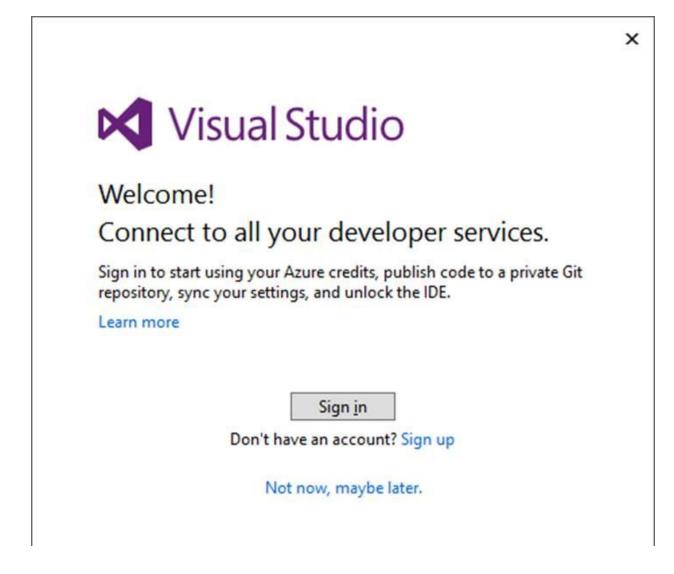
Chapter 1: UE4 Development Tools

Visual Studio Community

A free, fully-featured, and extensible IDE for creating modern applications for Windows, Android, and iOS, as well as web applications and cloud services.

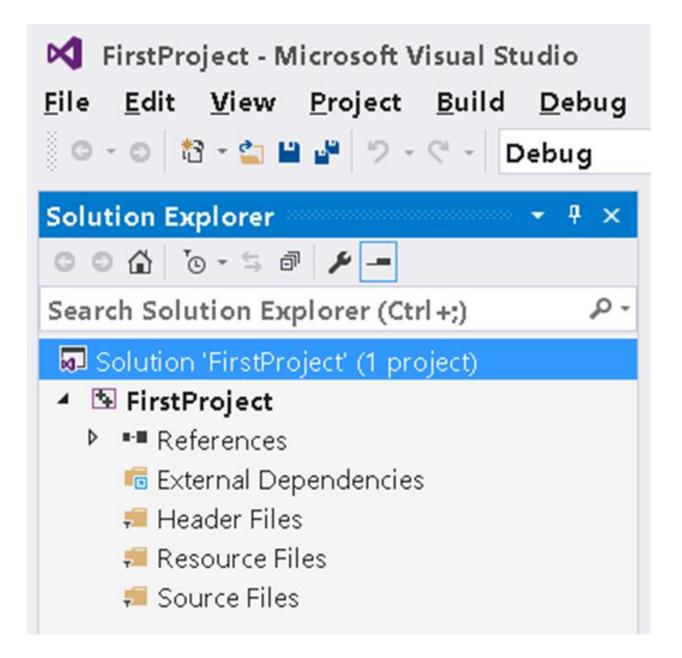
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HLSL ▶ Online	Click here to go online and find templates.	
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Welcome to Visual Studio 2015 Community Edition!		
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#include <stdio.h>

pint main()
{
 puts("Welcome to Visual Studio 2015 Community Edition!");
}

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#include <stdio.h>

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    puts( "Welcome!" );
}
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int main()
{
 puts("Welcome!");
}

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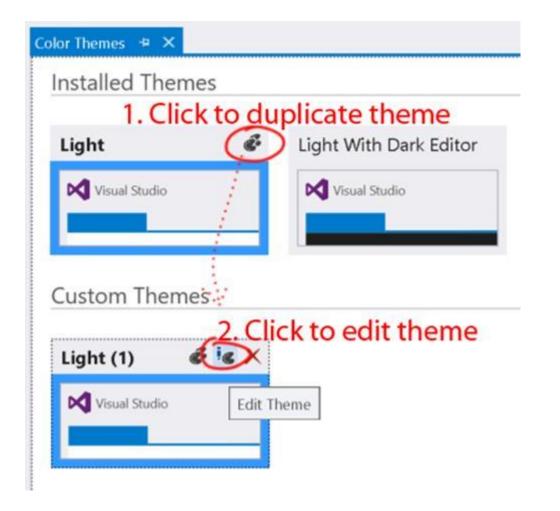
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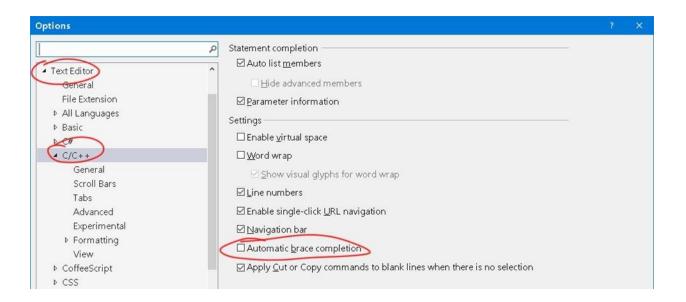
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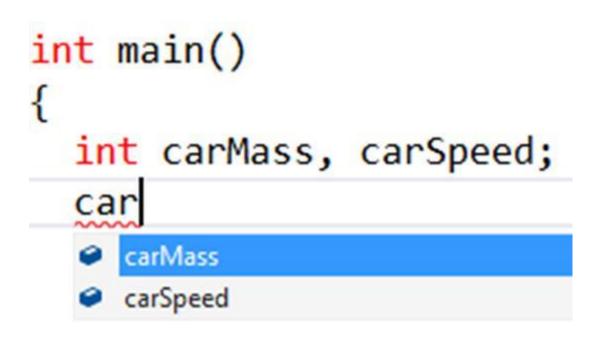
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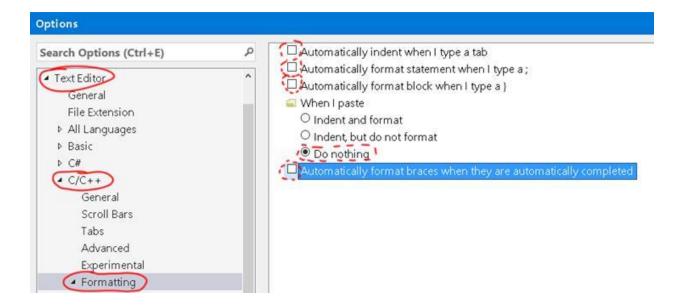


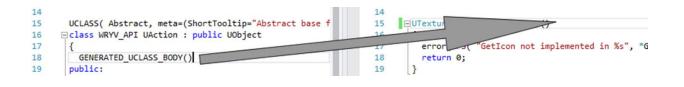
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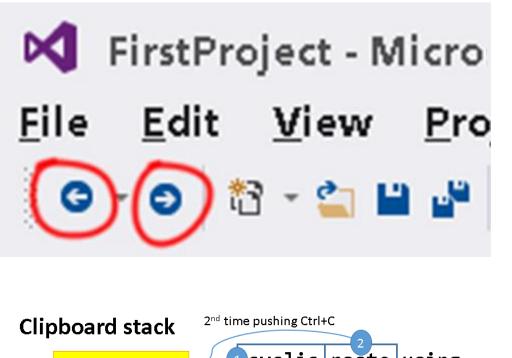
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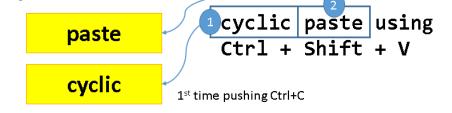








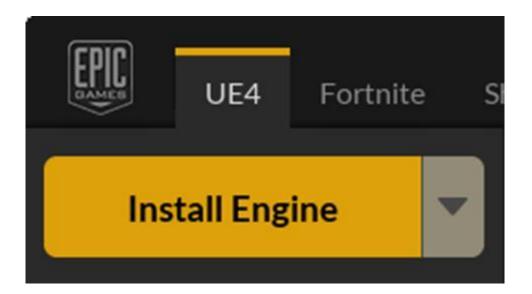




□UTexture* UBuildAction::GetIcon()	<pre>BUTexture* UBuildAction::GetIcon() { }</pre>
<pre>{ return Game->GetData(BuildingType).Portrait; }</pre>	

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// initialize a bunch of cooldow
FString name = FString::Printf(
Clock* clock = new Clock(name,



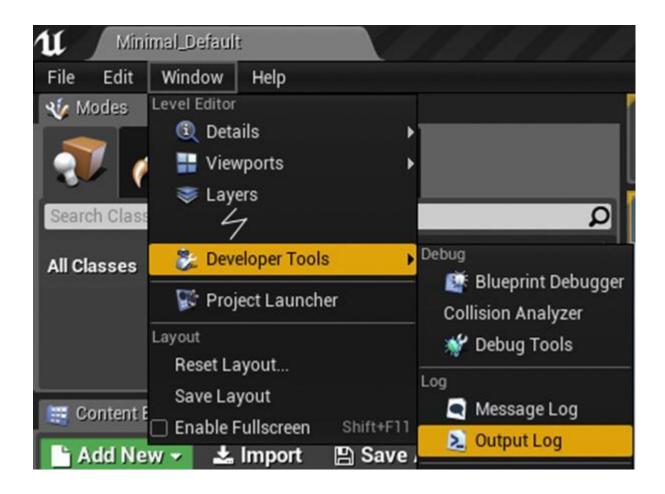
Unreal Engine 4.10.4 installation options

Core Components	7.20 GB 🗸
Starter Content	807.07 MB 🗸
Templates and Feature Packs	514.99 MB 🗸
Editor symbols for debugging	6.78 GB

Download Size: 4.39 GB Required Storage Space: 8.49 GB

Install





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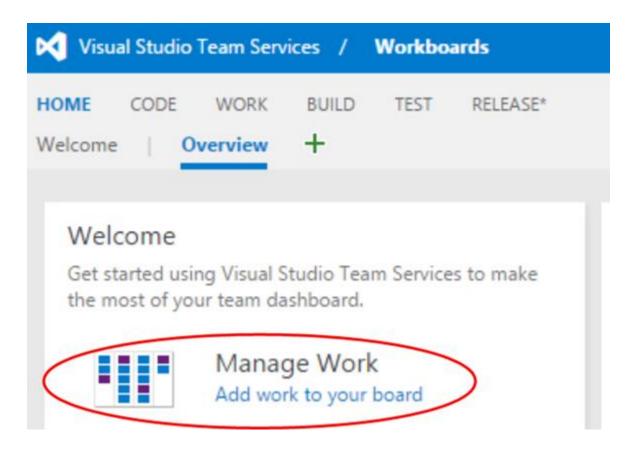
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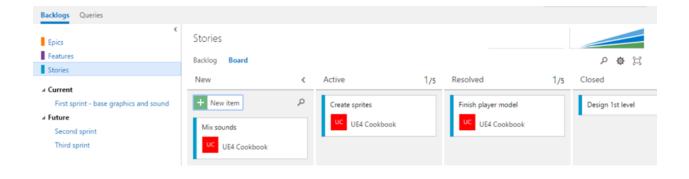
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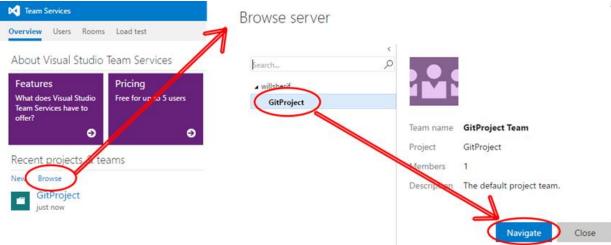
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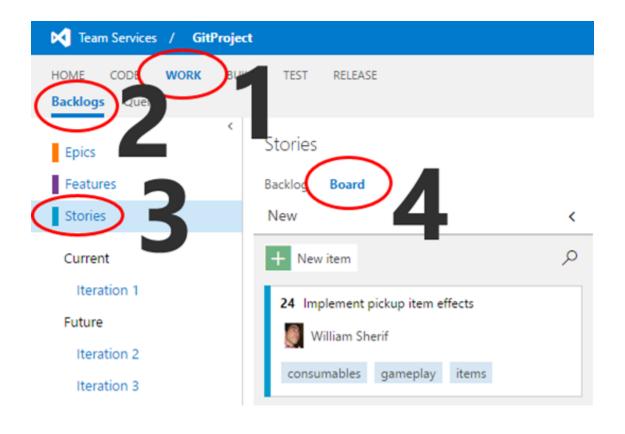
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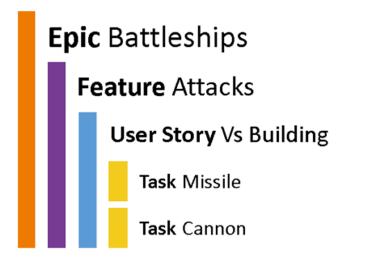
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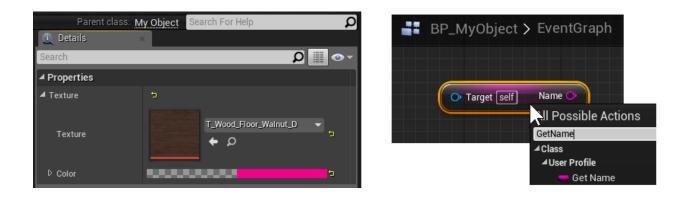


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Chapter 2: Creating Classes



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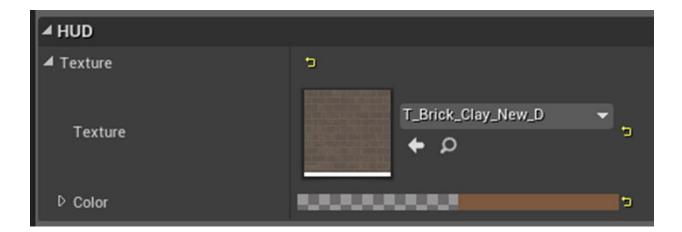
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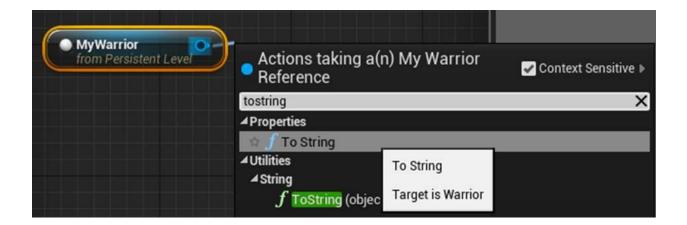
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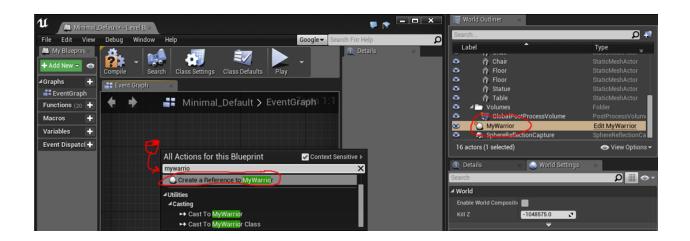
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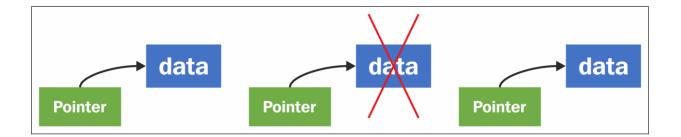
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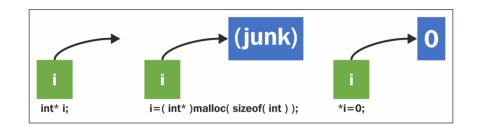


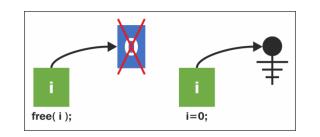


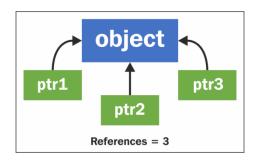


Chapter 3: Memory Management and Smart Pointers









8 UObject *o = NewObject<UObject>(GetTransientPackage(), 9 UObject::StaticClass());

Call Stack processo

Name

UE4Editor-MyProject.dll!NewObject<UObject>(UObject * Outer, UClass * Class, FName Name, EObjectFlags Flags, UE4Editor-MyProject.dll!AMyProjectGameMode::AMyProjectGameMode(const FObjectInitializer & PCIP) Line 11

Analysis Target



Startup Project

Available Tools

🗹 CPU Usage

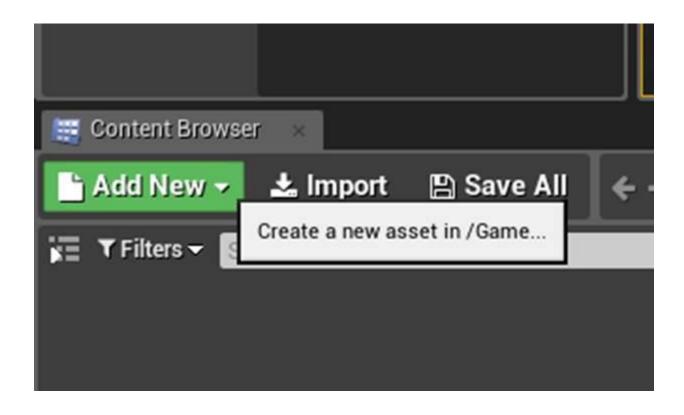
See where the CPU is spending time executing your code. Useful when the CPU is the performance bottleneck

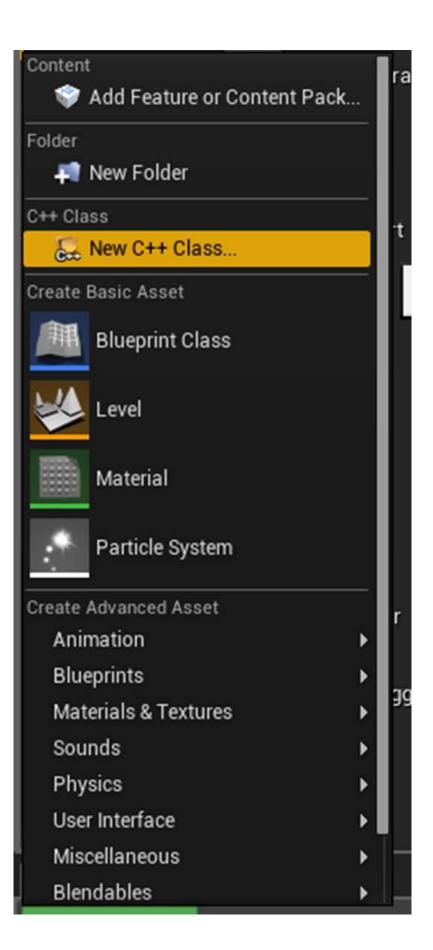
🗹 GPU Usage 🥸

Examine GPU usage in your DirectX application. Useful to determine whether the CPU or GPU is the performance bottleneck

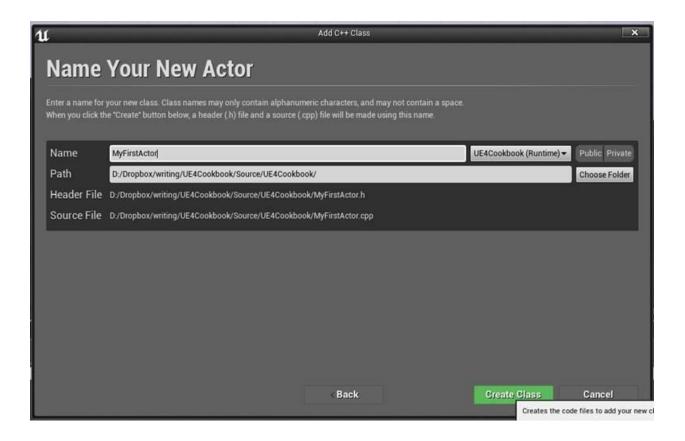


Chapter 4: Actors and Components

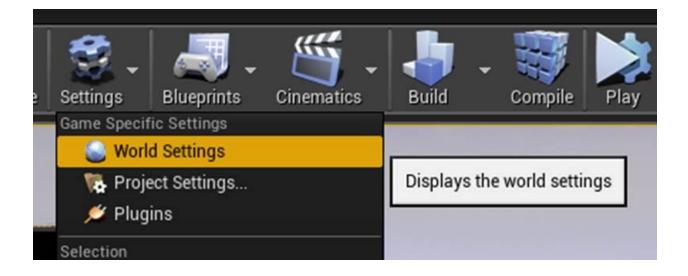




u	Add C++ Class	×
Choose Parent Class		
This will add a C++ header and source code file to your game p	project.	Show All Classes
 None An empty C++ class with a default constructor and dest Character 	o walk around.	
Actor An Actor is an object that can be placed or spawned in t	the world.	
Actor Component An ActorComponent is a reusable component that can b Selected Class Actor (7)	be added to any actor.	
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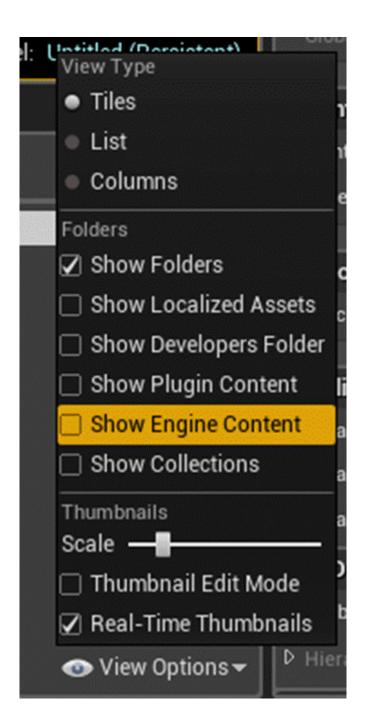






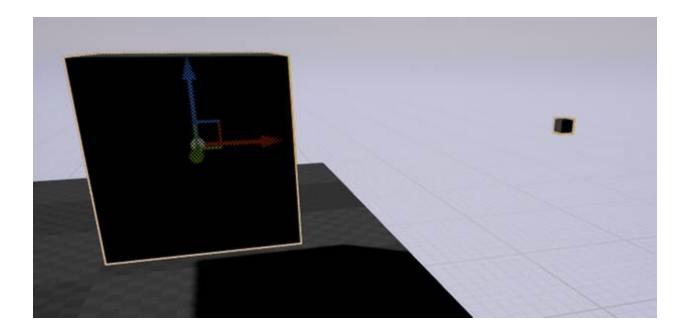
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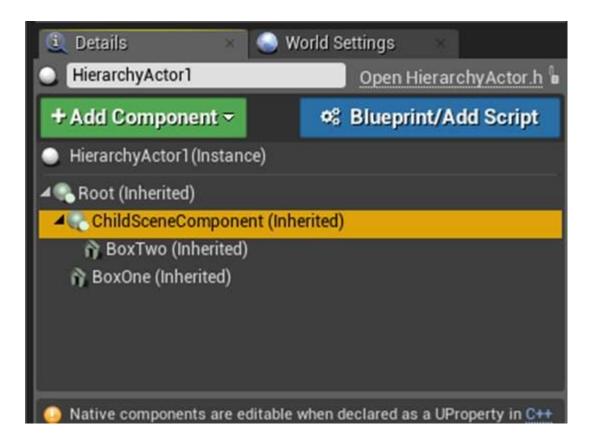
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ParticleEventManager3	ID Name: MyFirstActor_25
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PlayerState1	PlayerState
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18 actors (1 selected)	💿 View Options 🗸

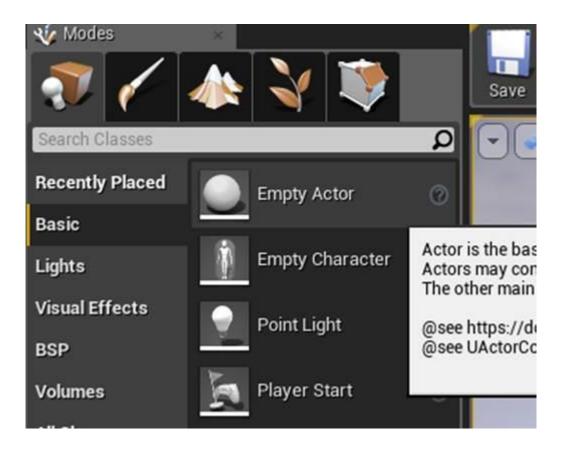


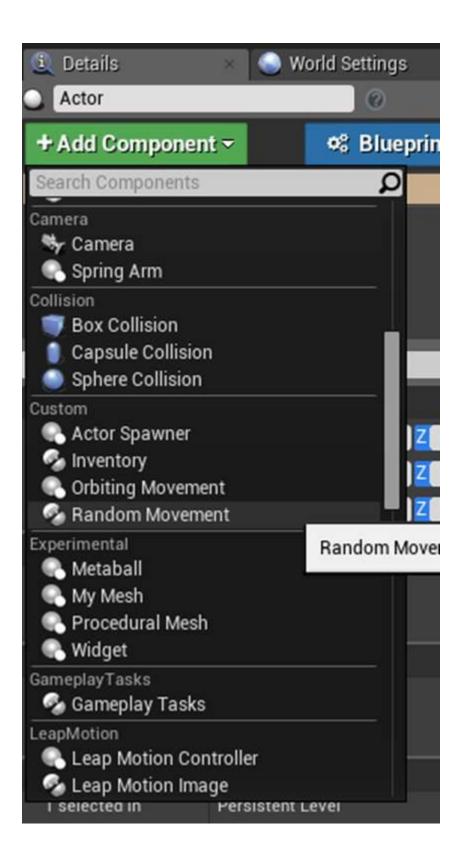
Search Folders	▼ Filters ▼ Search BasicShapes
 Content Blueprints Levels Meshes RefactoredContent Blueprints Blueprints UI C++ Classes Engine Content ArtTools BasicShapes BufferVisualization 	Basic Shape MaterialConeCubeCylinderSphere
Collections	5 items (1 selected)

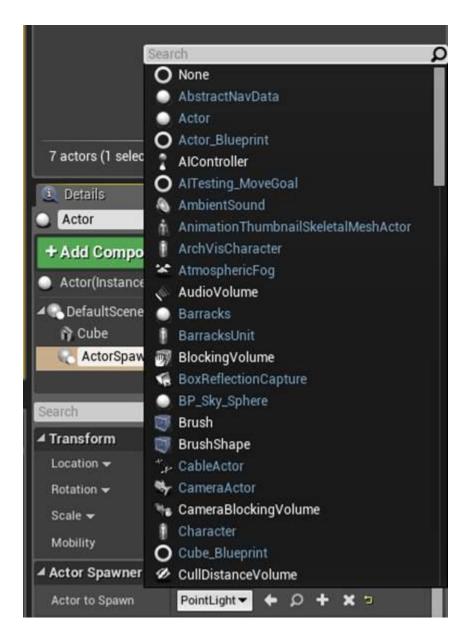
	1 K.S.	
	Explore Show in Folder View Ctrl+B Show In Explorer	Level: Untitled (Persistent)
	References	▲ Selected Gam
	Copy Reference	Default Pawr
	Reference Viewer Size Map	Copies reference paths for the selected assets to the clipboard.
	Collections Manage Collections	Player Contri Game State
	Connect To Source Control	Player State Spectator Cl
rint n MyFir	stActor MyGame MyMesh Orbiting Rando State Component Movement Movem	ent GameMode

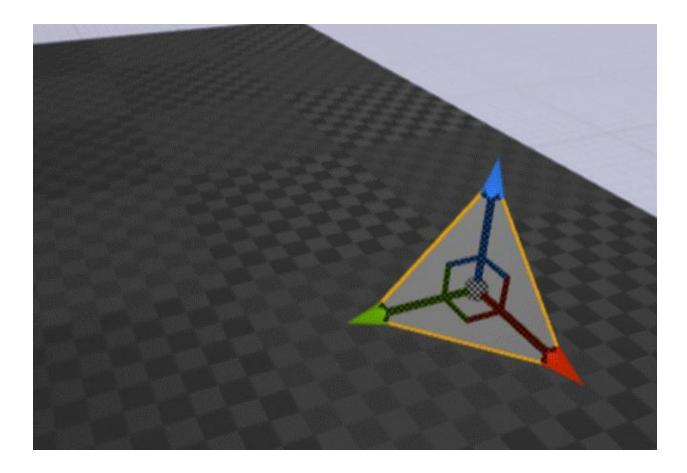










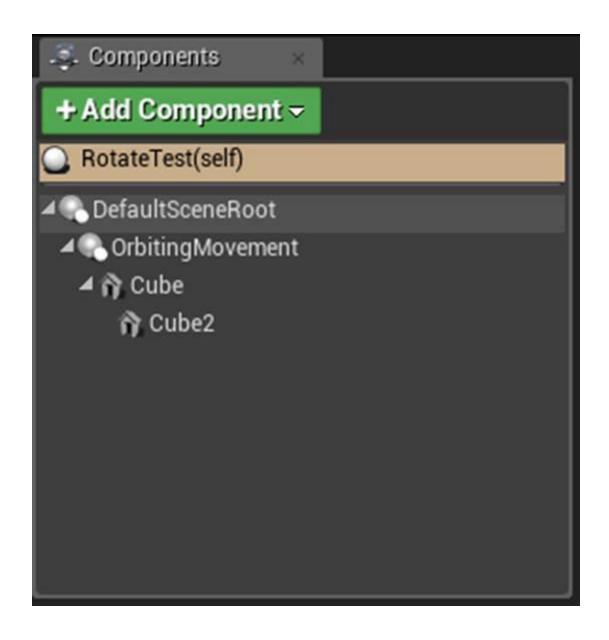




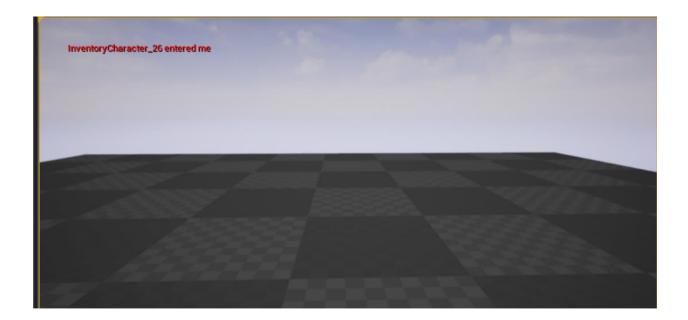
Engine - Input

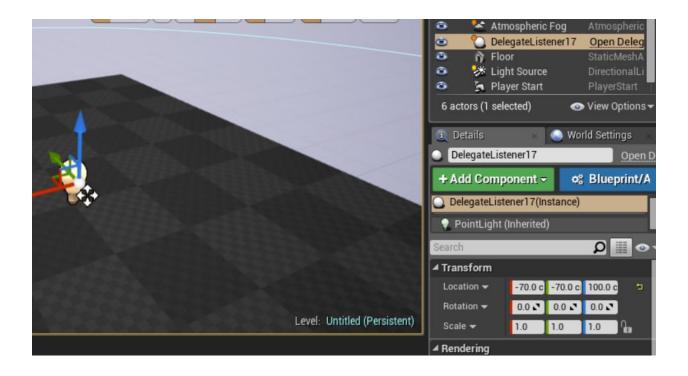
Input settings, including default input action and axis bindings.

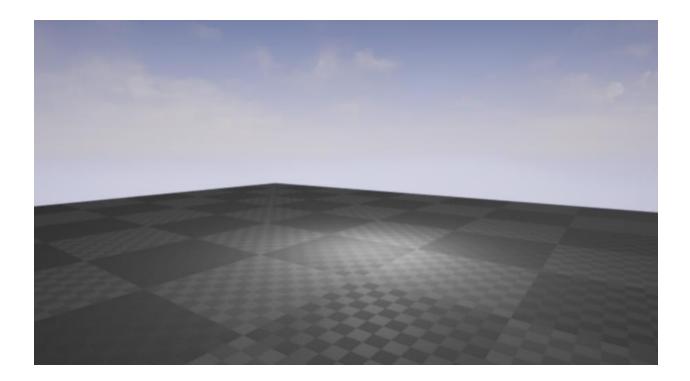
∩ These settings are saved	in DefaultInput.ini, which is currently writable.
Search	
▲ Bindings	
	ovide a mechanism to conveniently map keys and axes to uses, while Axis Mappings allow for inputs that have a conf
🔺 Action Mappings 🕂 🛅	
⊿ DropItem	+ ×
ΞE	Shift 💭 Ctrl 🔛 Alt 💭 Cmd 🔛 🗙

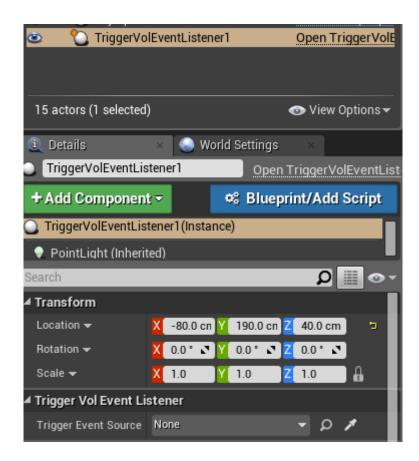


Chapter 5: Handling Events and Delegates

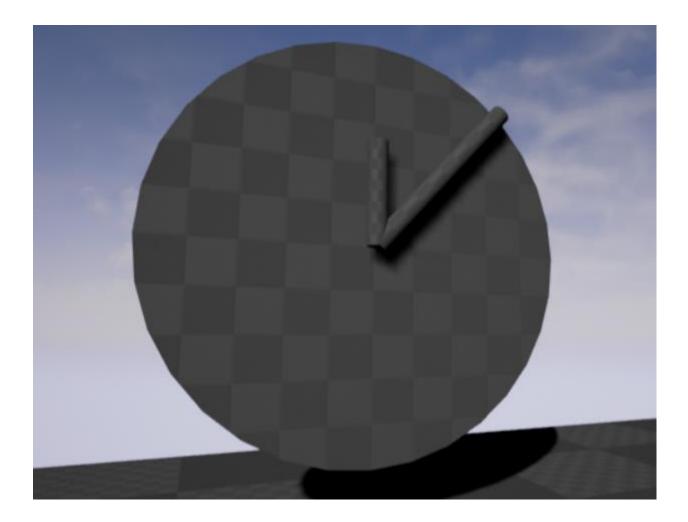


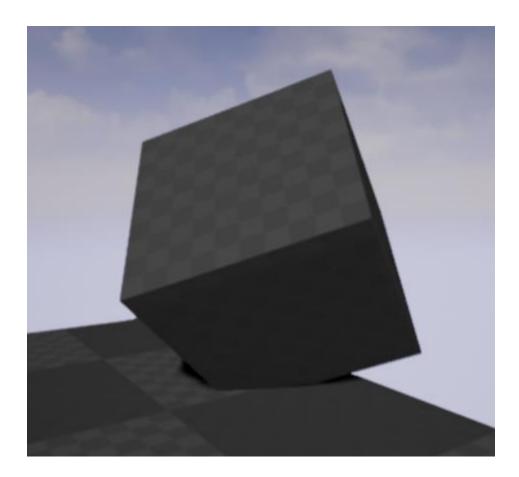




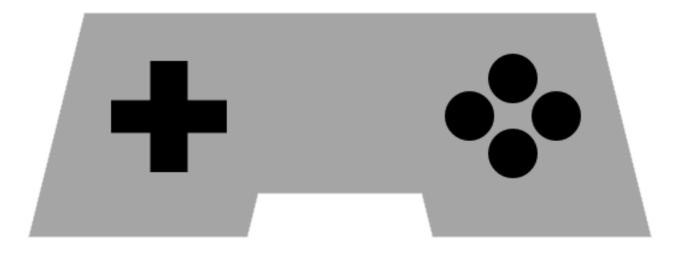


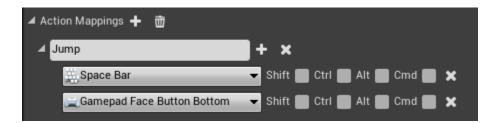






Chapter 6: Input and Collision





User Interface	Az Font	
Miscellaneous	• <u></u>	
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	Slate Widget S	tyle
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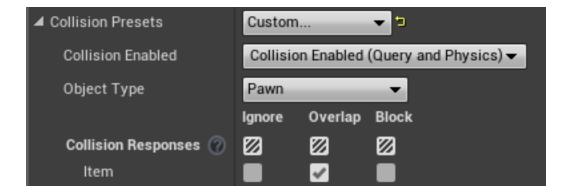


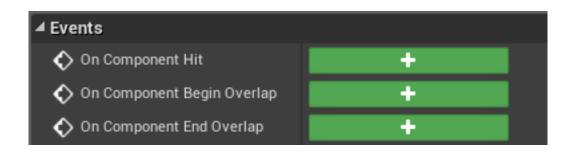
✓ Collision			
Simulation Generates Hit Events			
Phys Material Override	None	-	a 🔶
Generate Overlap Events	>		
▲ Collision Presets	Custom		- 5
Collision Enabled	Collisio	n Enabled	(Query a ▼
Object Type	Pawn	_	-
	Ignore	Overlap	Block
Collision Responses 🕜	Ø		Ø
Trace Responses			
Visibility	N		1
Camera			
Object Responses			
WorldStatic			~
WorldDynamic			
Pawn			
PhysicsBody			
Vehicle			
Destructible			
Can Character Step Up On	ECB No		-

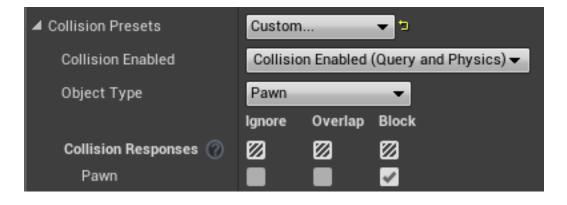
11 💦 Project Settings	
Project Description Maps & Modes	Engine - Collision Set up and modify collision settings.
<u>Movies</u> Packaging Supported Platforms	Perform These settings are saved in Default Default Response Overlap▼ Search Accept ✓ Object Channels Cancel
Target Hardware Engine Al System	You can have up to 18 custom channels including object and trace channels. This is list of object type for your project. If you delete the object type that has been used by game, it will go back to WorldStatic. New Object Channel Edit Delete Name Default Response
Animation Audio ▶ Collision	✓ Trace Channels You can have up to 18 custom channels including object and trace channels. This is list of trace channel for you project. If you delete the trace channel that has been used by game, the behavior of trace is undefined. New Trace Channel Edit Delete

▲ Collision Presets	Custom		- 5
Collision Enabled	Collisio	n Enabled	(Query and Physics) 🔫
Object Type	ltem	_	•
	Ignore	Overlap	Block
Collision Responses 🕜	ً	ø	
Pawn		~	

Generate Overlap Events 🖌

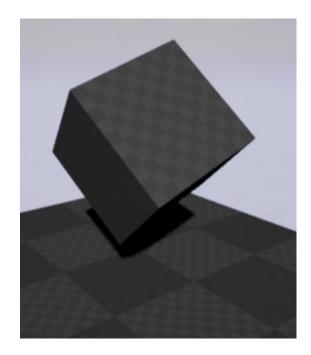






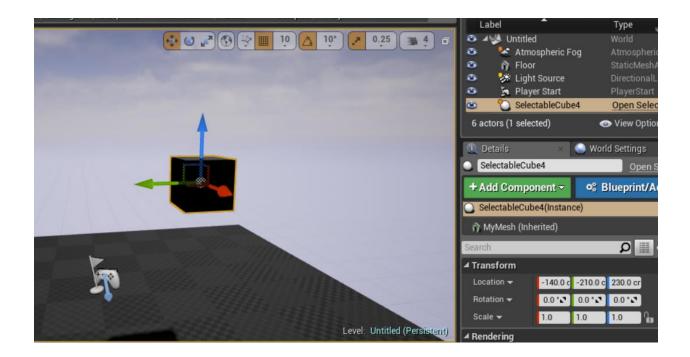
Chapter 7: Communication between Classes and Interfaces

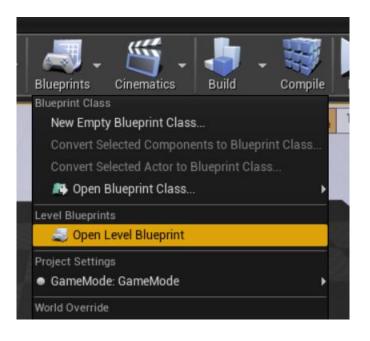


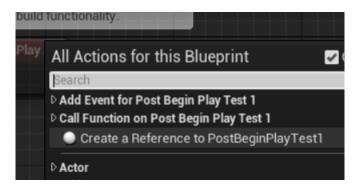


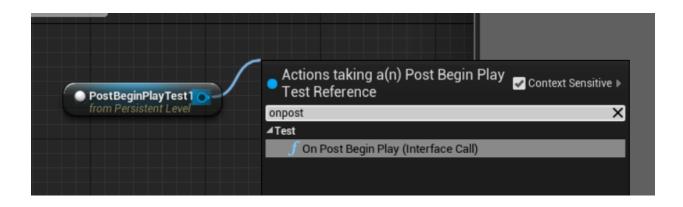


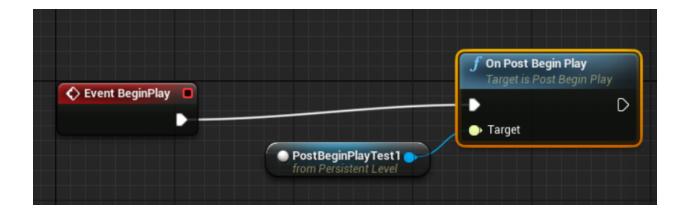
Arrrgh You can't kill what is already dead. Mwahaha

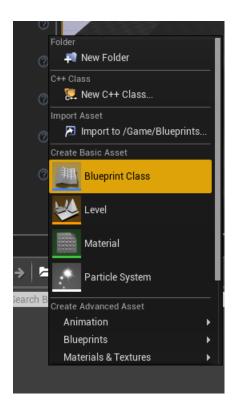


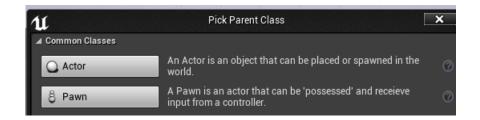




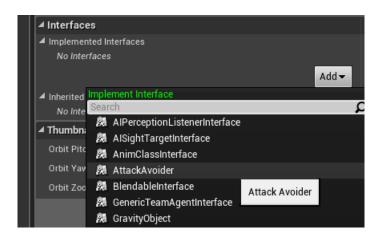






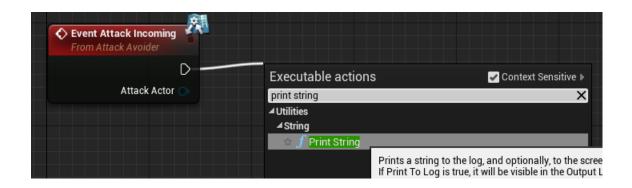


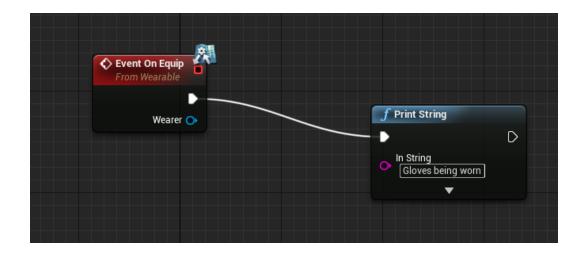




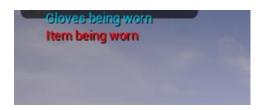


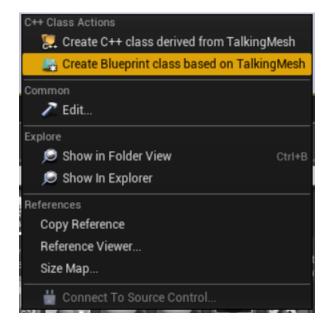
All Actions for this Blueprint	🧹 Context Sensitive 🕨
event attac	X
▲Add Event ▲Attack Avoider	
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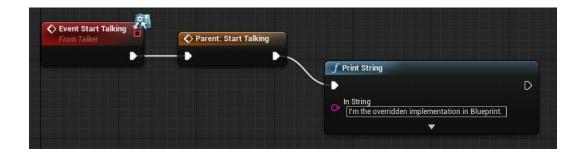




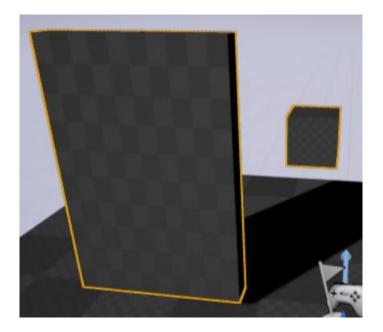
	On Equip	On Equip Using Interface Wearable
Event BeginPlay		
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	Wearer	Wearer
Boots1 from Persistent Level	Gloves from Persist	entLevel
	f Get Player Pawn	
	O Player Index 0 Return Value ●	

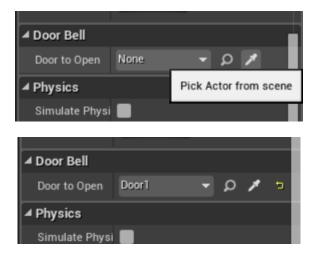


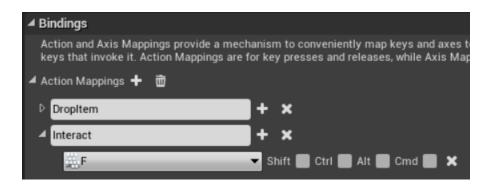




I'm the overridden implementation in Blueprint. Hello there. What is your name?







Chapter 8: Integrating C++ and the Unreal Editor

Choose Parent Class This will add a C++ header and source code file to your game project.

-			- 10			
1	1.21	101	 40	С 04 1		ा

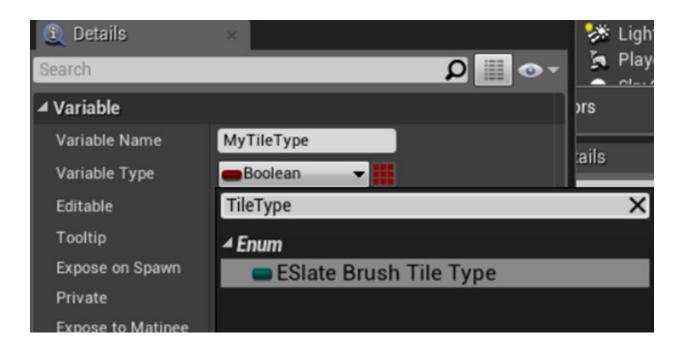
ρ

Search Object

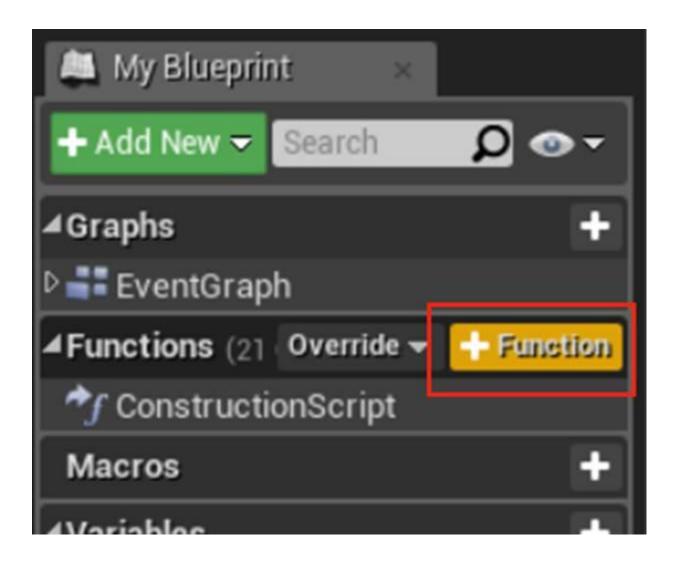
Þ 🍚 Actor

ActorComponent
 ActorFactory

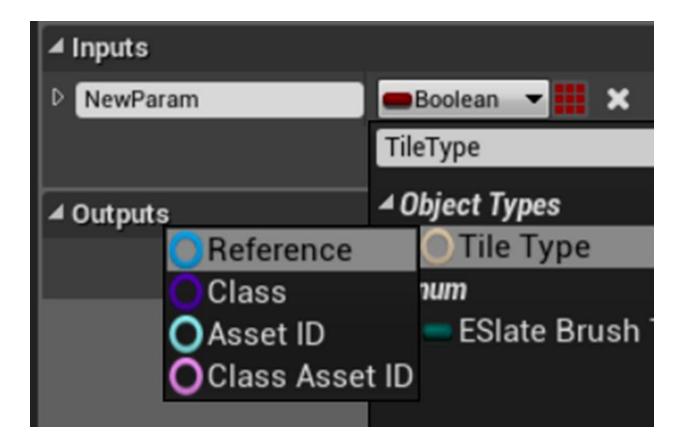
× **Pick Parent Class** 11 Common Classes An Actor is an object that can be placed or spawned in the 0 Actor world. A Pawn is an actor that can be 'possessed' and receieve 0 Pawn input from a controller. A character is a type of Pawn that includes the ability to walk 0 Character around. A Player Controller is an actor responsible for controlling a Disus Controllo

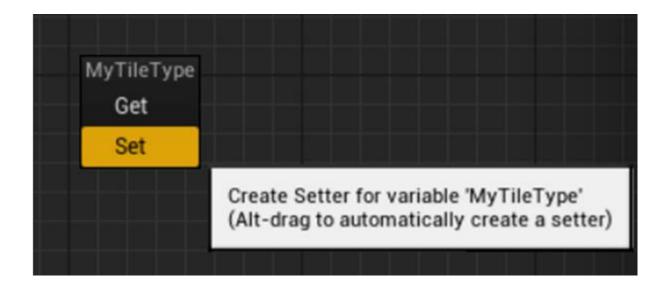


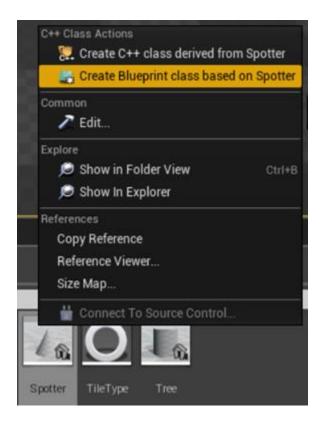
MyTileType	ails
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▲ Object Types	
Tile Type	Þ
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💳 ESlate Brush Tile Type	



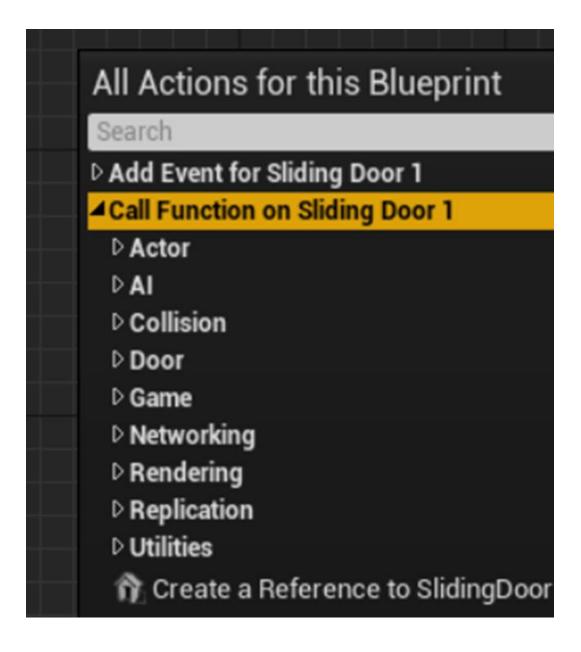
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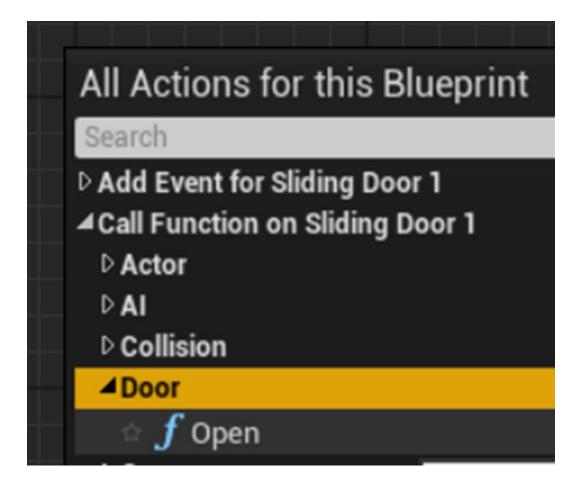




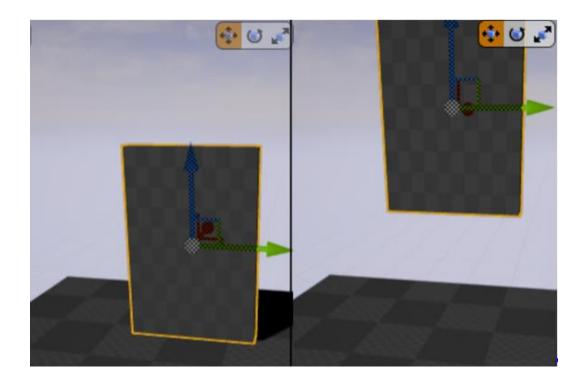


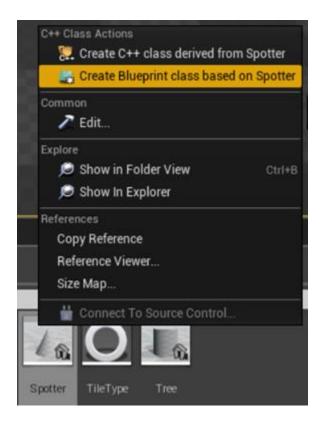
11	Pick Parent Class	x
▲ Common Classes		
Actor	An Actor is an object that can be placed or spawned in the world.	0
8 Pawn	A Pawn is an actor that can be 'possessed' and receieve input from a controller.	0
Dharacter	A character is a type of Pawn that includes the ability to walk around.	0
🍹 Player Controller	A Player Controller is an actor responsible for controlling a Pawn used by the player.	0
📓 Game Mode	Game Mode defines the game being played, its rules, scoring, and other facets of the game type.	0
la Actor Component	An ActorComponent is a reusable component that can be added to any actor.	0
😪 Scene Component	A Scene Component is a component that has a scene transform and can be attached to other scene components.	0
▲ All Classes		
Base		X
▲O Object		
Actor		
BaseEnemy		
EmitterCameraLen	sEffectBase	

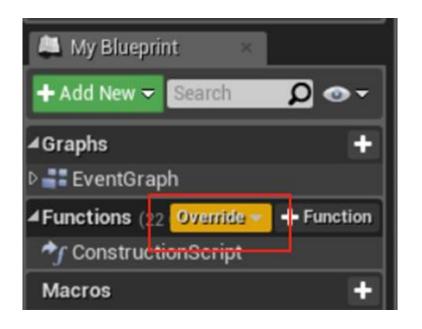


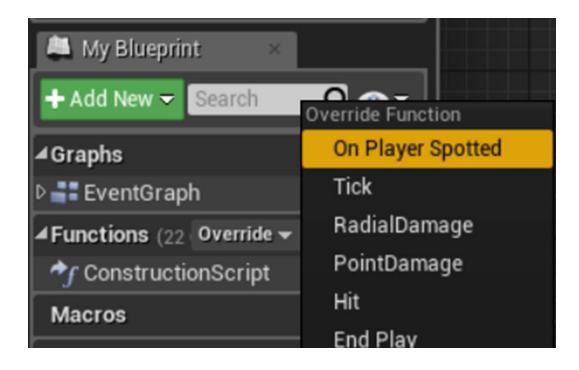


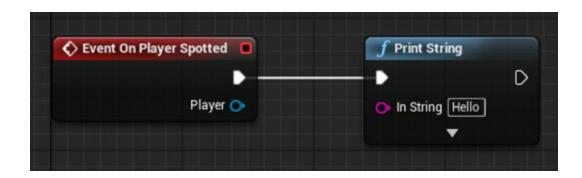


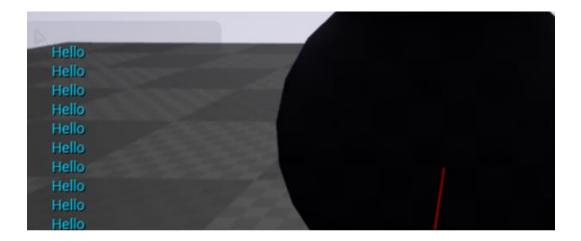


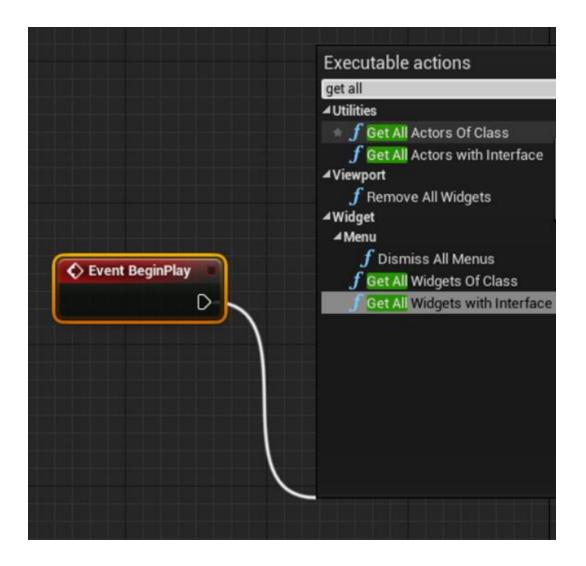


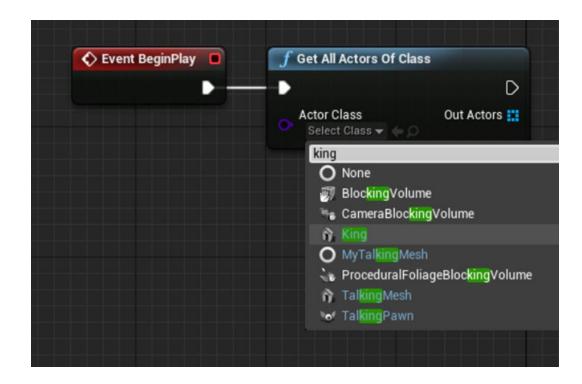


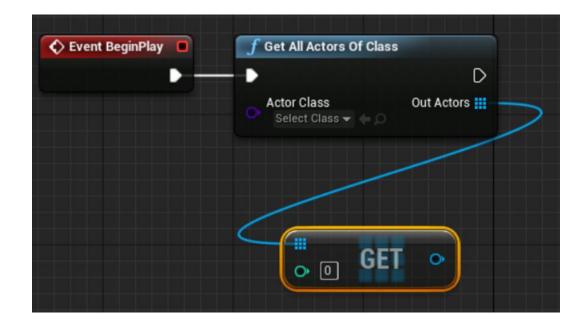


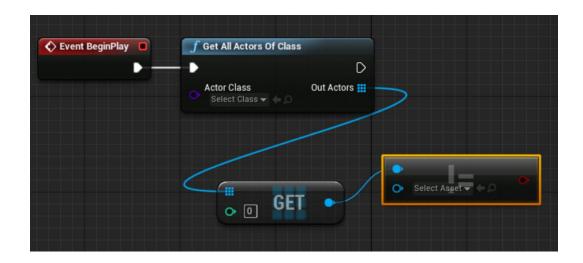


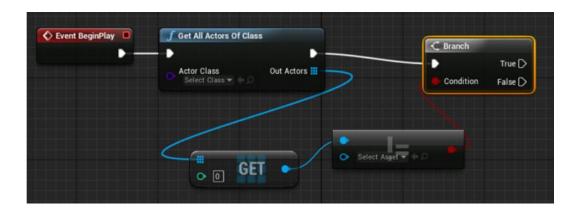


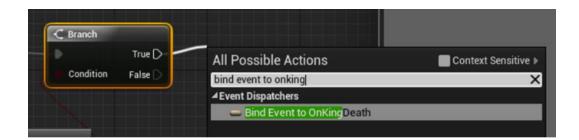


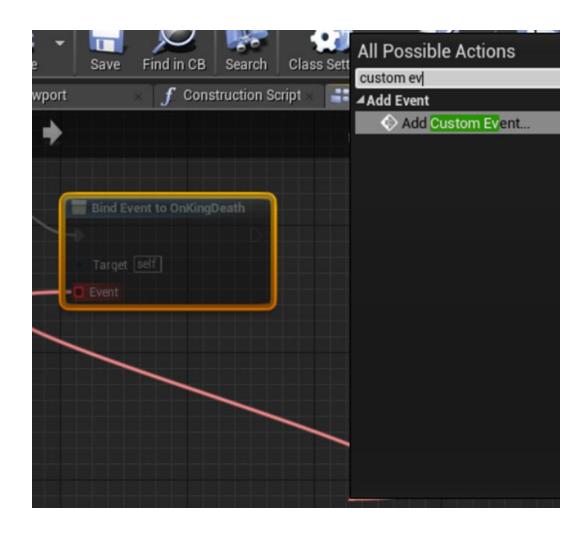


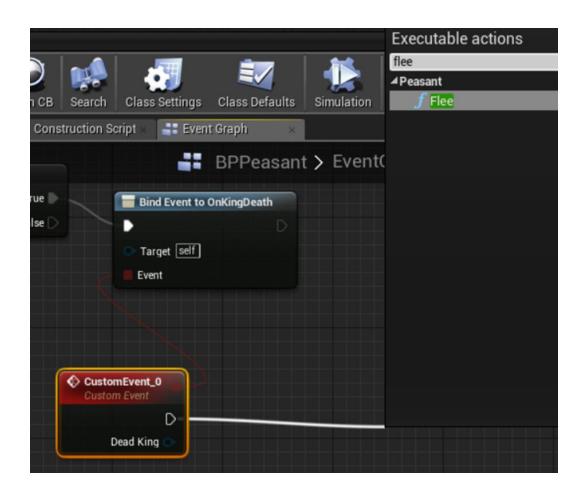


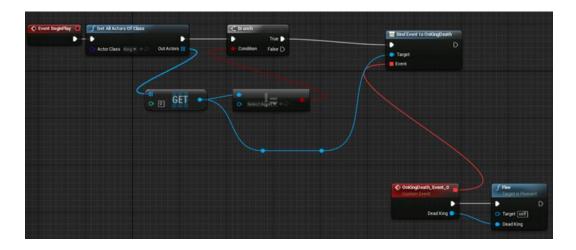


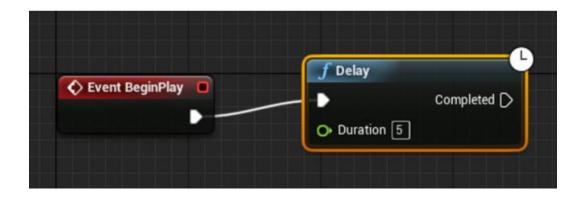




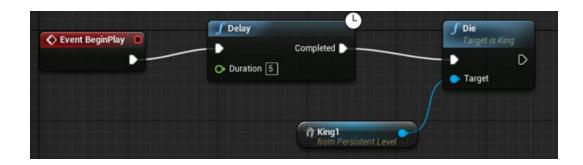


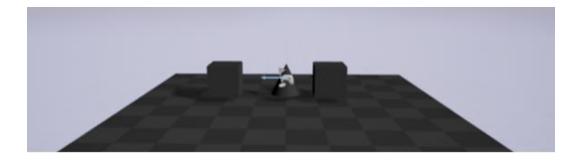


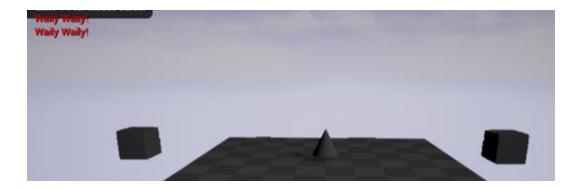


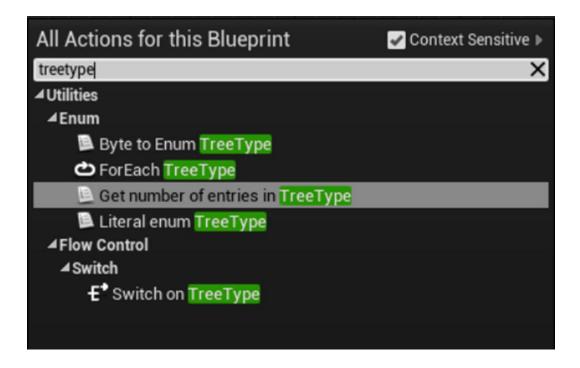


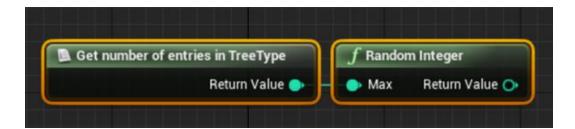
All Actions for this Blueprint	🖌 Cont	ext Sensitive 🕨
Search		Q
D Add Event for King 1		
▲Call Function on King 1		
D Actor		
₽AI		
D Collision		
D Game		
⊿King		
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Create a Reference to King1		



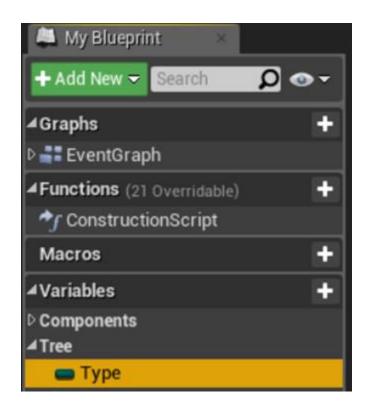


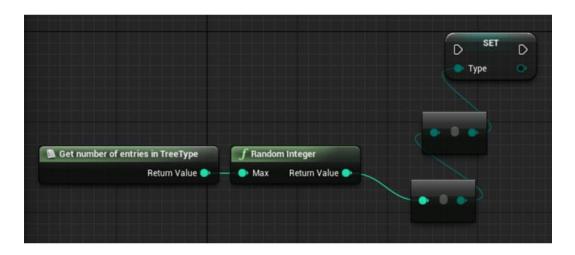


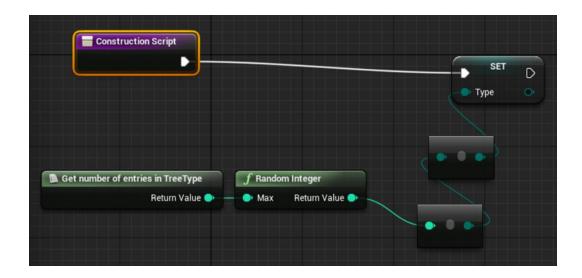


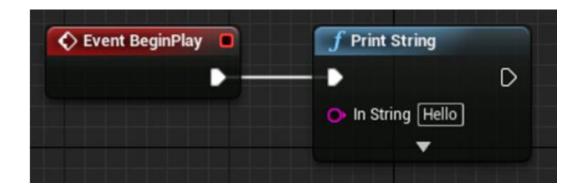


Actions taking a(n) In	teger 🚽	Context Sensitive 🛚	
Search		۶ ۲	
Select a Component to see	available Events & F	unctions	
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Promote to variable			
D Canvas Render Target 2D			
D Components			
D Cookbook			
D Game			
D Game Options			
D Leap Motion			
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f ToBool (int)			
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$oldsymbol{f}$ ToFloat (int)	Converts on intege	r to a byte (if the inte	ger is too large re
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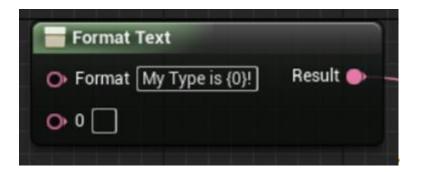


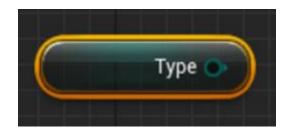


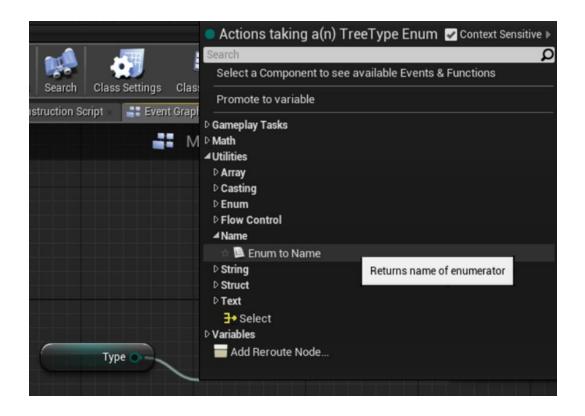




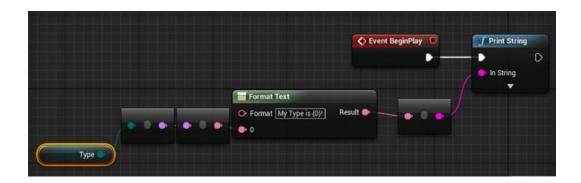


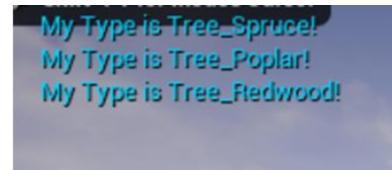






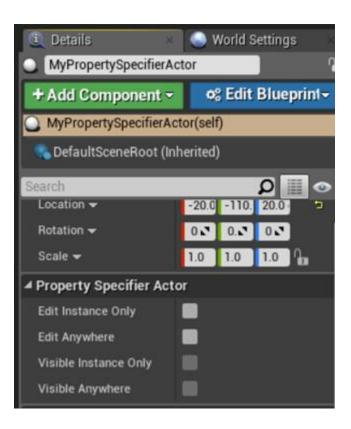
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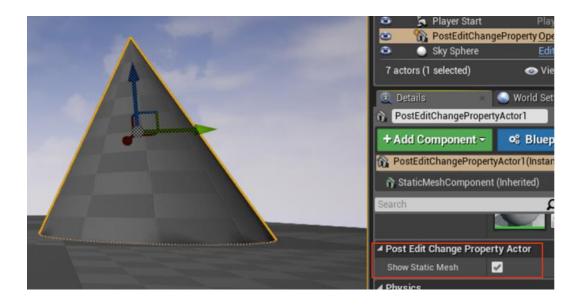






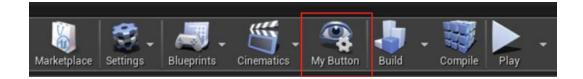


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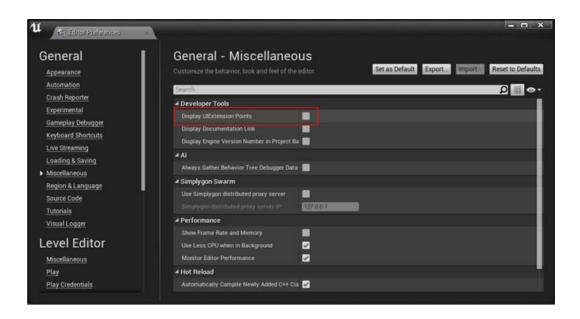




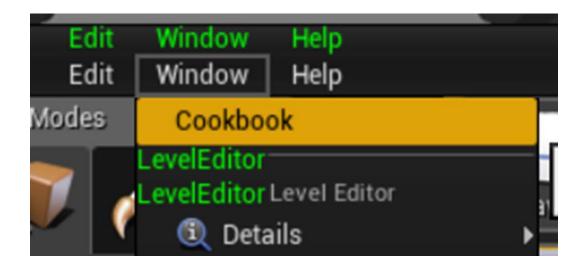
🛈 Unreal Engine		×
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	🐴 Undo (Can't undo after: New Map)	Ctrl+Z
	🌈 Redo (Nothing to redo)	Ctrl+Y
	🕤 Undo History	
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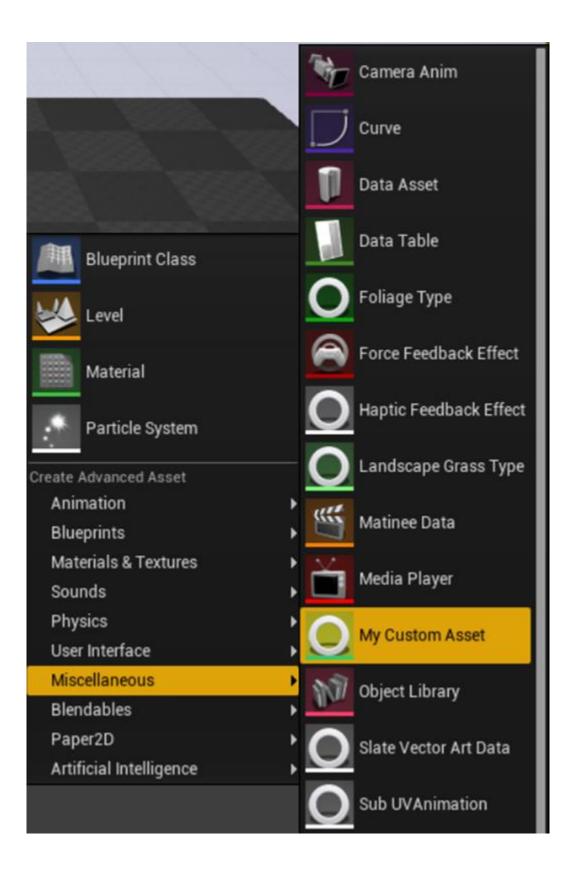


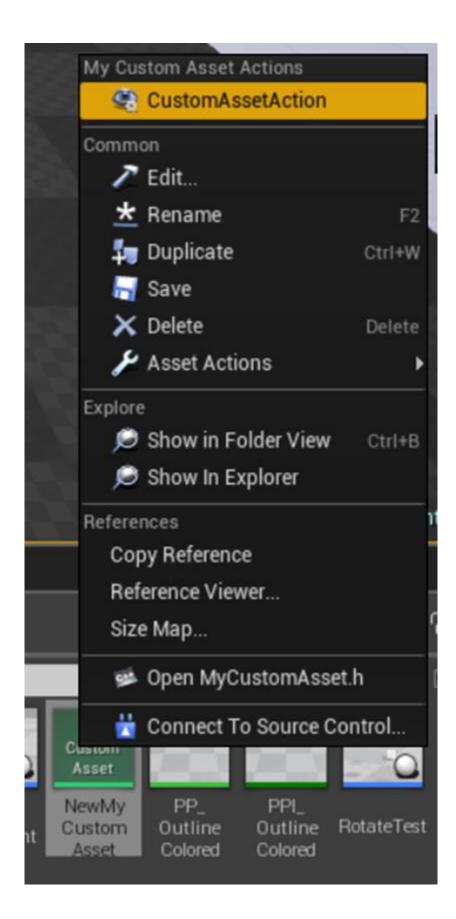




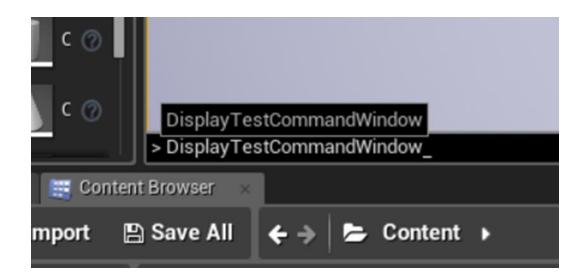


pplication Scale: 1.0 💽 Fold	Tick Widget Caching Invalida	ation Debugging	Demo Mode Toggle St
Show Focus Pick Live Widget	Take Snapshot DESKTOP-H7F	9AL9-10360 (Wind	ows) - Load Snapsho
Vidget Name	FG Visibility	Widget Info	Address
Shudua -	Visible	UE4CookbookEd	itc 0x000001694E48C100
Soverlay	SelfHitTestInvisible	SWindow.cpp(46	7) 0x000001694E372C00
Simage	SelfHitTestInvisible	SlateApplication.	cc 0x000001694E374800
Simage	SelfHitTestInvisible	SlateApplication.	cc 0x000001694E374B80
SVerticalBox	SelfHitTestInvisible	SWindow.cpp(49	3) 0x000001694E372E80
SVerticalBox	SelfHitTestInvisible	SWindow.cpp(41	4) 0x000001694465D580
SWindowTitleBar	SelfHitTestInvisible	SlateApplication.	cp 0x0000016944654100
SVerticalBox	SelfHitTestInvisible	UE4CookbookEd	itc 0x000001694465D800
STextBlock	Visible	UE4CookbookEd	itc 0x000001694E36E080
SPopupLayer	SelfHitTestInvisible	SWindow.cpp(50	6) 0x000001694E373100
Simage	SelfHitTestInvisible	SlateApplication.	cp 0x000001694E374F00
SHorizontalBox	SelfHitTestInvisible	STutorialRoot.cp	p(0x000001694E370400

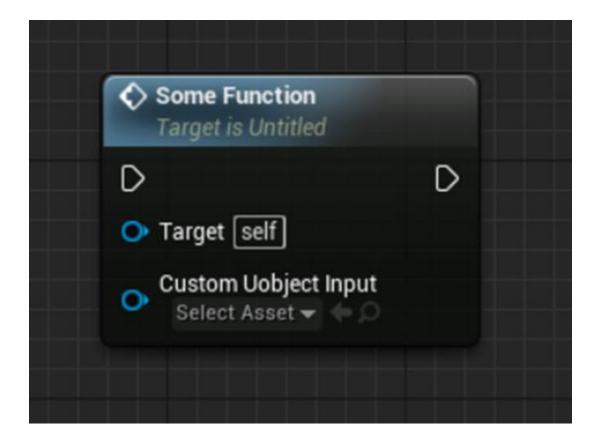


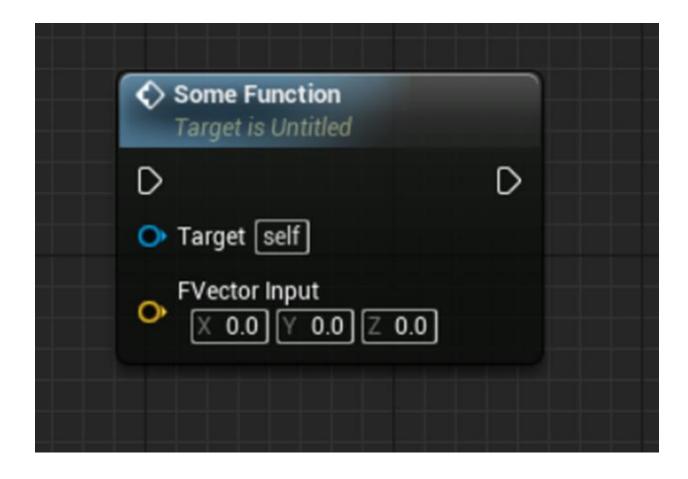


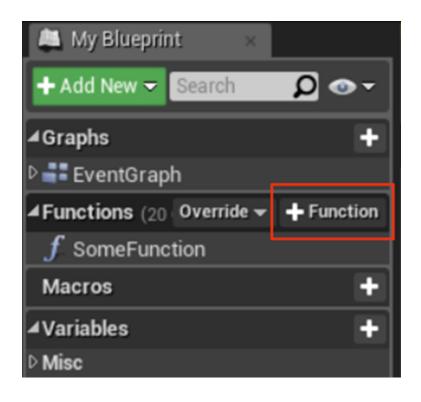










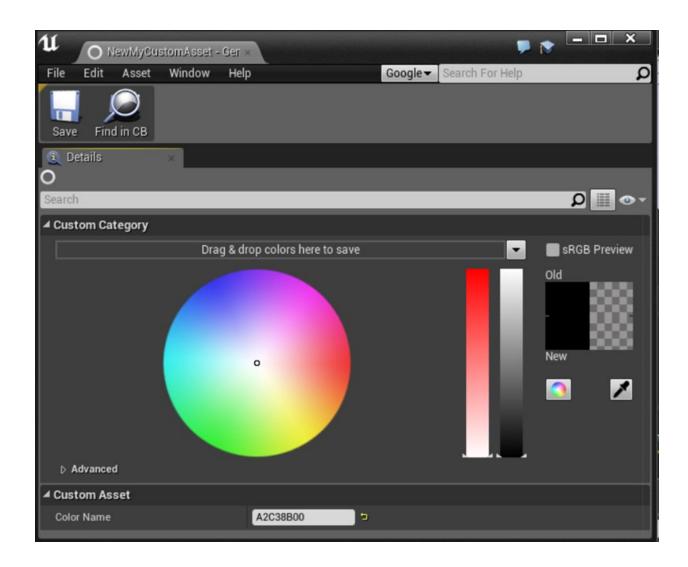


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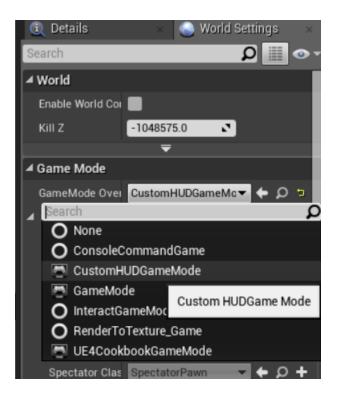


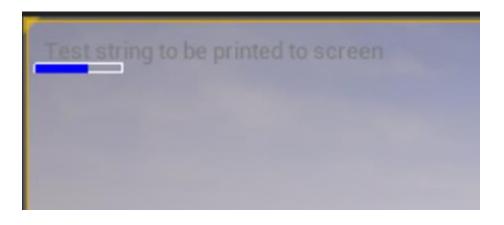
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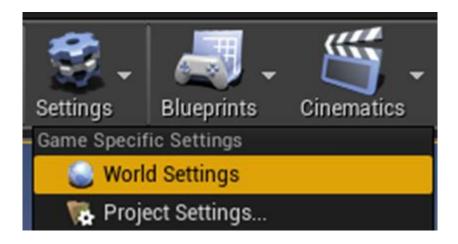


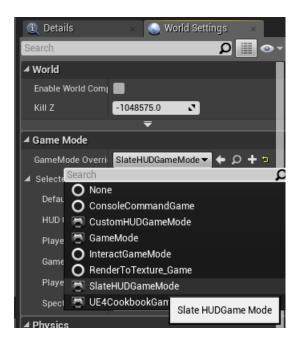
Chapter 9: User Interfaces—UI and UMG

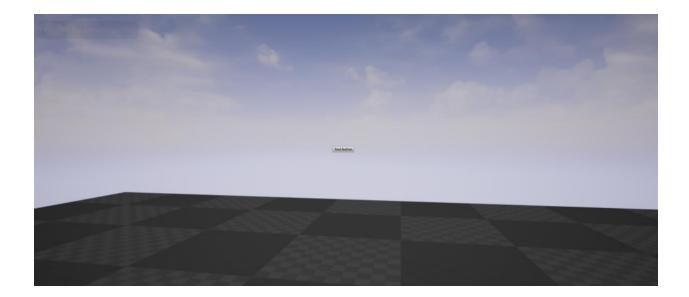


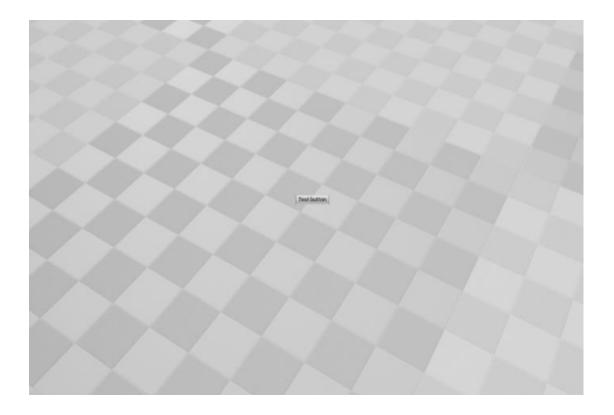






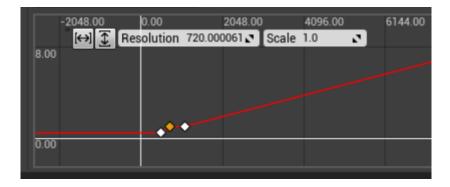






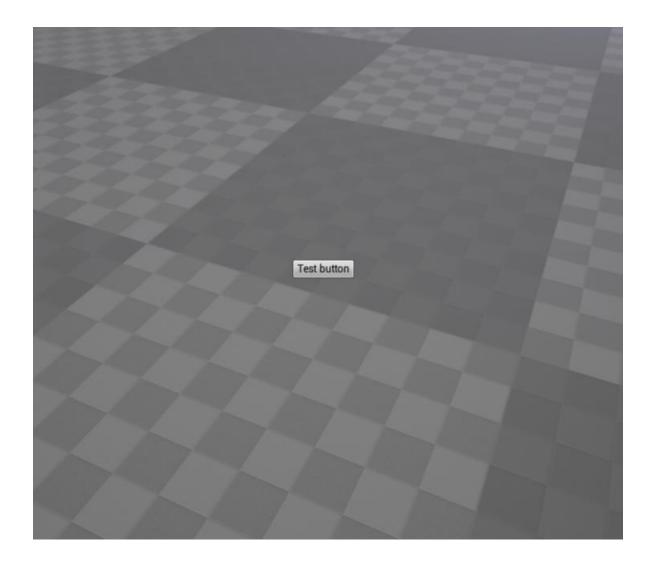
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ndo (Hit U	ndo barrier; can't undo any further)	
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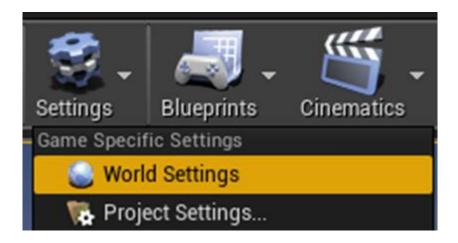
11 💦 Project Settings	×	_ _ X
<u>Audio</u> <u>Collision</u> Console	Engine - User Interface User Interface settings that control Slate and U	
Cooker Crowd Manager	1 These settings are saved in DefaultEngine	.ini, which is currently writable.
End-User Settings	Search	۵ 🏢 👁 ۲
Garbage Collection	✓ Focus	
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Navigation Mesh	Default Cursor	None
Navigation System	Text Edit Beam Cursor	None • 0 + ×
Network	Crosshairs Cursor	
Physics		None • ρ + ×
Rendering	Grab Hand Cursor	None ← 𝒫 + ×
Streaming	Grab Hand Closed Cursor	None 🗸 🔶 D 🕂 🗙
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Dropbox > writing > UE4Cookbook > Config

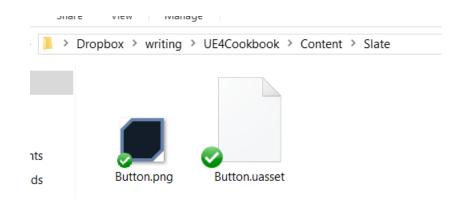
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📓 DefaultEngine.ini	16/05/2016 9:42 A	Notepad++ Docu	3 KB
🞽 DefaultGame.ini	12/02/2016 11:26	Notepad++ Docu	1 KB
🞽 DefaultInput.ini	13/04/2016 11:42	Notepad++ Docu	3 KB

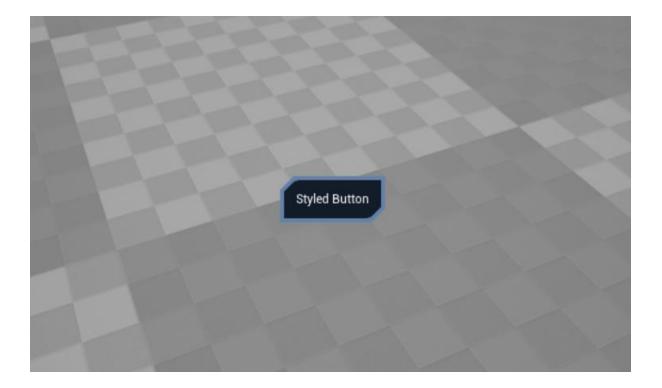


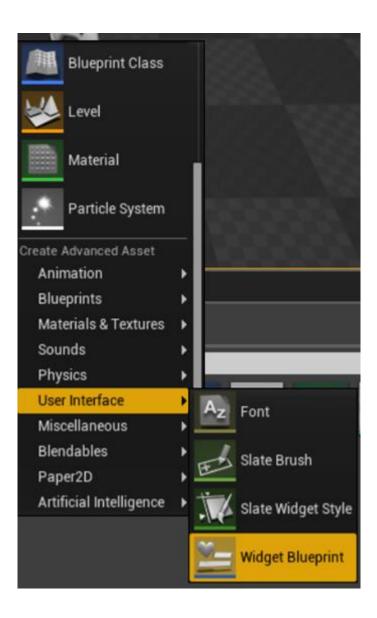


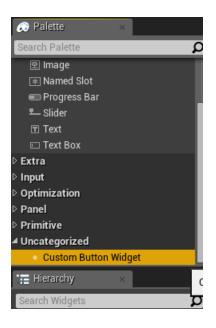


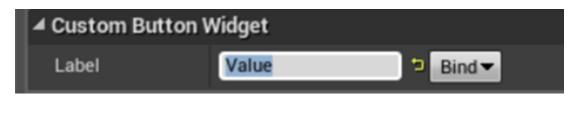


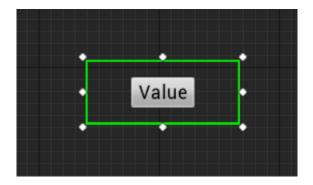










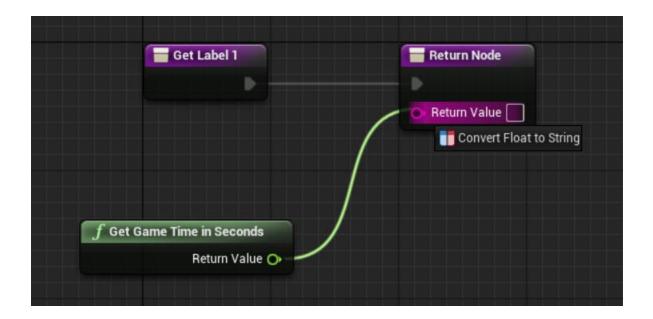


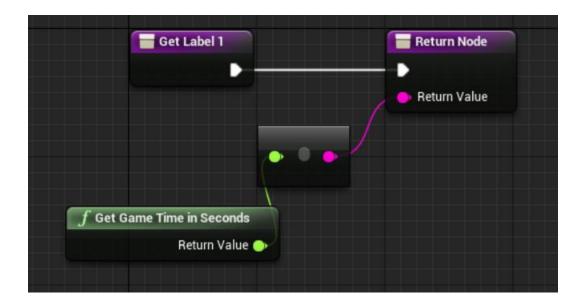
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Label	Value	5	Bind▼	
✓ Behavior		÷	Create	Binding

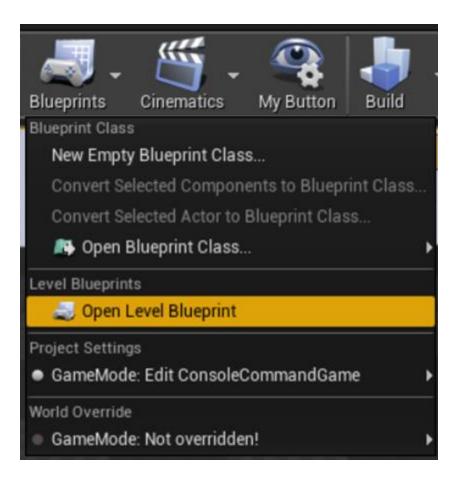
All Actions for this Blueprint game time JUtilities

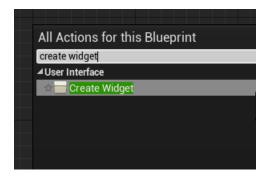
⊿Time

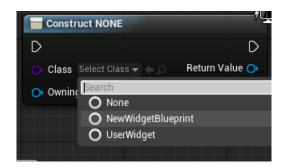
f Get Game Time in Seconds

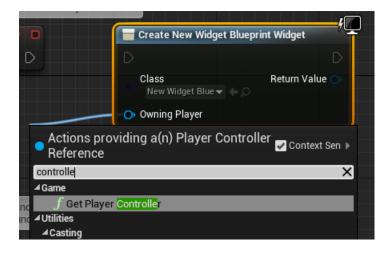


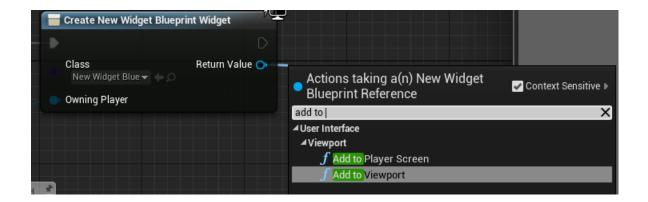


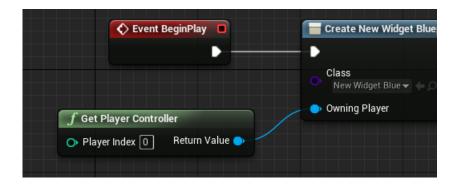






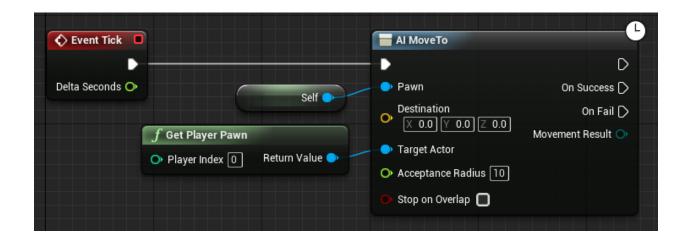


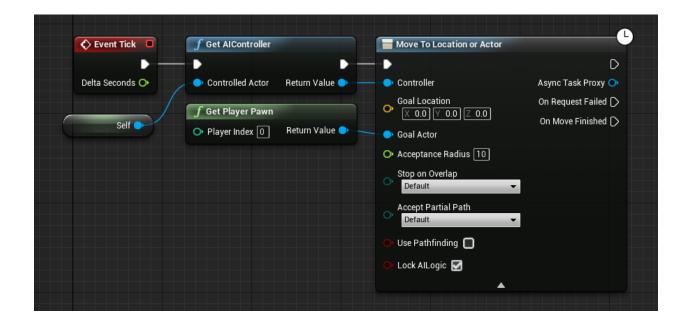


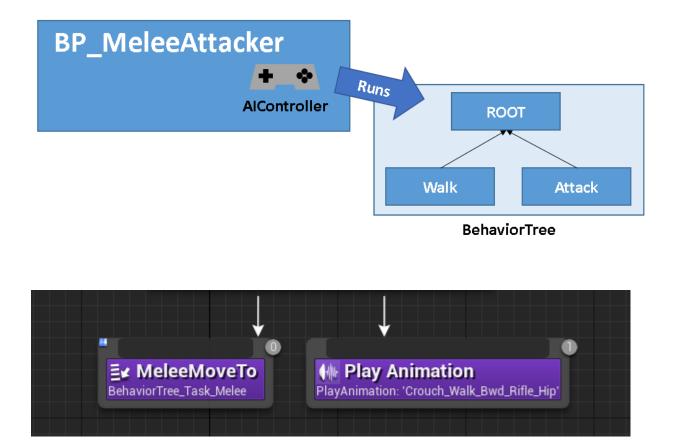


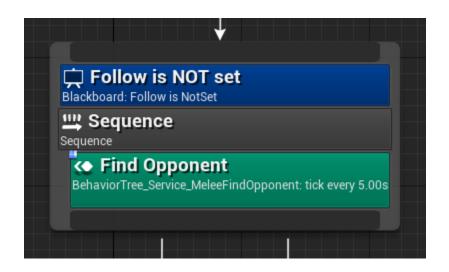


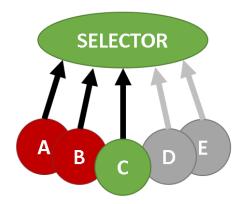
Chapter 10: AI for Controlling NPCs

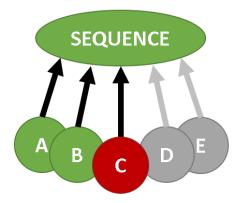


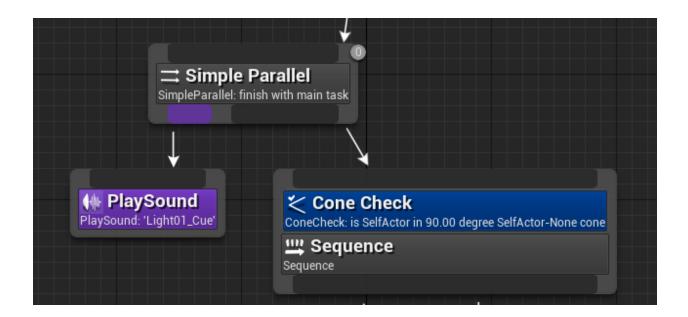






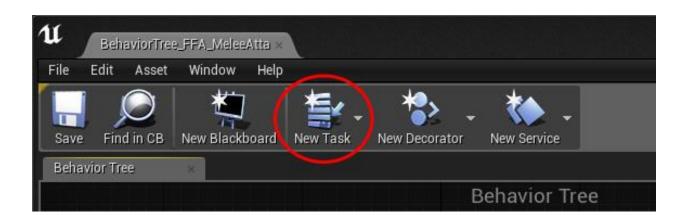










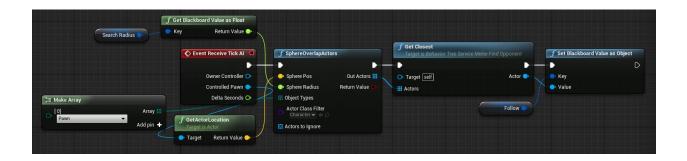


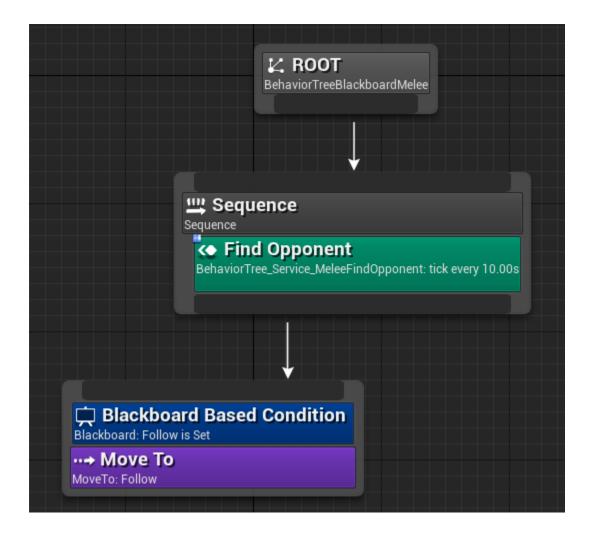


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File	Edit	Asset	Window	Help			_		
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Beha	vior Tre	e	8			~	/		
					بالمرعام		E	Behavior Tree	

/		f Get Blackboard Value as Float		f Get Blackboard Value as Actor	
	Bounding Sphere	🔶 Key Return Value 🔶	Bounding Sphere	🔶 Key 🧼 Return Value 🕒	
	;iii Make Array	Perform Condition Check AI	<pre></pre>		Return Node
	[0] Array III Add pin +	Owner Controller O Controlled Pawn O	Sphere Pos Out Actors Sphere Radius Return Value	CONTAINS •	Return Value
;∷ Make Array [0]	Аггау 🏢	f GetActorLocation	Object Types Actor Class Filter		

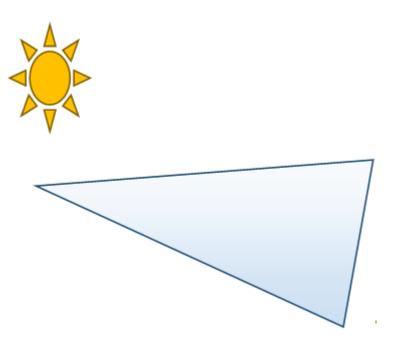


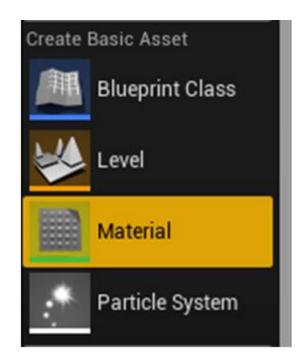


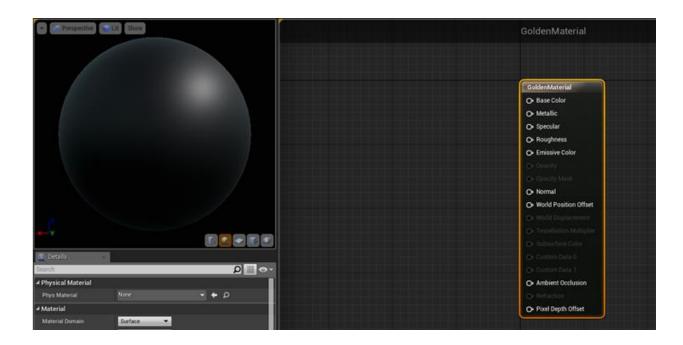


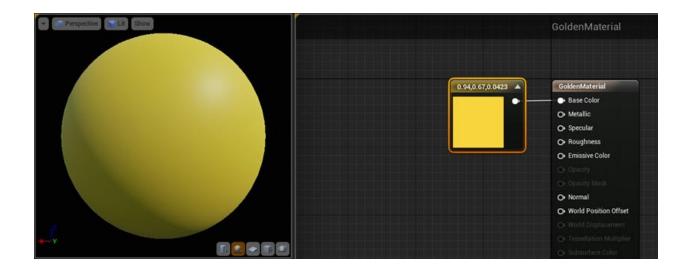
Behavior Tree	Zoom 1
K ROOT BehaviorTreeBlackboardMelee	
Find Opponent BehaviorTree_Service_MeleeFindOpponent:	: tick every 2.00s
Blackboard Based Condition Blackboard: Follow is Set	Cooldown: lock for 5.0s after execution and return Failed
Er Move Towards BehaviorTree_Task_MoveTowards	SAT Location IsAtLocation: Follow
	≣ ✓ Damage Opponent BehaviorTree_Task_DamageOpponent
	REHAVIOR TRE

Chapter 11: Custom Materialsand Shaders

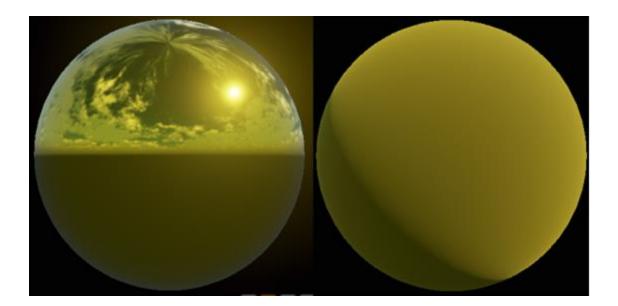


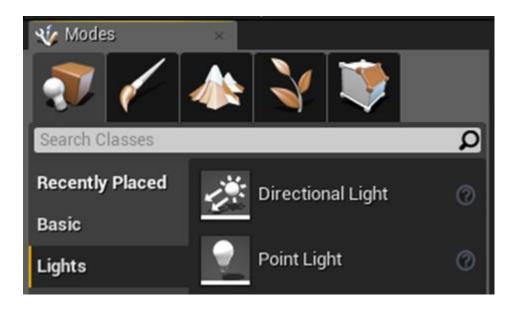


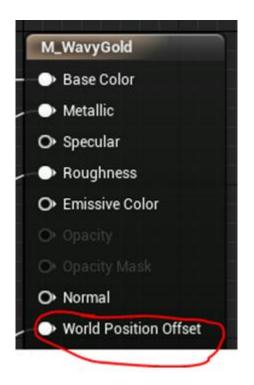


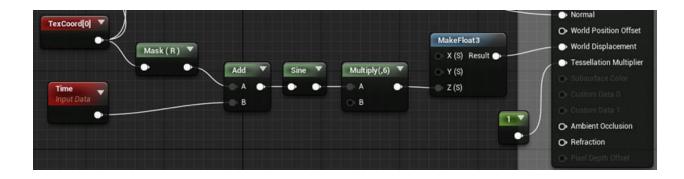








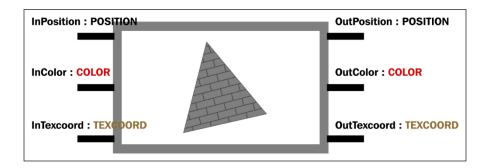


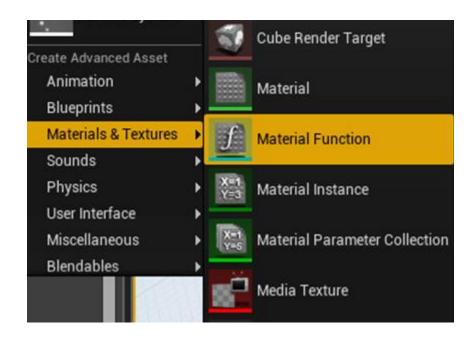


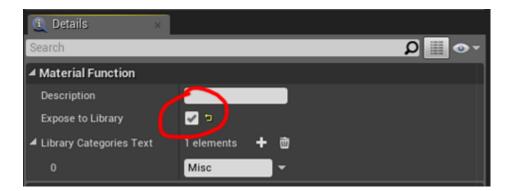


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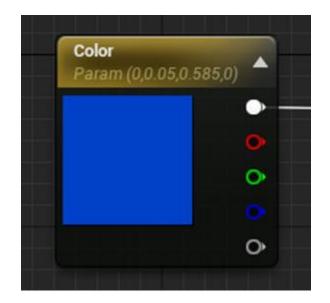




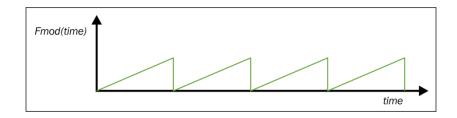




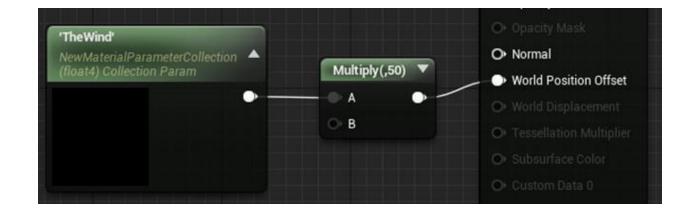
Start Previewing Node Enable Realtime Preview Break Link(s)











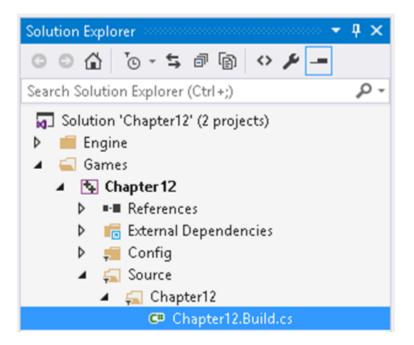


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		Normal World Position Offset Or World Displacement
	move coordinates between	Tresellation Multipler

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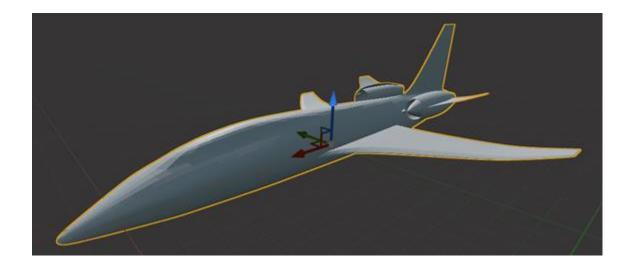


Chapter 12: Working with UE4 APIs



LogCh12:Display: A display message, log is working LogCh12:Warning: A warning message

💽 Message Log 🛛 🗙	
Chapter 12 (3)	an info message
Asset Registry	l a warning message
Build and Submit Errors	💋 an error message
Source Control (5)	



 θ

$$x = v_x \sin\left(\frac{\theta}{2}\right)$$
$$y = v_y \sin\left(\frac{\theta}{2}\right)$$
$$z = v_z \sin\left(\frac{\theta}{2}\right)$$
$$w = \cos\left(\frac{\theta}{2}\right)$$

$$v = (1, 2, 1) = \left(\frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$$

 $\frac{\pi}{2}$

$$(x, y, z, w) = \left(\frac{1}{\sqrt{10}}, \frac{2}{\sqrt{10}}, \frac{1}{\sqrt{10}}, \frac{1}{\sqrt{2}}\right)$$



