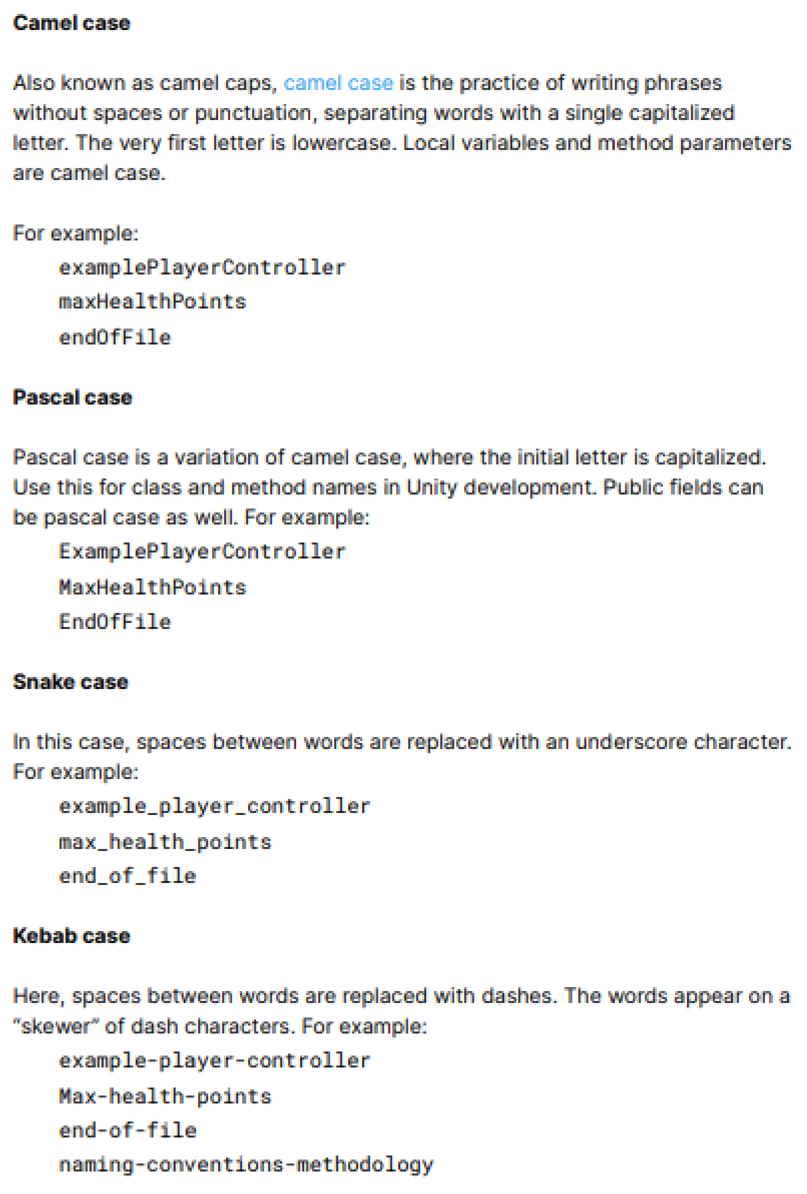
命名规则

- `Camel Case`:首字母小写，其余单词首字母大写
    - 应用：局部变量、函数参数
- `Pascal Case`: 全部单词首字母大写
    - 应用：类、函数、`public fields`
- `Snake Case`:用 `_` 连接
- `Kebab Case`:用 `-` 连接
- `Hungarian Notation`: 标准变量的类型（`Unity`中不常见）



Camel case

Also known as camel caps, camel case is the practice of writing phrases without spaces or punctuation, separating words with a single capitalized letter. The very first letter is lowercase. Local variables and method parameters are camel case.

For example:

```
    examplePlayerController
    maxHealthPoints
    endOfFile
```

Pascal case

Pascal case is a variation of camel case, where the initial letter is capitalized. Use this for class and method names in Unity development. Public fields can be pascal case as well. For example:

```
    ExamplePlayerController
    MaxHealthPoints
    EndOfFile
```

Snake case

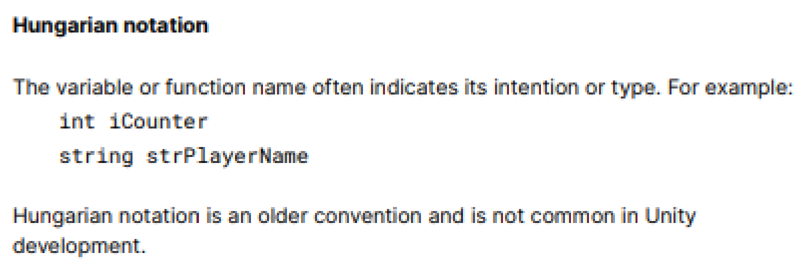
In this case, spaces between words are replaced with an underscore character. For example:

```
    example_player_controller
    max_health_points
    end_of_file
```

Kebab case

Here, spaces between words are replaced with dashes. The words appear on a "skewer" of dash characters. For example:

```
    example-player-controller
    Max-health-points
    end-of-file
    naming-conventions-methodology
```



Hungarian notation

The variable or function name often indicates its intention or type. For example:

```
    int iCounter
    string strPlayerName
```

Hungarian notation is an older convention and is not common in Unity development.

- `Unity`内部的命名规则
    - `bool`类型的变量加上一个动词前缀例如`is\has`, `isDead`、`isWalking`、`hasDamageMultiplier`
    - 用能充分说明用途的名字，不要缩写
    - 用名词给变量起名，除非是`bool`值
    - `public fields: Pascal Case`
    - `private fields: Camel Case`
    - `access level`需要统一指出或统一省略
    - 可以在 `私有成员变量` 前加前缀比如 `_` 、 `m_` 以与 `局部变量` 区分，示例 `private float _currentHealth;`
- 类型很明确的时候，可以使用 `var` 提高可读性

```
// EXAMPLE: good use of var
var powerUps = new List<PowerUps>();
var dictionary = new Dictionary<string, List<GameObject>>();

// AVOID: potential ambiguity
var powerUps = PowerUpManager.GetPowerUps();
```

- 枚举类型，用单数名词，Pascal Case
    - 例外：bitwise，标注了 `System.FlagsAttribute` 属性的枚举类型用复数名词

```
// EXAMPLE: enums use singular nouns
public enum WeaponType
{
     Knife,
     Gun,
     RocketLauncher,
     BFG
}
public enum FireMode
{
     None = 0,
     Single = 5,
     Burst = 7,
     Auto = 8,
}

// EXAMPLE: but a bitwise enum is plural
[Flags]
public enum AttackModes
{
     // Decimal // Binary
     None = 0, // 000000
     Melee = 1, // 000001
     Ranged = 2, // 000010
     Special = 4, // 000100
     MeleeAndSpecial = Melee | Special // 000101
}
```

- 类和接口
    - 类名：Pascal Case
    - 一个文件只能有一个继承 `Monobehaviour` 的类，且类名与文件名需要匹配
    - 对于接口，用前缀 `I` +形容词

```
// EXAMPLE: Class formatting
public class ExampleClass : MonoBehaviour
{
     public int PublicField;
     public static int MyStaticField;
     private int _packagePrivate;
     private int _myPrivate;
     private static int _myPrivate;
     protected int _myProtected;

     public void DoSomething()
     {

     }
}
```

```
// EXAMPLE: Interfaces
public interface IKillable
{
     void Kill();
}
public interface IDamageable<T>
{
     void Damage(T damageTaken);
}
```

- 函数
    - 函数名：Pascal Case
    - 参数：Camel Case

```
// EXAMPLE: Methods start with a verb
public void SetInitialPosition(float x, float y, float z)
{
 transform.position = new Vector3(x, y, z);
}

// EXAMPLE: Methods ask a question when they return bool
public bool IsNewPosition(Vector3 currentPosition)
{
 return (transform.position == newPosition);
}
```

- 事件
    - 观察者模式：Observer pattern - Wikipedia
    - Use the `System.Action` delegate for events
    - Name the event with a `verb` phrase
    - Prefix the event raising method (in the subject) with `“On”`
    - Prefix the event handling method (in the observer) with the subject’s name and underscore (_)
    - Create `custom EventArgs` only as necessary

```
// EXAMPLE: Events
// using System.Action delegate
public event Action OpeningDoor; // event before
public event Action DoorOpened; // event after
public event Action<int> PointsScored;
public event Action<CustomEventArgs> ThingHappened;
```

```
// raises the Event if you have subscribers
public void OnDoorOpened()
{
     DoorOpened?.Invoke();
}
public void OnPointsScored(int points)
{
     PointsScored?.Invoke(points);
}
```

```
// define an EventArgs if needed
// EXAMPLE: read-only, custom struct used to pass an ID and Color
public struct CustomEventArgs
{
     public int ObjectID { get; }
     public Color Color { get; }
     public CustomEventArgs(int objectId, Color color)
     {
         this.ObjectID = objectId;
         this.Color = color;
     }
}
```

- 命名空间
    - Use `pascal case` without special symbols or underscores.
    - Add a `using directive` at the top of the file to avoid repeated typing of the namespace prefix.

```
namespace Enemy
{
     public class Controller1 : MonoBehaviour
     {
         ...
     }

     public class Controller2 : MonoBehaviour
     {
         ...
     }
}
```

格式

Properties

- Properties是特殊的方法（accessor）

```
// EXAMPLE: expression bodied properties
public class PlayerHealth
{
 // the private backing field
 private int maxHealth;
 // read-only, returns backing field
 public int MaxHealth => maxHealth;
 // equivalent to:
 // public int MaxHealth { get; private set; }
}
```

```
// EXAMPLE: expression bodied properties
public class PlayerHealth
{
 // backing field
 private int _maxHealth;
 // explicitly implementing getter and setter
 public int MaxHealth
 {
     get => _maxHealth;
```

```
        set => _maxHealth = value;
    }
    // write-only (not using backing field)
    public int Health { private get; set; }
    // write-only, without an explicit setter
    public SetMaxHealth(int newMaxValue) => _maxHealth = newMaxValue;
}
```

Serialization

- 对私有变量使用 `[SerializeField]` 属性
- 用 `[Range(min, max)]` 属性限定值的范围
- 用 `结构体` 包裹序列化的参数，inspector面板会更简洁

```
[Serializable]
public struct PlayerStats
{
    public int MovementSpeed;
    public int HitPoints;
    public bool HasHealthPotion;
}
```

括号与缩进

- 两种风格
    - Allman or BSD style(Indentation style - Wikipedia)
    - K&R style(Indentation style - Wikipedia)

```
// EXAMPLE: Allman or BSD style puts opening brace on a new line.
void DisplayMouseCursor(bool showMouse)
{
     if (!showMouse)
     {
         Cursor.lockState = CursorLockMode.Locked;
         Cursor.visible = false;
     }
     else
     {
         Cursor.lockState = CursorLockMode.None;
         Cursor.visible = true;
     }
}

// EXAMPLE: K&R style puts opening brace on the previous line.
void DisplayMouseCursor(bool showMouse){
     if (!showMouse) {
         Cursor.lockState = CursorLockMode.Locked;
         Cursor.visible = false;
     }
     else {
         Cursor.lockState = CursorLockMode.None;
         Cursor.visible = true;
     }
}
```

- 不要省略大括号（例如：for语句后、嵌套for语句）
- switch语句缩进格式

```
// EXAMPLE: indent cases from the switch statement
```

```
switch (someExpression)
{
    case 0:
        DoSomething();
        break;
    case 1:
        DoSomethingElse();
        break;
    case 2:
        int n = 1;
        DoAnotherThing(n);
        break;
}
```

EditorConfig

- EditorConfig settings - Visual Studio (Windows) | Microsoft Learn
- EditorConfig
- .NET code style rule options - .NET | Microsoft Learn

行间空格

- 函数参数间，逗号后面加一个空格
- 不要在括号和参数间加空格

```
// EXAMPLE: no space after the parenthesis and function arguments
DropPowerUp(myPrefab, 0, 1);
//AVOID:
DropPowerUp( myPrefab, 0, 1 );
```

- 不要在函数和括号间加空格

```
// EXAMPLE: omit spaces between a function name and parenthesis.
DoSomething()
// AVOID
DoSomething ()
```

- 不要在中括号和参数间加空格

```
// EXAMPLE: omit spaces inside brackets
x = dataArray[index];
// AVOID
x = dataArray[ index ];
```

- 流控制语句的括号前加一个空格

```
// EXAMPLE
while (x == y)
// AVOID
while(x==y)
```

- 比较操作符两端加空格

```
// EXAMPLE
if (x == y)
// AVOID
if (x==y)
```

- 控制一行的长度不要太长，（80-120 characters）
- 不要列队齐（持保留意见）

```
// EXAMPLE: One space between type and name
public float Speed = 12f;
public float Gravity = -10f;
public float JumpHeight = 2f;
public Transform GroundCheck;
public float GroundDistance = 0.4f;
public LayerMask GroundMask;

// AVOID: column alignment
public float          Speed = 12f;
public float          Gravity = -10f;
public float          JumpHeight = 2f;
public Transform      GroundCheck;
public float          GroundDistance = 0.4f;
public LayerMask      GroundMask;
```

列间空格

- 类似的方法放在一起
- 在下列情况可以加**两行空行**来区分
  - 变量声明与方法
  - 类与接口
  - if-then-else语块

#region

- #region指令可以折叠代码，但不是很有必要

代码格式化

- 格式化设置：Visual Studio (Windows): Tools > Options> Text Editor > C# > Code Style Formatting
- 格式化：Edit > Advanced > Format Document (Ctrl + K, Ctrl + D)

类

类的编写顺序

— Fields

— Properties

— Events / Delegates

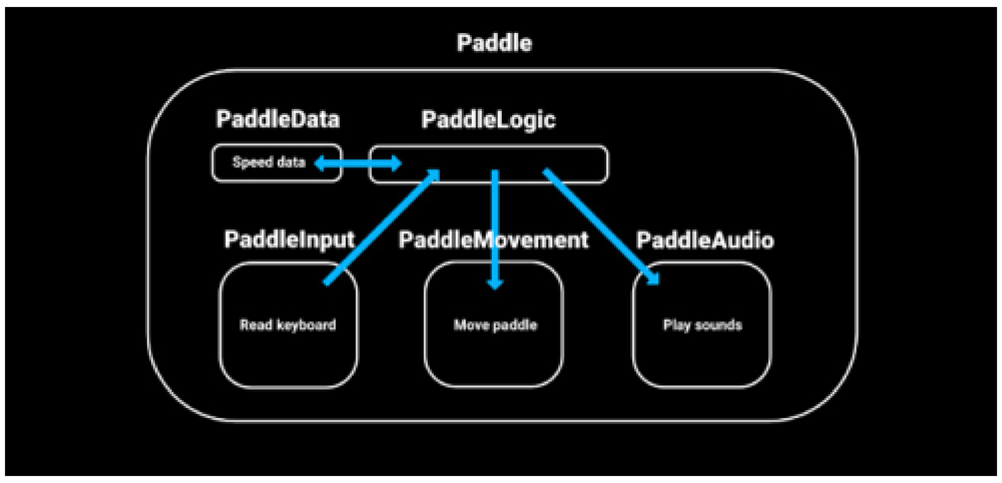
— Monobehaviour Methods (Awake, Start, OnEnable, OnDisable, OnDestroy, etc.)

— Public Methods

— Private Methods

Single-responsibility principle

- 一个模块只为一件事负责
- 实践
  - 将一个既处理逻辑、数据、输入、音频等的 `Monobehavior` 类拆分，借助 `ScriptObject`
  - Unity - Manual: ScriptableObject (unity3d.com)
  - How to architect code as your project scales | Avoiding technical debt | Unity



Refactor a Paddle class into single responsibilities

函数

设计原则

- 参数尽可能少
- 不要过度重载
- 不要根据传入的flag决定函数功能，将这种形式写成分开的两个函数
- 不要做多余的事

Extension methods

- 扩展方法 - Unity Learn

```
using UnityEngine;
using System.Collections;

//创建一个包含所有扩展方法的类
//是很常见的做法。此类必须是静态类。
public static class ExtensionMethods
{
    //扩展方法即使像普通方法一样使用，
    //也必须声明为静态。请注意，第一个
    //参数具有“this”关键字，后跟一个 Transform
    //变量。此变量表示扩展方法会成为
    //哪个类的一部分。
    public static void ResetTransformation(this Transform trans)
    {
        trans.position = Vector3.zero;
        trans.localRotation = Quaternion.identity;
        trans.localScale = new Vector3(1, 1, 1);
    }
}
```

```
using UnityEngine;
using System.Collections;

public class SomeClass : MonoBehaviour
{
    void Start () {
        //请注意，即使方法声明中
        //有一个参数，也不会将任何参数传递给
        //此扩展方法。调用此方法的
        //Transform 对象会自动作为
        //第一个参数传入。
        transform.ResetTransformation();
    }
}
```

注释

设计原则

- 避免过多的注释
- 换行写注释
- 在 `//` 和注释文本间加个空格
- 对于序列化的fields，利用Tooltip属性代替注释

```
[Tooltip("The amount of side-to-side friction.")]
public float Grip
```

- xml的注释

```
// You can also use a summary XML tag.
//
/// <summary>
/// Fire the weapon
/// </summary>
public void Fire()
{
     ...
}
```

ScriptTemplates

- 可以将ScriptTemplate目录复制进项目中，然后在项目中修改模板，修改后重启编辑器即可生效
- ScriptTemplate中的文件名格式： `PriorityNumber–MenuPath–DefaultName.FileExtension.txt`
  - PriorityNumber：在目录中的顺序
  - MenuPath：可以用 `__` 来构造多级目录
- 例如：添加新的模板 `82-CustomScript__ScriptableObject-NewScriptableObject.cs.txt` ，创建ScriptableObject脚本，通过该脚本可以再从目录中选择创建ScriptableObject

```
using UnityEngine;

[CreateAssetMenu(fileName = "#SCRIPTNAME#", menuName = "ScriptableObjects/#SCRIPTNAME#", order = 1)]
public class #SCRIPTNAME# : ScriptableObject
{
#NOTRIM#
}
```

测试

- About Unity Test Framework | Test Framework | 1.1.33 (unity3d.com)
- Workflow: How to create a new test assembly | Test Framework | 1.1.33 (unity3d.com)
- https://docs.unity3d.com/Packages/com.unity.test-framework@1.1/manual/workflow-run-playmode-test-standalone.html

参考资料

- Framework Design Guidelines | Microsoft Learn
- C# Coding Conventions | Microsoft Learn
- C# at Google Style Guide | styleguide
- Unity - Manual: Script serialization (unity3d.com)
- 10 ways to speed up your programming workflows in Unity with Visual Studio 2019 | Unity Blog