### Introduction of Unity

Ounity











#### 認識Unity

- 遊戲引擎Unity簡介
- Unity基本介面操作
- 專案儲存與匯出

















• 遊戲引擎

Friendly UI, Physical Engine, Particle System, GUI, Networking, Terrain Editor

• 跨平台輸出

Android, iOS, Windows, PS4, Web ...

• 多種應用領域

遊戲開發、資料視覺化、教育訓練、互動裝置、虛擬實境等

# Now available Unity 2020.1























#### 一款遊戲需要什麼元素?

































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#### Unity 架構



#### 專案檔(Project)

- 一個遊戲
- 一個完整目錄的檔案架構
- Unity同時只能開啟一個專案
- 一個專案只能由一個Unity視窗開啟

## Unity 架構









基本物件(Object)

- 長方體、球體、膠囊體、圓柱體、平面…
- 可自由調整大小及位置

腳本 (Script)

- 場景內元件控制
- C#







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New User Micro-Game: Karting Project - Beginner - 4h 45m



**Creator Kit: FPS** Project - Beginner - 1h 15m






# Unity Hub

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• 在project view 會呈現的檔案物件,都稱為asset

包含scenes, scripts, 3D models, textures, audio files



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#### Project vs Scene

- Project : 遊戲專案, 如「坦克大決戰」
- Scene : 關卡場景(Level), 一個坦克大決戰可能有五個場景關卡

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• 一種在場景中重複使用的物件, 如子彈或敵人, 通常會在遊戲執行中才動態產生或釋放



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#### Package

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包存成單一檔案, 副檔名為\*.unitypackage





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			,		

## GameObject

•任何在遊戲中的物件,如模型、光、攝影機、粒子效果...

#### Components

• 遊戲中的物件的組成元素,如音樂、碰撞體...,用來控制GameObject的行為,

每個GameObject可以包含多個不衝突components

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Rotation	X 0 Y 0 Z 0	
Scale	X 1 Y 1 Z 1	
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	Add Component	

## ameObject

•任何在遊戲中的物件,如模型、光、攝影機、粒子效果...

#### omponents

• 遊戲中的物件的組成元素,如音樂、碰撞體...,用來控制GameObject的行為,

每個GameObject可以包含多個不衝突components

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ls Trigger					
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					Scripts

## ameObject

•任何在遊戲中的物件,如模型、光、攝影機、粒子效果...

#### omponents

• 遊戲中的物件的組成元素,如音樂、碰撞體...,用來控制GameObject的行為,

每個GameObject可以包含多個不衝突components



# 常見components







• Transform是GameObject的Compoent的一種, Transform描述GameObject的

位置(Position)、旋轉(Rotate)、縮放(Scale)、每個GameObject都會包含這個元件



Cube (Mesh Filter) Mesh	[]] ↓ ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     []] ↓     [	Trans
🔻 🛃 🗹 Mesh Renderer	💽 🕂 🐥	
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Size	1	
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Lighting		
Cast Shadows	On \$	
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Anchor Override	None (Transform) O	N A a a la
Additional Settings		IVIESN
Motion Vectors	Per Object Motion +	
Dynamic Occlusion		• 在



Cube Mesh 24 verts, 12 tris uv,uv2 Library/unity default resources

#### form

nsform是GameObject的Compoent的一種, Transform描述GameObject的

置(Position)、旋轉(Rotate)、縮放(Scale)、每個GameObject都會包含這個元件

### Filter

想造GameObject的外觀, Mesh Filter從resource裡選一個Mesh當作外觀。

-個model的mesh是很多個三角形所組起來的。

### Renderer

E畫面上呈顯GameObject的外觀。



🔻 🛵 🛛 Rigidbody	📰 📫 🍋	Rigib
Mass	1	
Drag	0	• 允許日
Angular Drag	0.05	
Use Gravity		加了『
Is Kinematic		
Interpolate	None \$	也無法
Collision Detection	Discrete \$	
Constraints		而對ス
Freeze Position		
Freeze Rotation		
▶ Info		

#### ody

自身受到物理碰撞。

剛體的物件才會受到物理作用力,如受到重力而落下、被物理作用力推動/旋轉, 法主動穿越其他碰撞器,這都是受到剛體的影響。

方若是沒加剛體,對方就不會受到碰撞的作用力推擠,但仍然可以判斷雙方有碰撞。





🔻 🟡 Rigidbody	🔝 🕂 🔅
Mass	1
Drag	0
Angular Drag	0.05
Use Gravity	
Is Kinematic	
Interpolate	None \$
Collision Detection	Discrete \$
Constraints	
Freeze Position	
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▶ Info	

#### ▶ 物體質量,也可以說是重量。

🔻 🛵 🛛 Rigidbody	🔯 🕂 🔅	
Mass	1	b
Drag	0	
Angular Drag	0.05	
Use Gravity		
Is Kinematic		
Interpolate	None \$	
Collision Detection	Discrete \$	
Constraints		
Freeze Position		
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▶ Info		

▶ 物體質量, 也可以說是重量。

b. Drag空氣阻力

▶ 提高數值可減少落下速度、被撞飛距離。



▶ 物體質量, 也可以說是重量。

# b. Drag空氣阻力

▶ 提高數值可減少落下速度、被撞飛距離。

## c. Angular Drag角阻力

▶ 提高數值可減少旋轉速度。

		」
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Use Gravity		_
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Constraints		
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▶ Info		

物體質量,也可以說是重量。

# ag空氣阻力

昌高數值可減少落下速度、被撞飛距離。

## ngular Drag角阻力

昌高數值可減少旋轉速度。

## se Gravity

]體是否受重力影響。

		► 羽r
🔻 🛵 🛛 Rigidbody	🔯 📑 🔅	175
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Use Gravity		
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Interpolate	None \$	
Collision Detection	Discrete \$	► 提
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		e Isk

物體質量,也可以說是重量。

## ag空氣阻力

高數值可減少落下速度、被撞飛距離。

## igular Drag角阻力

- 高數值可減少旋轉速度。
- e Gravity
- 體是否受重力影響。

## e. IsKinematic運動學

- a. 不允許自身受到碰撞, 也不會受到重力等物理影響, 但會對其他物件造成碰撞。 ●雙方都勾運動學的話,雙方都不會受到碰撞,會直接穿越,因此會被視為沒有碰 撞到, 無法執行OnCollision函式。
  - ●對自身而言,剛體+運動學的效果,就等同於不加剛體,唯一差異是「剛體+運動 學」去撞「靜止的碰撞體」時,仍可以執行碰撞、觸發函式;但雙方都不加剛體 的話,則無法執行碰撞、觸發函式。



		▶ 物
🔻 🛵 🛛 Rigidbody	🔟 🕂 🐥	
Mass	1	b. Dra
Drag	0	
Angular Drag	0.05	▶ 提
Use Gravity		_
Is Kinematic		c. An
Interpolate	None \$	
Collision Detection	Discrete \$	▶提
Constraints		
Freeze Position		a. Us
Freeze Rotation		▶ 物
▶ Info		

▶ 自身受到碰撞時,勾選的位置(Position)、角度(Rotarion)不受力。 很類似把運動學拆成六個細項來設定,但唯一差別在於仍然算有碰撞,可以照常執行

#### a. Mass

1體質量,也可以說是重量。

## ag空氣阻力

圖數值可減少落下速度、被撞飛距離。

## igular Drag角阻力

高數值可減少旋轉速度。

## se Gravity

1體是否受重力影響。

## e. IsKinematic運動學

a. 不允許自身受到碰撞, 也不會受到重力等物理影響, 但會對其他物件造成碰撞。 ●雙方都勾運動學的話,雙方都不會受到碰撞,會直接穿越,因此會被視為沒有碰 撞到, 無法執行OnCollision函式。

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## **Constraints**限制







Mass 1 Drag 0 ・プ	
Drag 0 ・ 方	
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Is Kinematic	
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Collision Detection Discrete +	
▼ Constraints	旦 恭4 -
Freeze Position	ע נישר נו
Freeze Rotation X Y Z	
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🔻 🔰 🗹 Box Collider	、安1
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▲ Edit Collider 注 Is Trigger □ Material None (Physic Material) ○ ⇒	〒初1 5切1
La Trigger Edit Collider 若 None (Physic Material) で Center X 0 Y 0 Z 0	〒物1 5物(

#### ody

自身受到物理碰撞。

剛體的物件才會受到物理作用力,如受到重力而落下、被物理作用力推動/旋轉, 法主動穿越其他碰撞器。

方若是沒加剛體,對方就不會受到碰撞的作用力推擠,但仍然可以判斷雙方有碰撞。

#### der

有碰撞器就會對其他物件產生碰撞;

件自身要受到碰撞的話,則需要碰撞器+剛體,缺一不可。

件自身要受到程式Translate位移或Rotate旋轉,也至少需要碰撞器。







## Rigibody

## Collider

• 允許自身受到物理碰撞。

加了剛體的物件才會受到物理作用力,如受到重力而落下、被物理作用力推動/旋轉, 也無法主動穿越其他碰撞器。

而對方若是沒加剛體,對方就不會受到碰撞的作用力推擠,但仍然可以判斷雙方有碰撞。

• 只要有碰撞器就會對其他物件產生碰撞;

若物件自身要受到碰撞的話,則需要碰撞器+剛體,缺一不可。

若物件自身要受到程式Translate位移或Rotate旋轉,也至少需要碰撞器。











## a. IsTrigger觸發器

🔻 🛵 🛛 Rigidbody	💽 📑 🌣,
Mass	1
Drag	0
Angular Drag	0.05
Use Gravity	
Is Kinematic	
Interpolate	None \$
Collision Detection	Discrete \$
Constraints	
Freeze Position	
Freeze Rotation	
▶ Info	
🔻 🧊 🗹 Box Collider	🔯 🗐 🖓 🔅
	La Edit Collider
ls Trigger	
Material	None (Physic Material) O
Center	X 0 Y 0 Z 0
Size	X 1 Y 1 Z 1

▶ 勾了就不允許自身受到/造成碰撞,也不會受到重力等物理作用力影響,而是改為 Trigger觸發,雙方碰到時會直接穿越並執行Trigger函式,但自身還是可以受到程式 位移或旋轉。



# **Collision vs Trigger**

	Collision	
程式判斷 接觸條件	A、B皆要有collider 且至少動的一方要有Rigibody	A、B <sup>-</sup> 且至少動的
物理性質	物理碰撞	無
Is Trigger	皆不開 <b>啟Trigger</b>	至少一方
Function	OnCollisionEnter OnCollisionStay OnCollisionExit	On On On On

### Trigger

## 皆要有collider ]一方要有Rigibody

無物理碰撞

的collider要開啟 Trigger

**FriggerEnter** TriggerStay TriggerExit

兩個物件A跟B接觸時,不可能同時產生碰撞+觸發,最多產生 其中一種,但是可以辦到讓A跟B產生碰撞,A跟C產生觸發。 如果動的一方沒有剛體, 它去撞的靜止一方即使有剛體, 也是當作沒接觸。

\*若雙方都勾了Kinematic運動學, 或任一方勾了Trigger觸發器,則碰撞無效。

Enter函式是當兩個物件接觸的瞬間,會執行一次這個函式; Stay函式是當兩個物件持續接觸時,會不斷執行這個函式; Exit函式是當兩個物件分開的瞬間,會執行一次這個函式。





## a. IsTrigger觸發器



► 勾了就不允許自身受到/造成碰撞,也不會受到重力等物理作用力影響,而是改為 Trigger觸發,雙方碰到時會直接穿越並執行Trigger函式,但自身還是可以受到程式 位移或旋轉。

▶ 調整collider的中心位置。



## a. IsTrigger觸發器



► 勾了就不允許自身受到/造成碰撞,也不會受到重力等物理作用力影響,而是改為 Trigger觸發,雙方碰到時會直接穿越並執行Trigger函式,但自身還是可以受到程式 位移或旋轉。

▶ 調整collider的中心位置。

調整collider的大小。


## a. IsTrigger觸發器



► 勾了就不允許自身受到/造成碰撞,也不會受到重力等物理作用力影響,而是改為 Trigger觸發,雙方碰到時會直接穿越並執行Trigger函式,但自身還是可以受到程式 位移或旋轉。

▶ 調整collider的中心位置。

調整collider的大小。

## d. Edit Collider

▶ 在Scene直接調整物件的collider。







<b>Animation</b>	In the second secon	Anir
Animation	o test	
Animations		<ul> <li>為物</li> </ul>
Play Automatically		
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20		
UI		

## mation

物件製作動畫

🚭 Unity 2018.2.8f1 Personal (64bit) - Untitled - Standard Assets Example Project - PC, Mac & Linux Standalone\* <DX11 >

File Edit A	le Edit Assets GameObject Component Mobile Input Window Help								
🖑 🕂	S 🗔 🗊 😥 🗉 Center 🕸 Local				(	Collab ▼			
# Scene			•	≡ <sup>1</sup> ≔ Hierarchy	■ Inspector				
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NetworkIdentity	
NetworkLobbyManager	
NetworkLobbyPlayer	
🚺 Network Manager	
NetworkManagerHUD	
NetworkMigrationManager	
NetworkProximityChecker	
NetworkStartPosition	
NetworkTransform	
NetworkTransformChild	U
👃 Network Transform Visualizer	•

• 為物件製作動畫

Window	Help	
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200111	► Google VR Android 1.18.4 Version 1.0.4
Bring All to Front	Google VR iOS 1.18.5
Layouts <	► High Definition RP preview – 6.9.1 <i>com.unity.multiplayer-hlapi</i>
	► Hybrid Renderer preview – 0.1.1 Author: Unity Technologies Inc.
Asset Store	► Immediate Window preview.3 - 1.1.0 The high level API component of the Unity Multiplayer system.
Package Manager	► In App Purchasing 2.0.6
Asset Management	▶ Input System preview – 0.9.4
	Jobs preview – 0.1.1
TextMeshPro	Lightweight RP 6.9.1
	Mathematics 1.1.0
General	Memory Profiler preview.7 – 0.1.0
Rendering	Mobile Notifications 1.0.3
Animation	Mono Cecil preview – 0.1.5 O
Audio	Multiplayer HLAPI 1.0.4
Sequencing >	Oculus Android 1.38.2
Analysis <	Oculus Desktop 1.38.2
2D 🕨	► OpenVR (Desktop) 1.0.5
AI	► Package Manager UI 2.2.0 🗸
UI	Package Validation Suite preview – 0.6.1
	PlayableGraph Visualize preview.3 - 0.2.1
	► Polybrush 1.0.0
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# 新增材質



# 材質設定





Inspector		<b>≧</b> •≡
test 1		💽 🕂 🐥
Shader Standard		•
Rendering Mode	Opaque	\$
Main Maps		
⊙Albedo		
⊙ Metallic	0	0
Smoothness	O	0.5
Source	Metallic Alpha	\$
⊙Normal Map		
⊙Height Map		
⊙ Occlusion		
⊙ Detail Mask		
Emission		
Tiling	X 1 Y 1	
Offset	X 0 Y 0	
Secondary Maps		
⊙Detail Albedo x2		
⊙Normal Map		1
Tiling	X 1 Y 1	
Offset	X 0 Y 0	
UV Set	UV0	\$
Forward Rendering Options	5	
Specular Highlights		
Reflections		
Advanced Options		
Enable CPU Instancing		
Double Sided Clobal Illumina	+i/	
Double Sided Global IIIdillina		
test 1		
AssetBundle None	† Non	ie 🕴

## Material

- a. Albedo
- b. Metallic
- c. Smoothness
- d. Normal Map
- e. Height Map
- f. Emission

▶ 物件的基礎色

▶ 物件像金屬的程度

▶ 光照後平滑的程度

▶ 法向量貼圖

▶ 製造立體的視覺

▶ 高度貼圖

### ▶ 增強立體感

▶ 物體本身發光程度

Inspector		<u> </u>
test 1		🔄 🕂 🐥
Shader Standard		•
Rendering Mode	Opaque	
Main Mans	Cobudae	
Oletallic	0	0
Smoothness	0	0.5
Source	Metallic Alpha	÷
© Normal Map		
O leight Map		
© Dccl	▶ 放貼圖(Texture)	
© Detail Mask		
Emission		
Tiling	X 1 Y 1	
Offset	X 0 Y 0	
Secondary Maps		
⊙ Detail Albedo x2		
⊙Normal Map		1
Tiling	X 1 Y 1	
Offset	X 0 Y 0	
UV Set	UV0	\$
Forward Rendering Optio	ons	
Specular Highlights		
Reflections		
Advanced Options		
Enable GPU Instancing		
Double Sided Global Illumi	nati	
test 1		
AssetBundle None	÷   N	ione 🕴

## Material

- a. Albedo
- b. Metallic
- c. Smoothness
- d. Normal Map
- e. Height Map
- f. Emission

▶ 物件的基礎色

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▶ 高度貼圖

### ▶ 增強立體感

▶ 物體本身發光程度

🗸 🧿 🗹 Light	🔯 🗐 🖓 🔅
Туре	Directional +
Color	<i>I</i>
Mode	Baked
Intensity	1
Indirect Multiplier	1
Shadow Type	Soft Shadows \$
Baked Shadow Angle	0
Draw Halo	
Flare	None (Flare) O
Render Mode	Auto \$
Culling Mask	Everything \$



a. Type 光源種類

- Spot
- Point
- Area
- b. Color 光源顏色



Directional

c. Intensity 光源強度(亮度)

d. Shadow Type 產生的影子類型(Pro版才可使用)

e. [Point/Spot] Range 光線可照到的最大範圍(黃圈)

f. [Spot]Spot Angle 聚光燈的展開角度(黃圈)



## Particle System

🔻 🙀 🛛 Particle System	🔯 다 🌣.
	Open Editor
Cube	+
Emission	
✓ Shape	
Velocity over Lifetime	
Limit Velocity over Lifetime	
Inherit Velocity	
Force over Lifetime	
Color over Lifetime	
Color by Speed	
Size over Lifetime	
Size by Speed	
Rotation over Lifetime	
Rotation by Speed	
External Forces	
Noise	
<ul> <li>Collision</li> </ul>	
Triggers	
Sub Emitters	
Texture Sheet Animation	
Lights	
<ul> <li>Trails</li> </ul>	
Custom Data	
✓ Renderer	

## Particle System

• 特效參數

# Script



Particle System	📃 🎝 🎝
	Open Editor
Cube	+
Emission	
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Force over Lifetime	
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Rotation by Speed	
External Forces	
<ul> <li>Noise</li> </ul>	
<ul> <li>Collision</li> </ul>	
<ul> <li>Triggers</li> </ul>	
Sub Emitters	
Texture Sheet Animation	
<ul> <li>Lights</li> </ul>	
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Renderer	

## Particle System

• 特效參數

## Script

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test



# Unity基本物體操作





## 基本操作



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## 基本操作

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### 自由縮放 旋轉物件 縮放物件 移動物件













## Asset store

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test - PC, Mac & Linux Standalone - Unity 2019.2.1f1 Personal [PREVIEW PACKAGES IN USE] (Personal) <Metal>





## Asset store









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# Unity Tutorial





Survival Shooter tutorial (12) They mostly come at night..



Tanks tutorial (8) 2-players, 1 keyboard, Tank vs Tank.



Adventure Game tutorial (7)

Learn to create the systems used to develop an adventure game in this intermediate level project.



## 2D UFO tutorial (9)

New? Want to make 2D games? Start here.



## Space Chicken (19)

Never tried Unity? No coding skills? Perfect! Make your first game & share using "Ready."



### 2D Roguelike tutorial (14) Procedural level Survive-em-up!



## Tower Defense Template (10)

Learn how to create your own Tower Defense game

# Unity Answer

$\triangleleft$	<b>unity</b> Unity S	Services Made v	vith Unity Learn	<u>Community</u>				Get Unity Asset Store 👤 🍳
	Forums ½	<u>Answers</u> Feedback	Issue Tracker Blog	g Evangelists	User Group	OS		
查	找帖子、主题和用户						Q	提一个问题 空间▼ よ▼
全部	『问题▼			l	0	Ċ	۲	Welcome to Unity Answers
	Twinklier 已解答 "The associated script GameObject in the pro 3 分前 error · project · compile	cannot be loaded oject. Corrupted Pi	" on every Script in roject. 维基百科	every		<b>6</b> 回复	<b>0</b> [ 喜欢	The best place to ask and answer questions about development with Unity. To help users navigate the site we have posted a site navigation guide. If you are a new user to Unity Answers, check out
	dzarrah 已评论 My code is right but th 23 分前 unity 5 · movement · v	l <b>e movement is ve</b> vector2	ry strange 已关闭			<b>1</b> 回复	<b>0</b> 喜欢	our FAQ for more information. Make sure to check out our Knowledge Base for commonly asked Unity questions. If you are a moderator, see our Moderator
	roshan090 已编辑 Player Settings Resolution 26 分前 playersettings	tion and Presenta	tion is not working			<b>0</b> 回复	<b>0</b> 喜欢	Guidelines page. We are making improvements to UA, see the list of changes.
(A)	PeteWatch 已提出 <b>How can I make the ar</b> 29 分前 animation · timeline ·	<b>himation timeline</b> keyframes	more intuitive ?			<b>0</b> 回复	<b>0</b> 喜欢	热门主题 c# animation android unity 5 javascript camera gui
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	ChronikSpartan 已评论 All my NavMeshAgents	s are tilted 已关闭				<b>1</b> 回复	<b>0</b> 喜欢	collidertransformterrainmesharrayprefab查看全部













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> Model OBJ, FBX

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