



The attached tutorial is a sample of a first-year session for Games Art & Design students. Normally the practical would include a lecture explaining core concepts and a demonstration of software techniques. There would also be video demonstration available on our Virtual Learning Environments. Feel free to explore Unity and develop your ideas further than those contained overleaf. Unity is free to download from:

<https://unity3d.com>

Learning outcomes

By the end of this topic you should be able to:

- Understand purpose of Unity
- Comprehend how to create a new project
- Use the Unity interface to build a 3D environment
- Add a first person controller to a scene

Overview of the session

The session will determine the core elements of the game that need to be designed as well as introduce the Unity game engine. Additionally, there will be a discussion of Unity's interface and how to create a 3D environment. Techniques for creating terrains and a first person camera will be demonstrated.

Textbook links

Blackman, S. (2011) *Beginning 3D game development with Unity the world's most widely used multi-platform game engine*. Berkeley, CA: Apress

Geig, M. (2013) *Terrain Sculpting* [Online] Available from:

<https://unity3d.com/learn/tutorials/topics/graphics/environment-details>

Student activities

Complete the Unity tutorial overleaf and use it to create your own 3d scene – spend about 1hour doing this. During the rest of the tutorial session, meet with one of the tutors to discuss your ideas for the assignment. If you have not already done so start completing the games design document template.

Self-study

Read the textbook link given above. Continue to develop skills in Unity.

Install Unity on your own PC/MAC, the latest version is available from:

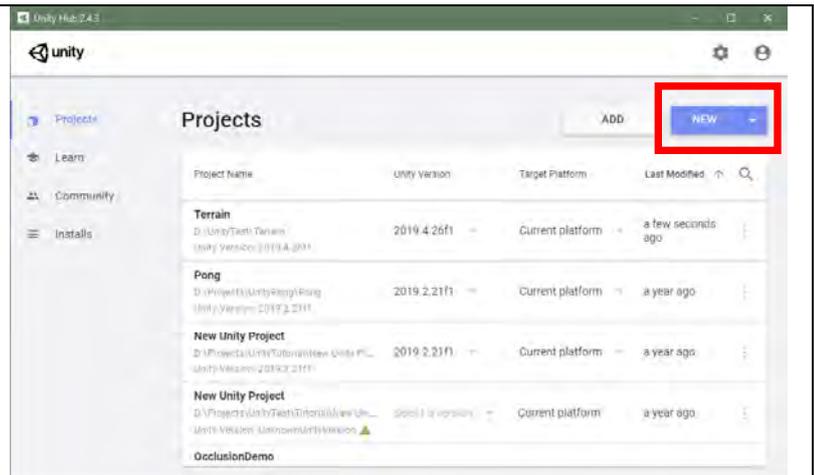
<https://unity3d.com>

The following tutorial is using Unity version 2019.4.26f1 but is very likely to work with other versions of Unity as well.

Download and review the help video tutorials for Beginner Editor 001 through 010 (these are available from within Unity or at

<http://unity3d.com/learn/tutorials/modules/beginner/editor>).

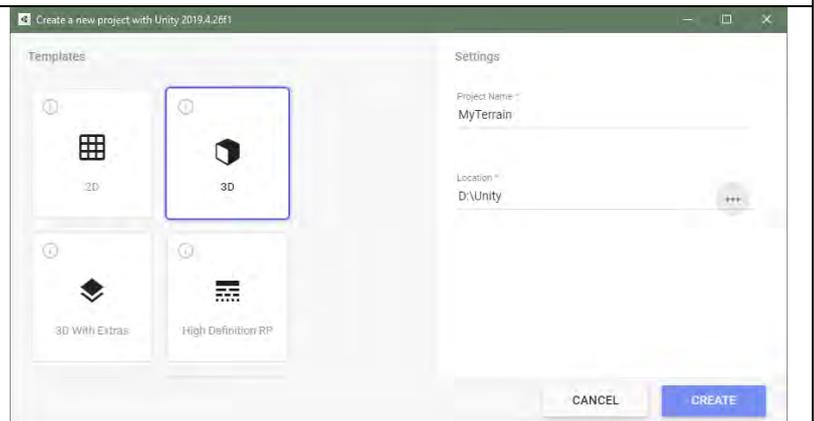
1. Start Unity and create a new project.



2. Under Templates, pick 3D.

Under Settings, call your project "MyTerrain" or something similar.

And choose a location on the PC's hard drive. At the University it's advised to Create a folder on the T: drive.

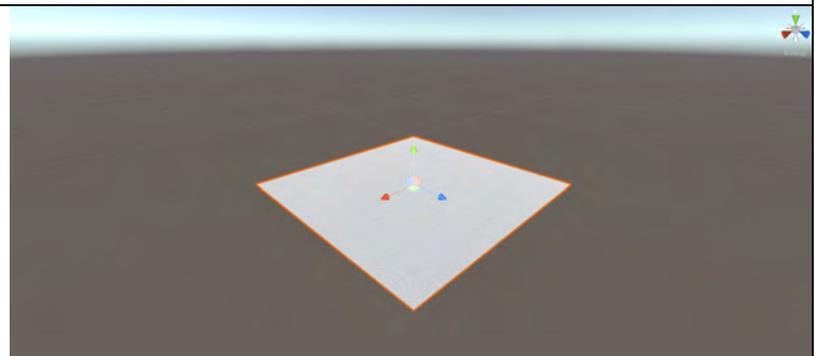


3. When the Unity editor with your empty project has started:

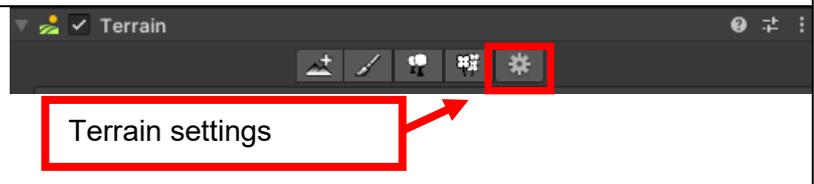
In the menu, go to: Game Object > 3d Object > Terrain

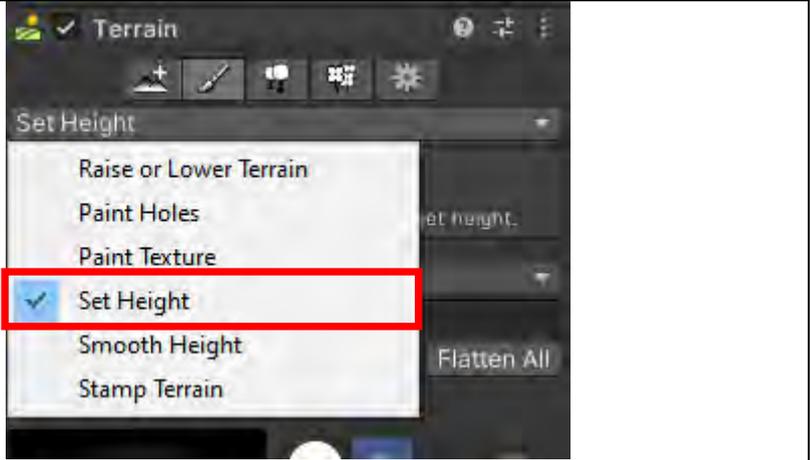
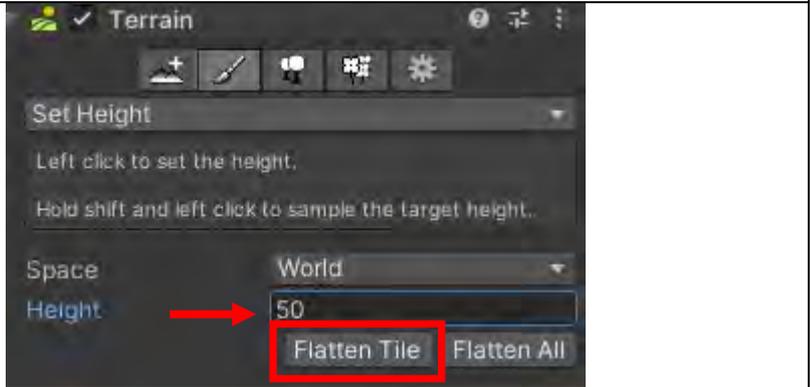
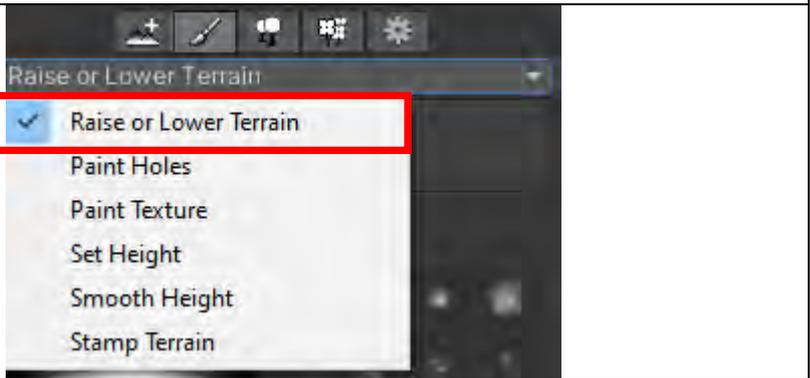
Make sure the terrain is selected by clicking it in the Hierarchy panel on the left in the editor.

Press F to focus the terrain in the scene



4. We need to adjust the size of the terrain a bit.
In the Inspector panel on the right; click on the terrain settings button



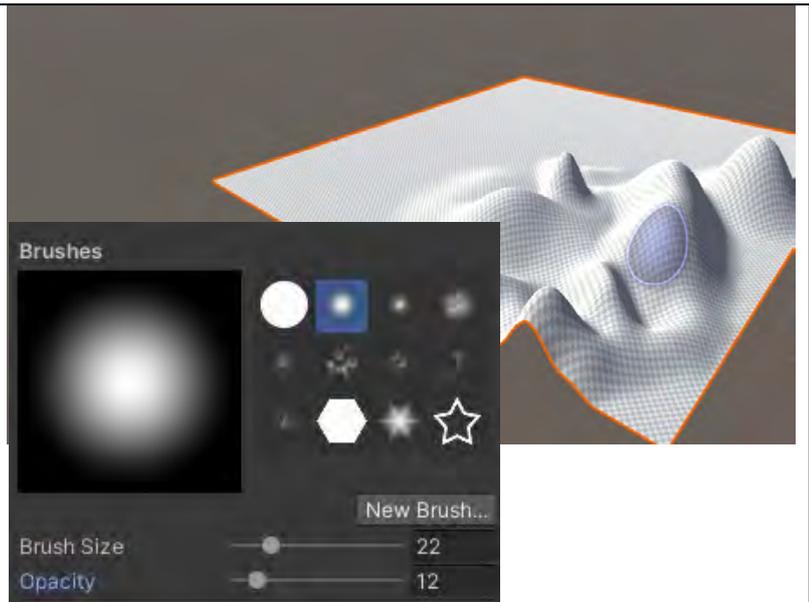
<p>5. Look down the settings to where you find Mesh Resolution (On Terrain Data). Set the Width, Length & Height to 200</p> <p>You can hit F again to zoom</p>	
<p>6. On the Terrain toolbar select the Brush button to go into Paint mode.</p>	 <p>Paint mode</p>
<p>7. In the dropdown menu right below the Terrain toolbar, select Set Height</p>	
<p>8. Set the Height to 50 and click Flatten Tile. You should see the Terrain jump upwards in the work area.</p>	
<p>9. Now in the dropdown menu of paint mode, select: Raise or Lower Terrain.</p>	

10. Time to create some mountains.

If you click+drag your cursor across the terrain you will see mountains appearing.

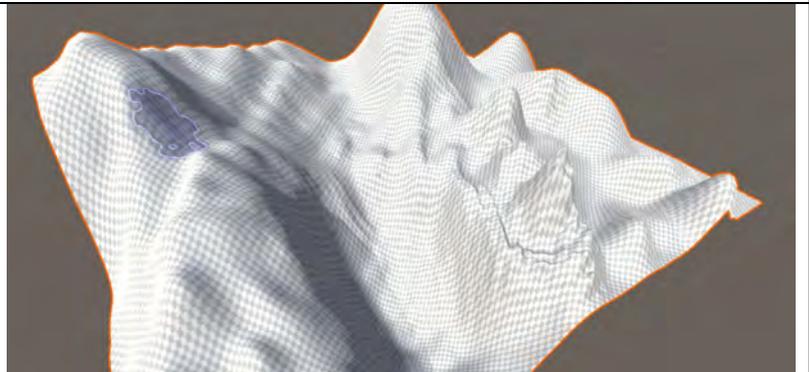
Notice how in the Brushes panel you can select different shapes for your brush as well as set the size. You can also use the [&] keys to adjust the brush size.

The Opacity has a big impact on how strong your brush is. Set it so a low value for more subtle changes in the terrain.



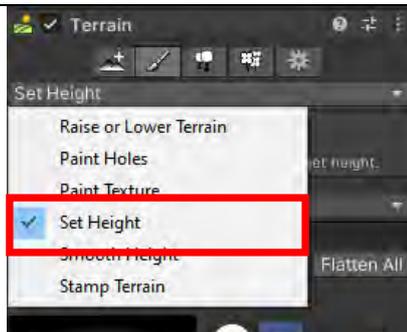
11. Play around with some of the different brush shapes and see what they do on your terrain.

By holding **Shift** you can invert the effect and lower the terrain.



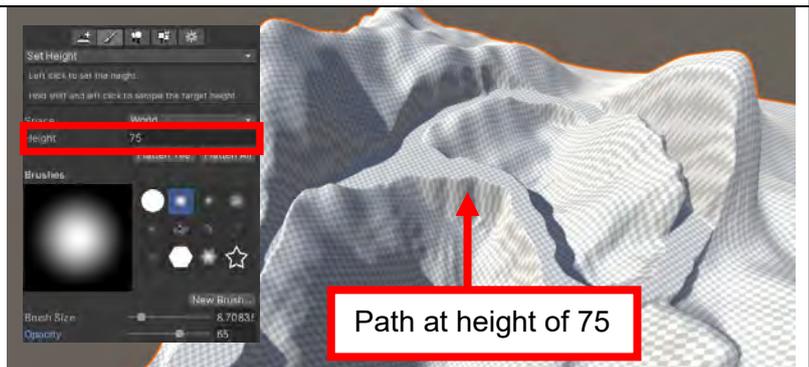
12. If you think of the terrain as a game level that needs to support gameplay, you might want to create some relatively flat areas.

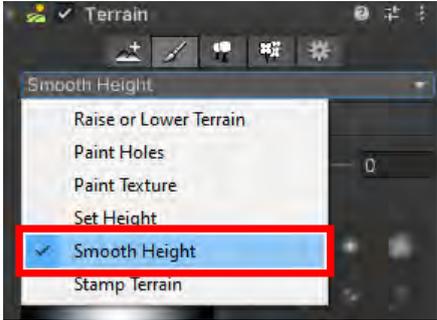
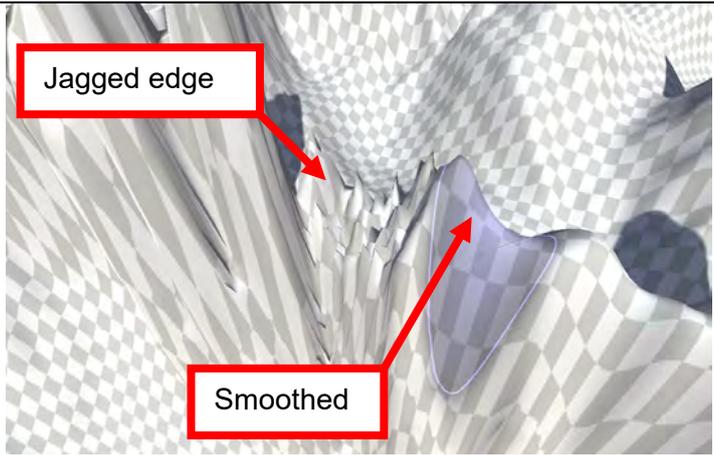
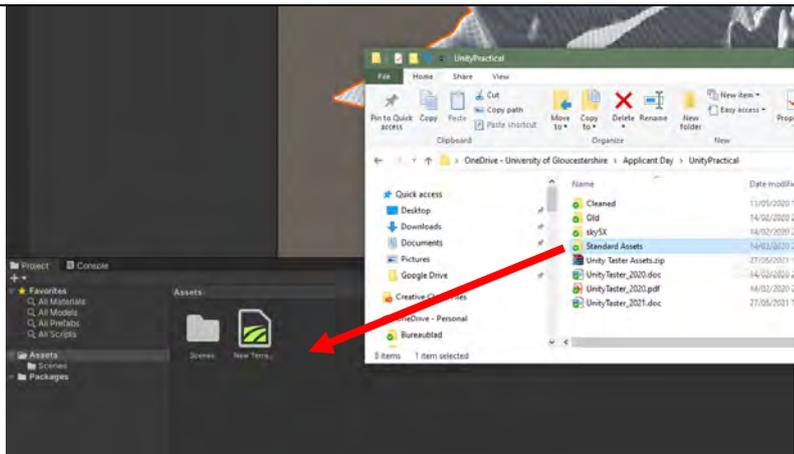
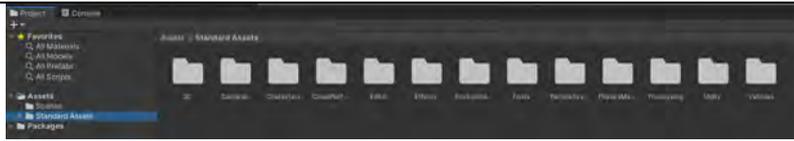
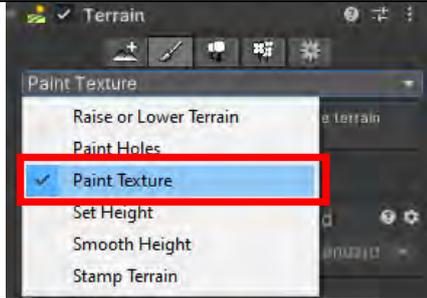
You can easily achieve this by switching back to Set Height in the Paint mode dropdown menu.

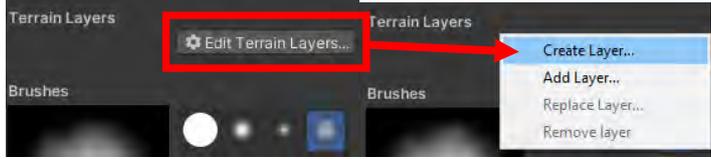
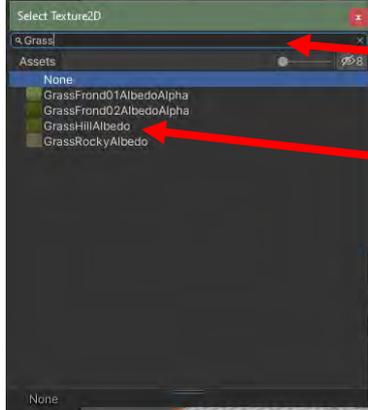
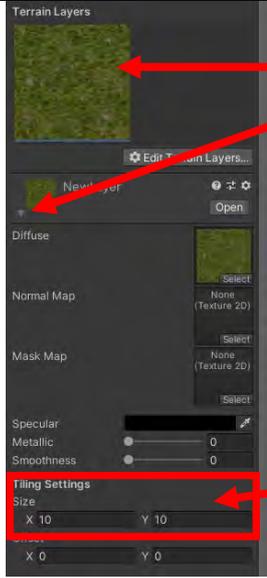
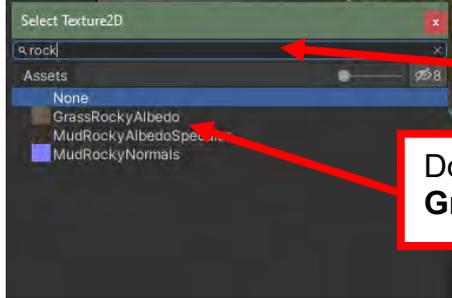


13. Set the height to, say 75. Pick a simple brush and start painting a path.

Note that wherever you paint the height will be set to the selected value. It will raise when the surface is lower and lower where there are mountains or hills.



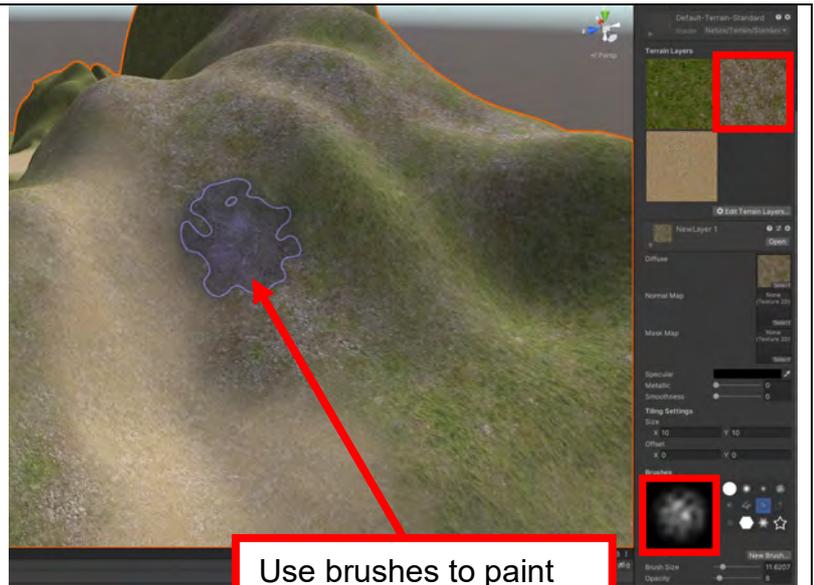
- | | |
|---|--|
| <p>14. Select the Smooth height mode to paint over any jagged edges that are too harsh and smooth them.</p>  |  |
| <p>15. Once you are happy with your terrain it is time to paint in some materials.
To do this we first need to import some assets that we need going forward.</p> <p>Drag the folder called “Standard Assets” from the Desktop of your PC into the Assets folder in Unity.</p> <p>Note: It will take a while for Unity to import the content.</p> |  |
| <p>16. NOTE: If the “Standard Assets” are not available on the desktop (for instance, because you do not use this tutorial at the University) it can be downloaded using the following link:
https://drive.google.com/file/d/1iEWHfo3mEMDy63Ir45Gq1dNntU_rPUWV/view?usp=sharing
Once downloaded, make sure the <i>Unity Taster Assets.zip</i> file is unzipped to your desktop (or hard drive) before dragging the Standard Assets folder into Unity.</p> | |
| <p>17. Once the import is done you will find a number of folders with content have now been added to your project.</p> |  |
| <p>18. Ensure you have the Paint tool selected and from the dropdown list select: Paint Texture</p> |  |

<p>19. Click the Edit Terrain Layer... button and choose: Create Layer...</p>	
<p>20. A window pops up that allows you to select a texture for the new layer.</p> <p>Start typing Grass in the search box</p> <p>Then double-click GrassHillAlbedo to select it from the list.</p>	
<p>21. Note how the grass material is now applied to your terrain. If you zoom in, you will see how the texture is very densely tiled across the terrain.</p> <p>Let's adjust this a little.</p> <p>Double-click the Grass terrain layer or use the tiny arrow to unfold its properties.</p> <p>Under Tiling Settings adjust the Size to 10 for X & Y</p>	
<p>22. To create some variety, let's add another Terrain Layer.</p> <p>To so, repeat the steps from step 19 but this time search for rock and select GrassRockyAlbedo</p> <p>And do this one more time. Now search for Sand and select SandAlbedo</p>	

23. With these Terrain Layers in place you can now select any of them and start painting on top of the terrain using the different brushes.

As with forming the terrain, you can adjust the size of the brush. The opacity controls how strongly the material will be painted on top of what is already there. You can use low values to create more subtle blended effects.

As with the Grass, it might be good to increase the size to 10 for X & Y in the Tiling settings of the Terrain layers.

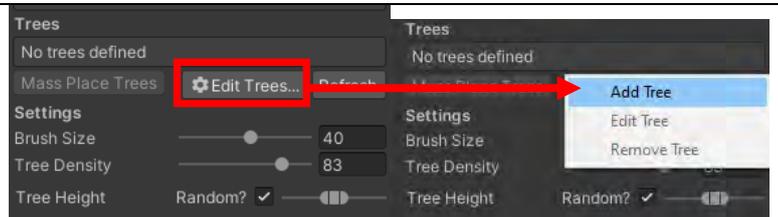


Use brushes to paint with the selected TerrainLayers

24. With some materials painted in, the terrain already starts to look a lot better. Time to add some more detail to the world by adding some vegetation. On the Terrain toolbar select the Tree paint button.



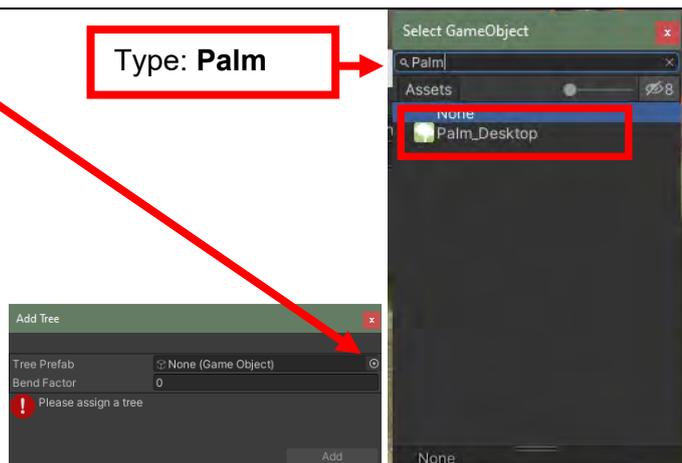
25. Click Edit Trees... and choose Add Tree from the list.



26. In the Add Tree menu, click on the small circle icon next to Tree Prefab.

In the search box that appears type: **Palm** and double-click **Palm_Desktop** to select it.

Click the Add button to confirm.



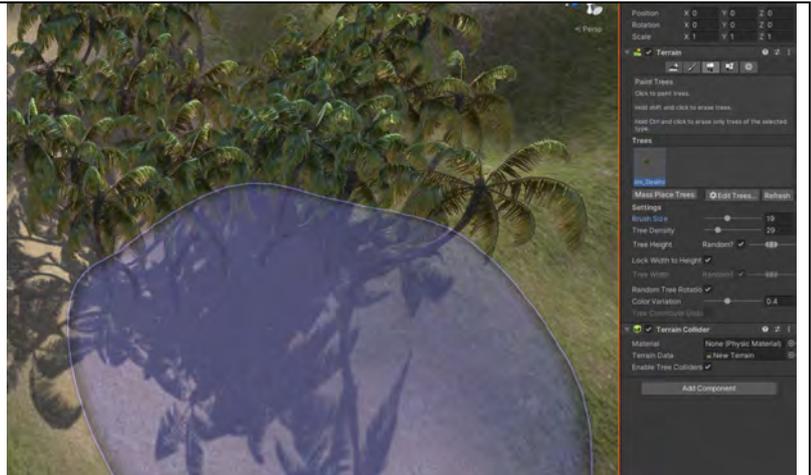
Type: **Palm**

27. You can now paint with trees on the landscape.

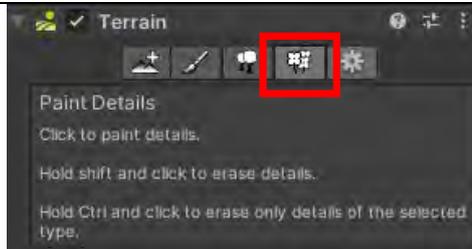
Note that you can set the brush size and the Tree Density. It is advised to start with a low value for the density as too many trees will severely slow down the performance of your PC.

By holding **Ctrl** while painting you can remove trees from the terrain.

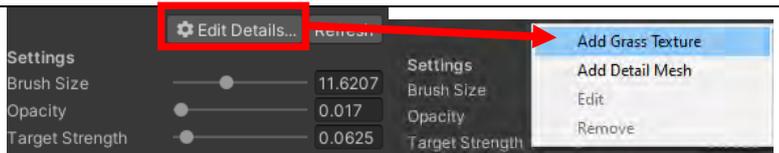
There are Broadleaf and Conifer trees as well, if you want to add some variation.



28. Now that we have trees, let's add some grass as well. On the Terrain toolbar select the Paint Details button.



29. Much like with the Trees, click Edit Details and from the list pick: Add Grass Texture

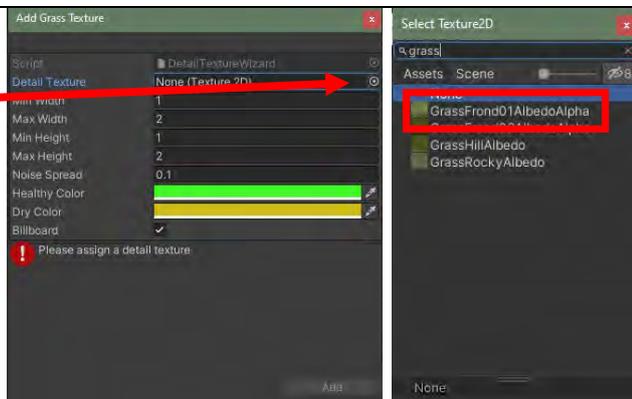


30. In the Add Grass Texture window, click on the tiny circle icon next to Detail Texture.

In the window that opens, type: **grass** in the search box and double-click on **GrassFron01AlbedoAlpha**

Note that there are some parameters for the grass that can be set. It might be good to pick a slightly darker colour for the Healthy colour, for instance.

Click Add to confirm.



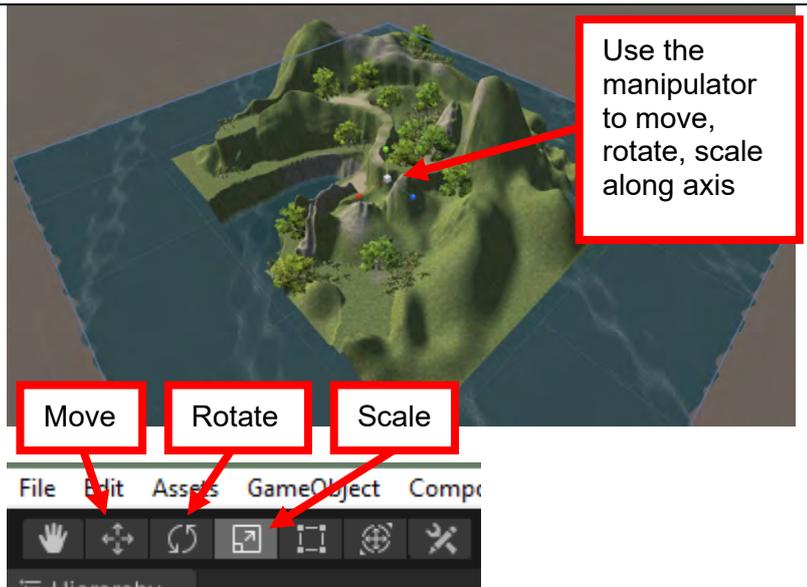
- 31.** With the Grass in place you can now paint the grass onto the landscape like you did with the trees.
Again, be mindful of the density as this will affect performance.
Use **Shift** or **Ctrl** while painting to remove some of the painted grass.

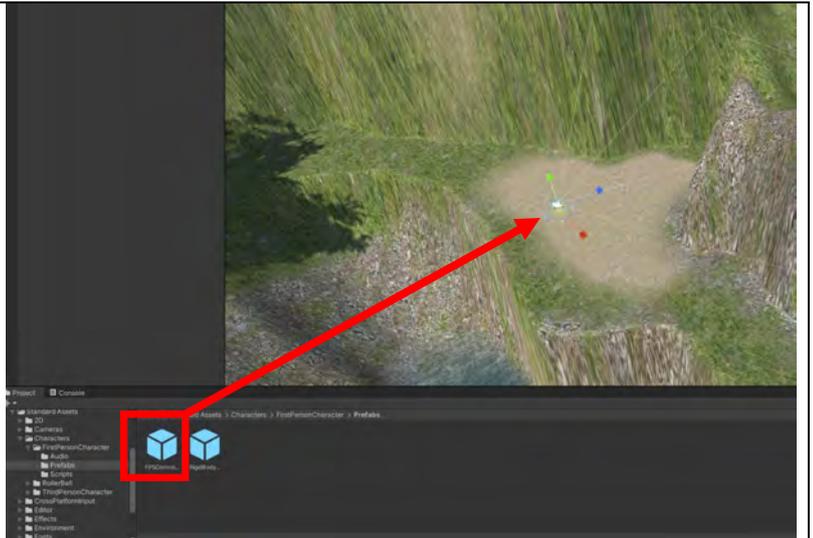
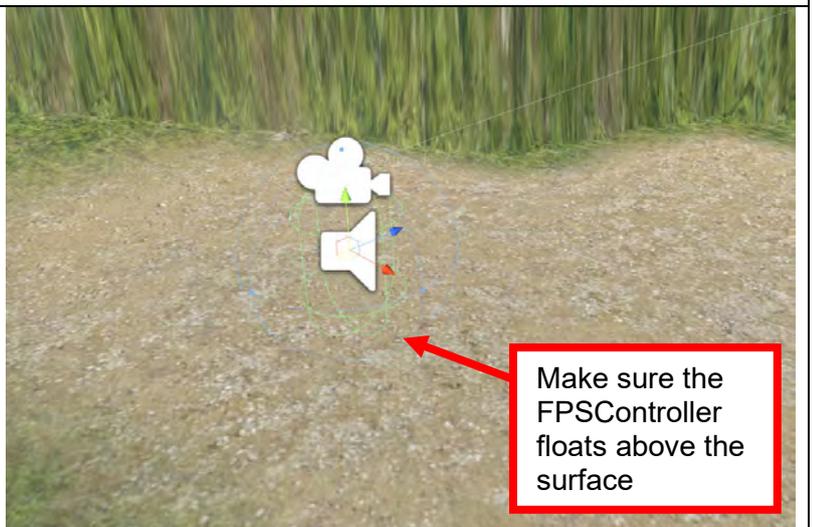
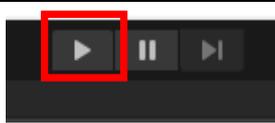


- 32.** OK, the world is now starting to come to life. Before making it playable, let's add 1 final element: water!
In your asset browser at the bottom of the screen, navigate to Standard Assets > Environment > Water > Water4 > Prefabs
Click-drag the Water4Advanced prefab into your scene.



- 33.** Notice how this water is a flat plane with a very fancy material applied.
With the plane selected we can use the Move (**W**), Rotate (**E**) and Scale (**R**) tools in the top-left of the screen to move the water where we want and scale it as big as needed.
By moving the water up and down we can control how much of the terrain is above and below the water.



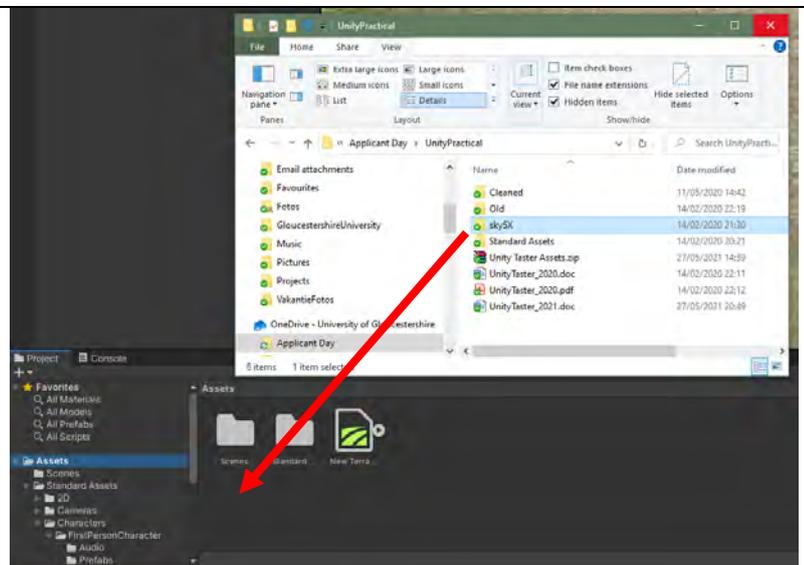
<p>34. Cool! Time to make this landscape playable.</p> <p>In your asset browser at the bottom of the screen, navigate to Standard Assets > Characters > FirstPersonCharacter > Prefabs And click-drag the FPSController prefab to a flat area in your landscape.</p>	
<p>35. Zoom in a little to the spot where you dragged the FPSController and use the move tool to drag it up so that the capsule shape floats above the surface.</p>	
<p>36. OK, now quickly use Ctrl+S or File > Save to Save your scene.</p> <p>Then, hit the Play button in the top middle of your screen.</p>	
<p>37. If all is well, this should now take you into the game. You can use your mouse to look around. Use W, A, S, D to move. Hold Shift to run and press Space to jump.</p> <p>If you want to leave the game, hit Esc to get your mouse cursor back and then click the Play button again.</p>	

38. If you select the FPSController, you can see in the Inspector on the right that there are a few cool properties you can experiment with, such as Walk, Run and Jump speed. Feel free to have fun with these and see how they affect the “feel” of the game.



39. One final thing to make things pretty...
From the Desktop of your PC, drag the Sky5X folder into the Assets folder of your project.

NOTE: If you downloaded the project files and these are still zipped, you need to unzip them first.



40. In the asset browser, navigate to Sky5X > Sky5X_skyboxes and Click-drag one of these into the work area with your level.

You can try them to see what they do to the atmosphere in your level.

NICE!



OK, that’s all for today. This is how games are made. I hope you had fun and are proud of what you have been able to accomplish in so little time. But why stop here? Unity is free to download and use and there are many awesome tutorials out there to learn from!

Would you like to know more?

For more information about the course visit <http://www.glos.ac.uk> or email Andre van Rooijen (avanrooijen@glos.ac.uk)

The following are indicative course maps for Computer Games Design & Games Art. There are more options, but this is what most students study!

Level 4	Games Production	Introduction to 3D	Creative Skills for Design	2D Mobile Design
Level 5	Level Design	3D Animation for games	UX Design	Games Professional Awareness
				Games Audio
Optional Placement year				
Level 6	Advanced Group Project	Individual Research Project	Digital 3D Effects	Indie Game Development
			Advanced Concepts in Games	3D Character Development

Level 4	Introduction to Games Art	Introduction to 3D	Creative Skills for Design	Games Production
Level 5	3D Animation for games	Digital Sculpting	Level Design	Professional Awareness
		Environment Art		Experimental Games
Optional Placement year				
Level 6	Advanced Group Project	Individual Research Project	Personal Portfolio	Concept Art
			Technical Art	3D Character Development

UoG Games Team