#2 Use the Project Tab to creat
- Apply them one your obi

#3 Use the Asset Store to
- Or have a look on mo

Please present your final



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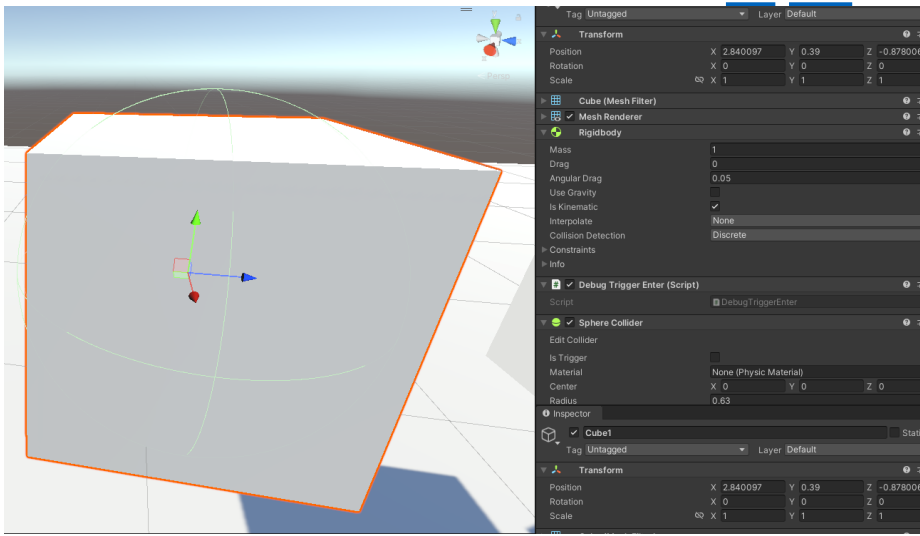
Topic: Collider



Colliders are components that are managed by the internal physic engine.

- Allows objects to behave in a physical way
  - Like static scene objects, that blocks other objects
- Allows detection of intersection
  - To check if a player is in front of a door

Collision handling is done during the „Fixed Update“ process (so not every frame)

There are simple shapes (sphere, box, capsule) that cover your real geometry

- A special mesh collider can have a more specific shape (but should be always constructed as complex hull)

More details on collision detection in this and other lectures.

Topic: Collider

https://docs.unity3d.com/Manual/CollidersOverview.html

Keep in mind:

- Collision detection is computational intense!
  - Only use simple shapes
  - Reduce to a minimum

- A collider can be just used as trigger, reduce computational effort
  - Only states of current frames are used (which object intersects with)
  - No information from previous (no velocity, collision info)

- If you want physical behavior, add a rigidbody to that object (A static wall only needs a collider)
- If you want to move objects with colliders attach also a rigidbody component (with isKinematic active)

Topic: Light Source

https://docs.unity3d.com/Manual/Lighting.html

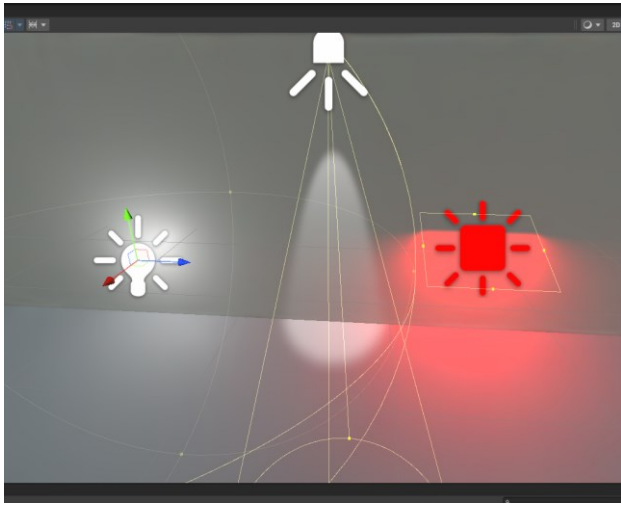
Light Sources are used to illuminate your scenes.

Light calculation during runtime is costly (special with dynamic shadows enabled)

You can use different types of lights
- Directional light (like sun with parallel light rays, position independent)
- Spot light (target and origin of light source)
- Point light (light with just a light radius
- …

Light Baking can be used to precalculated static light spots
(discussed later in this class)

More details on lighting in this and other lectures.



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Topic: Skybox

https://docs.unity3d.com/Manual/skyboxes-using.html

from ogldev.org

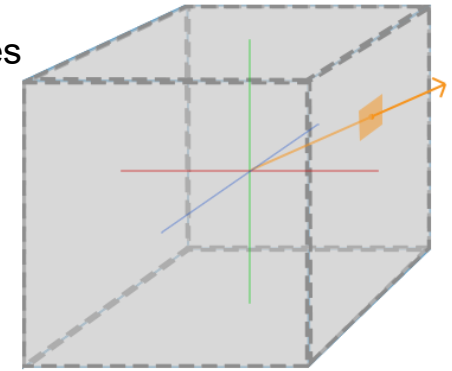
Are used to draw scenes as background „far“ away to the viewer.

In 2D games you could just use a static/moved images as background layer

For 3D Games view direction needs to be taken into account

A skybox consists typically out of 6 six images
- Nowadays you can avoid the creation of a cube or use panorama images

Unity3D has a special skybox material
- Take care on the source images to avoid artifacts on the „stitches“


from learnopengl.com/

Graphic pipeline assumes you are always in the center of your skybox an calculates four corner positions of your current view

Camera as component

https://docs.unity3d.com/Manual/BuildSettings.html

Now let‘s have a closer look on your MainCamera (via inspector)

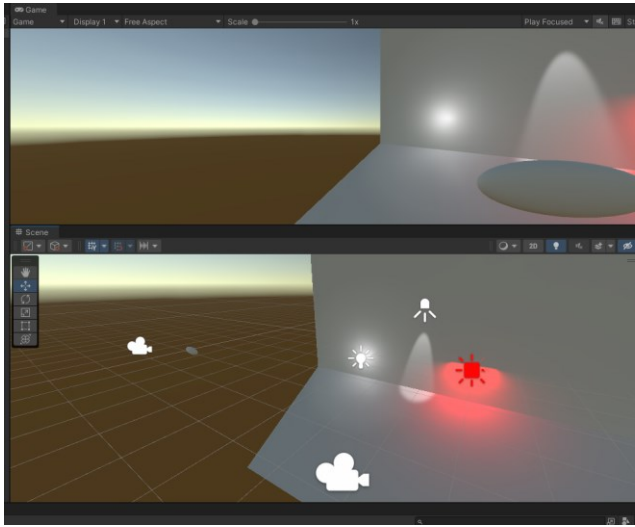
- Clear flags
  - You can decide which background is used for a specific camera (like skybox, color, nothing, …)
  - Eg. Use a custom background color
- Projection
  - Default perspective mode, what happens in orthographic?
- Frustum (Pyramidenstumpf) settings
  - Change the view angle „Field of View“ (FoV)
  - Near/far plane, the distance in which you can see
  - Rect specifies how much of your screen should be used (imagine two camera for a „hot seat“ two player game

Camera as component

#1 What influences your camera resolution/screen rect?

Culling mask
- Can decide to ignore specifc layers (a game object is tagged with)

#2 Add a seccond camera to your scene
- With „don‘t clear“ yo can overlay your new camera on the Main one



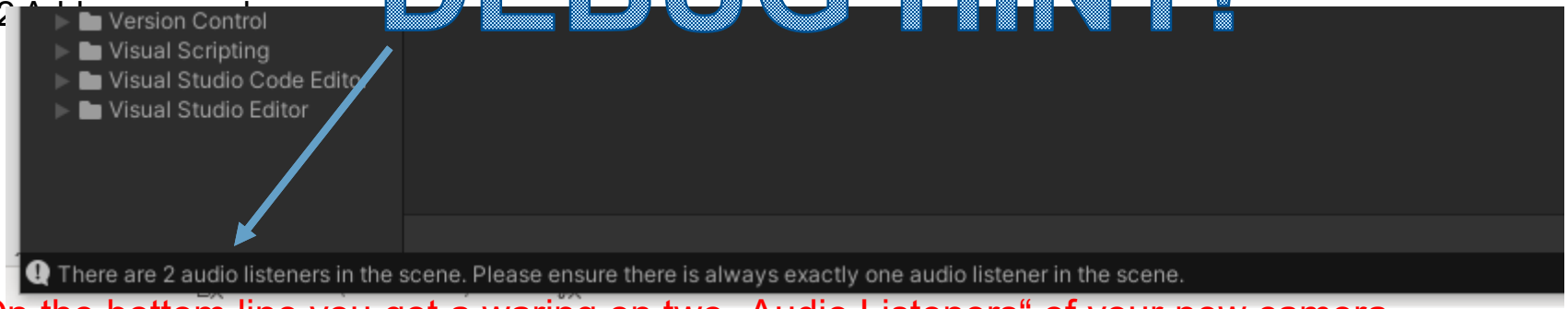
Camera as component

#1 What influences your camera resolution/screen rect?

Culling mask
- Can decide to ignore specifc layers (a game object is tagged with)

#2 Add
-

DEBUG HINT!



On the bottom line you got a waring on two „Audio Listeners“ of your new camera
Keep in mind to look here if something behave odd!

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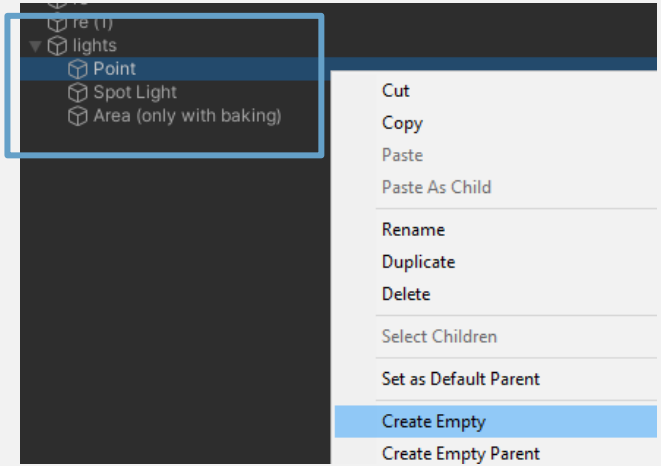
Prefabs

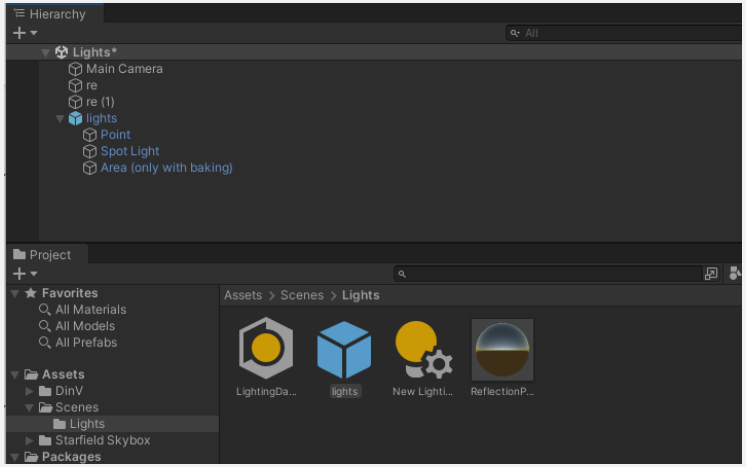
https://docs.unity3d.com/Manual/Prefabs.html

To build levels faster, reuse more complex game objects your can group objects

In the hierarchy you can use „empty objects“ as parent to group smaller ones



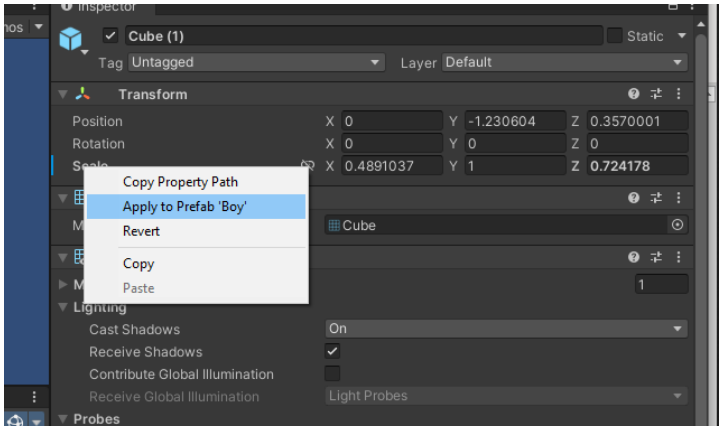
Convert such a group as prefab by drag and drop them to your project tab



Prefabs

Using prefabs can make your life easier!

- Can be reused across scenes (in one project)
- Changes in prefab apply to all instances of that prefab (changing a variable in inspector)
- Can be reset to the „original“ one
- Edited in an isolated view
- Individual changes can be applied to all



Play vs. Build

https://docs.unity3d.com/Manual/BuildSettings.html

Using play button is a fast way for developing

- Each time Unity3d interprets, compiles, loads resources, scenes and scripts from your project folder
- You can pause everything, have a look in the inspector, can changes (temporal) anything… all fine

To avoid “loading” times on a demo or to give it to friends you should always build your projects

- Better performance
- Smaller file size (no temporal files)
- Optimized for target platform

“Files -> Build settings” add current scene (only added scene will be compiled to final .exe), you can try to build and run your game now

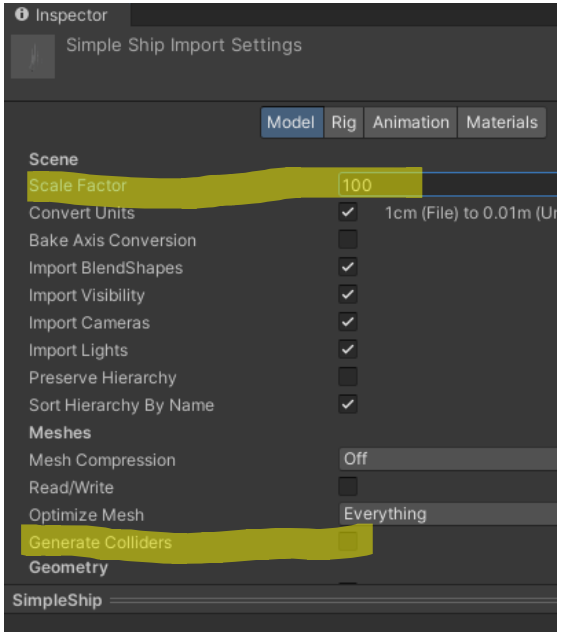
Import 3D Models

https://docs.unity3d.com/Manual/ImportingModelFiles.html

#1 Download our simple space ship model from moodle
- Extract the files to your disk our directly into the unity asset folder
- Or drag and drop the files to the project tab

#2 place it in your scene
- In general, you won‘t see anything now
- Model scale is much too small
- Change scale by clicking on your model (project tab) and change settings in the inspector

#3 Also textures have import options, check them out



Additional Task (free work time during tuorial or at home)

#1 Setup your own skybox that fits to the spaceship

#2 Switch to a orthograpic camera projection

#3 adjust light source so everything is visible

Please present your final results next tutor session!