INTRODUCTION TO PROGRAMMING

USING C#

Lecture 5: Inheritance

CONTENTS:

- What's inheritance.
- Why we should use inheritance.
- Examples.
- Adding new members to inherited class
- Overriding old members.
- Access modifiers.
- Sealed classes.
- Extending sealed classes.
- Extension methods.
- Demo.

WHAT'S INHERITANCE

Is relationship between two classes in which one class (child) copy all members from the other class (parent)

WHAT'S INHERITANCE

```
class Car
{
    //car members , (functions, properites,..)
}


class BMW : Car
{
    // Now, we have Car's members.
}
```

ADDING NEW MEMBERS TO INHERITED CLASS

```csharp
class Car
{
    public void StartEngine()
    {

    }
}


class BMW : Car
{
    public void StopEngine()
    {

    }
}
```

OVERRIDING INHERITED MEMBERS

```csharp
class Car
{
    public virtual void StartEngine()
    {
    }
}

class BMW : Car
{
    public void StopEngine()
    {
    }


    public override void StartEngine()
    {
        // new implementation here
    }
}
```

SEALED CLASSES

A class that you can't inherit from.

SEALED CLASSES

```
sealed class Car
{
    public void StartEngine()
    {
    }
}

class BMW : Car
{
    public void StopEngine()
    {
    }

    public void StartEngine()
    {
        // new implementation here
    }
}
```

EXTENDING SEALED CLASSES

1. **By adding a new helper class that contains static methods that add the functionality you want.**
2. **By adding an extinction method.**

EXTENSION METHODS

An static method that extend the functionality of anther class and appear as a class member.

EXTENSION METHODS

Roles :

- **Must be a static method.**
- **Must be in the same namespace as the target class.**
- **Must take an argument of the same type as target class preceded by the keyword *this*.**

EXTENSION METHODS

```csharp
sealed class Car
{
    public void StartEngine()
    {
    }
}

static class CarExtinstionMethodsHost
{
    public static void StopEngine(this Car c)
    {
        // implementation here
    }
}
```

DEMO

NEXT

- **Data Structures.**