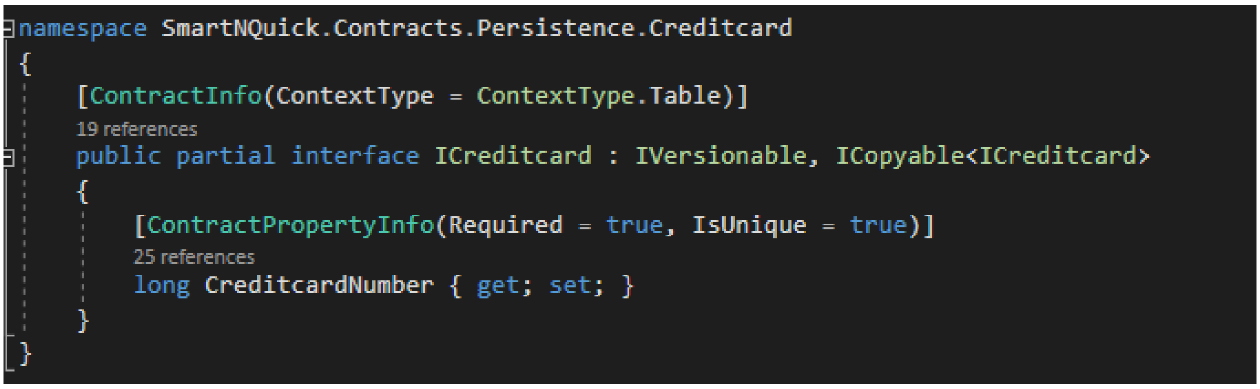
Module Logic:
Microsoft.EntityFrameworkCore
Microsoft.EntityFrameworkCore.SqlServer
System.Linq.Dynamic.Core

Module ConApp:
Microsoft.EntityFrameworkCore.Tools
Microsoft.EntityFrameworkCore.Design

ConnectionString In der Klasse 'ProjectDbContext' muss der ConnctionString gesetzt werden: ConnectionString = "Data Source=(localdb)\MSSQLLocalDB;Database=SmartNQuickDb;Integrated Security=True";

Schritt 1:

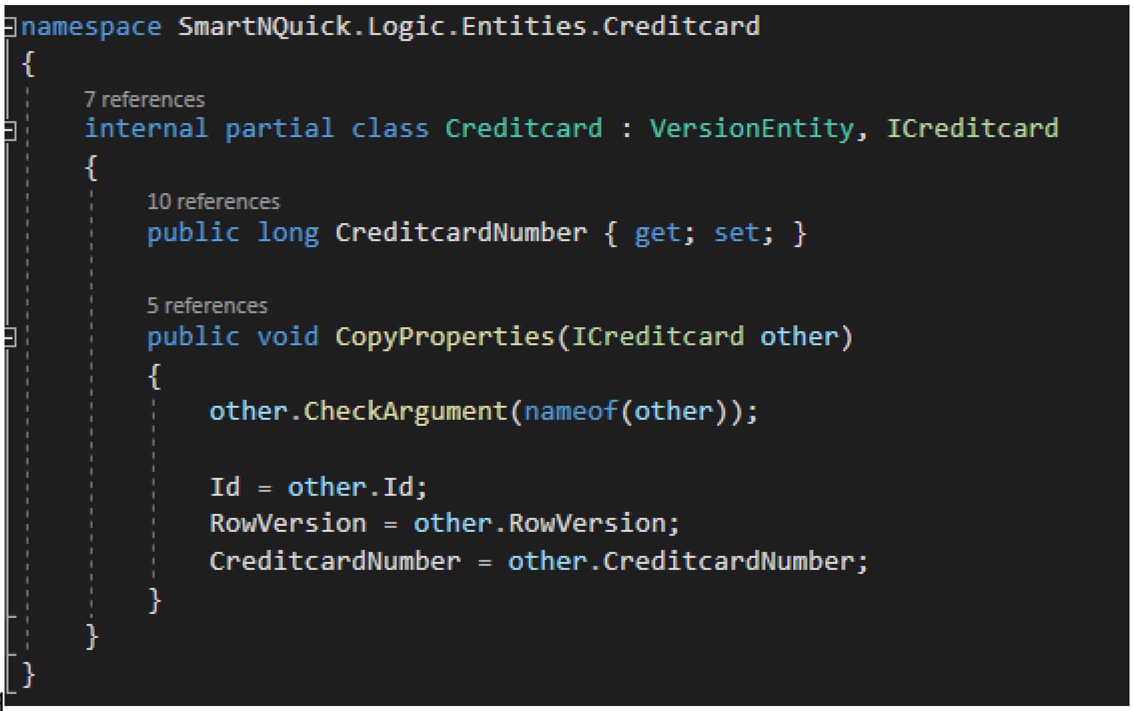
Contracts -> Persistence -> Ordner für Entity erstellen -> Interface für Entity erstellen



```
namespace SmartNQuick.Contracts.Persistence.Creditcard
{
    [ContractInfo(ContextType = ContextType.Table)]
    19 references
    public partial interface ICreditcard : IVersionable, ICopyable<ICreditcard>
    {
        [ContractPropertyInfo(Required = true, IsUnique = true)]
        25 references
        long CreditcardNumber { get; set; }
    }
}
```

Schritt 2:

Logic -> Entities -> Ordner für Entity erstellen -> Entity erstellen



```
namespace SmartNQuick.Logic.Entities.Creditcard
{
    7 references
    internal partial class Creditcard : VersionEntity, ICreditcard
    {
        10 references
        public long CreditcardNumber { get; set; }

        5 references
        public void CopyProperties(ICreditcard other)
        {
            other.CheckArgument(nameof(other));

            Id = other.Id;
            RowVersion = other.RowVersion;
            CreditcardNumber = other.CreditcardNumber;
        }
    }
}
```

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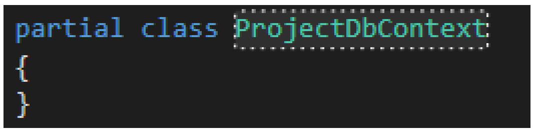
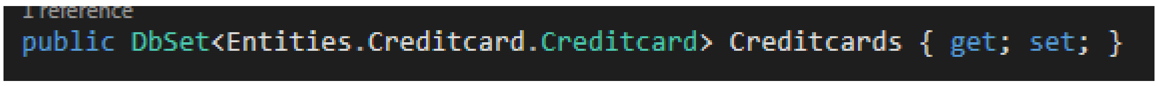
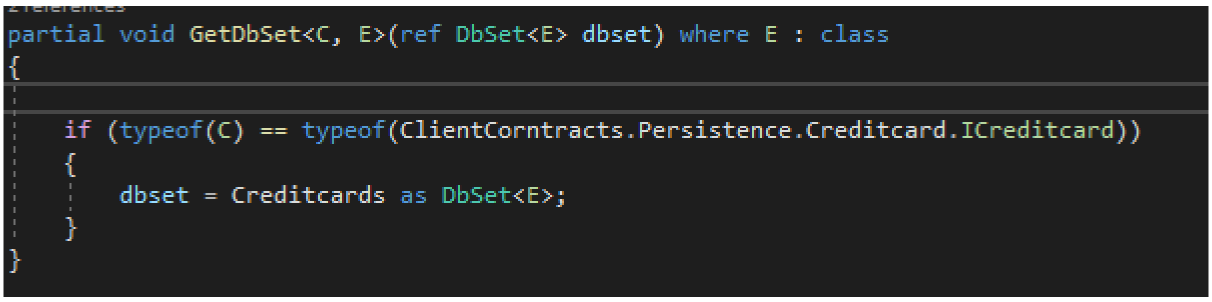
Schritt 3:

Logic -> DataContext -> ProjectDbContextEx.cs -> DbSet für Entity erstellen

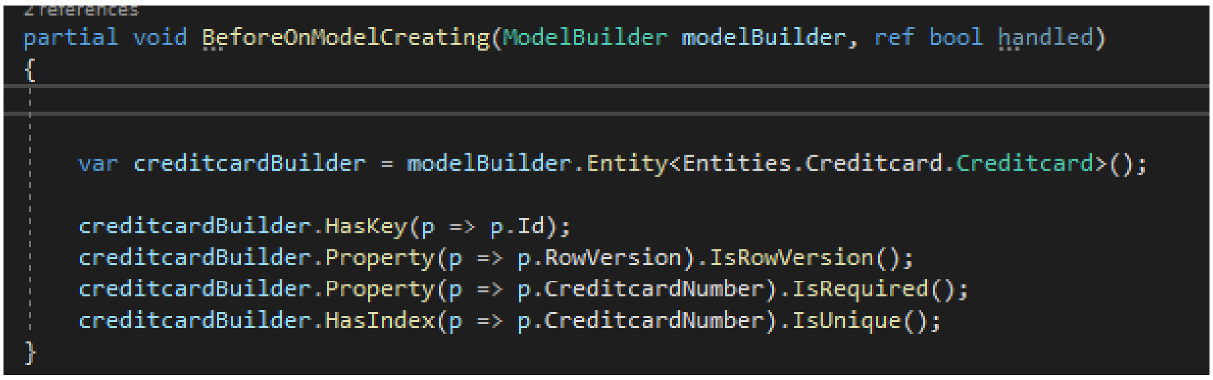

```
partial class ProjectDbContext
{
}
```


```
1 reference
public DbSet<Entities.Creditcard.Creditcard> Creditcards { get; set; }
```

Logic -> DataContext -> ProjectDbContextEx.cs -> GetDbSet erstellen

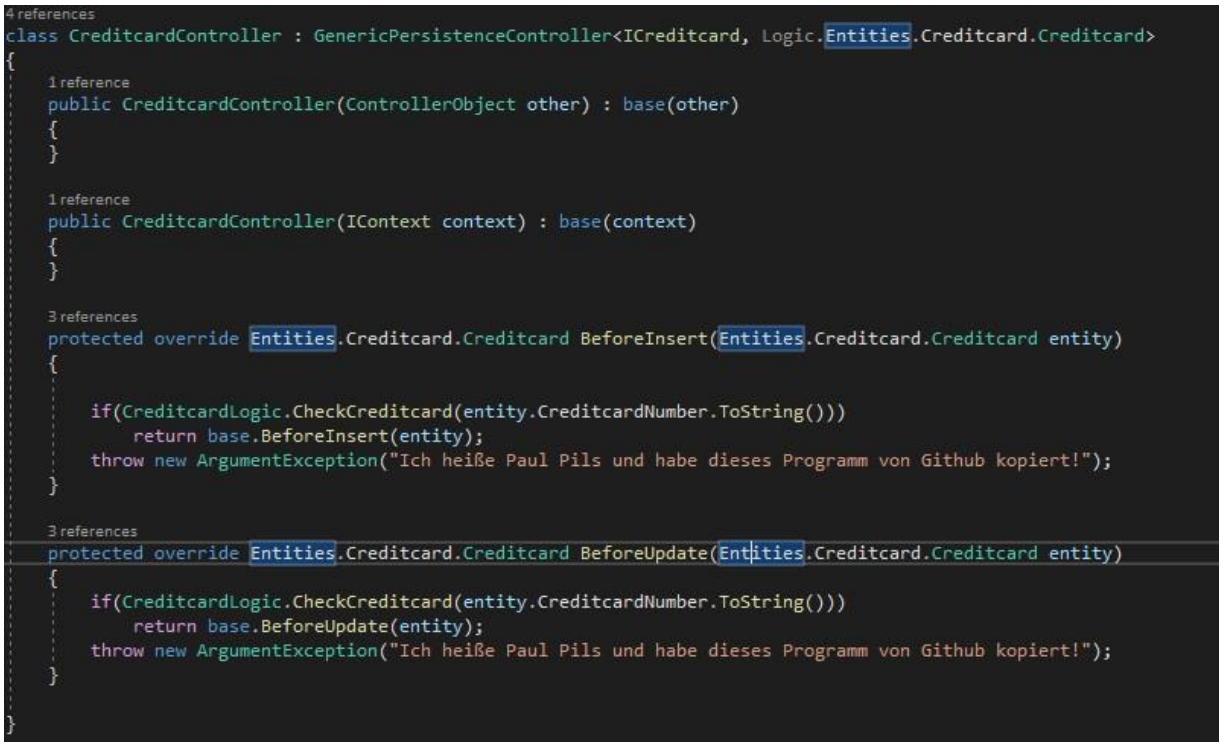

```
2 references
partial void GetDbSet<C, E>(ref DbSet<E> dbset) where E : class
{

    if (typeof(C) == typeof(ClientCorntracts.Persistence.Creditcard.ICreditcard))
    {
        dbset = Creditcards as DbSet<E>;
    }
}
```

Logic -> DataContext -> ProjectDbContextEx.cs -> BeforeOnModelCreating erstellen


```
2 references
partial void BeforeOnModelCreating(ModelBuilder modelBuilder, ref bool handled)
{

    var creditcardBuilder = modelBuilder.Entity<Entities.Creditcard.Creditcard>();

    creditcardBuilder.HasKey(p => p.Id);
    creditcardBuilder.Property(p => p.RowVersion).IsRowVersion();
    creditcardBuilder.Property(p => p.CreditcardNumber).IsRequired();
    creditcardBuilder.HasIndex(p => p.CreditcardNumber).IsUnique();
}
```

Schritt 4:

Logic -> Controllers -> Persistence -> Ordner für Entity erstellen -> Controller für Entity erstellen



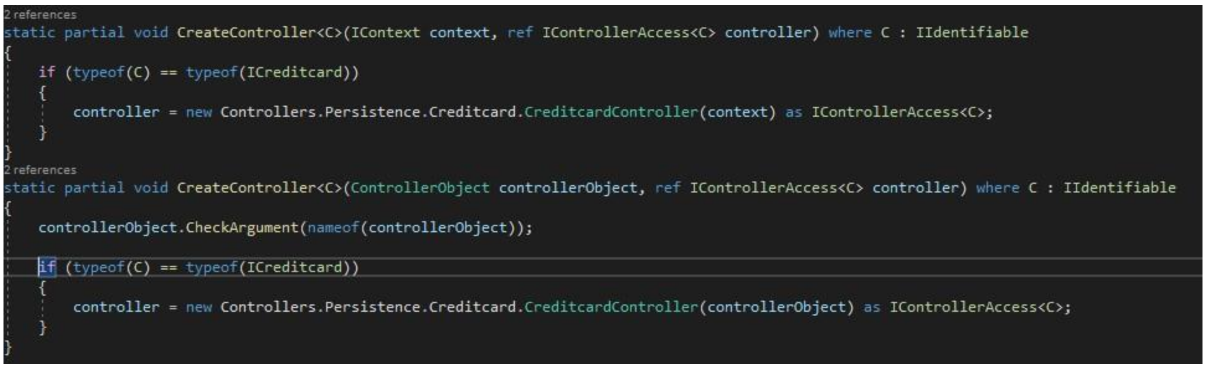
```
4 references
class CreditcardController : GenericPersistenceController<ICreditcard, Logic.Entities.Creditcard.Creditcard>
{
    1 reference
    public CreditcardController(ControllerObject other) : base(other)
    {
    }

    1 reference
    public CreditcardController(IContext context) : base(context)
    {
    }

    3 references
    protected override Entities.Creditcard.Creditcard BeforeInsert(Entities.Creditcard.Creditcard entity)
    {

        if(CreditcardLogic.CheckCreditcard(entity.CreditcardNumber.ToString()))
            return base.BeforeInsert(entity);
        throw new ArgumentException("Ich heiße Paul Pils und habe dieses Programm von Github kopiert!");
    }

    3 references
    protected override Entities.Creditcard.Creditcard BeforeUpdate(Entities.Creditcard.Creditcard entity)
    {
        if(CreditcardLogic.CheckCreditcard(entity.CreditcardNumber.ToString()))
            return base.BeforeUpdate(entity);
        throw new ArgumentException("Ich heiße Paul Pils und habe dieses Programm von Github kopiert!");
    }

}
```

Schritt 5:

Package Manager Console (links unten) -> Default Project -> Logic auswählen -> ConApp als StartUpPorject -> add-migration initDb -> update-database

Schritt 6:

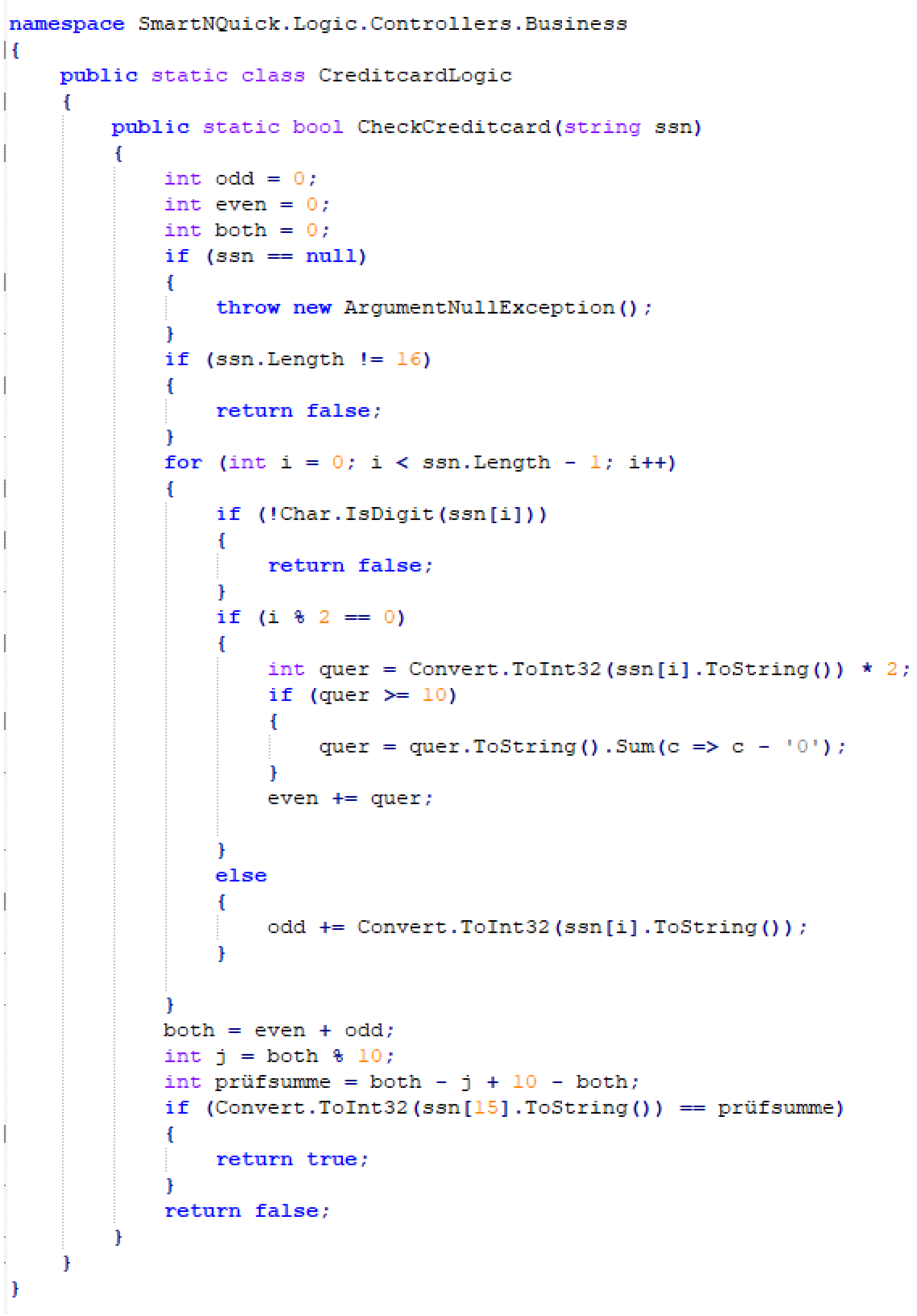
Logic -> FactoryEx.cs -> erstellen



```
2 references
static partial void CreateController<C>(IContext context, ref IControllerAccess<C> controller) where C : IIdentifiable
{
    if (typeof(C) == typeof(ICreditcard))
    {
        controller = new Controllers.Persistence.Creditcard.CreditcardController(context) as IControllerAccess<C>;
    }
}
2 references
static partial void CreateController<C>(ControllerObject controllerObject, ref IControllerAccess<C> controller) where C : IIdentifiable
{
    controllerObject.CheckArgument(nameof(controllerObject));

    if (typeof(C) == typeof(ICreditcard))
    {
        controller = new Controllers.Persistence.Creditcard.CreditcardController(controllerObject) as IControllerAccess<C>;
    }
}
```

Schritt 7:

Logic -> Controllers -> Business -> <Entity>Controller.cs erstellen

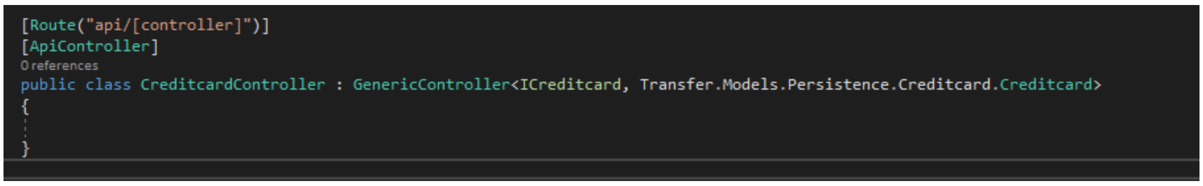


```csharp
namespace SmartNQuick.Logic.Controllers.Business
{
    public static class CreditcardLogic
    {
        public static bool CheckCreditcard(string ssn)
        {
            int odd = 0;
            int even = 0;
            int both = 0;
            if (ssn == null)
            {
                throw new ArgumentNullException();
            }
            if (ssn.Length != 16)
            {
                return false;
            }
            for (int i = 0; i < ssn.Length - 1; i++)
            {
                if (!Char.IsDigit(ssn[i]))
                {
                    return false;
                }
                if (i % 2 == 0)
                {
                    int quer = Convert.ToInt32(ssn[i].ToString()) * 2;
                    if (quer >= 10)
                    {
                        quer = quer.ToString().Sum(c => c - '0');
                    }
                    even += quer;

                }
                else
                {
                    odd += Convert.ToInt32(ssn[i].ToString());
                }

            }
            both = even + odd;
            int j = both % 10;
            int prüfsumme = both - j + 10 - both;
            if (Convert.ToInt32(ssn[15].ToString()) == prüfsumme)
            {
                return true;
            }
            return false;
        }
    }
}
```

C

Schritt 8:

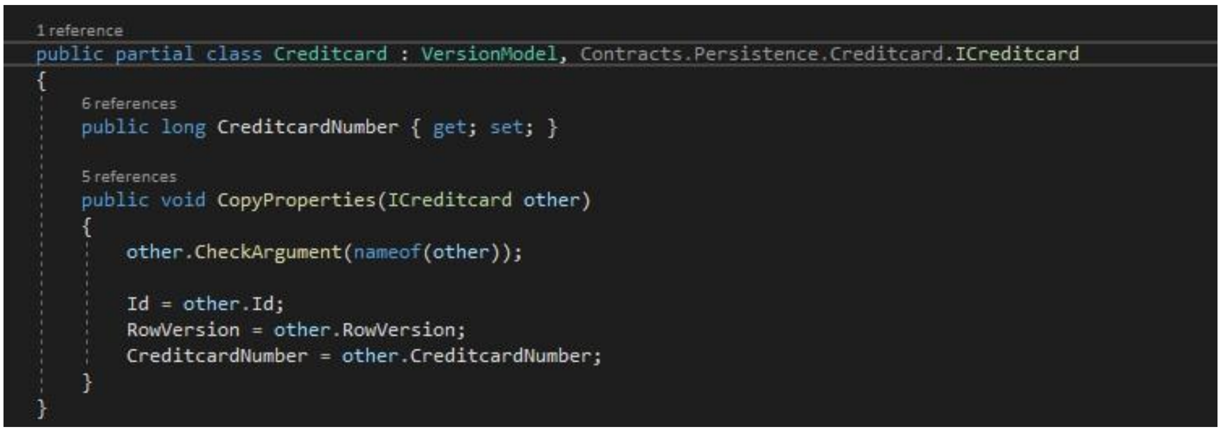
WebApi -> Controllers -> Persistence -> Ordner für Entity erstellen -> <Entity>Controller.cs erstellen



```
[Route("api/[controller]")]
[ApiController]
0 references
public class CreditcardController : GenericController<ICreditcard, Transfer.Models.Persistence.Creditcard.Creditcard>
{

}
```

Schritt 9:

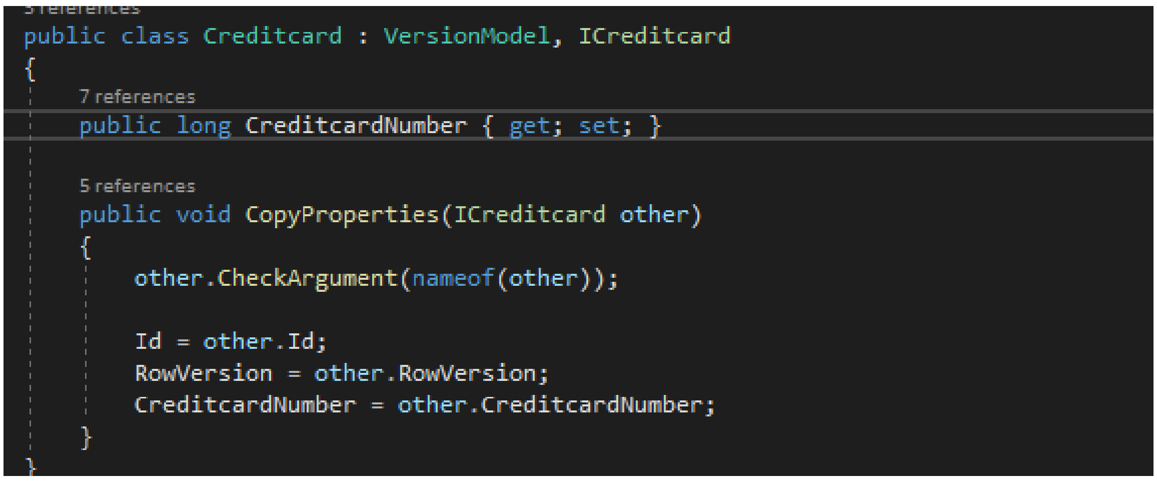
Transfer -> Models -> Persistence -> Ordner für Entity erstellen -> <Entity>.cs



```
1 reference
public partial class Creditcard : VersionModel, Contracts.Persistence.Creditcard.ICreditcard
{
    6 references
    public long CreditcardNumber { get; set; }

    5 references
    public void CopyProperties(ICreditcard other)
    {
        other.CheckArgument(nameof(other));

        Id = other.Id;
        RowVersion = other.RowVersion;
        CreditcardNumber = other.CreditcardNumber;
    }
}
```

Schritt 10:

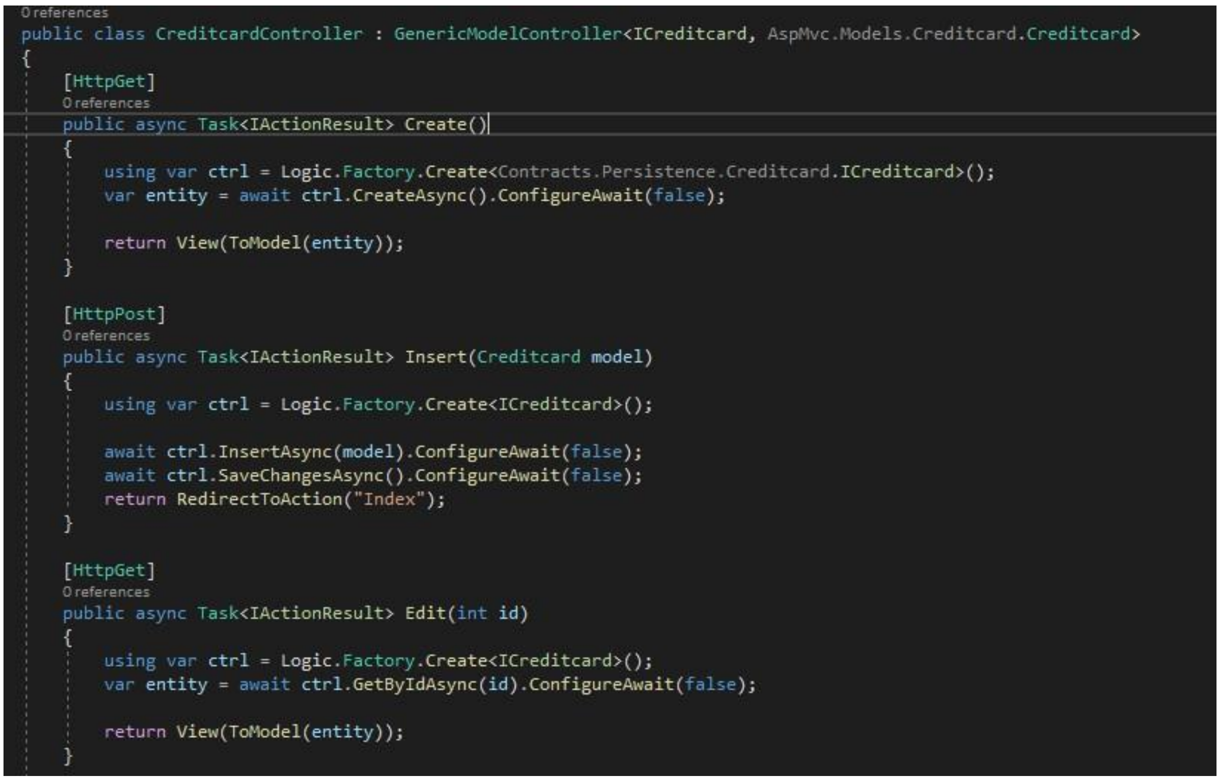
AspMvc -> Models -> Ordner für Entity erstellen -> <Entity>.cs



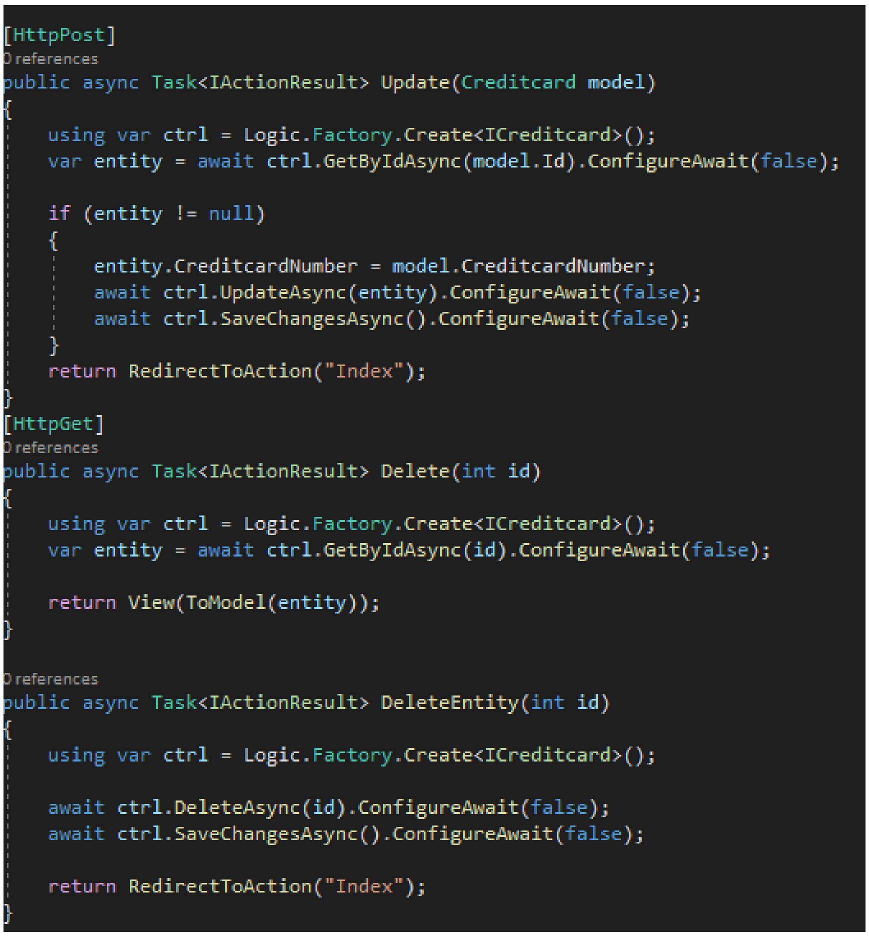
```
3 references
public class Creditcard : VersionModel, ICreditcard
{
    7 references
    public long CreditcardNumber { get; set; }

    5 references
    public void CopyProperties(ICreditcard other)
    {
        other.CheckArgument(nameof(other));

        Id = other.Id;
        RowVersion = other.RowVersion;
        CreditcardNumber = other.CreditcardNumber;
    }
}
```

Schritt 11:

AspMvc -> Controllers -> rechts Klick -> Add -> Controller -> Empty



```
0 references
public class CreditcardController : GenericModelController<ICreditcard, AspMvc.Models.Creditcard.Creditcard>
{
    [HttpGet]
    0 references
    public async Task<IActionResult> Create()
    {
        using var ctrl = Logic.Factory.Create<Contracts.Persistence.Creditcard.ICreditcard>();
        var entity = await ctrl.CreateAsync().ConfigureAwait(false);

        return View(ToModel(entity));
    }

    [HttpPost]
    0 references
    public async Task<IActionResult> Insert(Creditcard model)
    {
        using var ctrl = Logic.Factory.Create<ICreditcard>();

        await ctrl.InsertAsync(model).ConfigureAwait(false);
        await ctrl.SaveChangesAsync().ConfigureAwait(false);
        return RedirectToAction("Index");
    }

    [HttpGet]
    0 references
    public async Task<IActionResult> Edit(int id)
    {
        using var ctrl = Logic.Factory.Create<ICreditcard>();
        var entity = await ctrl.GetByIdAsync(id).ConfigureAwait(false);

        return View(ToModel(entity));
    }
```

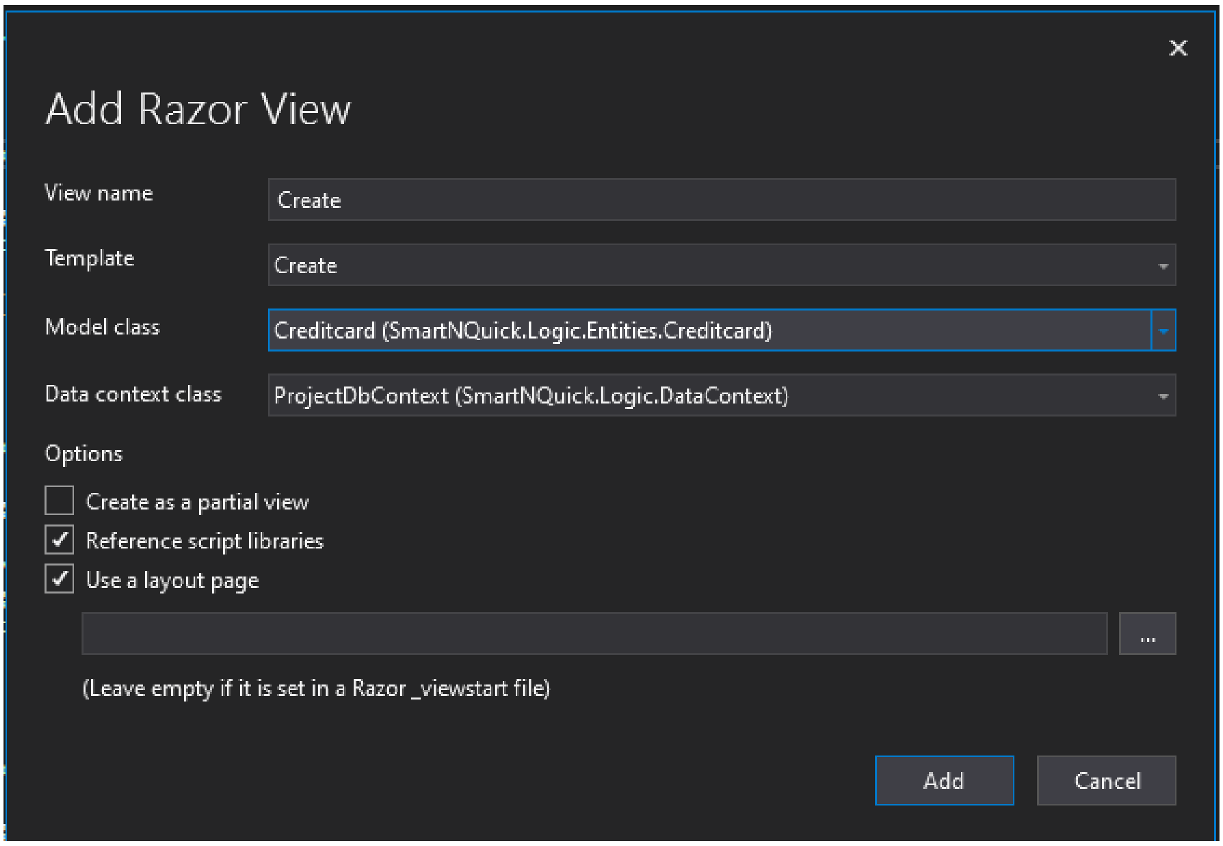


```
[HttpPost]
0 references
public async Task<IActionResult> Update(Creditcard model)
{
    using var ctrl = Logic.Factory.Create<ICreditcard>();
    var entity = await ctrl.GetByIdAsync(model.Id).ConfigureAwait(false);

    if (entity != null)
    {
        entity.CreditcardNumber = model.CreditcardNumber;
        await ctrl.UpdateAsync(entity).ConfigureAwait(false);
        await ctrl.SaveChangesAsync().ConfigureAwait(false);
    }
    return RedirectToAction("Index");
}
[HttpGet]
0 references
public async Task<IActionResult> Delete(int id)
{
    using var ctrl = Logic.Factory.Create<ICreditcard>();
    var entity = await ctrl.GetByIdAsync(id).ConfigureAwait(false);

    return View(ToModel(entity));
}

0 references
public async Task<IActionResult> DeleteEntity(int id)
{
    using var ctrl = Logic.Factory.Create<ICreditcard>();

    await ctrl.DeleteAsync(id).ConfigureAwait(false);
    await ctrl.SaveChangesAsync().ConfigureAwait(false);

    return RedirectToAction("Index");
}
```

Schritt 12:

AspMvc -> Controllers -> <Entity>Controller.cs -> Create() -> rechts klick -> Add View -> Razor View -> Add

bei create nochmal view erstellen! (index) 4.Auswahl als List



Add Razor View

View name: Create

Template: Create

Model class: Creditcard (SmartNQuick.Logic.Entities.Creditcard)

Data context class: ProjectDbContext (SmartNQuick.Logic.DataContext)

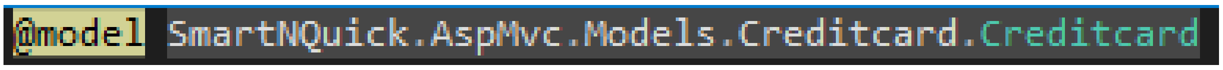
Options

- [ ] Create as a partial view
- [x] Reference script libraries
- [x] Use a layout page

(Leave empty if it is set in a Razor _viewstart file)

Schritt 13:

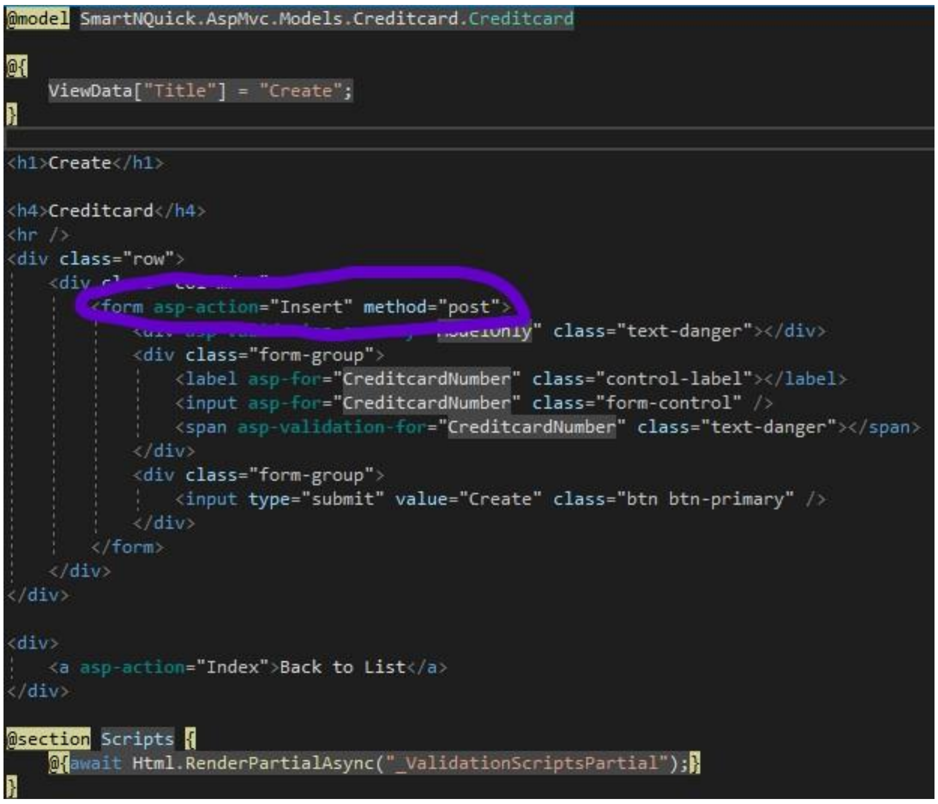
AspMvc -> Views -> in den Entity Ordner gehen (wurde davor erstellt) -> 1. Zeile -> Pfad ändern



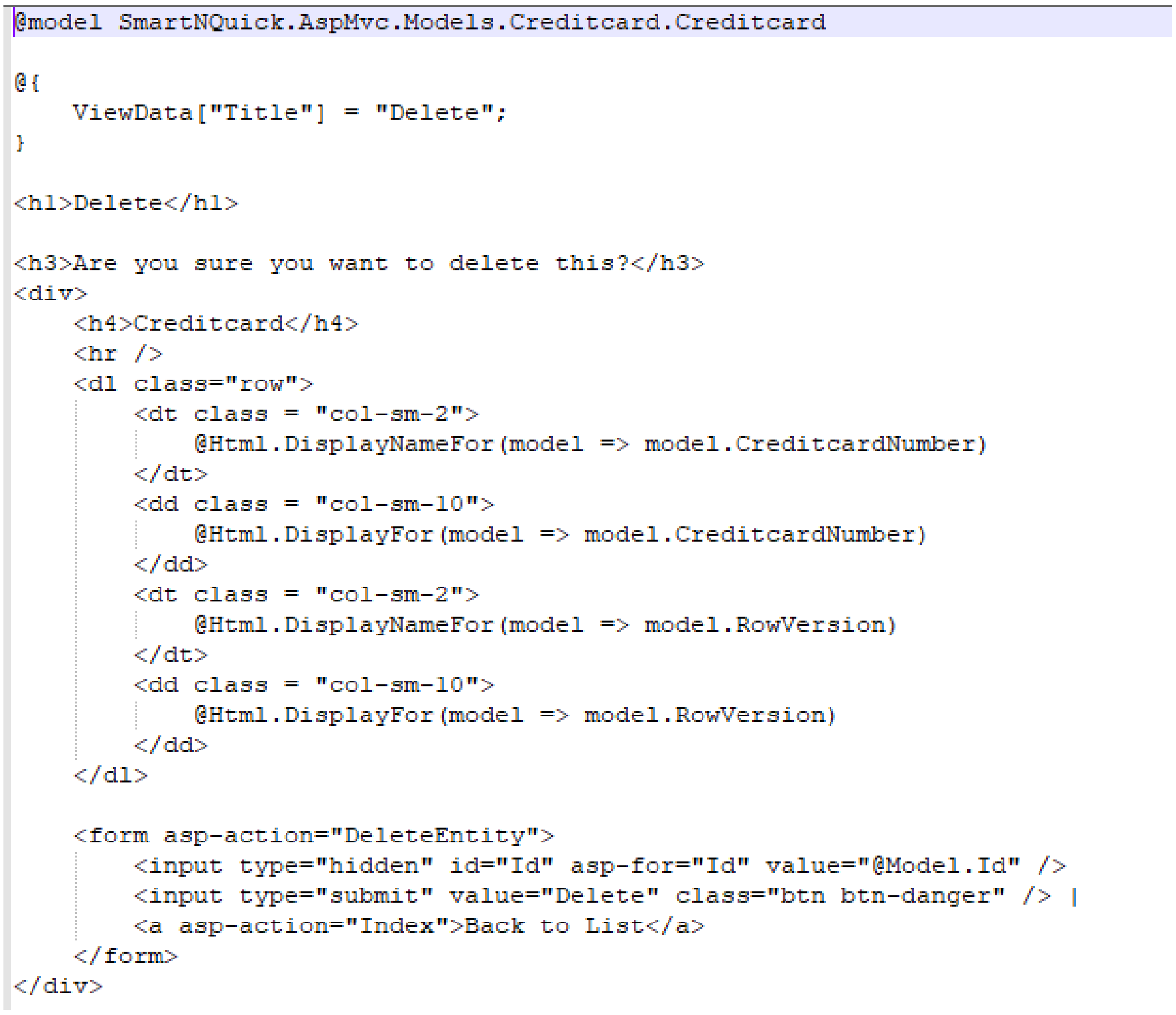
```
@model SmartNQuick.AspMvc.Models.Creditcard.Creditcard
```

Schritt 14:

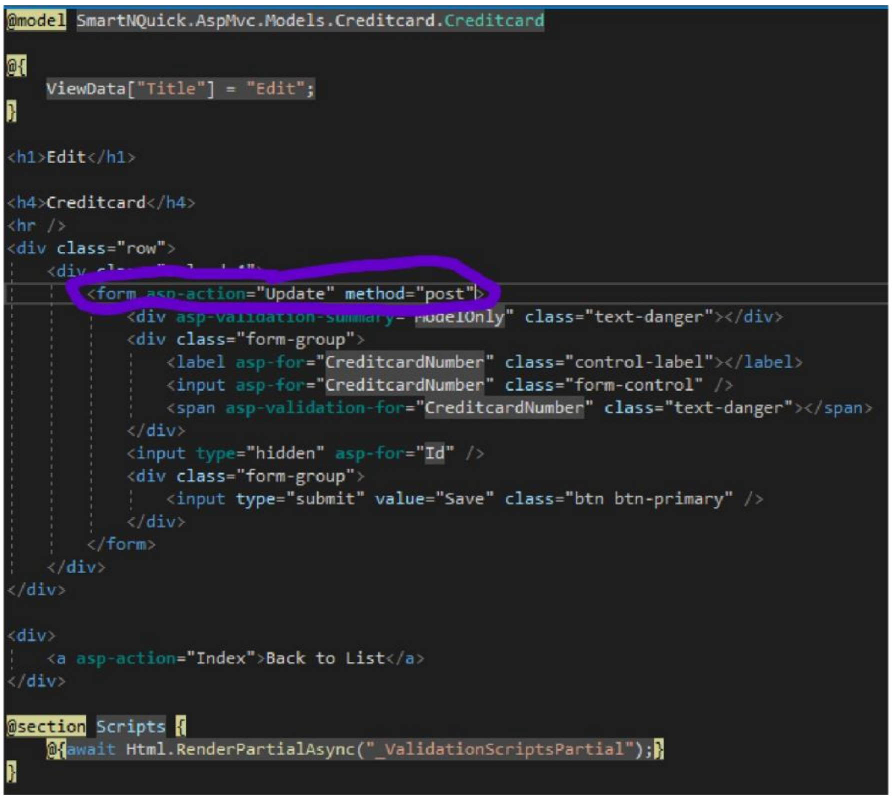
AspMvc -> Views -> in den Entity Ordner gehen (wurde davor erstellt) -> Create/Delete/Edit/Index -> ändern



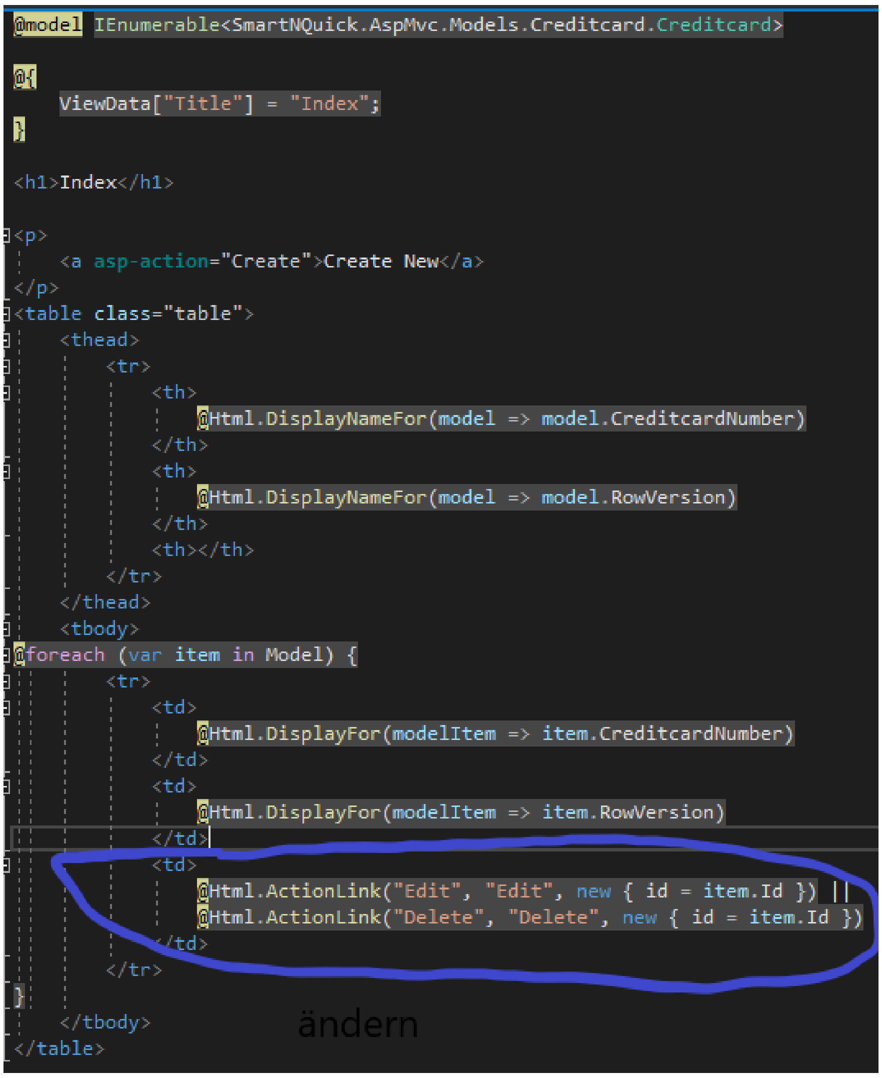
```
@model SmartNQuick.AspMvc.Models.Creditcard.Creditcard

@{
    ViewData["Title"] = "Create";
}

<h1>Create</h1>

<h4>Creditcard</h4>
<hr />
<div class="row">
    <div class="col-md-4">
        <form asp-action="Insert" method="post">
            <div asp-validation-summary="ModelOnly" class="text-danger"></div>
            <div class="form-group">
                <label asp-for="CreditcardNumber" class="control-label"></label>
                <input asp-for="CreditcardNumber" class="form-control" />
                <span asp-validation-for="CreditcardNumber" class="text-danger"></span>
            </div>
            <div class="form-group">
                <input type="submit" value="Create" class="btn btn-primary" />
            </div>
        </form>
    </div>
</div>

<div>
    <a asp-action="Index">Back to List</a>
</div>

@section Scripts {
    @{await Html.RenderPartialAsync("_ValidationScriptsPartial");}
}
```



```
@model SmartNQuick.AspMvc.Models.Creditcard.Creditcard

@{
    ViewData["Title"] = "Delete";
}

<h1>Delete</h1>

<h3>Are you sure you want to delete this?</h3>
<div>
    <h4>Creditcard</h4>
    <hr />
    <dl class="row">
        <dt class = "col-sm-2">
            @Html.DisplayNameFor(model => model.CreditcardNumber)
        </dt>
        <dd class = "col-sm-10">
            @Html.DisplayFor(model => model.CreditcardNumber)
        </dd>
        <dt class = "col-sm-2">
            @Html.DisplayNameFor(model => model.RowVersion)
        </dt>
        <dd class = "col-sm-10">
            @Html.DisplayFor(model => model.RowVersion)
        </dd>
    </dl>

    <form asp-action="DeleteEntity">
        <input type="hidden" id="Id" asp-for="Id" value="@Model.Id" />
        <input type="submit" value="Delete" class="btn btn-danger" /> |
        <a asp-action="Index">Back to List</a>
    </form>
</div>
```



```
@model SmartNQuick.AspMvc.Models.Creditcard.Creditcard

@{
    ViewData["Title"] = "Edit";
}

<h1>Edit</h1>

<h4>Creditcard</h4>
<hr />
<div class="row">
    <div class="col-md-4">
        <form asp-action="Update" method="post">
            <div asp-validation-summary="ModelOnly" class="text-danger"></div>
            <div class="form-group">
                <label asp-for="CreditcardNumber" class="control-label"></label>
                <input asp-for="CreditcardNumber" class="form-control" />
                <span asp-validation-for="CreditcardNumber" class="text-danger"></span>
            </div>
            <input type="hidden" asp-for="Id" />
            <div class="form-group">
                <input type="submit" value="Save" class="btn btn-primary" />
            </div>
        </form>
    </div>
</div>

<div>
    <a asp-action="Index">Back to List</a>
</div>

@section Scripts {
    @{await Html.RenderPartialAsync("_ValidationScriptsPartial");}
}
```

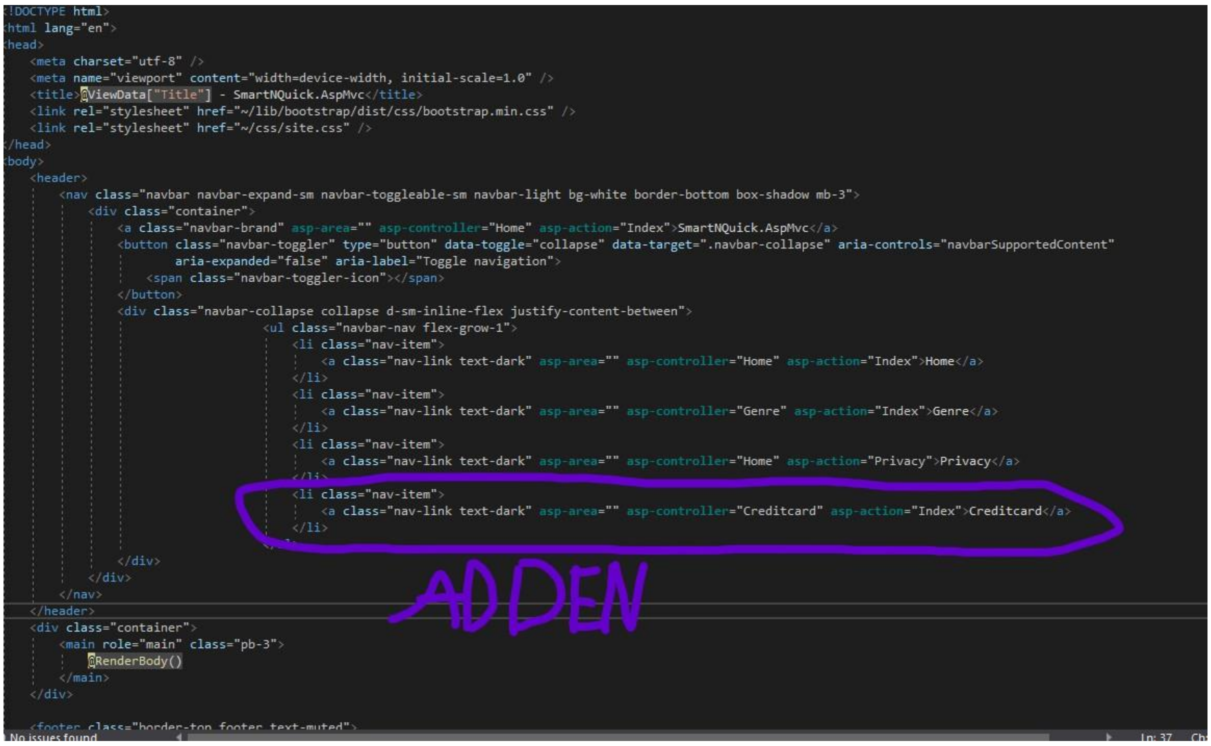


```
@model IEnumerable<SmartNQuick.AspMvc.Models.Creditcard.Creditcard>

@{
    ViewData["Title"] = "Index";
}

<h1>Index</h1>

<p>
    <a asp-action="Create">Create New</a>
</p>
<table class="table">
    <thead>
        <tr>
            <th>
                @Html.DisplayNameFor(model => model.CreditcardNumber)
            </th>
            <th>
                @Html.DisplayNameFor(model => model.RowVersion)
            </th>
            <th></th>
        </tr>
    </thead>
    <tbody>
@foreach (var item in Model) {
        <tr>
            <td>
                @Html.DisplayFor(modelItem => item.CreditcardNumber)
            </td>
            <td>
                @Html.DisplayFor(modelItem => item.RowVersion)
            </td>
            <td>
                @Html.ActionLink("Edit", "Edit", new { id = item.Id }) |
                @Html.ActionLink("Delete", "Delete", new { id = item.Id })
            </td>
        </tr>
}
    </tbody>
</table>
```

ändern

Schritt 15:

AspMvc -> Views -> Shared -> _Layout -> ändern

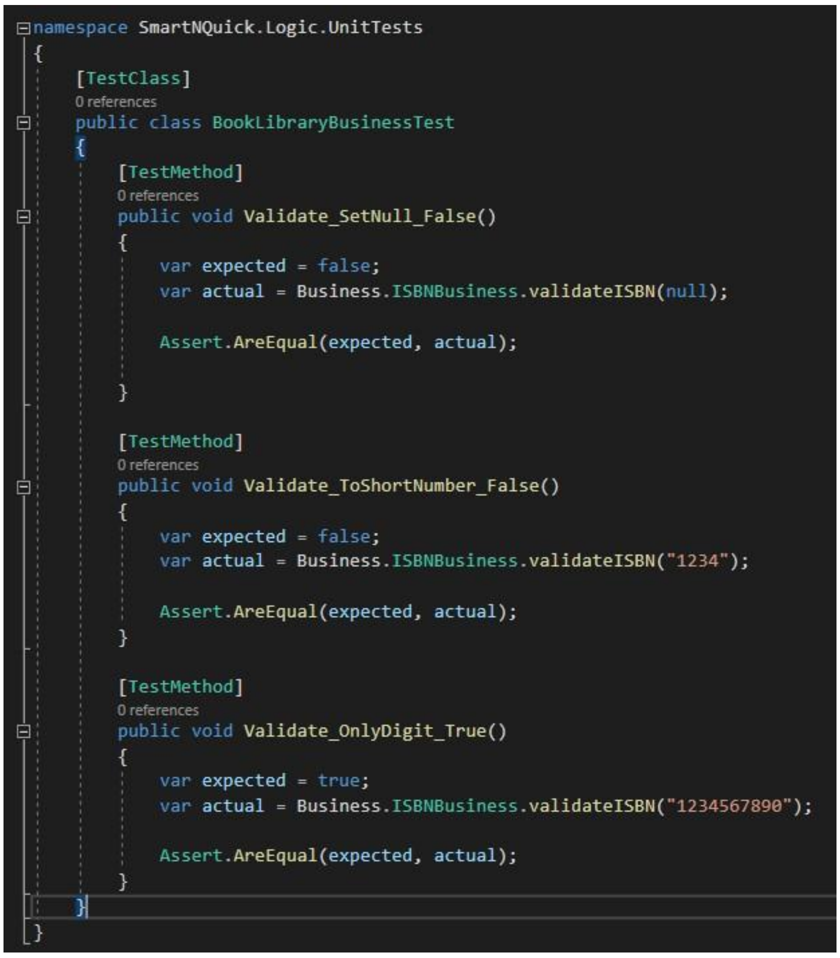


```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>@ViewData["Title"] - SmartNQuick.AspMvc</title>
    <link rel="stylesheet" href="~/lib/bootstrap/dist/css/bootstrap.min.css" />
    <link rel="stylesheet" href="~/css/site.css" />
</head>
<body>
    <header>
        <nav class="navbar navbar-expand-sm navbar-toggleable-sm navbar-light bg-white border-bottom box-shadow mb-3">
            <div class="container">
                <a class="navbar-brand" asp-area="" asp-controller="Home" asp-action="Index">SmartNQuick.AspMvc</a>
                <button class="navbar-toggler" type="button" data-toggle="collapse" data-target=".navbar-collapse" aria-controls="navbarSupportedContent"
                        aria-expanded="false" aria-label="Toggle navigation">
                    <span class="navbar-toggler-icon"></span>
                </button>
                <div class="navbar-collapse collapse d-sm-inline-flex justify-content-between">
                                    <ul class="navbar-nav flex-grow-1">
                                        <li class="nav-item">
                                            <a class="nav-link text-dark" asp-area="" asp-controller="Home" asp-action="Index">Home</a>
                                        </li>
                                        <li class="nav-item">
                                            <a class="nav-link text-dark" asp-area="" asp-controller="Genre" asp-action="Index">Genre</a>
                                        </li>
                                        <li class="nav-item">
                                            <a class="nav-link text-dark" asp-area="" asp-controller="Home" asp-action="Privacy">Privacy</a>
                                        </li>
                                        <li class="nav-item">
                                            <a class="nav-link text-dark" asp-area="" asp-controller="Creditcard" asp-action="Index">Creditcard</a>
                                        </li>
                </div>
            </div>
        </nav>
    </header>
    <div class="container">
        <main role="main" class="pb-3">
            @RenderBody()
        </main>
    </div>

    <footer class="border-top footer text-muted">
```

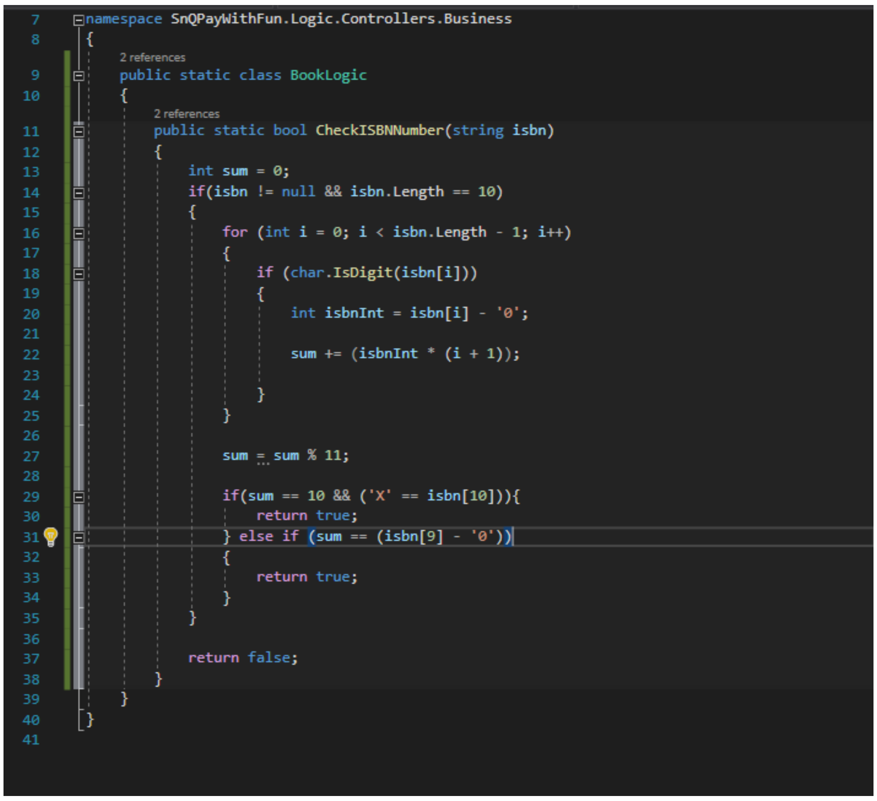
No issues found   Ln: 37

Schritt 16:

Neues Projekt -> Unit Test Project (.NET Core) -> Klasse erstellen



```csharp
namespace SmartNQuick.Logic.UnitTests
{
    [TestClass]
    0 references
    public class BookLibraryBusinessTest
    {
        [TestMethod]
        0 references
        public void Validate_SetNull_False()
        {
            var expected = false;
            var actual = Business.ISBNBusiness.validateISBN(null);

            Assert.AreEqual(expected, actual);

        }

        [TestMethod]
        0 references
        public void Validate_ToShortNumber_False()
        {
            var expected = false;
            var actual = Business.ISBNBusiness.validateISBN("1234");

            Assert.AreEqual(expected, actual);
        }

        [TestMethod]
        0 references
        public void Validate_OnlyDigit_True()
        {
            var expected = true;
            var actual = Business.ISBNBusiness.validateISBN("1234567890");

            Assert.AreEqual(expected, actual);
        }
    }
}
```



```
namespace SnQPayWithFun.Logic.Controllers.Business
{
    2 references
    public static class BookLogic
    {
        2 references
        public static bool CheckISBNNumber(string isbn)
        {
            int sum = 0;
            if(isbn != null && isbn.Length == 10)
            {
                for (int i = 0; i < isbn.Length - 1; i++)
                {
                    if (char.IsDigit(isbn[i]))
                    {
                        int isbnInt = isbn[i] - '0';

                        sum += (isbnInt * (i + 1));

                    }
                }

                sum = sum % 11;

                if(sum == 10 && ('X' == isbn[10])){
                    return true;
                } else if (sum == (isbn[9] - '0'))
                {
                    return true;
                }
            }

            return false;
        }
    }
}
```

Unit Test:

```
private static SnQPayWithFun.Contracts.Client.IControllerAccess<IBook> CreateControlle
        {
            return SnQPayWithFun.Logic.Factory.Create<IBook>();
        }
        private static async void DeleteAllBooksAsync()
        {
            using var ctrl = CreateController();

            foreach (var item in await ctrl.GetAllAsync())
            {
                await ctrl.DeleteAsync(item.Id);
            }

            await ctrl.SaveChangesAsync();
        }

        [ClassInitialize]
        public static void ClassInitialize(TestContext testcontent)
        {
            DeleteAllBooksAsync();

        }

        [ClassCleanup]
        public static void ClassCleanup()
        {
            DeleteAllBooksAsync();
        }

        [TestInitialize]
        public void InitDatabase()
        {

        }

        [TestCleanup]
        public void Cleanup()
        {

        }
```

```
[TestMethod]
public void Create_NoneRequirments_Result()
{
    Task.Run(async () =>
    {
        using var ctrl = CreateController();

        var entity = await ctrl.CreateAsync();

        Assert.IsNotNull(entity);
    }).Wait();
}

[TestMethod]
public void Insert_WithValidISBN_ResultPersistenceEntity()
{
    IBook expected = null;
    string expectedISBN = null;

    Task.Run(async () =>
    {
        using var ctrl = CreateController();
        var entity = await ctrl.CreateAsync();

        expectedISBN = "0471190470";
        entity.ISBNNumber = expectedISBN;
        expected = await ctrl.InsertAsync(entity);
        await ctrl.SaveChangesAsync();
    }).Wait();

    Assert.IsNotNull(expected);
    Assert.AreNotEqual(0, expected.Id);
    Assert.AreEqual(expected.ISBNNumber, expectedISBN);
}

[TestMethod]
[ExpectedException(typeof(ArgumentException))]
public async Task Insert_WithInvalidISBN_ResultPersistenceEntity()
{
    IBook expected = null;
    string expectedISBN = null;

    using var ctrl = CreateController();
    var entity = await ctrl.CreateAsync();

    expectedISBN = "0471290470";
    entity.ISBNNumber = expectedISBN;
    expected = await ctrl.InsertAsync(entity);
    await ctrl.SaveChangesAsync();


}
```

```
    [TestMethod]
    public void Edit_ValidChange_ResultPersistenceEntity()
    {
        IBook expected = null;
        IBook expectedISBN = null;
        string insertedISBN = null;
        IBook getByIdItem = null;

        Task.Run(async () =>
        {
            using var ctrl = CreateController();
            var entity = await ctrl.CreateAsync();

            insertedISBN = "0471190470";
            entity.ISBNNumber = insertedISBN;
            var inserted = await ctrl.InsertAsync(entity);
            await ctrl.SaveChangesAsync();


            getByIdItem = await ctrl.GetByIdAsync(inserted.Id);

            if(getByIdItem != null)
            {
                string newISBN = "2231694166";
                getByIdItem.ISBNNumber = newISBN;
                await ctrl.UpdateAsync(getByIdItem);
                await ctrl.SaveChangesAsync();
            }

            expectedISBN = await ctrl.GetByIdAsync(getByIdItem.Id);

        }).Wait();

        Assert.IsNotNull(expectedISBN);
        Assert.AreNotEqual(0, expectedISBN.Id);
        Assert.AreNotEqual(expectedISBN.ISBNNumber, insertedISBN);
    }


    [TestMethod]
    [ExpectedException(typeof(ArgumentException))]
    public async Task Edit_InvalidChange_ResultPersistenceEntity()
    {
        IBook expected = null;
        IBook expectedISBN = null;
        string insertedISBN = null;
        IBook getByIdItem = null;


        using var ctrl = CreateController();
        var entity = await ctrl.CreateAsync();

        insertedISBN = "0471190470";
        entity.ISBNNumber = insertedISBN;
        var inserted = await ctrl.InsertAsync(entity);
        await ctrl.SaveChangesAsync();


        getByIdItem = await ctrl.GetByIdAsync(inserted.Id);

        if (getByIdItem != null)
        {
            string newISBN = "1231694166";
            getByIdItem.ISBNNumber = newISBN;
            await ctrl.UpdateAsync(getByIdItem);
            await ctrl.SaveChangesAsync();
        }

        expectedISBN = await ctrl.GetByIdAsync(getByIdItem.Id);
    }
}
```