

3D scene transposition in Unreal engine for VR interaction

Daniele De Luca



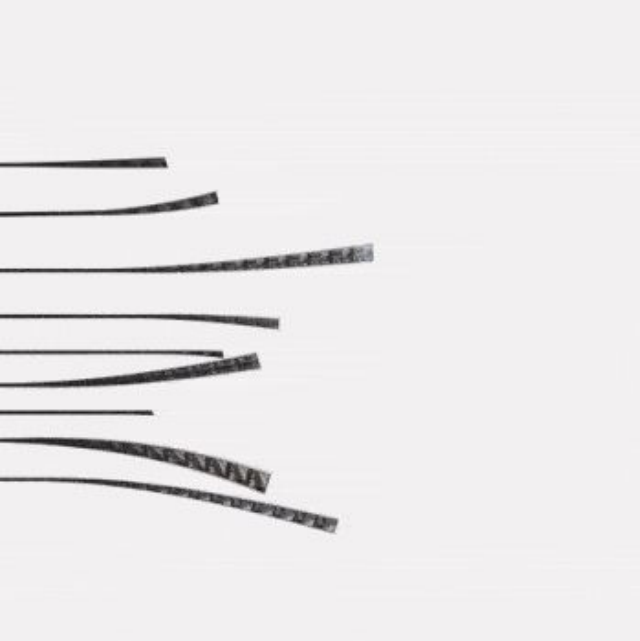


VISIT LAB
VISUAL INFORMATION
TECHNOLOGY LAB
CINECA

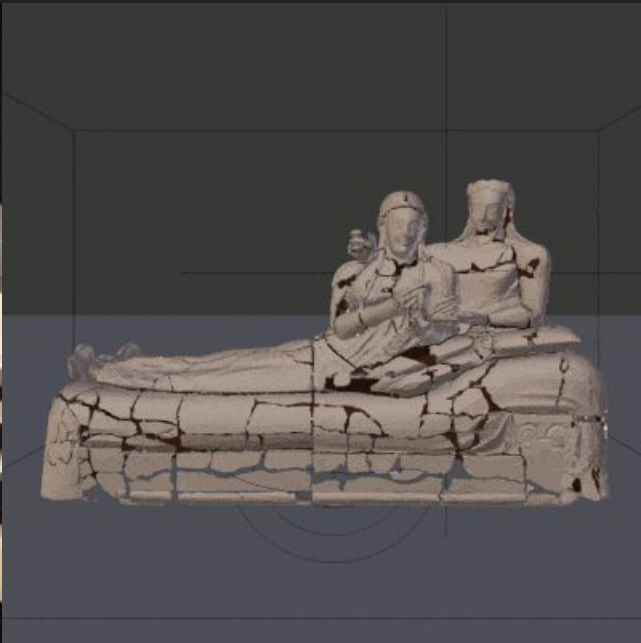
CINECA and VisitLab

Cineca is an **Interuniversity Consortium** serving both research and industries by means of the main Italian supercomputing public facility.

Cineca Visual IT Lab is a small department focused on computer graphics applications. We have been developing real-time applications and short movies to communicate scientific results and cultural heritage knowledge both for research and a general public



Daniele De Luca
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3D scene transposition in Unreal engine for VR interaction



3D scene transposition in Unreal engine for VR interaction



3D scene **transposition**

in Unreal engine for VR interaction



3D scene transposition
in **Unreal engine** for VR interaction



3D scene transposition
in Unreal engine for **VR interaction**

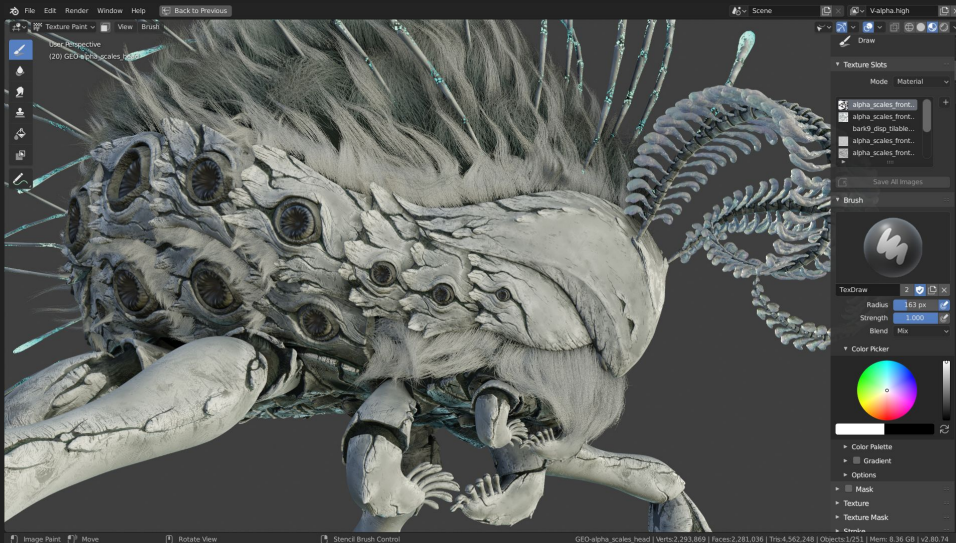
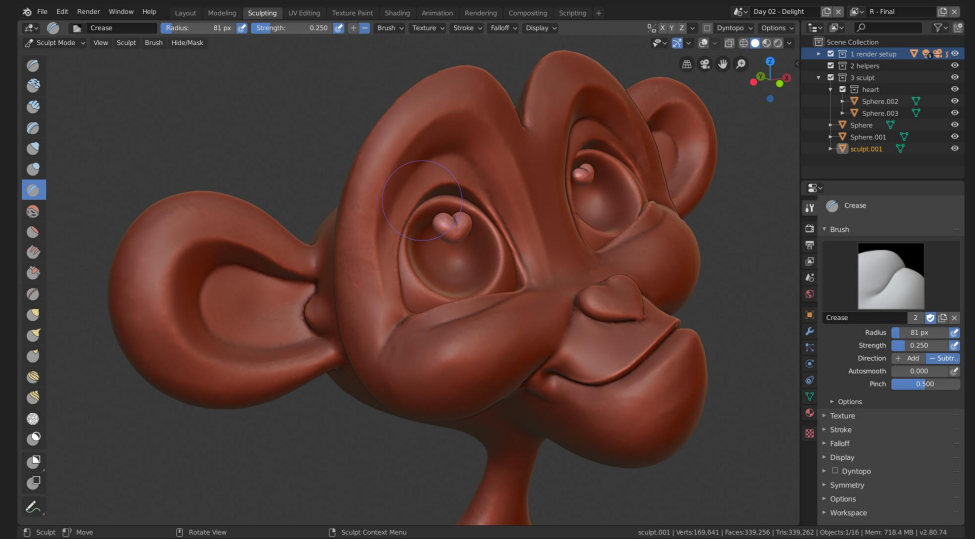


Weapon of choice





Modeling
Sculpt
UV edit

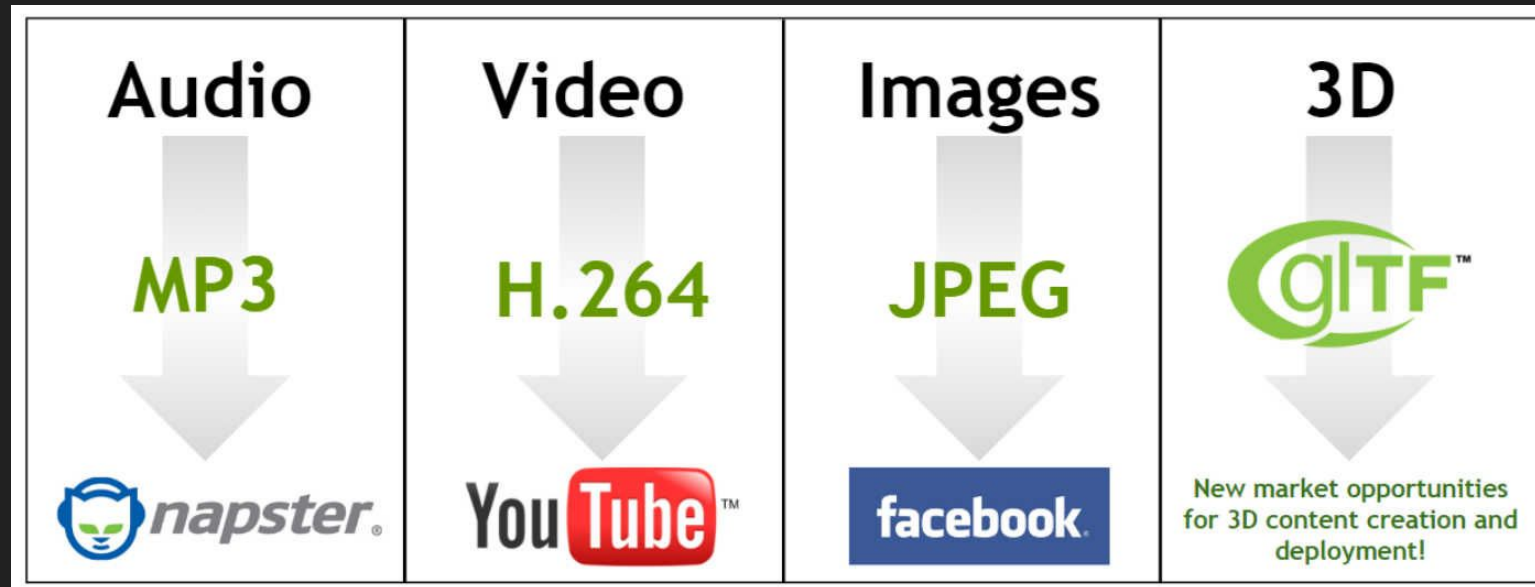


Cycles Render Engine
Eevee Real Time Engine

many more...

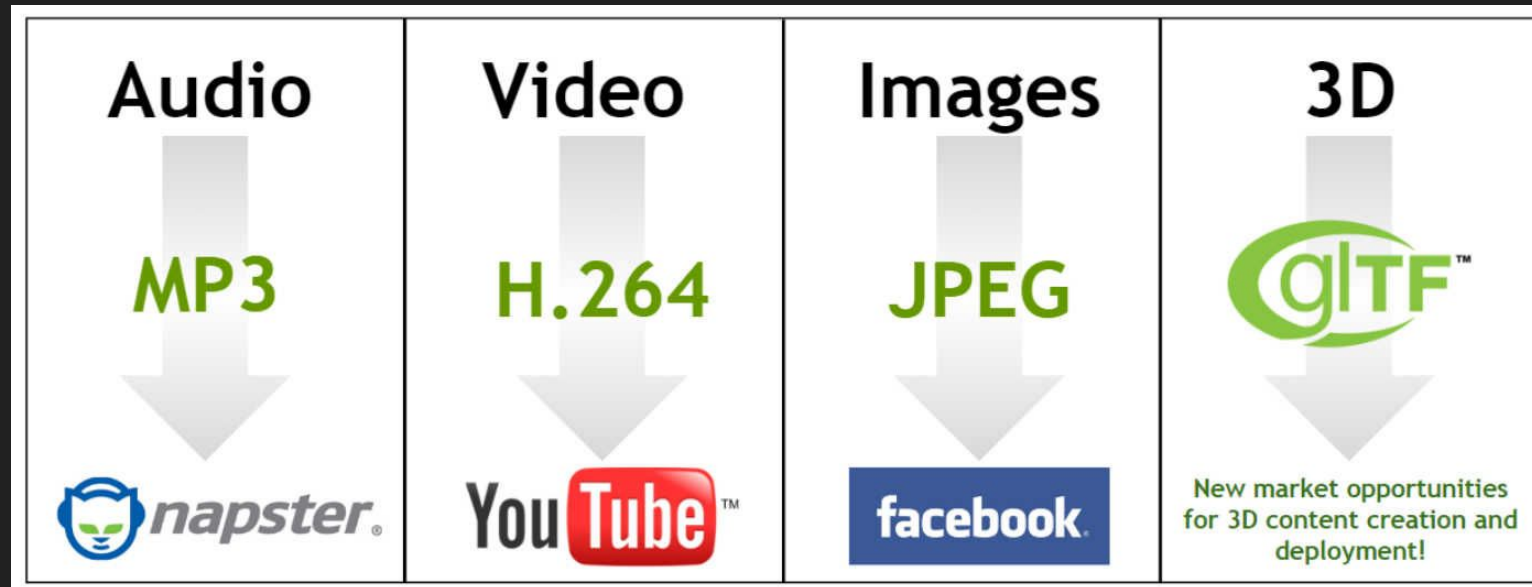


GL Transmission Format





GL Transmission Format



gITF is the "JPEG of 3D"

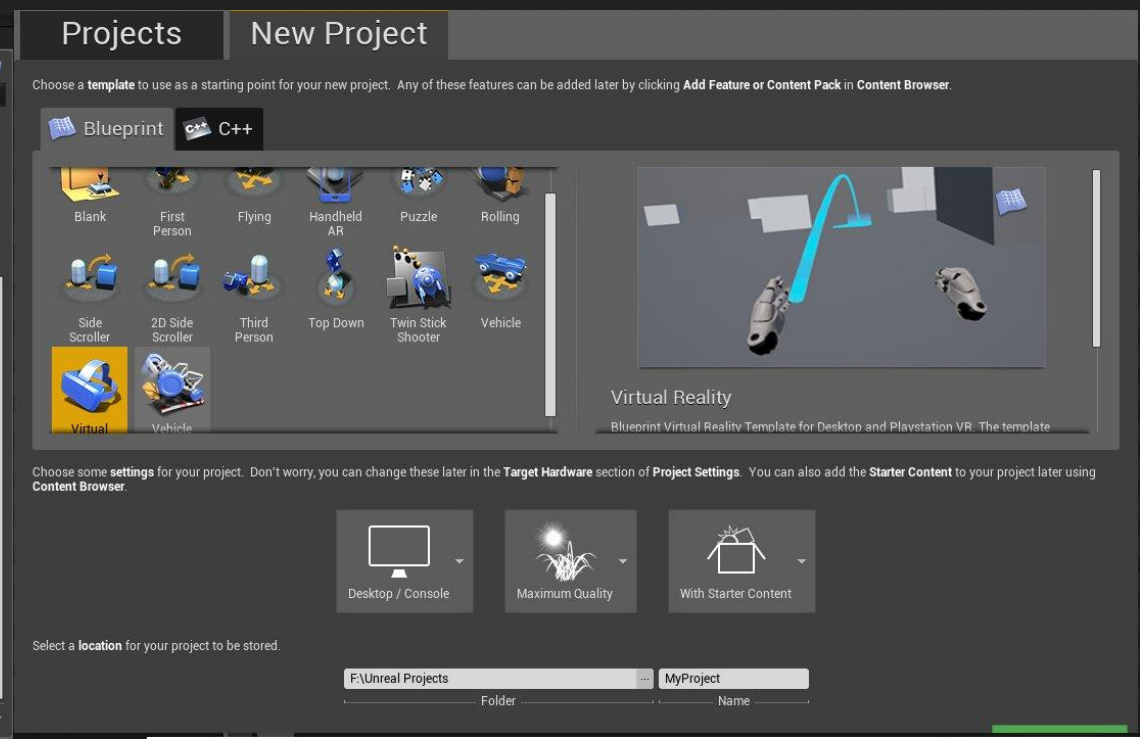
Weapon of choice



UNREAL
ENGINE



- Game engine like Unity / CryEngine / Lumberyard ...
- Open Source
- Entirely developed in C++



Game Engine

- Rendering Engine
- Physics simulation engine
- Scripting modules
- Graphical API management with an Hardware Abstraction Layer (DirectX e OpenGL)

The Unreal Editor

Main Components

- Level
- Actors
- World Outliner
- Content Browser
- Details

Modes

Search Classes

Recently Placed

- Basic: Empty Ac
- Lights: Empty Ch
- Cinematic: Empty Pa
- Visual Effects: Point Lig
- Geometry: Player St
- Volumes: Cube
- All Classes: Sphere

Save Current Source Control Content Marketplace Settings Blueprints Cinematics VR Mode Build



World Outliner

Search...

Label	Type
MotionControllerMap (EditWorld)	Folder
Lighting	Folder
Light Source	DirectionalLig
LightmassImportance	LightmassImp
PostProcessVolume	PostProcessV
SkyLight	SkyLight
Pickup_Actors	Folder
aglio	Edit aglio
aglio2	Edit aglio
banana1	Edit banana1
banana2	Edit banana2
banana3	Edit banana3
bicchierino	Edit bicchieri
bicchierino2	Edit bicchieri
bicchierino3	Edit bicchieri
bicchierino4	Edit bicchieri
bottiglia_cucina	Edit bottiglia_
caffettiera	Edit caffettie
coca	Edit coca
Cofanetto_Cucina	Edit Cofanett
f_boia	Edit f_boia
f_casanova	Edit f_casanc
f_imitatore	Edit f_imitato
fruttiera	Edit fruttier a
mamma	Edit mammin
orologio	Edit orologio
piattino	Edit piattino
piattino2	Edit piattino
piatto_ovale	Edit piatto_ov
Preziosa_2	Edit Preziosa
Preziosa_1	Edit Preziosa

41 actors (1 selected) View Options

Details Output Log

banana2

Add Component Edit Bl

Search

Transform

Location: 724,91 -627,1 128,59

Rotation: 89, -6, 0,0

Scale: 0,1 0,1 0,1

Mobility: St St M

Content Browser

Add New Import Save All Content VirtualRealityBP Blueprints

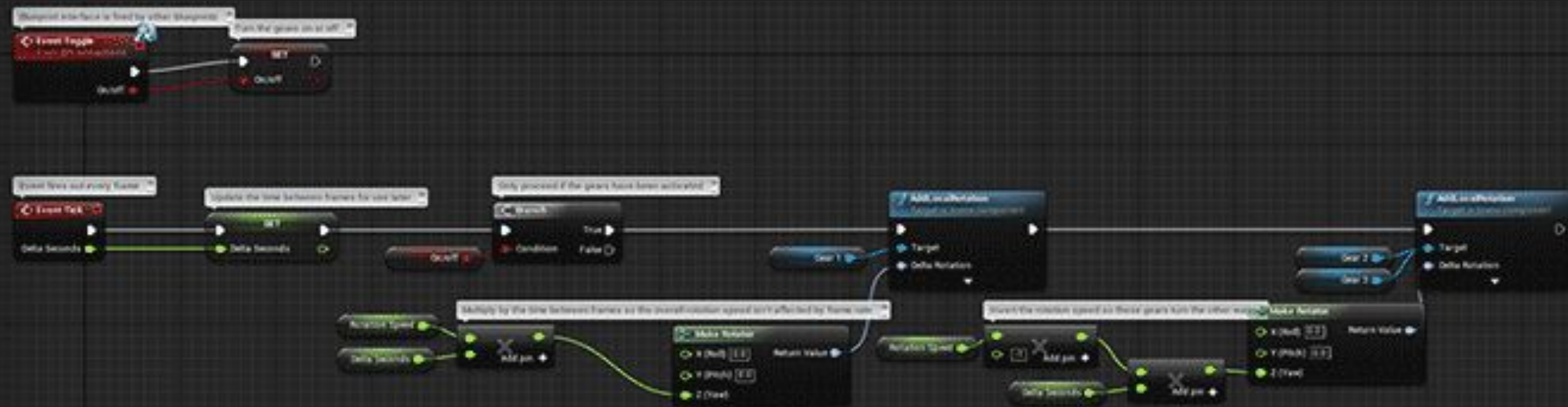
Filters Search Blueprints

- BP_Motion Controller
- BP_Pickup Cube
- Grip Enum
- HMD locomotion Pawn
- Haptic Feedback Effect
- Motion Controller Pawn
- Pickup Actor Interface

7 items (1 selected) View Options

Unreal Engine 4: Blueprints

- **Visual** scripting
- **Optimize** the C++ code
- Object building, functions, gameplay events



Classificazione Blueprints

Level Blueprint

- Blueprint base di ogni livello
- Manipolazione degli attori
- Gestione dei checkpoint e gli altri elementi di un livello

Blueprint Class

- Blueprint per la creazione di meccaniche di gioco

Components x **Toolbar** x

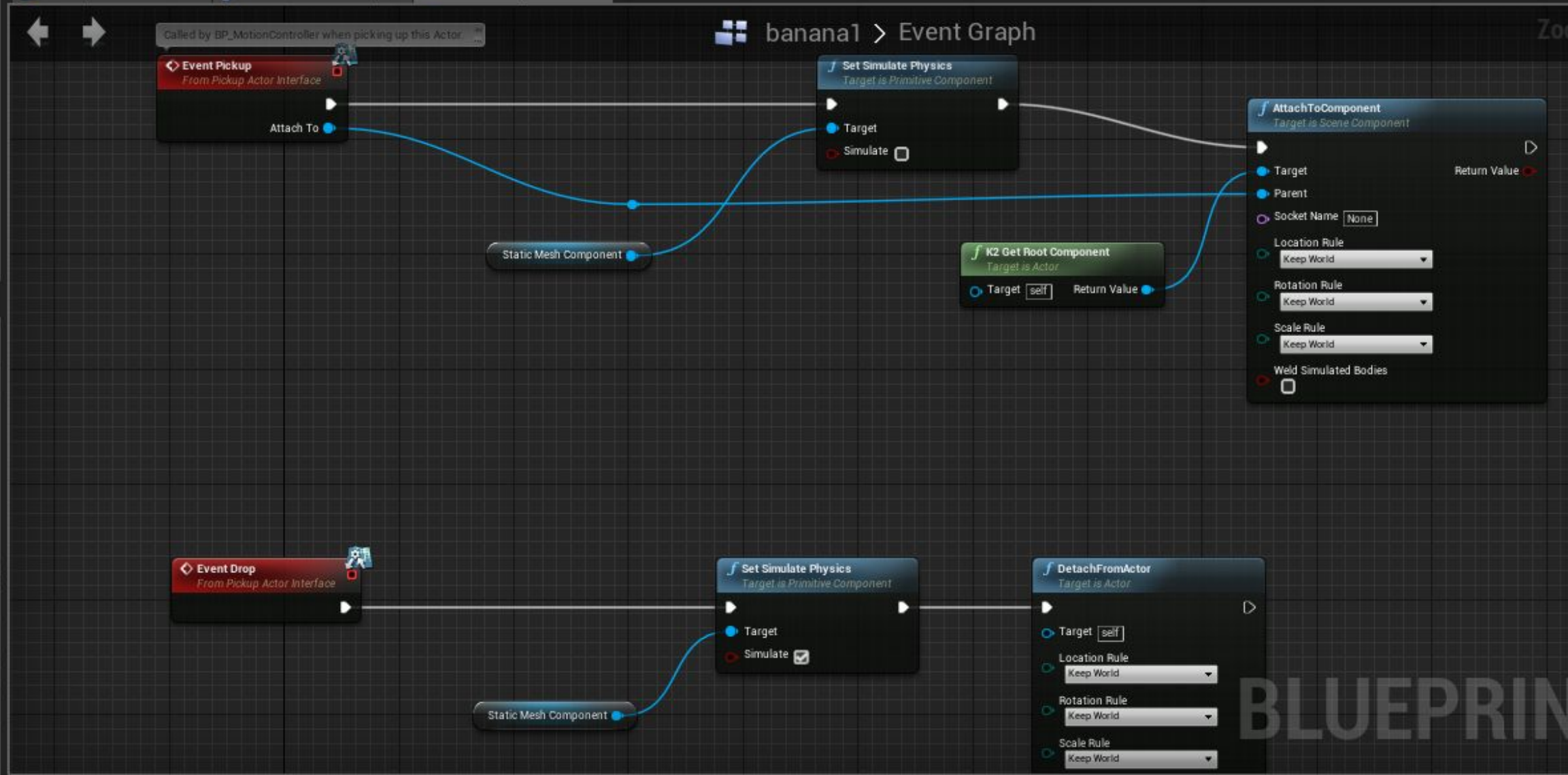
+ Add Component

banana1 (self)

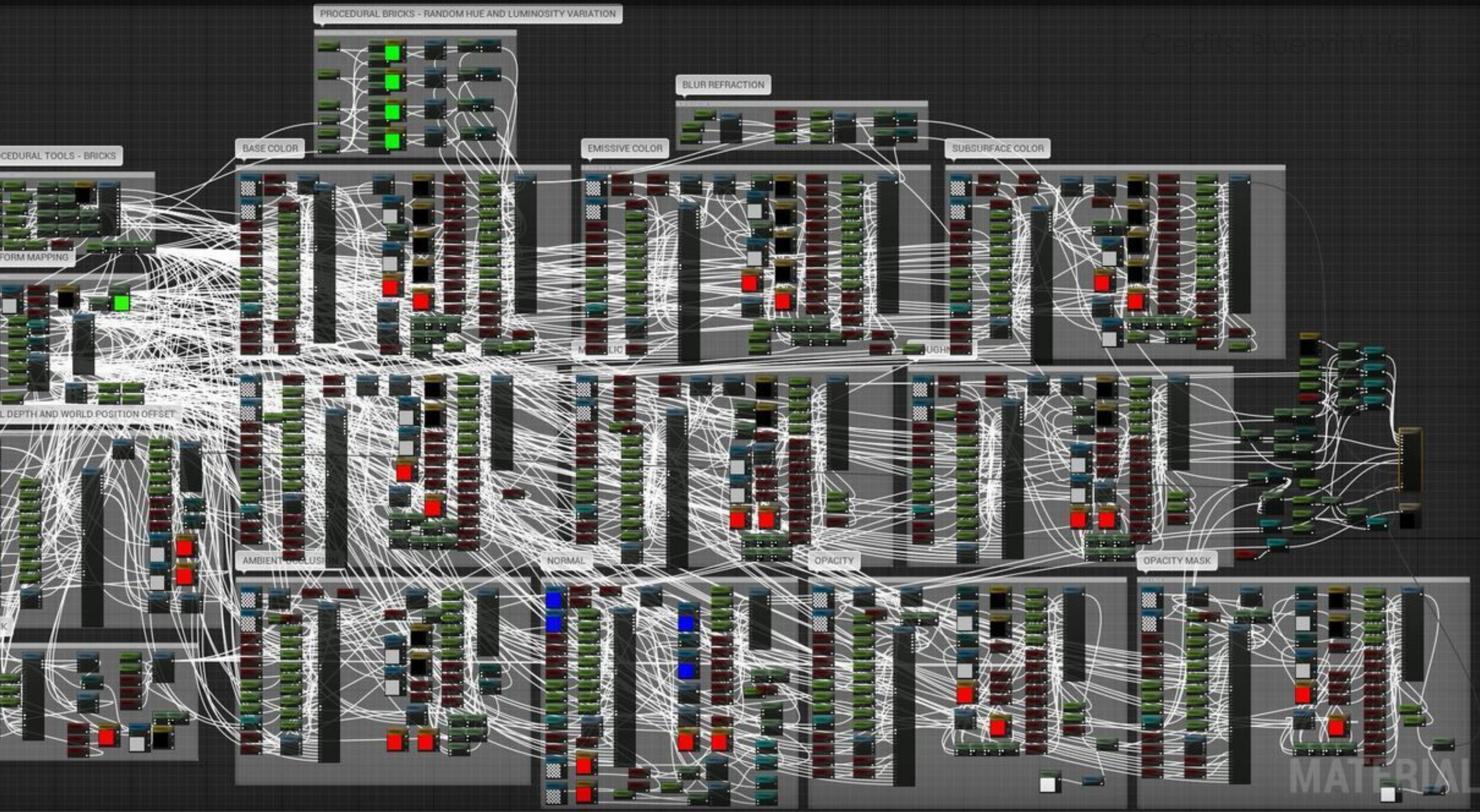
StaticMeshComp

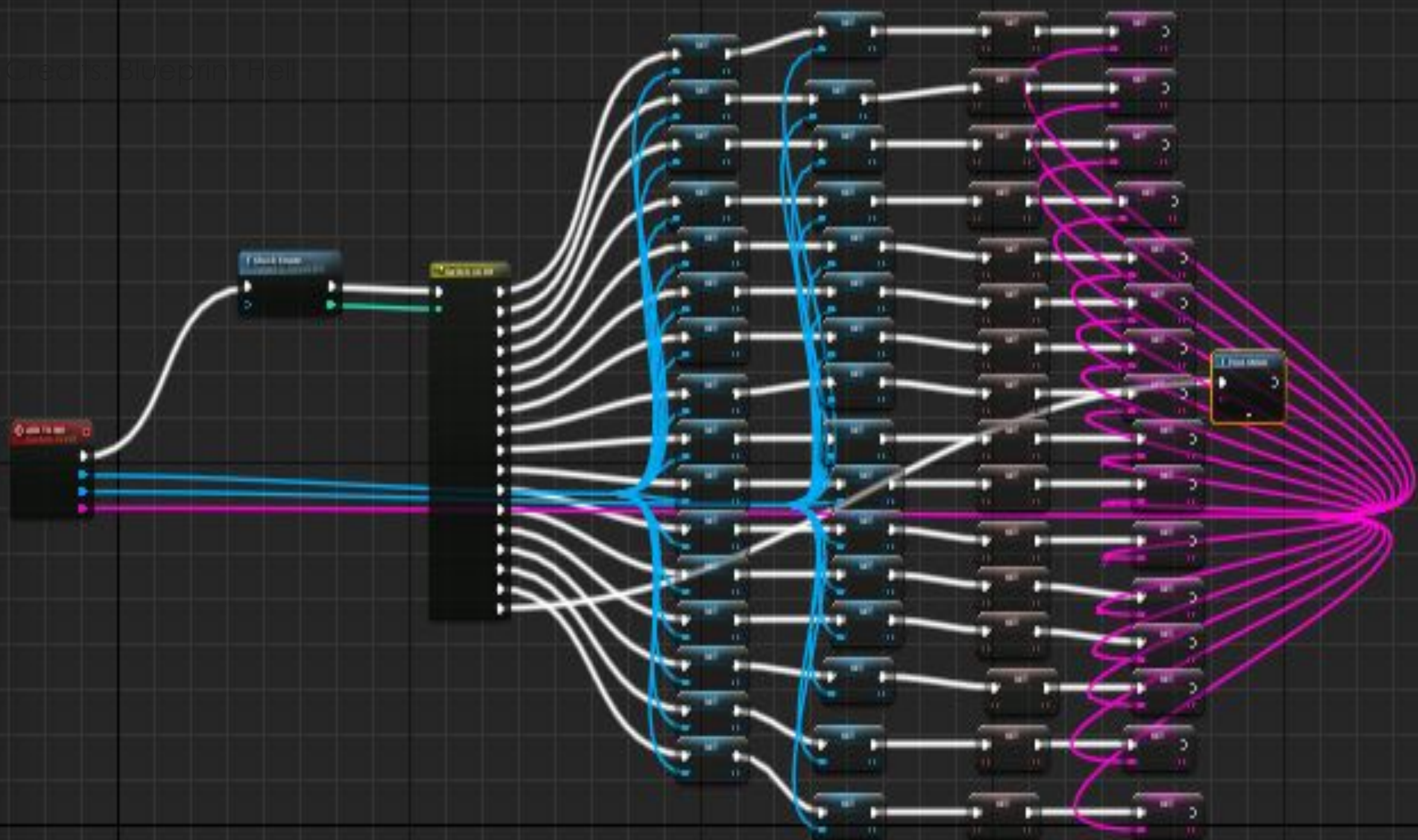
Compile Save Browse Find Class Settings Class Defaults Simulation Play banana1 (selected) Debug Filter

Viewport x Construction Scrip x Event Graph x



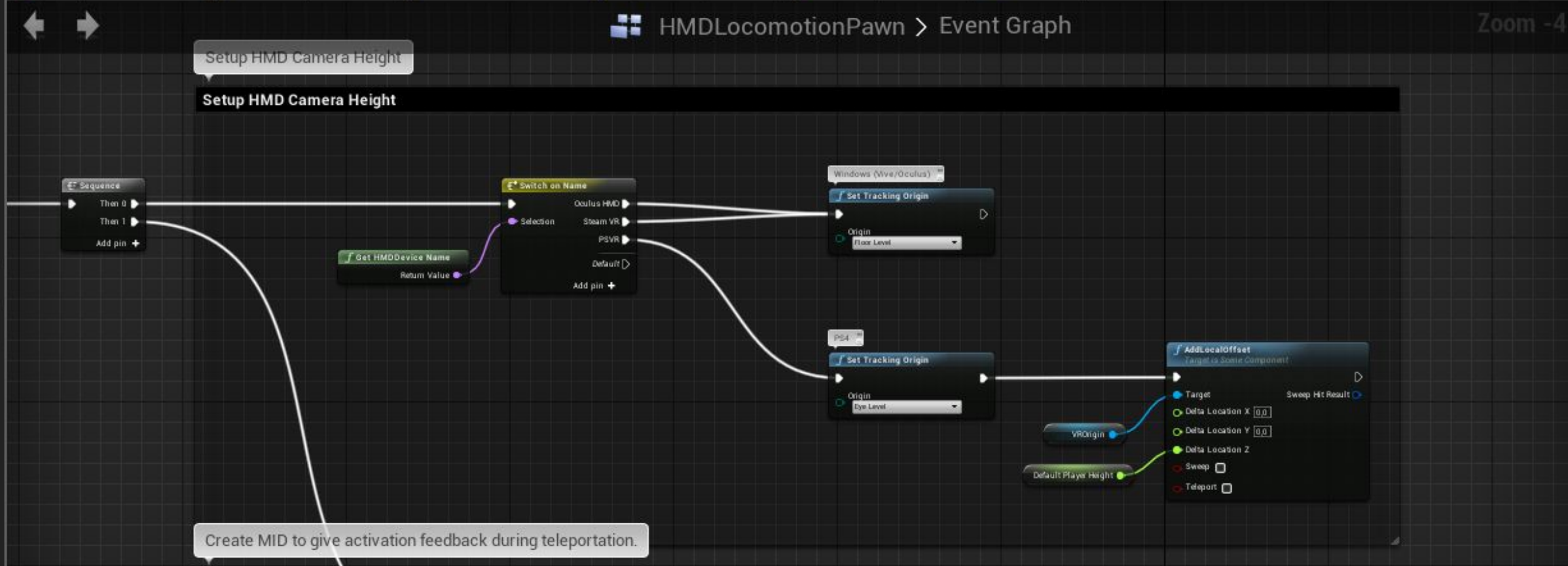
BLUEPRINT



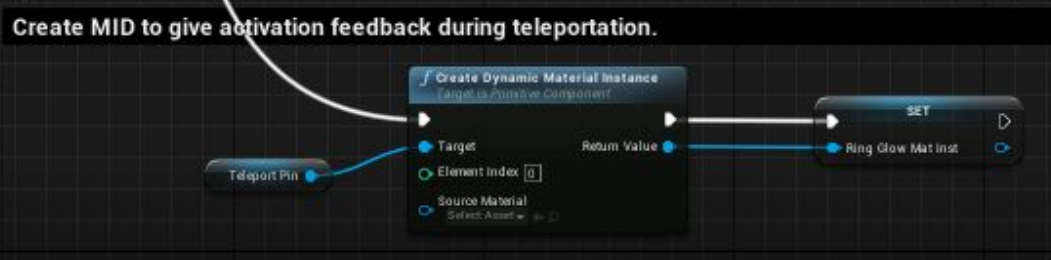


Components: LocomotionP

Toolbar: Compile Save Browse Find Class Settings Class Defaults Simulation Play No debug object selected Debug Filter



Create MID to give activation feedback during teleportation.



BLUEPRINT

Shaders and Materials

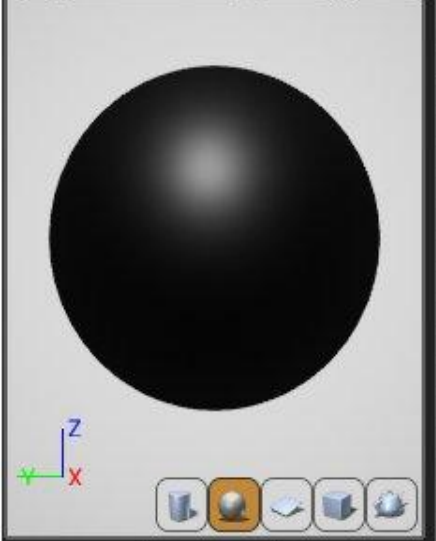
- Definiscono le proprietà che la luce deve avere su una determinata mesh
- Unreal 3
 - Diffuse
 - Specular
 - Specular Power

Shaders and Materials in UE4

- Physically-based
- Floating point RGBA colors
- Main properties:
 - Base Color
 - Metallic
 - Roughness
 - Emissive
 - Normals

Save Browse Apply Search Home Clean Up Connectors Live Preview Live Nodes Live Update Stats Mobile Stats Substance

Perspective Lit Show



Con x Con x Deta x

Add New Import

Content Muv

Filters Search Mesh

97 items View Options

- bottiglia
- caffettiera
- cappa
- credenza_grande
- credenza_niccola
- cucina_architettura
- elementi_esterno
- figurine

contenuto

Zoom 1:1

contenuto

- Base Color
- Metallic
- Specular
- Roughness
- Emissive Color
- Opacity
- Opacity Mask
- Normal
- World Position Offset
- World Displacement
- Tessellation Multiplier
- Subsurface Color
- Custom Data 0
- Custom Data 1
- Ambient Occlusion
- Refraction
- Pixel Depth Offset

MATERIAL

Palette

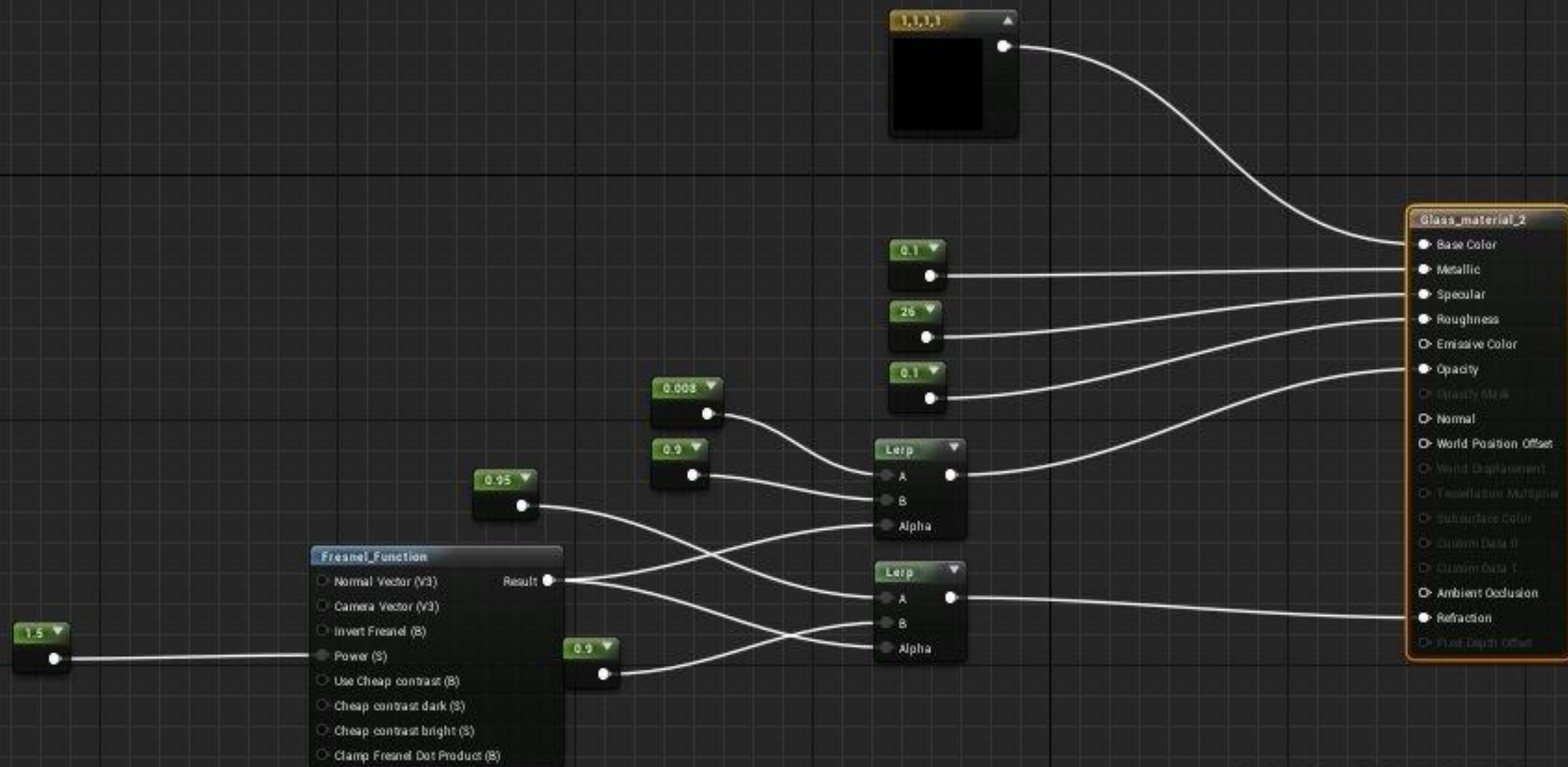
Category: All

Search

- Atmosphere
 - Atmospheric
- Blends
 - Blend_Color
 - Blend_Color
 - Blend_Dark
 - Blend_Differ
 - Blend_Exclu
 - Blend_Hard
 - Blend_Light
 - Blend_Linear
 - Blend_Linear
 - Blend_Linear
 - Blend_Overl
 - Blend_PinLi
 - Blend_Scre
 - Blend_SoftL
 - Lerp_Scrat
 - Lerp_Scrat
- Color
 - Desaturatio
- Constants
 - Constant 1
 - Constant2 2
 - Constant3 3
 - Constant4 4
 - DistanceCul
 - ParticleColo
 - ParticleDire

Stats

- Base pass shader: 145 instructions



MATERIAL

Normal maps

- Realistic Depth
- Efficiency without geometry





Details

Search

Blend Mode: **Opaque**

Decal Blend Mode: **Translucent**

Shading Model: **Default Lit**

Two Sided:

Use Material Attribute:

Subsurface Profile: **None**

Decal Response (DB): **Color Normal Roughness**

Opacity Mask Clip V: **0.3333**

NewMaterial

Zoom -1

Texture Sample

- UVs
- Tex

NormalTexture Param2D

- UVs
- Tex

NewMaterial

- Base Color
- Metallic
- Specular
- Roughness
- Emissive Color
- Opacity
- Opacity Mask
- Normal
- World Position Offset
- World Displacement
- Tessellation Multiplier
- Subsurface Color
- Custom Data 0
- Custom Data 1
- Ambient Occlusion
- Refraction
- Pixel Depth Offset

Stats

- Base pass shader: 154 instructions

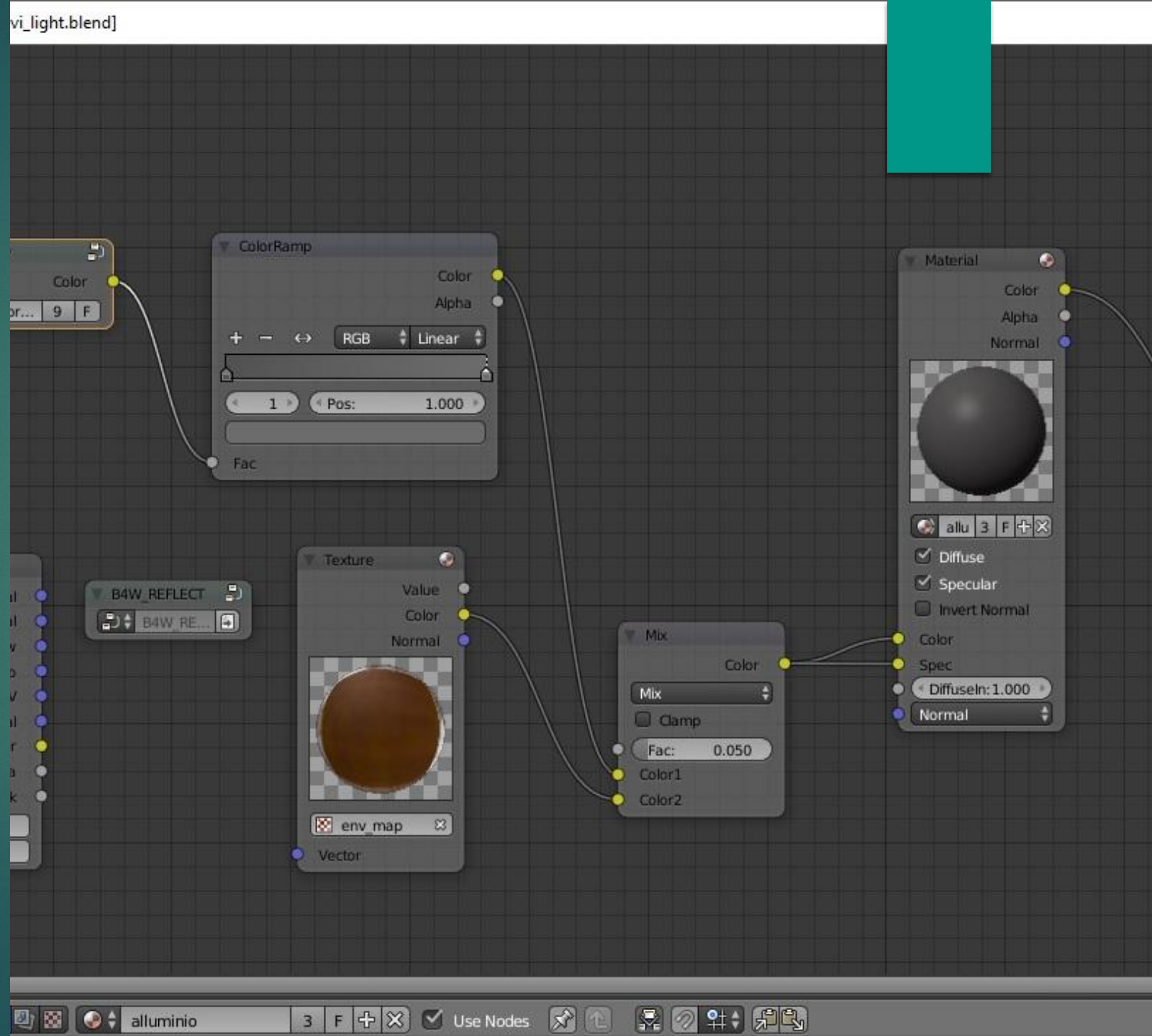
MATERIAL

Problematica n°1: Blender e Unreal

- Importare la scena di MUVI creata da Blender su Unreal
- Dimensionamento della scena
 - Regolare le UV con la metrica
- Cycle Renderer

Cycle Renderer VS Unreal

- Shading strettamente legato al motore di rendering
- Export/Import FBX
 - Geometrie
 - Texture
 - UV Mapping



SOLUZIONI?

- Texture Baking
- Utilizzo di applicazioni di terzi
 - Substance
- Ricreazione di materiali ex novo
- Utilizzo di Plug-In di conversione

Weapon of choice

Oculus Rift

Controllers

Constellation
Tracking

Guardian System

Stereoscopic
Vision

Controllers



Constellation

Tracking with positional tracker



Guardian system



Set Your Boundaries

- 1.** Squeeze and hold the **trigger** while walking around the edges of your cleared play area. Keep the Touch controller in view of the sensors; don't block it with your body.
- 2.** To add to or complete your play area, squeeze and hold the trigger while moving.



✓ Play Area Size **Optimal**

Stereo system

Lens distortion to
trick the eye

View distortion to
normalize the image



Simulation Sickness

- First appearance with flight simulations used by pilots to practise
- Some users are more sensitive than others
- The developer should follow a few rules to avoid this sickness

The mantra of VR developer

- The **FPS** should stay **above** the headset standards
 - Oculus CV1 90 FPS
 - DK2 75 FPS
 - DK1 60 FPS
 - HTC Vive 90 FPS
 - PSVR >102 FPS
- **Don't remove** the **control** of the view / camera of the user
- **Don't reconfigure** the **Field Of View** (FOV) of the headset because it will cause several distortions

The mantra of VR developer pt.2

- **Avoid** the **Walking Bob** effect
- **Don't shake** or buzz the **camera** of the HMD
- Use **natural lights and colors** and avoid vibrating lights
- **Avoid stairs**, use elevators instead
- **Test** any VR app on as many **people** as possible to obtain a complete feedback and discover any issue

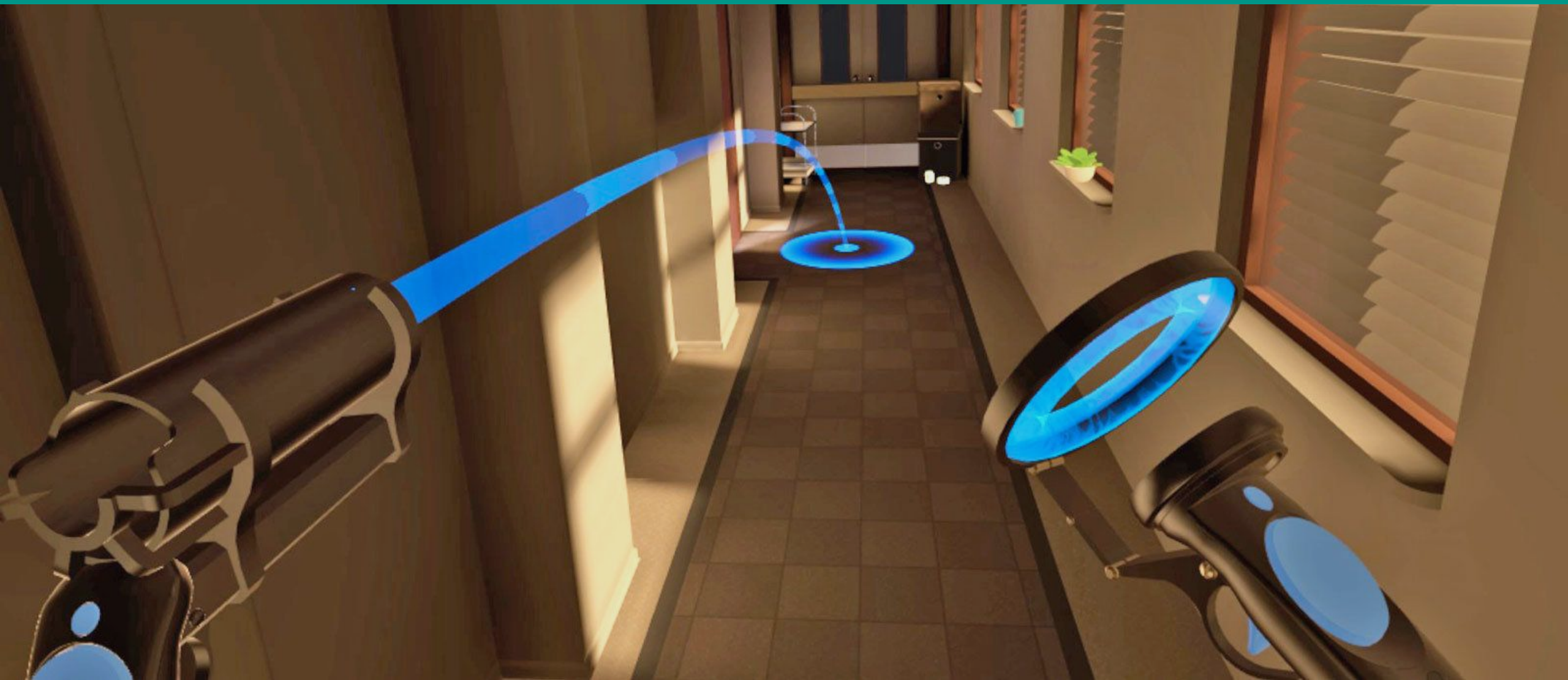
Navigation

We will use the **Point and Click teleportation** technique

- Using the controllers to point on the floor where to go
- Fade to simulate the opening/closing process of the eye

One of the most popular technique

Navigation

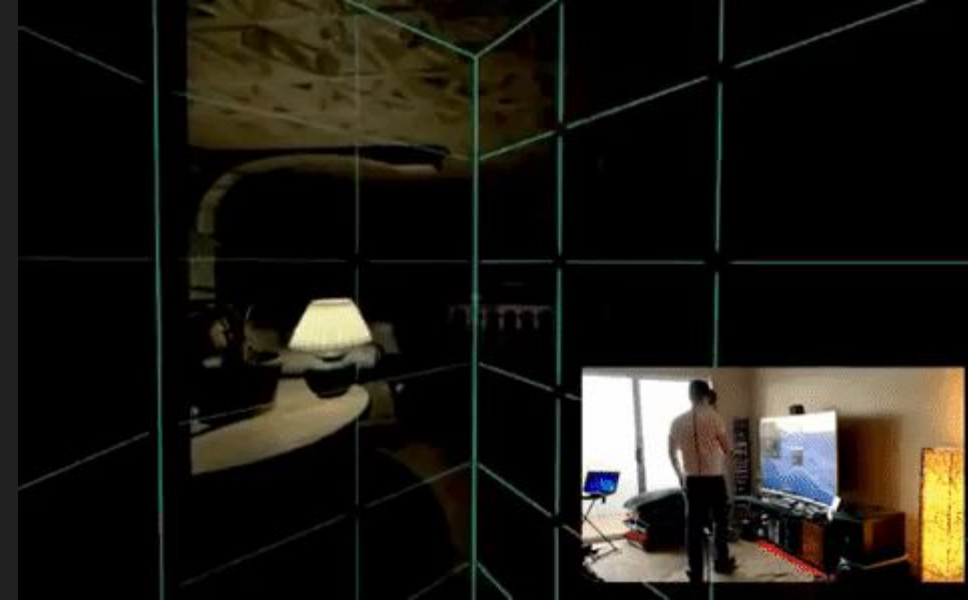


WalkAbout

Tekton Games

Turn into Guardian System to create an infinite walking environment

Credits to [AboveAndBeyondSoftware](#)



RIPMotion

Simulate the movement by walking in place

Credits to [deprecatedcoder](#)



VR Walking Prototype

Simulate the movement by moving the arms

Credits to [David Dewhirst](#)

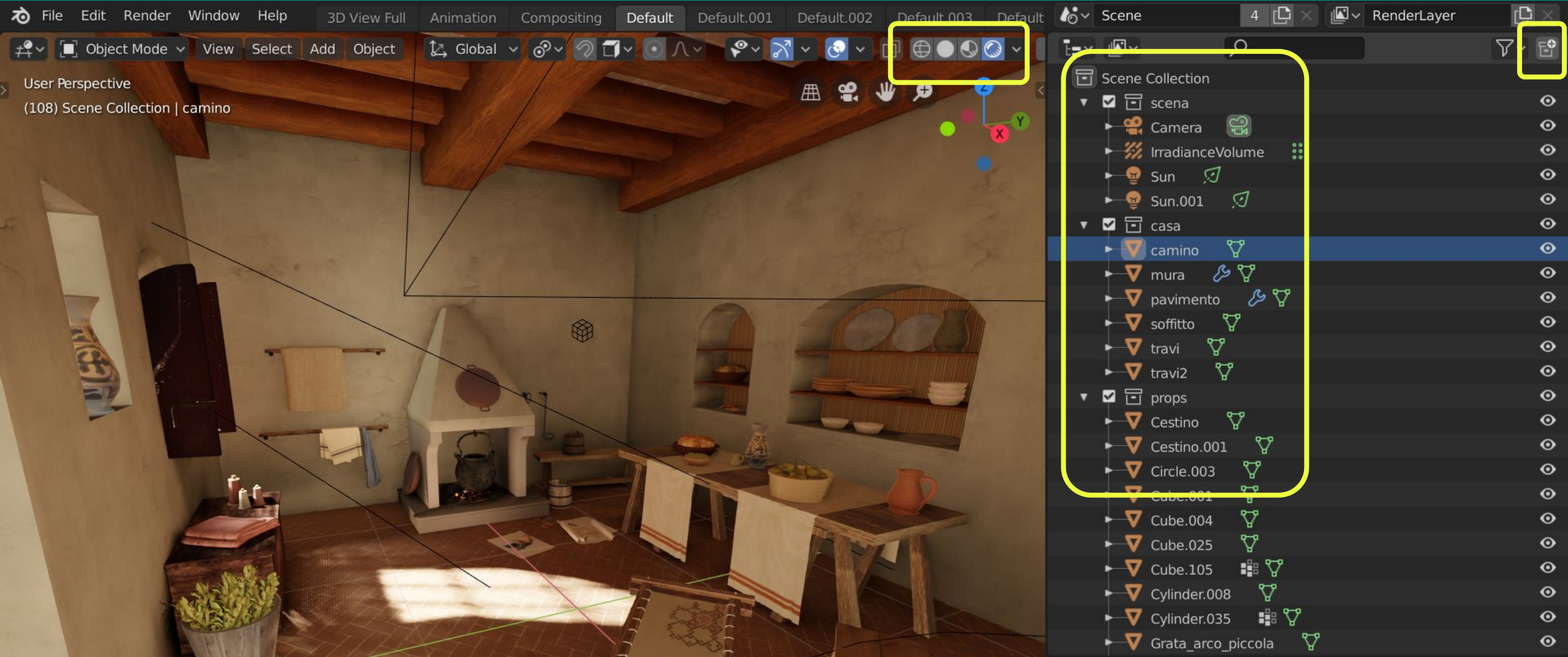


VR Locomotion
Walking System
By David Dewhirst
Downable Prototype
Availible in Description

Getting Started

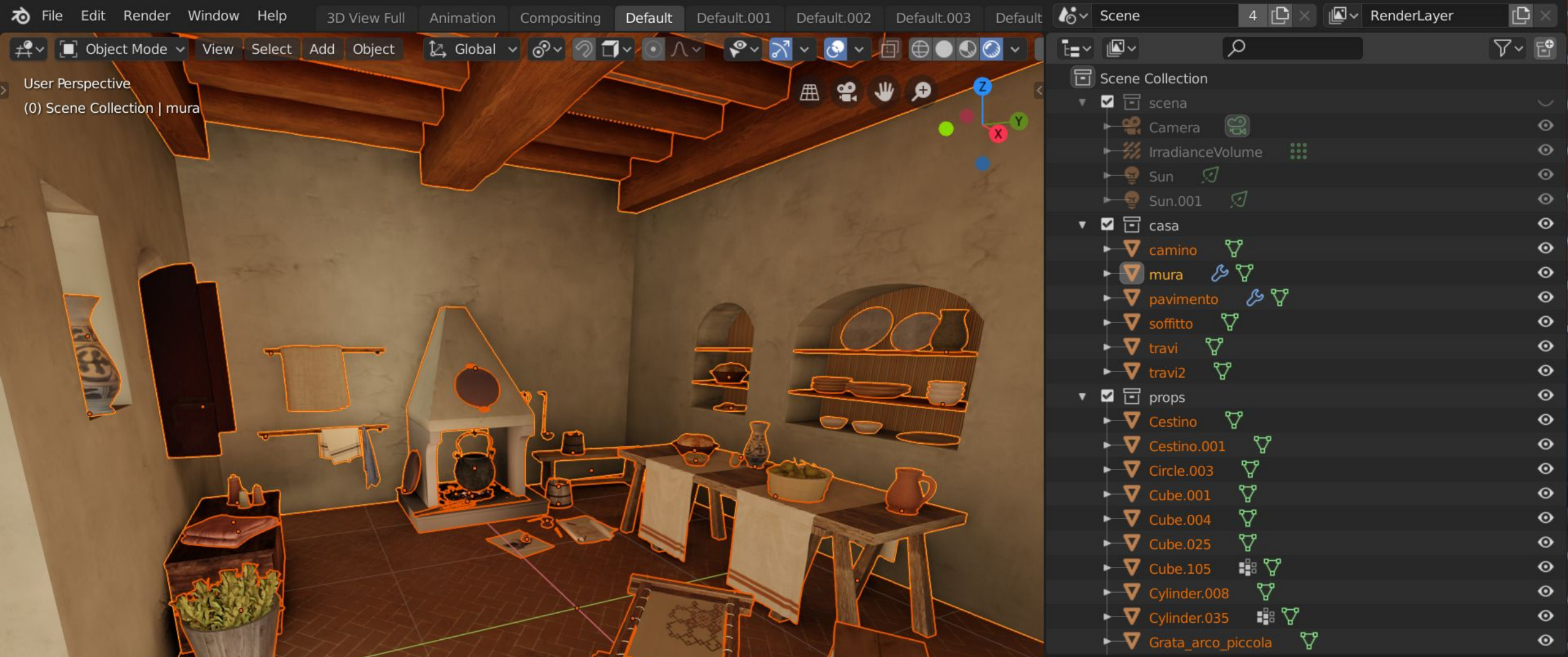
1. Install Blender
2. Open the file
“CasaMasaccioVR.blend”



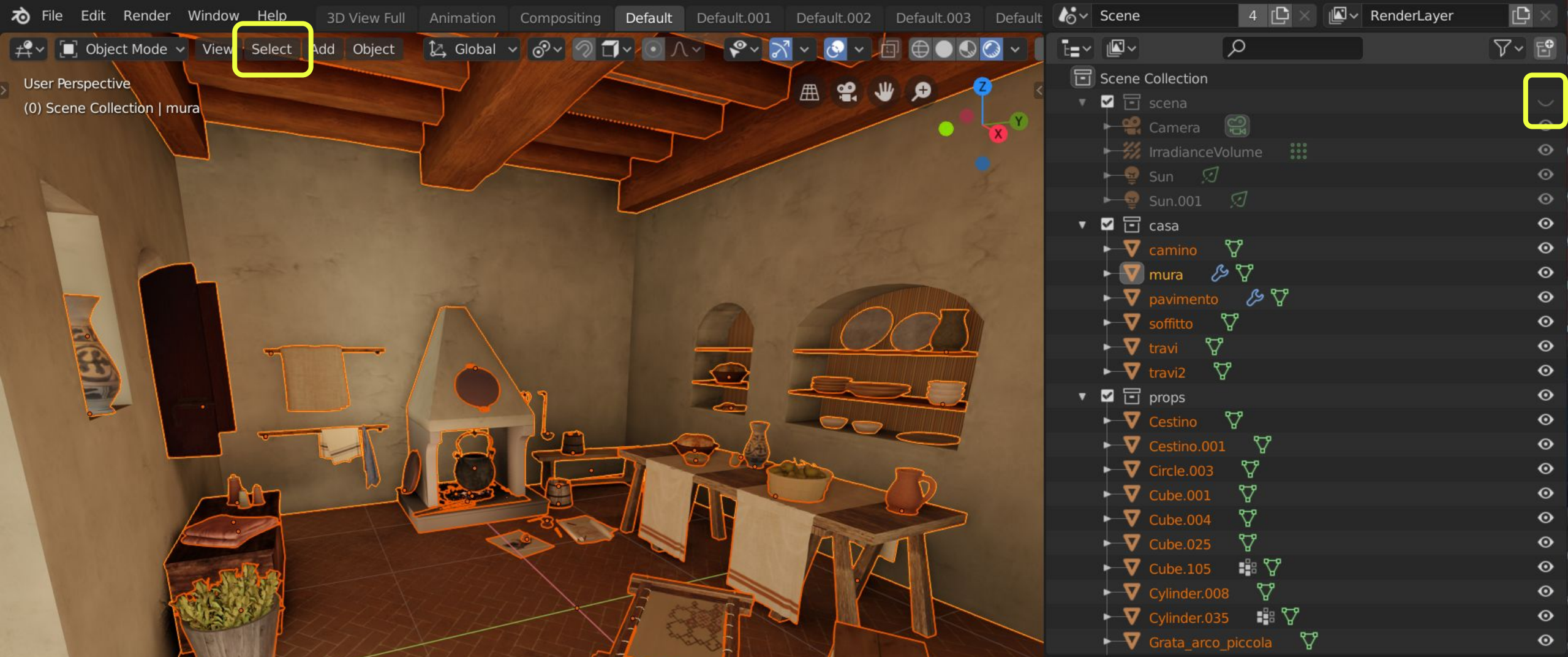


Organize your scene into Collections by drag and drop of the 3D objects

Preview your shaders and material



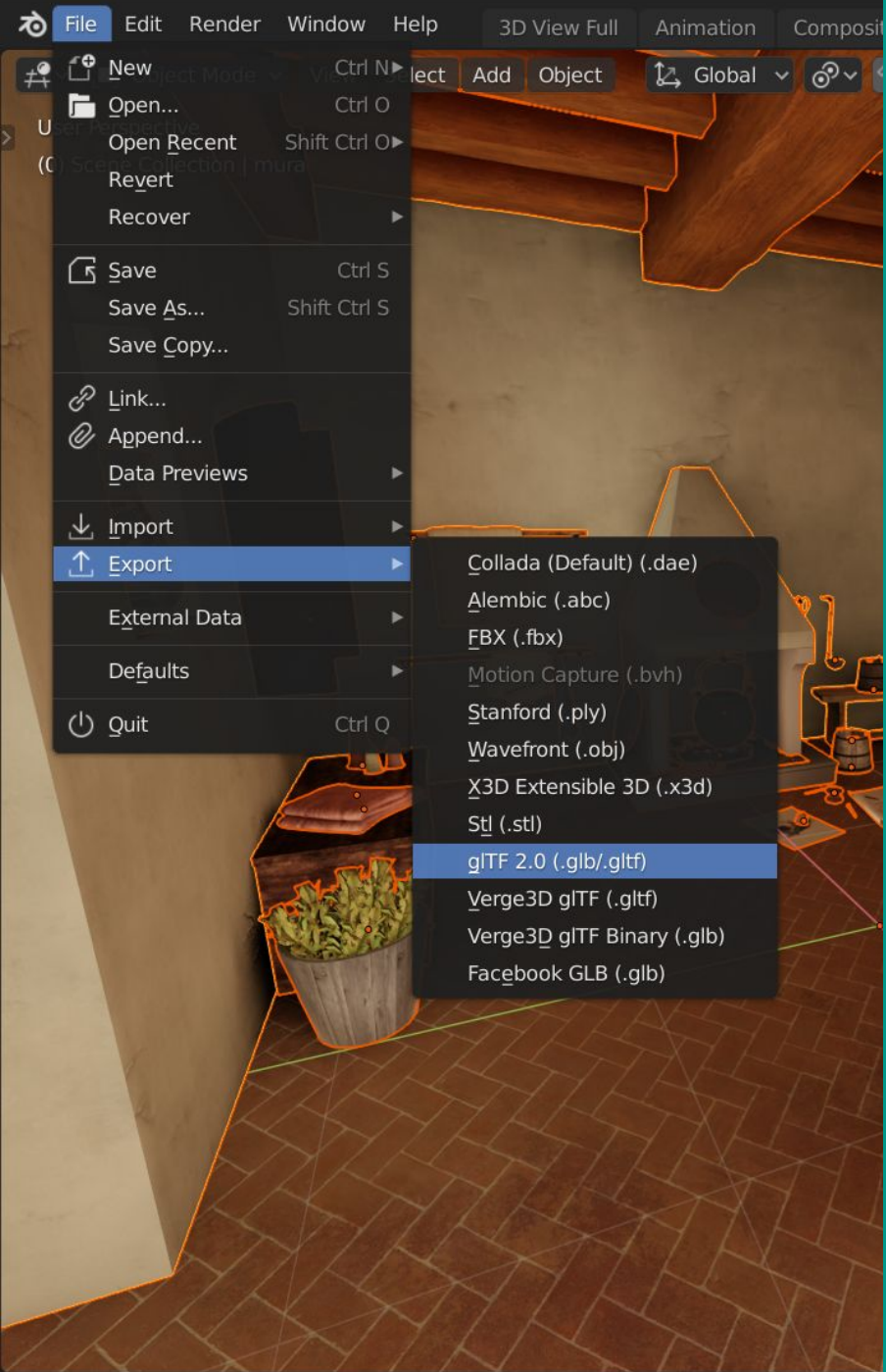
Organize your scene into **Collections** by drag and drop of the 3D objects



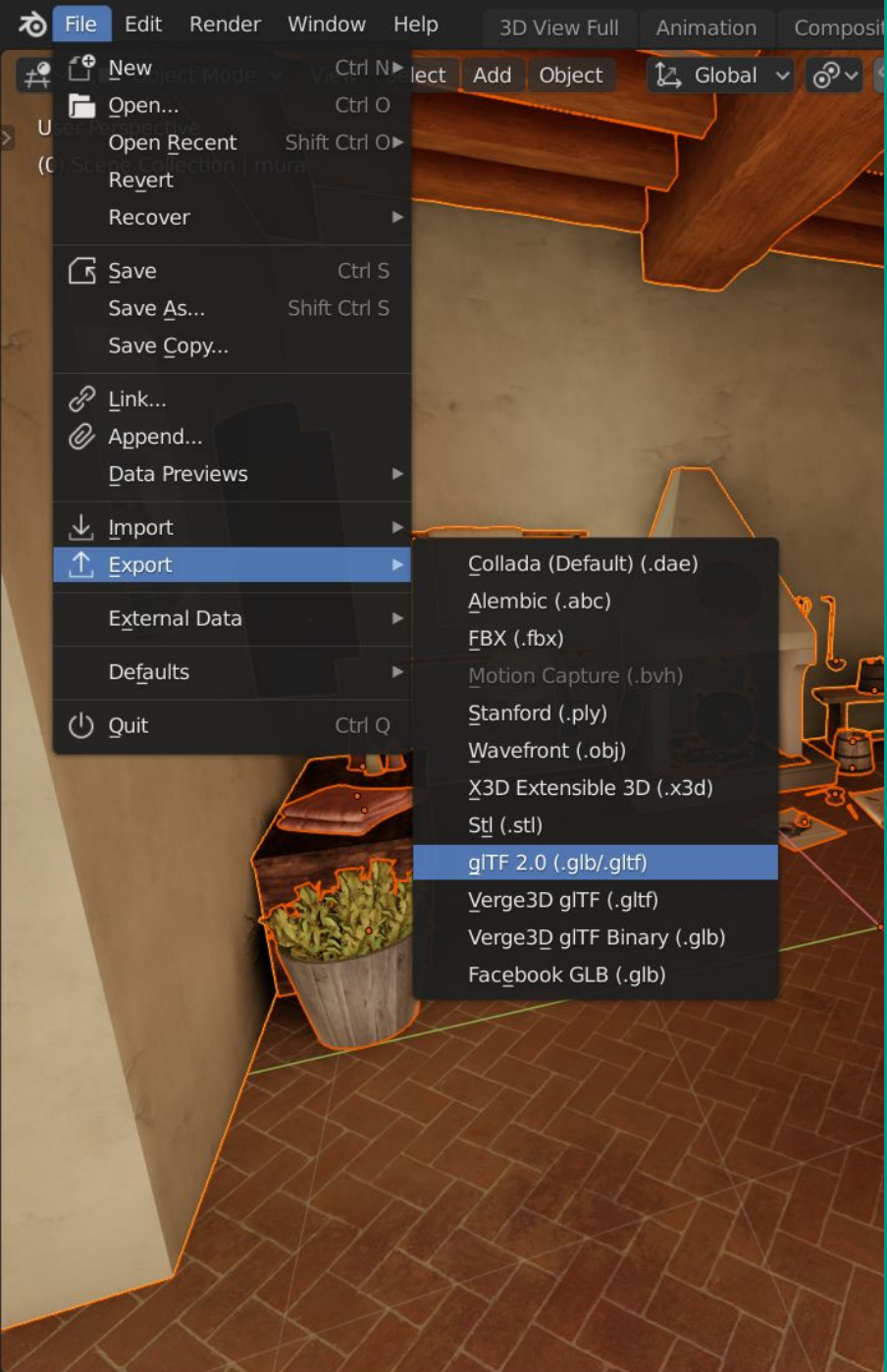
Hide the Blender-related objects. **Select** everything else

A to select all

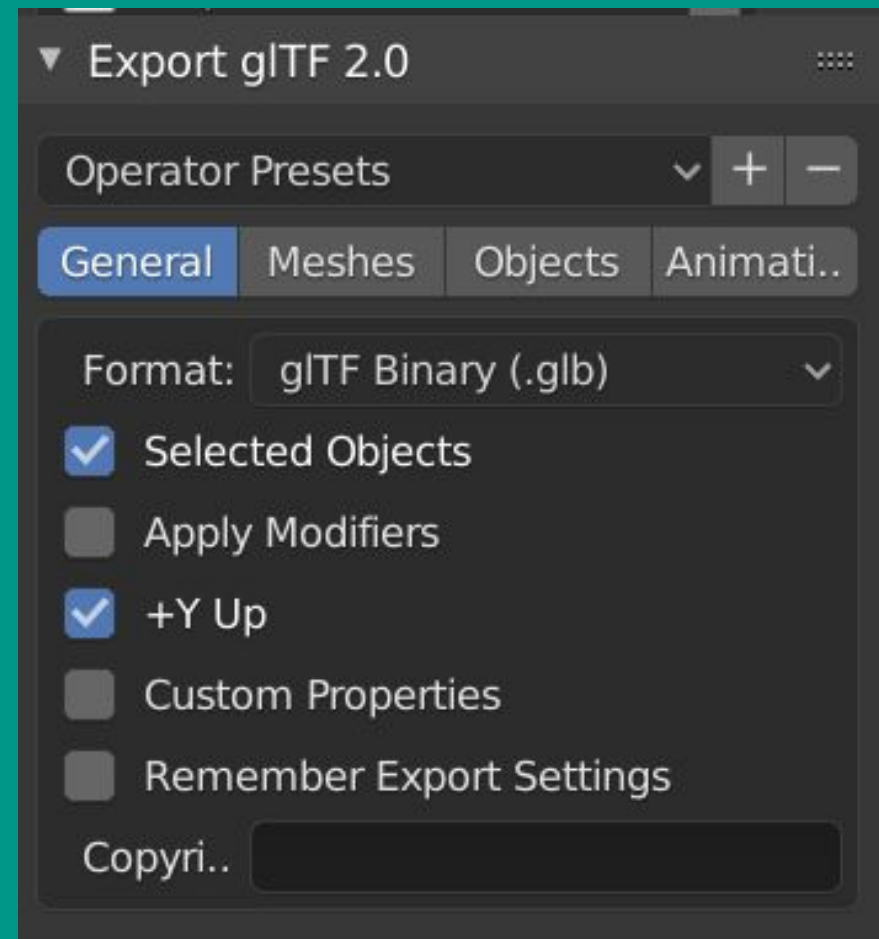
ALT+A to deselect



File → Export → glTF



File → Export → glTF



Specify the exporter preferences
Choose an appropriate folder and filename
Export

.gltf (JSON)

Node hierarchy, PBR material textures, cameras

.bin

Geometry: vertices and indices
Animation: key-frames
Skins: inverse-bind matrices

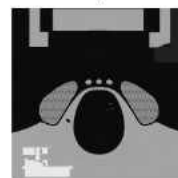
.png

.jpg

...
Textures



Geometry

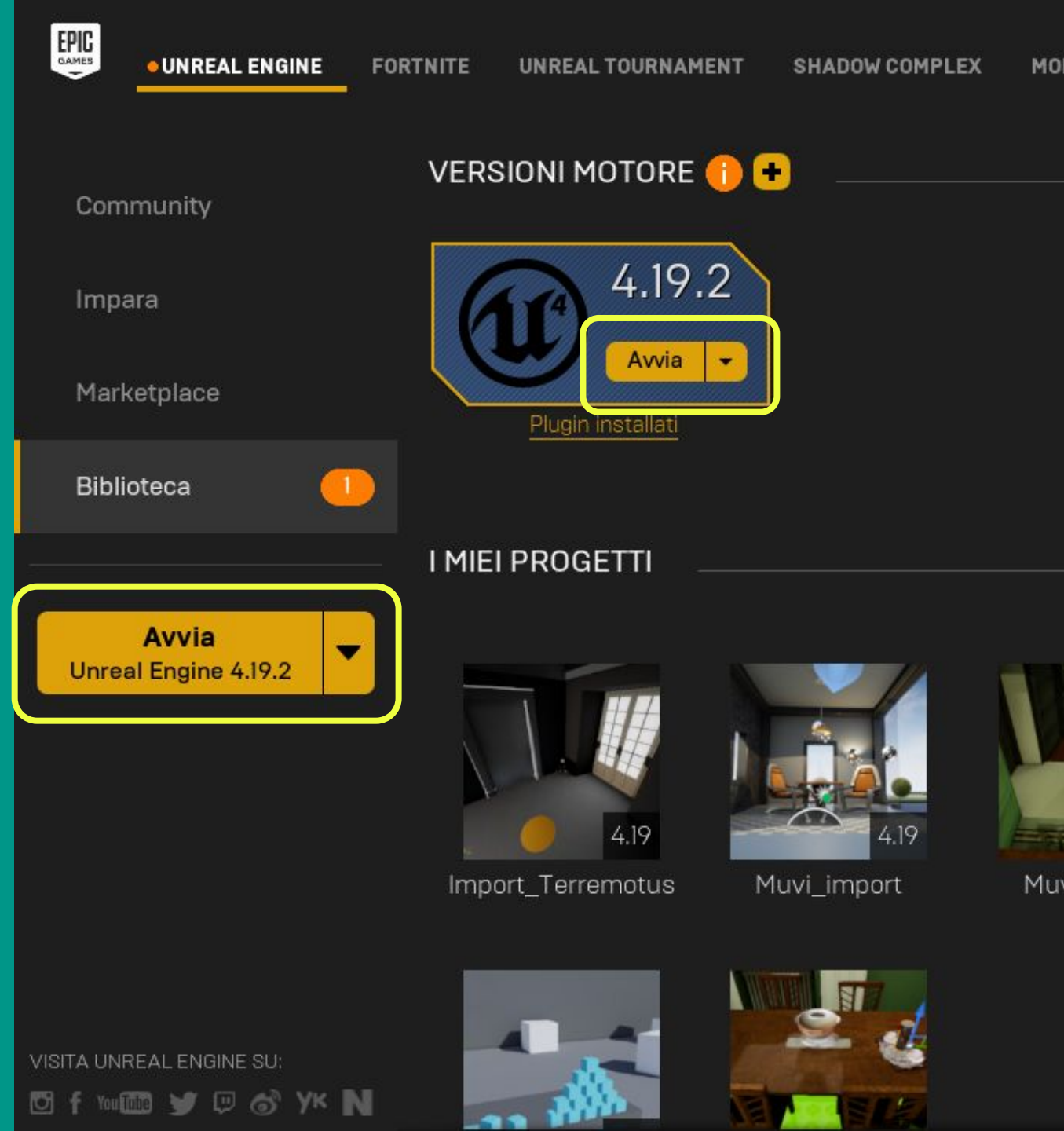


Texture based
PBR materials

Choose an appropriate folder and filename
Export

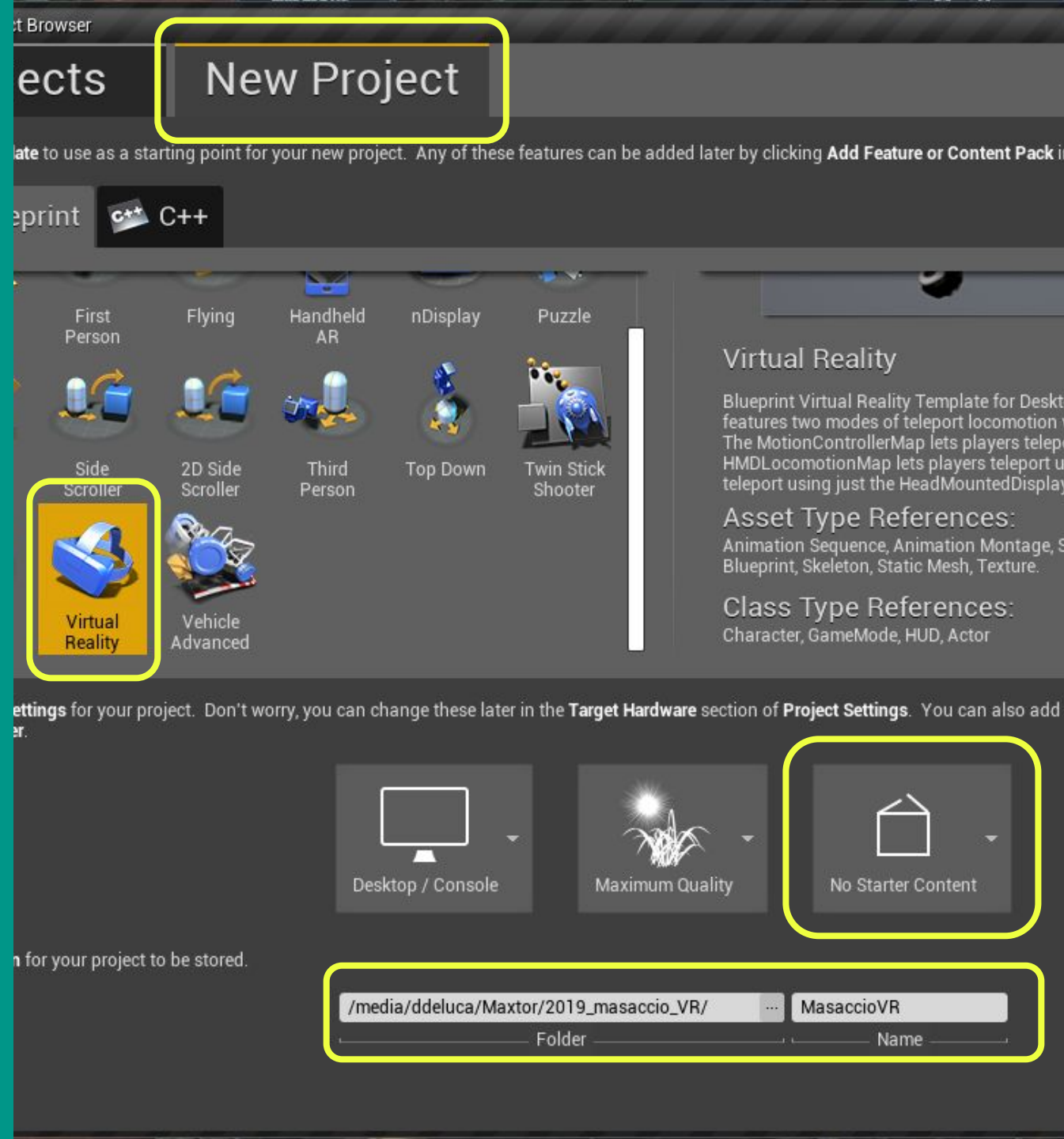
Getting Started

1. Download the Epic Games Launcher
2. Launch Unreal Engine
3. Select a New project
Choose your template
4. Wait...



Getting Started

1. Download the **Epic Games Launcher**
2. Launch **Unreal Engine**
3. Select a **New project**
Choose your **template**
4. Wait...



ONE
HOUR LATER

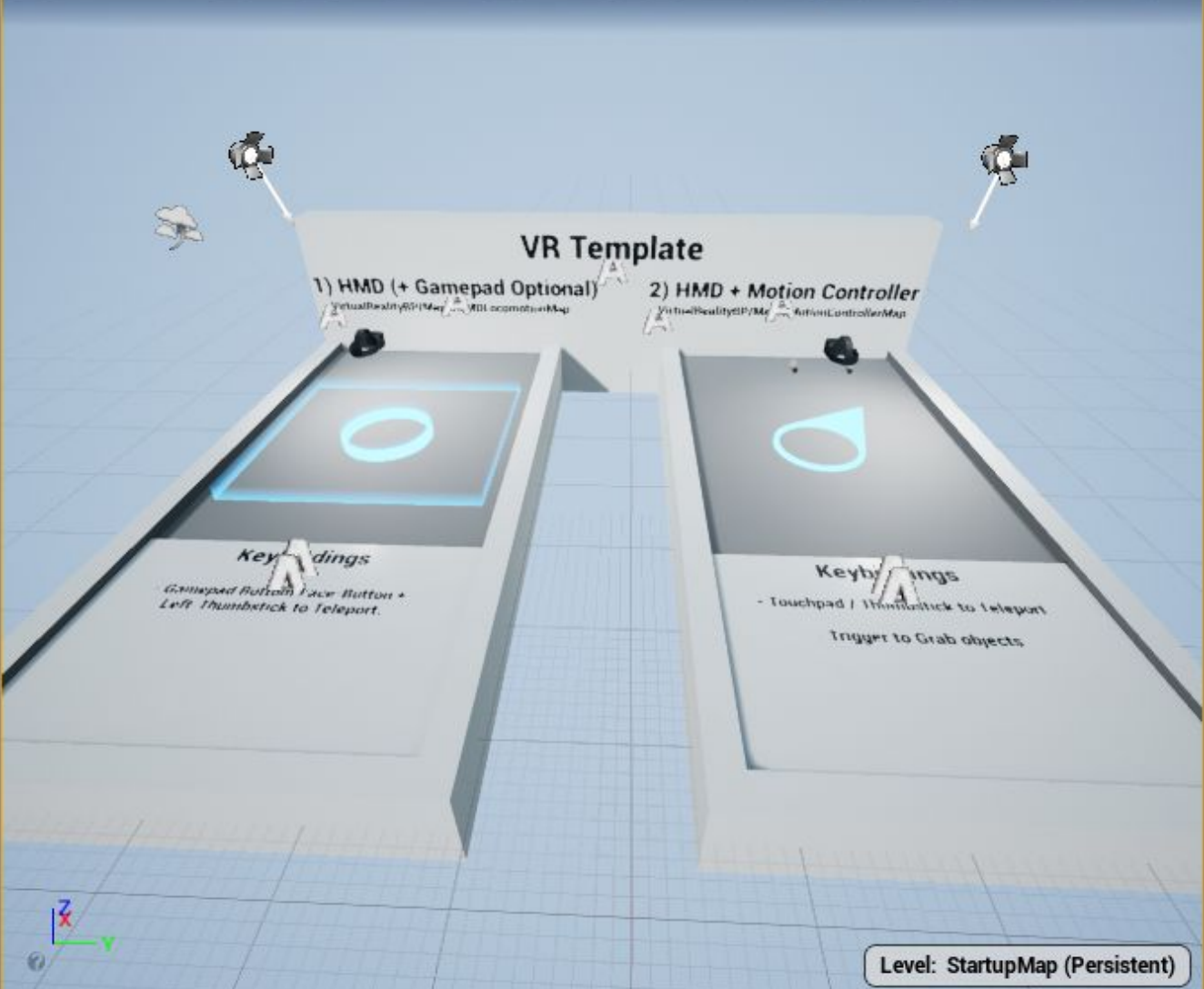




Geometry VirtualReality VirtualRealityBP

Save Current Source Control Content Settings Blueprints Cinematics Build Play

Perspective Lit Show [Navigation icons]



Label	Type
StartupMap (Editor)	World
GeometryBrushes	Folder
BackWall_A	Brush
LeftFloor_A	Brush
LeftFrontFloor_A	Brush
LeftSideWall_F_A	Brush
LeftSideWall L_A	Brush

33 actors View Options

Select an object to view details.



History

- Undo (Can't undo after: Loading map: StartupMap.umap...) Ctrl+Z
- Redo (Nothing to redo) Ctrl+Y
- Undo History

Edit

- Cut Ctrl+X
- Copy Ctrl+C
- Paste Ctrl+V
- Duplicate Ctrl+W
- Delete

Configuration

- Editor Preferences...
- Project Settings...
- Plugins**

Open the Plugins Browser tab.

Save Current Source Control Content Settings Blueprints Cinematics

Perspective Lit Show



► Built-In

Search



glTF Importer

An importer for Khronos glTF 3D models.



Enabled

Edit... Package...



Message



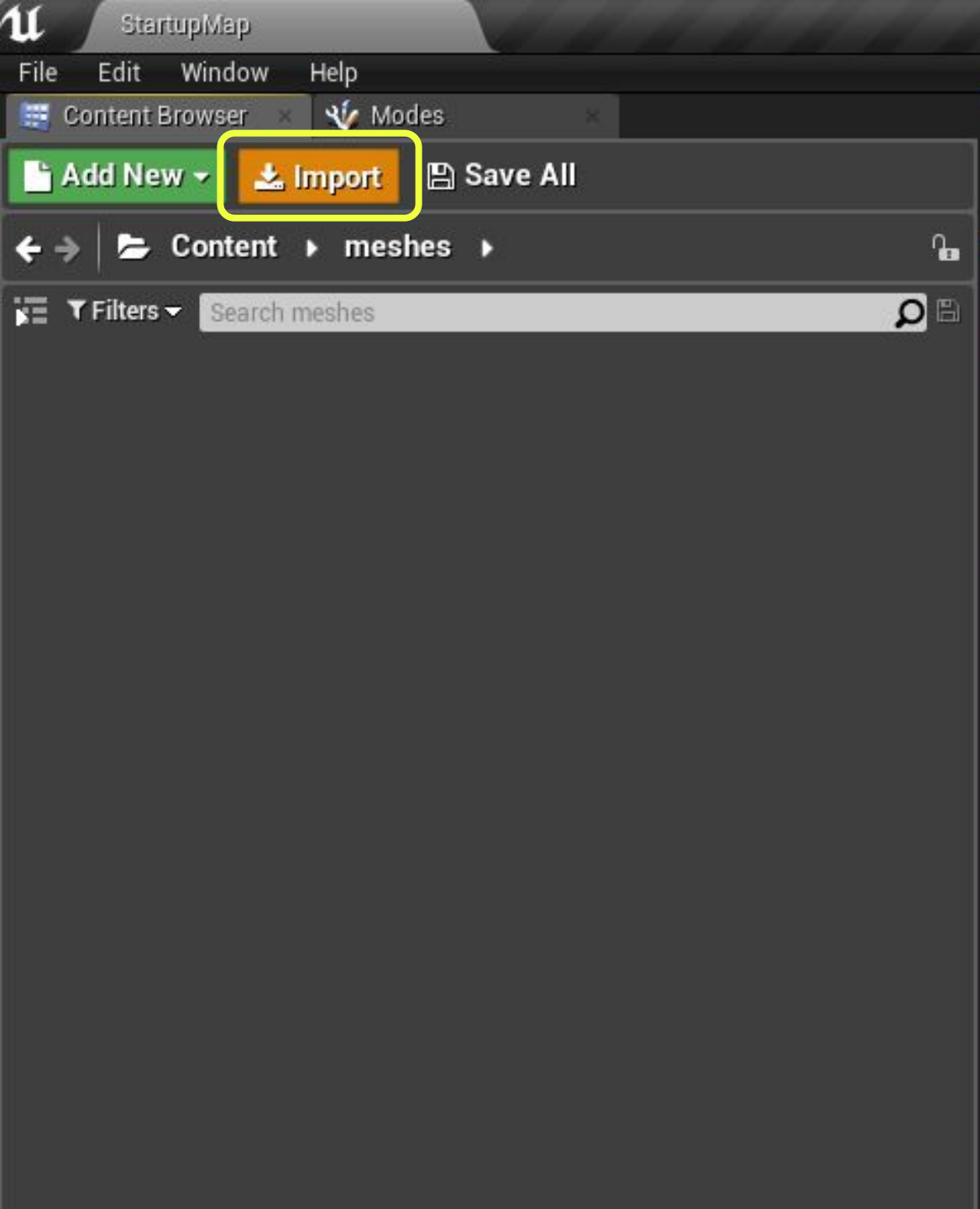
Plugin 'glTF Importer' is a beta version and might be unstable or removed without notice. Please use with caution. Are you sure you want to enable the plugin?

Copy Message

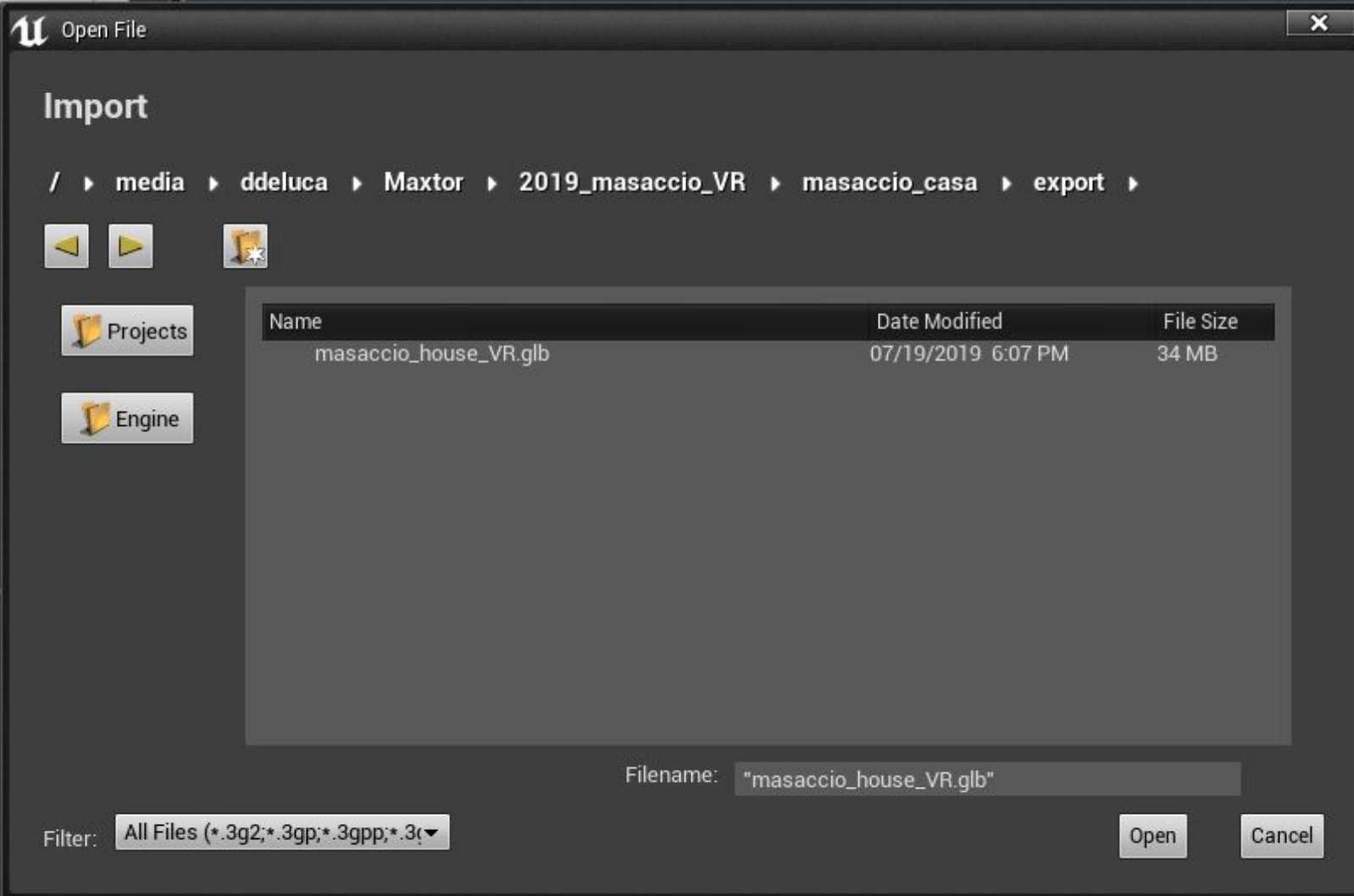
Yes

No

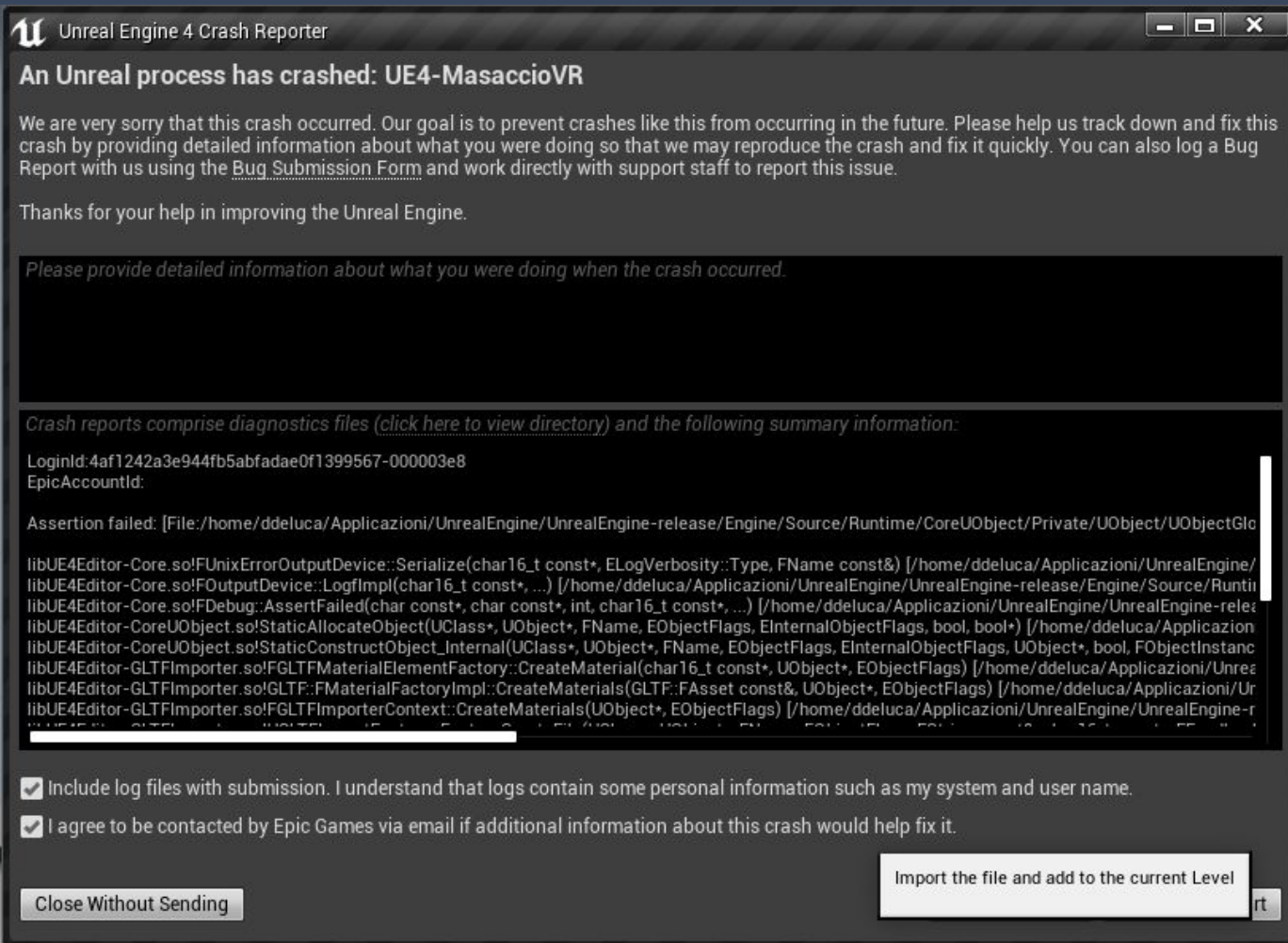
Search glTF → Enable it → Be Sure → Restart



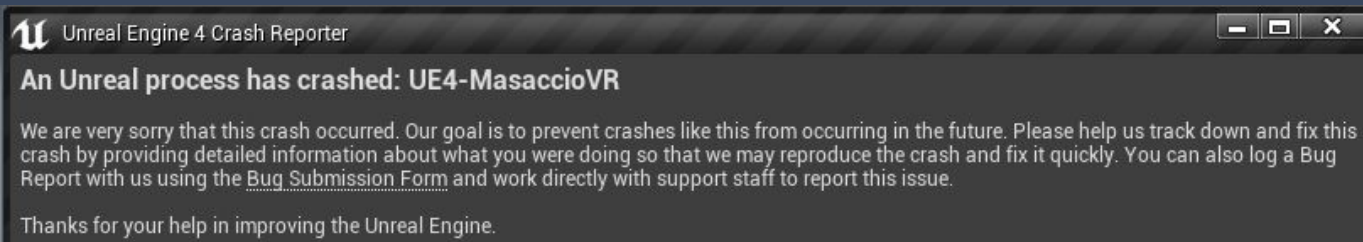
Import the GLB file
into the Content
Browser



aaaaand...



The nature reveals 2 types of people...



LoginId:4af1242a3e944fb5abfadae0f1399567-000003e8
EpicAccountId:

Assertion failed: [File:/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-release/Engine/Source/Runtime/CoreUObject/Private/UObject/UObjectGlobals.cpp] [Line: 2314] Objects have the same fully qualified name but different paths. New Object: Material /Game/meshes/masaccio_house_VR/zaffera_001.zaffera_001 Existing Object: StaticMesh /Game/meshes/masaccio_house_VR/zaffera_001.zaffera_001

libUE4Editor-Core.so!UnixErrorOutputDevice::Serialize(char16_t const*, ELogVerbosity::Type, FName const&) [/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-release/Engine/Source/Runtime/Core/Private/Unix/UnixErrorOutputDevice.cpp:70]
libUE4Editor-Core.so!FOutputDevice::LogfImpl(char16_t const*, ...) [/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-release/Engine/Source/Runtime/Core/Private/Misc/OutputDevice.cpp:71]

Crash reports comprise diagnostics files ([click here to view directory](#)) and the following summary information:

LoginId:4af1242a3e944fb5abfadae0f1399567-000003e8
EpicAccountId:

Assertion failed: [File:/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-release/Engine/Source/Runtime/CoreUObject/Private/UObject/UObjectGlo

libUE4Editor-Core.so!FUnixErrorOutputDevice::Serialize(char16_t const*, ELogVerbosity::Type, FName const&) [/home/ddeluca/Applicazioni/UnrealEngine/
libUE4Editor-Core.so!FOutputDevice::LogfImpl(char16_t const*, ...) [/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-release/Engine/Source/Runtit
libUE4Editor-Core.so!FDebug::AssertFailed(char const*, char const*, int, char16_t const*, ...) [/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-rele
libUE4Editor-CoreUObject.so!StaticAllocateObject(UClass*, UObject*, FName, EObjectFlags, EInternalObjectFlags, bool, bool*) [/home/ddeluca/Applicazion
libUE4Editor-CoreUObject.so!StaticConstructObject_Internal(UClass*, UObject*, FName, EObjectFlags, EInternalObjectFlags, UObject*, bool, FObjectInstanc
libUE4Editor-GLTFImporter.so!FGLTFMaterialElementFactory::CreateMaterial(char16_t const*, UObject*, EObjectFlags) [/home/ddeluca/Applicazioni/Unree
libUE4Editor-GLTFImporter.so!GLTF::FMaterialFactoryImpl::CreateMaterials(GLTF::FAsset const&, UObject*, EObjectFlags) [/home/ddeluca/Applicazioni/Ur
libUE4Editor-GLTFImporter.so!FGLTFImporterContext::CreateMaterials(UObject*, EObjectFlags) [/home/ddeluca/Applicazioni/UnrealEngine/r

Include log files with submission. I understand that logs contain some personal information such as my system and user name.

I agree to be contacted by Epic Games via email if additional information about this crash would help fix it.

Close Without Sending

Import the file and add to the current Level

Assertion failed:

[File:/home/ddeluca/Applicazioni/UnrealEngine/UnrealEngine-release/Engine/Source/Runtime/CoreUObject/Private/UObject/UObjectGlobals.cpp] [Line: 2314]

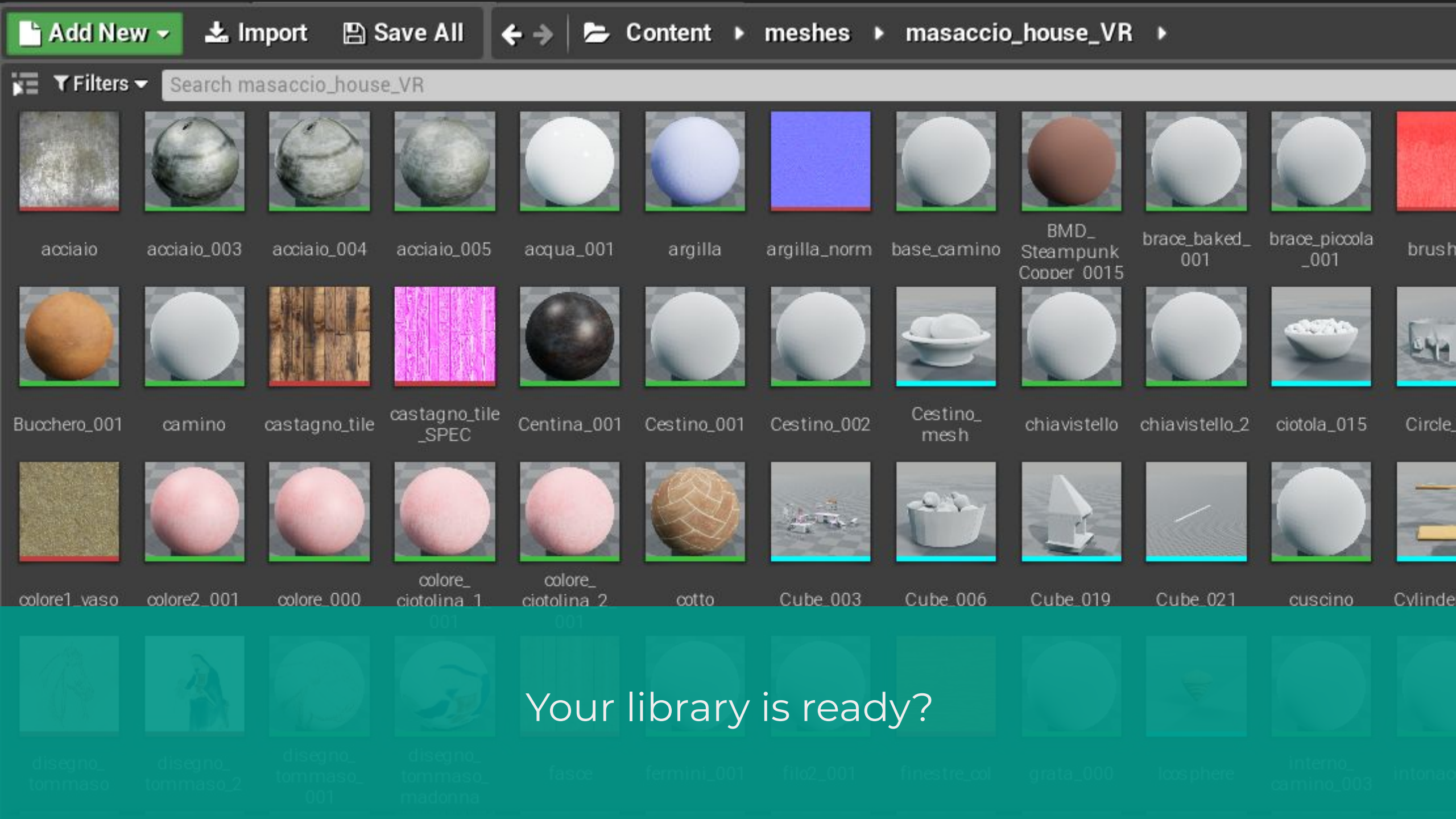
Objects have the same fully qualified name but different paths.

New Object: Material /Game/meshes/masaccio_house_VR/zaffera_001.zaffera_001

Existing Object: StaticMesh /Game/meshes/masaccio_house_VR/zaffera_001.zaffera_001

- Avoid instanced mesh, materials, textures (use make single user in Blender)
- Avoid custom normals
- Delete complex shader configuration
- Avoid same name between object-mesh-materials
- Many more

Import errors



Add New

Import

Save All



Content

meshes

masaccio_house_VR

Filters

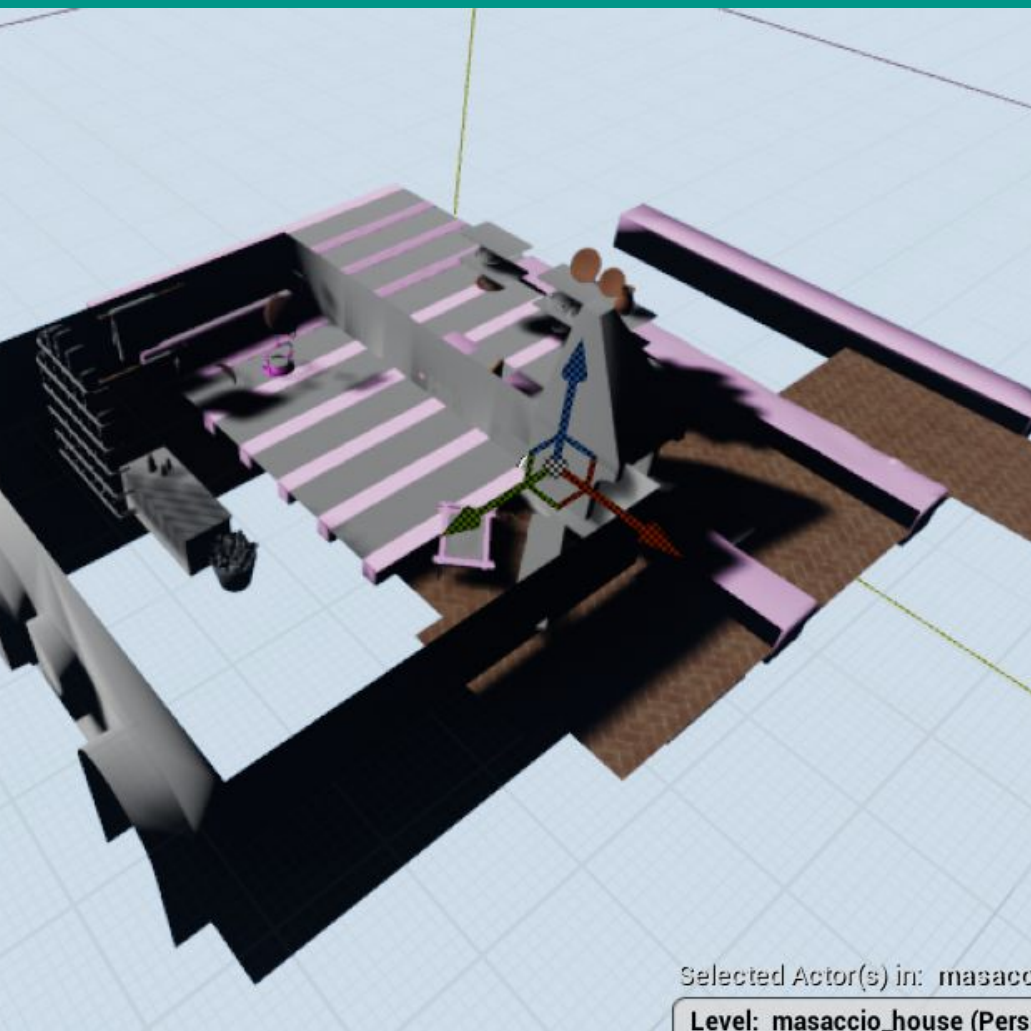
Search masaccio_house_VR

- acciaio
- acciaio_003
- acciaio_004
- acciaio_005
- acqua_001
- argilla
- argilla_norm
- base_camino
- BMD_SteampunkCopper_0015
- brace_baked_001
- brace_piccola_001
- brush
- Bucchero_001
- camino
- castagno_tile
- castagno_tile_SPEC
- Centina_001
- Cestino_001
- Cestino_002
- Cestino_mesh
- chiavistello
- chiavistello_2
- ciotola_015
- Circle
- colore1_vaso
- colore2_001
- colore_000
- colore_ciotolina_1_001
- colore_ciotolina_2_001
- cotto
- Cube_003
- Cube_006
- Cube_019
- Cube_021
- cuscino
- Cylinder

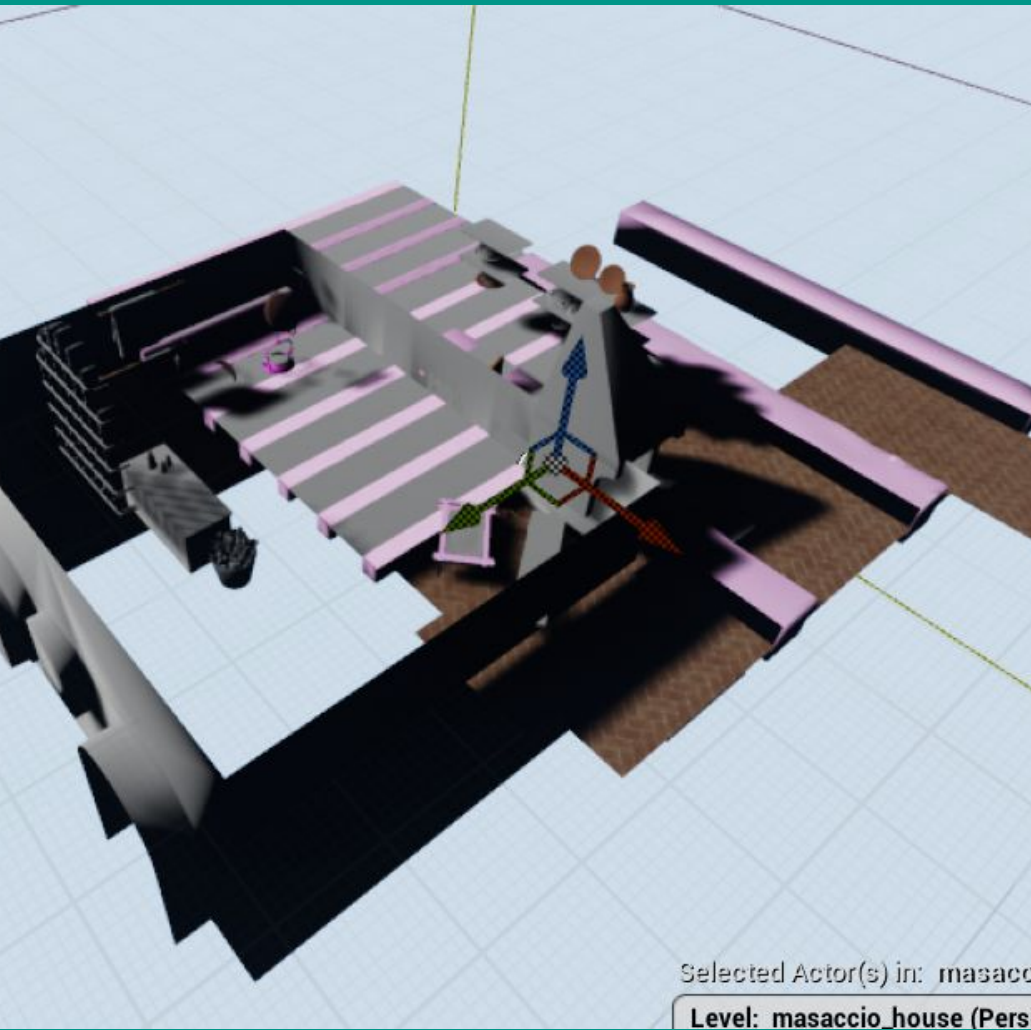
- disegno_tommaso
- disegno_tommaso_2
- disegno_tommaso_001
- disegno_tommaso_madonna
- fasce
- fermi_001
- filo2_001
- finestre_col
- grata_000
- loosphere
- interno_camino_003
- intonaco

Your library is ready?

Almost...

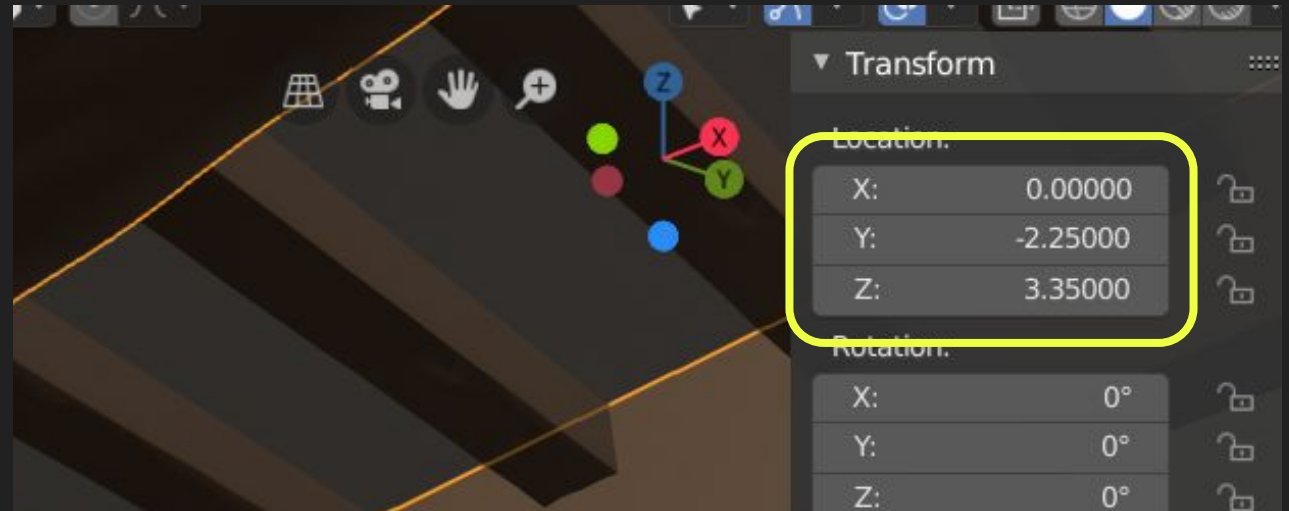


Almost...

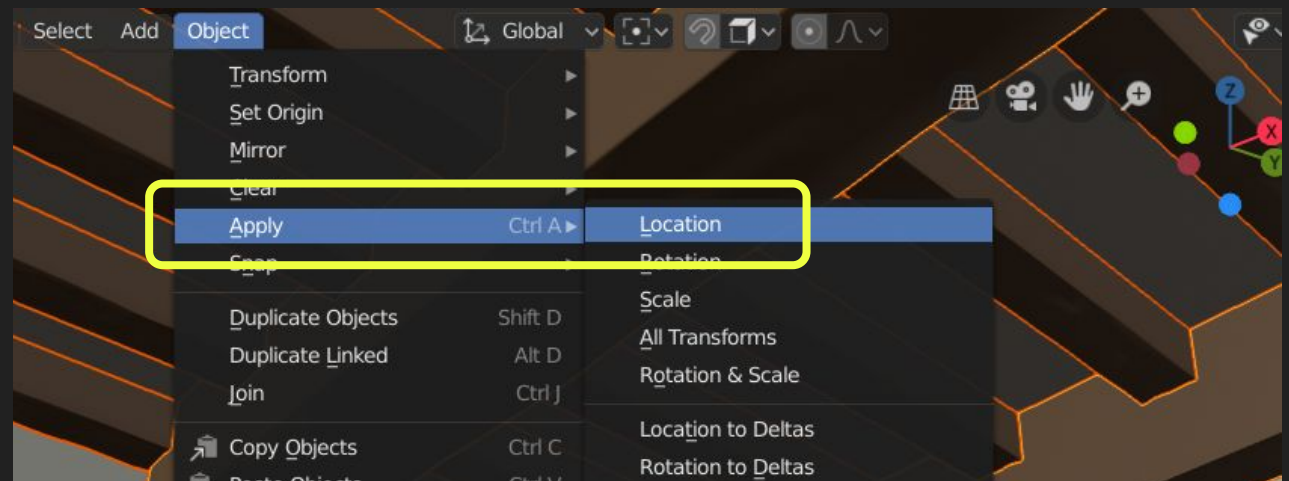


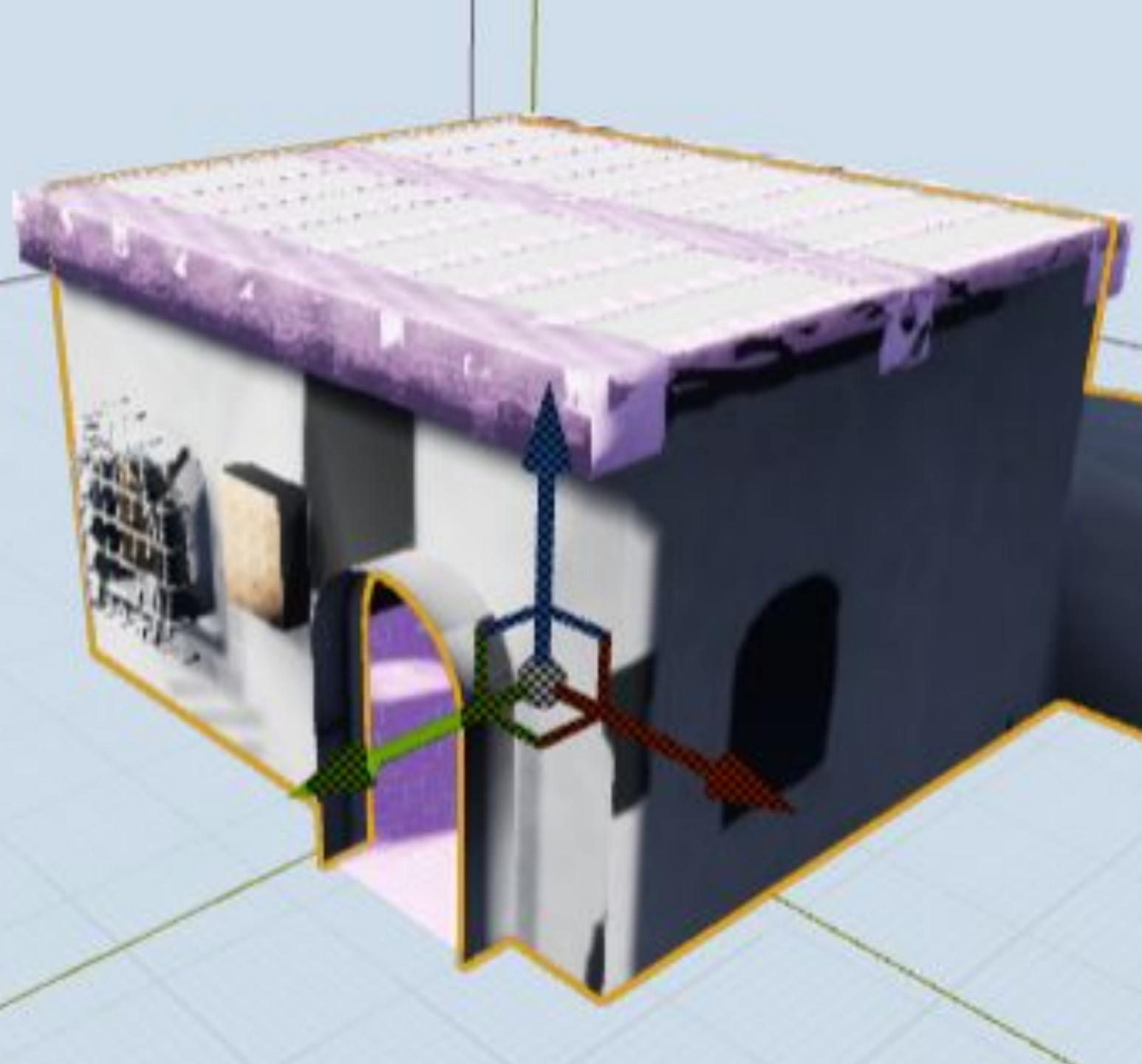
To avoid this

The problem...



...the solution





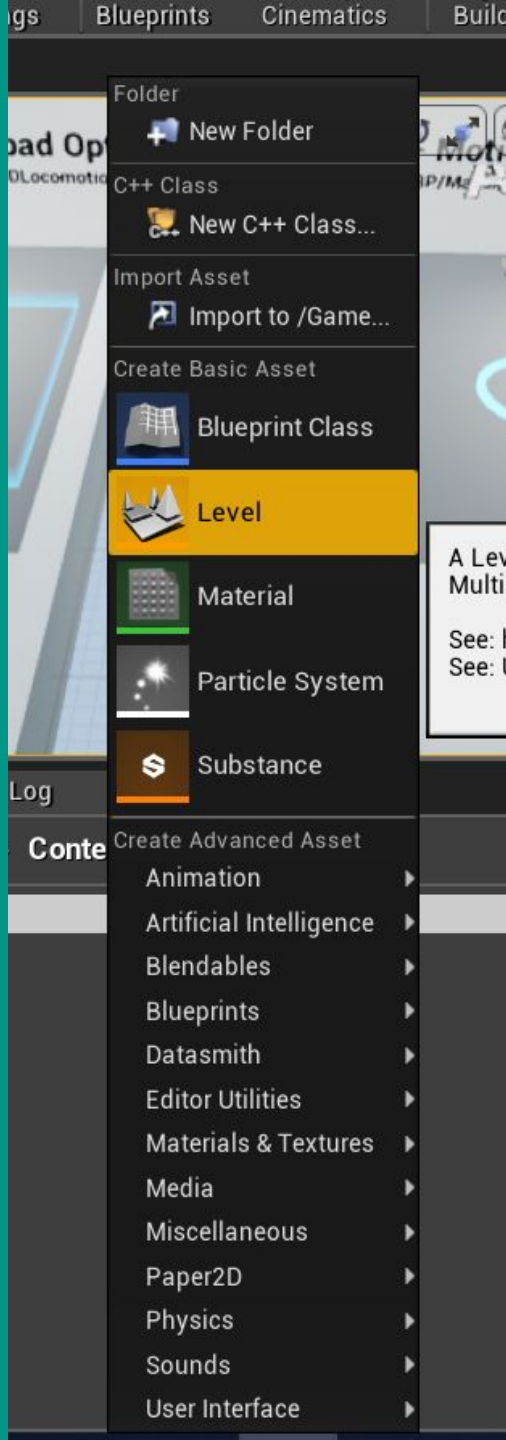
And re-import:
fixed!



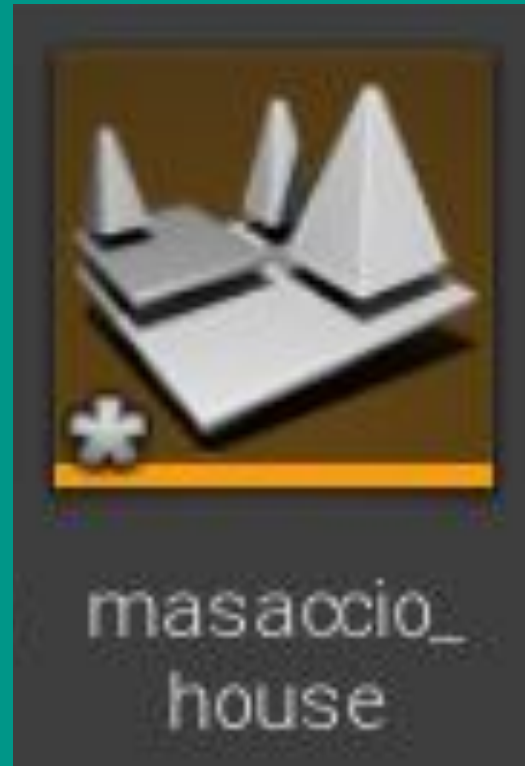
You weren't
paying attention?

Start from:

[/Exercise_Blender/casa_masaccio_VR_import_ready.blend](#)

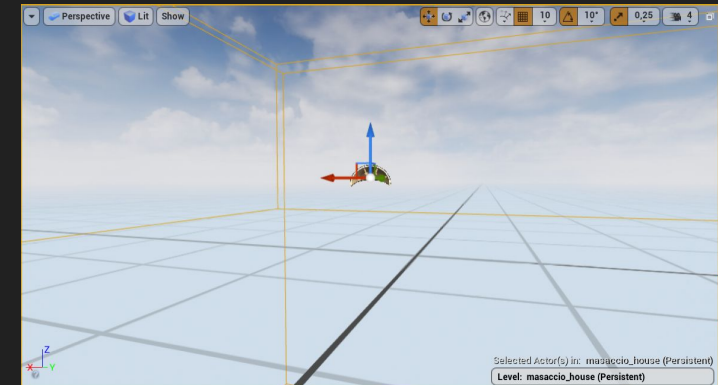
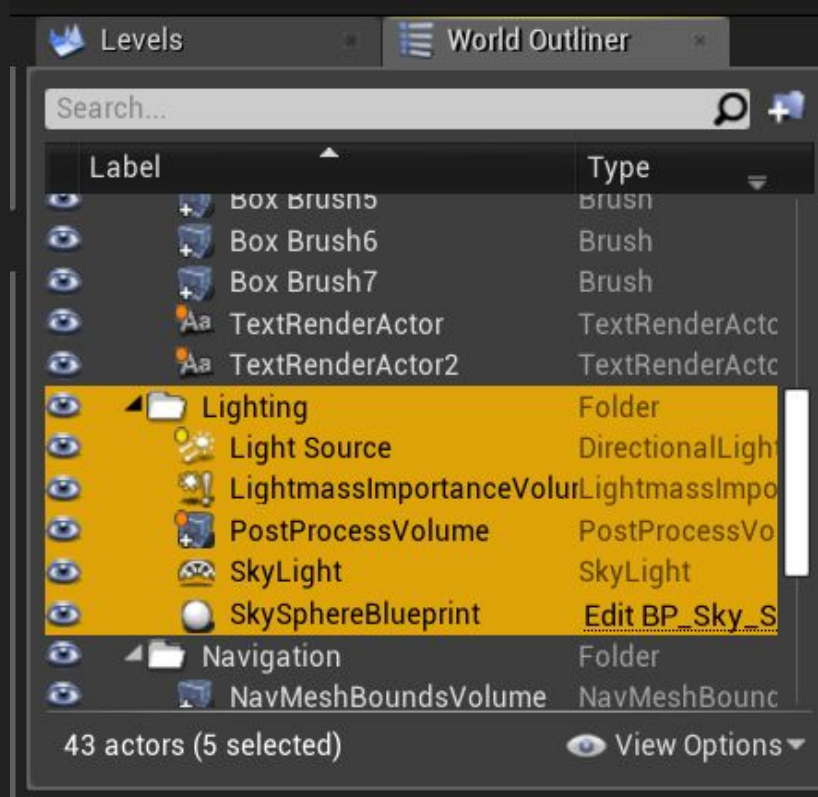
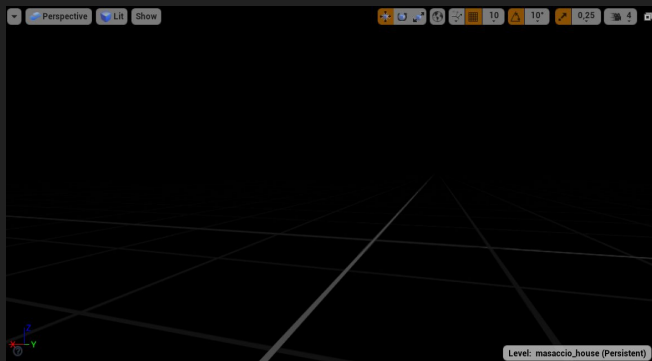


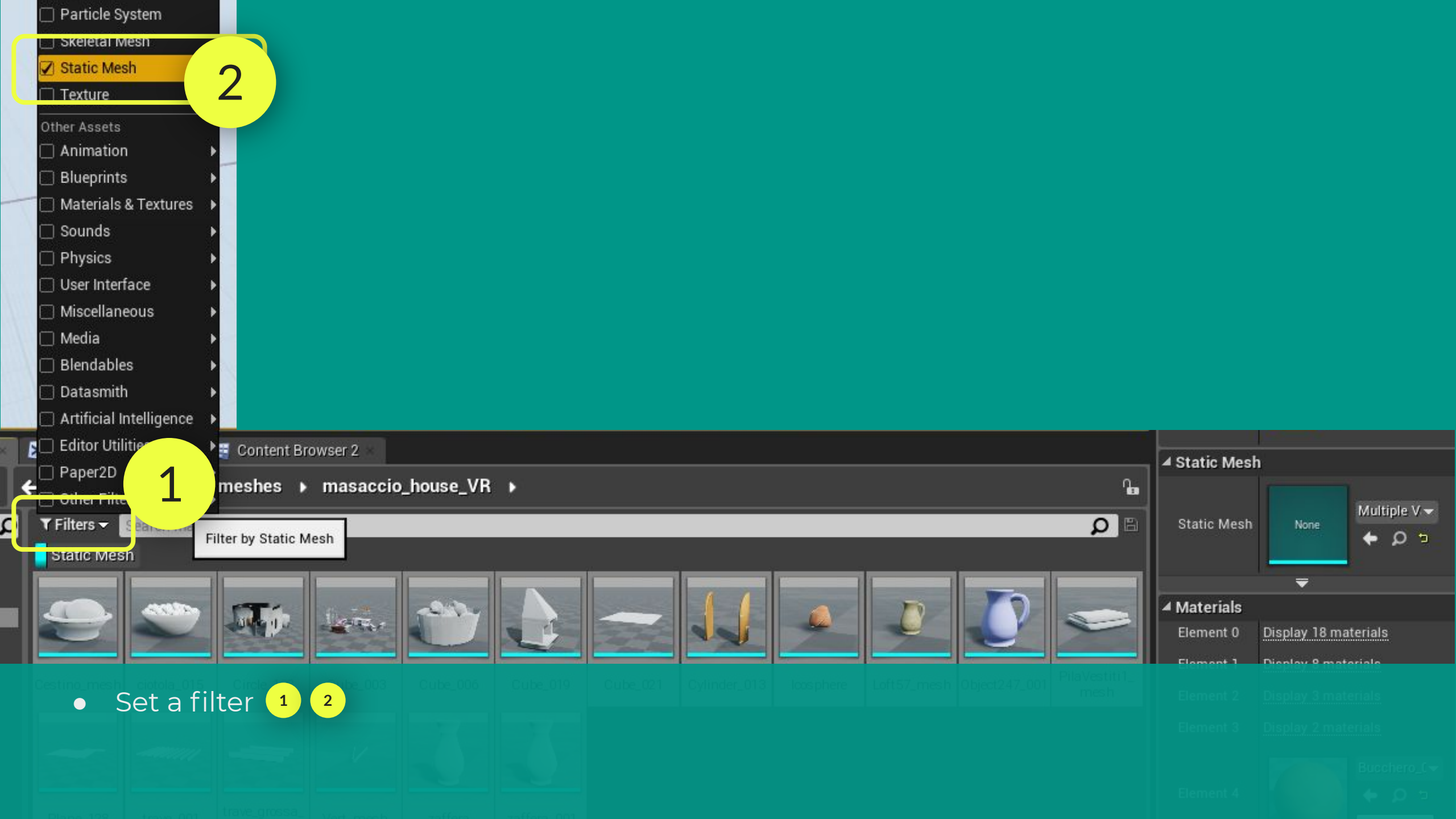
Create a **new level** that will host your models



Copy and paste through the world outline the **lighting folder and objects**

- **From** the HMD Locomotion Map: **Content/VirtualRealityBP/Map**
- **To** your new level “masaccio_house”





2

1

Filter by Static Mesh

- Set a filter 1 2

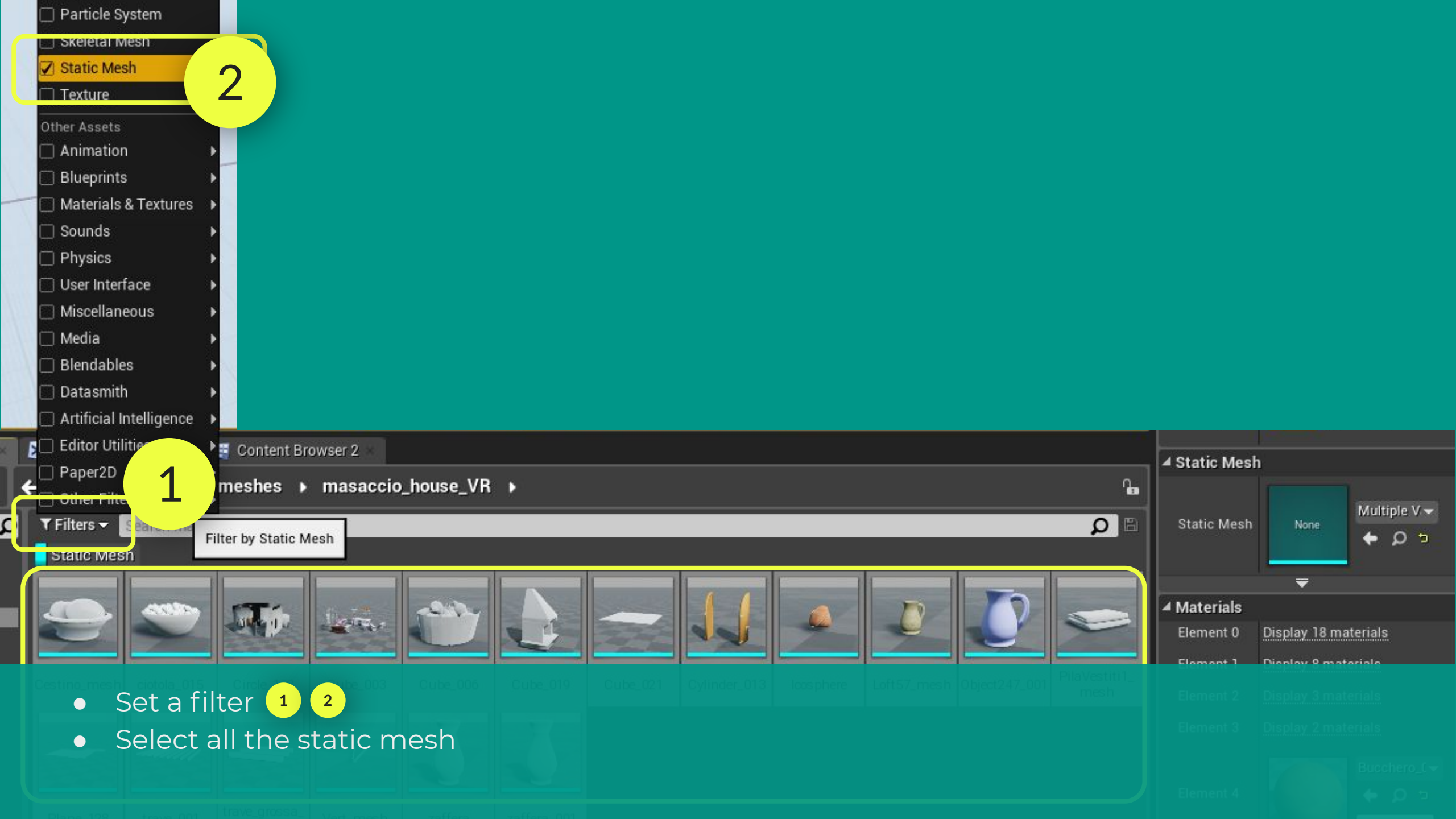
Static Mesh

Static Mesh: None

Multiple V

Materials

Element 0	Display 18 materials
Element 1	Display 8 materials
Element 2	Display 3 materials
Element 3	Display 2 materials
Element 4	Bucchero_I



2

1

- Set a filter 1 2
- Select all the static mesh

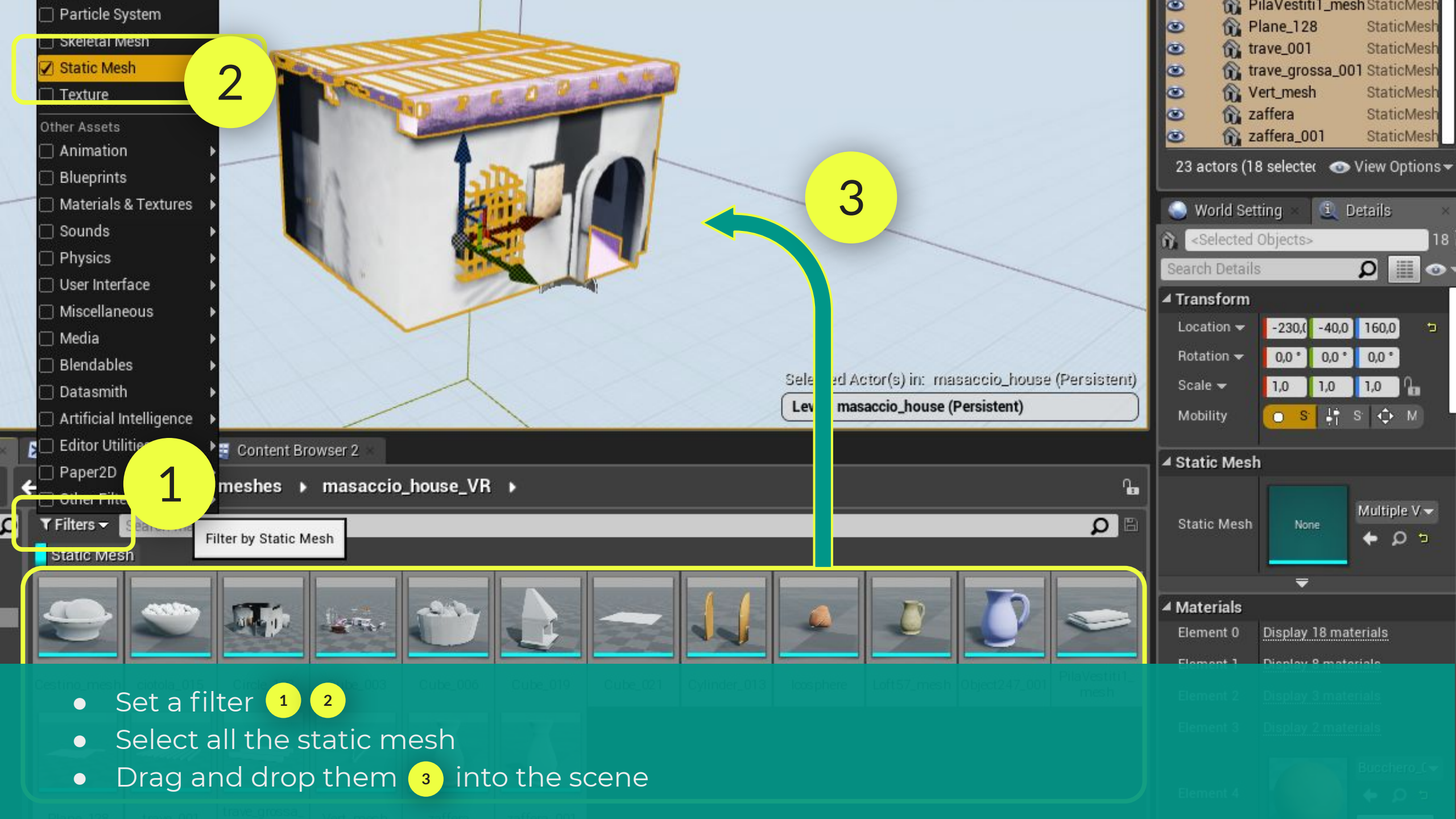
Static Mesh

Static Mesh: None

Multiple V

Materials

Element 0	Display 18 materials
Element 1	Display 8 materials
Element 2	Display 3 materials
Element 3	Display 2 materials
Element 4	



Particle System

Skeletal Mesh

Static Mesh

Texture

Other Assets

Animation

Blueprints

Materials & Textures

Sounds

Physics

User Interface

Miscellaneous

Media

Blendables

Datasmith

Artificial Intelligence

Editor Utilities

Paper2D

Other Filters

Static Mesh

2

3

1

Filter by Static Mesh



- Set a filter 1 2
- Select all the static mesh
- Drag and drop them 3 into the scene

<input type="checkbox"/>	PilaVestiti1_mesh	StaticMesh
<input type="checkbox"/>	Plane_128	StaticMesh
<input type="checkbox"/>	trave_001	StaticMesh
<input type="checkbox"/>	trave_grossa_001	StaticMesh
<input type="checkbox"/>	Vert_mesh	StaticMesh
<input type="checkbox"/>	zaffera	StaticMesh
<input type="checkbox"/>	zaffera_001	StaticMesh

23 actors (18 selected) View Options

World Setting Details

<Selected Objects> 18

Search Details

Transform

Location -230,0 -40,0 160,0

Rotation 0,0° 0,0° 0,0°

Scale 1,0 1,0 1,0

Mobility S S M

Static Mesh

Static Mesh None Multiple V

Materials

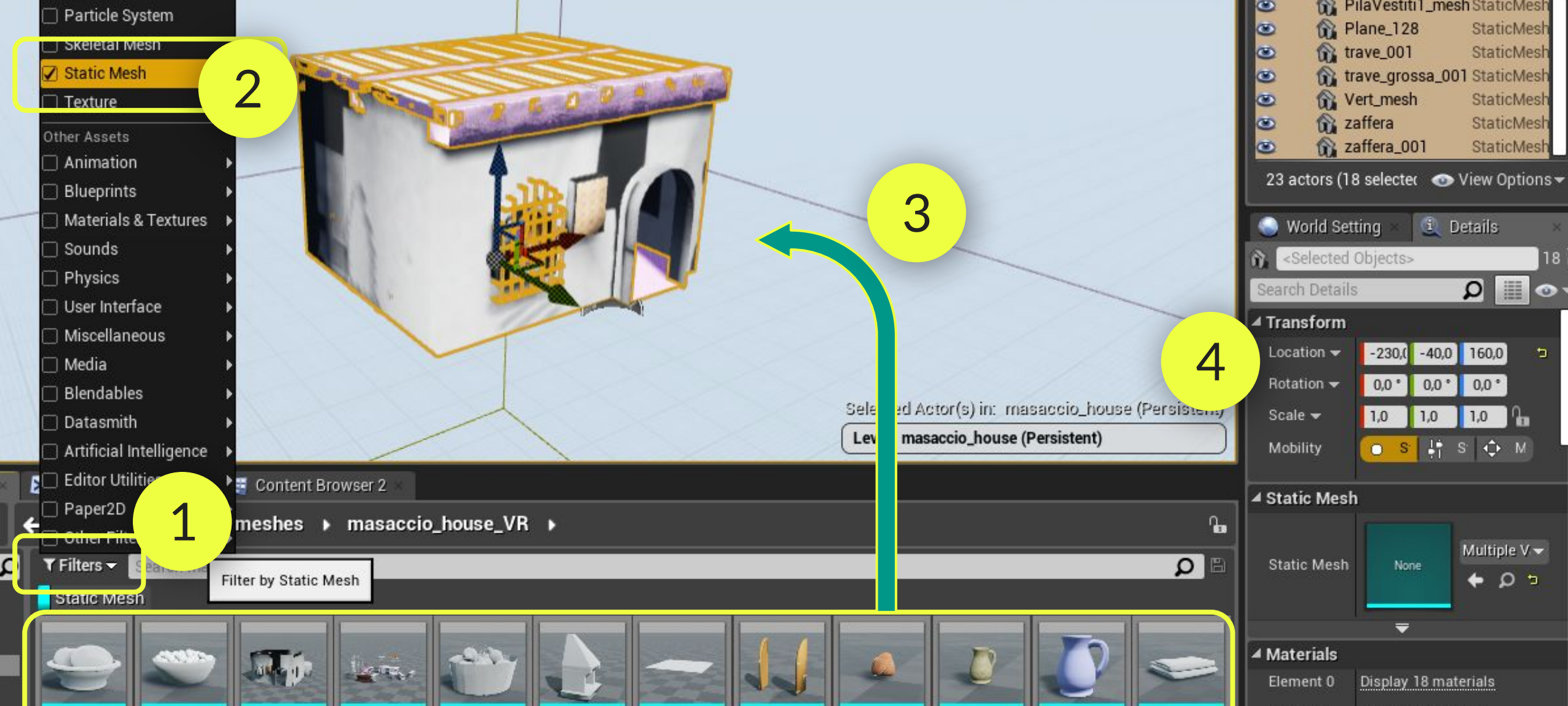
Element 0 Display 18 materials

Element 1 Display 8 materials

Element 2 Display 3 materials

Element 3 Display 2 materials

Element 4



- Set a filter **1** **2**
- Select all the static mesh
- Drag and drop them **3** into the scene and reset the location to 0,0,0 **4**



Are you lost?

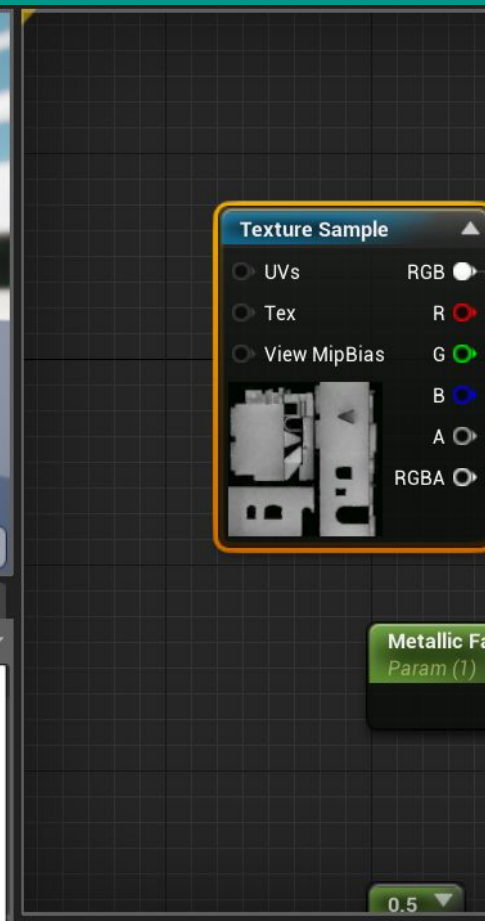
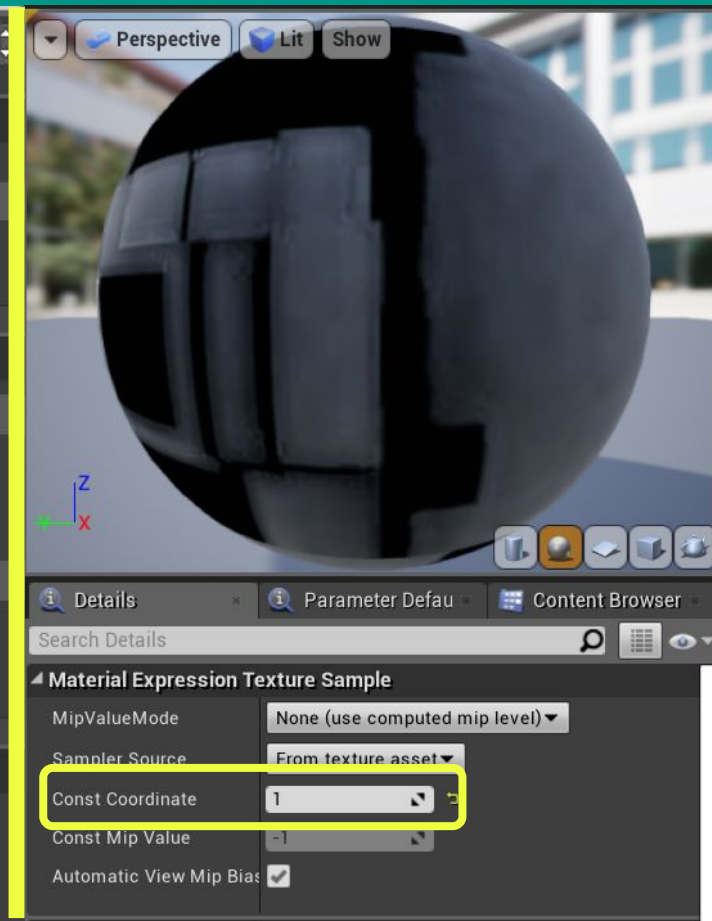
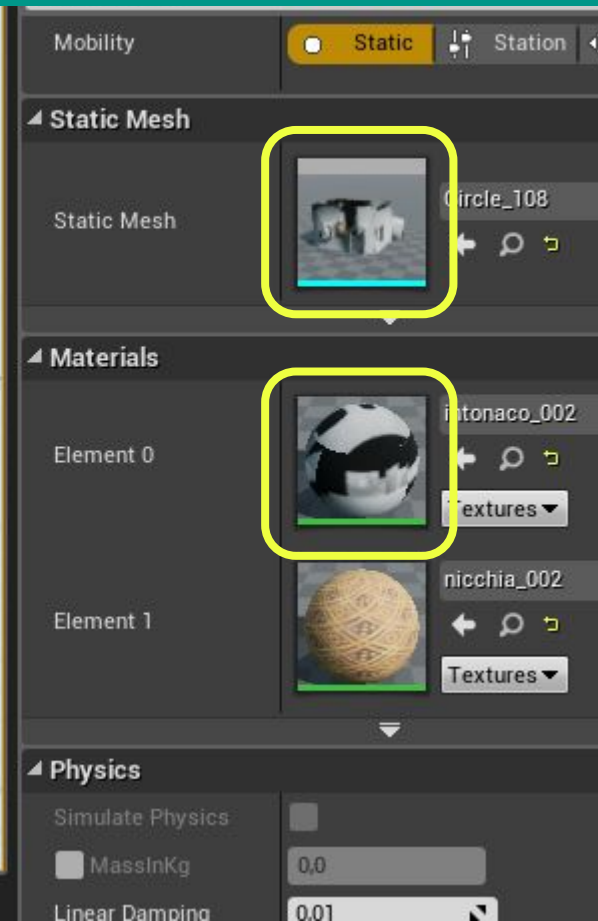
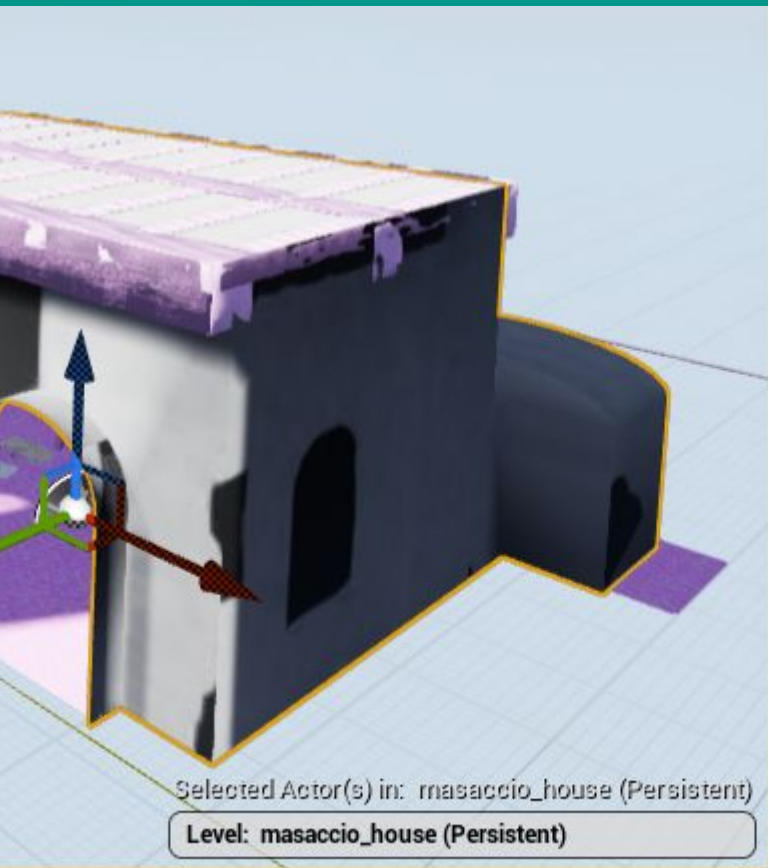
Start from:

[/Exercise_UE4zip/MasaccioVR_2.zip](#)

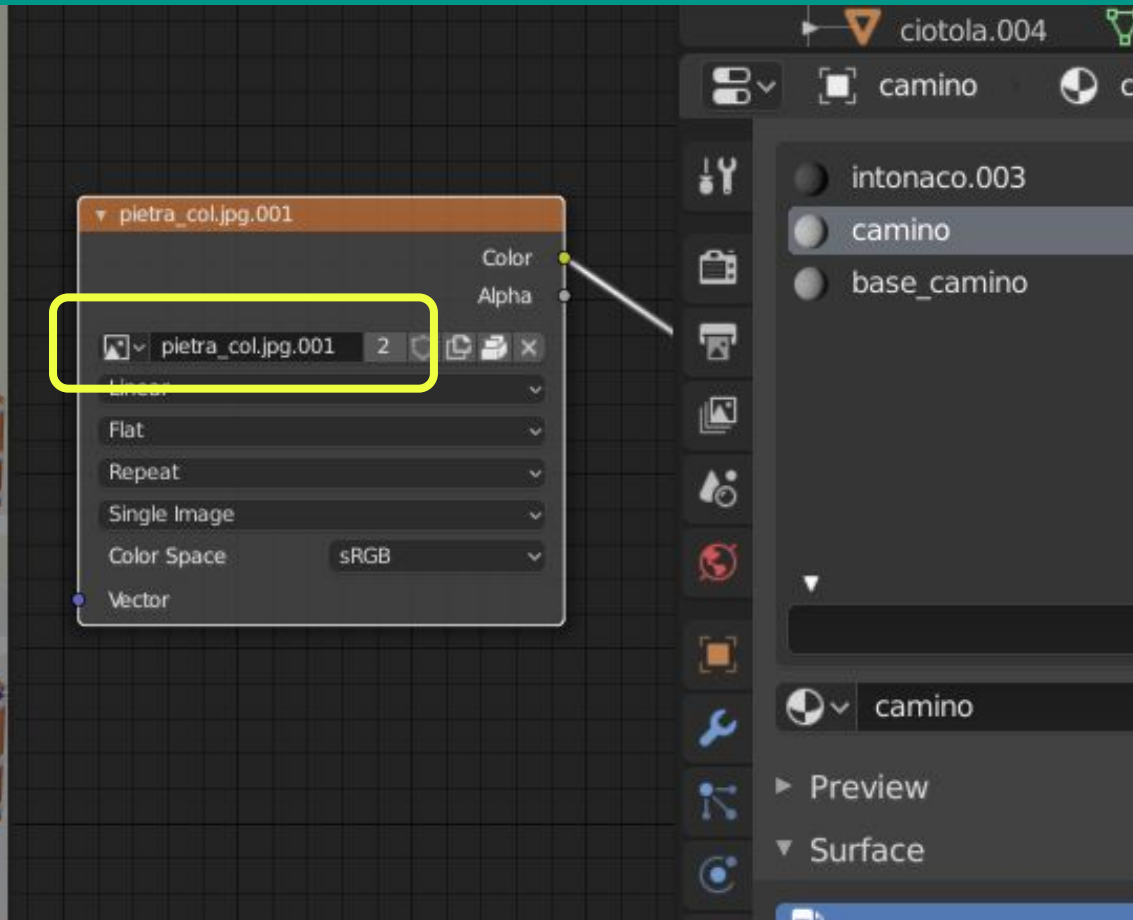
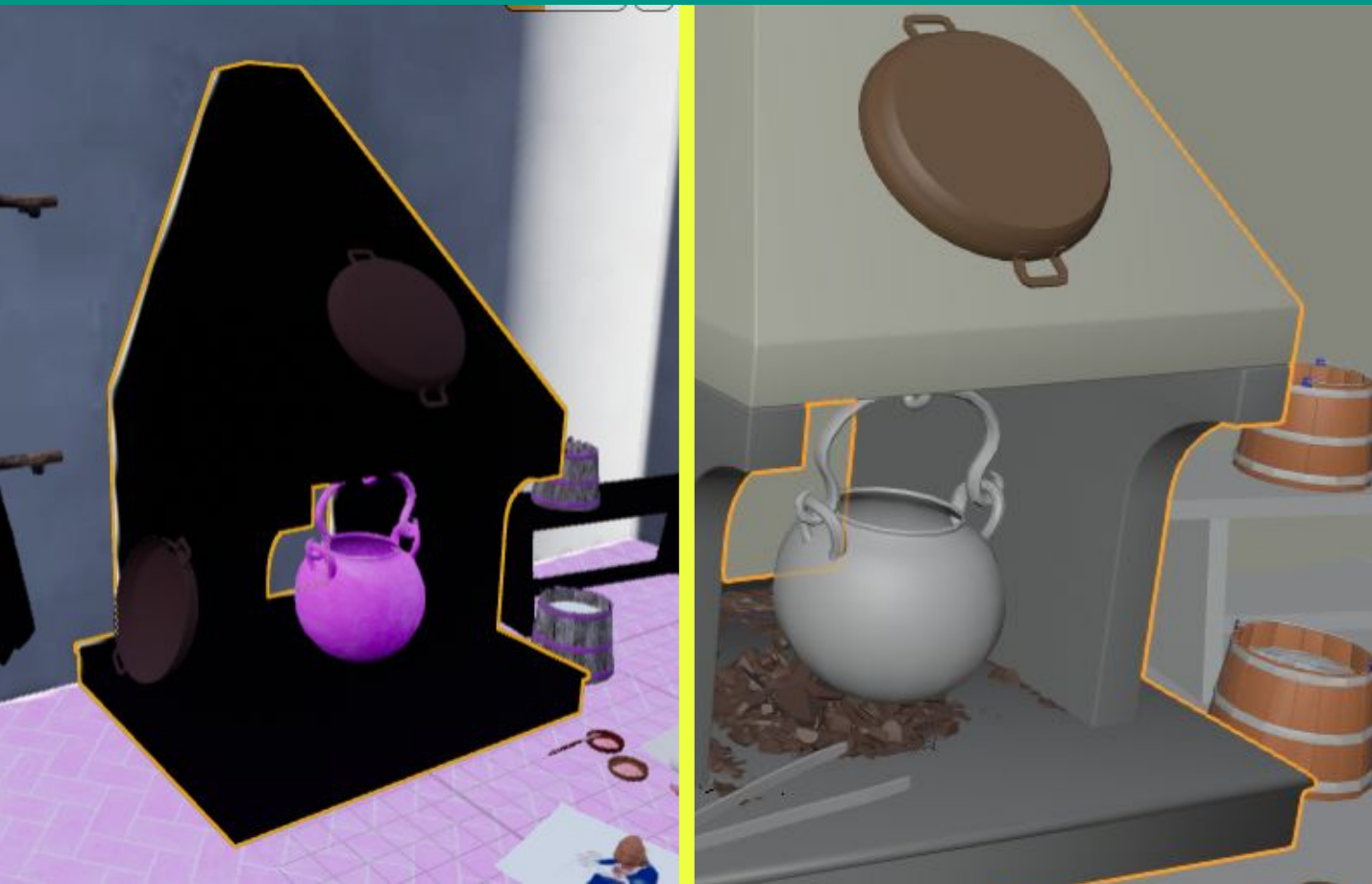
Check the wrong **materials**

Open the relative Static Mesh and Materials

Fix the **coordinate** index to the correct one

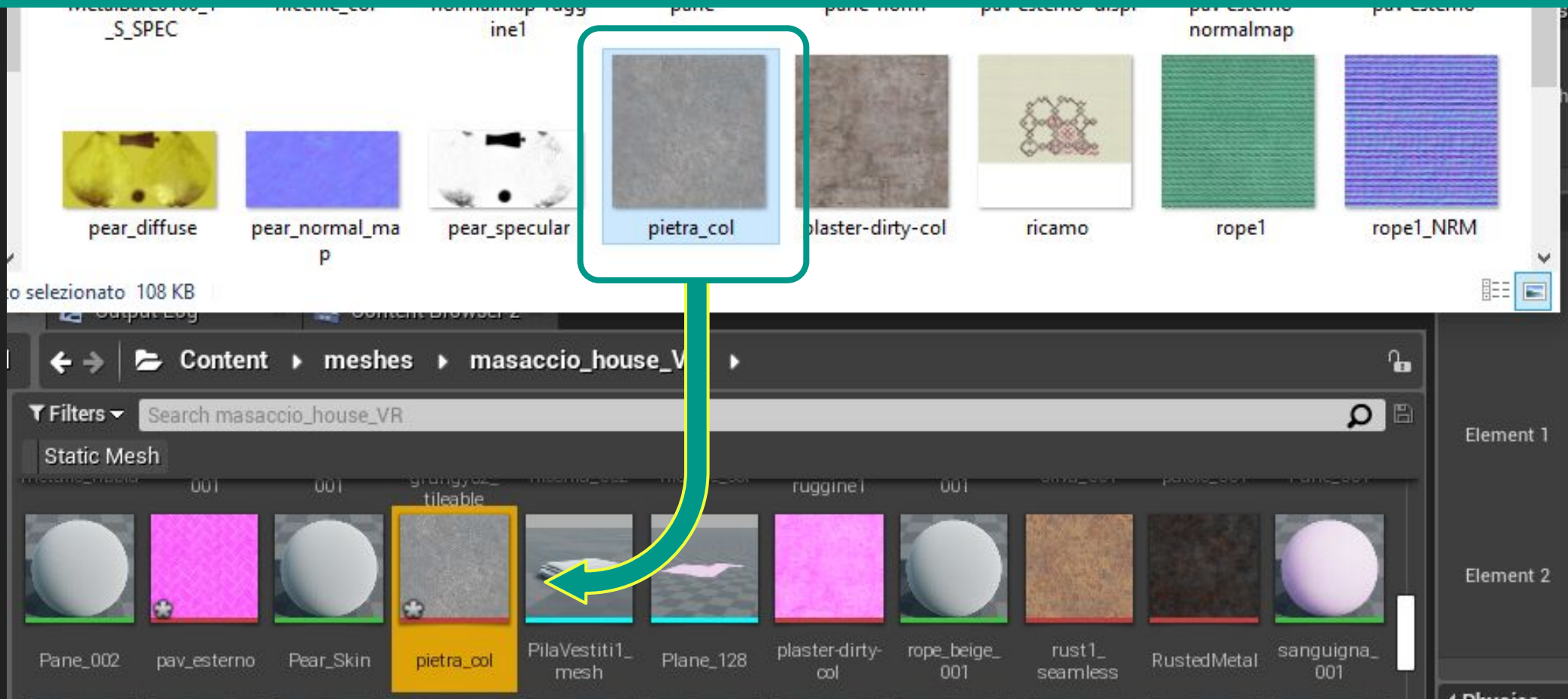


Check the wrong or missing textures



Check the wrong or missing textures

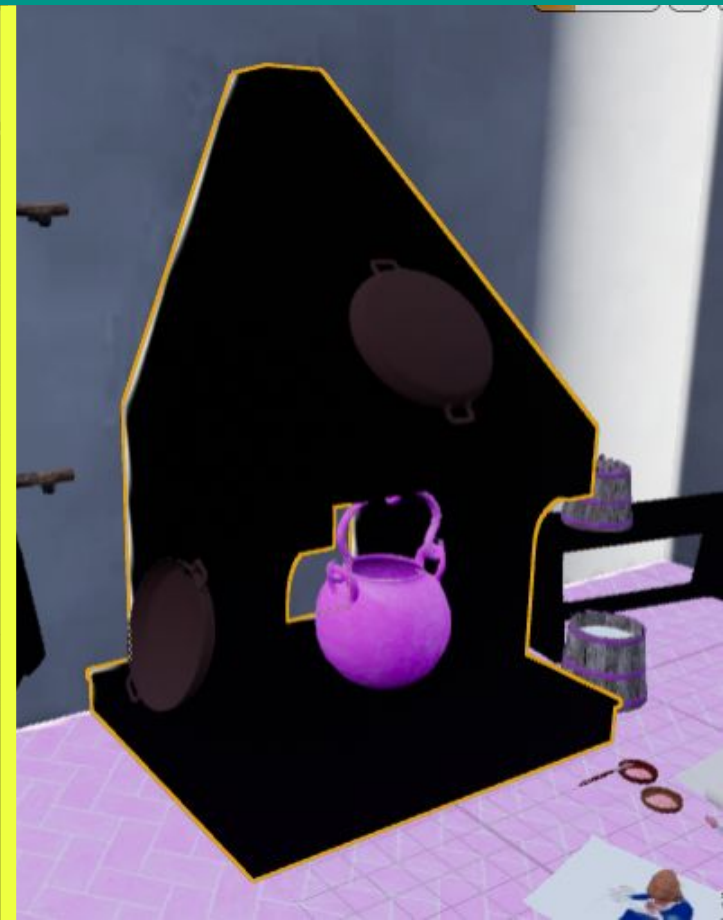
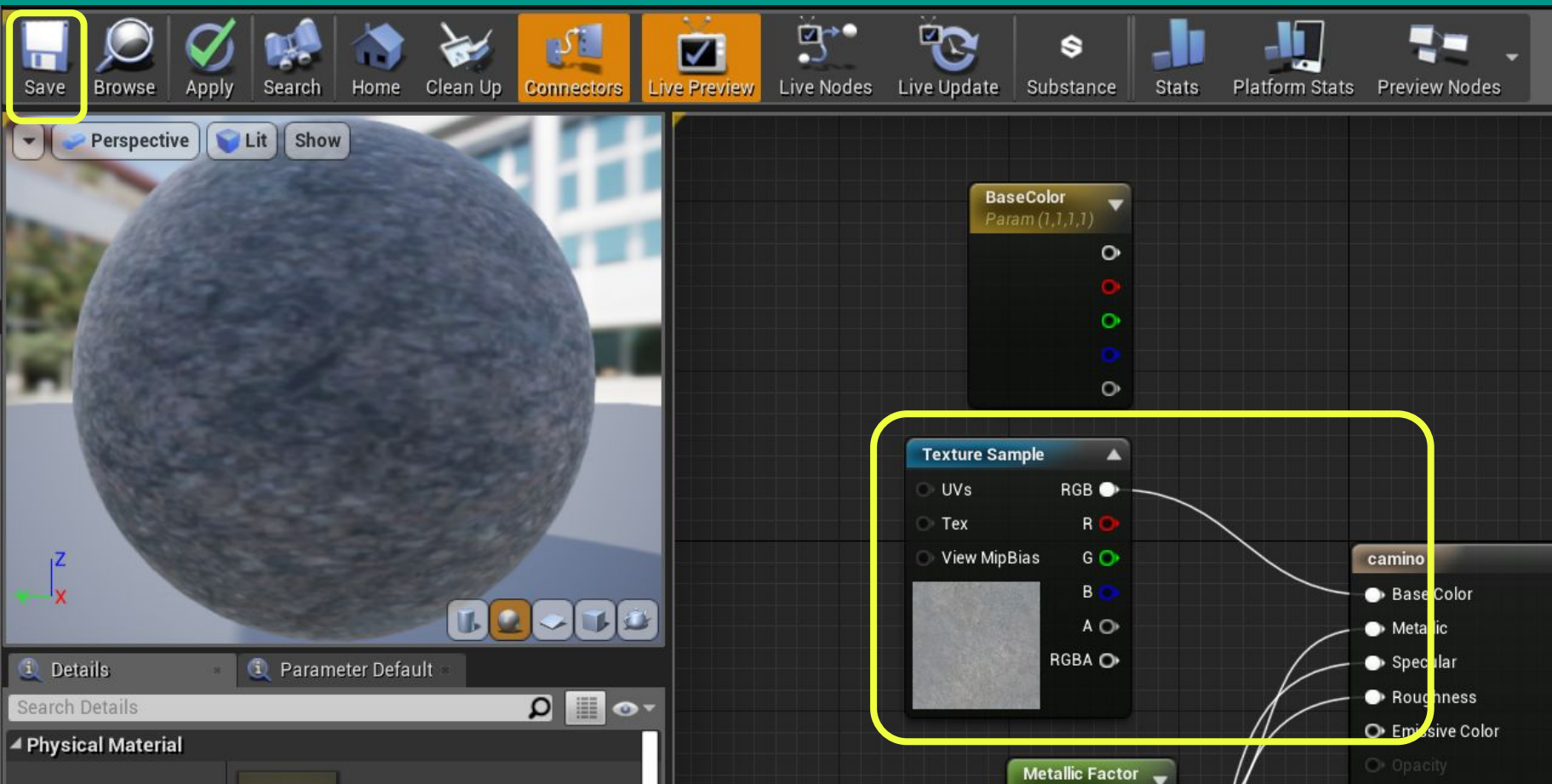
Drag and drop from the “textures” folder of your blend file into the UE4 content



Check the wrong or missing textures

Drag and drop from the “textures” folder of your blend file into the UE4 content

Drag and drop the correct texture from the content to the material editor



Check and cry!



Be patient and fix
everything

Be patient and fix
everything

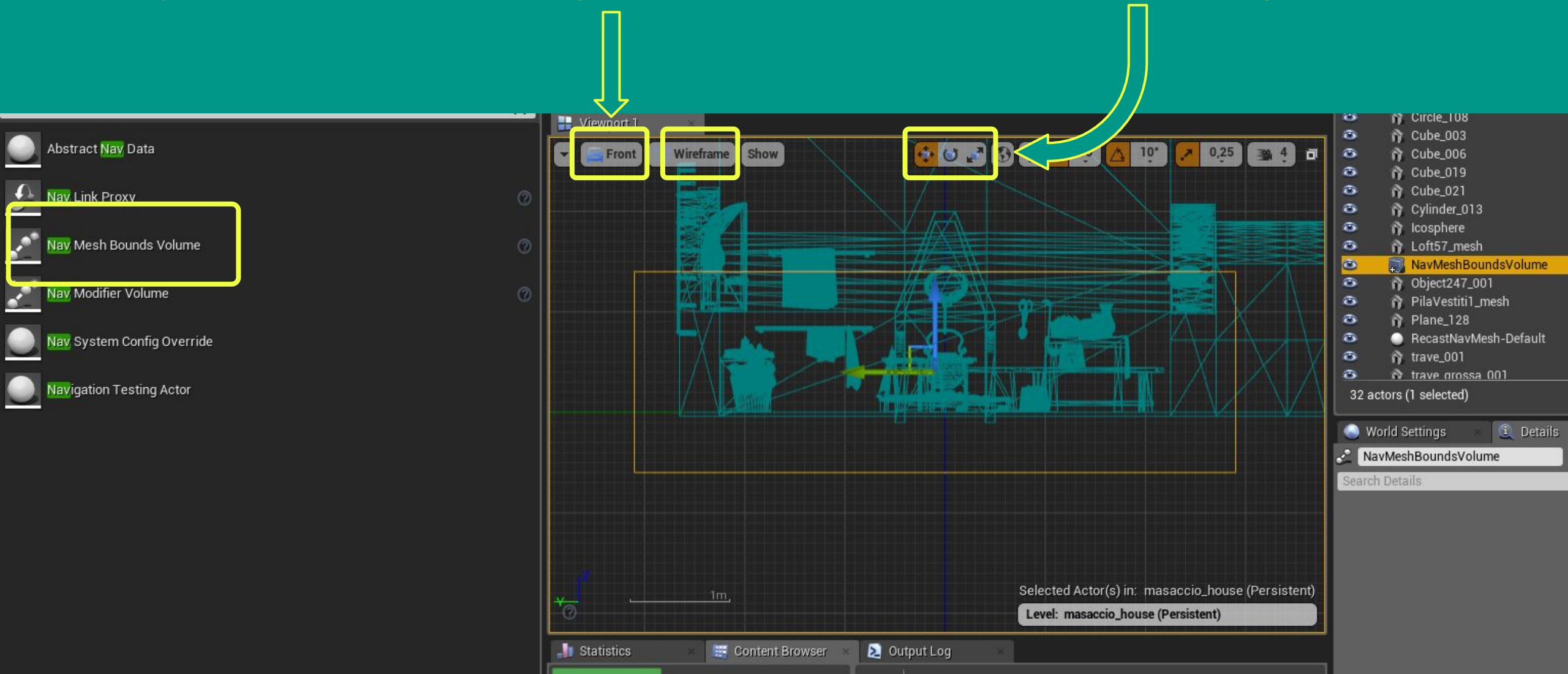
We will take a shortcut!



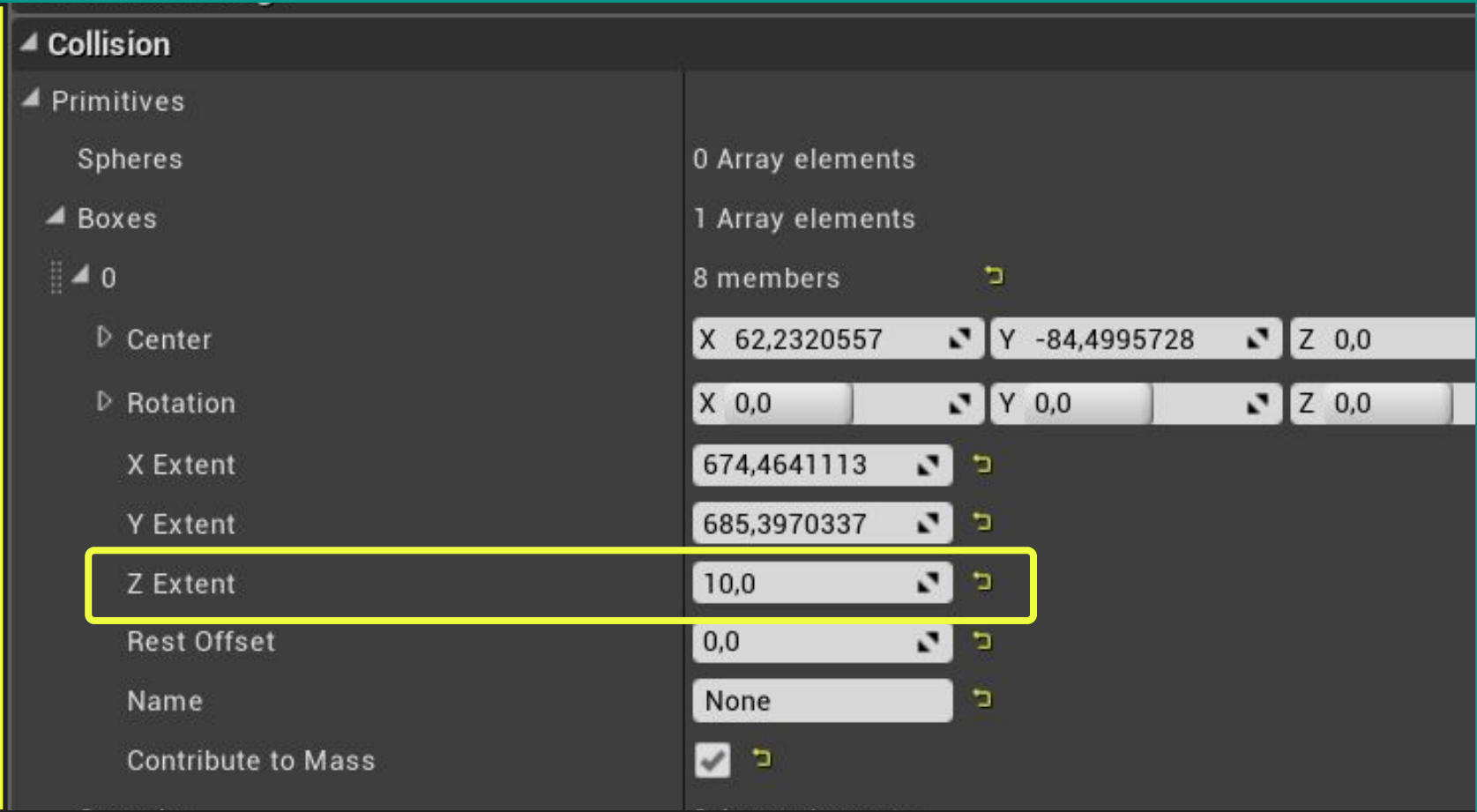
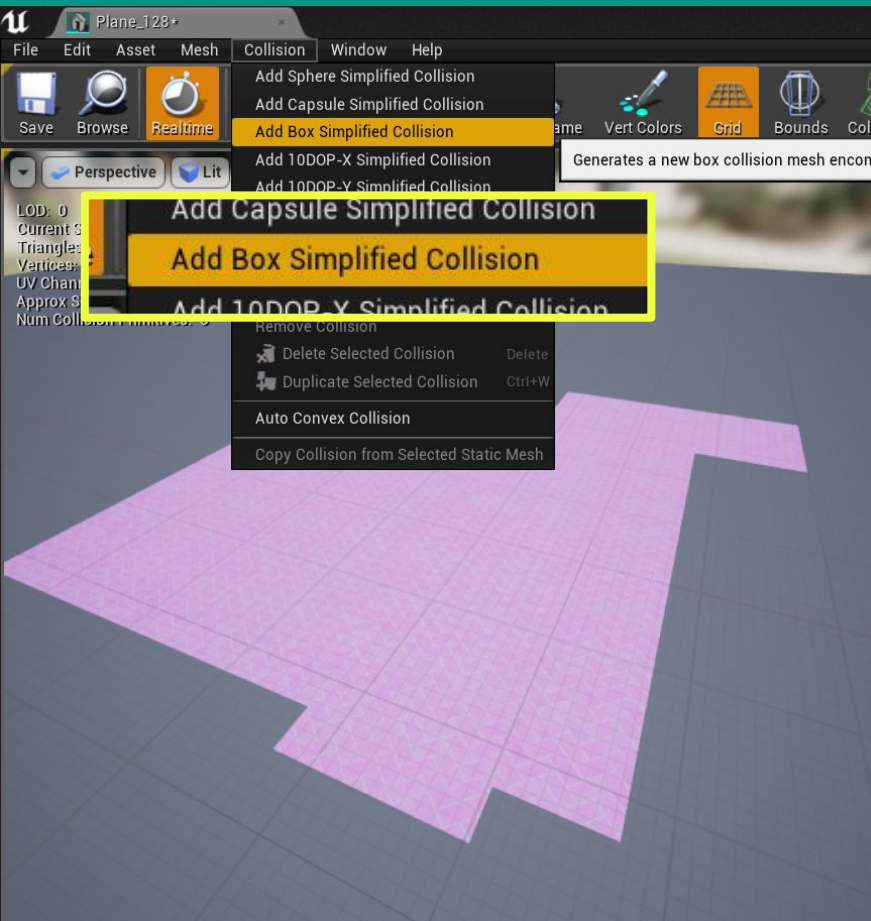
Start from: [/Exercise_UE4zip/MasaccioVR_5.zip](#)



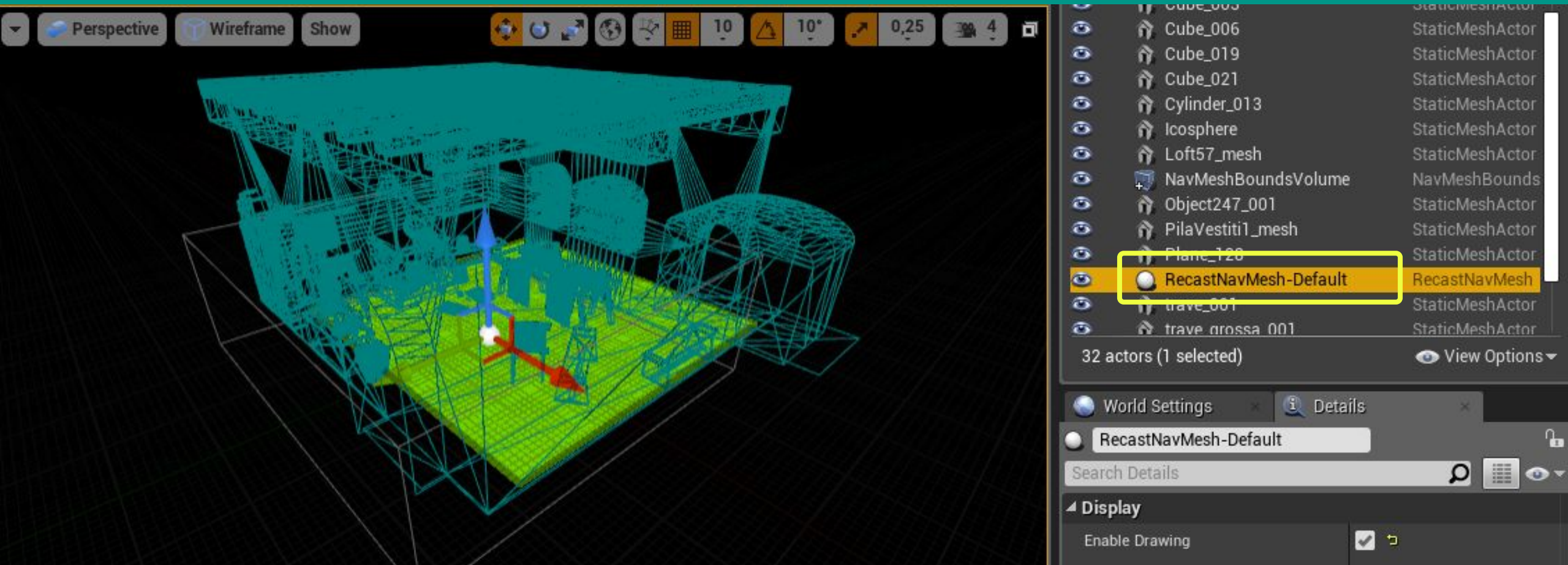
Add **Nav Mesh Bounds Volume** into the scene and place it all over the floor
Help yourself with the **orthographic views** and the **transformation gizmos**



Select and open the mesh of the **floor** and add to it a **Box Simplified Collision**
Set **Z Extent** to **10** to give to the floor a relevant thickness for the collisions



The Navigation mesh bounds will calculate a **NavMesh** (in green)





Open the **Cube_003** mesh and enable the **Complex Collision** view

Create a collision group by setting the **convex decomposition** parameters and press **Apply**

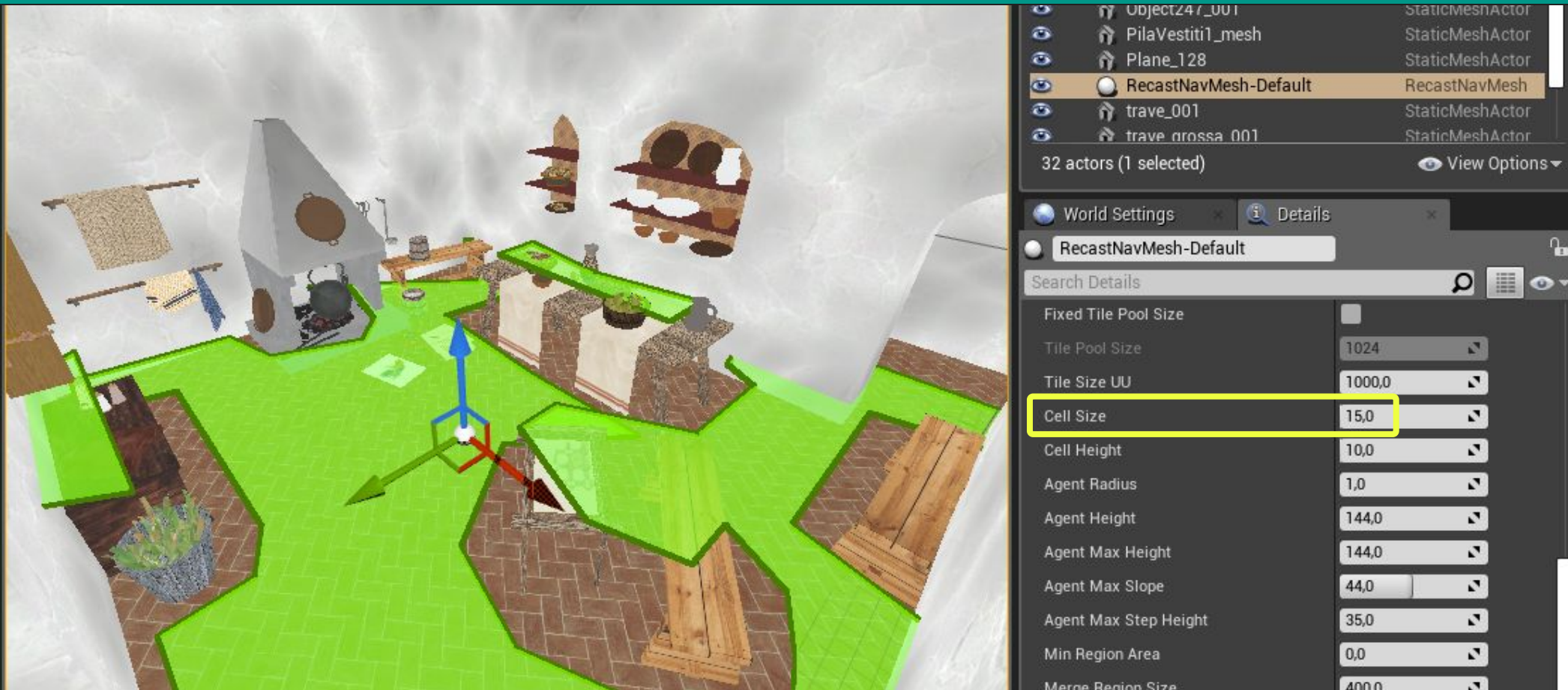
Socket Manager Convex Decompo:

Hull Count	24
Max Hull Verts	16
Hull Precision	100000

Apply Defaults

It will result in an update of the **NavMesh**

To increase the detail of the navigation area, change the RecastNavMesh Cell size parameter



Add the **Motion Controller Pawn** from the content
Rename it to **VRPawn** and **move** it in a convenient place



World Outliner

Label	Type
masaccio_house (Editor)	World
Lighting	Folder
VR	Folder
VRPawn	Edit MotionController
Castine_mesh	StaticMeshActor
ciotola_015	StaticMeshActor
Circle_108	StaticMeshActor
Cube_003	StaticMeshActor
Cube_006	StaticMeshActor
Cube_019	StaticMeshActor
Cube_021	StaticMeshActor
Cylinder_013	StaticMeshActor
Icosphere	StaticMeshActor
Loft57_mesh	StaticMeshActor
NavMeshBoundsVolume	NavMeshBoundsVolu

33 actors (1 selected) View Options

World Settings Details

VRPawn

+ Add Component Edit Blueprint

Search Components

VRPawn (self)

Search Details

Actor

1 selected in Persistent Level

Convert Actor Select a Type

Can be Damaged

Generate Overlap Events During Level Streamin

Initial Life Span 0.0

Spawn Collision Handling Method Try To Adjust Location, D

Collision

Relevant for Level Bounds

LOD

Include Actor for HLOD Mesh generation

Content Browser

Search Folders

Content

- Geometry
- meshes
- VirtualReality
- VirtualRealityBP

Filters: motion

Texture

- BP_Motion Controller
- HMD Locomotion Map
- HMD Locomotion Map Built
- HMD Locomotion Pawn
- Motion Controller Haptics
- Motion ControllerMap
- Motion ControllerMap BuiltData
- Motion Controller Pawn**

Adapt the properties to your need



Levels | World Outliner

Search...

Label	Type
masaccio_house (Editor)	World
Lighting	Folder
VR	Folder
VRPawn	Edit MotionControlle
Cestino_mesh	StaticMeshActor
ciotola_015	StaticMeshActor
Circle_108	StaticMeshActor
Cube_003	StaticMeshActor
Cube_006	StaticMeshActor
Cube_019	StaticMeshActor
Cube_021	StaticMeshActor
Cylinder_013	StaticMeshActor
Icosphere	StaticMeshActor
Loft57_mesh	StaticMeshActor

World Settings | Details

VRPawn

+ Add Component | Edit Blueprint

Search Components

VRPawn (self)

Search Details

Pawn

Auto Possess Player | Player 0

Camera

Base Eye Height | 150,0

Actor

Spawn Collision Handling Method | Always Spawn, Ignore Collis

Statistics | Content Browser | Output Log

Add New | Import | Save All | Content

Search Folders

Content

- Geometry
- meshes
- VirtualReality
- VirtualRealityBP

Filters: motion

Texture

BP_Motion Controller

HMD Locomotion Map

HMD Locomotion Map Built

HMD Locomotion Pawn

Motion Controller Haptics

Motion ControllerMap

Motion ControllerMap BuiltData

Motion Controller Pawn

Now it's possible to explore the whole area
except from the collisions that we set up



But **how**
does it work?

Label	Type
masaccio_house (Editor)	World
Lighting	Folder
VR	Folder
VrPawn	StaticMeshActor
Cestino_mesh	StaticMeshActor
ciotola_015	StaticMeshActor
Circle_108	StaticMeshActor

Edit MotionControllerPawn

VrPawn (selected)

My Blueprint

+ Add New

Graphs

EventGraph

Functions (21 Overridable)

ConstructionScript

GetRotationFromInput

Macros

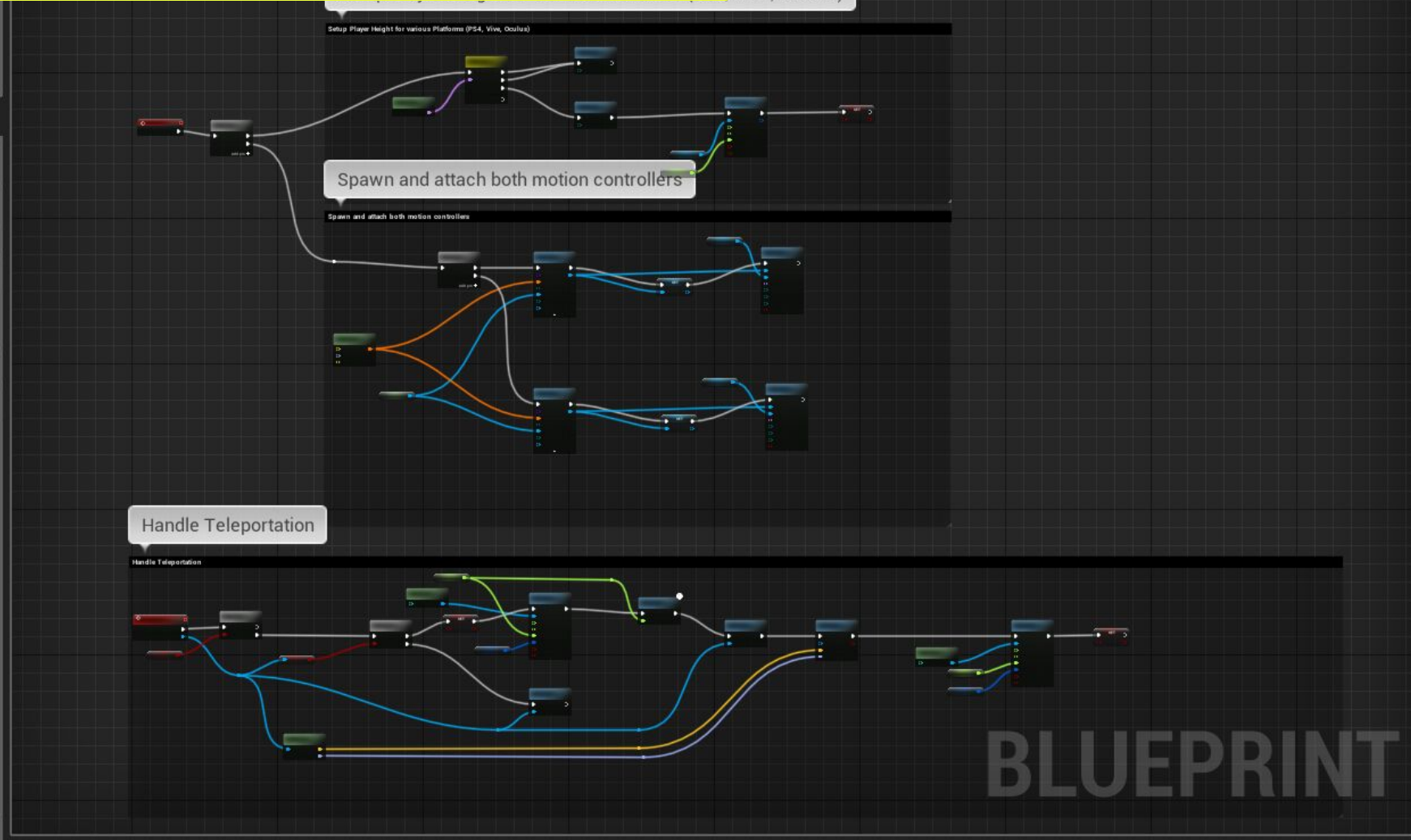
Variables

Components

Chaperone

- LeftController
- RightController
- FadeOutDuration
- FadeInDuration
- IsTeleporting
- TeleportFadeColor
- ThumbDeadzone
- RightStickDown
- LeftStickDown
- DefaultPlayerHeight
- UseControllerRollT

Event Dispatchers



Details

Search Details

Default

- Fade Out Duration: 0,1
- Fade in Duration: 0,2
- Is Teleporting:
- Teleport Fade Color: [Color Picker]
- Thumb Deadzone: 0,7
- Right Stick Down:
- Left Stick Down:
- Default Player Height: 180,0
- Use Controller Roll T:

Actor Tick

- Start with Tick Enabled:
- Tick Interval (secs): 0,0
- Allow Tick Before B:

Chaperone

- Show Chaperone:

Pawn

- Use Controller Rotat:
- Use Controller Rotat:
- Use Controller Rotat:
- Can Affect Navigati:
- Auto Possess Playe: Disabled
- Auto Possess AI: Placed in World
- AI Controller Class: AIController

Camera

- Base Eye Height: 64,0

Rendering

- Actor Hidden In Cam:



/Exercise_UE4zip/MasaccioVR_7.zip !

Into the template there is a pre-configured **BP_PickupCube**

The screenshot displays the Unreal Engine 4 interface. The main viewport shows a 3D scene of a kitchen table with various items. A blue cube is selected, and a tooltip indicates it is in the 'masaccio_house (Persistent)' level. The Content Browser on the left shows a filter for 'bp' and lists two blueprints: 'BP_Motion Controller' and 'BP_Pickup Cube'. The Details panel on the right shows the properties of the selected 'BP_PickupCube' actor, including its path and parent class. The 'Physics' section of the Details panel is expanded, showing settings for 'Simulate Physics', 'MassInKg', 'Linear Damping', and 'Angular Damping'.

Viewports: Viewport 1

Mode: Perspective, Lit, Show

Selected Actor(s) in: masaccio_house (Persistent)

Level: masaccio_house (Persistent)

Content Browser: bp

BP_PickupCube (Blueprint Class)

- Path: /Game/VirtualRealityBP/Blueprints
- Cooking Filepath Length: 165 / 260
- Parent Class: StaticMeshActor
- Native Parent Class: StaticMeshActor
- Blueprint Type: Normal
- Is Data Only: False
- Num Replicated Properties: 0
- Native Components: 1
- Blueprint Components: 0

Details Panel: BP_PickupCube

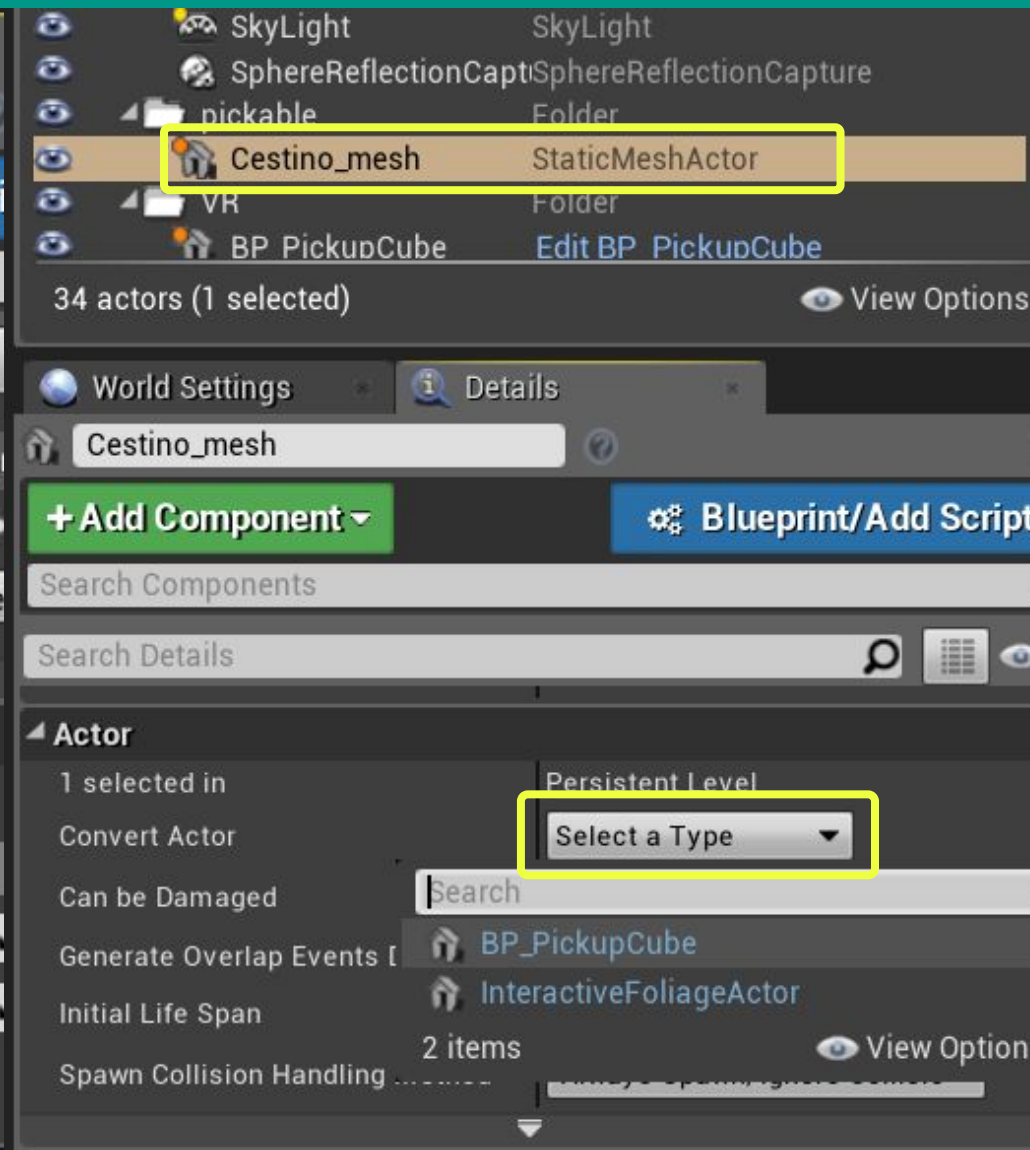
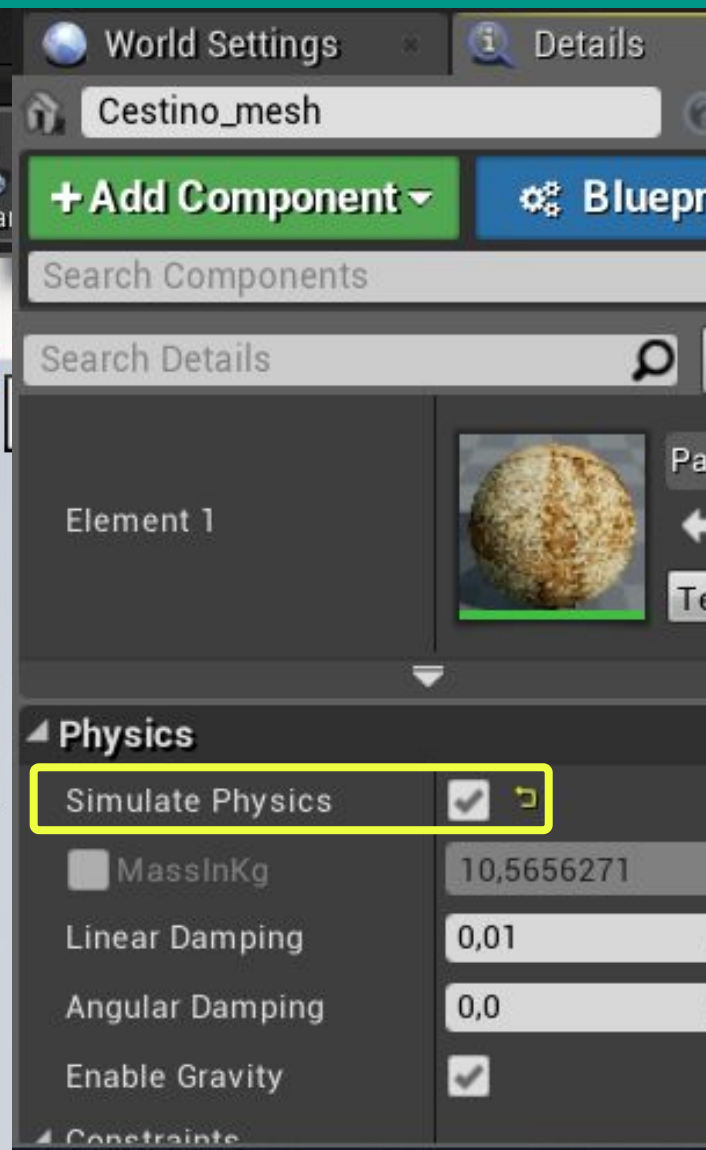
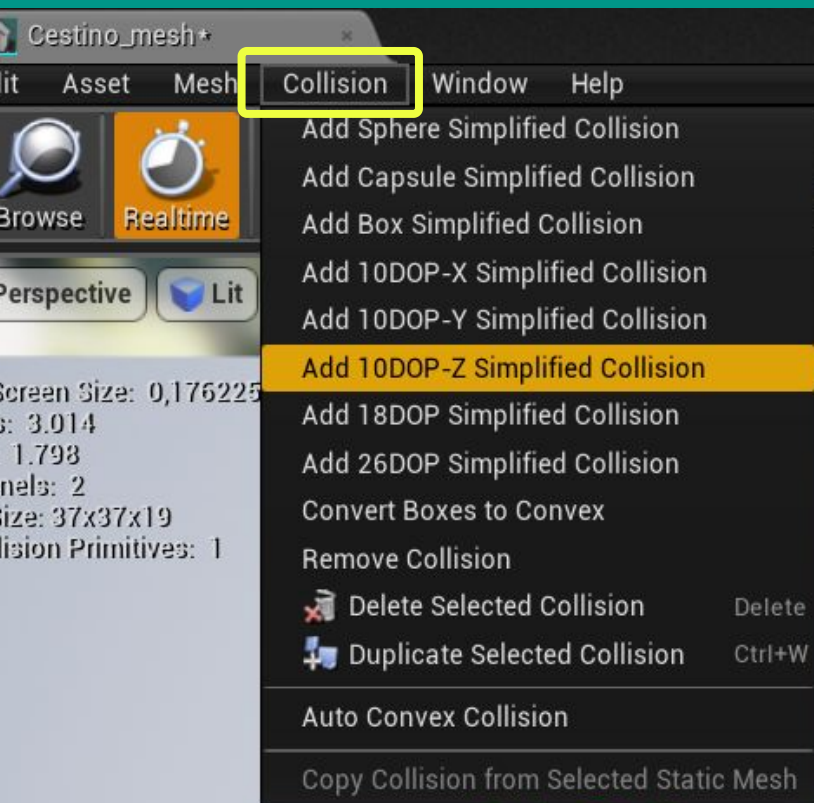
- + Add Component
- Edit Blueprint
- Search Components
- Search Details
- Physics
 - Simulate Physics:
 - MassInKg: 4,7568283
 - Linear Damping: 0,01
 - Angular Damping: 0,0

In order to make our objects pickable:

Add to their mesh a **Collision bound**

Enable the **Simulate Physics**

Convert the actor to a **BP Type**



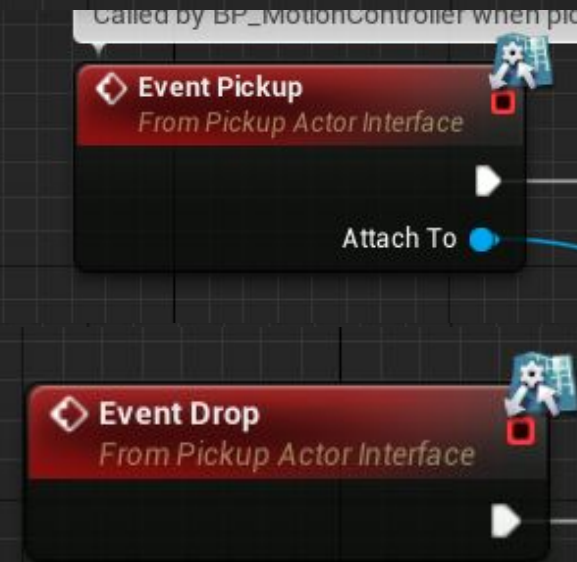
Repeat those steps for every pickable object!

It's now possible to **grab meshes** and **explore** the space



Interaction with Unreal Blueprint

- To enable the “grab” interaction, we converted a Blueprint template where there are **PickUp** and **Drop events**
- PickUp **binds** every mesh transform to the controller/hand
- Drop **un-binds** the mesh from the controller and re-enable the physics of the mesh



Many **thanks** for your
attention

Any **questions** ?

