

AN INTRODUCTION TO THE UNREAL ENGINE 4

By

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Introduction

This small tutorial is designed to give you a taste of using an industry standard game engine, specifically Unreal Engine 4.

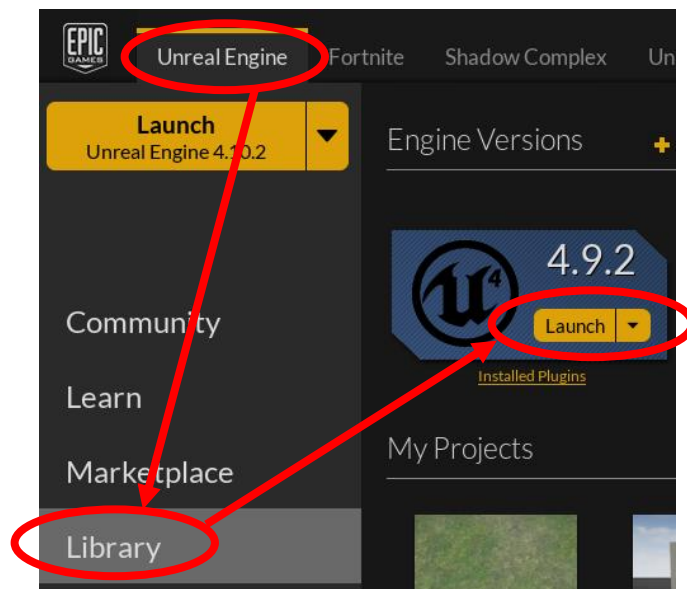
In this tutorial, you will learn how to use tools within Unreal Engine 4 to rapidly prototype a race track for a driving game and it is ideal for anyone who has never used Unreal Engine 4. It would be a good taster event for a school activity.

NOTE: Unreal Engine 4 is updated on a regular basis. Occasionally, menus and screen layouts change. I will do my best to keep the tutorial up to date, but there may be some inconsistencies with the menus etc in newer version.

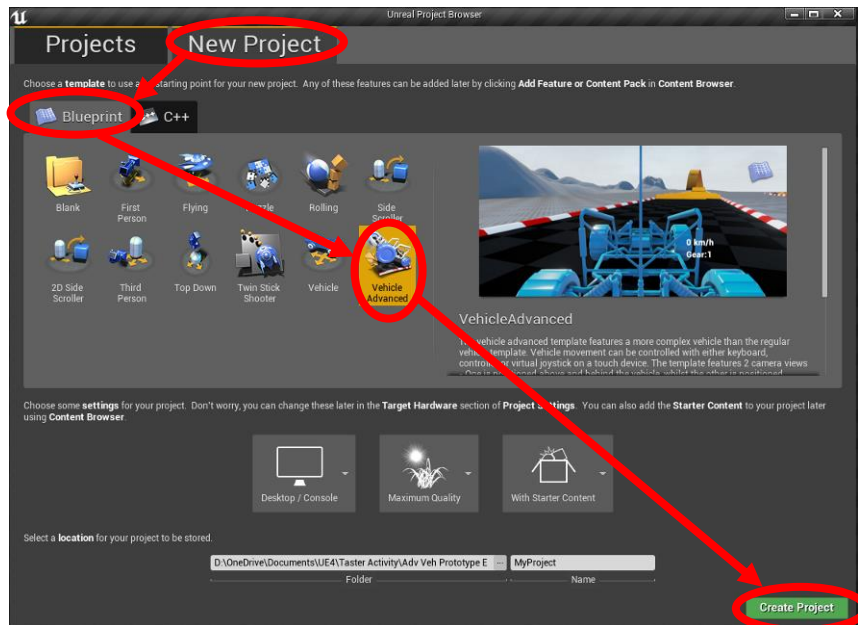
Getting Started - Opening the Game Level

Open the Epic Games Launcher . A shortcut will be on the desktop.

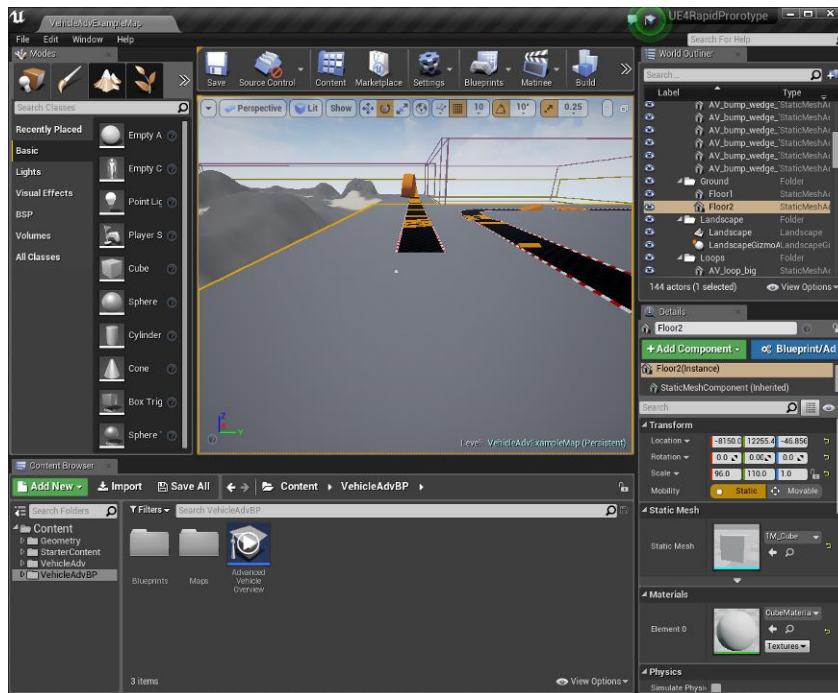
Once the launcher app is open click the UNREAL ENGINE Tab, then LIBRARY. At the top of the LIBRARY page you will see the ENGINE VERSIONS section.





Click LAUNCH on the currently installed engine version. If several versions are installed, launch the latest version. The exact version does not matter for the purpose of this exercise. In the Project Browser window which appears, click NEW PROJECT tab, then BLUEPRINT tab. Select the VEHICLE ADVANCED sample project and click CREATE PROJECT.



The engine will take some time to launch, even on a powerful PC. You will eventually be presented with the UNREAL ENGINE, as below.



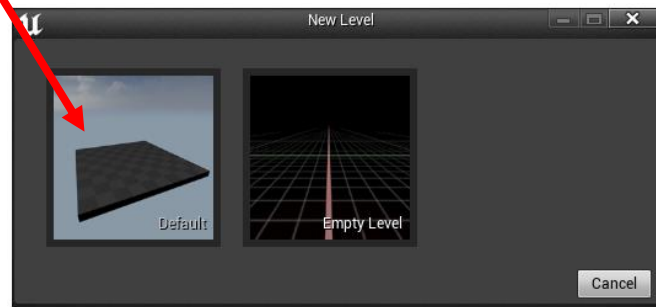
Take a moment to run the sample level and familiarise yourself with it. Run the game by clicking the PLAY icon at the top of the editor . Use the WASD keys to control the vehicle. To return to the editor, click the STOP button . The next step is to create a new level and rapidly prototype a new track.

Creating a New Level

Follow these steps:

1. In the editor, click FILE then NEW LEVEL, the window below appears.

2. Click on the DEFAULT LEVEL icon. This will provide us with basic lighting for our level.



3. The new level will now open. Before going any further, familiarise yourself with the following controls for moving around the 3D view in the editor.

MOVE FORWARD = Hold left mouse button + Move mouse Forward

MOVE BACK = Hold left mouse button + Move mouse Back

ROTATE LEFT = Hold left mouse button + Move mouse Left

ROTATE RIGHT = Hold left mouse button + Move mouse Right


PAN CAMERA VIEW UP = Hold LEFT & Right Mouse Button + Move mouse Forward

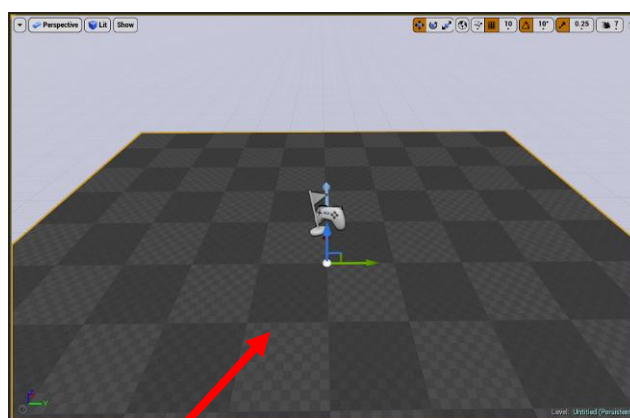
PAN CAMERA VIEW DOWN = Hold LEFT & Right Mouse Button + Move mouse Back

PAN CAMERA VIEW LEFT = Hold LEFT & Right Mouse Button + Move mouse Left

PAN CAMERA VIEW RIGHT = Hold LEFT & Right Mouse Button + Move mouse Right

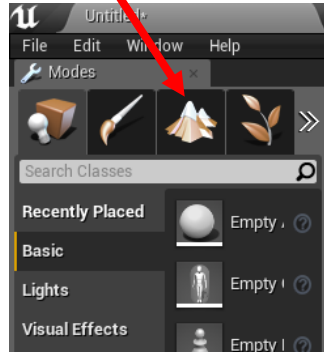
You can also PAN the camera by holding the RIGHT mouse button and using the WASD keys, just like any FPS game on the PC.

You can change the speed at which the camera moves within the editor by clicking on the CAMERA SPED icon in the top right of the viewport  and selecting a new value: 1 = slow, 8 = Fast

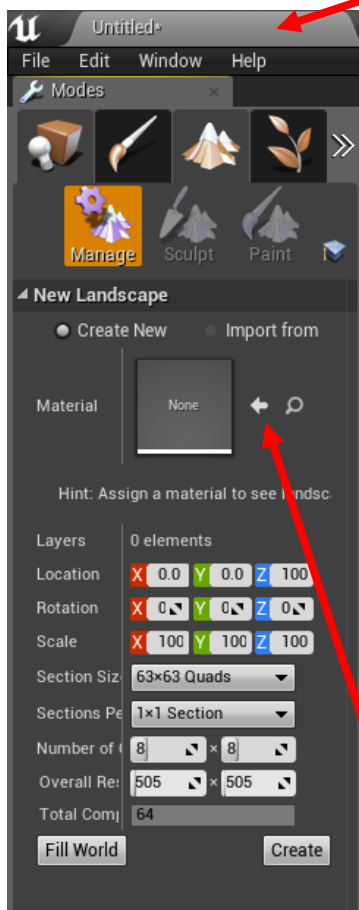


4. Click on the rectangular grey ground shape (a yellow border will appear around it) and press the DELETE key. This was a small area of ground provided by the default settings which we do not need, as we will be creating our own terrain to drive on.

- Click on the TERRAIN tab (mountain icon) in the top left of the editor. A green grid will now appear in the editor window to represent the land.



- The terrain tab will change to the NEW LANDSCAPE window where we can adjust the setting for the terrain.

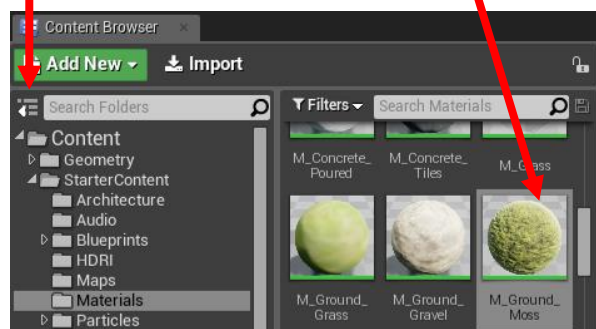



- Do not change any of the default settings in the lower half of the window**, as they define how detailed the landscape can be and the values need to be selected very carefully to fully optimise the landscape size. The current settings will be adequate for our purpose.

- You need to apply a default material to the terrain. Think of this as the colour & type of ground applied across the terrain (grass, mud, sand etc).

- In the CONTENT BROWSER tab (lower left corner of editor), if the 'folder view' on the left is not visible, click the folder icon

- expand the CONTENT folder, then STARTERCOTENT, then MATERIALS and click on the M_Ground_Moss icon. Do not double click this. This will be the texture we add to our landscape. Although the title is moss, it looks like grass for our purposes !



- Now click the small white arrow  next to the MATERIAL box in the NEW LANDSCAPE window. This applies the selected material to the landscape, so when the landscape is created, that material will be placed over the entire landscape automatically.

12. Now click the CREATE button at the bottom of the NEW LANDSCAPE window. A large flat area of terrain will be added to the level.

13. At this point, it is worth building the level. Click the BUILD icon at the top of the editor window. This will start the build process, which can take quite some time depending on the complexity of the level and the configuration of the computer.

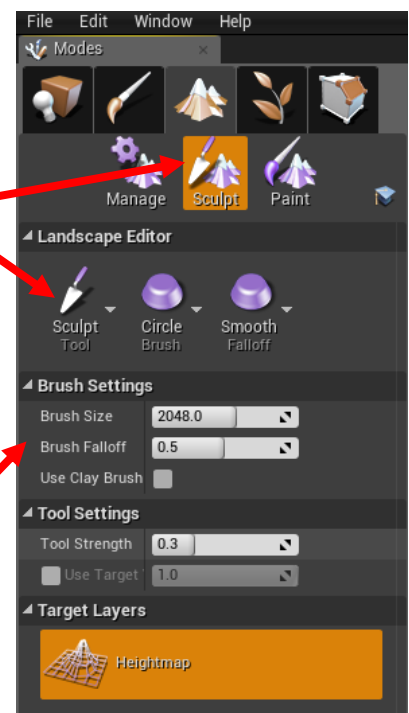


Watch the progress message in the bottom right of the editor. 'Building' a game allows Unreal Engine to recalculate the lighting and shadows, as well as other aspects of the game and is necessary to check for errors and tidy up any visual discrepancies in the editor window. What you see in the editor window is not always 100% accurate until you build the level.

14. If a MESSAGE LOG window appears, ignore any messages in it and close the window. Now play the game and you have a grass \ moss type effect on the landscape.

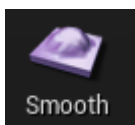
15. Now would be a good time to save the level. Select the FILE menu, then SAVE. Enter a name for the level and click SAVE. It is good practice to save the level regularly, and especially after you have implemented a complex part of the game. UE4 will auto-save your level.

16. There are some very powerful and fast landscape sculpting tools in UE4. To access these, click the SCULPT icon within the LANDSCAPE tab, then click SCULPT TOOL. With this tool selected a left click and hold with the mouse cursor over the terrain will create a hill under the cursor. If you hold the SHIFT key while doing this, you will create a depression. You can move the mouse while doing this.

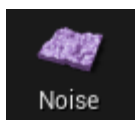


17. All of these tools can have their properties changed in the SCULPT window.

18. Other useful tools in the SCULPT TOOL menu are:



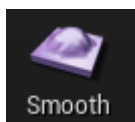
SMOOTH: Left click over the terrain to smooth out small bumps.



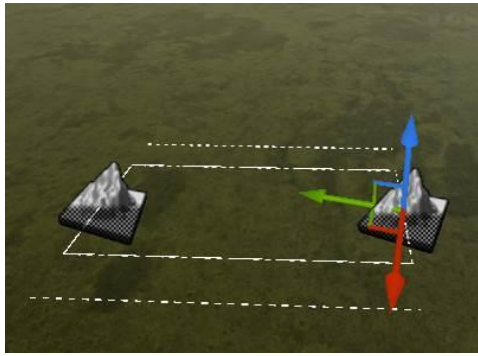
NOISE: Left click and drag over the terrain to create random bumps.



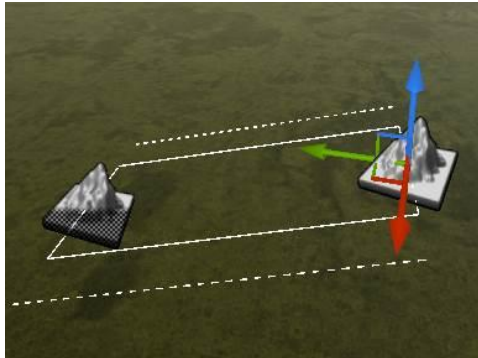
FLATTEN: Left click and hold on the terrain and as you move the cursor over the terrain, all hills and depressions will be lowered \ raised to the same height as the initial click location. Very useful for cutting a track through a hilly area.



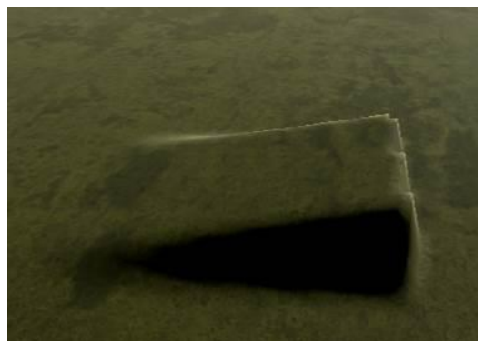
RAMP: Creates a ramp. This is a two-step process. Click once to define starting position of the ramp. Click again to define the length of the ramp. You will see two mountain icons, as below.



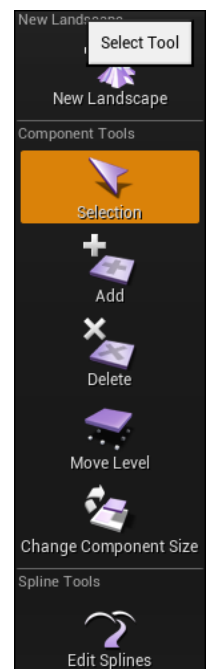
Now click the blue arrow of the position GIZMO, and move the last mountain icon upwards to define the height of the ramp, as below

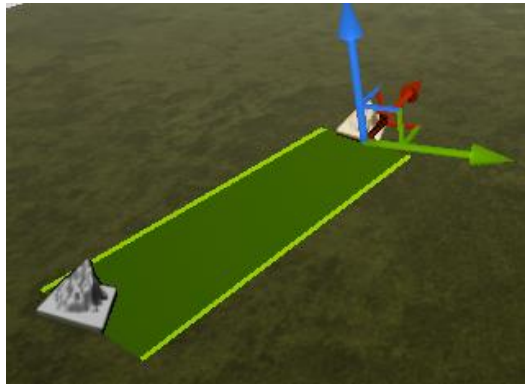


Now press the RETURN key on the keyboard to accept the changes, then press ESC to stop using the tool. Your RAMP will be like the screenshot below.

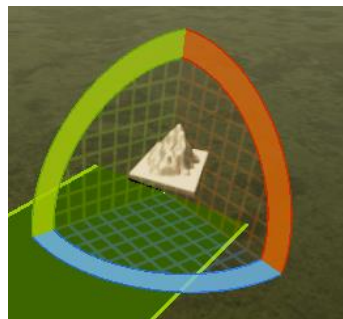


19. Another useful tool is the TERRAIN SPLINE. A very useful tool for quickly laying out roads.
20. Click MANAGE in the TERRAIN Tab, and click EDIT SPLINES.
21. Now hold the CONTROL key down and left click on the terrain where you would like your track to start, and then click again (Still holding CONTROL key) at the point where the ramp will end. You will see the track being created as a green path, as below. Keep holding CONTROL and clicking to create the track.

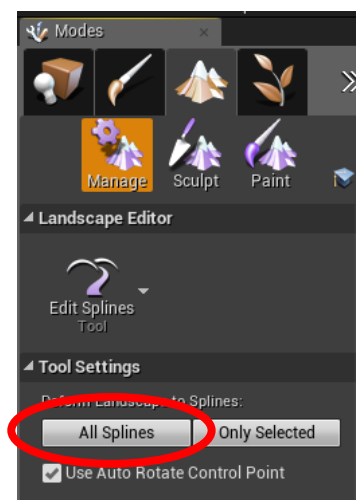
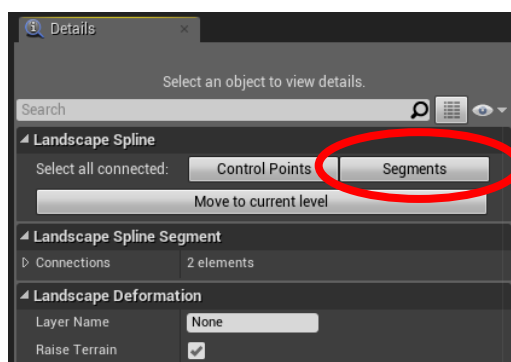




22. Once the track is defined, click on the last control point (mountain icon) and use the position gizmo (the three arrowed shape, see picture above) to move the control point up or down, to modify the ramp height. If this gizmo is not visible, click on a control point and press space bar several times until it does appear. Pressing space bar cycles through the different gizmos, which control the position, scale and rotation of an object. You can use the ROTATE gizmo to rotate a control point on the track to create an angled surface, as below.



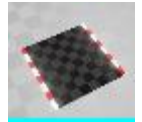
23. Once you have modified the position and/or rotation of the control points, click the SEGMENTS button in the details tab, see below (you should still have the terrain spline selected). This selects ALL the individual segments along the track. The whole track should now have a yellow border around it. Back in the Terrain tab on the left of the screen, click the ALL SPLINES button, see below. This applies the spline to the terrain, lowering and raising terrain to meet the surface of the spline, thus creating a track along the terrain.



24. To add an actual road surface along the track is also very quick. This does assume an artist has create a 3D model of the track surface as a repeatable section. With the spline still selected, click the CONTROL POINTS button in the DETAILS tab. This selects all the control points along

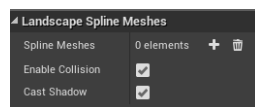
the spline. We are now going to add a 3D mesh of the track surface between these control points.

25. In the CONTENT BROWSER at the bottom of the editor, select CONTENT | VEHICLEADV | ARENAMESSH and click once on the STRAIGHTFULL mesh to select it. This is a straight piece of road surface which we can repeat, stretch and bend along the path of the spline.

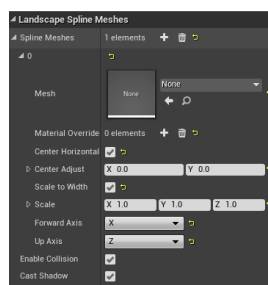



26. Make sure all the segments are still selected. The whole spline path should have a yellow border around it. If not, click the SEGMENTS button as in the previous step above.

27. At the bottom of the details panel on the right side of the screen, you will see a section called LANDSCAPE SPLINE MESHES, as below. In this section, you can assign a 3D mesh to follow the path of the spline. We will apply a pre-built section of track to follow the spline, thus creating our track.

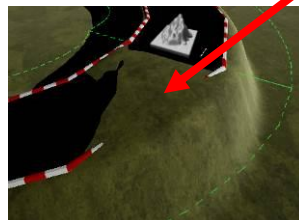


28. Click the white + icon. The section will now expand as below which has created an empty 'mesh slot' for us to add in a mesh along the spline..



29. You already have a 3D model selected in the CONTENT BROWSER, so click the WHITE ARROW in the above section . This applies the selected model into this mesh slot. You will now see that the mesh has been applied along the whole path of the spline.

30. You may see some issues with the new track surface disappearing into the terrain, as below.



31. This is easily fixed by selecting the nearest control point on the spline (the mountain icon) and moving (or rotating) the control point so that the track is exposed. Alternatively, you could use the terrain editing tools to smooth out the terrain in that section to expose the road.

*These tools allow you to rapidly create a level, test it and then make adjustments to the terrain. This iterative approach to **BUILD – EVALUATE – REFINE** is a principle game developers use on a daily basis. Now use these tools to create create a track for a racing game.*