Members: Methods, Events, and Properties

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Methods

- **Methods define behavior**
- **Every method has a return type**
  - □ void if not value returned
- **Every method has zero or more parameters**
  - □ Use params keyword to accept a variable number of parameters
- **Every method has a signature**
  - □ Name of method + parameters (type and modifiers are significant)

```csharp
public void WriteAsBytes(int value)
{
    byte[] bytes = BitConverter.GetBytes(value);

    foreach(byte b in bytes)
    {
        Console.Write("0x{0:X2} ", b);
    }
}
```

Method Overloading

- **Define multiple methods with the same name in a single class**
  - Methods require a unique signature
- **Compiler finds and invokes the best match**

```csharp
public void WriteAsBytes(int value)
{
    // ...
}


public void WriteAsBytes(double value)
{
    // ...
}
```

Methods - Review

- **Instance methods versus static methods**
    - Instance methods invoked via object, static methods via type
- **Abstract methods**
    - Provide no implementation, implicitly virtual
- **Virtual methods**
    - Can override in a derived class
- **Partial methods**
    - Part of a partial class
- **Extension methods**
    - Described in the LINQ module

Fields

- **Fields are variables of a class**
  - Can be read-only

```csharp
public class Animal
{
    private readonly string _name;

    public Animal(string name)
    {
        _name = name;
    }
}
```

Properties

- **A property can define a get and/or set accessor**
  - Often used to expose and control fields
- **Auto-implemented properties use a hidden field**

```csharp
public string Name
{
    get;
    set;
}
```
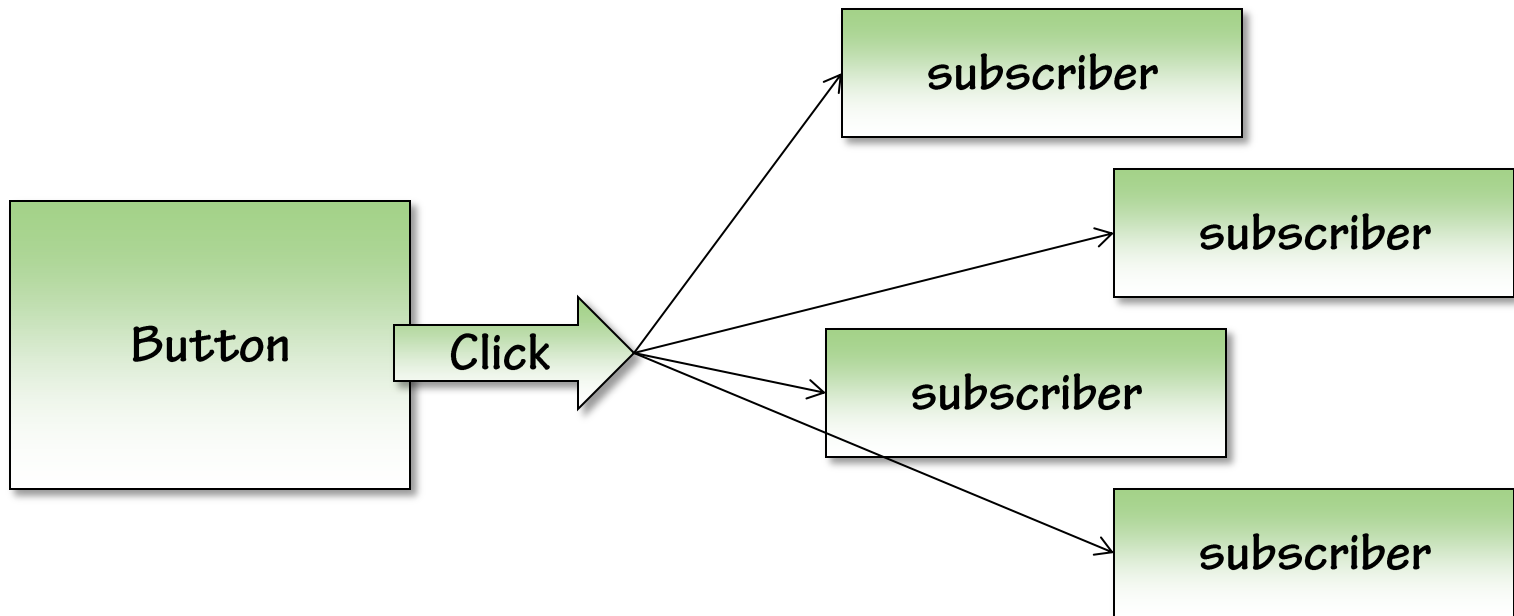
```csharp
private string _name;

public string Name
{
    get { return _name; }
    set
    {
        if(!String.IsNullOrEmpty(value))
        {
            _name = value;
        }
    }
}
```

Events

- **Allows a class to send notifications to other classes or objects**
  - Publisher raises the event
  - One or more subscribers process the event

Delegates

- I need a variable that references a method
- A delegate is a type that references methods

```csharp
public delegate void Writer(string message);
```

```csharp
Logger logger = new Logger();
Writer writer = new Writer(logger.WriteMessage);
writer("Success!!");
```

```csharp
{
        public void WriteMessage(String message)
        {
                Console.WriteLine(message);
        }
}
```

Subscribing To Events

- **Use the += and -= to attach and detach event handlers**
    - Can attached named or anonymous methods

```csharp
public static void Initialize()
{
    _submitButton.Click += new RoutedEventHandler(_submitButton_Click);
}


static void _submitButton_Click(object sender, RoutedEventArgs e)
{
    // ... respond to event
}
```

Publishing Events

- **Create custom event arguments (or use a built-in type)**
  - Always derive from the base EventArgs class
- **Define a delegate (or use a built-in delegate)**
- **Define an event in your class**
- **Raise the event at the appropriate time**

```csharp
public event NameChangingEventHandler NameChanging;

private bool OnNameChanging(string oldName, string newName)
{
    if(NameChanging != null)
    {
        NameChangingEventArgs args = new NameChangingEventArgs();
        args.Cancel = false;
        args.NewName = newName;
        args.OldName = oldName;
        NameChanging(this, args);
```

Summary

- **Members are used to craft an abstraction**
  - Fields and properties for state
  - Methods for behavior
  - Events for notification