

May 26 Recap

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I'll go over the material covered in our first class. I'll go through it once again in the next one.

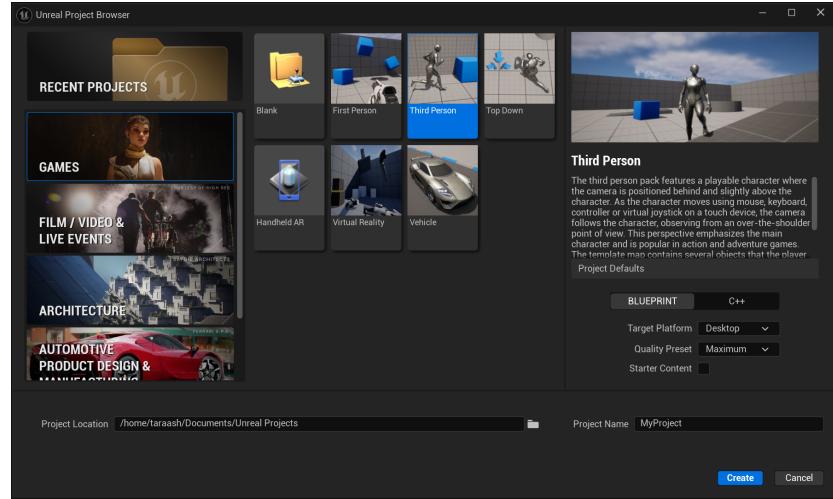


Figure 1: Welcome screen

This is the first thing you'll be greeted with when you open Unreal Engine. Most of the time we'll select The ThirdPerson template with Starter Content enable to give us starting materials, props and more to work with. If we didn't initially check Starter Content but find ourselves in need of it. We can always get it by right clicking in your Content Browser, selecting Add Feature or Content Pack, heading over to the third tab (labeled Content), select Starter Content and press Add to Project.

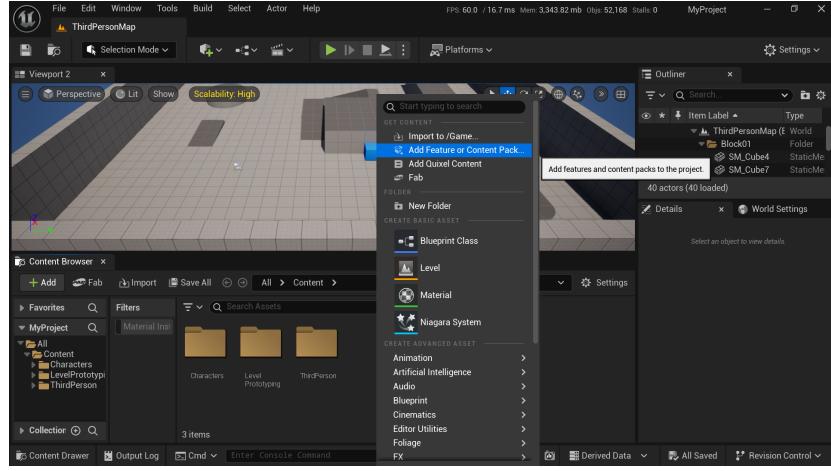


Figure 2: Adding back templates

This also how you would add back the functionality of say having the Third-Person template, or the TopDown one. This doesn't work out of the box though, and we briefly talked about Game Modes. We'll cover these in more detail in Week 2, but, simply, a Game Mode tells Unreal Engine what defaults should be spawned when the user hits play. In the case we started with an Empty level, this Game Mode is unset, and remains so after adding the template. To fix this, we go to World Settings (which can be accessed by going to the Window pane on top, and selecting World Settings. **The Window pain is incredibly important! It houses every single relevant window you might need pertaining to the thing you've got currently open).**

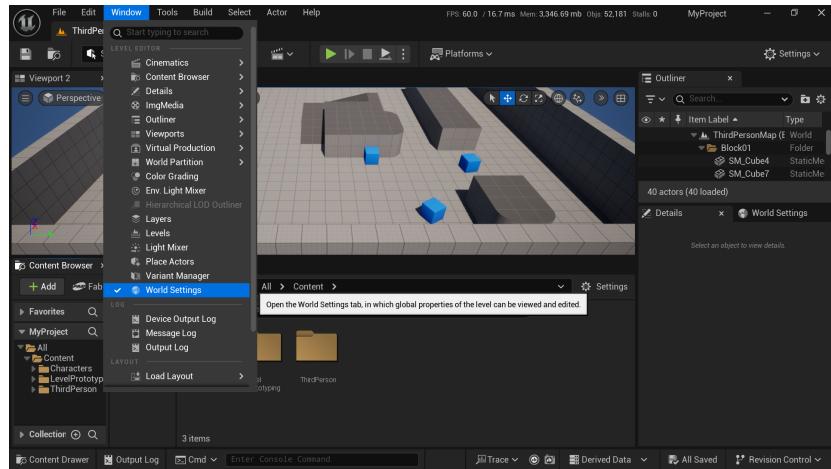


Figure 3: The Window pane!

In our World Settings tab, we simply set the Game Mode Override to the one that ships with the ThirdPerson template (I recommend opening up the associated folder and opening up this file!)

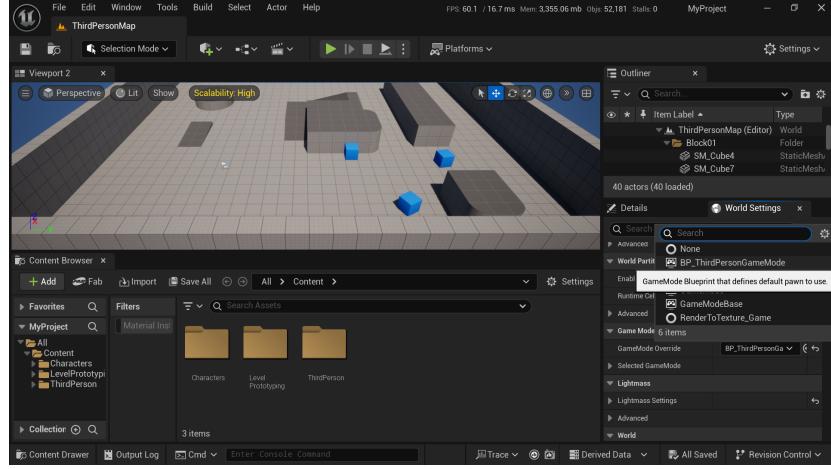


Figure 4: Game mode

This now allows us to freely move around with our brand new character.

1 Unreal Engine's Interface

Take a look at the following screenshot

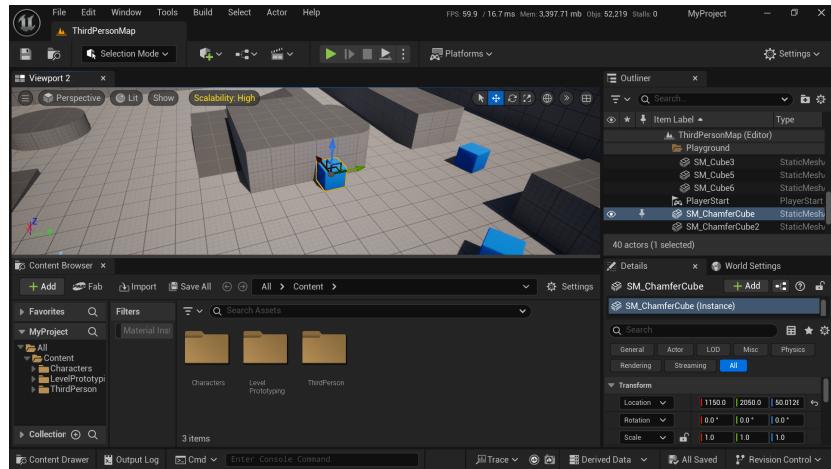


Figure 5: Interface

- The Outliner on the top right contains every single asset (or *actor*, in Unreal Engine everything is referred to as an *actor*.)
- The Content Browser on the bottom left contains every file you've imported into the project, which you may or may not wish to use in your game. It also contains various files generated by Unreal Engine itself, which we ideally shouldn't be messing with.
- The Details panel in the bottom right has details about the currently selected object. In this case, I have selected the blue cube in the middle of our scene, and we can manipulate all of its properties in this panel.
- The Viewport window is where we build our game, we can place actors by dragging and dropping, select different viewmodes such as Lit, Unlit (without light – shows only the diffuse color), Wireframe (the underlying geometry of each mesh) and more. We also have options of snapping and camera speed, which we'll talk about now.

2 Navigation

We move around by holding down our right mouse button (RMB) and pressing the WASD keys to move as expected. The Q key brings us down while E raises us. You can pan around the scene by holding down the middle mouse button (MMB). Holding and dragging the left mouse button (LMB) allows you to gently traverse a scene without pressing the WASD keys. There are few more keys that do stuff here, I recommend you try out a bunch of stuff here.

You can change the speed at which these operations happen by increasing/decreasing the camera speed which you could do by scrolling the scroll wheel up and down or under Camera Speed Settings.

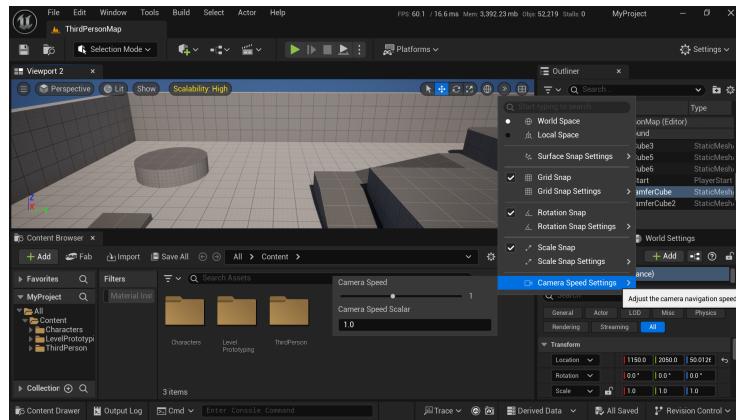


Figure 6: Camera speed

Also take a look at the different snapping modes that are available. These snap their corresponding actions to increments of the specified number. If I set my transnational snapping to 10 and try to move an object, it will only offset in multiples of 10. You could disable this feature if you'd like finer control.

3 Lightning and Content Browser

Let's see how we can add lights to our scene. To do this I want to start a brand new level which has nothing in it. To do this, I will go into the Content Browser (which you can open up by pressing **Control+Spacebar** or going to the Window pane and selecting one from there. Note that you can always drag and move around any window anywhere. To reset your window layout go to Window >Load Layout >Default Editor Layout)

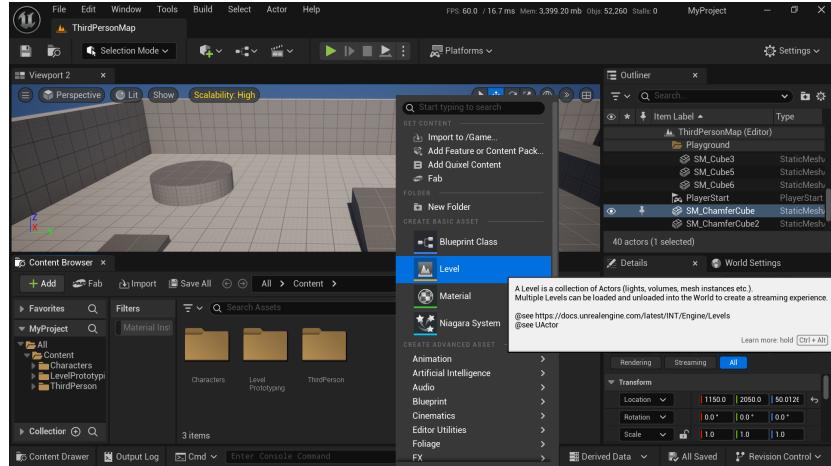


Figure 7: Creating a new level

Give it a new name, and save everything by pressing **Shift+Alt+S**. Open this new level by double clicking, observe that in the outliner it shows nothing, no lights, no default meshes, nothing. Let's now add light to our scene.

We can do this quickly by going to Window >Env. Light Mixer.

We can now just click on all these five buttons and look at our newly lit scene! I recommend selecting all these lights in the Outliner and pressing the New Folder button (just to the right of the search bar) to place these lights in a folder.

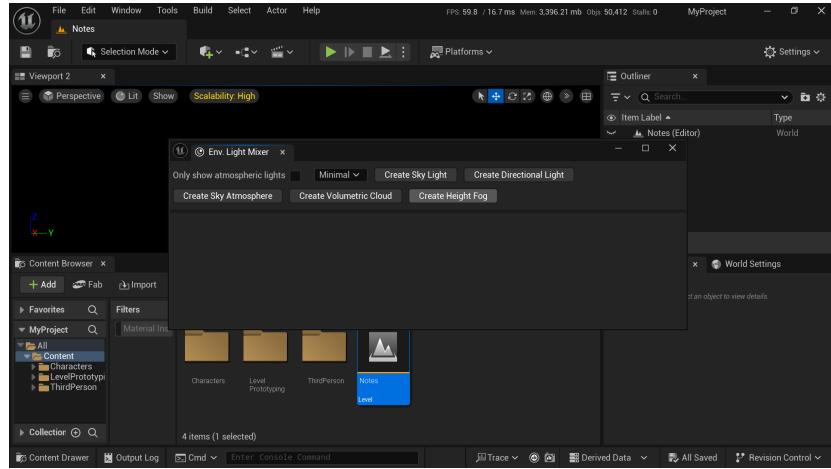


Figure 8: Env. Light Mixer

It has no objects right now, let's add a few.

4 Adding objects

Take a look at the button right next to `SelectionMode`. You can hover over almost any field in Unreal Engine to get a tooltip which describes what that specific thing does. In our case, it lets us quickly add objects. Let's add in a plane and a cube.

If you take a look at the Lights and Visual Effects sub-menu, you'll find the actors Env. Light Mixer placed for us, along with a few others. Experiment! See what all this new stuff is.

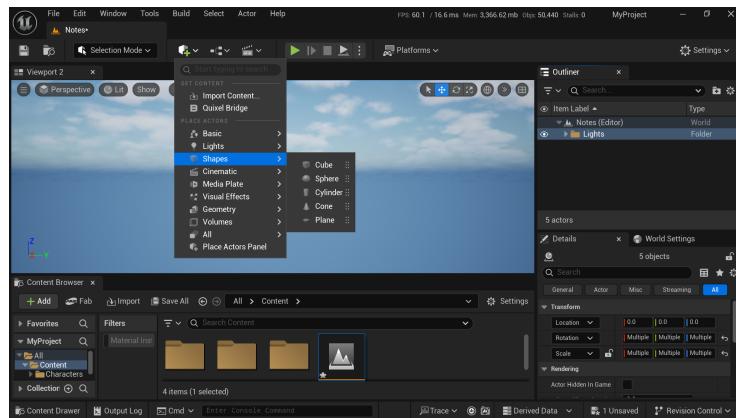


Figure 9: Placing actors

I'll now add in a plane and cube, and position the cube on top of the plane. You could move the cube by either heading over to the Details pane, or use the translation widget.

4.1 Widgets

We can manipulate our objects by using the translation, rotation and scaling gizmos. These names are rather self-explanatory. We cycle through these gizmos by pressing the **Space** key, or select one directly by pressing it's corresponding key. These are

- W: Translation gizmo
- E: Rotation gizmo
- R: Scale gizmo

This is rather confusing! But these correspond to the location of the button on the actual screen, translation, rotation and scale. On the keyboard, W, E and then R.

Using all this, we can easily create a scene with basic objects and lights. At this point I would like to experiment with a few light settings, make your scene look fascinating. Place a few cubes or spheres. If you'd like your objects to interact with your character, you need to enable physics for that object. In the Details panel, search for physics and check Simulate Physics.

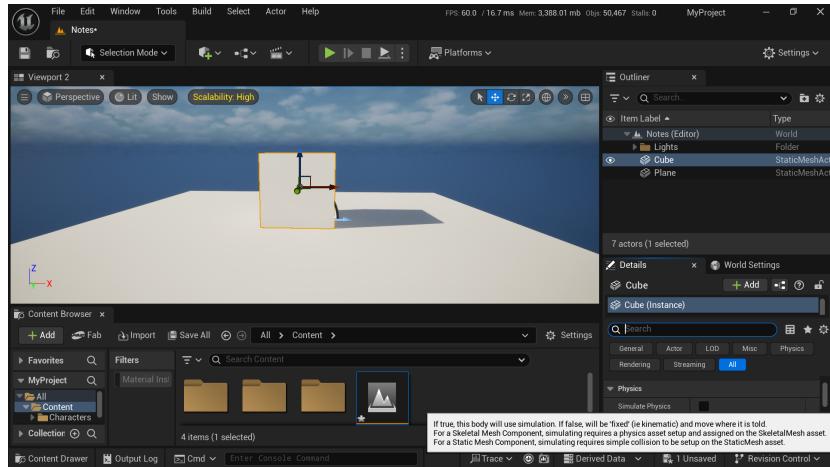


Figure 10: Simulating physics

5 Adding better objects — Brushes

I'll now go over what brushes in Unreal Engine are. Heading over to the Window > Actors Panel opens up a new window which contains more options than the one we've been using before. Find and select the tag that says Geometry.

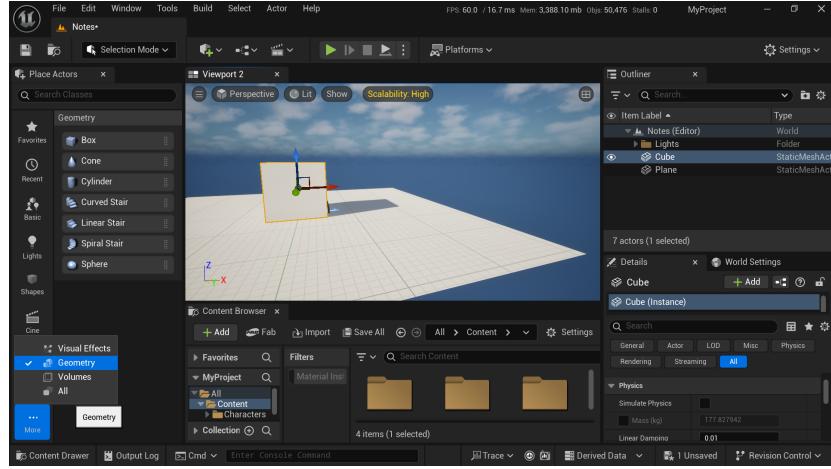


Figure 11: Brushes

This provides us with a similar menu. Let's drag in a Box. But first, a little talk about materials.

5.1 Materials

Materials. These are the things that make our 3D assets look good. You can find plenty in the Starter Content we added, you could download more from Fab, or over on the internet. I will not talk much about them right now.

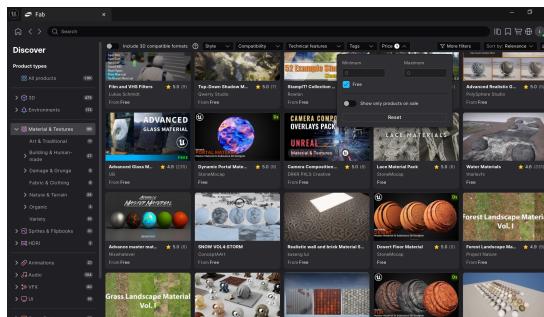


Figure 12: Materials in Fab

(There's another class of materials, known as decals that can be "projected" onto a mesh, without being directly applied to it, we'll also talk about these later.)

The important bit right now is you can only apply one material to the meshes we've been adding before (the cube and the plane). This new *Brush* we added allows us to place a new material for each surface (and also has very nice properties for these. We'll get to this soon.)

Let's get back to brushes. I'll add a box in. Be careful not to scale these things using the gizmos, that'll cause those nice square to not be squares anymore, which means any texture we apply will be stretched. (**Tip:** you can reset a value to its default by pressing the reverse arrow next to a field)



Figure 13: Texture stretching

Instead, you should use the X, Y and Z parameters under Brush Settings in the Details pane. Let's now add textures to this box (I'll use the ones found in Starter Content).

We can simply drag a material in on a face we'd like it to go to, or we can select that particular face and set the Surface Material property to the material we'd like.

There are a few ways you can slot in a material like this.

1. Drag and drop a material on this slot, it should be highlighted in blue.
2. Expand the drop down menu and find it there.
3. Select the material you like in the content browser and press the tiny arrow with a circle next to the material preview in the details panel. This will set the currently selected material in the content browser as the one to be applied.

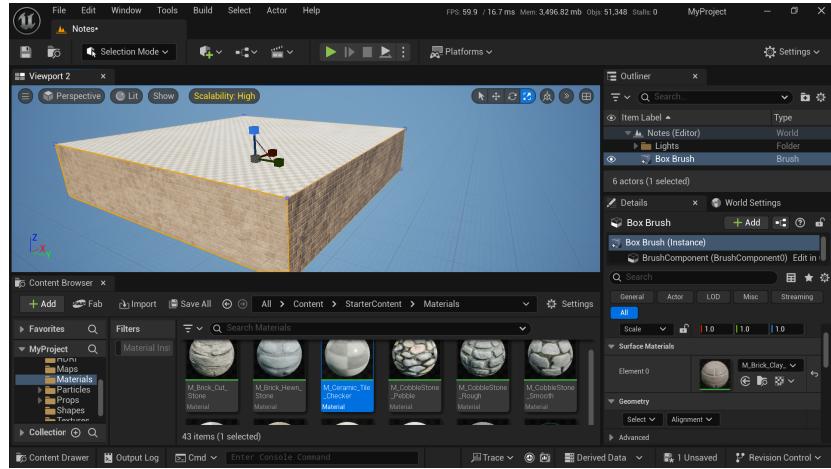


Figure 14: Adding materials

To perform boolean operations on this surface, we drag in another brush, resize it as we please, and position it where we want there to not be a solid surface. We then set the Brush Type to Subtractive under Brush Settings. This will not give us exactly what we need though, take a look

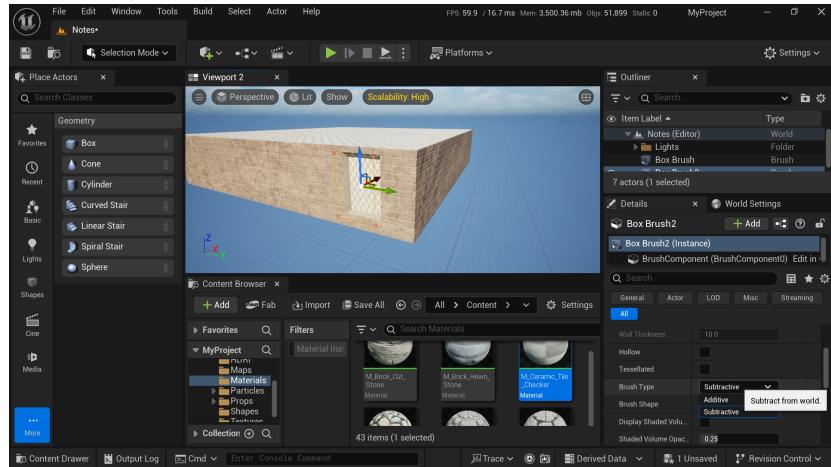


Figure 15: It's not hollow!

We can very easily fix this by checking Hollow in the Brush Setting for our main brush (this will destroy all the materials we placed, you'll have to place them again). This also enable the wall thickness parameter. I want you to go ahead and create a room with a few windows and a door. Make sure to keep everything organized in the outliner by selecting all the brushes and moving



Figure 16: Using brushes

them to a new folder.

Note: You can duplicate an object by holding down the Alt key.

We'd like our pretty building to be on top of something, let's now talk about Landscapes.

6 Landscapes

You can switch to Landscape mode by pressing on the Selection mode dropdown in the top left.

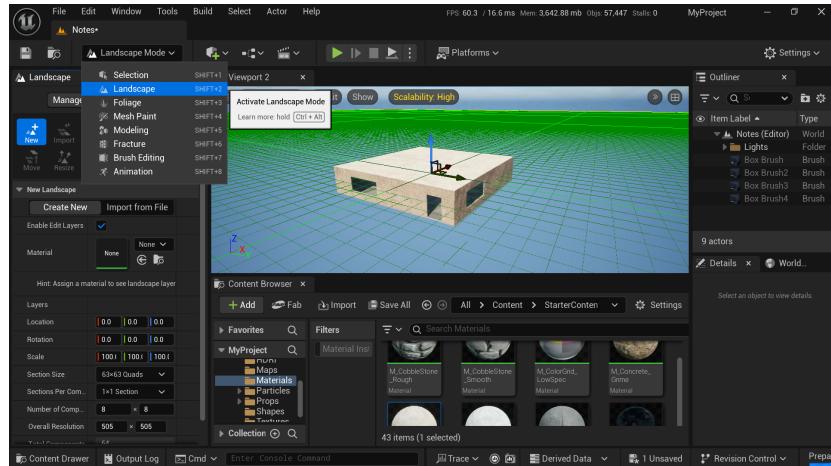


Figure 17: Landscapes

We have two options:

Create new Manually sculpt in details

Import from file Use a height map to generate the landscape

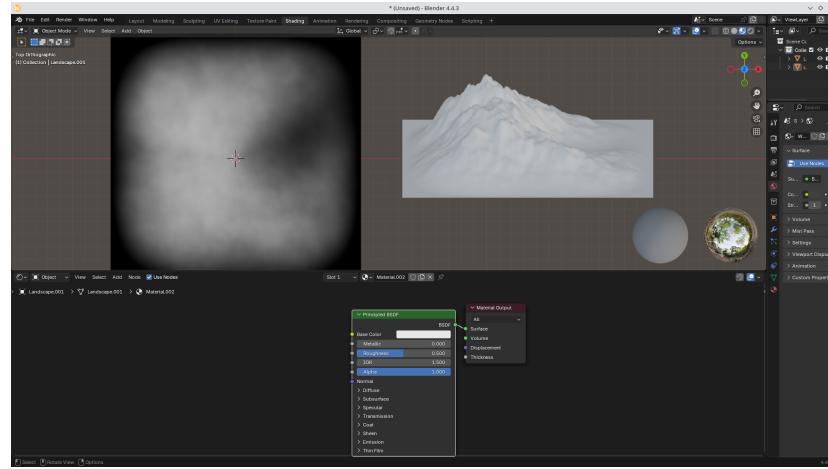


Figure 18: Heightmap in Blender

We won't be using height maps, so we continue with the create new option. We might decrease the Number of Components to reduce the size of our landscape, and thus save on performance. I'll set mine to 4 each.

By pressing on Create, we are greeted with the following window.

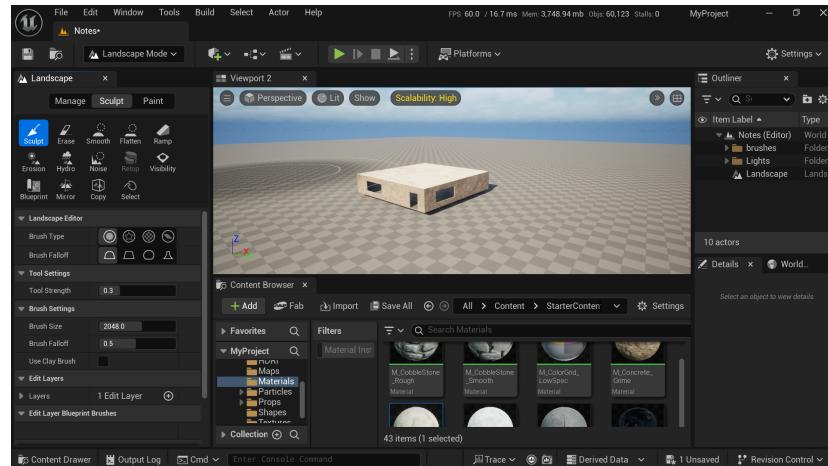


Figure 19: Sculpting landscape

I highly recommend playing around with these brushes. Most settings are self-explanatory, and you can hover over anything to show a tool tip. After you've had a go with this, you'd find it's difficult to get a lot of realistic looking detail without spending hours. A way to fix this is to go to our regular Sculpt brush and select the third option as our brush type, the pattern brush.

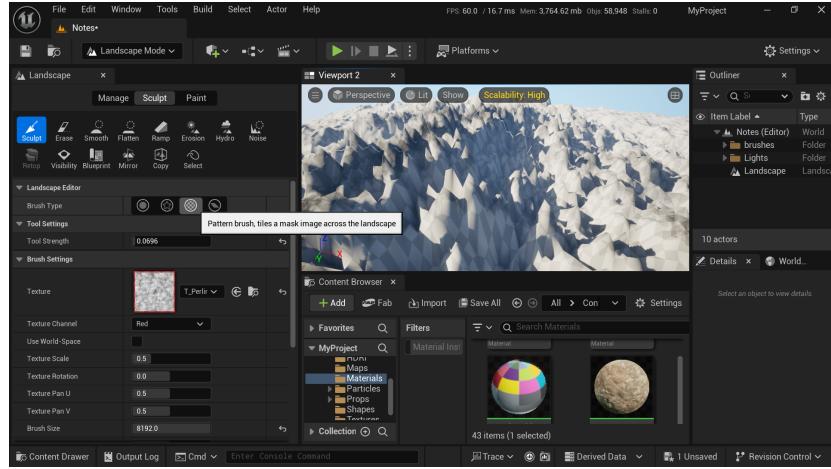


Figure 20: Perlin noise

This brush allows us to paint with a texture, black parts of the image will receive maximum displacement while the white ones will not move. This can be easily demoed by the default checkerboard texture. We can change this checkerboard one to a more natural noise, the Perlin noise by simply finding it from the drop down menu. This gives us a way to very easily get detailed landscapes without a ton of effort. You'll see the result is quite jagged, try smoothing it out with the Smooth brush. I recommend taking a look at the Kernel Size parameter and experimenting with different values.

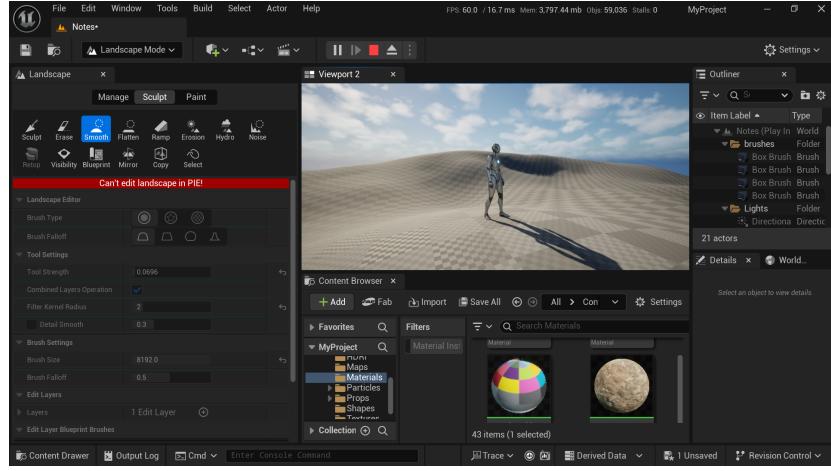


Figure 21: Smooth brush, kernel size 2

Take a look at this, it looks pretty good! Remember the building we made? We want to create a place flat enough for it to be on top of, take a look at the Flatten button and it's Flatten mode (Raise and Lower are very helpful, again, read the tool tip!).

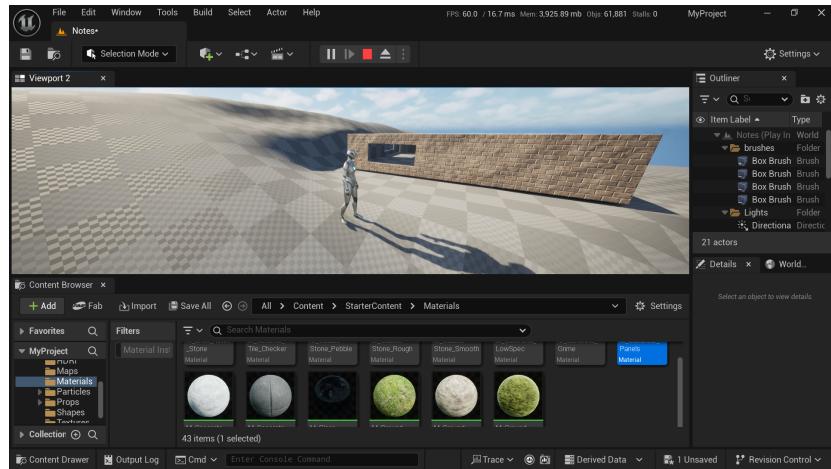


Figure 22: Using the Flatten brush

Tip: You can press the **Shift** key while on a particular brush to do the *opposite* of whatever it is meant to do currently.

Our landscape is now fairly done, let's drag and drop a grass material (from Starter Contents) in the Landscape Material slot in the Details panel of this landscape (directly dragging and dropping won't work here) and talk about foliage.

7 Foliage

These are the things that make our environment come to life, we don't have any tree or grass assets right now, so let's search for them in Fab.

For trees I highly recommend this pack from Quixel.

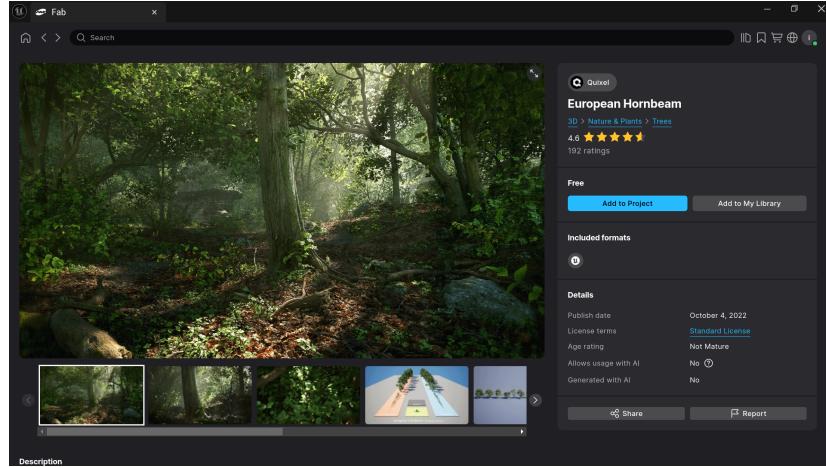


Figure 23: European Hornbeam

Do keep in mind that this is a fairly heavy pack, so if you don't wish to download one you can simply search for some 3d models for trees on Fab or the internet and use those. (To import a downloaded 3d model, simply right click inside the folder you wish for the asset to be in the content browser and click the first button, the one that starts with Import. After navigating to your downloaded asset, Unreal asks for a little more information, you can leave those unchanged for now and hit Import.)

For grass and flowers I recommend this pack from Project Nature

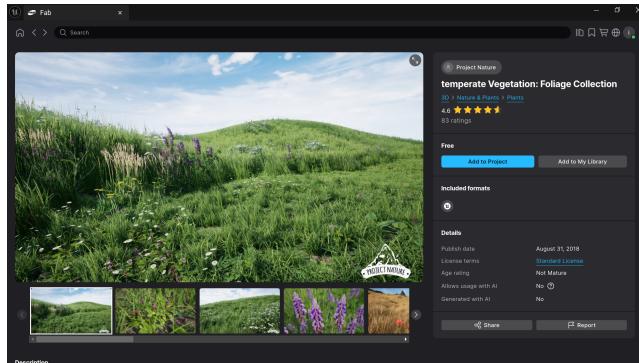


Figure 24: temperate Vegetation

Go ahead and download these, I'll now go over placing these on our landscape. To place this foliage, we head on over to Foliage mode.

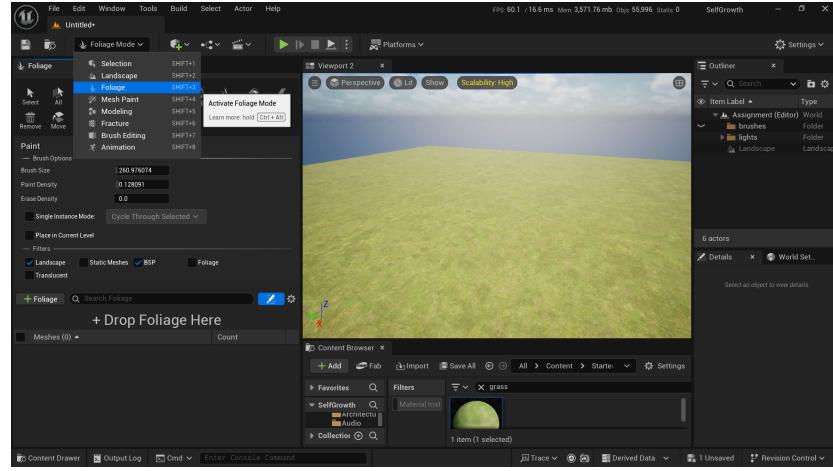


Figure 25: Foliage mode

(I've switched my project here since it already had these assets downloaded)

Let's place a few trees first. Head on over to European Hornbeam >Foliage >Simple Wind to find the trees we will place. Simply drag a few you like to where it says + Drop Foliage Here. I recommend going to the settings icon next to the search foliage bar and changing the view mode from thumbnails to list as that can make things a bit easier. Make sure to check the ones you'd like to paint over your landscape and then go ahead and paint them in! Once again, these settings are fairly self explanatory and I recommend you explore. This is the part where you can get creative, and I cannot tell you where to paint. There are a few more settings, including optimizations that we will talk about later—they are not relevant right now.

I will end with a challenge.



Figure 26: Challenge

Try and recreate this scene. I've given the foliage packs I used for the trees, flowers and the grass. You might need to

1. Experiment with the single instance mode for the trees
2. Play around with the density sliders to not put too many flowers or too little grass
3. Figure out a good brush size to avoid grass where it doesn't make sense

I'll go over how to create this from scratch in day two.

8 Finish

And this all we covered in day one. I know this was way more than I, or you probably intended and I am sorry for this, I will go over everything once again tomorrow. I hope you find this document helpful as it took me more time to make than I spent in the class. Please feel free to go over this doc and send me any and all doubts you have, and I'll try my best to help you. Thank you for your patience, and I hope to see you on day two.