(T15)CustomAttribute(客製化屬性)、Reflection(反射)
CourseGUID: 29f1196a-1950-41a4-b9c1-dd13a9e92d92
==========
(T15)CustomAttribute(客製化屬性)、Reflection(反射)
==========

==========

# 0. Summary

*這個 tutorial 討論客製化 attribute，應用方面是，搭配 Reflection 和 XML 後，可以讓你寫的 code 可以用客製化，比如說你的 XML 明確規定 指讀取啥啥 attribute 的 class，透過 reflection 動態讀取。

1.

Attribute

1.1.

Syntax:

//[AttributeUsage(AttributeTargets.Class | AttributeTargets.Property | AttributeTargets.Method | ...etc.)]

//public class ClassNameAttribute : System.Attribute

1.2.

Attribute is a Class which extend System.Attribute and
provide declarative information which is queried at runtime using reflection.
The suffix of Attribute is "Attribute".
[AttributeUsage(AttributeTargets.All)] is default usage setting
that means it can apply to every where.

//[AttributeUsage(AttributeTargets.Class | AttributeTargets.Property | AttributeTargets.Method)]
it means this attribute can only apply to Class, Property, Method

2.

Pre-defined attributes in the .NET framework.
2.1.
//[Obsolete]
Marks types and type members outdated.
2.1.1.
The compiler issues a warning to types or type members with [Obsolete].
2.1.2.
The compiler issues a warning with message to types or type members with [Obsolete("Message")]
2.1.3.
The compiler issues a compiler error with message to types or type members with [Obsolete("Message", true)]
2.2.
//[WebMethod]
expose a method as an XML Web service method

2.3.

//[Serializable]

Indicates that a class can be serialized

==========

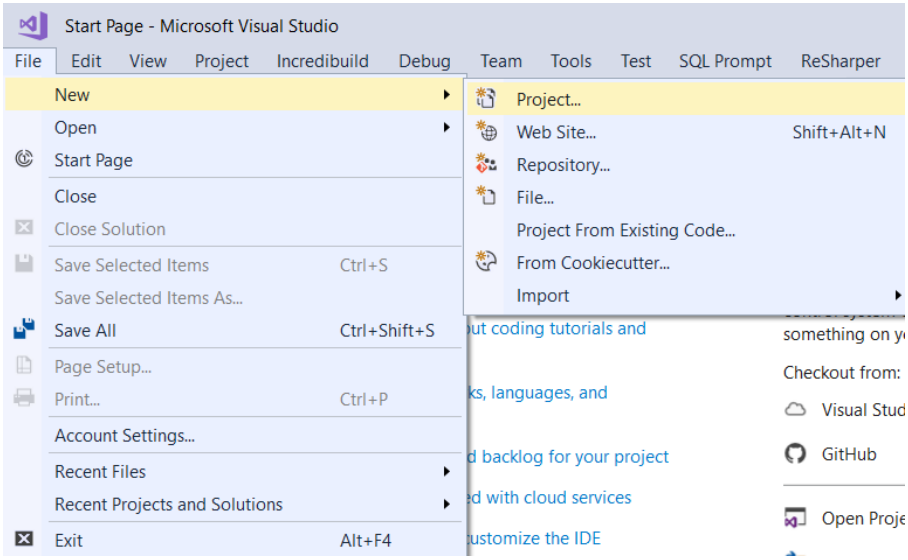
# 1. New Project

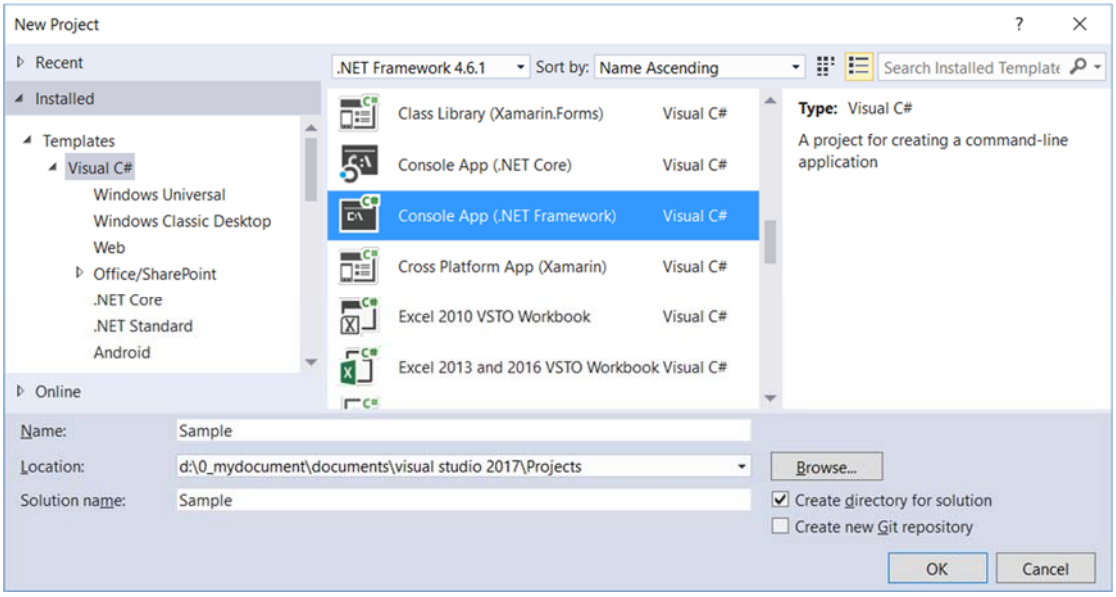
## 1.1. Create New Project

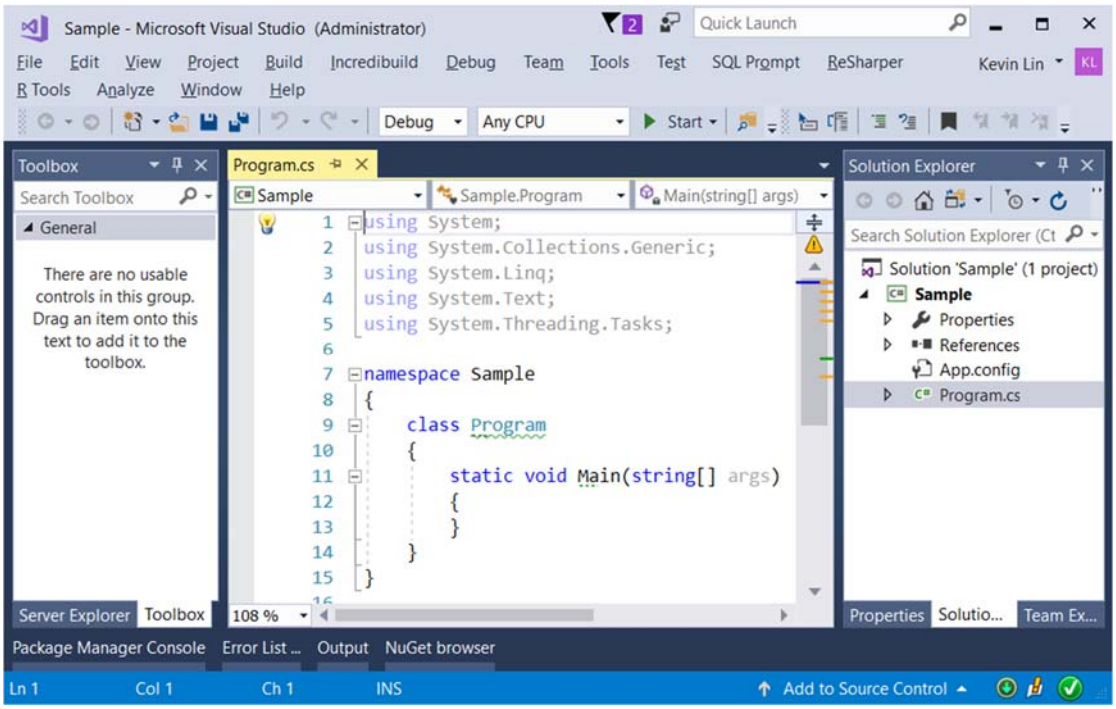
### File --> New --> Project... -->

Visual C# --> **Console App (.Net Framework)** -->

Name: **Sample**






==========

# 2. Program.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Reflection;
using OnLineGame;
namespace Sample
{
    class Program
    {
        static void Main(string[] args)
        {
            //3. ---------------------------------------
            Console.WriteLine("AttributeLinqSample(); ============================");
             AttributeLinqSample();
            //4. ---------------------------------------
            Console.WriteLine("ObsoleteSample(); ============================");
             ObsoleteSample();
            Console.ReadLine();
        }
        //3. ---------------------------------------
        static void AttributeLinqSample()
        {
            // Get all the Types which apply GamerB1Attribute
            IEnumerable<Type> types = from t in Assembly.GetExecutingAssembly().GetTypes()
                                      where t.GetCustomAttributes<GamerB1Attribute>().Any()
                                      select t;
            foreach (Type t in types)
```

```
            {
                // TypeObject.FullName is NameSpace.ClassName
                Console.WriteLine("====================================");
                Console.WriteLine(t.FullName);
                Console.WriteLine("properties --------------------------");
                foreach (PropertyInfo propertyInfo in t.GetProperties())
                {
                    // "PropertyType PropertyName"
                    Console.WriteLine($"{propertyInfo.PropertyType} {propertyInfo.Name}");
                }
                // Get all the PropertyInfo which apply GamerB1Attribute
                IEnumerable<PropertyInfo> gamerB1AttributePropertyInfo = from pInfo in t.GetProperties()
                                                                         where pInfo.GetCustomAttributes<GamerB1Attribute>().Any()
                                                                         select pInfo;
                Console.WriteLine("gamerB1Attribute Properties --------------------------");
                foreach (PropertyInfo propertyInfo in gamerB1AttributePropertyInfo)
                {
                    // "PropertyType PropertyName"
                    Console.WriteLine($"{propertyInfo.PropertyType} {propertyInfo.Name}");
                }
                Console.WriteLine("Methods --------------------------");
                foreach (MethodInfo methodInfo in t.GetMethods())
                {
                    // "ReturnType MethodName"
                    Console.WriteLine($"{methodInfo.ReturnType.Name} {methodInfo.Name}");
                }
                IEnumerable<MethodInfo> gamerB1AttributeMethodInfo = from mInfo in t.GetMethods()
                                                                     where mInfo.GetCustomAttributes<GamerB1Attribute>().Any()
                                                                     select mInfo;
                Console.WriteLine("gamerB1Attribute Methods --------------------------");
                foreach (MethodInfo methodInfo in gamerB1AttributeMethodInfo)
                {
                    // "ReturnType MethodName"
                    Console.WriteLine($"{methodInfo.ReturnType.Name} {methodInfo.Name}");
                }
            }
        }
        //4. ---------------------------------------
        static void ObsoleteSample()
        {
            Console.WriteLine($"GameScoreCaculator.Sum(2, 3)  :  {GameScoreCaculator.Sum(2, 3)}");
            Console.WriteLine($"GameScoreCaculator.Sum(1, 2, 3)  :  {GameScoreCaculator.Sum(1, 2, 3)}");
            List<int> intList = new List<int>{1,2,3,4};
            GameScoreCaculator.Sum(intList);
            Console.WriteLine($" GameScoreCaculator.Sum(intList)  :  { GameScoreCaculator.Sum(intList)}");
        }
    }
}


namespace OnLineGame
{
    //1. ---------------------------------------
    //[AttributeUsage(AttributeTargets.All)] is default usage setting
    //that means it can apply to every where.
```

```
public class GamerA1Attribute : Attribute
{
}
[GamerA1]
public class GamerA
{
    // Properties ----------------------------
    [GamerA1]
    public int GameScore { get; set; }
    [GamerA1]
    public string Name { get; set; }
    // Methods ----------------------------
    [GamerA1]
    public override string ToString()
    {
        return $"GameScore : {GameScore} ; Name : {Name}";
    }
    public void NoAttributeMethod()
    {
    }
}
//2. ---------------------------------------
// it means this attribute can only apply to Class, Property, Method
[AttributeUsage(AttributeTargets.Class | AttributeTargets.Property | AttributeTargets.Method)]
public class GamerB1Attribute : Attribute
{
    public string Name { get; set; }
    public double Version { get; set; }
}
[GamerB1(Name = "GamerB", Version = 1.0)]
public class GamerB
{
    // Properties ----------------------------
    [GamerB1(Name = "GamerBMethod", Version = 1.0)]
    public int GameScore { get; set; }
    [GamerA1]
    public string Name { get; set; }
    // Methods ----------------------------
    [GamerB1]
    public override string ToString()
    {
        return $"GameScore : {GameScore} ; Name : {Name}";
    }
    public void NoAttributeMethod()
    {
    }
}
[GamerB1(Name = "GamerB2", Version = 1.0)]
public class GamerB2
{
    // Properties ----------------------------
    [GamerB1(Name = "GamerB2Method", Version = 1.0)]
    public int GameScore { get; set; }
    [GamerA1]
    public string Name { get; set; }
    // Methods ----------------------------
    [GamerB1]
    public override string ToString()
```

```
        {
            return $"GameScore : {GameScore} ; Name : {Name}";
        }
    }


  //3. ---------------------------------------
    public class GamerCNoAttribute
    {
    }
    //4. ---------------------------------------
    public class GameScoreCaculator
    {
        [Obsolete]
        public static int Sum(int i1, int i2)
        {
            return i1 + i2;
        }
        [Obsolete("Use Sum(List<int> intList) instead.")]
        //[Obsolete("Use Sum(List<int> intList) instead.", true)]
        public static int Sum(int i1, int i2, int i3)
        {
            return i1 + i2 + i3;
        }
        public static int Sum(List<int> intList)
        {
            int Sum = 0;
            foreach (int i in intList)
            {
                Sum += i;
            }
            return Sum;
        }
        //2.1.
        ////[Obsolete]
        //Marks types and type members outdated.
        //2.1.1.
        //The compiler issues a warning to types or type members with[Obsolete].
        //2.1.2.
        //The compiler issues a warning with message to
        //types or type members with[Obsolete("Message")]
        //2.1.3.
        //The compiler issues a compiler error with message to
        //types or type members with [Obsolete("Message", true)]
    }
}

/*
1.
Attribute
1.1.
Syntax:
//[AttributeUsage(AttributeTargets.Class | AttributeTargets.Property | AttributeTargets.Method
| ...etc.)]
//public class ClassNameAttribute : System.Attribute
1.2.
Attribute is a Class which extend System.Attribute and
provide declarative information which is queried at runtime using reflection.
The suffix of Attribute is "Attribute".
[AttributeUsage(AttributeTargets.All)] is default usage setting
```

```
that means it can apply to every where.
//[AttributeUsage(AttributeTargets.Class | AttributeTargets.Property | AttributeTargets.Method)]
it means this attribute can only apply to Class, Property, Method
2.
Pre-defined attributes in the .NET framework.
2.1.
//[Obsolete]
Marks types and type members outdated.
2.1.1.
The compiler issues a warning to types or type members with [Obsolete].
2.1.2.
The compiler issues a warning with message to
types or type members with [Obsolete("Message")]
2.1.3.
The compiler issues a compiler error with message to
types or type members with [Obsolete("Message", true)]
2.2.
//[WebMethod]
expose a method as an XML Web service method
2.3.
//[Serializable]
Indicates that a class can be serialized
*/
```

```
AttributeLinqSample(); ============================
====================================
OnLineGame.GamerB
properties -------------------------
System.Int32 GameScore
System.String Name
gamerB1Attribute Properties -------------------------
System.Int32 GameScore
Methods -------------------------
Int32 get_GameScore
Void set_GameScore
String get_Name
Void set_Name
String ToString
Void NoAttributeMethod
Boolean Equals
Int32 GetHashCode
Type GetType
gamerB1Attribute Methods -------------------------
String ToString
====================================
OnLineGame.GamerB2
properties -------------------------
System.Int32 GameScore
System.String Name
gamerB1Attribute Properties -------------------------
System.Int32 GameScore
Methods -------------------------
Int32 get_GameScore
Void set_GameScore
String get_Name
Void set_Name
String ToString
Boolean Equals
Int32 GetHashCode
Type GetType
gamerB1Attribute Methods -------------------------
String ToString
ObsoleteSample(); ============================
GameScoreCaculator.Sum(2, 3)  :  5
GameScoreCaculator.Sum(1, 2, 3)  :  6
 GameScoreCaculator.Sum(intList)  :  10
```

```
//4. ----------------------
static void ObsoleteSample
{
    GameScoreCaculator.Sum()
}
```

(**List<int> intList**):int
~~(**int i1**, int i2):int~~
~~(**int i1**, int i2, int i3):int~~

```
//4. ---------------------------------------
static void ObsoleteSample()
{
    GameScoreCaculator.Sum(2, 3);
    GameScoreCaculator.Sum(1, 2,
}
```

'GameScoreCaculator.Sum(int, int)' is obsolete

```
//4. ---------------------------------------
static void ObsoleteSample()
{
    GameScoreCaculator.Sum(2, 3);
    GameScoreCaculator.Sum(1, 2, 3);
}
```

'GameScoreCaculator.Sum(int, int, int)' is obsolete: 'Use Sum(List<int> intList) instead.'

```
//4. ---------------------------------------
static void ObsoleteSample()
{
    GameScoreCaculator.Sum(2, 3);
    GameScoreCaculator.Sum(1, 2, 3);

    List<int> intList = new List<int>{1,2,3,4};
    GameScoreCaculator.Sum(intList);
}
```