关于碰撞检测

知识点

- 碰撞体：Collider
- 触发器：Is Trigger
- 检测方法：OnCollisionEnter ， onTriggerEnter
- 碰撞对象的结构：Collision，Collider，
- 运动学物体：Is Kinematic
- 碰撞体处理分类：静态碰撞体、刚体碰撞体、非刚体碰撞体
- 碰撞事件与碰撞体类型的关系

大数据与物联网学院 邵亮

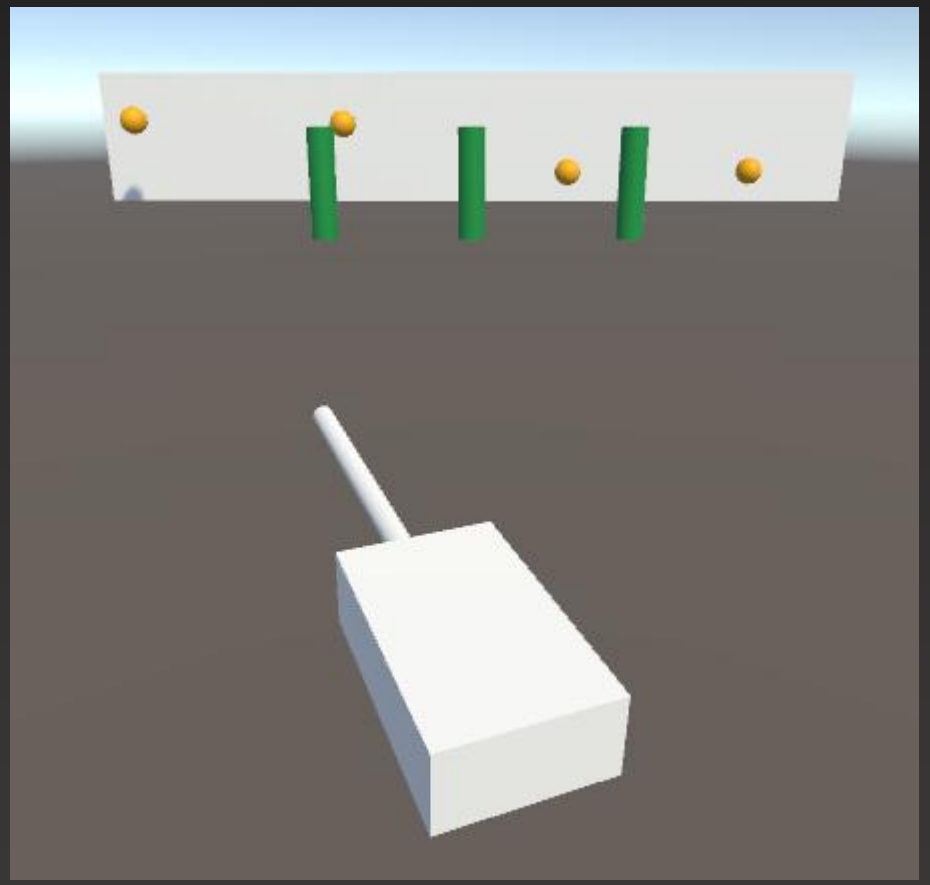
课堂案例：坦克炮弹击毁目标

功能要求：

1、按下空格，炮塔能够发射炮弹（上讲内容，已完成）；

2、炮弹击中目标（绿色圆柱体），目标和炮弹均击毁；

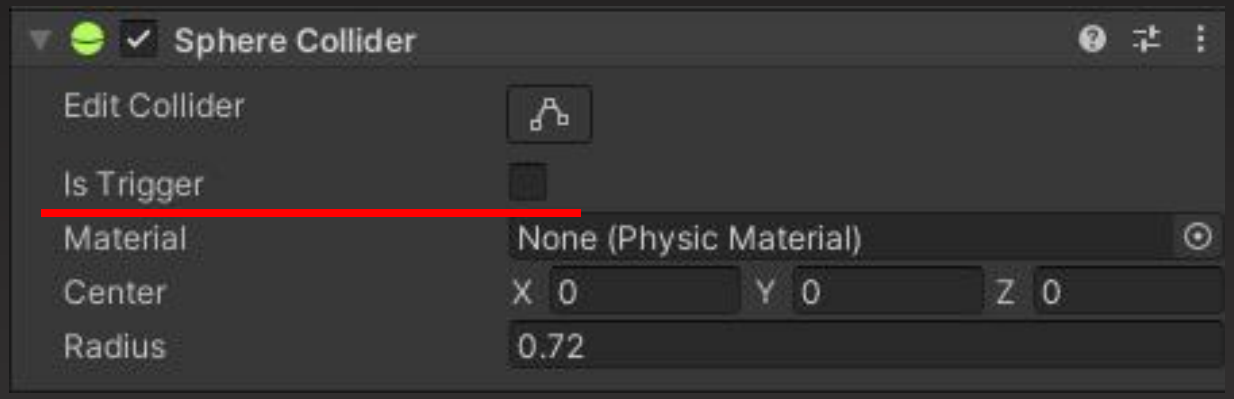
3、炮弹击中目标白墙（脱靶），在弹着点出现黄球。



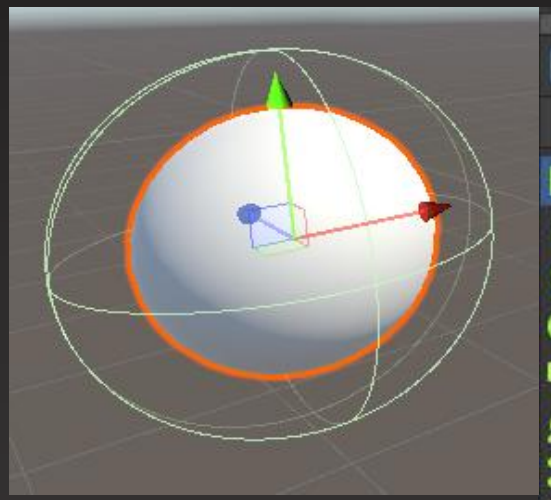
碰撞检测的基本原理

1、碰撞体：Collider

碰撞体属性



球型碰撞体（绿线）



各种碰撞体组件

2、触发器 Is Trigger

- 打开：可以穿过；（至少有一个刚体）
- 关闭：不能穿过。

3、碰撞检测方法

Is Trigger 打开（可穿过）	Is Trigger 关闭（不可穿过）	
Trigger	Collision	含义
OnTriggerEnter（）	OnCollisionEnter（）	碰撞开始
OnTriggerStay（）	OnCollisionStay（）	一直在撞
OnTriggerExit（）	OnCollisionExit（）	碰撞结束

检测方法应用

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class projectile : MonoBehaviour
{

    void OnTriggerEnter(Collider obj)
    {
        if(obj.name=="box")
        {
            Destroy(obj.gameObject);
        }
    }
}
```

Collider碰撞对象常用属性

属性	备注
name	撞击体的名字
transform	1、撞击体对象的变型子对象 2、position位置子对象常用
gameObject	撞击体对象自身

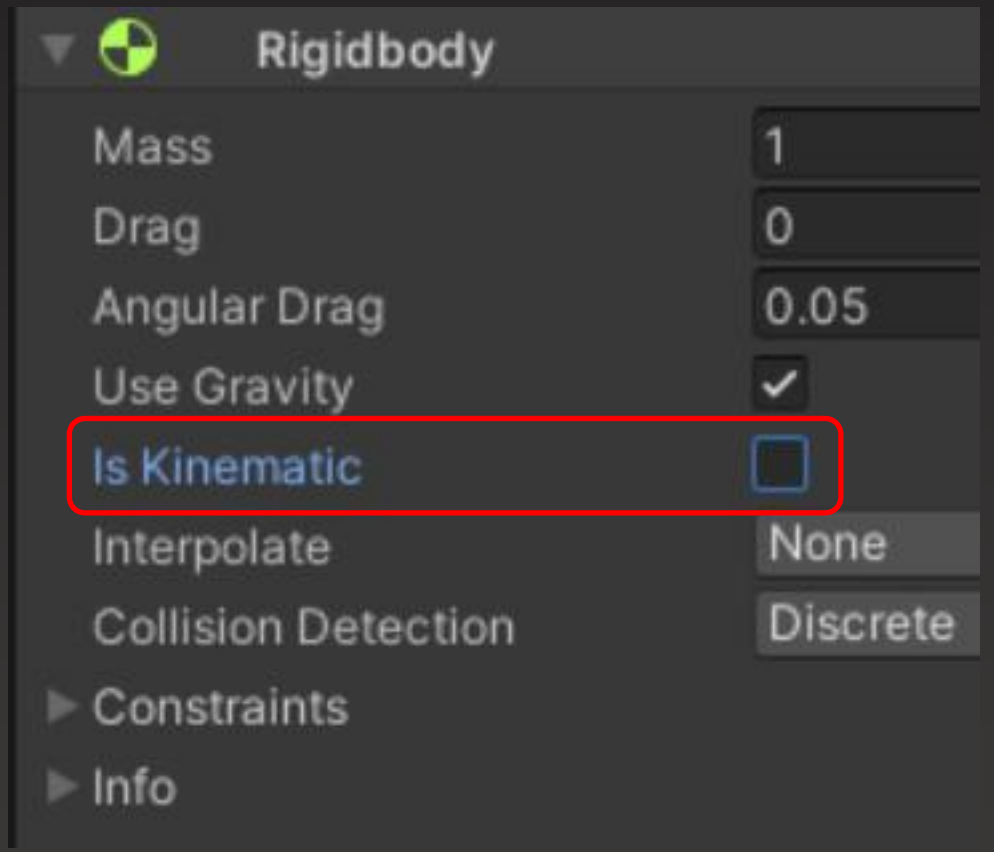
Collision对象相同

4、运动学物体 Kinematic

打开：

- 保持刚体类型，但不受物理控制
- 通过坐标系进行运动

刚体组件



5、碰撞体处理分类：

静态碰撞体
Static Collider

- 无刚体组件的碰撞体

不位移、无物理影响
如：地形、障碍物等

刚体碰撞体
Rigidbody Collider

- 有刚体组件的碰撞体

Rigidbody组件，
受物体力学和脚本力学影响

运动学碰撞体
Kinematic Collider

- 有刚体组件的碰撞体
- 打开了Kinematic

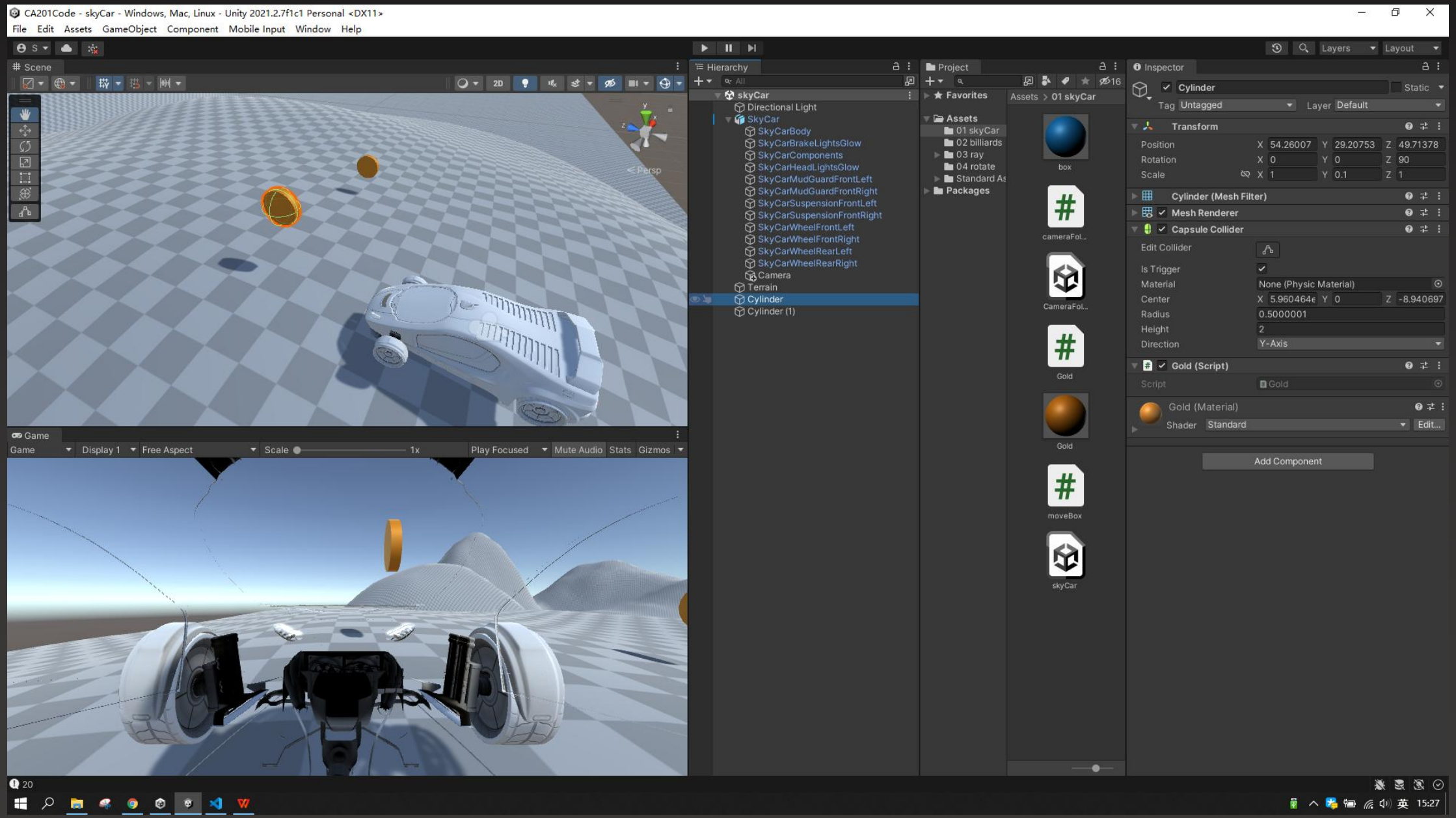
不受物理力学影响，
通过脚本Transform移动

6、碰撞事件与碰撞体类型的关系：

（1）碰撞器方法　OnCollisionEnter　　（2）触发器方法　OnTriggerEnter

	Static Collider	Rigidbody Collider	Kinematic Collider	Static Trigger	Rigidbody Trigger	Kinematic Trigger
Static Collider		Y			Y	Y
Rigidbody Collider	Y	Y	Y	Y	Y	Y
Kinematic Collider		Y		Y	Y	Y
Static Trigger		Y	Y		Y	Y
Rigidbody Trigger	Y	Y	Y	Y	Y	Y
Kinematic Trigger	Y	Y	Y	Y	Y	Y

拓展自研：吃金币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Directional Light
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SkyCarBody
SkyCarBrakeLightsGlow
SkyCarComponents
SkyCarHeadLightsGlow
SkyCarMudGuardFrontLeft
SkyCarMudGuardFrontRight
SkyCarSuspensionFrontLeft
SkyCarSuspensionFrontRight
SkyCarWheelFrontLeft
SkyCarWheelFrontRight
SkyCarWheelRearLeft
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03 ray
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Gold
Gold
moveBox
skyCar
Inspector
Cylinder
Static
Tag Untagged
Layer Default
Transform
Position X 54.26007 Y 29.20753 Z 49.71378
Rotation X 0 Y 0 Z 90
Scale X 1 Y 0.1 Z 1
Cylinder (Mesh Filter)
Mesh Renderer
Capsule Collider
Edit Collider
Is Trigger
Material None (Physic Material)
Center X 5.960464e Y 0 Z -8.940697
Radius 0.5000001
Height 2
Direction Y-Axis
Gold (Script)
Script Gold
Gold (Material)
Shader Standard Edit...
Add Component
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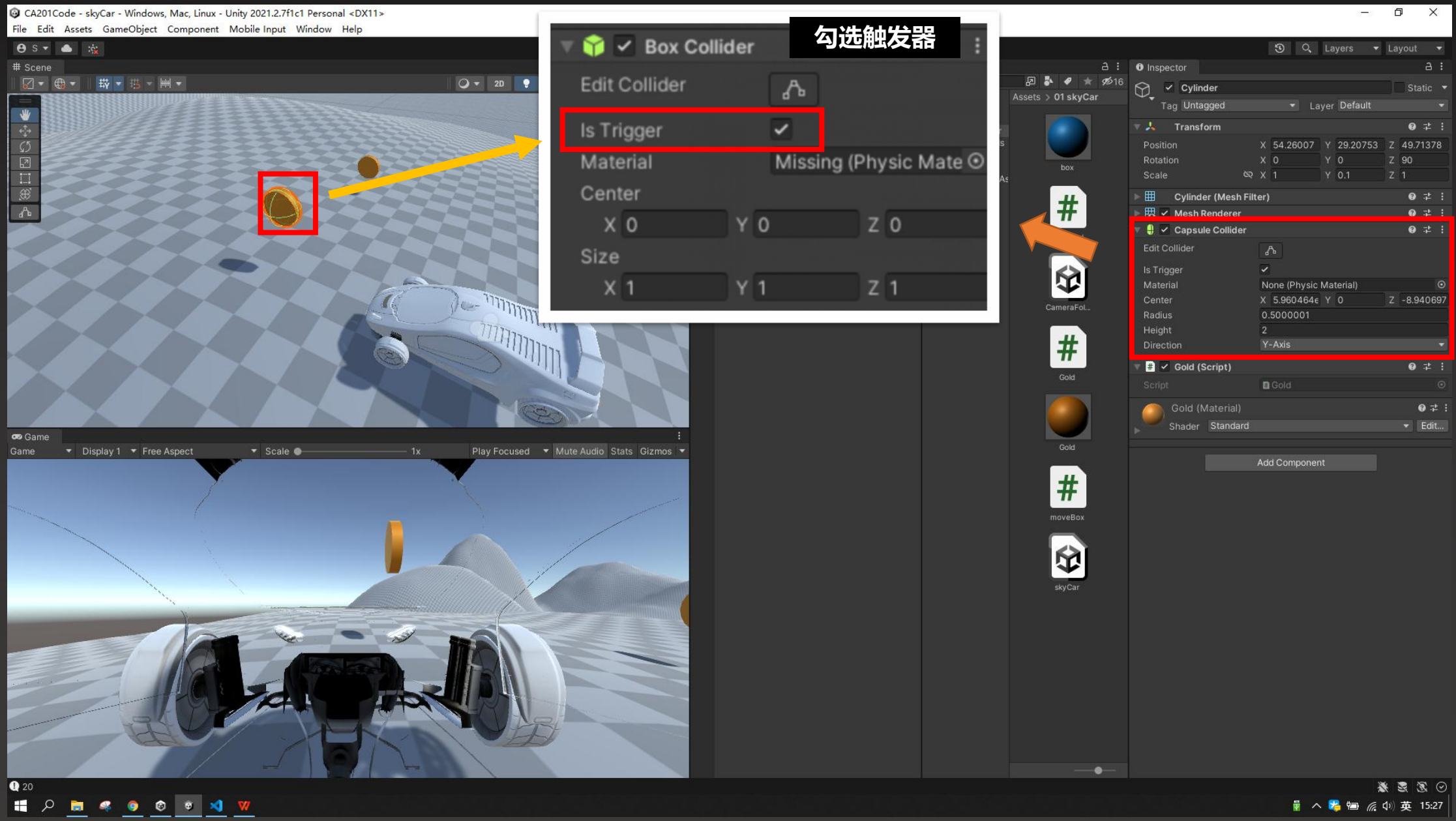
吃金币游戏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Center X 5.960464e Y 0 Z -8.940697
Radius 0.5000001
Height 2
Direction Y-Axis
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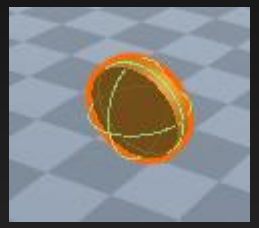
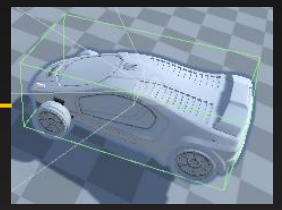


金币代码

```
public class Gold : MonoBehaviour
{
    GameObject car;

    void Start()
    {   }

    void Update()
    {       transform.Rotate(1f,1f,1f);    }

    void OnTriggerEnter(Collider other)
    {
        car=GameObject.Find(other.name);
        moveBox script=car.GetComponent<moveBox>();
        script.addScore();

        Destroy(gameObject);
    }


}
```



飞车代码完善

```
using UnityEngine;

public class moveBox : MonoBehaviour
{
    float offsetX, offsetZ, wheelSpeed;
    int moveSpeed = 10;
    int rotateSpeed = 80;
    int score=0;
    GameObject leftWheel, rightWheel;

    public void addScore()
    {
        score+=10;
        print(score);
    }

    void Start()
    {
        leftWheel = GameObject.Find("SkyCarWheelFrontLeft");
        rightWheel = GameObject.Find("SkyCarWheelFrontRight");
    }

    void Update()
    {
        offsetX = Input.GetAxis("H") * Time.deltaTime * rotateSpeed;
        offsetZ = Input.GetAxis("V") * Time.deltaTime * moveSpeed;
        wheelSpeed = Input.GetAxis("V") * 5;
        transform.Translate(0f, 0f, offsetZ);
        if (offsetZ != 0)
        {
            transform.Rotate(0f, offsetX, 0f);
        }

        leftWheel.transform.Rotate(wheelSpeed, 0f, 0f);
        rightWheel.transform.Rotate(wheelSpeed, 0f, 0f);
    }

}
```