

Level Creation Bible

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Intro - Level Design Tenets

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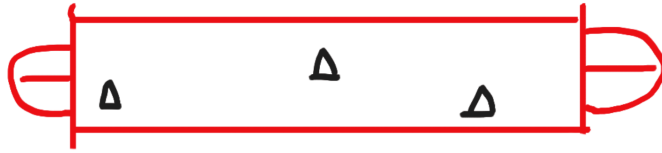
A level in the game consists of the player(s) making their way through a series of rooms to **reach a goal at the end of a level.**

In this game, **each room has a core purpose which justifies its existence**, i.e. one room might be designated for combat while the next offers a calm room with a stunning view of the world.

We will have **around 15 rooms per level** and offer about **20 minutes of gameplay per level.**

Each level should try to have a theme around it, i.e. 'Bridge World' that focuses on bridges or 'Fire World' that focuses on fire themes. If we **plan to have strict themes in each level** instead of liberally wasting concepts throughout the game it will make our gameplay stand out.

ROOM TYPES <i>% = average makeup in a level</i>	DEFINITION
Heavy Combat Rooms (%30) & Standard Combat Rooms (%20)	These are rooms where fighting takes the focus. Heavy Combat Rooms are intense arenas that could double as MP maps Light Combat Rooms are smaller skirmishes with more platforming The player will enter a stage where a combat scenario has been set up and it is up to the player how it plays out. Examples of which are: • Taking on a goblin camp • Ambush • Rescuing someone/thing etc... We want combat rooms to fulfil the following specifications: • Layouts which favour length over depth in layout.



- Minimise flat surfaces, allow for as much slide-able geo as possible. **Bowl shapes** are great for this kind of situation

Feels less good,
more punishing

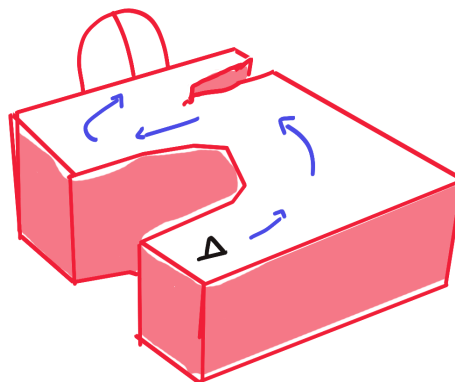


↑ ナイス!!

- Doom-style built in flow



- Switchbacks to force more traversal in limited space, when using choke points make sure they are surrounded by danger the player can harness



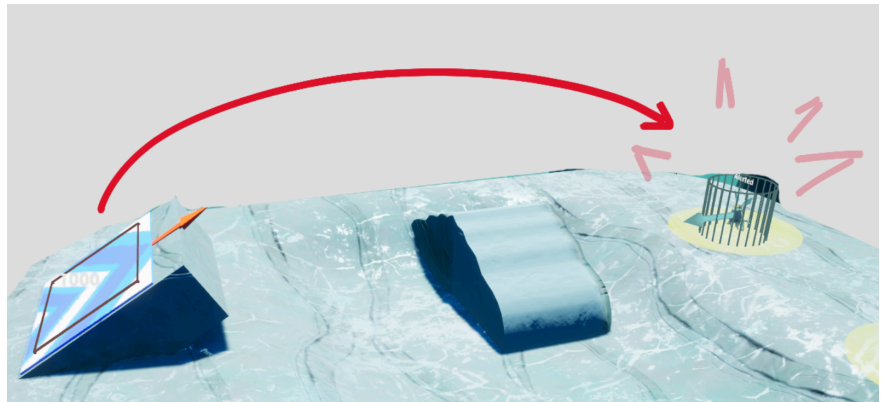
- Qbert (The camera should frame the level with no blockage)



- Interactable that allow you to create your own tactical openings



- Omotenashi - Create fun scenarios that let you enter the fight with a free hit



**Vista
(%20)**

These are rooms where the character controller takes the focus.

The player will enter combat free zones with interesting geometry or situations set up for the player to enjoy. Examples of which are:

	• Bonus Goodies • Room with a view • Fairy fountain etc.. These are rooms that exhibit the fun of the sliding and movement in the aways, they can also be a way to justify a major change in elevation in the level. These can be used to help change up the verticality and demonstrate the scale of the world to the player. Example of which are: • Grassy Slopes • Water slide drop • Staircases • Elevator etc...
Puzzle (%15)	These are rooms where a specific puzzle or gimmick takes the focus. These can be combat encounters or a puzzle room with no combat etc. The player must use a game mechanic to aid in progression. Examples of which are: • Flood room with fountain • Puzzle • etc... When it comes to designing these rooms we should follow the mantra of design for the 90%.
Monk (15%)	These are rooms where freeing the monk is the main goal These rooms can be categorized into • Arena • Skill Check • Puzzle
Boss	These are rooms where the main focus is a boss fight. Levels may have a mid-level boss or it may be a final boss.

For the project I would recommend we start by creating one of each room types in one of the three room sizes our project uses. Those sizes are:

Small - 2x3

Medium - 3x5

Large - 4x6

*numbers are equal to one block in our lego kit

1 - Creating project folder

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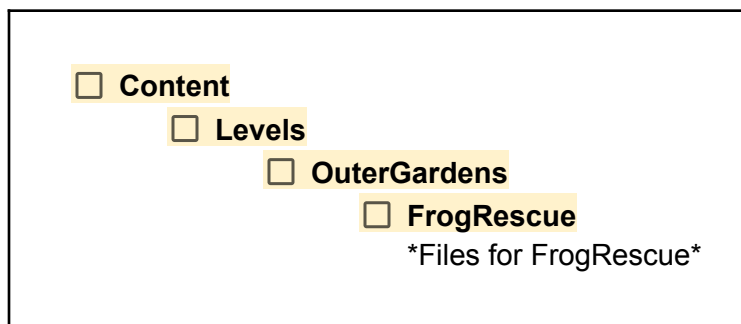
The first step to making a level for the game is to begin by creating a folder for your level. From the root of the project directory, move to the folder called **Levels**.

Levels is the folder that houses all of the final levels for the project. Inside **Levels**, the structure is further broken down by zones. Ensure that you are always creating your level in the correct respective zone folder. I.e. if you are creating a level for the *Outer Gardens* zone then it should be in the **OuterGardens** folder.

When creating your level folder, ensure that it is named appropriately.

Level Naming Conventions

For this document we will use the example of creating a level called FrogRescue



Once you have created your folder, it is time to make level files.

2 - Creating project files

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This project uses [Unreal's Level Streaming Pipeline](#), please make sure you are familiar with it first!

Each level is made up of at least the following components:

- ☐ Persistent level
- ☐ Effects level
- ☐ Details level
- ☐ LS_... light level(s)
- ☐ Mission level(s)

Persistent level is where all of the geometry for a level will be stored. This is the main level which level designers will be working out of.

Effects level is where any special VFX or SFX items will be stored. This is the level from which Audio or Techart will be working out of.

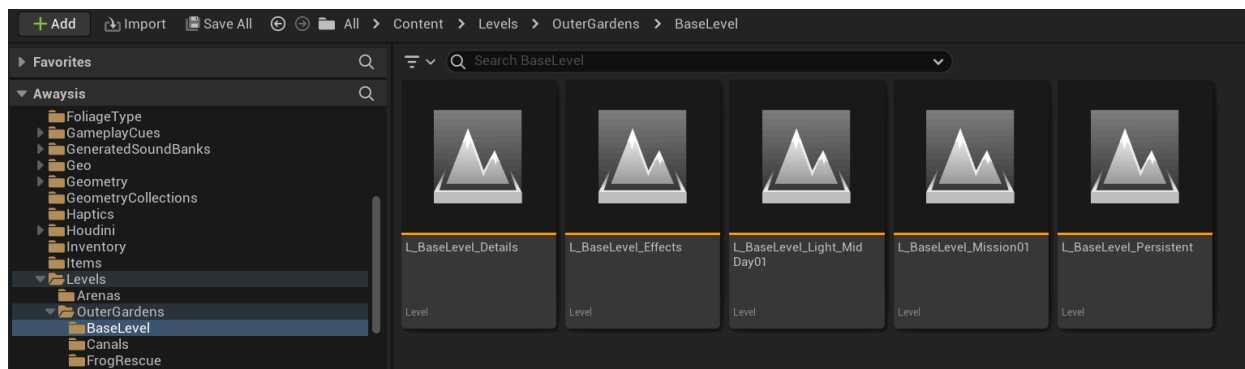
Details level is for any special details or experimentation with visuals. This is the level from which Jake will be able to edit things.

LS_... light level is a [light streaming level](#). Each level is planned to have multiple (e.g. LS_MidDay, LS_Dusk, etc.) but at least one base light streaming level is required.

Mission level is where missions can be stored within a level. Each mission will need it's own sub-level. This allows for a level to have missions expanded to it easily, either in the base game or as DLC.

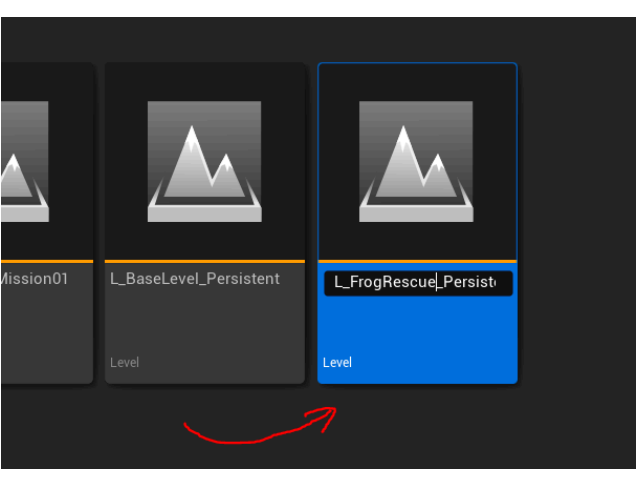
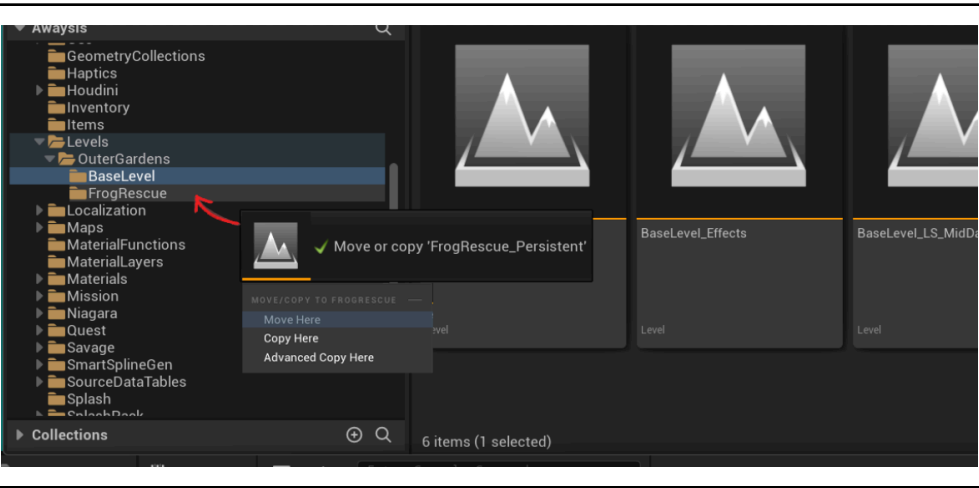
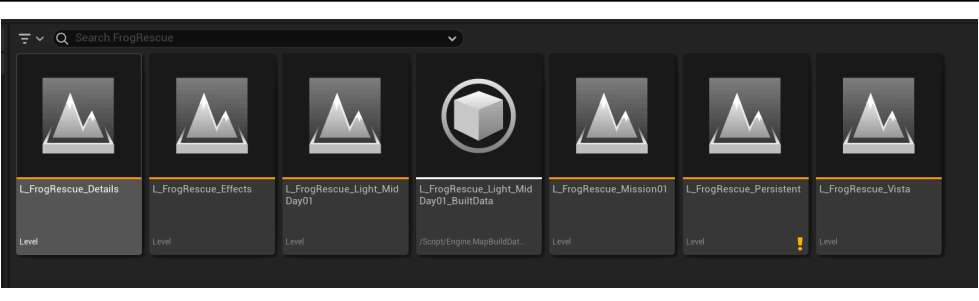
To expedite the creation of a new level, I have created the **BaseLevel** folder. This contains a level with all of the above levels already set up.

The file path is from root is **Content > Levels > OuterGardens > Base levels**



Start by making a copy of these files and moving the copies to your new level folder. Take care that you do not just take the base files without copying them, or that you edit them before copying etc. Copy first and then move the copies.

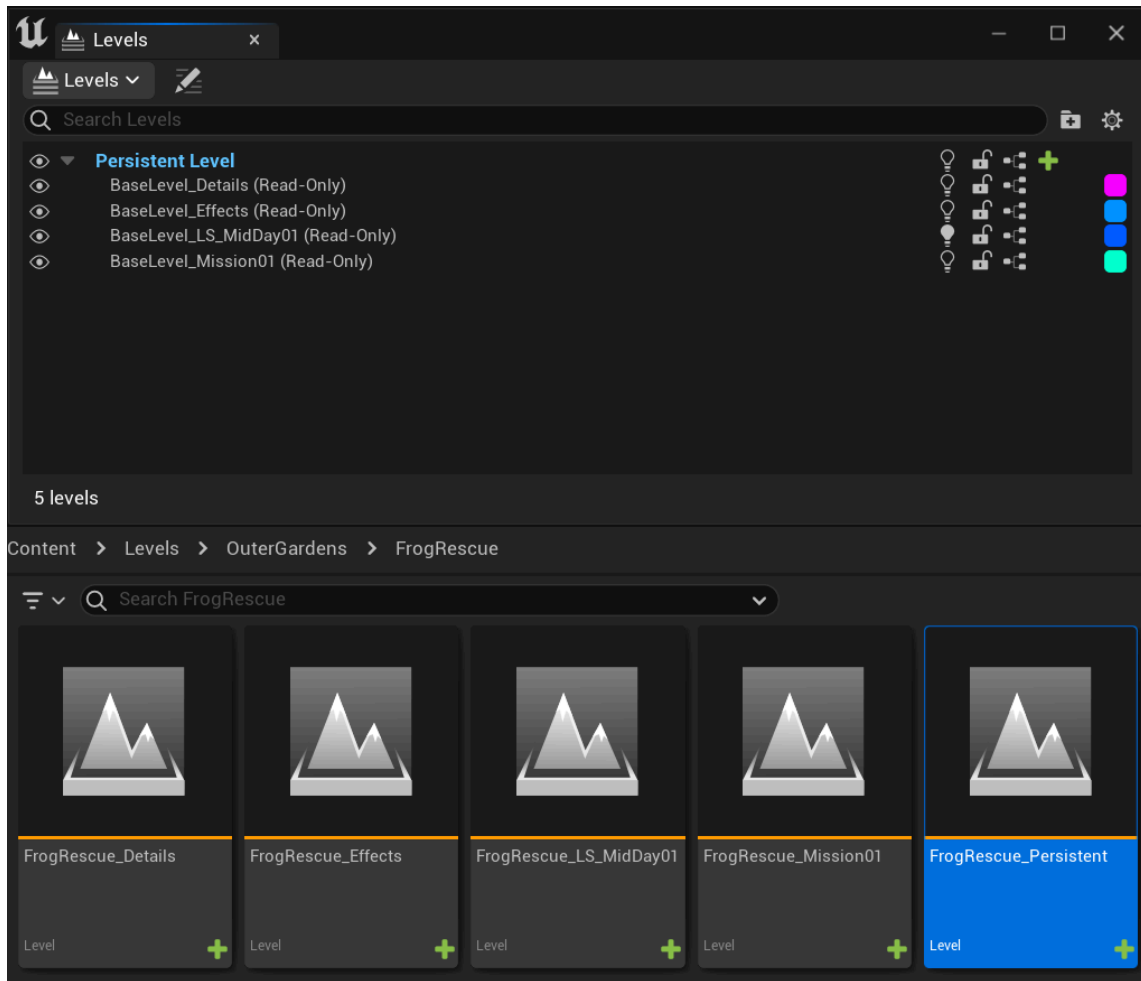
When copying, be sure to rename them appropriately!

1.		Be sure to rename files appropriately when duplicating them.
2.		Move them to a correct folder.
3.		Baddabing, baddaboom. Well done.

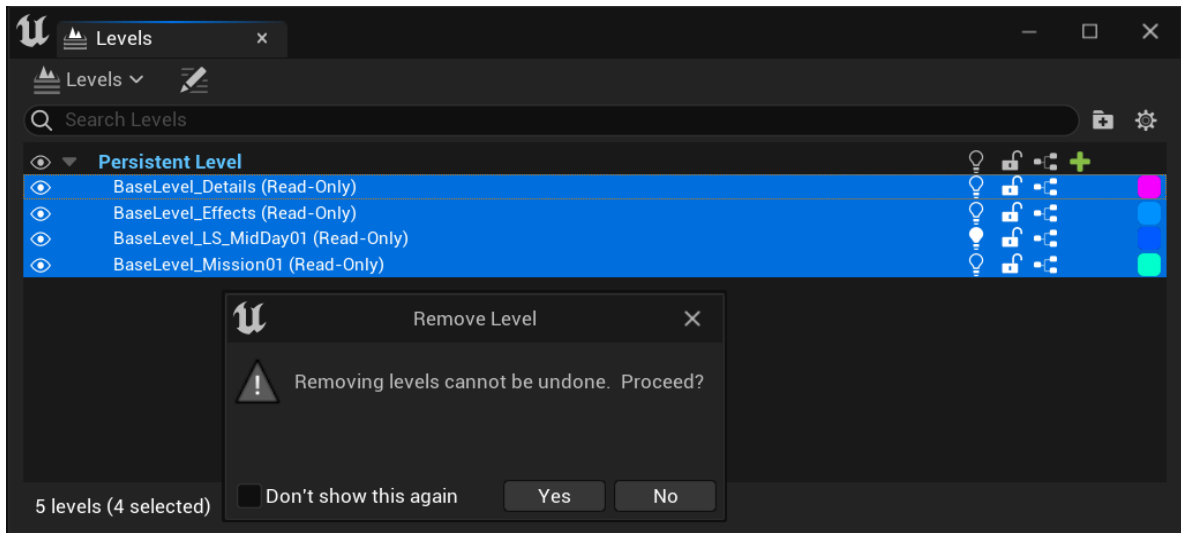
IMPORTANT: Once you have created the duplicates, the Persistent level will still have its old references to the BaseLevel_ sublevels. It does not know it has been duplicated to a new file!

You need to redo these! Bad things will happen if you forget to do this! Heed this warning!!!

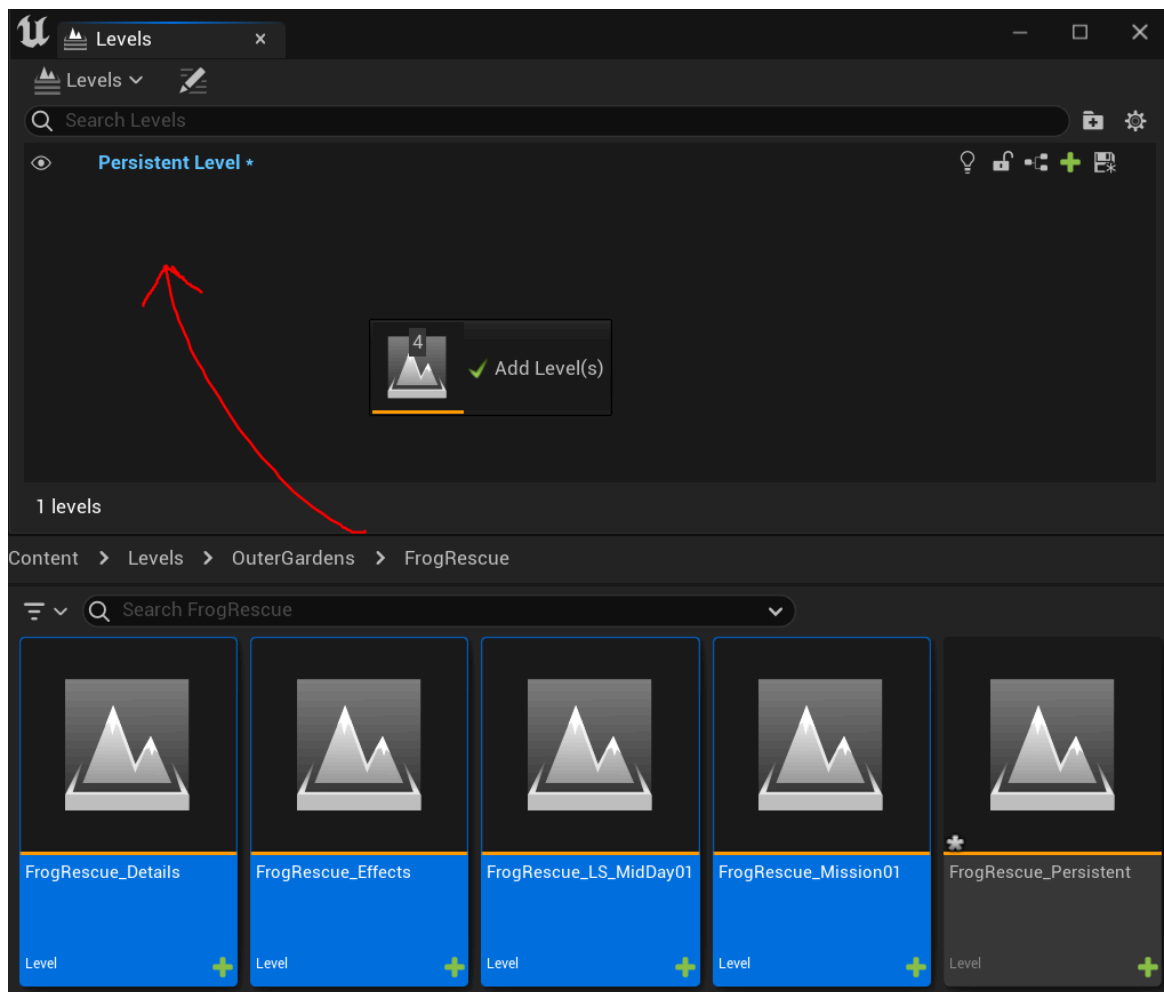
To fix this, open up your new persistent level and open up the Levels window. You will see it is still streaming the wrong BaseLevel_ data.



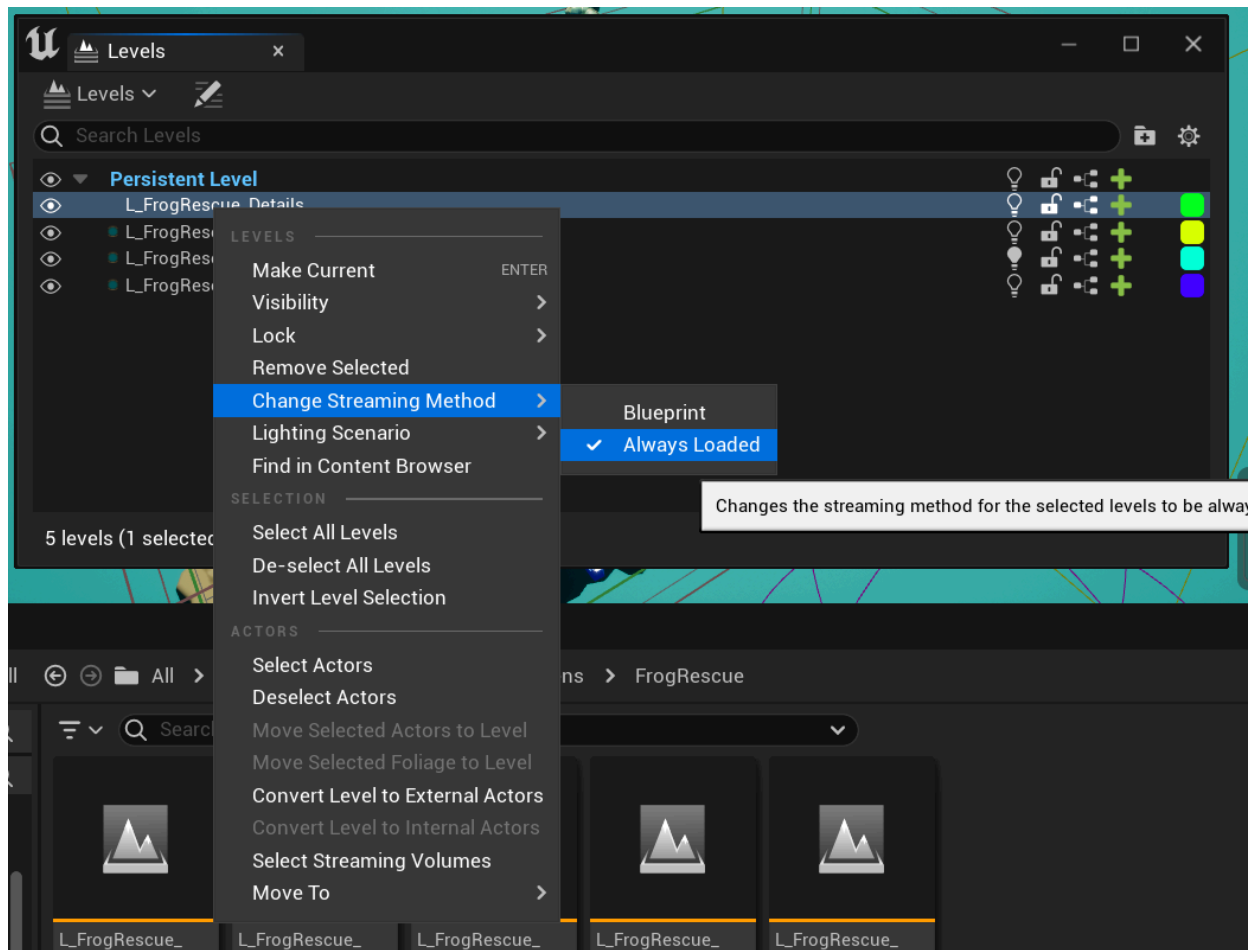
First off, highlight all of the BaseLevel_ sublevels. Hit the DEL key and the engine will ask you if you want to remove the levels selected. Hit yes.



Now the list will be empty. Drag in your new sublevels that you just duplicated.



And finally once that is done, you need to set the streaming method of each level to always loaded. This is done with a right click.

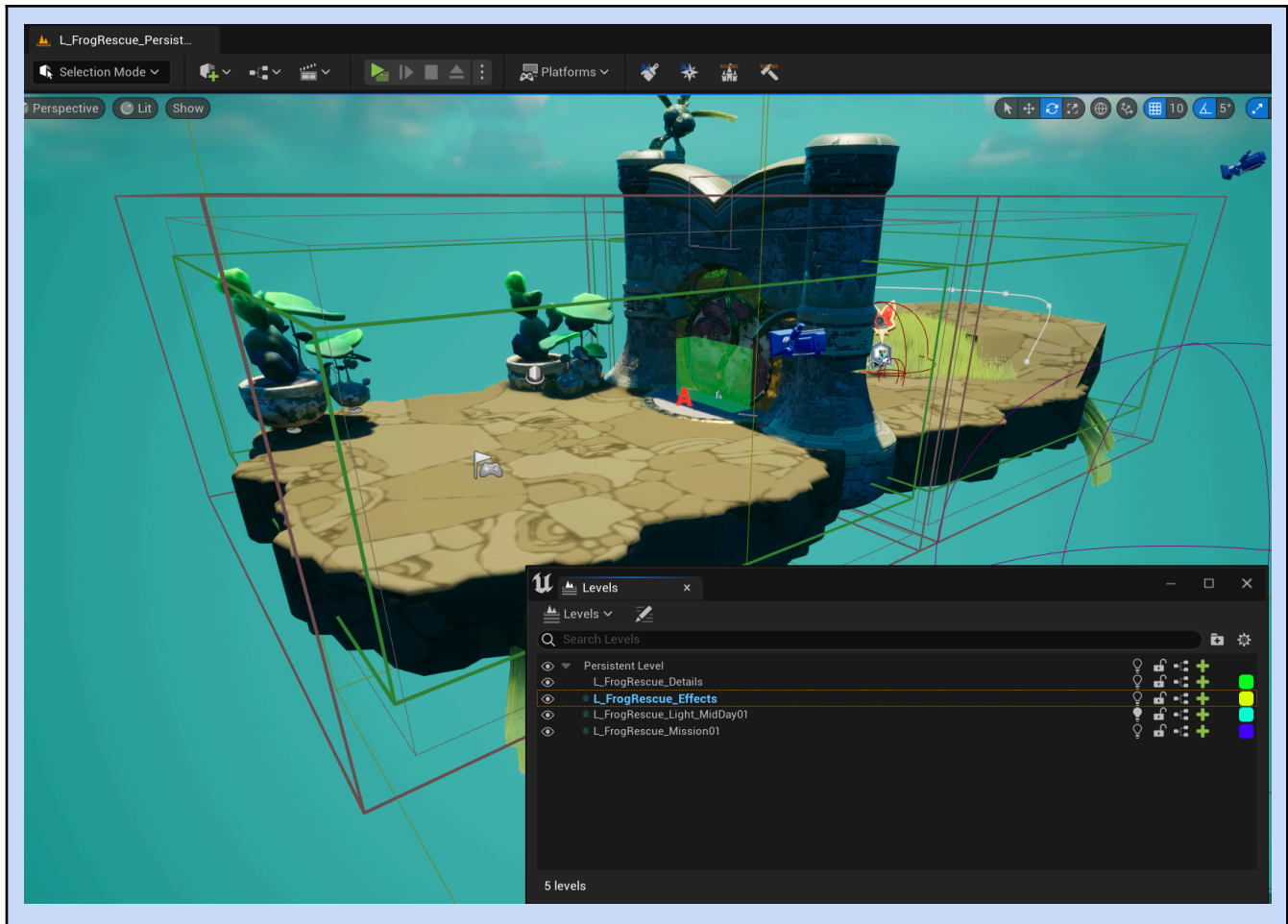


Finally your new stage is complete and ready for you to work on. If you are confident in what you are doing then proceed with creating your level.

Tip on workflow for those working with level streaming for the first time:

In general it is good to see the level as a whole while creating it. But you need to be careful you are working in the right sub-level. If you just load directly into a sublevel then you can't see everything.

The workaround for this is to first open up the persistent level. Then in the Levels window double click the sublevel you want to work on (i.e. effects) then the sublevel you double clicked should become bold. This will keep the viewport loaded in the persistent level but all changes are now saved to the sublevel in bold.



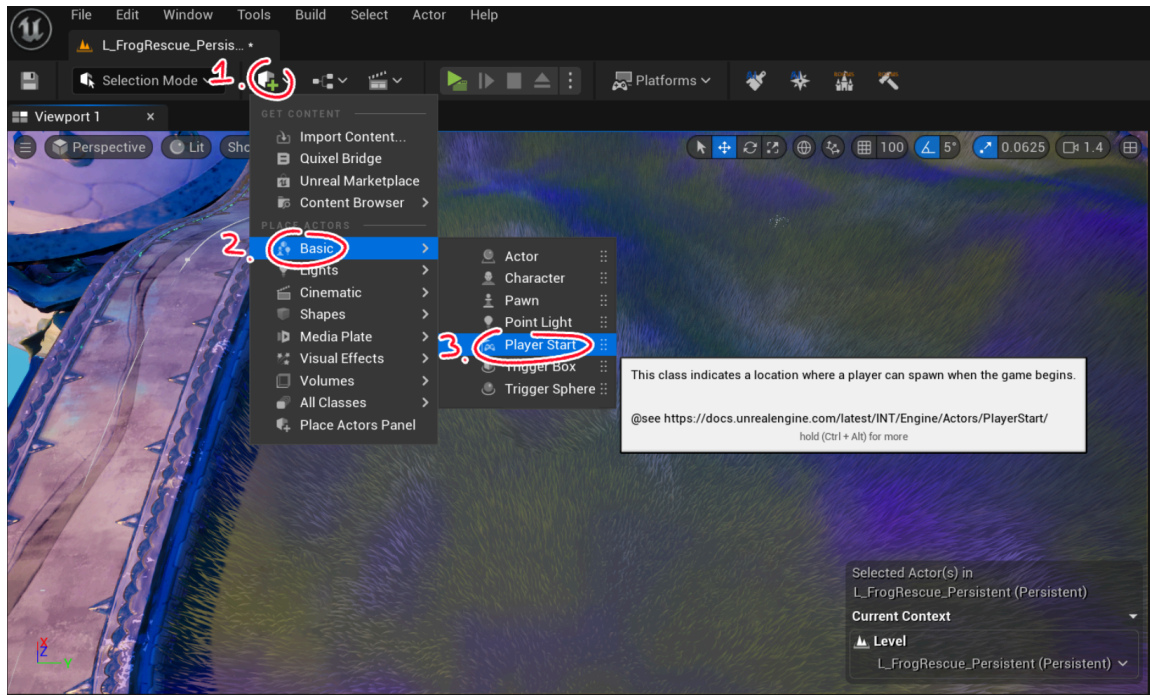
3 - PlayerStarts

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Each level requires multiple *PlayerStart* classes to be present.
These are the points which determine where the players start when they enter a level.

How to add a *PlayerStart* class:

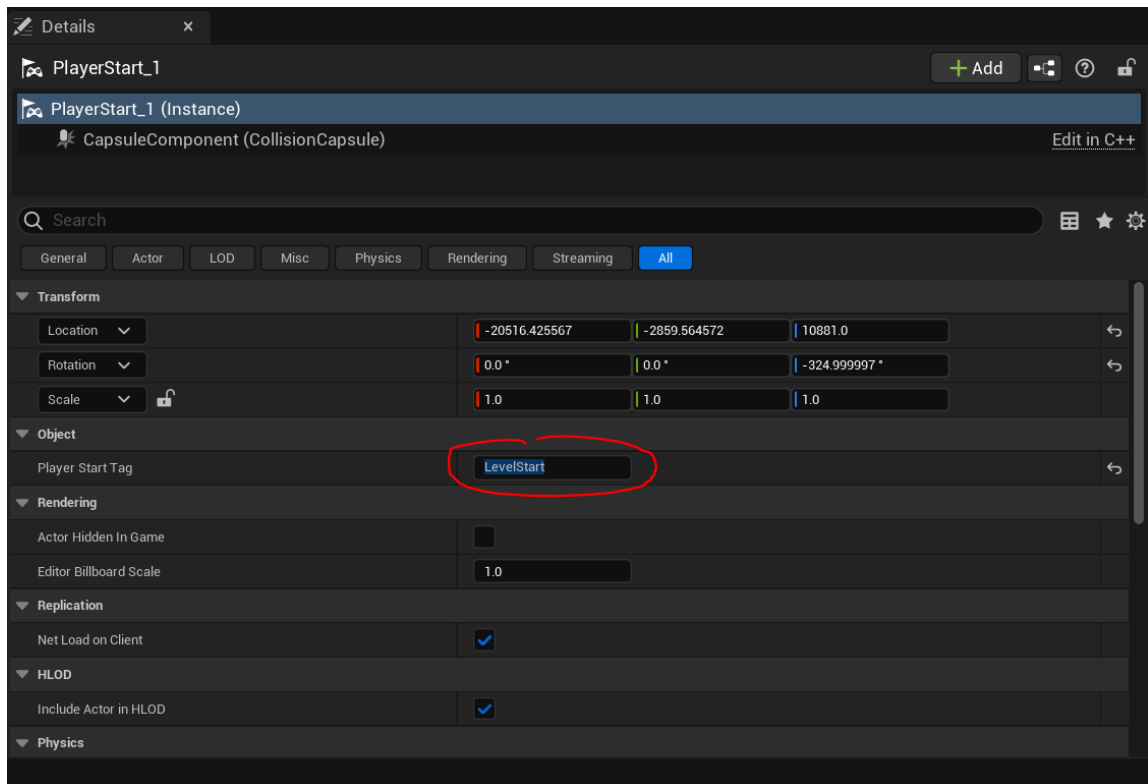
1. Start by adding the *PlayerStart* class (if not already present)



2. Move it to your desire location in the world



3. In the Details window, set the **Player Start Tag** to **LevelStart**



4. Create as many duplicates as required for your level
- **Regular campaign levels require 3 *PlayerStart* classes** as this is the max amount of players
 - **Multiplayer Arena levels require 4 *PlayerStart* classes** as this is the max amount of players



NOTE: Be sure to give breathing room between the classes, if they are too close it will cause problems.

If a *PlayerStart* class is not present then no players will spawn.

If an insufficient amount of *PlayerStart* classes are present then players will spawn in the same spot causing problems

4 - Outliner Folders

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A key philosophy behind this project's design process is the use of a robust folder structure in the level.

This will allow for quick manoeuvring of rooms, usage of tools, and the ability to expand levels in future.

It is critical that we maintain organized folder structures for rooms.

Failure to do so will cause long term problems.

Maintaining this practice through development will only take mere SECONDS.



DON'T MAKE ME TAP THE SIGN.

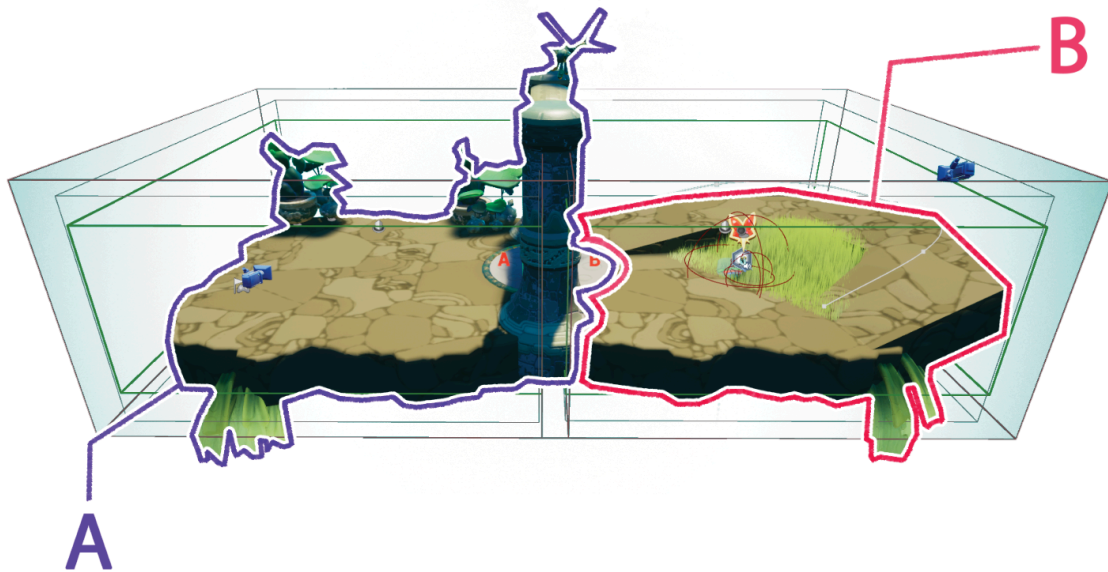
This exact situation
would have been avoided
with the proper folders.



The reason for this folder structure is that we need to be able to quickly grab and move geometry.

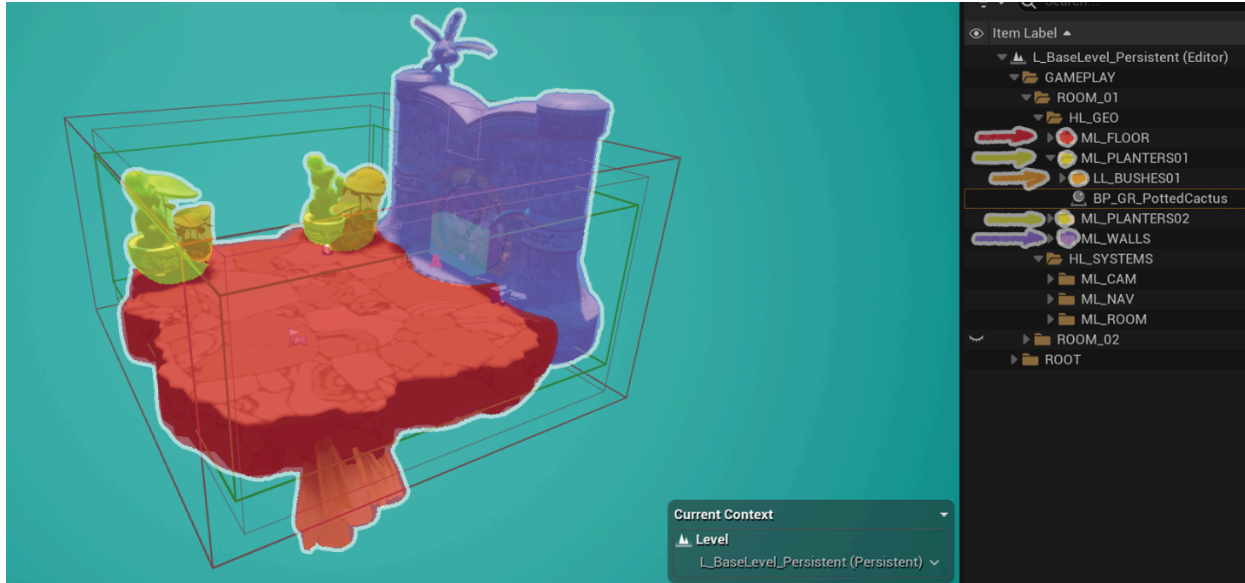
This could mean copying or moving rooms, traps or decos in rooms, details etc.

Here is an example using BaseLevel, a small map with only two rooms called A and B.



Having a proper folder structure lets us quickly move and change-out rooms as demonstrated in the gif.

We can break this down further on a per-room basis. This means we can easily swap around spawns, item locations, details etc.



The Folder structure for the room has the following hierarchy

☐ **Root folder**

Stores the whole room

☐ **HL_**

This is the high level folder. Currently rooms will have two high level folders, one for geometry and the other for systems (blue prints, spawners etc.)

☐ **ML_**

This is medium level folder. Use this to break up the room into large chunks. At a minimum these need a ML_FLOOR and ML_WALLS* folder.

You are welcome to make any other folders as necessary. Just make sure that if you make a ML_ folder to give it a logical name and grouping

☐ **LL_**

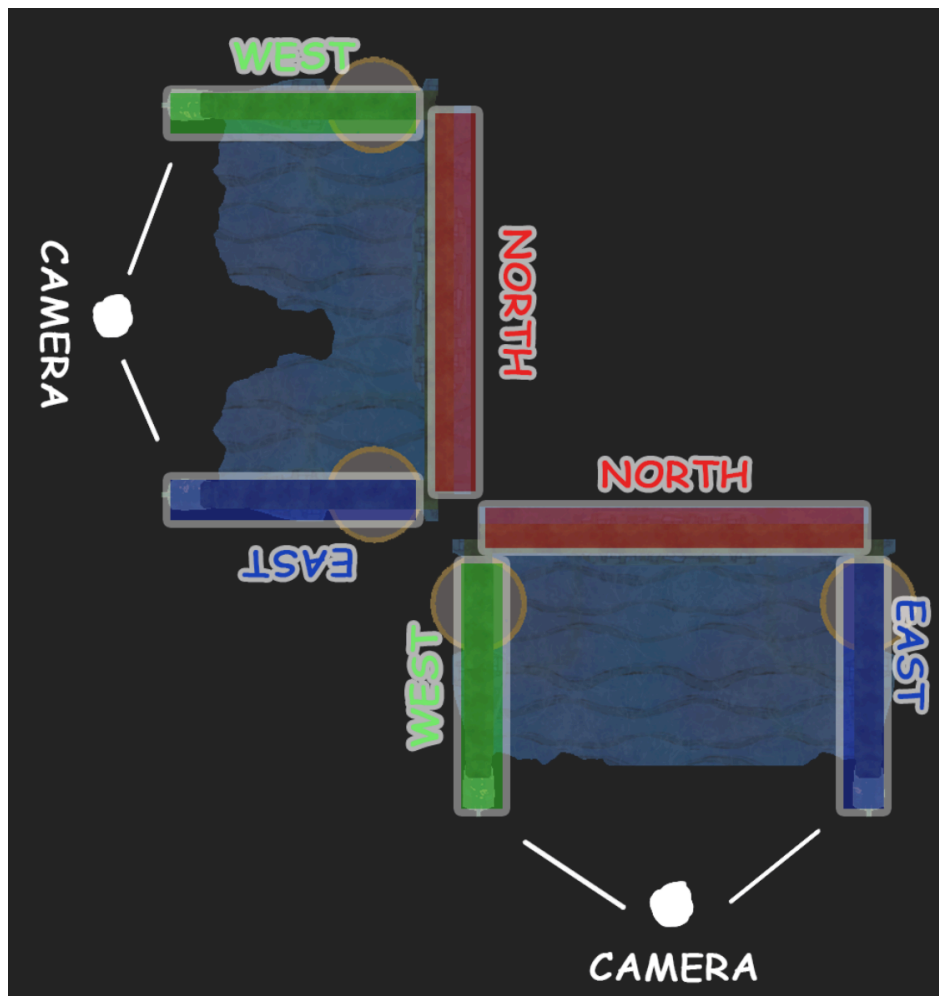
This is the low level folder. This is used to tidy up any little bits and bobs, like groups of detail meshes.

IT IS RECOMMENDED THAT FOLDER NAMES ARE TYPED IN ALL CAPS. THIS MAKES THEM EASIER TO DIFFERENTIATE FROM asset names AT A GLANCE

***Notes on ML_WALLS**

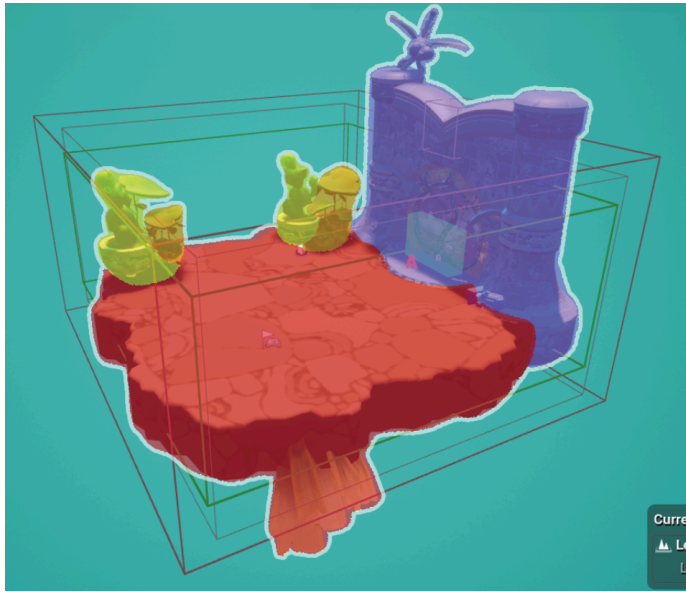
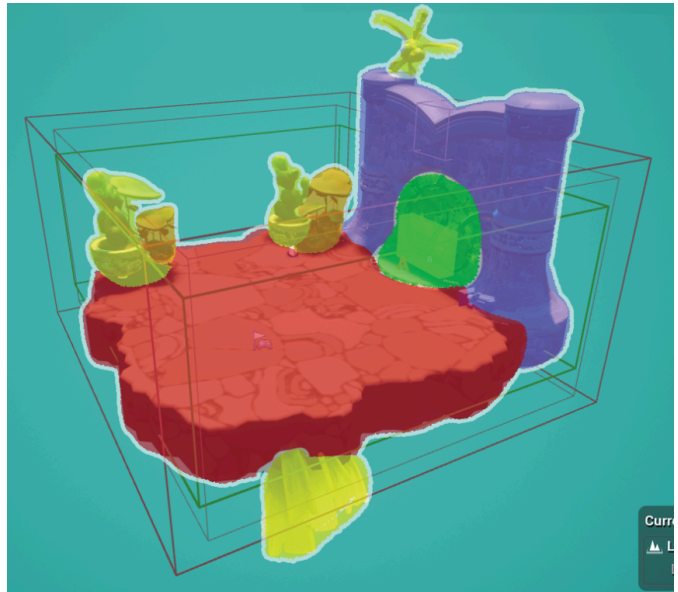
Walls are broken down by faces relative to where the camera is looking into a room and NOT in world space. This is due to the fact that rooms will be moved, copied, rotated etc. so a local terminology is best. Cardinal directions are used over left, right, top and bottom due to the fact top and bottom can become confusing in terms of verticality. South is not used as the camera is always 'south'.

- LL_WALL_NORTH
- LL_WALL_EAST
- LL_WALL_WEST



When it comes to walls with doors that connect between two rooms, the wall and door should be parented to the room that has the A part of the door connected to it.

Here are examples of good vs bad groping:

GOOD	NG
	
This is the example from above. Just use common sense of “If I wanted to move this whole area in one go what is the best way to group things.	Although it maybe would “make sense” to group things like detail parts into their own yellow group, if you tried to then move the floor or walls you would end up with floating random geo. Or if you wanted to move the whole wall but the door is spererate then it would also be undesirable etc.

Here is an example of what a usual room folder should look like:

☐ ROOM_0X Stores the whole room and numbered depending on position in level ☐ HL_GEO ☐ ML_ FLOOR Geo for the floor of the map ☐ LL_FLOOR_LOWER ☐ LL_FLOOR_LOWER ☐ ML_ WALLS Geo for the walls of the map, broken up by cardinal direction

☐ **LL_ WALLS_NORTH**

☐ **LL_ WALLS_EAST**

...

☐ **HL_SYSTEMS**

☐ **ML_ ROOM**

This is where BP_Room and all attached camera, camera splines or any other logic related to rooms are stored

☐ **ML_ SPAWNERS**

This is where room specific spawners are spawned

☐ **HL_AUDIO**

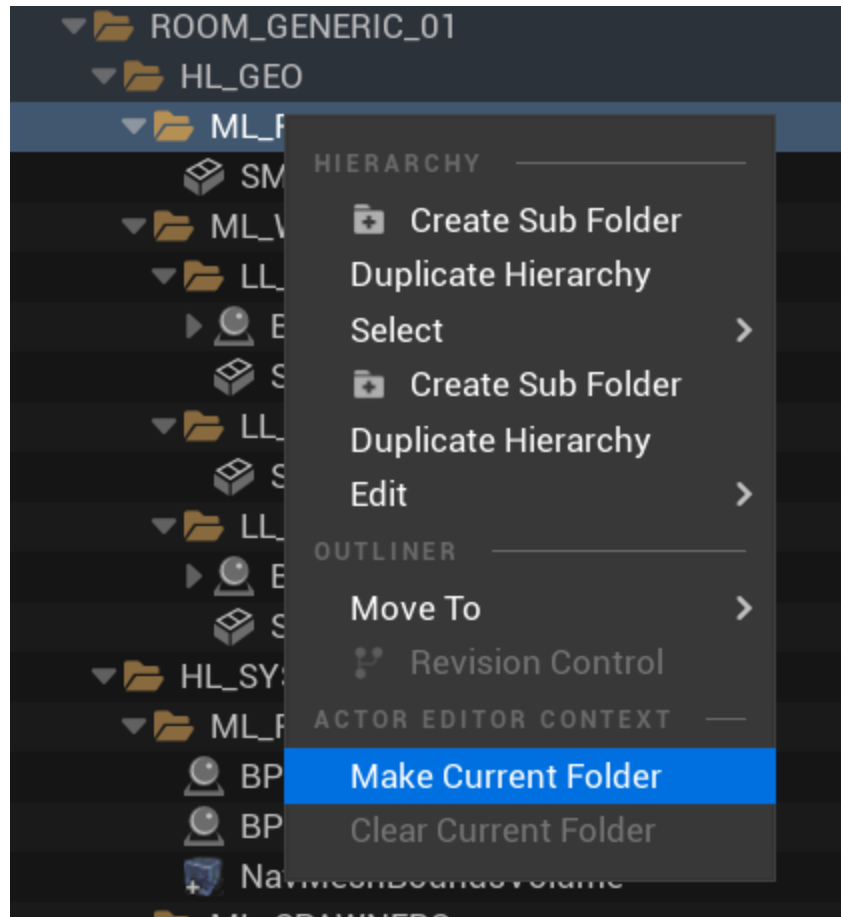
Usually managed by Ally, stores all the individual audio components for a room.

☐ **HL_LIGHTING**

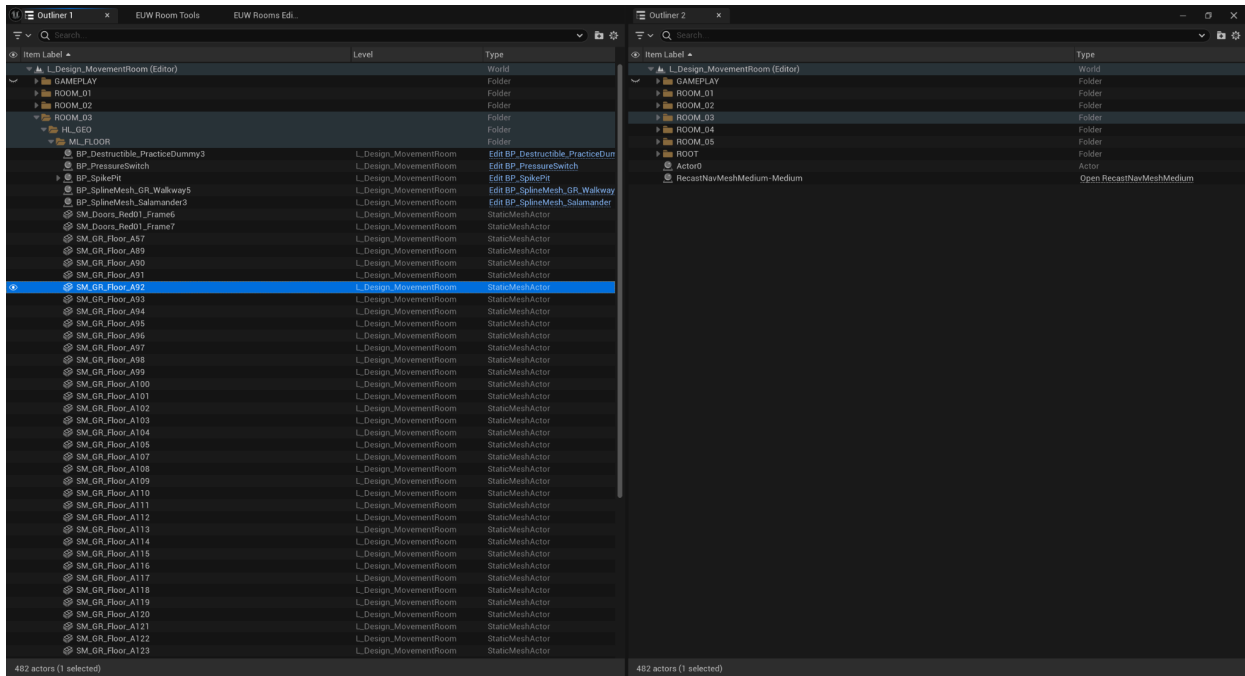
Used to store all room specific lighting data, usually contains assets like lighting probes, spot lights, volumes etc.

IT IS RECOMMENDED THAT FOLDER NAMES ARE TYPED IN ALL CAPS. THIS MAKES THEM EASIER TO DIFFERENTIATE FROM asset names AT A GLANCE

To make life easier, you can create a folder first, make it the 'Current Folder' by right clicking, and then all meshes you drag into the scene will automatically go in that folder. Be sure to clear current folder once done.



You can also have two outliners with one set to focus on selection and the other has that toggle off, this makes for quick and easy file management.

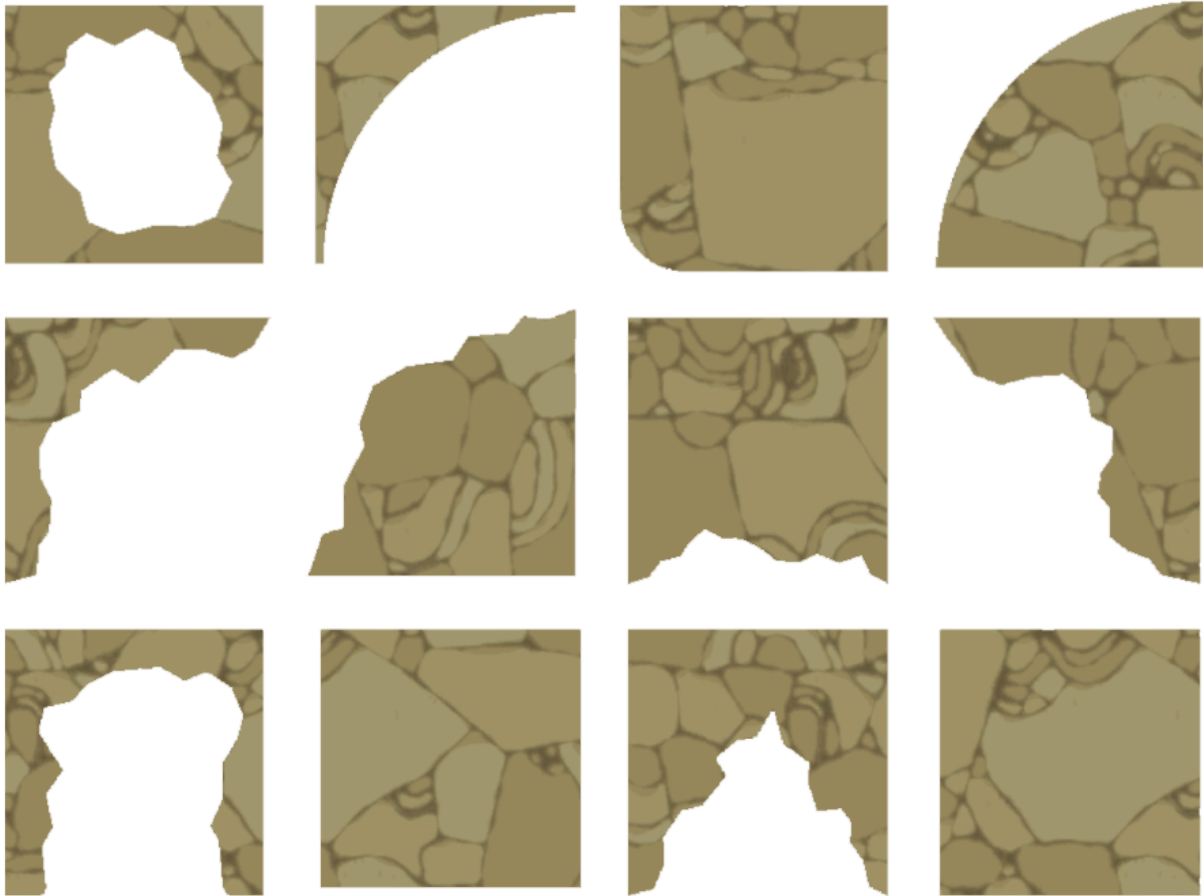


When in doubt, check out L_Design_Movement room, which opens by default in the project

5 - Lego Pieces

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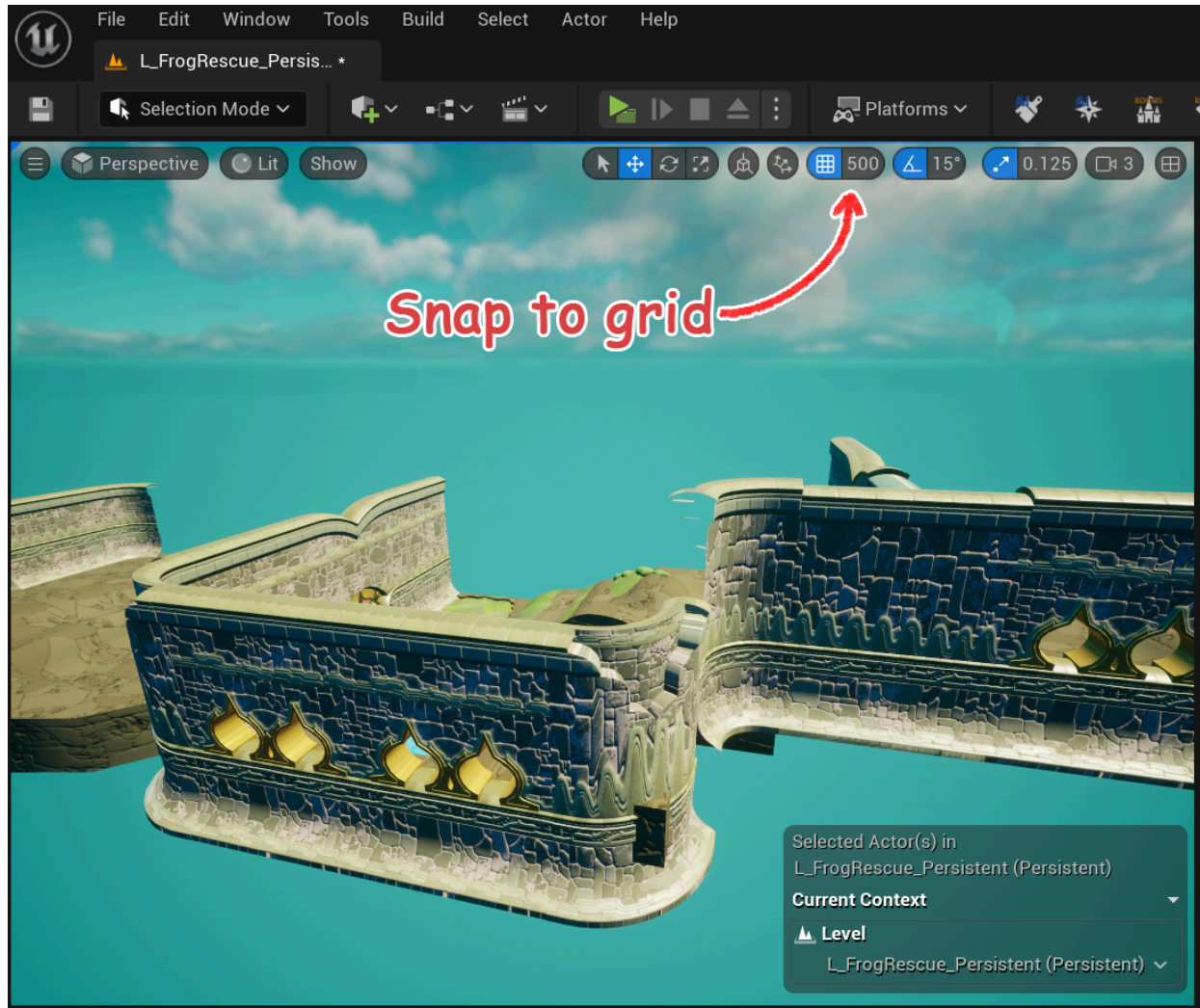
Our levels are going to be built around a modular asset pack dubbed “The Lego Set”.



Currently the pieces can be found in Content > Geo > Environment > Z1_OuterGardens

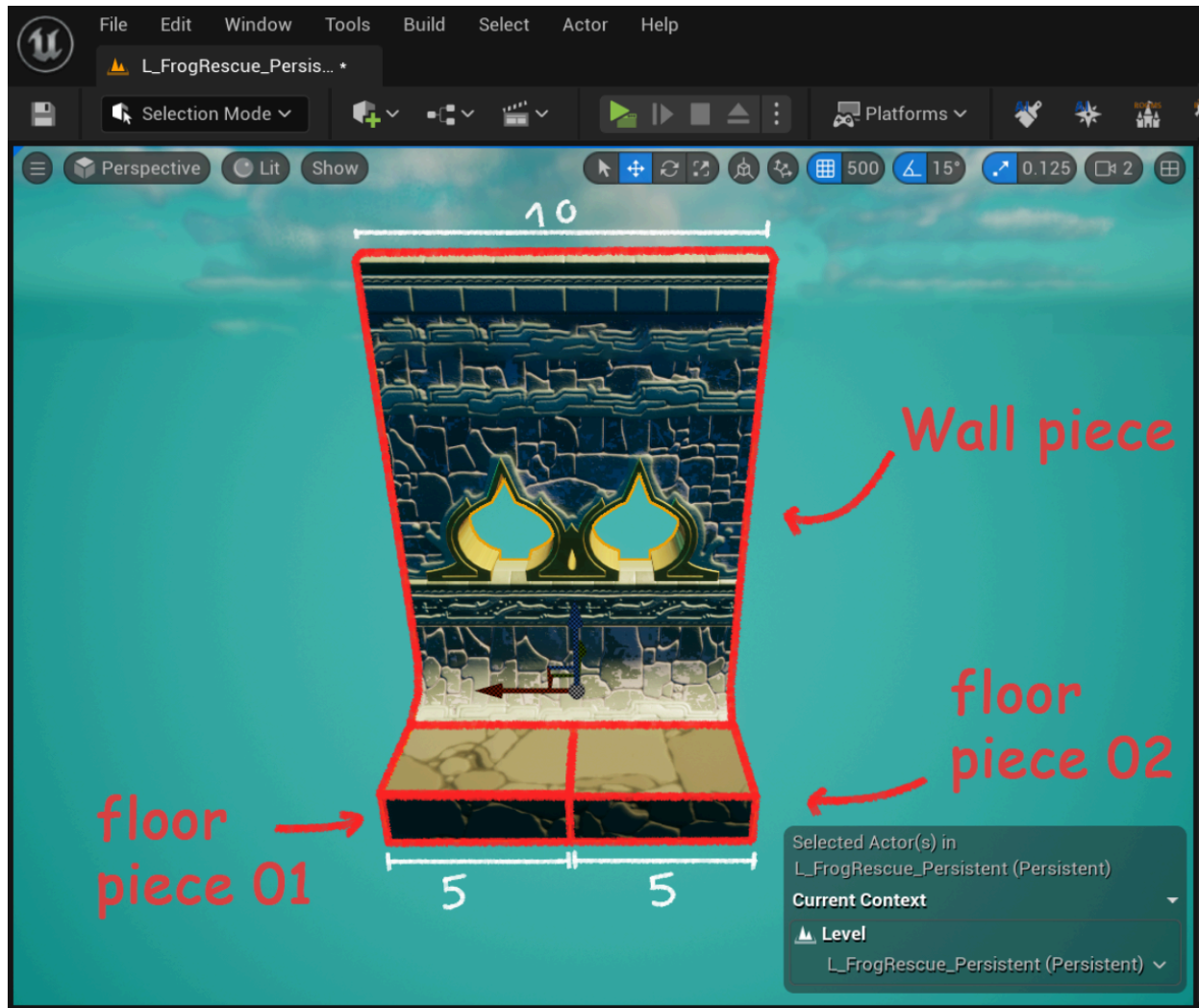
THESE FILES ARE IN THE PROCESS OF BEING CLEANED UP SO PATHS MAY CHANGE SOON

When using these assets it is important to use Unreal's snap to grid system.

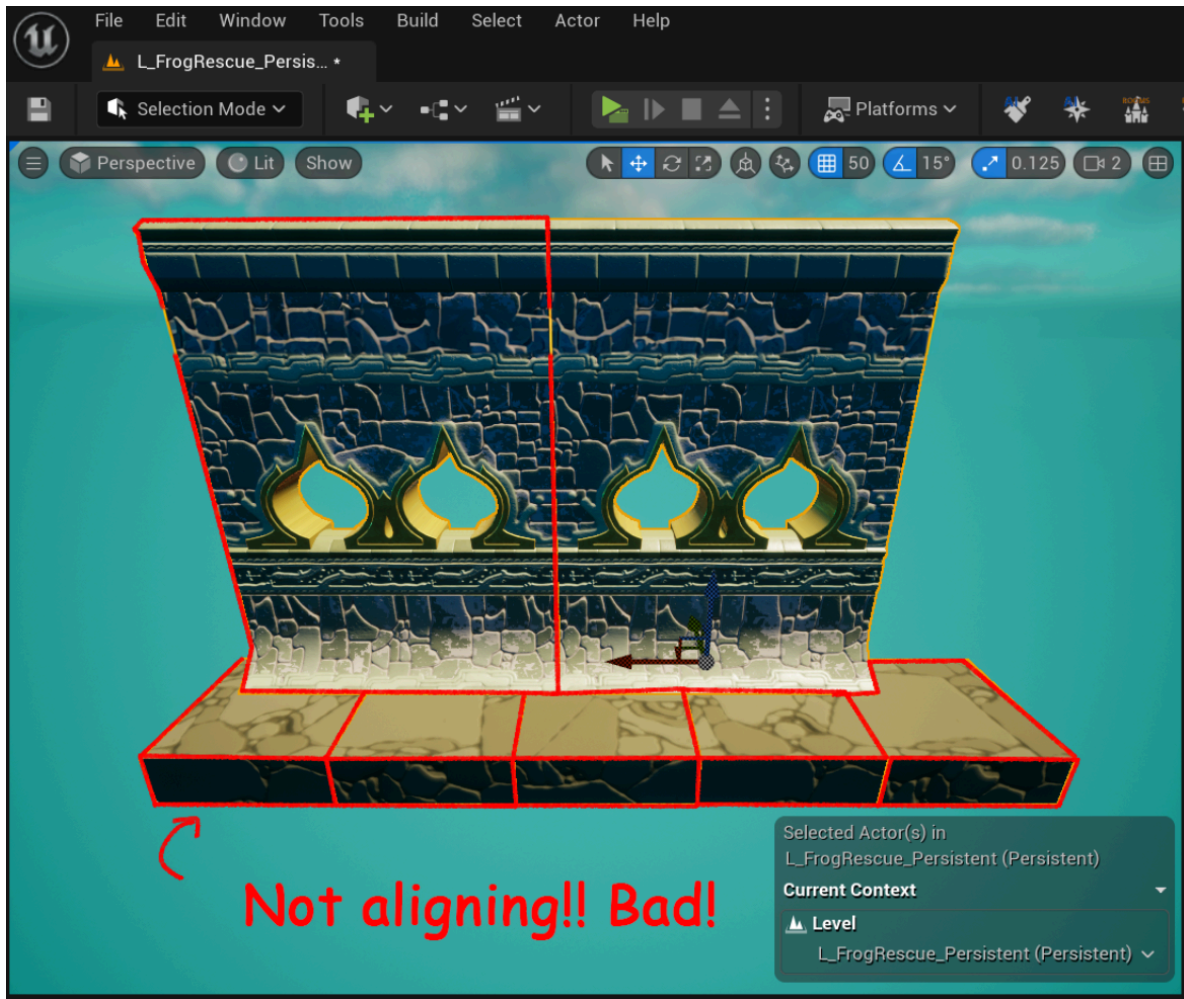


The parts have been designed to snap together in a very specific way which I will outline below.

In concept, the levels are made of floor tiles and wall tiles. Floor pieces have a dimension of 5x5m while walls go for 10x10m. That means when making levels you need to align the pieces correctly so that they flow together properly.



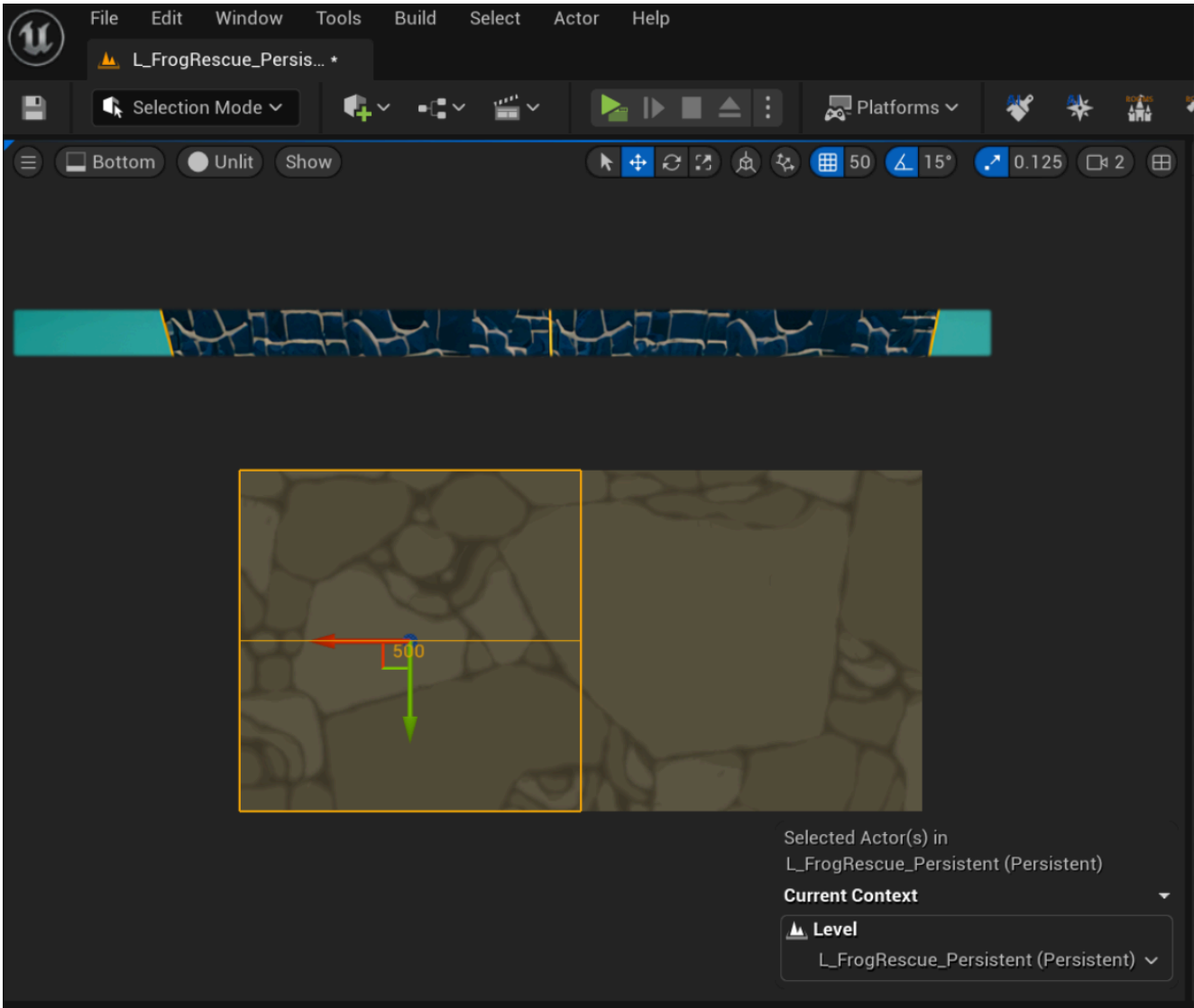
Do not miss-match pieces along the grid like so:



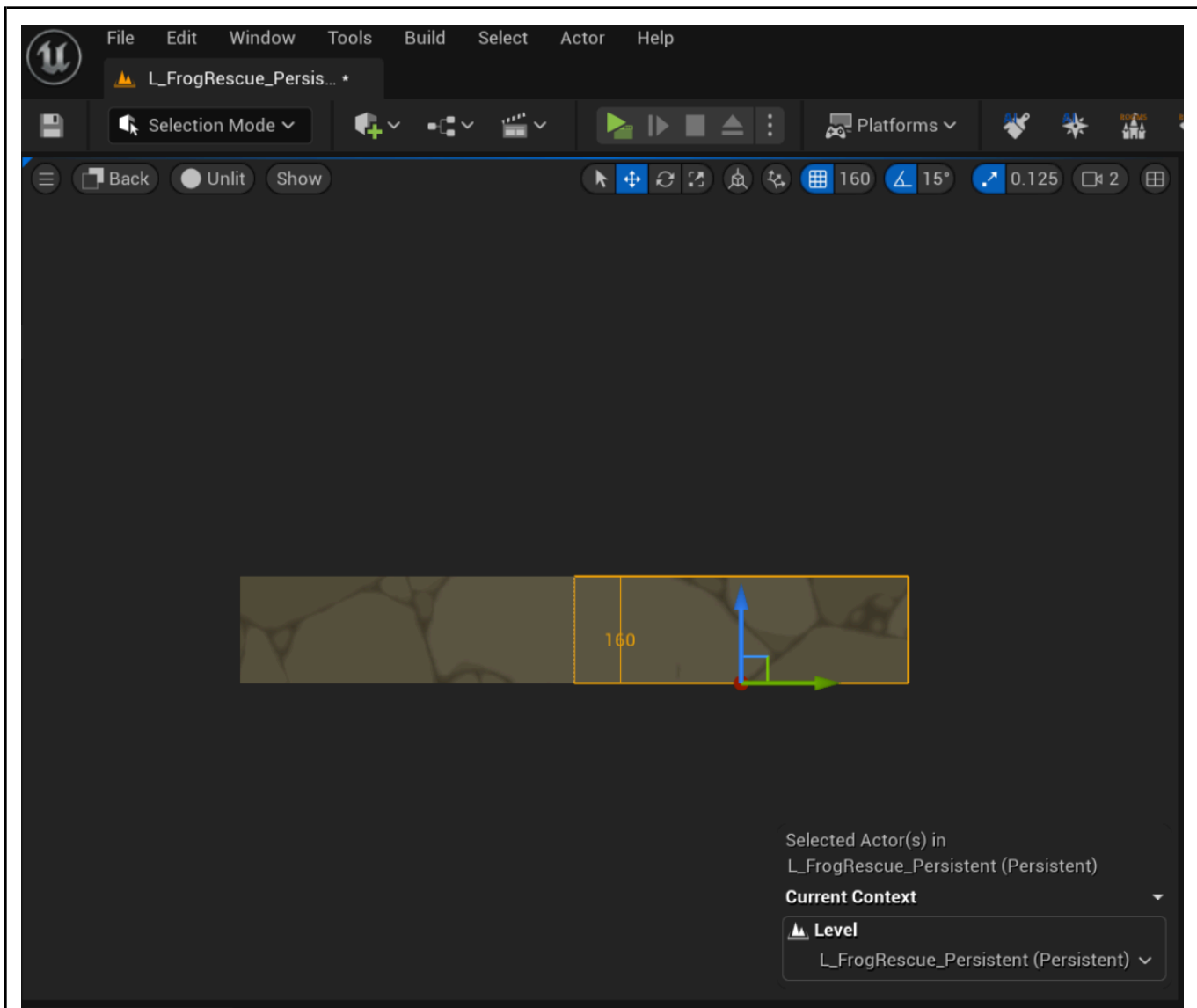
Sometimes when pieces are pulled into a scene from the asset browser they are not aligned to the same grid. Either zero them out or copy/paste the coordinates of a nearby correct piece and move it from there for now.

Below is the best practice for working with the grid, but always remember to stay within the room sizes specified above!

• X or Y axis movement - Set the snap size to 500 units

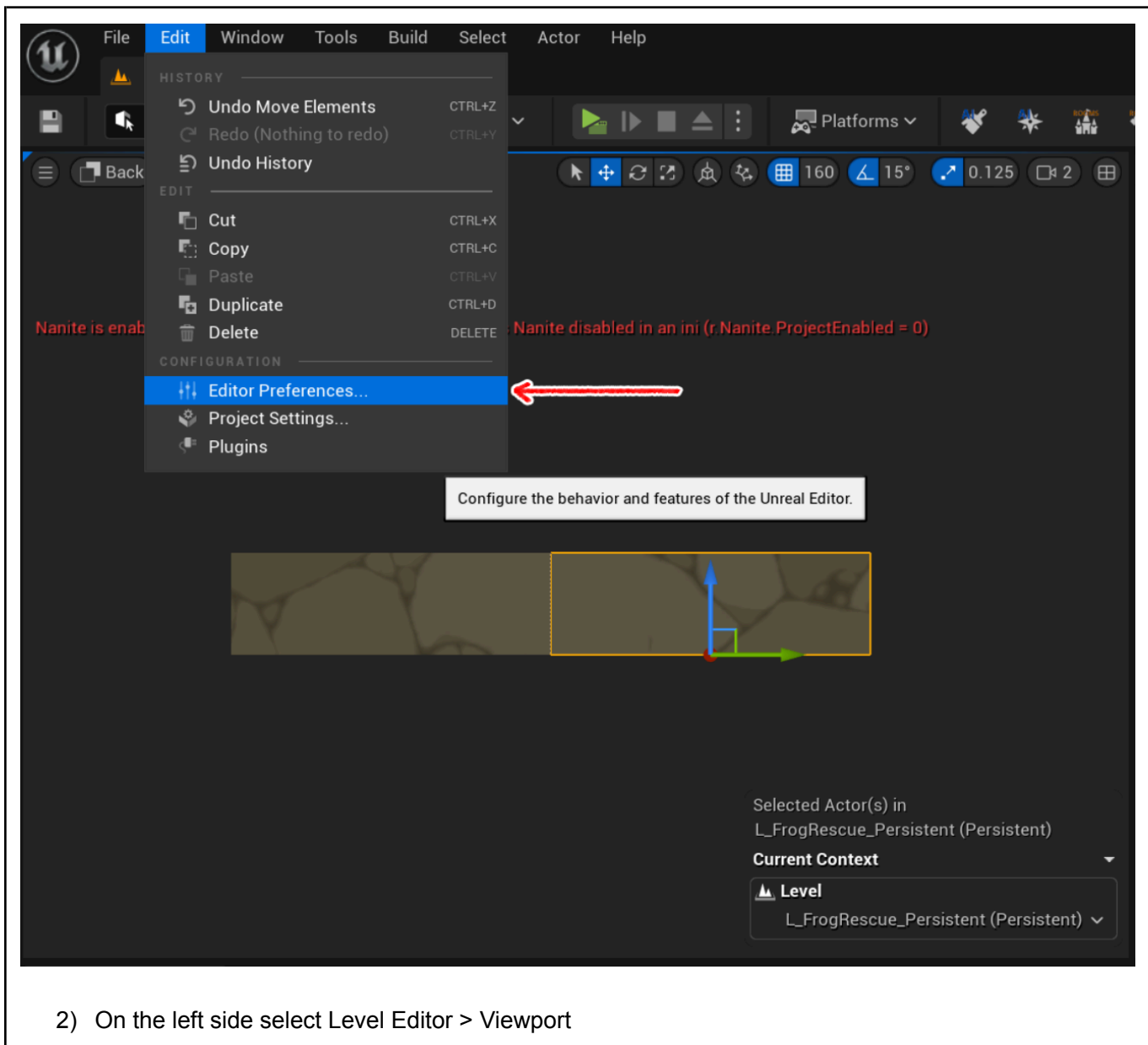


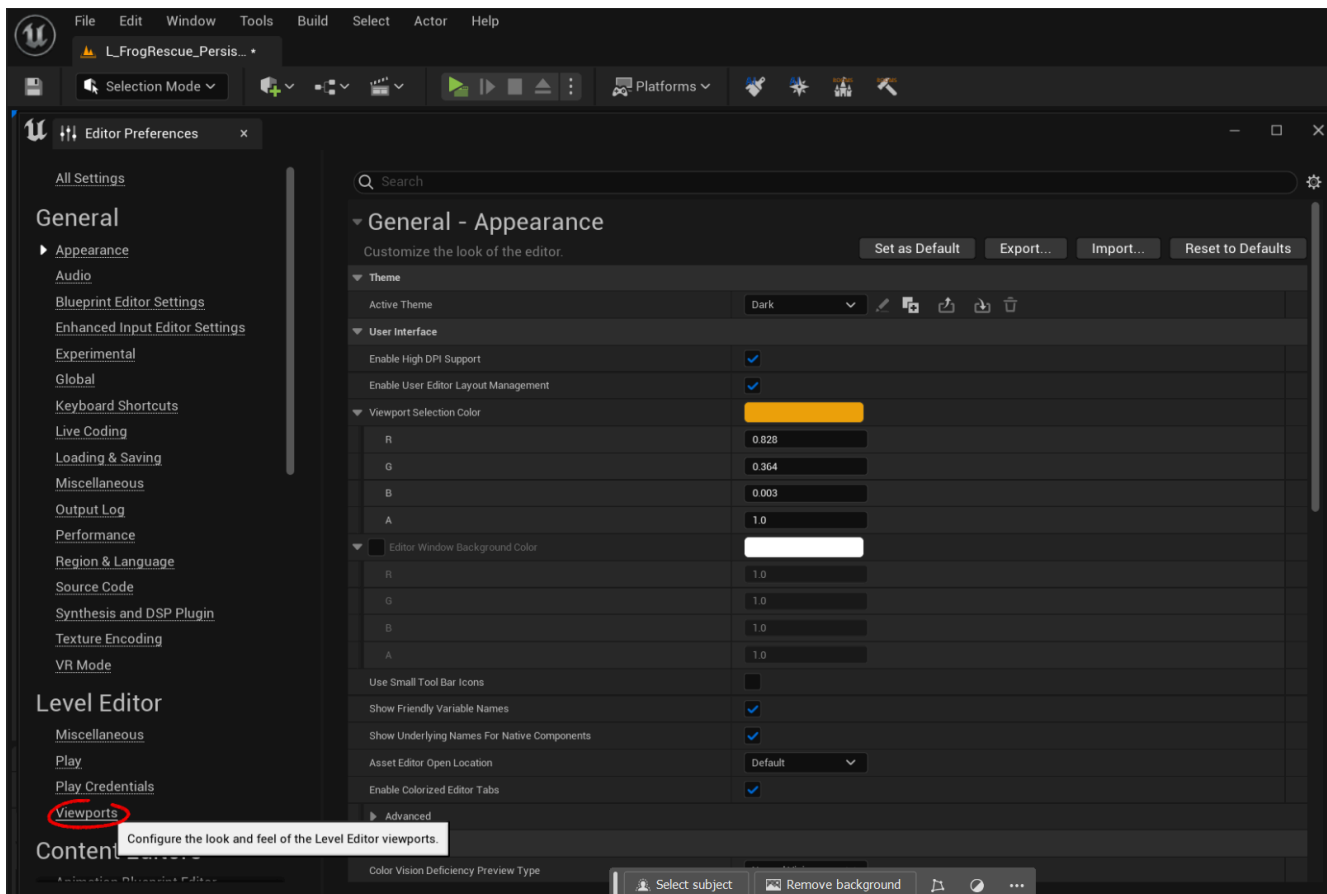
- **Z axis movement - Set the snap size to 160 units***



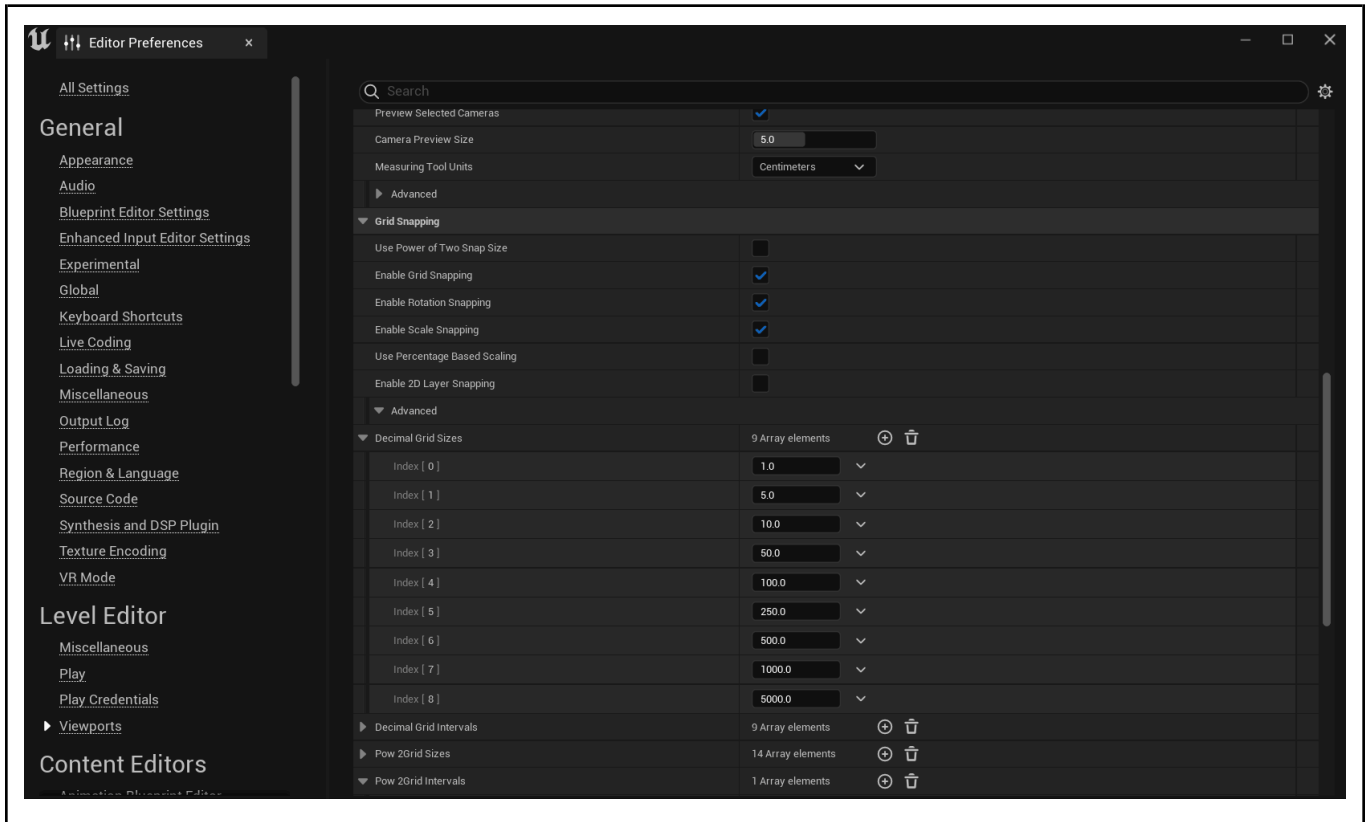
* 160 is not a default size, you need to set this yourself in editor like so:

- 1) Go to Edit > Editor Preferences





3) Under Grid Snapping, Decimal grid sizes click the add element and add 160

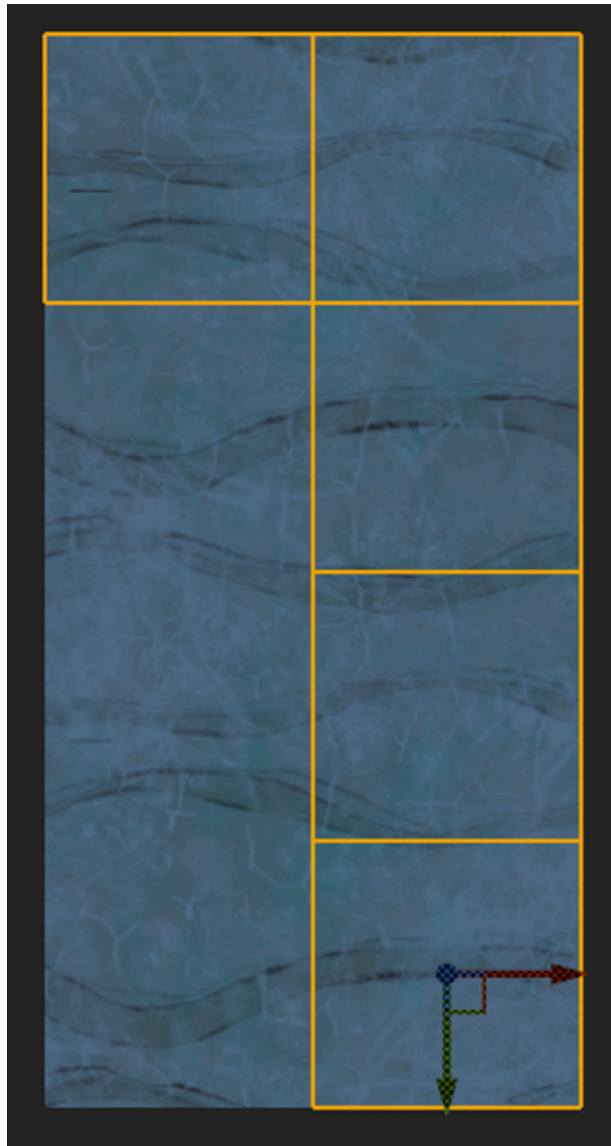


6 - Level Dimensions

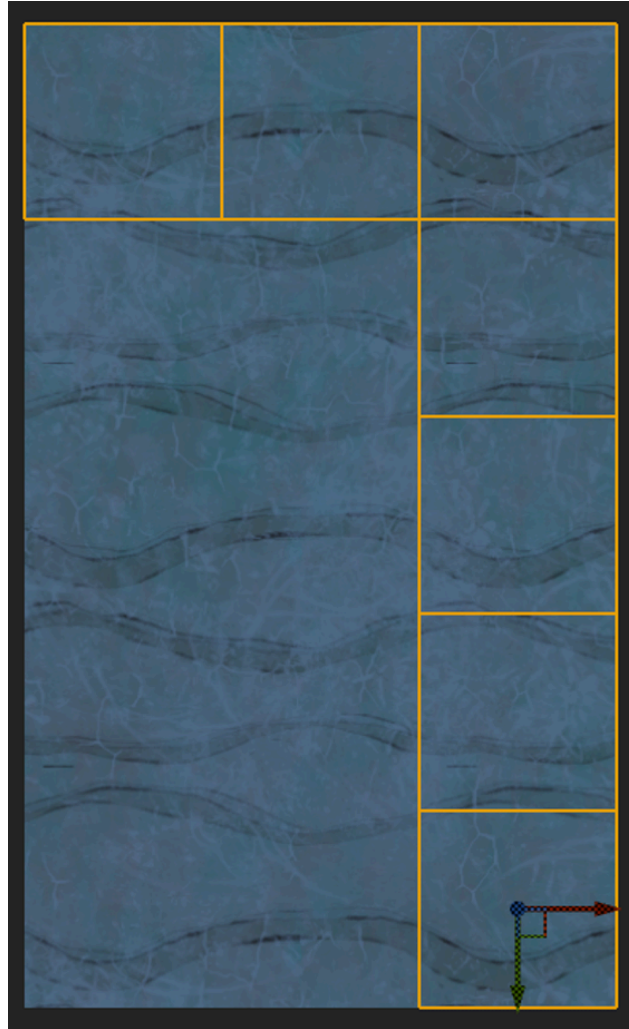
Room sizes:

When making rooms using these assets, we want the sizes to follow the following template. If rooms are too big it can cause problems with our camera system and overall gameplay feel. There will of course always be exceptions - especially in non-combat rooms but the guidelines for best practice are as follows:

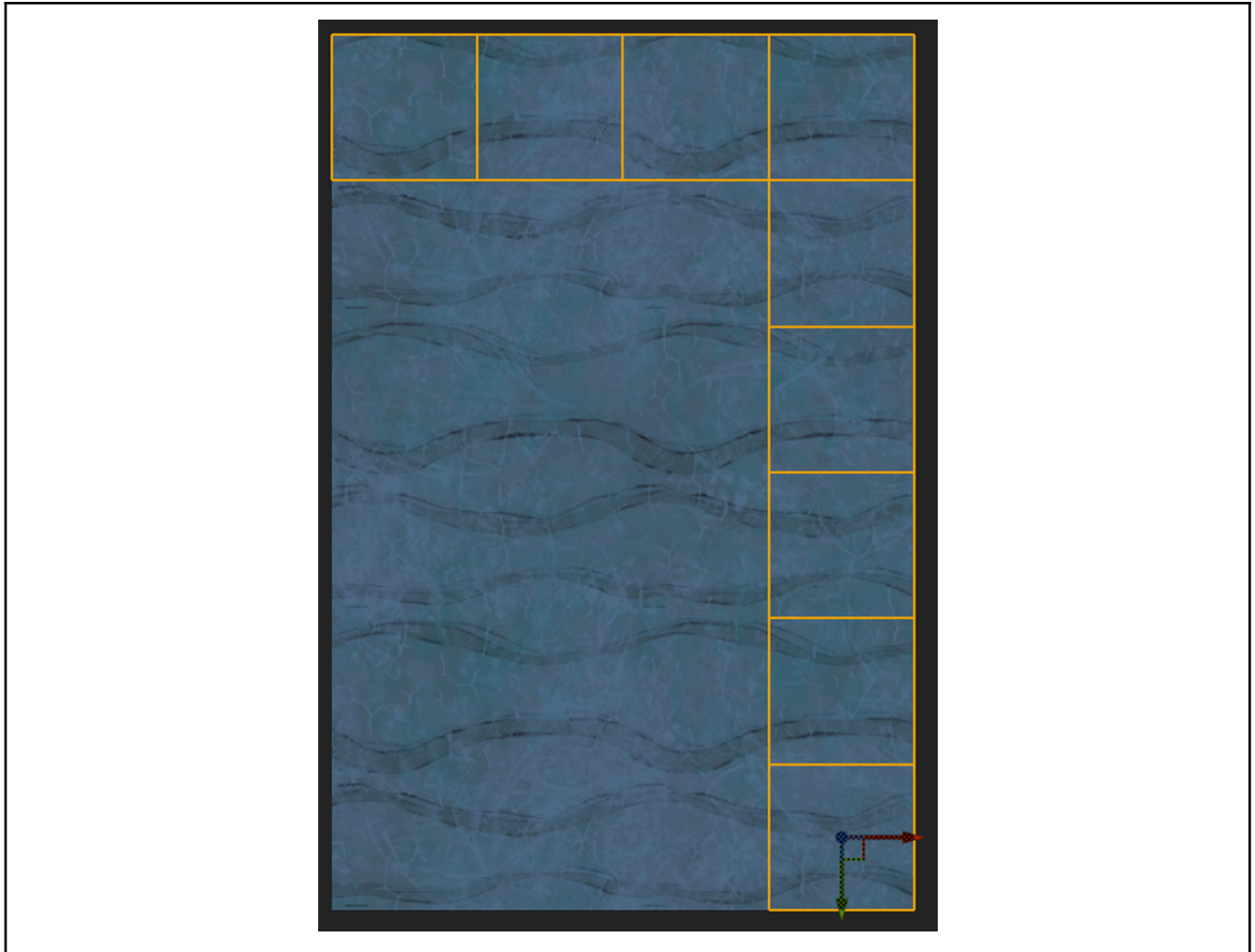
Small - approx. 2x4 - NO ROOM SHOULD BE SMALLER THAN THIS



Medium - approx. 3x5



Large - approx 4x6 - NO ROOM SHOULD BE LARGER THAN THIS



When it comes to verticality, our rooms aim to offer a diverse range of ways the player can traverse verticality. As a rule of thumb, no vertical drop should exceed 10,000 units deep, with 6000 units being a good rule of thumb for a deep drop.

7- BP_Room

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In the case of adding optional side rooms:



7a - Room Intensities

When it comes to balancing the combat of rooms, we have decided to implement a vary list of room intensities.

<i>Room Intensities</i>	<i>DEFINITION</i>
No Combat	These are rooms where no fighting takes place.
Spawn Desire Only	These are rooms where only spawn desires that are placed will spawn. You can do this to create specific narrative points or mood rooms.
Low	These are rooms where you have 'low' level combat. This will only use comps at difficulty level low and there is always just one wave.
Medium	These are rooms where you have 'medium' level combat. This will only use comps at difficulty medium and there is 50% chance to

	spawn another wave of equal difficulty
High	These are rooms where you have 'high' level combat. This will only use comps at difficulty high and there is 2 to 3 waves with at least 1 to 2 XL enemies (if possible)
Arena	These are rooms where you have 'arena' level combat. This will only use comps at difficulty arena and there are 2 to 3 waves with at least 2 to 4 XL enemies (if possible)

A room doesn't need to be locked into a single intensity, multiple intensities can be assigned and a random one will be chosen when the player enters this room.

This can allow for flexibility and diversity, especially for subsequent playthroughs.

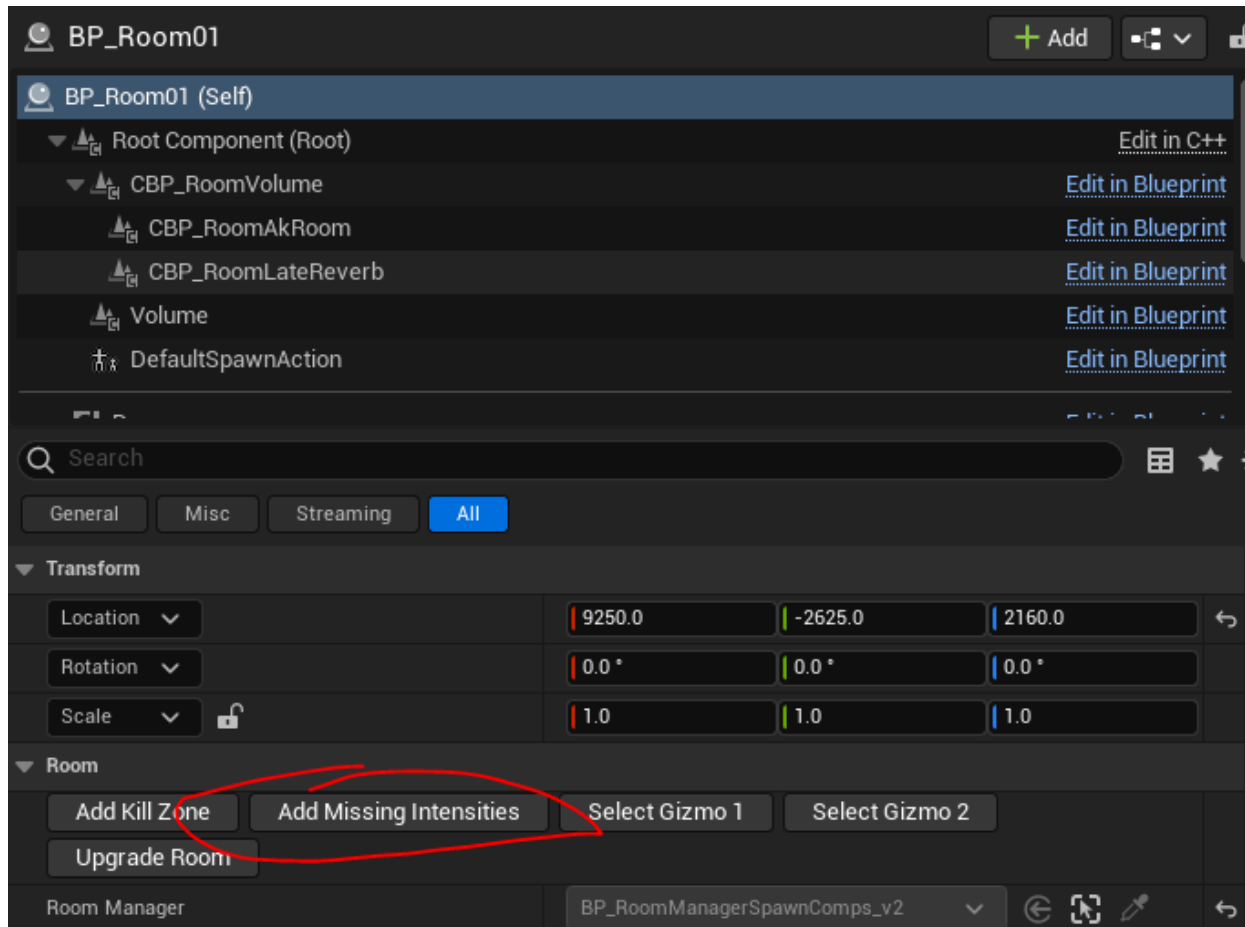
When setting up the room you assign a weight which is like a more flexible percentage.

▼ Index [4]	2 members ▼
Intensity	High ▼
Weight	1.0
▼ Index [5]	2 members ▼
Intensity	Arena ▼
Weight	2.0

So in the above example it would be a 33% chance for a high room and 66% chance for an arena.

To set up a level is easy! Open the level and select the BP_Room you want to set up. (If you want to do all at once just go the Menu > Select > Select All BP_Room_C(s))

From there you should see an [Add Missing Intensities] button.



This will populate the rooms with a list of all the intensities at a weigh of 0. From there all you need to do is assign a weight to the room intensities you want to see.

▼ Allowed Room Intensities	6 Array elements	⊕	🗑	↶
▼ Index [0]	2 members	▼		↶
Intensity	No Combat	▼		↶
Weight	0.0			↶
▼ Index [1]	2 members	▼		↶
Intensity	Spawn Desires Only	▼		↶
Weight	0.0			↶
▼ Index [2]	2 members	▼		↶
Intensity	Low	▼		↶
Weight	0.0			↶
▼ Index [3]	2 members	▼		↶
Intensity	Medium	▼		↶
Weight	0.0			↶
▼ Index [4]	2 members	▼		↶
Intensity	High	▼		↶
Weight	1.0			↶
▼ Index [5]	2 members	▼		↶
Intensity	Arena	▼		↶
Weight	2.0			↶

From there, setup should be done!

When playing in editor you can see what intensity was rolled on the bottom right of the screen



When playing you might encounter issues with the spawns (made apparent by the debug text at bottom right showing a red error message).



If this is the case then open up the pause menu and go Debug > Rooms. Copy the output text in the left side of the screen and make a thread for that level on slack. Post that output in the thread and do the same for any other problem rooms. Be sure to Tag Ryan and Christian to make them aware!

Paused by DESKTOP-HAGK3KC-6A8A



```
Message: Waiting for NavMesh Update...
Message: Disallowed Idle Action: GuardDoor
Message: NavMesh Update Finished (0.46sec). Activating Room...
Message: Unlocked enemy types by 'World Progression Titles': GoblinSmall, GoblinMed,
GoblinCaptain, WizardFire, WizardWater, GoblinOgre, Dragon, ZombieSmall, ZombiePiercet,
WizardBearth, SpiderMed, SpiderSmall, DarkKnightOwl, Wizard, DarkKnight
Message: ##### Desired Waves #####
Message: Wave 0: required IntensityMed blocked Fallback
Message: Wave 1: required IntensityMed blocked Fallback
Message: Unlocked compositions in DT_SpawnCompositions NormalAIs for faction
EFaction::Goblin
  GoblinCIMi+Si+Si, GoblinCIM2+Si+Si, GoblinCIMi+Mi+Mi, GoblinCIS2+Ci, GoblinC2+Mi+Mi,
  GoblinCIMi+Ci+Mi, GoblinOIMi+Mi+Mi, GoblinOISi+Si+Si, GoblinWIMi+Mi+Mi, GoblinWIMi+Si+Si.
Message: Cannot match spawn desires to composition for faction EFaction::Goblin. No
unlocked desires were found.
Message: Picking random composition from 10 (weight 8.000000)...
  GoblinCIMi+Si+Si: 1.000000
  GoblinCIM2+Si+Si: 1.000000
  GoblinCIMi+Mi+Mi: 1.000000
  GoblinCIS2+Ci: 1.000000
  GoblinC2+Mi+Mi: 1.000000
  GoblinCIMi+Ci+Mi: 1.000000 <--
  GoblinOIMi+Mi+Mi: 0.500000
  GoblinOISi+Si+Si: 0.500000
  GoblinWIMi+Mi+Mi: 0.500000
  GoblinWIMi+Si+Si: 0.500000
Message: Unlocked compositions in DT_SpawnCompositions NormalAIs for faction
EFaction::Goblin
  GoblinCIMi+Si+Si, GoblinCIM2+Si+Si, GoblinCIMi+Mi+Mi, GoblinCIS2+Ci, GoblinC2+Mi+Mi,
  GoblinCIMi+Ci+Mi, GoblinOIMi+Mi+Mi, GoblinOISi+Si+Si, GoblinWIMi+Mi+Mi, GoblinWIMi+Si+Si.
Message: Cannot match spawn desires to composition for faction EFaction::Goblin. No
unlocked desires were found.
Message: Picking random composition from 10 (weight 7.000000)...
  GoblinCIMi+Si+Si: 1.000000
  GoblinCIM2+Si+Si: 1.000000
  GoblinCIMi+Mi+Mi: 1.000000
  GoblinCIS2+Ci: 1.000000
  GoblinC2+Mi+Mi: 1.000000 <--
  GoblinCIMi+Ci+Mi: 1.000000 (already used)
  GoblinOIMi+Mi+Mi: 0.500000
  GoblinOISi+Si+Si: 0.500000
```

7b - Spawn Idle Actions

There are the following idle actions:

Guard (enemy stands there and guards)

Wander (enemy wanders in range)

▼ Idle Settings	
Idle Radius	200.0
May Assign Randomly	☒
AI Group	None

Practice Dummy (enemy whacks the dummy about) ((use SPW_Dummy01)

Patrol (AI moves between BP_AllIdle_Wait)

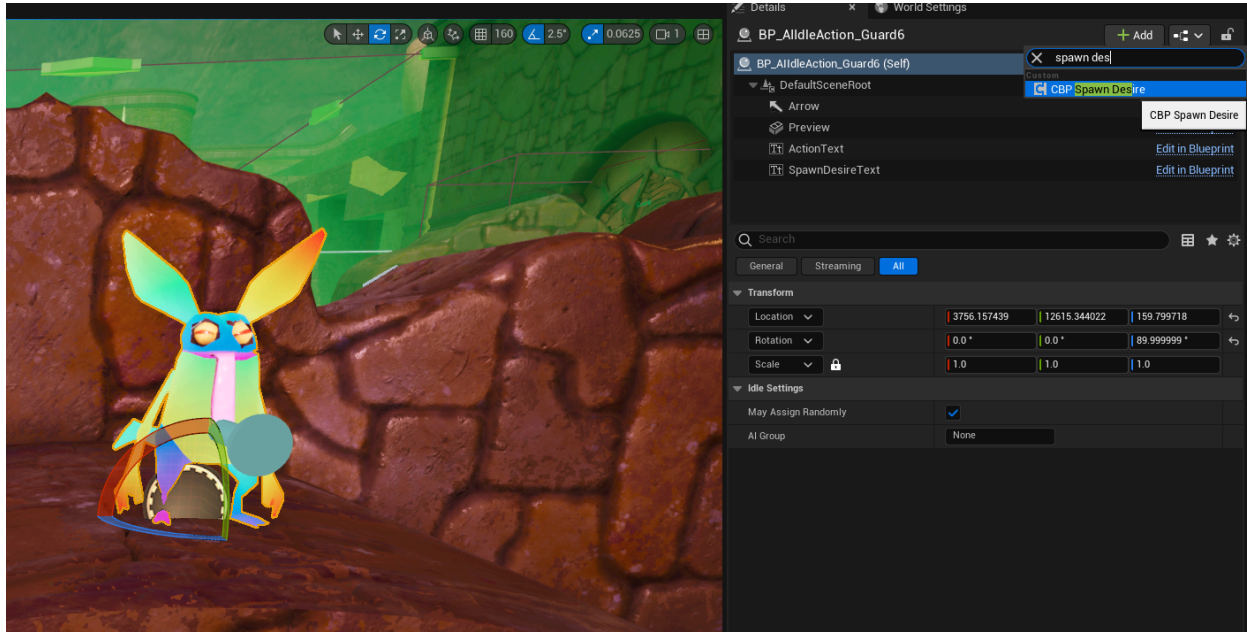
▼ Patrol	
▼ Patrol Points	2 Array elements ⊕ 🗑 ↶
Index [0]	BP_AllIdle_Wait2 ▼ ↶ 🔍 ✎ ▼ ↶
Index [1]	BP_AllIdle_Wait ▼ ↶ 🔍 ✎ ▼ ↶
Patrol Order	Ping Pong ▼ ↶
Resume Mode	Repeat Current ▼ ↶
Patrol Reverse	☐
Patrol Loop Count	1000

7c - Spawn Desires

Daniel should be writing a technical doc on this soon, but for now this is the tldr setup for LDs

the game uses spawn compositions which means level designers can not directly choose desired characters to spawn, but with spawn desires we can influence what compositions can be chosen.

Start by selecting your idle action in the room. You want to add a CBP_SpawnDesire to that idle action.



From here you can then assign your desired spawn via the row name option on the CBP. If there is not a spawn desire that you want then you can create a new one in DT_SpawnDesirePresets.

Details

World Settings

BP_AIdleAction_Guard6

+ Add

BP_AIdleAction_Guard6 (Self)

DefaultSceneRoot

Edit in Blueprint

Arrow

Edit in Blueprint

Preview

Edit in Blueprint

ActionText

Edit in Blueprint

SpawnDesireText

Edit in Blueprint

CBP_SpawnDesire

Edit in Blueprint

Search

Misc

All

AI Spawn Desire Component

Desired Spawn

Data Table

DT_SpawnDesirePresets

Row Name

None

Always Spawn when Unlocked

No Need for Unlock

Tags

Component Tags

Activation

Auto Activate

Cooking

Is Editor Only

Asset User Data

Navigation

Search

DarkKnightAny

DarkKnightOwl

DarkKnightShark

DarkKnightSnake

GoblinCaptain

GoblinMedium

GoblinOgre

GoblinSmall

GoblinSmallOrMedium

GU-Leader

MinibossAny

SpiderAny

SpiderMedium

SpiderSmall

UndeadAny

UndeadFerret

UndeadFootsoldier

WizardAny

WizardEarth

WizardFire

WizardWater

These are only desires, so there is a chance that they might not appear.

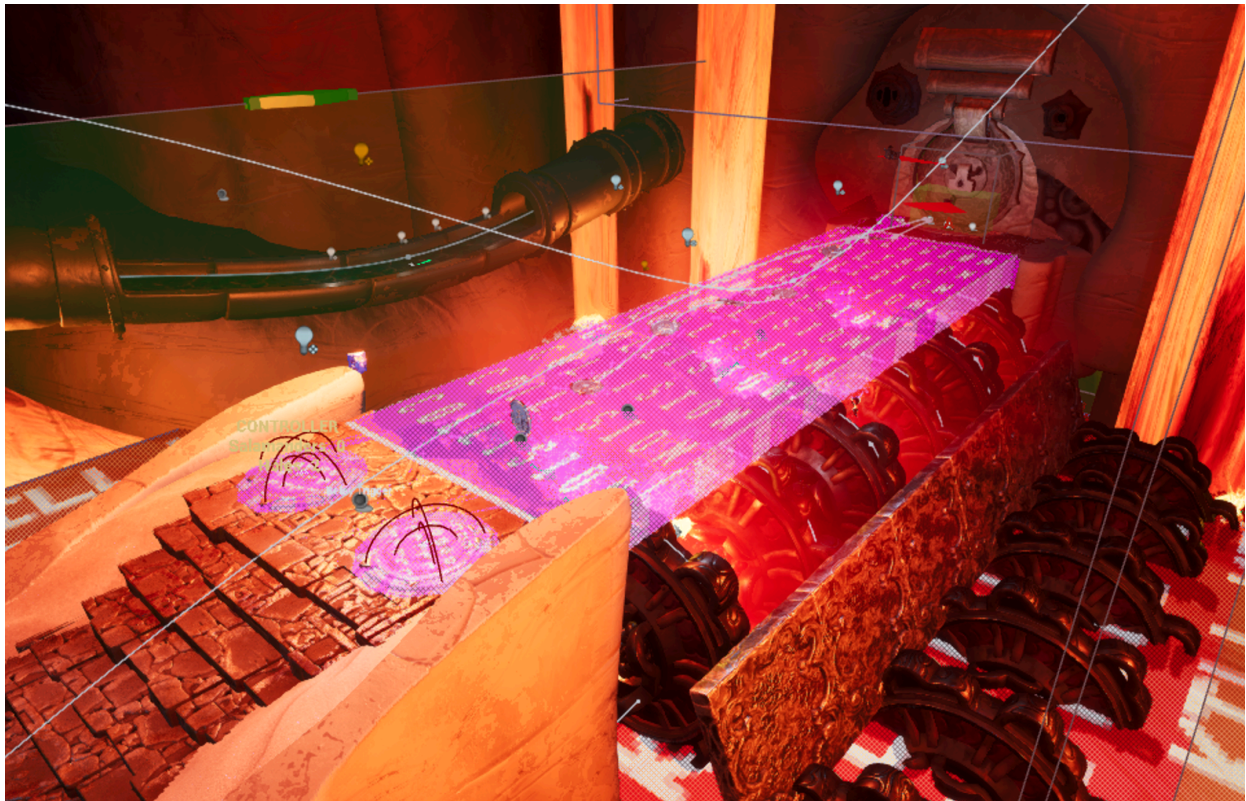
[Always Spawn When Unlocked] flag sets it so that the desire goes from suggestion to certainty.

[No Need For Unlock] means that you can spawn enemies before they are unlocked in world progression. That can be good for introducing guys for the first time.

7d - Rooms and manual paths

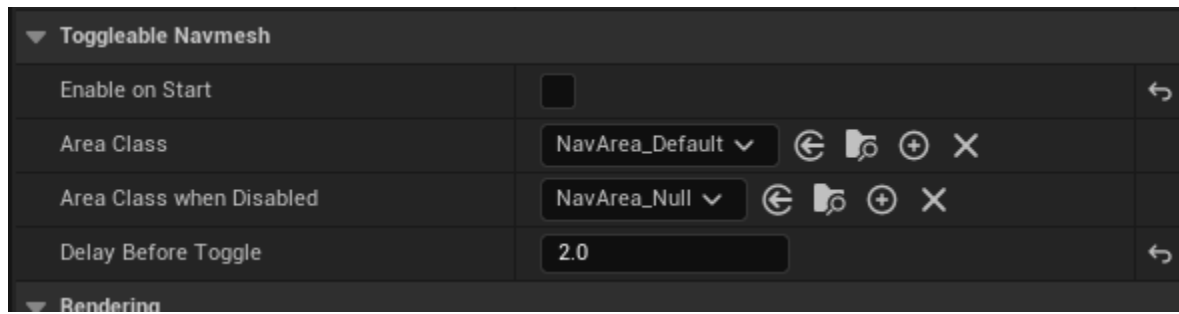
Creating and modifying paths at runtime

Generally speaking, we cannot change the navmesh at runtime, because it is baked in the editor. This means that in order for there to be navmesh, we need to have collidable geometry that the editor will use to generate the navmesh. However, if there is a situation in a level that requires there to be navmesh where there is initially no collidable geometry, BP_ToggleableNavmesh can be used to create it there and toggle the navmesh ON/OFF as needed.



Navmesh won't be generated for this bridge without BP_ToggleableNavmesh

BP_ToggleableNavmesh can also be used to simply toggle between two different navmesh area classes, such as to mark an area as dangerous to enemies when a trap or other gimmick is active, as shown in its settings below.



Note that BP_ToggleableNavmesh currently does not use the room event system, instead relying on the gimmick system. If you need to trigger it from an event, it's possible to do so by using the Room Manager's Gimmicks component, or also BP_EventRelayTrigger.

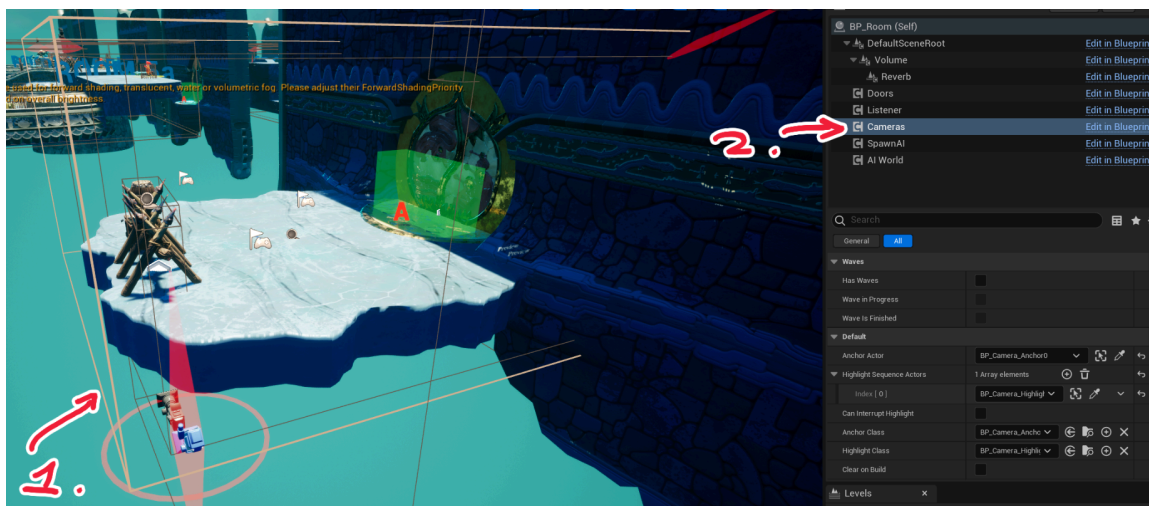
Some gimmicks manage their own navmesh, so will not need to use BP_ToggleableNavmesh, but it is useful in some situations where the navmesh is not handled by the gimmick, or navmesh can't be baked due to the gimmick's starting location in editor etc.

8 - Camera

=====

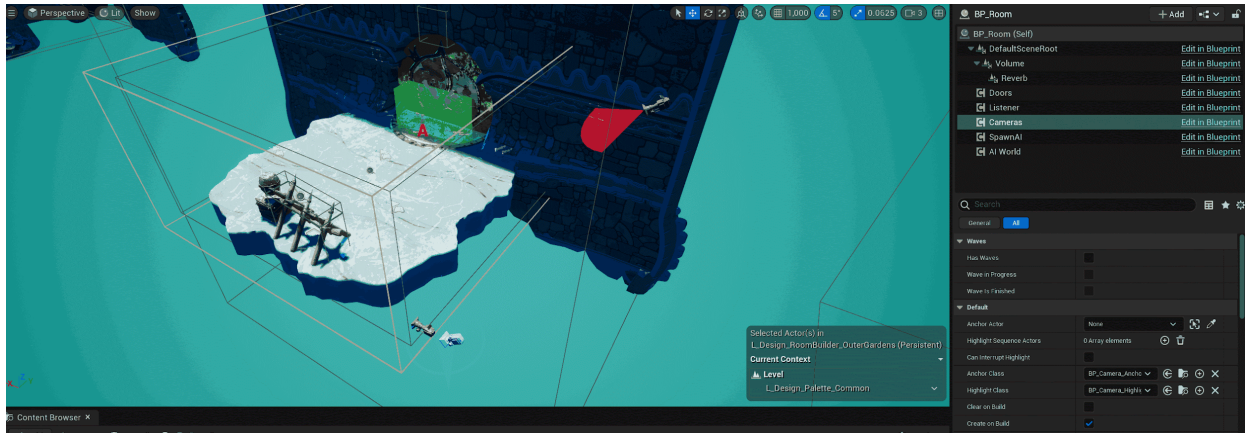
Per room camera setup

1. Start by selecting your BP_Room in the outliner and navigate to the Cameras component of BP_Room in the details window



2. Under "Anchor Actor" select your room's camera anchor. Under "Highlight Sequence Actors" add as many highlight actors to the sequence as required. This must be done for

every room, if you duplicate a room then be sure to fix the cameras at that time.



8a - Spline Cameras

Camera splines allow you to have relatively good control of the camera's position as the player moves through a room.

There are two components;

1. Player spline
2. Camera spline

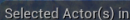
In general the way they function is the closer a player gets to a spline point on the player spline the camera will try to match the same point on the camera spline.

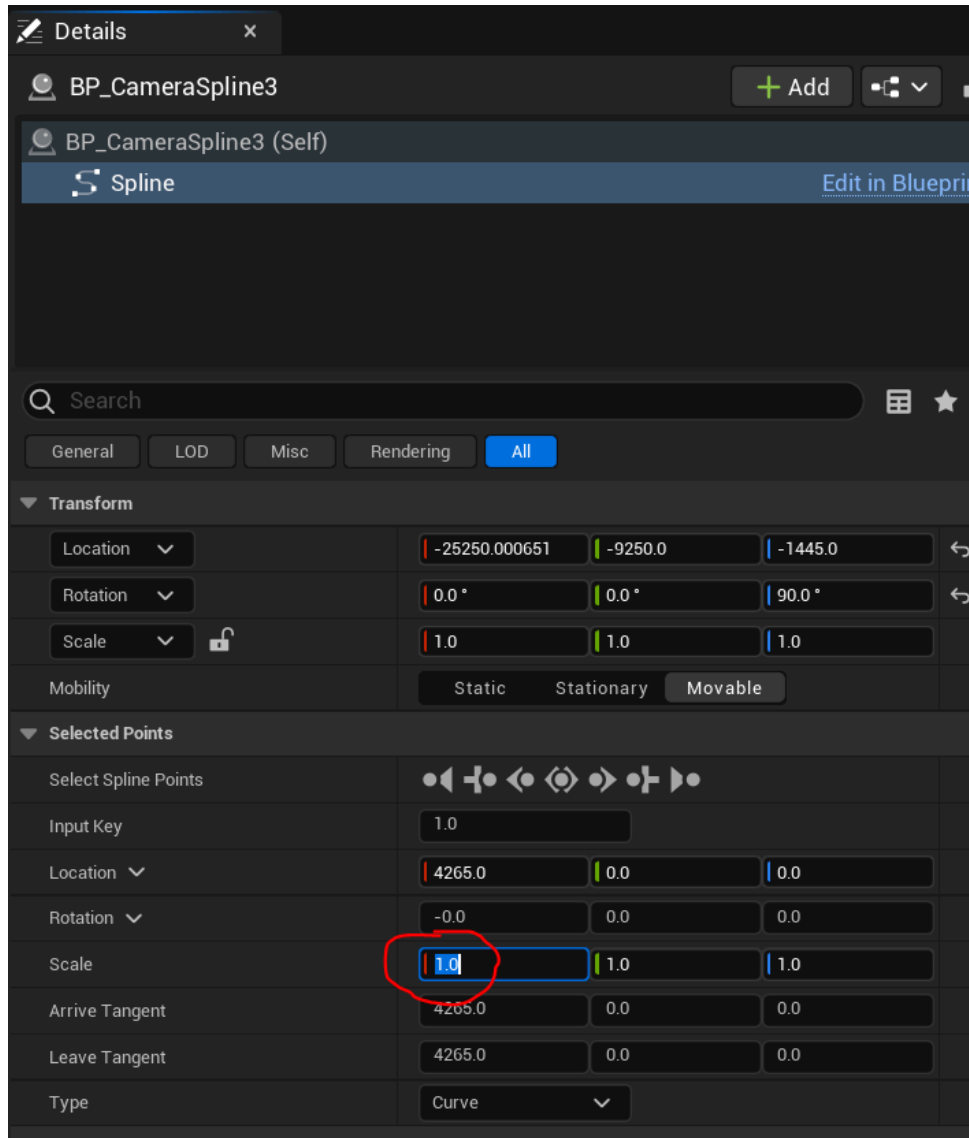
For example - below you can see a spline with 3 points on each spline. At each position they will be synced.



X Scale

A trick for getting more control over your camera is to set the scale of “x” on each spline point. This controls how much the game will try to force the camera to each point along the camera spline.





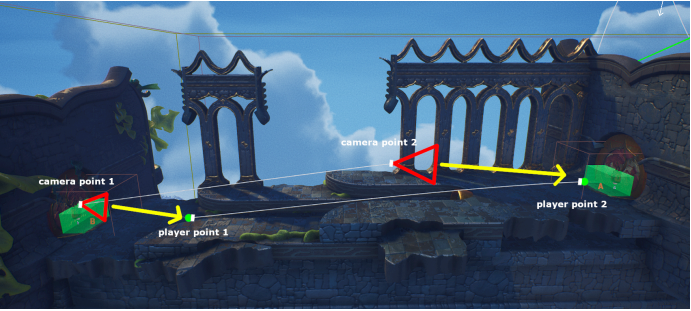
Concepts

Knowing this here are a few concepts of how to use the camera spline system to achieve certain effects.

Over the shoulder

The trick is to give the spline offset points that force it to look forward and force the x scale on the camera spline to zero.

This forces the camera to snap to points on the camera spline that are just behind the player when the player approaches the corresponding player spline points.



Connecting camera splines

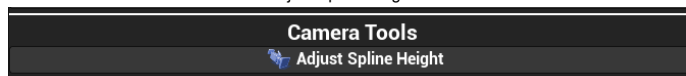
To utilise camera splines you need to add them to the rooms camera anchor.

Some rooms with combat would benefit from a spline camera, however because the height between the player and the spline is fully variable on a spline camera, it can result in the camera being higher or lower than is usual for the automatic settings on an anchor camera.

With anchor	With spline that is too low
-------------	-----------------------------



To combat this I have added a new "Adjust Spline Height" button to Da Steamer.



All this does is offset the camera spline from the ground spline by 800 units, the average height the anchor stays away from the player automatically.

To use this, just select the anchor with the splines and hit the button.

Camera Tools

Adjust Spline Height



That way you can approximate the correct height between the splines.

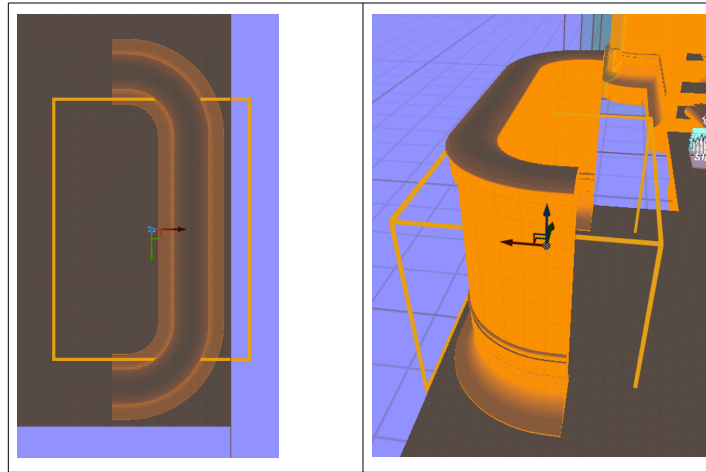
With anchor	With spline that is corrected
Room 4 Enemies are lurking in the shadows...  Level: L_AbandonedIsland (Part Two-Perish) Room number: 4 BP_Room04 Difficulty: 1	Enter Room 4: Invaders None Ambush Guards Waves  Level: L_AbandonedIsland (Part Two-Perish) Room number: 4 BP_Room04 Difficulty: 1

Note: this is only an approximation for combat rooms, it will not work with rooms that have crazy splines.

8b - Highlight Volumes

With the new highlight volumes, they currently lerp to the designated highlight point the closer the player moves to the centre. This means the player must make sure the pivot of the volume is placed over the area you wish to focus.

In the below example, if we wish to focus this wall, the pivot is placed directly in front of it.



When placing a volume it is also important that the volume does not intersect with door ways or level starts. If a player starts the room already within the volume this will cause unforeseen problems.

GOOD

NG

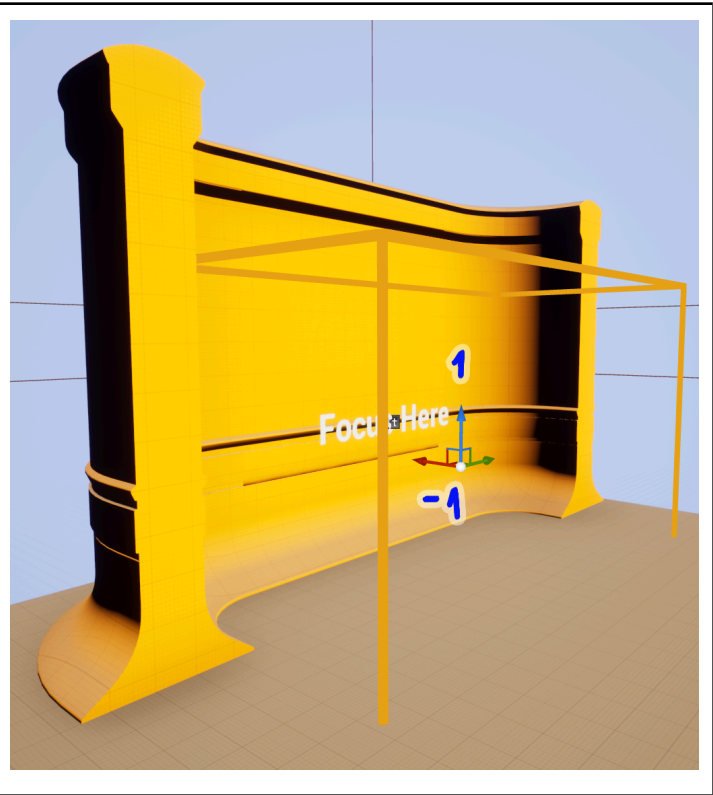
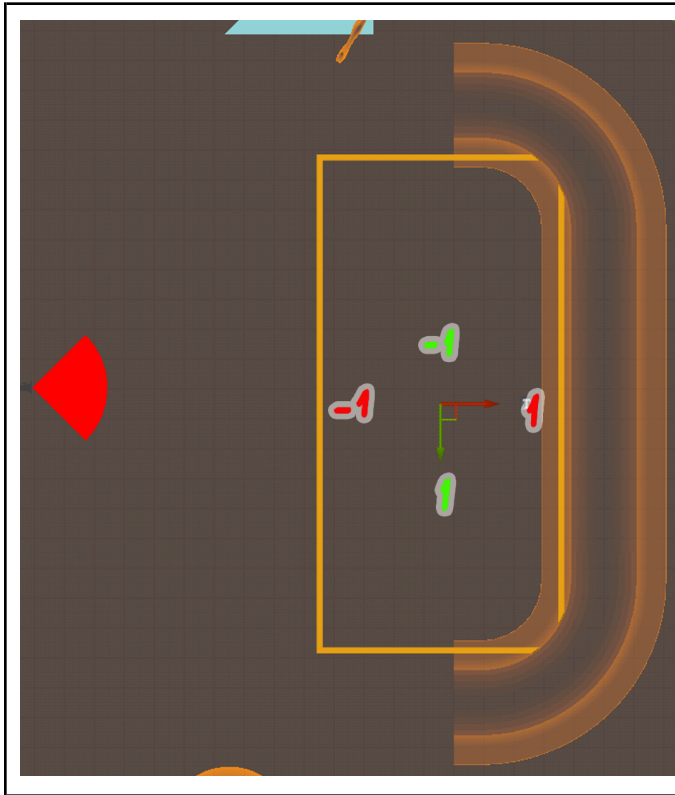


In cases where the lerp is not completing its path within the designated space, or is completing the path too quickly, then the lerp speed should be adjusted. A rule of thumb is as follows:

- Large: 800
- Medium: 500
- Small: 200

YMMV

If the above setup is behaving undesirably, there is the option to set up an ignore direction for the lerp on the camera volume. This way you can fit volumes into tighter spaces or get the lerp to be skipped.



In the above example, if you wanted to focus on the wall now you would just set the ignore dir x and z to -1, thus meaning if the player enters the volume they will trigger the volume with no lerp.

For fine tuning the speeds, remember to set camera lerp speed on the highlight cam

Camera Lerp Speed

10.0

HEED THIS WARNING LEST YE SUFFER:

THE HIGHLIGHT VOLUME SHOULD BE USED *CONSIDERATELY*.

- It should not be placed in an arena with lots of combat space
- It should not be used in cases where a spline camera would be better
- It should not be used as hacks or for one off camera behaviour



9 - Splines

=====

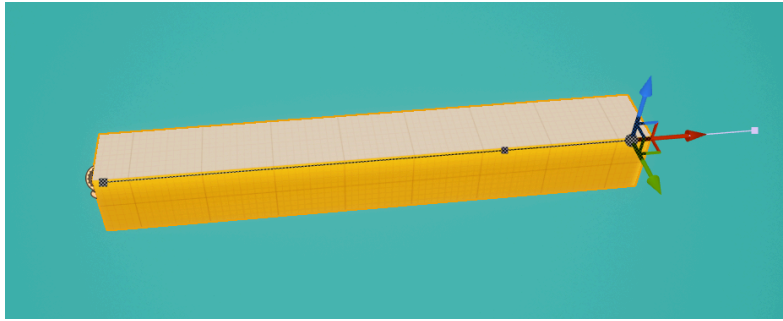
Splines are a powerful tool - but with great power comes great difficulty.

Splines let us put meshes on curves. This will be utilized where possible to expand the feel of flow in the game.

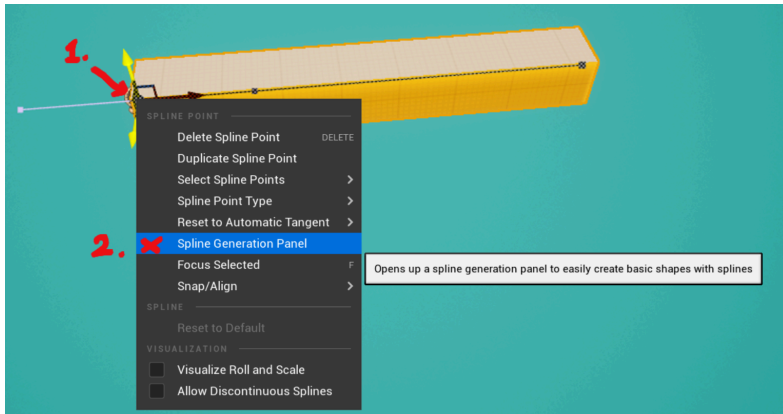
Firstly, to understand the principles of splines in unreal, I **highly** recommend watching these videos:

- ▶ Spline Mesh Components and Instanced Meshes for Faster Level Design in UE4 Blueprints
- ▶ How to make Splines using Blueprints | Spline Meshes | Unreal Engine 5 Tutorial

The project uses multiple kinds of splines in this project, but for now it is suggested that you familiarize yourself with the spline generation panel.

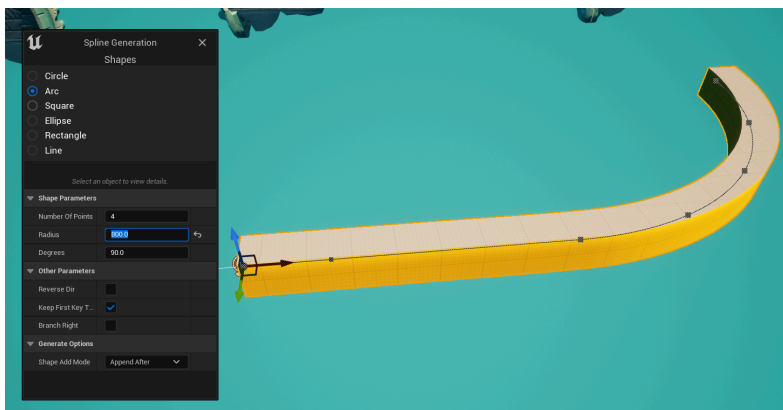


Start by placing your desired spline.



Right click on one of your spline points to open up a window.

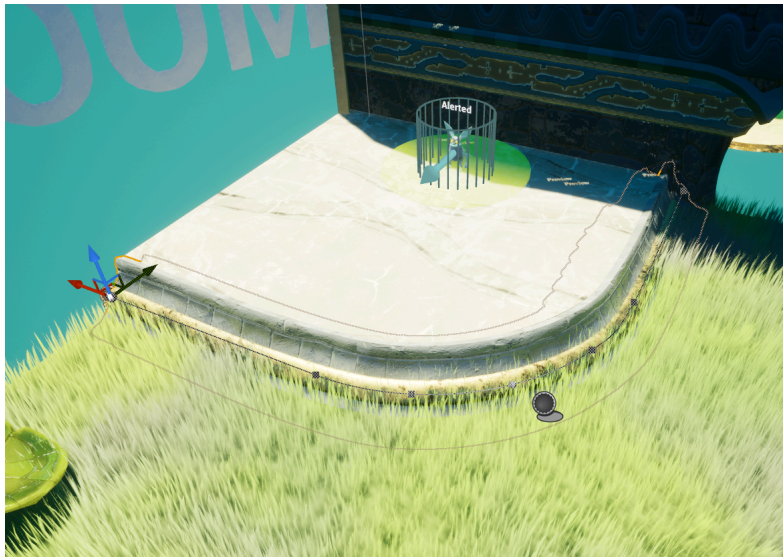
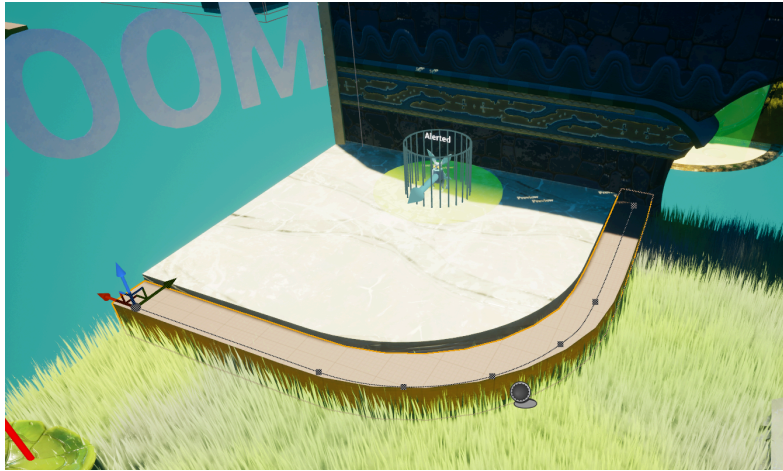
From there select the spline generation panel.



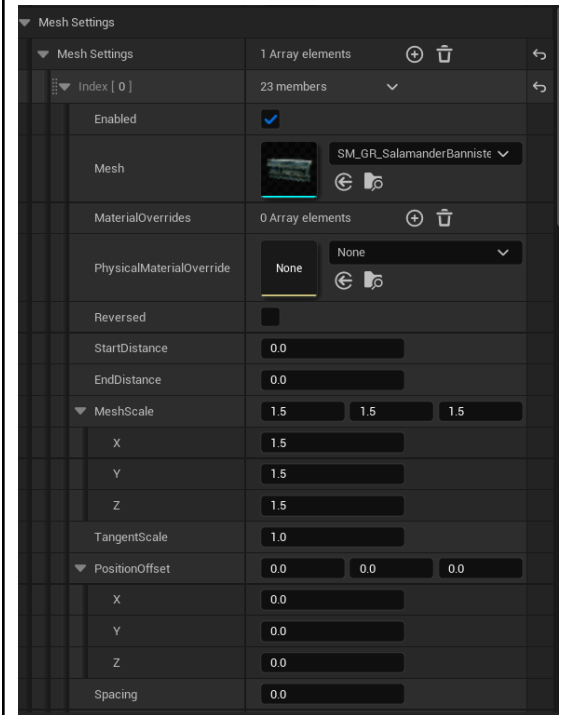
Use the panel to generate the kind of spline that you would desire.

Once you have dialled in the settings you like, **hit X to close the spline window.**

Do not click on the spline to move it etc. before closing the panel first or it will cause problems.



Use the mesh setting panel on the right to change lots of features. You can change the mesh, you can rotate or scale the mesh, add end or start caps etc.



DO NOT SCALE SPLINES AT THE ROOT.

If you want to scale or rotate splines, do it from the mesh settings section.

When in doubt...

Ryan can help you out!

Once you are done, we need to bake out our spline meshes into static meshes.

9a - HalfPipe Splines and volume

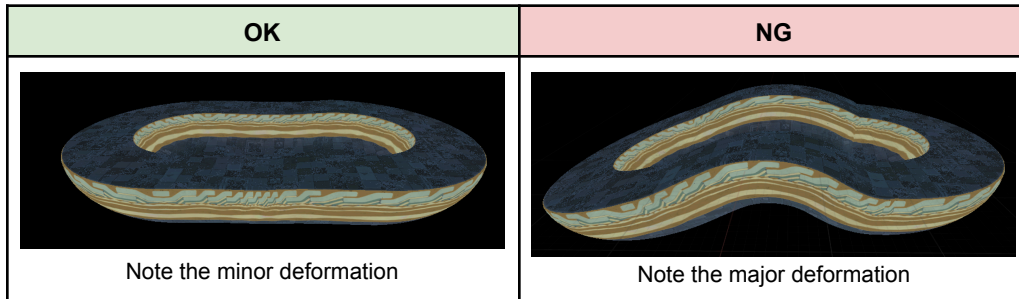
=====

Alex has made us a volume which changes the slide and friction values for the player controller for specific use in 'bowls' made of SM_GR_Floor_Canal_XX pieces.

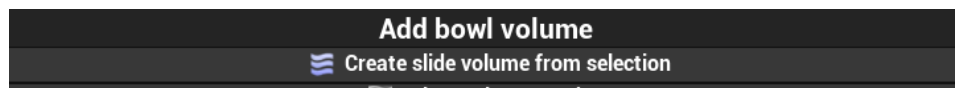
The tech is only designed to work with SM_GR_Floor_Canal, milage will vary on other meshes and is not advised. The volume should **NOT** be used with any blender or terrain tool geo.

The following will cover the very specific setup guide for the recommended **BP_SplineMesh_Canal_Dual**.

1. Place your geo in the level. Do NOT deform it too heavily. You need to preserve the bowl inside.

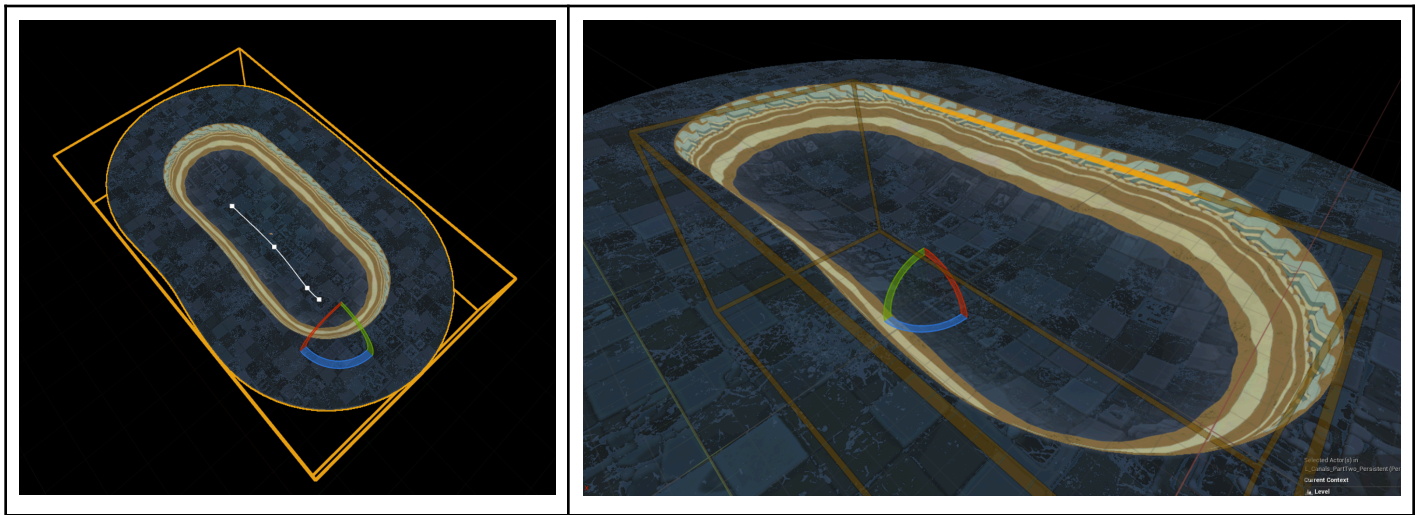


2. Select the geo and use the [Create Slide volume from Selection] button in Da Steamer. This will create a BP_SlideVolume_Default01 around the geo



3. Position the volume so that the box fits within the bowl and sits just below the top lip of the geo, make it as tight as possible.

From this	To this
-----------	---------

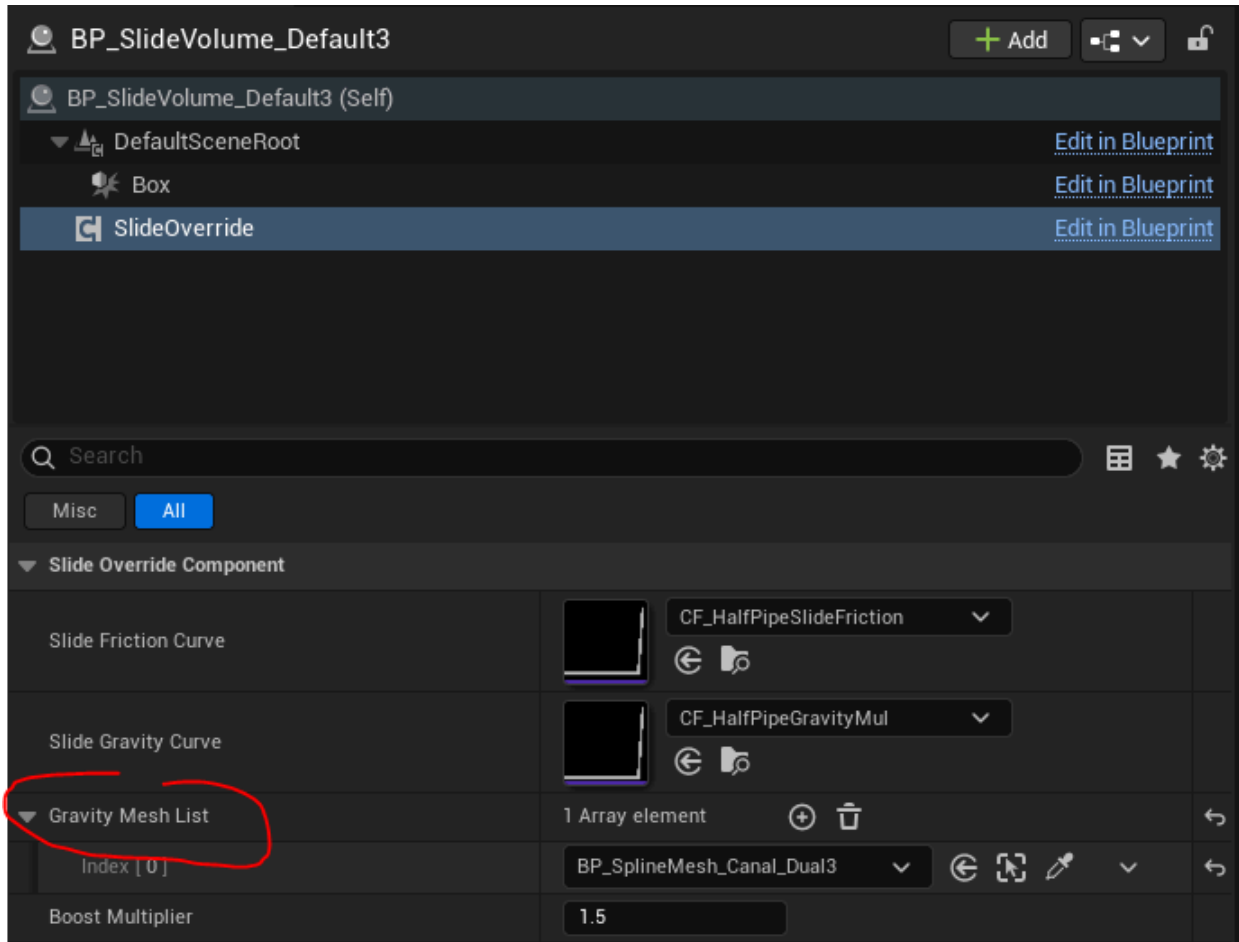


4. Finished!

If you need to check setup, look at room 2 in canals 1



Note: The [Create Slide volume from Selection] should take care of the creation but if you need to ever add more geo after the fact, select the BP_SlideVolume_Default01 and you can edit the mesh list on the override component.



11 - Missions

=====

When it comes to creating and managing missions, we should be sure to leverage their strengths.

Firstly, missions can be room based or global across a level.

To add an extra mission just search for the class at the bottom of the rooms editor screen and with your desired room selected hit the plus button.



Furthermore, they are stackable, which means that one room can have multiple missions.



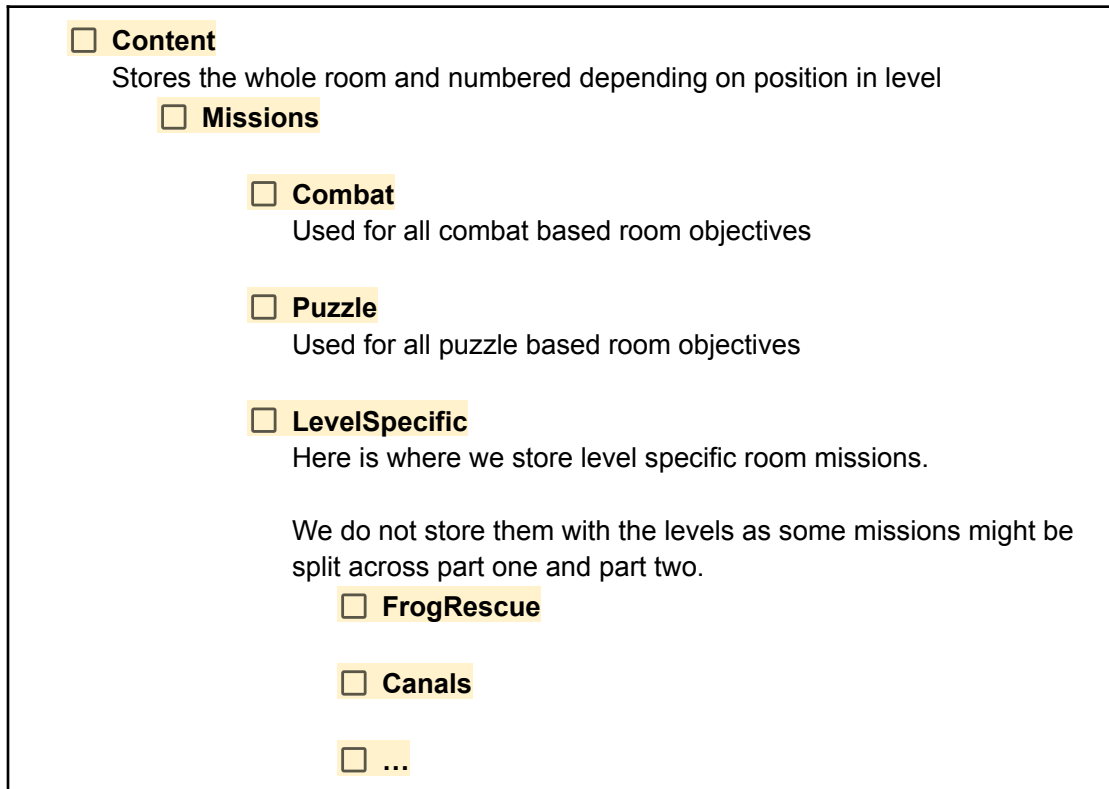
There is no hard line naming convention for room component objectives, however you should use common sense names.

Remember you aren't the only one working on the levels

If someone has to take over your work or fix a bug, giving them the gift of competent naming will go a long way. Use names that describe what the mission is doing and indicate if it is required or not.

GOOD	NG
MainRoomObjective SideRoomObjective FirePuzzleObjective	Objective 1 Objective 2
	Objective Objective Objective
	SuperObjective SuperObjectiveCopy

When it comes to saving the missions we should follow more strict naming conventions and file paths.



The following naming conventions should be kept.

MISS_[Type]_[Descriptor]_[Variant]

The types that exist are CMB for combat, PUZ for puzzle and for mission specifics we use the level initials such as AC for abandoned citadel.

The descriptor should say what this mission does. Remember that these are intended to be reused in most cases so be as helpful in your naming as possible.

Also remember that missions used in objects are re-usable. So if you have a level where you want there to be a mission in each room that involves breaking things - say a pot in room01, box in room 02, barrel in room03 then do not create individual mission files. Recycle what you have.

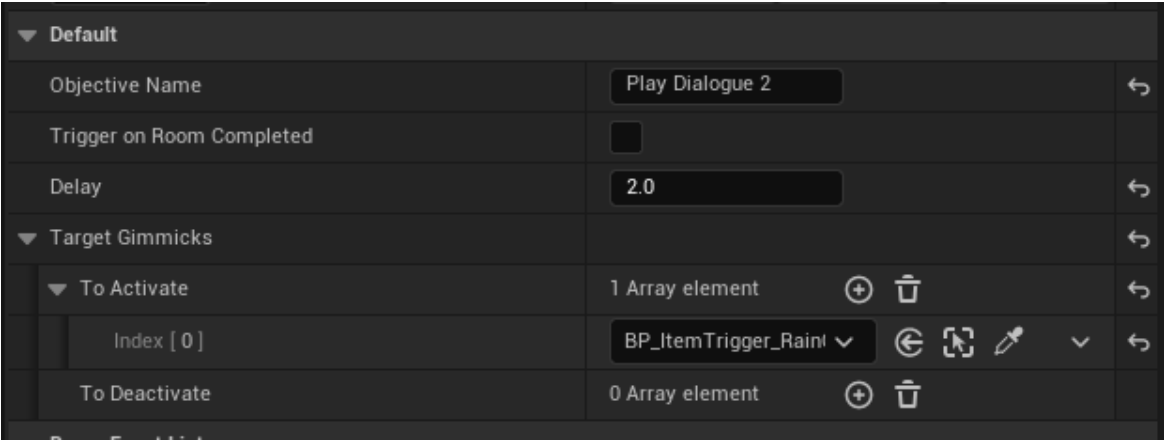
GOOD	NG
MISS_PUZ_DestroyItem_Default01	MISS_PUZ_DestroyPot

	MISS_PUZ_DestroyBox MISS_PUZ_DestroyBarrel
--	---

Using Mission Objectives to Trigger Gimmicks

the game has two systems for triggering events. The main one is to use the missions system and then setting up objectives which actors placed in the level can be triggered by when an objective becomes active or is completed. The other is the gimmick system, which works by pointing a trigger actor at a target actor. However, some actors use the objective system and others use the gimmick system, which means a bridge is required. Enter BP_EventRelayTrigger.

BP_EventRelayTrigger can be placed in a room with any gimmicks that need to be triggered when an event completes, with an optional delay. Instead of an objective, it can also be set to trigger the gimmicks when the room completes. This is useful for enabling things like rain and storm coins, which can work better when the room has been completed and there are not any enemies in the way.



11a - Missions and Cutscenes

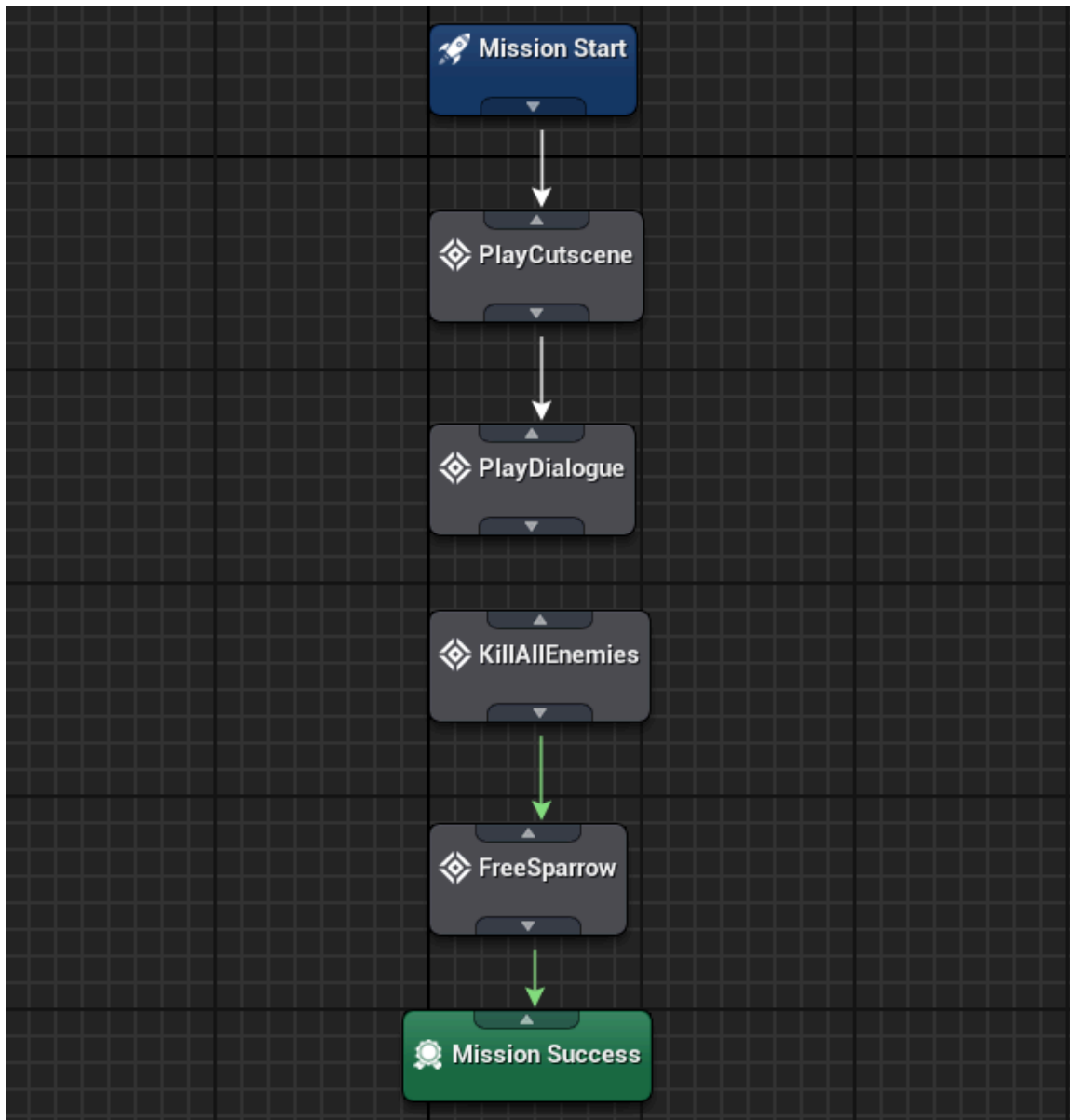
=====

This is a guide on how to set up missions around cutscenes.

1. Start by checking if the room already has a mission assigned under the [Objectives] component of the room manager. Some rooms will already have one for other reasons. If there is none there then go to step 2. If one does exist follow these steps:

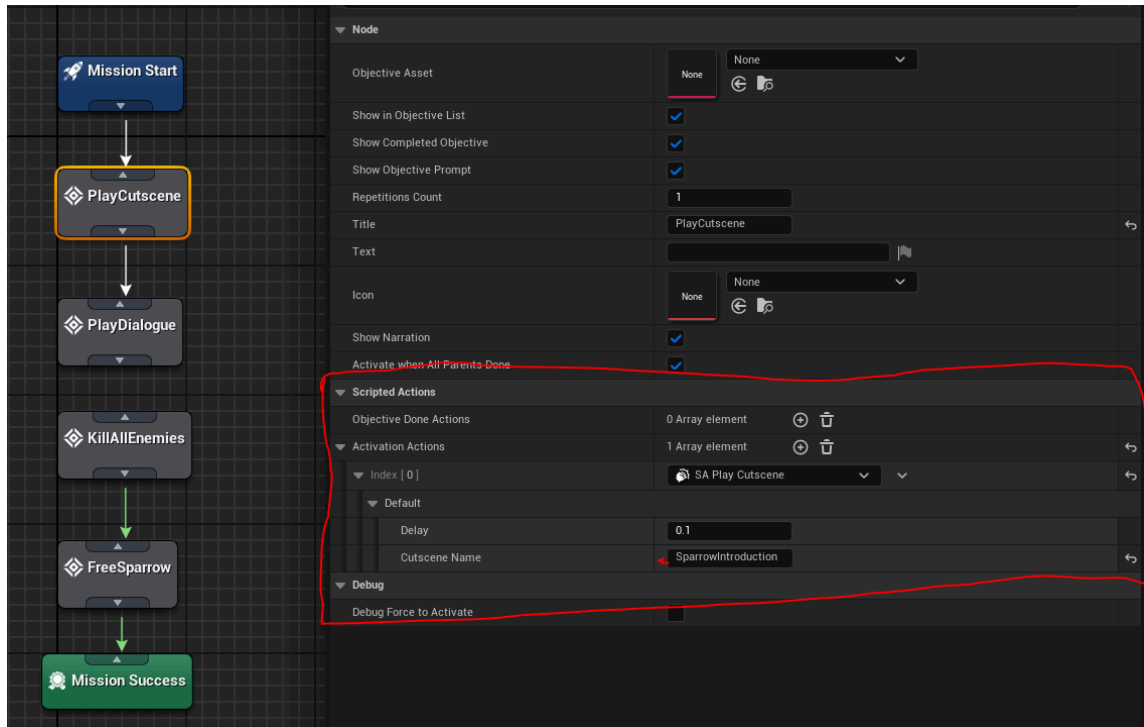
Rooms can have multiple objective room components, DO NOT remove the old one.

2. Once you have your room component and a mission assigned, it is time to block out the mission.



Once this is done, let's look at playing the cutscene!

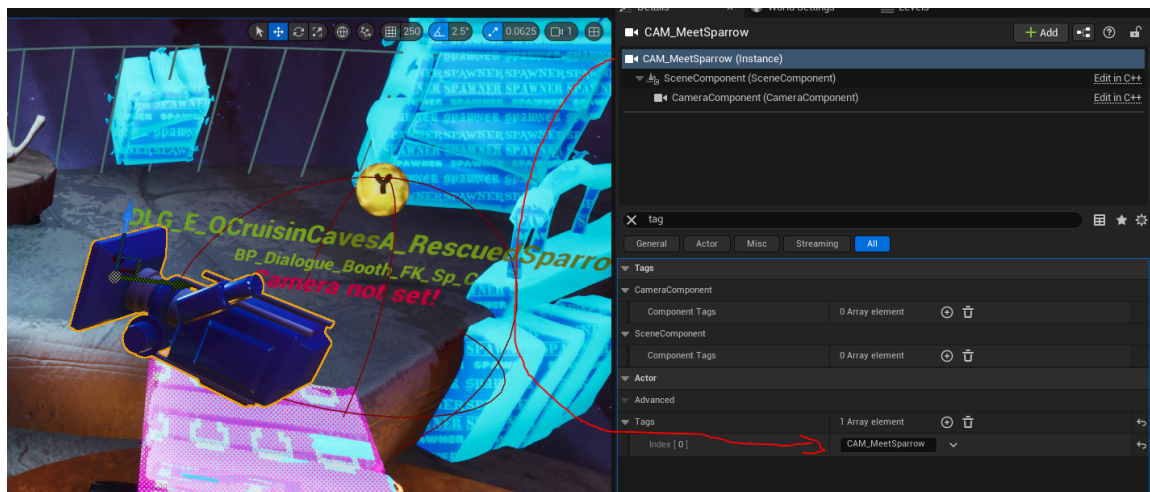
3. On the objective, assign an activation action of SA Play Cutscene. Be sure to put in the correct cutscene name key here. You can reference keys at [Dialogue - AWY](#)



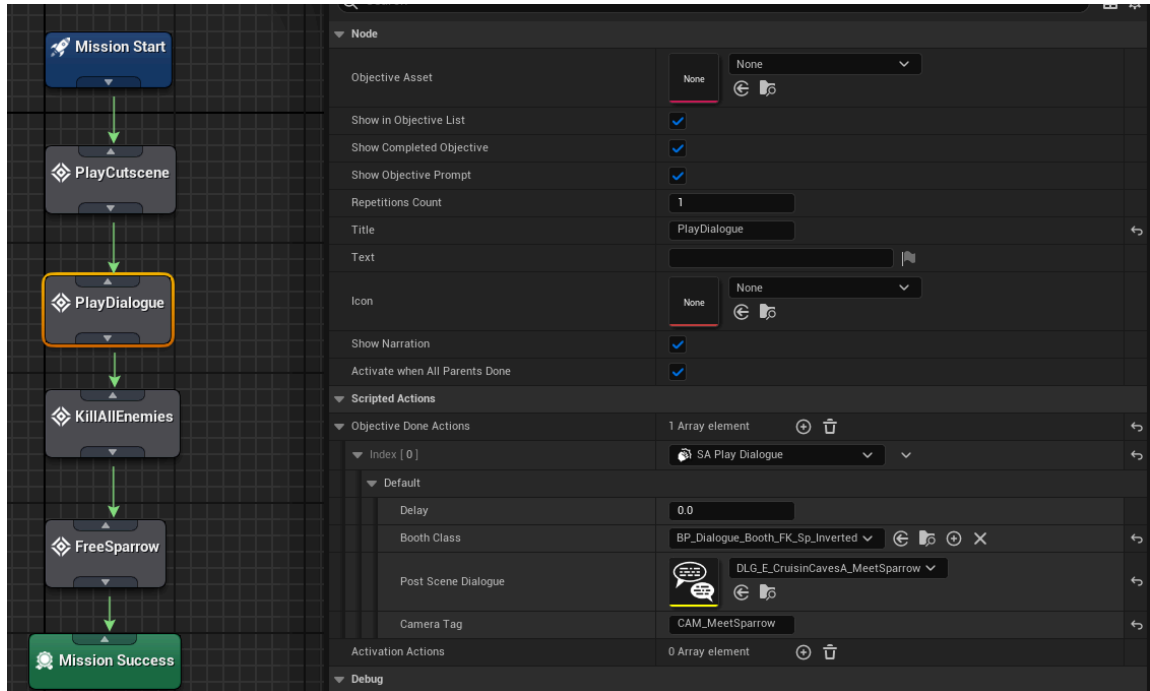
4. Next we do something very similar for the dialogue objective.

This time we need to reference the booth and dialogue from the same sheet.

We also need to put in a camera tag. All rooms should have cams pre-placed by colin. Just find that camera and assign that a tag of the name of the camera.

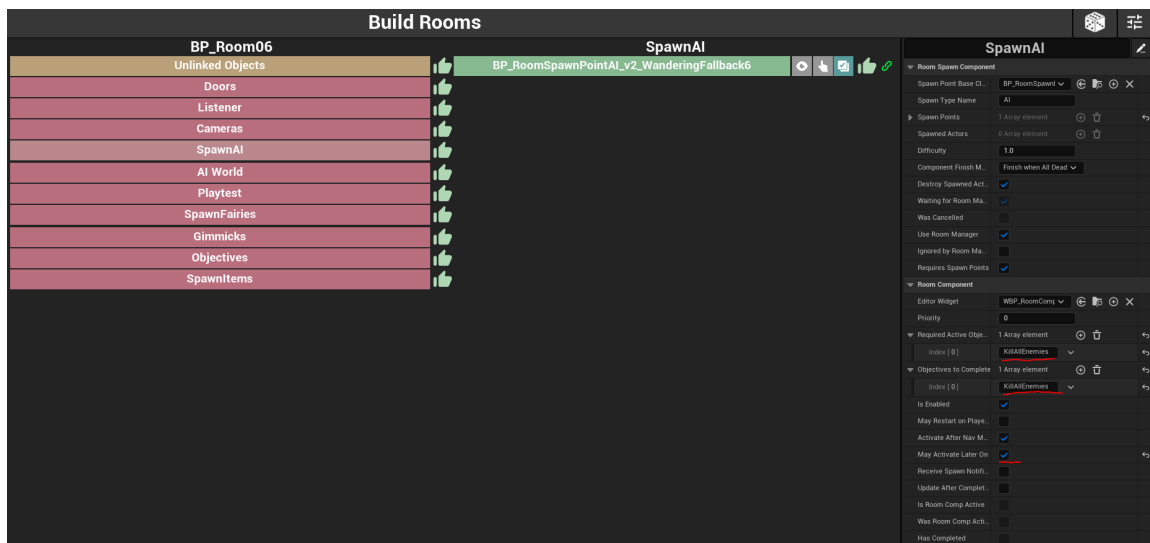


You then want to assign that on the objective.



- Now comes the part where you integrate the gameplay with the mission. This should be familiar to LDs, and if not listen up!

You need to tell the [SpawnAI] room component to listen out for the objective of KillAllEnemies and complete that task when everyone dies.



Under this component, assign the required active objective to be your objective and also set it to complete once finished. This is done by putting the EXACT name of your mission objective into the two string inputs highlighted above. You MUST also select the

[May activate later on] flag!!!

This means the AI will only spawn once this objective starts and they will complete it when they die. If your room has more than one SpawnAI component you can set it up on the specific one you need.

6. UHH COLIN?? BLUEPRINT STUFFFFFF??

11b - End room missions

=====

There always needs to be a mission on the end room of each level to ensure that the players collect the loot before leaving.

There are two situations, one where rooms don't have a blockade on the final door and ones where they do. I will cover both setups

A - Rooms without blockades.

For these rooms either assign an objective, or create a new one if the objective is already used, to **MISS_PUZ_OpenChestDefault01**.

GetChestObj

▼ Objectives Room Component

Room Mission



MISS_PUZ_OpenChestDel ▼

↶



↷

Wait for Objectives t...

0 Array element

+

🗑

Objectives to Comple...

0 Array element

+

🗑

Objectives to Comple...

0 Array element

+

🗑

Room Mission Mode

Wait Until Complete and Remove ▼

Completion Restarts...

☐

Ignored by Room Ma...

☐

▼ Room Component

Editor Widget

WBP_RoomComp ▼

↶



+

✕

Priority

10

Required Active Obje...

0 Array element

+

🗑

Objectives to Complete

0 Array element

+

🗑

Is Enabled

☒

May Restart on Playe...

☐

Activate After Nav M...

☐

May Activate Later On

☐

Receive Spawn Notifi...

☐

Update After Complet...

☐

Is Room Comp Active

☐

Was Room Comp Acti...

☐

Has Completed

☐

▼ Component Replication

Component Replicates

☐

▼ Variable

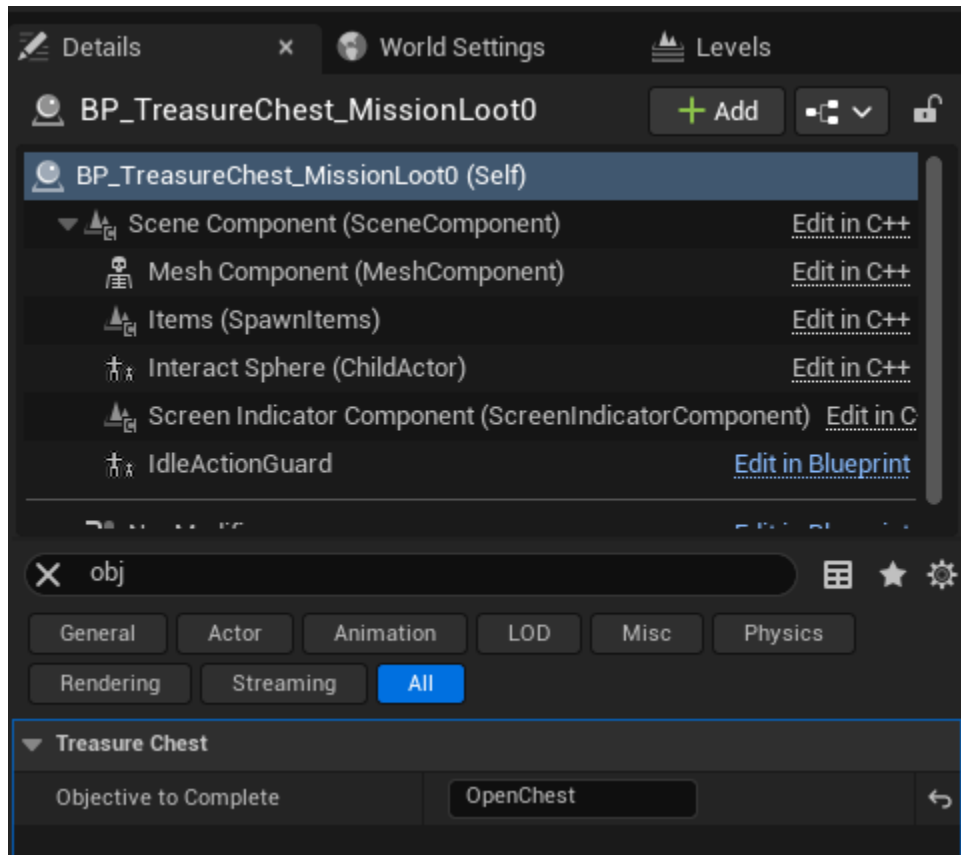
Editable when Inherited

☒

▶ Replication

▶ Navigation

After that ensure that the chest has OpenChest set as the objective.



From there “It just Works” (Howard, T. 2015)

A - Rooms with blockades.

For these rooms either assign an objective, or create a new one of the objective is already used, to **MISS_PUZ_ClearPortal_Default01**.

Objectives

Objectives Room Component

Room Mission



MISS_PUZ_ClearPortal_Di

↶



↷

Wait for Objectives t...

0 Array element

+

🗑

Objectives to Comple...

0 Array element

+

🗑

Objectives to Comple...

0 Array element

+

🗑

Room Mission Mode

Wait Until Complete and Remove

Completion Restarts...

☐

Ignored by Room Ma...

☐

Room Component

Editor Widget

WBP_RoomComp

↶



+

✕

Priority

10

Required Active Obje...

0 Array element

+

🗑

Objectives to Complete

0 Array element

+

🗑

Is Enabled

☒

May Restart on Playe...

☐

Activate After Nav M...

☐

May Activate Later On

☐

Receive Spawn Notifi...

☐

Update After Complet...

☐

Is Room Comp Active

☐

Was Room Comp Acti...

☐

Has Completed

☐

Component Replication

Component Replicates

☐

Variable

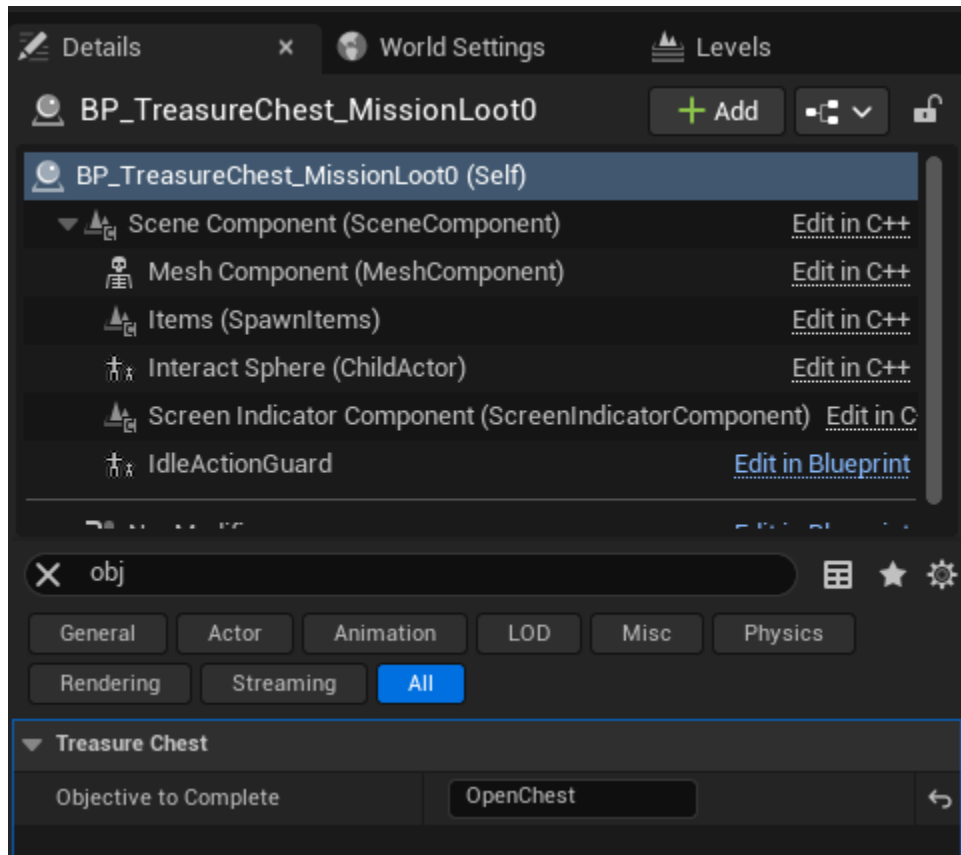
Editable when Inherited

☒

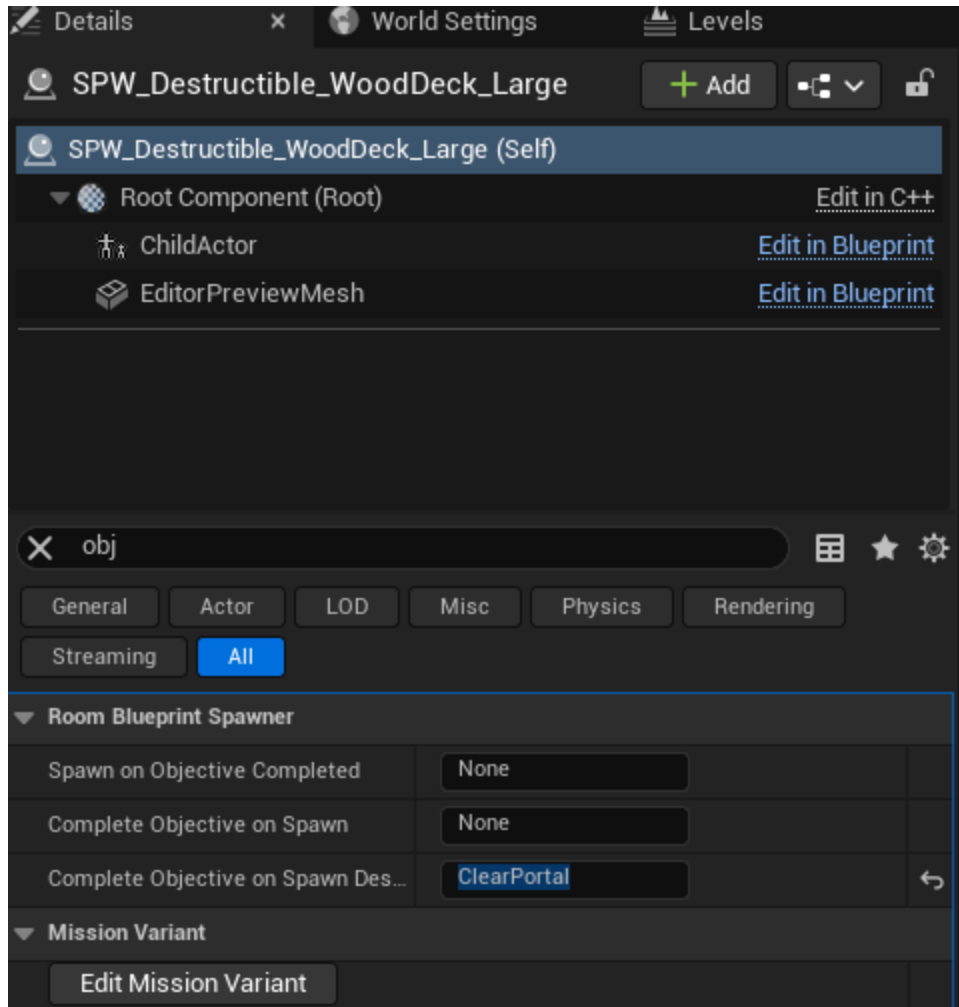
Replication

Navigation

After that ensure that the chest has OpenChest set as the objective.



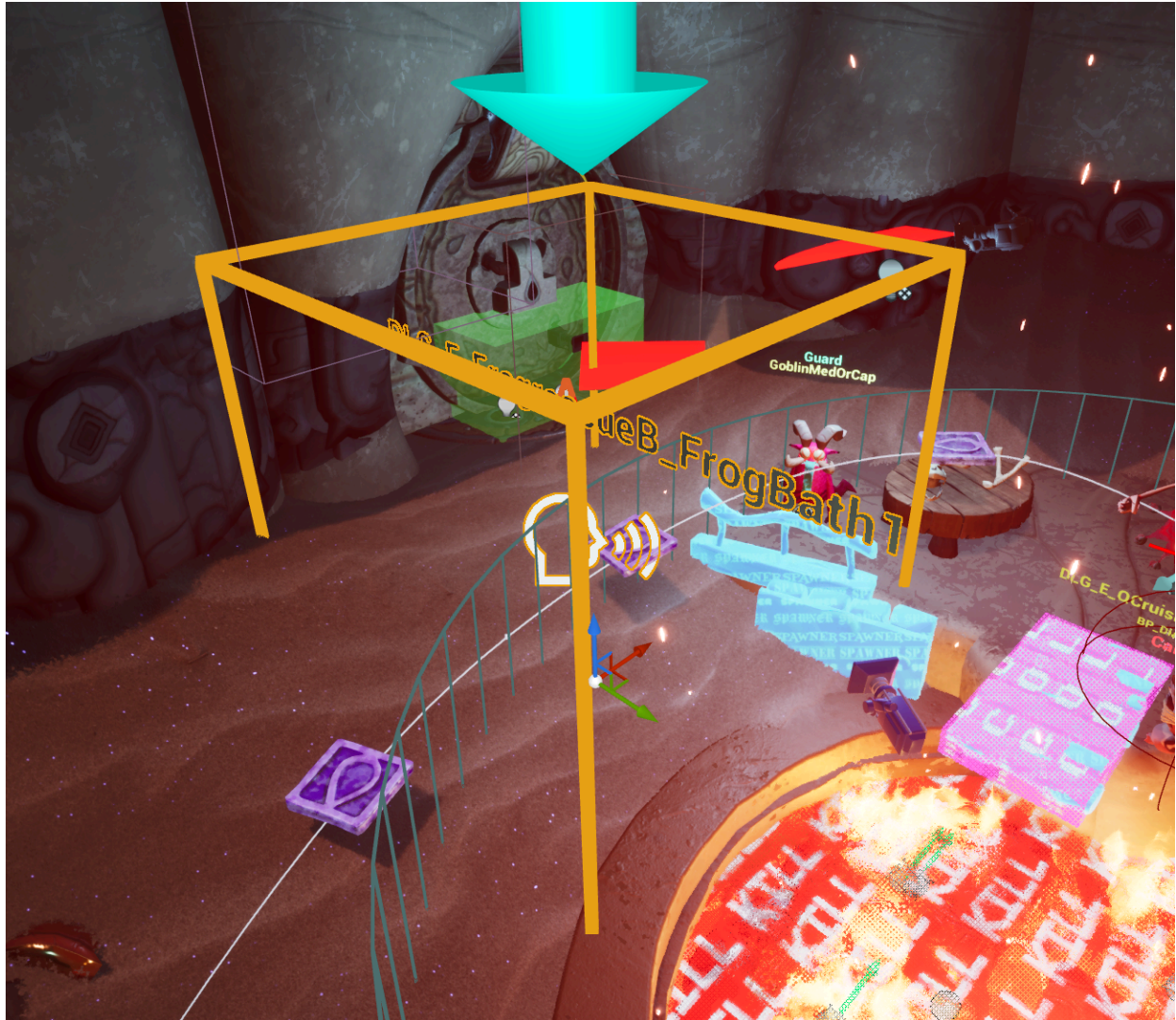
And ensure the blockade has ClearPortal.



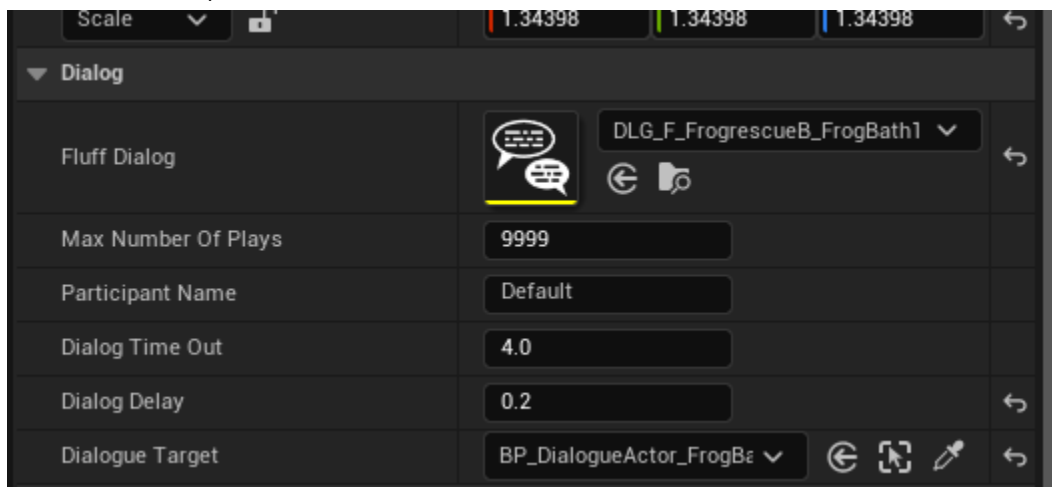
11c - Dialogue box volumes

=====

Start by placing a BP_ShowFluffDialogueBoxVolume where you want to trigger the dialogue.



Next assign the DLG_ fluff dialogue (these are made by Colin so holler at him if you don't know which one for that area)



By default these will cause the dialogue to play above the actor that entered the volume. If you want to play the dialogue at a different point, pull in and assign a BP_DialogueActor under Dialogue target and place that where you want to see the text

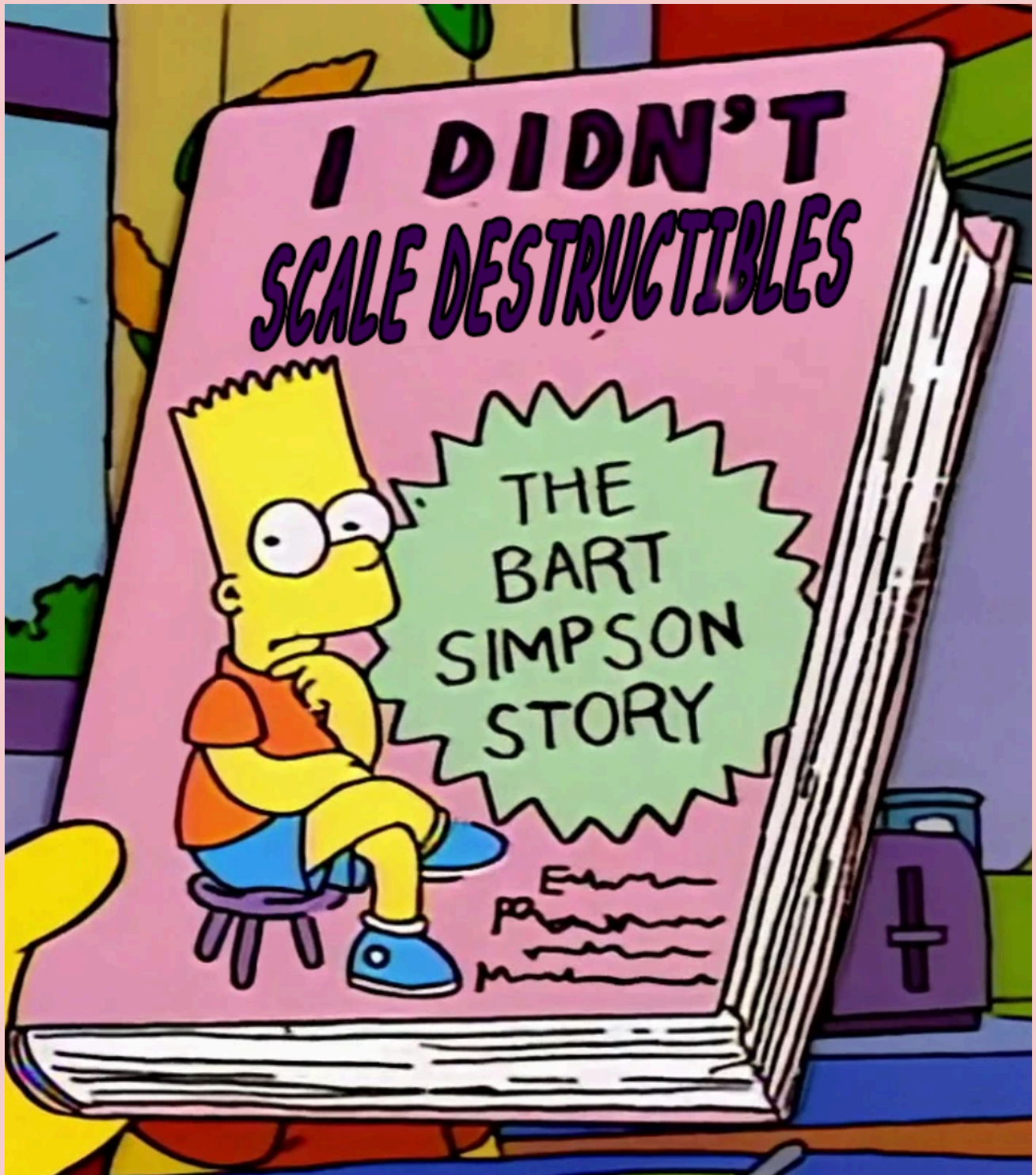


12 - Destructibles

=====

First off...

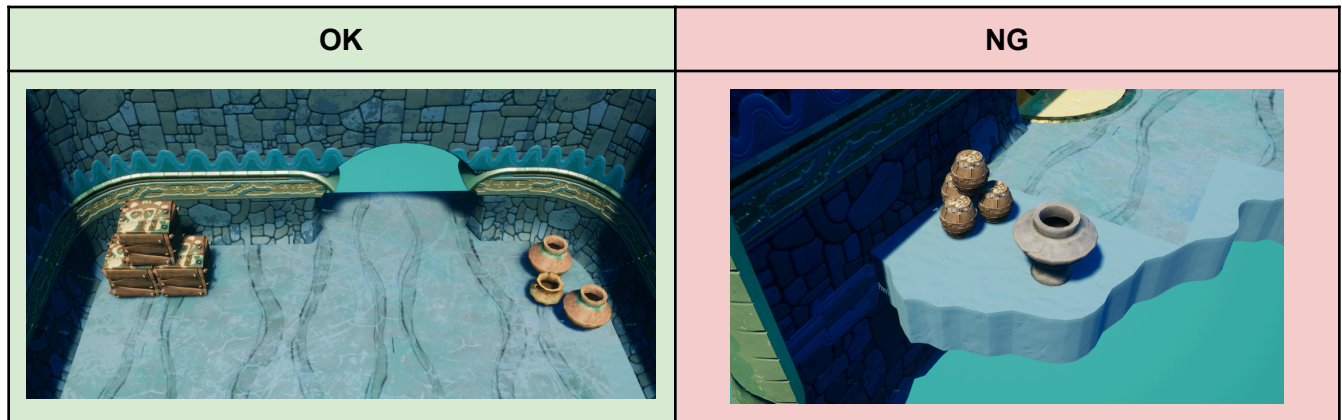
!!! NEVER, EVER, SCALE DESTRUCTIBLES !!!



Editor's note: ha ha, we blocked you from scaling them anyway!

Now that that is out of the way, it is time to start placing destructibles.

When it comes to placing destructibles, try and build nice “Vignettes” that also compliment the gameplay. From a stylistic point of view, we don’t want to intermingle the destructible types, i.e. barrels should not be mixed in with the pots



13 - Magic Puzzles

=====

To dynamically place magic puzzle throughout the world we have

VIN_Puzzle_Cube5x5_Magic... vignettes at our disposal. When updating your levels find or create a nice flat space that can hold this 5x5 cube and build rooms.

From there on out there will be a magic puzzle available in that part of the level when you play through.



The room needs to have a mission component with the following settings to work:

- ☐ Room Mission [MISS_PUZ_GenericPuzzle_Default01
- ☐ Room Mission Mode [Cancel when Leave and Remove]

14 - Storm coins and Rain Coins

=====

Collectibles can be added to the levels as storm coins and rain coins. First let us cover the difference in use and purpose of the two collectible types.

Storm Coins	Rain Coins
-------------	------------

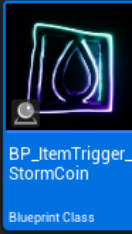
	
<u>HOW MANY</u> One per level max	<u>HOW MANY</u> These can be reused multiple times per level depending on need. The only size constraint is that small rooms should be limited to 5 coins while large rooms are limited to 10. <u>No other values should be used.</u>
<u>WHY</u>	<u>WHY</u>
<u>WHERE / WHEN</u>	<u>WHERE / WHEN</u> A
<u>REWARD</u>	<u>REWARD</u>

Next we shall discuss their implementation.

Each coin type has an associated pickup blueprint and a spline blueprint.

The pickup item is a version of the item that exists physically in the level, once collected it can trigger the splines to start.

	BP_ItemTrigger_StormCoin or BP_ItemTrigger_RainCoin01
--	---

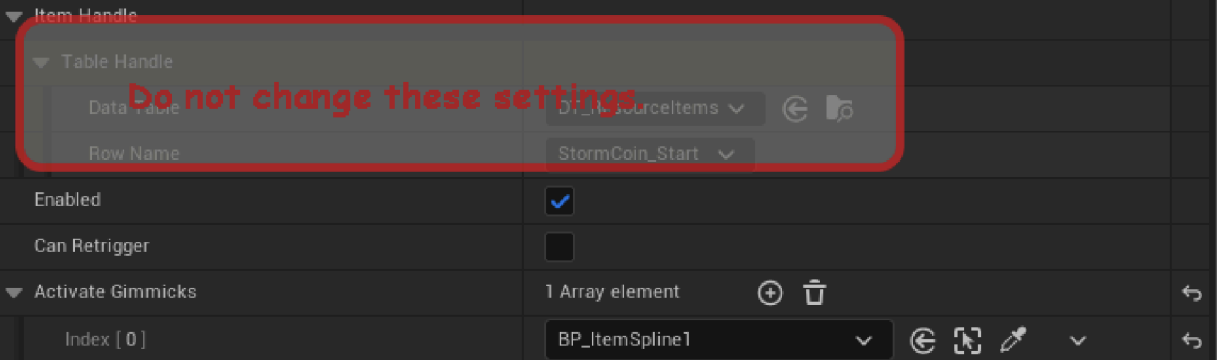


BP_ItemTrigger_StormCoin
Blueprint Class



BP_ItemTrigger_RainCoin01
Blueprint Class

Walking into it will trigger the pickup coin.



Enabled can let you determine if the coin should be active from the start. Turn this off if you want the coin to only appear after an event like combat etc.

Activate Gimmicks Array is where you assign the gimmicks, most probably a BP coin spline upon pickup.

The basic setup for BP_StormCoinSpline and BP_RainCoinSpline are essentially the same.

Start by placing the BP in your room. These are BPs with a spline. The designated coin type will move along said spline. You have settings, which we will cover, that let you control speed, path, life time etc.

Start by setting up the spline along your desired path. I highly recommend using Alex's Recording tool built into the spline.

When it comes to placing you should make sure the first coin is down camera of the trigger

The setup steps are as follows:

1. Play in editor
2. Eject but **DO NOT QUIT GAMEPLAY**
3. Select the desired spline and Hit StartRecording, a camera icon should appear
4. Follow the path you want to take and ...
 - a. Either toggle the record on with B
 - b. Or continuously record while sliding with X
5. Once you reach the end, eject but **DO NOT QUIT GAMEPLAY.**
6. Reselect the spline and hit Hit StopAndSave

7. Quit gameplay
8. Select the spline and hit LoadSavePoints
9. Profit

BP_StormCoinSpline



BP_RainCoinSpline



From there you have a few more settings at your disposal.

▼ Item Spawning		
▼ Basic Item Handle		
▼ Table Handle		
Data Table	DT_ResourceItems ▼	⌂
Row Name	StormCoin_Small ▼	
Basic Item Count	5	
▼ Reward Item Handle		
▼ Table Handle		
Data Table	DT_ResourceItems ▼	⌂
Row Name	StormCoin_Large ▼	
Prize Spawn Location	End Of Spline ▼	
Item Spread	1.0	
Item Reveal Speed	0.0	
Move as Revealing	☐	

You can change basic item count for how many there should be

Prize location has three options:

- End of spline is... at the end of the spline
- After basic items is wherever the last item on the spline was got
- Named Component is at the RewardLoc component

Item spread is how bunched up the items should be on the spline

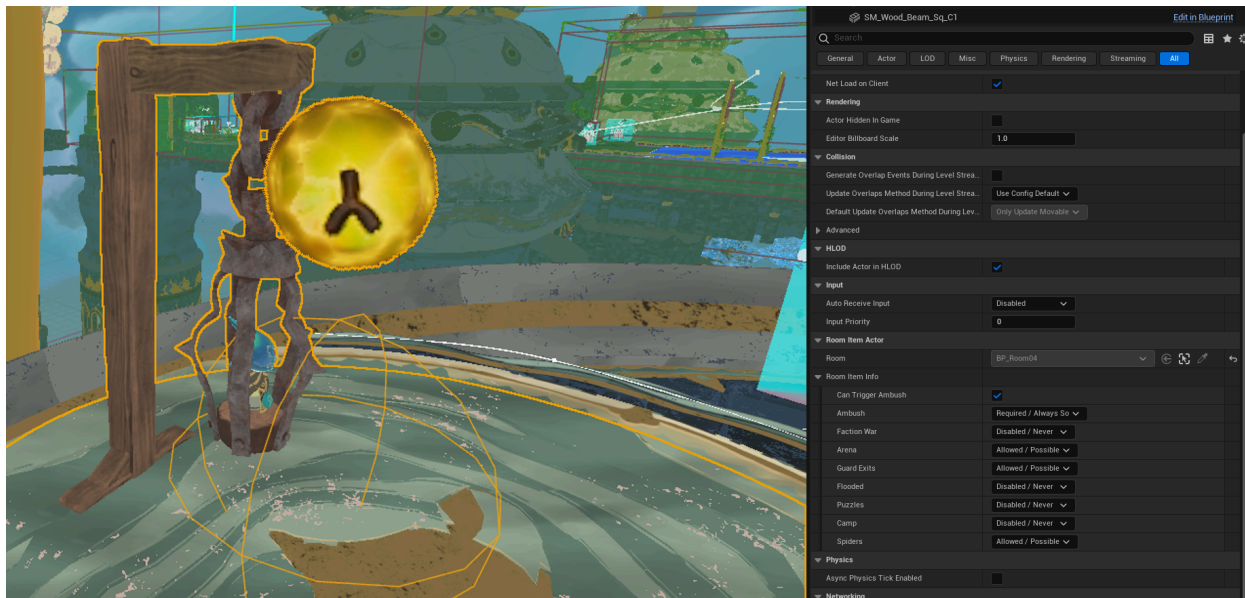
Item reveal speed lets you control how fast the coins move to the tip. Rain coins use this and item spread and the move as revealing bool to create the travel effect.

▼ Input		
Auto Receive Input	Disabled	▼
Input Priority	0	
▼ Item Motion		
Item Max Destination Overshoot	400.0	
Item Finished Distance Check	50.0	
Item Motion Speed	150.0	↶
Wrap Motion	☐	
▼ Item Spring Forces		
Spring Stiffness	200.0	
Spring Damping	30.0	
Max Force	20000.0	
Gravity Comp Factor	0.72	
Multiplier when Pulled	0.25	
▼ Item Debug		

15 - Monk Room - Deprecated

=====

This is a guide on how to designate a monk room as such.



First, ensure your monk room has a BP_Monk_Collectible located in side.

Depending on the setup of the monk room, you will need to adjust the values of the BP.

Editors note: As of Feb 2025 only the following settings work

- can trigger ambush
- ambush
- faction war

For **Arenas** the setup is as follows:

1. Place BP_RoomSpawnPointAI_v2_WanderingFallback where you want enemies to spawn
2. Place BP_Monk_Collectible
3. Make sure [can trigger ambush] is set to true (should be by default)
4. Set ambush tag to [Required / Always so]

For **Puzzles** or **Skill Check** the setup is as follows:

If there is combat:

Follow the steps for the arena

If there is no combat:

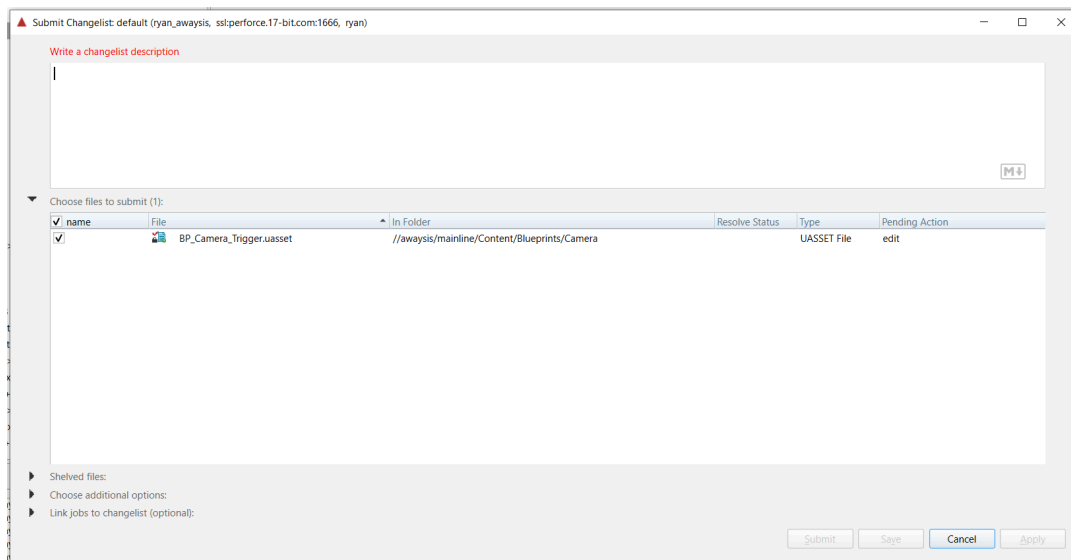
1. Place BP_Monk_Collectible
2. Set [can trigger ambush] to false

16 - Pushing files to Perforce

=====

Level designers should follow the following standards for submitting files to perforce.

Note that these guidelines are not company wide, but any one touching levels should adhere to them.



Start by prefixing your changelist description with one of the following prefixes

[add]	Use the add prefix if you have pushed any new files to the project, be it meshes, levels, blueprints etc.
[update]	Use the update prefix if you have updated any existing files such as levels, blueprints, meshes etc.
[remove]	Use the remove prefix if you have removed assets from the project.

After the prefix you should give an exact description of what changes you made in your edit. It is vital that you are specific about what exact changes you make. Please see the following examples:

GOOD	NG
[Update] Changed the camera anchor position in room 5 of frog rescue, built rooms in abandoned citadel, added 200 units to base speed of BP_ForcePad	Fixed cameras and made blueprint faster
[Add] Created level files for new CrusinCaves mission and started by adding 3 rooms.	caves work
[Remove] Removed excess wall meshes from [OuterGardens > walls > utility] as to not confuse other level designers	Mesh fix

If you make multiple kinds of edits in one push then separate them by line **UNLESS** it is a [Remove].
[Remove] actions should only be ever pushed by themselves in case we need to revert.

GOOD	NG
[Update] added room 06 to cruisin caves [add] included a new blueprint to let apples spawn where desired	Added caves and apples

NEVER combine [Remove] with a [Update] or [Add]