

# Build an EF and ASP.NET Core 2.1 App HOL

## Lab 3

Welcome to the Build an Entity Framework Core and ASP.NET Core 2.1 Application in a Day Hands-on Lab. This lab walks you through creating a user defined function, assigning it to a column on the database, and adding in all of the view models.

Prior to starting this lab, you must have completed Lab 2.

## Part 1: Create the User Defined Function

### Step 1: Create the Migration for the UDF

- 1) Open Package Manager Console (View -> Other Windows -> Package Manager Console)
- 2) Change to the SpyStore\_HOL.DAL directory:

```
cd .\SpyStore_HOL.DAL
```

- 3) Create an empty migration (but do **NOT** run database update):

**NOTE: The following lines must be entered as one line in Package Manager Console - copying and pasting from this document doesn't work**

```
dotnet ef migrations add TSQL -o EfStructures\Migrations -c  
SpyStore_HOL.DAL.EfStructures.StoreContext
```

**NOTE: The above lines must be entered as one line in Package Manager Console - copying and pasting from this document doesn't work**

- 4) Open up the new migration file (named <timestamp>\_TSQL.cs). In the Up method, add the following to create the User Defined Function:

```
string sql = @"CREATE FUNCTION Store.GetOrderTotal ( @OrderId INT )  
    RETURNS MONEY WITH SCHEMABINDING  
    BEGIN  
        DECLARE @Result MONEY;  
        SELECT @Result = SUM([Quantity]*[UnitCost]) FROM Store.OrderDetails  
        WHERE OrderId = @OrderId; RETURN @Result END";  
migrationBuilder.Sql(sql);
```

- 5) In the Down method, add the following code:

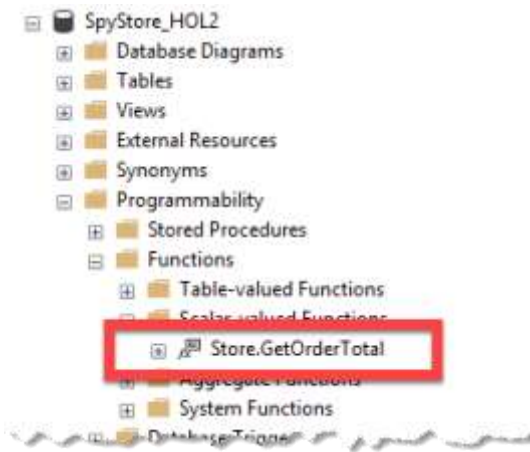
```
migrationBuilder.Sql("DROP FUNCTION [Store].[GetOrderTotal]");
```

### 6) SAVE THE MIGRATION FILE

- 7) Update the database by executing the migration:

```
dotnet ef database update
```

8) Check the database to make sure the function exists:



## Part 2: Add the Calculated Field to the Order Table

### Step 1: Update the Order Model

1) Open the Order.cs file in the Models project and add the following property:

```
[Display(Name = "Total")]  
public decimal? OrderTotal { get; set; }
```

### Step 2: Update the StoreContext OnModelCreating Method

1) Open the StoreContext.cs file in the DAL project, and add the following Fluent API command in the OnModelCreating method to the Order entity:

```
modelBuilder.Entity<Order>(entity =>  
{  
    entity.Property(e => e.OrderDate).HasColumnType("datetime").HasDefaultValueSql("getdate()");  
    entity.Property(e => e.ShipDate).HasColumnType("datetime").HasDefaultValueSql("getdate()");  
    entity.Property(e => e.OrderTotal).HasColumnType("money")  
        .HasComputedColumnSql("Store.GetOrderTotal([Id])");  
});
```

### Step 3: Create the Final Migration and Update the Database

#### 1) SAVE THE StoreContext.cs FILE

2) Create a new migration using Package Manager Console:

**NOTE: The following lines must be entered as one line in Package Manager Console - copying and pasting from this document doesn't work**

```
dotnet ef migrations add Final -o EfStructures\Migrations -c  
SpyStore_HOL.DAL.EfStructures.StoreContext
```

**NOTE: The above lines must be entered as one line in Package Manager Console - copying and pasting from this document doesn't work**

3) Update the database using Package Manager Console:

```
dotnet ef database update
```

## Part 3: Scalar Function Mapping in EF Core

With EF Core 2, scalar SQL Server functions can be mapped to C# methods to be used in LINQ queries.

- 1) Open the StoreContext.cs file and ensure the following using statement is in the file:

```
using System;
```

- 2) Add the following static method to the StoreContext.cs file:

```
public static int GetOrderTotal(int orderId)
{
    //code in here doesn't matter
    throw new Exception();
}
```

- 3) Functions can be mapped using Data Annotations. To map using Data Annotations, add the DbFunction attribute:

```
[DbFunction("GetOrderTotal", Schema = "Store")]
public static int GetOrderTotal(int orderId)
{
    //code in here doesn't matter
    throw new Exception();
}
```

## Part 4: Create the InvalidQuantityException

The custom InvalidQuantityException will be used later in this workshop to indicate when a user attempts to add more items into the cart than are available in stock.

### Step 1: Create the Custom Exception

- 4) Create a new folder in the **SpyStore\_HOL.DAL** project named Exceptions.
- 5) Add a new class to the folder named InvalidQuantityException.cs
- 6) Add the following using statements to the class:

```
using System;
```

- 7) Update the code to the following:

```
public class InvalidQuantityException : Exception
{
    public InvalidQuantityException() { }
    public InvalidQuantityException(string message) : base(message) { }
    public InvalidQuantityException(string message, Exception innerException)
        : base(message, innerException) { }
}
```

## Part 5: Add the ViewModels

ViewModels are a common way to represent data from multiple tables in one class. In this lab you will create the view models for the Data Access Layer.

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**NOTE:** The files are listed here for reference only. Since there aren't any EF Core specific concepts to explore, copy the files from Code\Complete\Lab3\SpyStore\_HOL.Models\ViewModels

## Step 1: Create the Base ViewModel

The base view model combines the Product and the Category classes, adding in the Display data annotations for the MVC rendering engine.

- 1) Create a new folder in the SpyStore\_HOL.Models project named ViewModels. Create a subfolder under that named Base.
- 2) Add a new class to the Base folder named ProductAndCategoryBase.cs
- 3) Add the following using statements to the class:

```
using System.ComponentModel.DataAnnotations;  
using SpyStore_HOL.Models.Entities.Base;
```

- 4) Update the code for the ProductAndCategoryBase.cs class to the following:

```
public class ProductAndCategoryBase : EntityBase  
{  
    public int CategoryId { get; set; }  
    [Display(Name = "Category")]  
    public string CategoryName { get; set; }  
    public int ProductId { get; set; }  
    [MaxLength(3800)]  
    public string Description { get; set; }  
    [MaxLength(50)]  
    [Display(Name = "Model")]  
    public string ModelName { get; set; }  
    [Display(Name="Is Featured Product")]  
    public bool IsFeatured { get; set; }  
    [MaxLength(50)]  
    [Display(Name = "Model Number")]  
    public string ModelNumber { get; set; }  
    [MaxLength(150)]  
    public string ProductImage { get; set; }  
    [MaxLength(150)]  
    public string ProductImageLarge { get; set; }  
    [MaxLength(150)]  
    public string ProductImageThumb { get; set; }  
    [DataType(DataType.Currency), Display(Name = "Cost")]  
    public decimal UnitCost { get; set; }  
    [DataType(DataType.Currency), Display(Name = "Price")]  
    public decimal CurrentPrice { get; set; }  
    [Display(Name="In Stock")]  
    public int UnitsInStock { get; set; }  
}
```

## Step 2: Create the CartRecordWithProductInfo Model

- 1) Add a new class to the ViewModels folder named CartRecordWithProductInfo.cs
- 2) Update the using statements to the following:

```
using System;
```

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```
using System.ComponentModel.DataAnnotations;
using SpyStore_HOL.Models.ViewModels.Base;
```

3) Update the code for the CartRecordWithProductInfo.cs class to the following:

```
public class CartRecordWithProductInfo : ProductAndCategoryBase
{
    [DataType(DataType.Date), Display(Name = "Date Created")]
    public DateTime? DateCreated { get; set; }
    public int? CustomerId { get; set; }
    public int Quantity { get; set; }
    [DataType(DataType.Currency), Display(Name = "Line Total")]
    public decimal LineItemTotal { get; set; }
}
```

### Step 3: Create the OrderDetailWithProductInfo Model

1) Add a new class to the ViewModels folder named OrderDetailWithProductInfo.cs

2) Add the following using statements to the class:

```
using System;
using System.ComponentModel.DataAnnotations;
using SpyStore_HOL.Models.ViewModels.Base;
```

3) Update the code for the OrderDetailWithProductInfo.cs class to the following:

```
public class OrderDetailWithProductInfo : ProductAndCategoryBase
{
    public int OrderId { get; set; }
    [Required]
    public int Quantity { get; set; }
    [DataType(DataType.Currency), Display(Name = "Total")]
    public decimal? LineItemTotal { get; set; }
}
```

### Step 4: Create the OrderWithDetailsAndProductInfo Model

1) Add a new class to the ViewModels folder named OrderWithDetailsAndProductInfo.cs

2) Add the following using statements to the class:

```
using System;
using System.Collections.Generic;
using System.ComponentModel.DataAnnotations;
using SpyStore_HOL.Models.Entities.Base;
```

3) Update the code for the OrderWithDetailsAndProductInfo.cs class to the following:

```
public class OrderWithDetailsAndProductInfo : EntityBase {
    public int CustomerId { get; set; }
    [DataType(DataType.Currency), Display(Name = "Total")]
    public decimal? OrderTotal { get; set; }
    [DataType(DataType.Date)]
    [Display(Name = "Date Ordered")]
    public DateTime OrderDate { get; set; }
    [DataType(DataType.Date)]
    [Display(Name = "Date Shipped")]
```

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```
public DateTime ShipDate { get; set; }  
public IList<OrderDetailWithProductInfo> OrderDetails { get; set; }  
}
```

## Part 6: Make Internal Methods Visible to the Unit Tests

- 1) Add an AssemblyInfo.cs file to the SpyStore\_HOL.DAL project. Clear out the default code, and replace it with this:

```
using System.Runtime.CompilerServices;  
[assembly: InternalsVisibleTo("SpyStore_HOL.Tests")]
```

## Summary

This lab created the user defined function and its related C# mapping, assigned it to a computed columns, and updated the database. Then you added in the view models.

## Next steps

In the next part of this tutorial series, you will create the repositories.