Anonymous Types

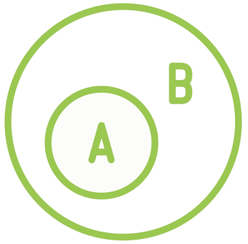
Filip Ekberg
Principal Consultant & CEO

@fekberg fekberg.com

Anonymous Types

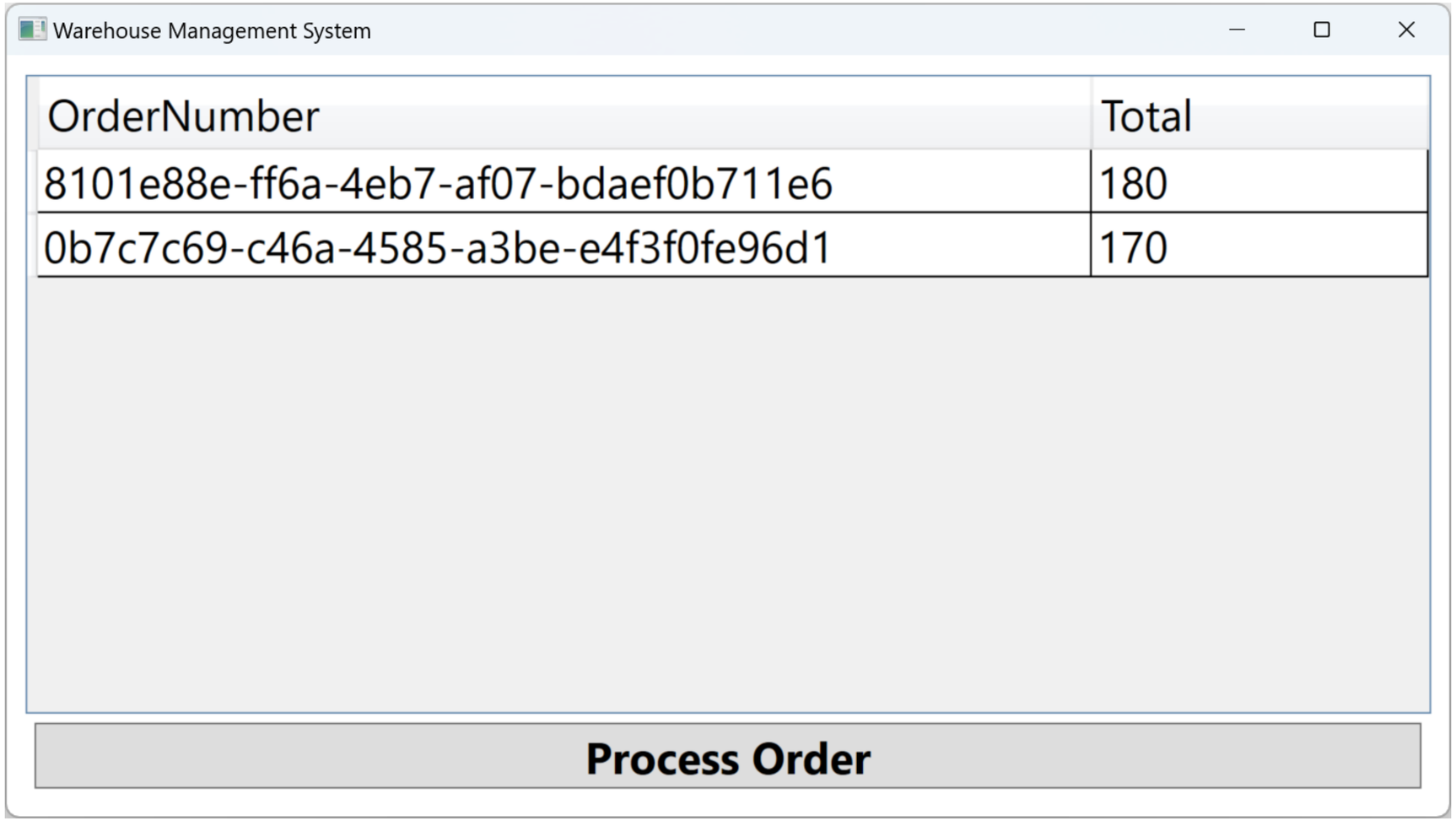
Temporary class
Use it to create a representation of data used in the current method

Do not return an anonymous type or use it as a parameter
It is only to be used in the current method



Commonly used with LINQ
Create a representation of a subset of the properties

List of **Anonymous Type** Bound to the UI



Property names can be
inferred by the compiler

Explicitly define the **names** for the properties **that** the **compiler cannot infer** or where a **better name** is **appropriate**

Creating an Anonymous Type

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```
var subset = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};
```

Creating an Anonymous Type

```
var subset = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};

var instance = new
{
    Read = new Func<string>(Console.ReadLine)
};

instance.Read();
```

Creating an Anonymous Type

```
var subset = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};

var instance = new
{
    Read = new Func<string>(Console.ReadLine)
};

instance.Read();
```

This is not something you normally want to do!

Anonymous Types

“**Anonymous types** provide a **convenient way** to **encapsulate** a set of **read-only properties** into a single object **without** having to **explicitly** define a **type** first.

The type name is **generated by** the **compiler** and is not available at the source code level.

The **type** of **each property** is **inferred** by the compiler.”

docs.microsoft.com/en-us/dotnet/csharp/fundamentals/types/anonymous-types

Using **LINQ** with **Anonymous Types**

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```
var totals = orders.Select(order => new { order.Total });
```

Using **LINQ** with **Anonymous Types**

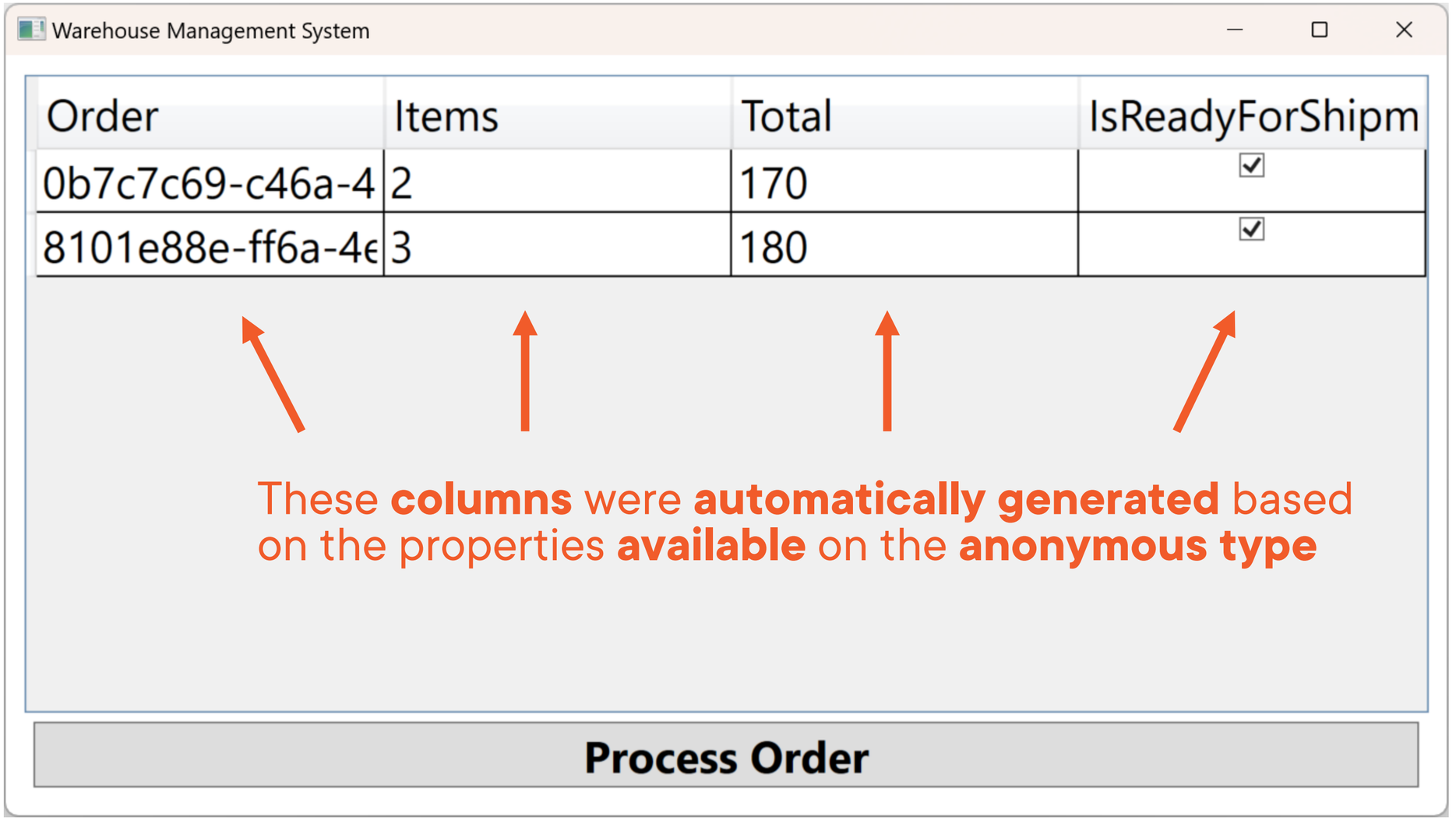
```
// Method Syntax
var totals = orders.Select(order => new { order.Total });
```

Using **LINQ** with **Anonymous Types**

```
// Method Syntax
var totals = orders.Select(order => new { order.Total });


// Query Syntax
var totals = from order in orders
             select new { order.Total };
```

Anonymous Type Bound to the UI



Creating an Anonymous Type

```
IEnumerable<Order> result = orders.Select(order => new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
});
```

Anonymous types are
read-only but support
non-destructive mutation

Introducing the **with** Expression

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```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};
```

Introducing the **with** Expression

```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};

var copy =
```

Introducing the **with** Expression

```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};

var copy = instance with {                  };
```

Introducing the **with** Expression

```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};

var copy = instance with {              };
```

You **cannot add** or **remove properties**!
Only **specify** which **modifications** you want.

Introducing the **with** Expression

```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};

var copy = instance with { Total = 50 };
```

Immutability is **beneficial** in **multi-threaded** applications

Only the reference is copied
for reference types!

You shouldn’t return an anonymous type or use it as a parameter!

But that doesn’t mean you cant! What happens if you do?

The **Anonymous Type** Is a **Reference Type**

```
object result = new { ... };
```

Constructing an **Anonymous Type**

Constructing an **Anonymous Type**

```
var instance = new
{



};
```

Constructing an **Anonymous Type**

```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};
```

Constructing an **Anonymous Type**

The **compiler** will **generate** an **anonymous type** for you

```
var instance = new
{
    order.OrderNumber,
    order.Total,
    AveragePrice = order.LineItems.Average(item => item.Price)
};
```

Don’t return anonymous types or use them as parameters

Using Reflection on **Anonymous Type**

```
var result = processor.Process(orders);

var type = result.GetType();
var properties = type.GetProperties();

foreach(var property in properties)
{
    Console.WriteLine($"Property: {property.Name}");
    Console.WriteLine($"Value: {property.GetValue(result)}");
}
```

Next: **Tuples** and **Deconstruction**

Anonymous Type and LINQ

```
var summaries = orders.Select(order =>
{
    return new
    {
        Order = order.OrderNumber,
        Items = order.LineItems.Count(),
        Total = order.LineItems.Sum(item => item.Price),
        LineItems = order.LineItems
    };
});
```