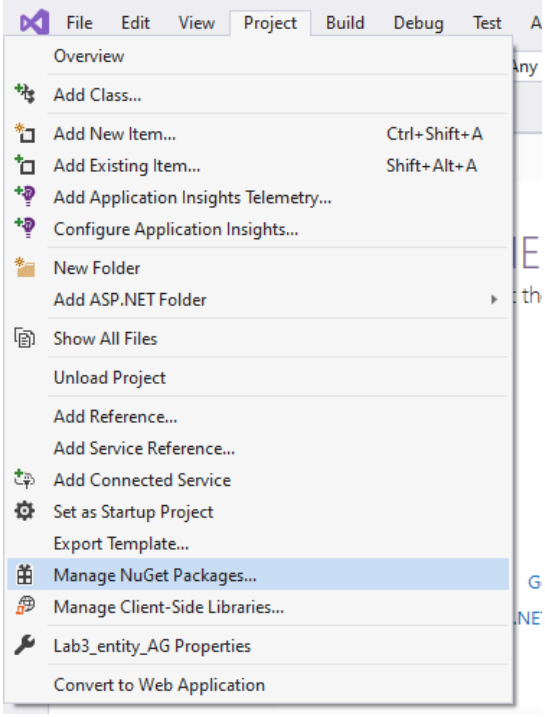
Laboratorul 3

Exercitiul 1

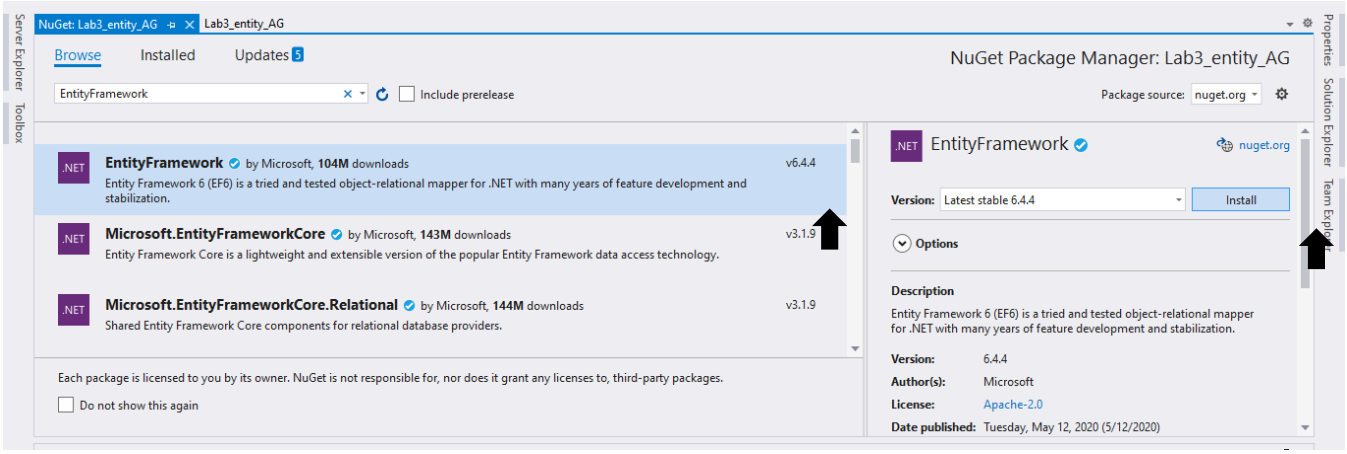
Implementati exemplul din curs. Observati comportamentul diferitelor strategii de initializare. (Creati in initializatorul personalizat o linie de tabel cu data si timpul curente pentru a putea determina momentul recrearii bazei de date). Examinati structura bazei de date in Server Explorer.

EntityFramework

Mai intai trebuie sa adaugam EntityFramework proiectului nostru. Mergeti la Project -> Manage NuGet Packages

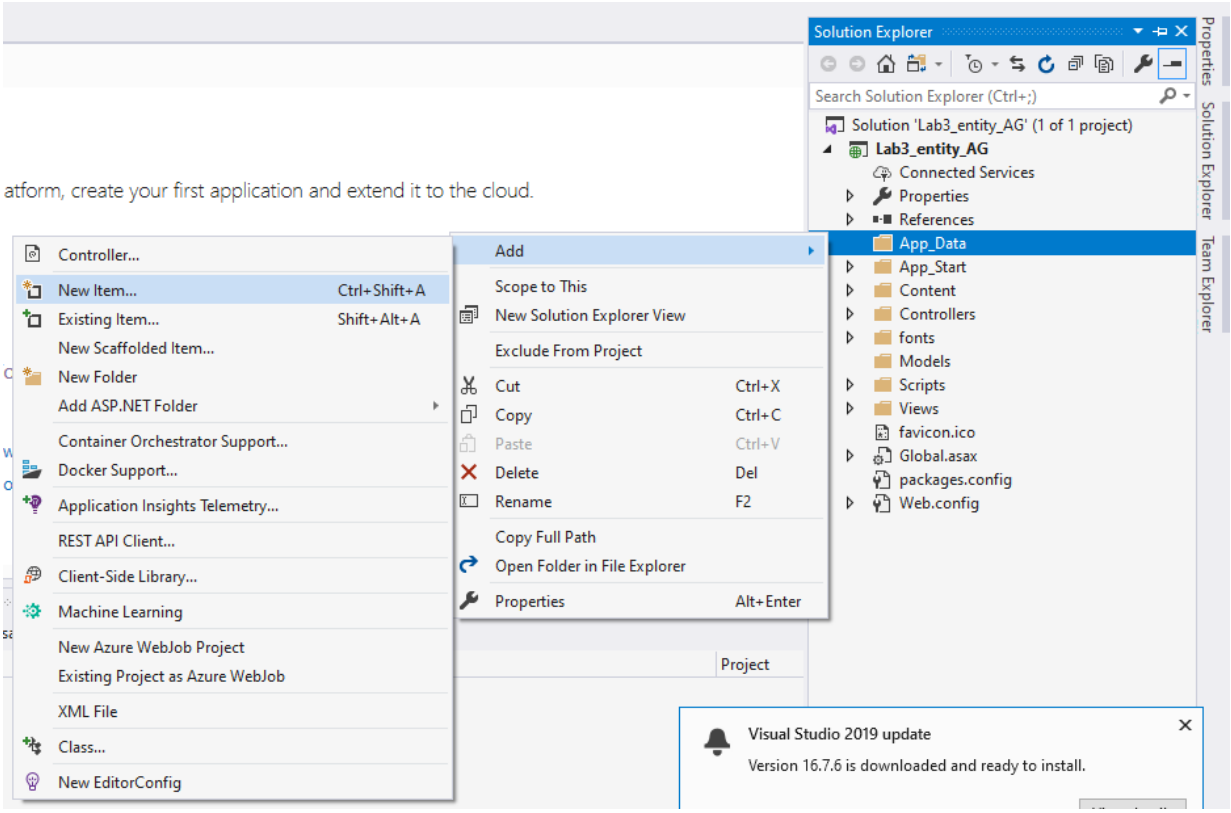


In Browse scrieti “Entity Framework” si apasati pe Install.

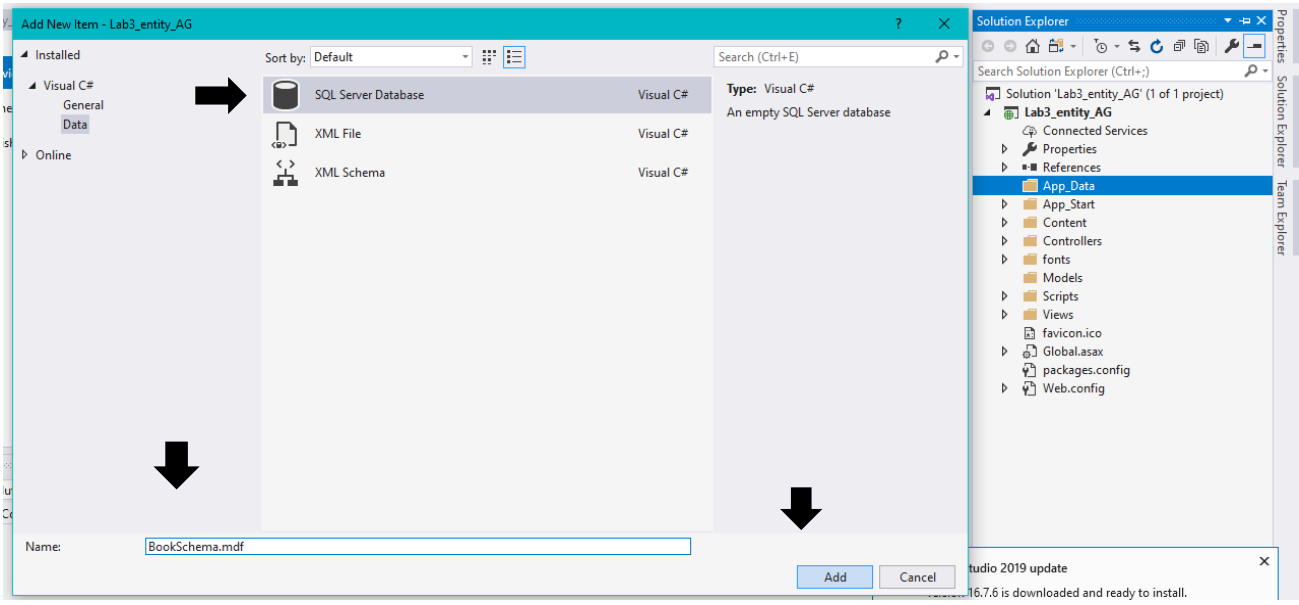


Crearea Bazei de Date

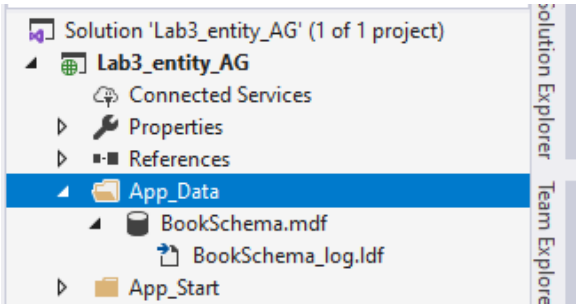
Click dreapta pe directorul App_Data -> Add -> New Item.



Selectati SQL Server Database, **introduceti un nume bazei de date** si apoi apasati pe **Add**.



Observati ca se va crea un fisier cu extensia .mdf.



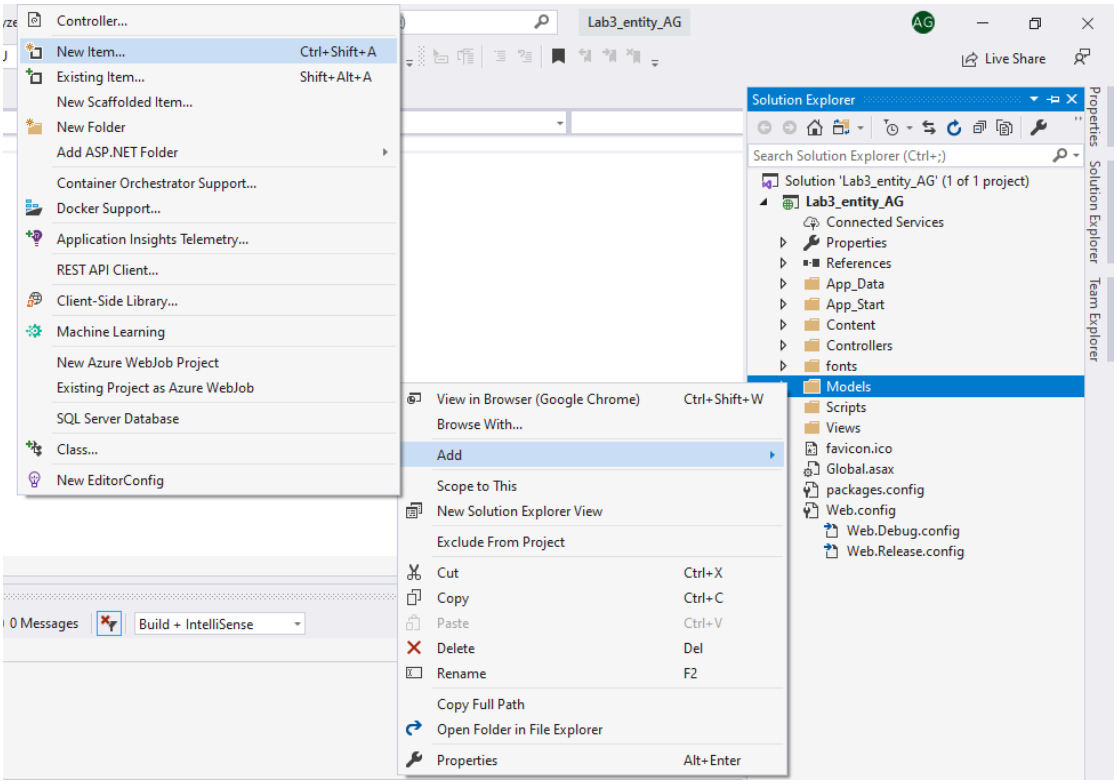
Pentru a accesa baza de date nou-creata trebuie definiti un **Connection String** in fisierul Web.config, inainte de </configuration> astfel:

```
  <connectionStrings>
    <add name="DbConnectionString" providerName="System.Data.SqlClient" connectionString="Data
Source=(LocalDB)\MSSQLLocalDB;AttachDbFilename='C:\...\App_Data\BookSchema.mdf';Integrated
Security=True"/>
  </connectionStrings>
```

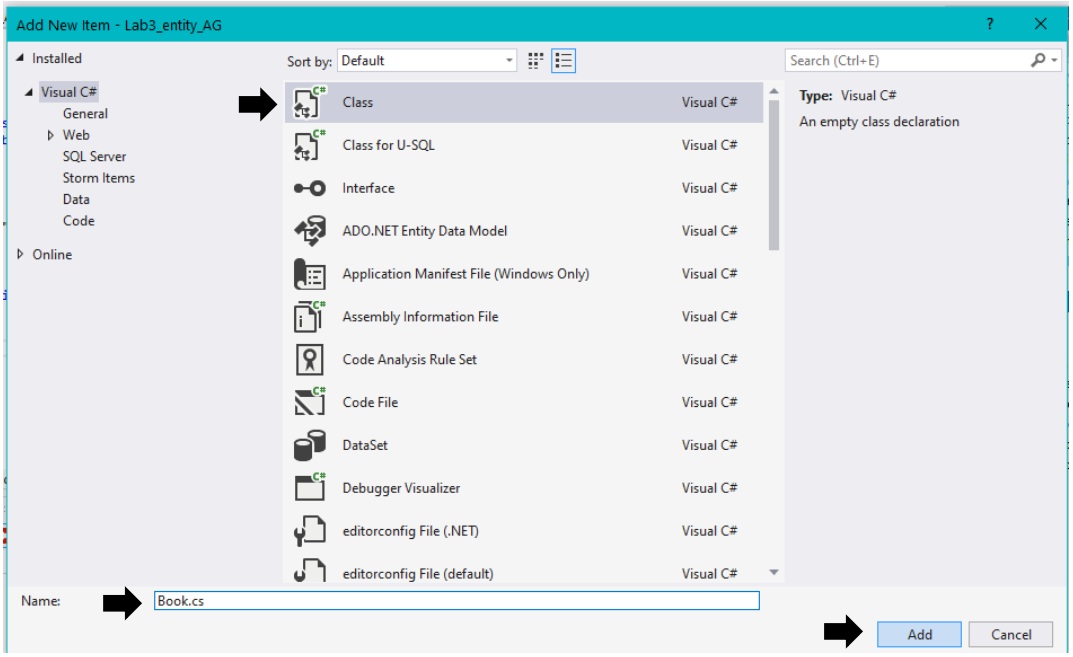
Puteti prelua connectionString-ul vostru din **Server Explorer** -> **click dreapta pe baza de date** -> **Properties** -> **copiati ce scrie la ConnectionString**.

Crearea Modelelor

Acum vom scrie clasa-model ce reprezinta tipurile de date corespunzatoare tabelelor. In directorul **Models -> Add -> New Item**



Selectati **Class** si **introduceti un nume sugestiv** pentru clasa voastra (ex: Book).



Introduceti urmatoarea secventa de cod:

```
public class Book
{
    public int BookId { get; set; }
    public string Title { get; set; }
    public string Author { get; set; }
}
```

Tipuri de atribute pentru BD:

- [Table("NumeTabel")]
- [Column("Name")]
- [Key]
- [NotMapped]
- [Required]
- [MinLength]
- [MaxLength]

Pentru a descrie structura bazei de date, vom crea o noua clasa (in acelasi fisier Book.cs), numita clasa context, ce va mosteni DbContext (clasa aflata in **System.Data.Entity**, asadar vom adauga o directiva corespunzatoare prin cuvantul cheie **using**).

```
namespace Lab3_entity_AG.Models
{
    public class Book
    {
        public int BookId { get; set; }
        public string Title { get; set; }
        public string Author { get; set; }
    }

    public class DbCtx : DbContext
    {
        public DbCtx() : base("DbConnectionString")
```

```
        {
            // set the initializer here
            Database.SetInitializer<DbCtx>(new Initp());
             //Database.SetInitializer<DbCtx>(new CreateDatabaseIfNotExists<DbCtx>());
            //Database.SetInitializer<DbCtx>(new DropCreateDatabaseIfModelChanges<DbCtx>());
            //Database.SetInitializer<DbCtx>(new DropCreateDatabaseAlways<DbCtx>());
        }
        public DbSet<Book> Books { get; set; }
    }
}
```

Constructorul clasei DbCtx apeleaza **constructorul clasei de baza**, si anume DbContext, cu un singur parametru. Acest parametru este un **string** ce **reprezinta numele connectionString-ului** si are rolul de a conecta clasa la baza de date corecta **!!!**

Clasa DbCtx contine si proprietatea **DbSet<T>** ce va reprezenta tabelul bazei de date ce se va numi "Books". T reprezinta tipul de obiect stocat in tabelul respectiv.

⚠ Deci, in baza de date se va crea o tabelul Books corespunzator clasei Book, iar coloanele tabelului vor fi reprezentate de campurile clasei Book.

⚠ Nu putem avea mai mult de un tabel de un anumit tip de date.

⚠Daca nu adaugati DropCreateDatabaseIfModelChanges si modificati o clasa-model, programul ne va da eroare deoarece trebuie modificata si structura bazei de date.

Exista mai multe strategii de initializare a bazei de date:

- `CreateDatabaseIfNotExists`
- `DropCreateDatabaseIfModelChanges`
- `DropCreateDatabaseAlways`
- `Initializare personalizata`

Vom incepe prin a crea o initializare personalizata:

```
public class Initp : DropCreateDatabaseAlways<DbCtx>
{   // custom initializer
    protected override void Seed (DbCtx ctx)
    {
        ctx.Books.Add(new Book { Title = "The Atomic Times", Author = "Michael Harris"});
        ctx.Books.Add(new Book { Title = "In Defense of Elitism", Author = "Joel Stein"});
        ctx.Books.Add(new Book { Title = "Data curenta", Author = DateTime.Now.ToString() });
        ctx.SaveChanges();
        base.Seed(ctx);
    }
}
```

Pentru crearea unei initializari a bazei de date personalizate trebuie mostenit un tip de initializator deja existent, in cazul de fata am ales **`DropCreateDatabaseAlways`**.Initializatorul bazei de date poate fi setat si din fisierul de configurare **app.config.** Pentru mai multe detalii consultati documentatia: https://www.entityframeworktutorial.net/code-first/database-initialization-strategy-in-code-first.aspx

Exercitiul 2

Creati o actiune noua cu un parametru id unde view-ul afiseaza detaliile cartii care are acel numar drept BookId. In view-ul corespunzator actiunii ce enumera toate cartile, creati cu Razor pentru fiecare carte un link catre pagina cu detalii.

Crearea Controller-ului

Creati controller-ul BookController.cs si introduceti urmatoarea secventa de cod

```
namespace Lab3_entity_AG.Controllers
{
    public class BookController : Controller
    {
        private DbCtx db = new DbCtx();

        // GET: Book
        public ActionResult Index()
        {
            List<Book> books = db.Books.ToList();
            ViewBag.Books = books;

            return View();
        }
    }
}
```

Crearea view-lui

In **Views -> Book -> Index.cshtml**

```
@{
    ViewBag.Title = "Books saved";
}


<h2>@ViewBag.Title</h2>

@if (ViewBag.Books != null)
{
    foreach (var book in ViewBag.Books)
    {
        <div class="panel-body">
            @Html.Label("Title", "Title:")
            <br />
            <p>@book.Title</p>

            @Html.Label("Author", "Author:")
            <br />
            <p>@book.Author</p>

            @using (Html.BeginForm(actionName: "Details", controllerName: "Book", method: FormMethod.Get,
routeValues: new { id = book.BookId }))
            {
                <button style="margin-right:5px" class="btn btn-primary col-lg-1"
type="submit">Summary</button>
            }

            @Html.HttpMethodOverride(HttpVerbs.Put)
            @using (Html.BeginForm(actionName: "Edit", controllerName: "Book", method: FormMethod.Get,
routeValues: new { id = book.BookId }))
            {
                <button style="margin-left:5px" class="btn btn-primary col-lg-1"
type="submit">Edit</button>
            }
        </div>
    }
}
else
{
    @Html.Display("No books to show!")
}
```

Exercitiul 3

In clasa Book, creati un nou camp Summary ce va reprezenta rezumatul unei carti. Pe pagina cu detalii despre o carte, afisati, pe langa informatiile existente:

- Summary: urmat de continutul campului, in cazul in care este nevid
- un mesaj de informare, in cazul in care este vid

Modificare Book.cs

Adaugati in clasa Book urmatorul camp

```
public string Summary { get; set; }
```

Modificare BookController.cs

Adaugati in controller actiunea **Details**

```
        public ActionResult Details(int? id)
        {
            if (id.HasValue)
            {
                Book book = db.Books.Find(id);
                if (book != null)
                {
                    return View(book);
                }
                return HttpNotFound("Couldn't find the book with id " + id.ToString() + "!");
            }
            return HttpNotFound("Missing book id parameter!");
        }
```

Creare Details.cshtml

In **Views -> Book** creati view-ul **Details.cshtml**.

```
@model Lab3_entity_AG.Models.Book

@{
    ViewBag.Title = "Details";
}

<h2>@Model.Title</h2>

@Html.Label("Author", "Author:")
<br />
<p>@Model.Author</p>

@Html.Label("Summary", "Summary:")
<br/>

<div class="panel-body">
    @if (Model.Summary.IsEmpty())
    {
        <p>This book has no summary to print.</p>
    }
    else
    {
        <p>@Model.Summary</p>
    }
</div>
```

Aici trebuie sa puneti numele proiectului vostru

Cod razor pentru tag-ul html <label> care specifica si textul label-ului, ex “Author:”.Este echivalentul lui <label for=”Author”>Author:</label> in HTML.

Afiseaza valoarea campului Author ale modelului Book

Exercitiul 4

Creati o clasa noua numita Publisher. Implementati, pe rand, relatii one-to-one, many-to-many, one-to-many intre ea si Book. Examinati structura bazei de date in Server Explorer.

Exemplu One to Many: https://www.entityframeworktutorial.net/code-first/configure-one-to-many-relationship-in-code-first.aspx

Exemplu Many to Many: https://www.entityframeworktutorial.net/code-first/configure-many-to-many-relationship-in-code-first.aspx

Exemplu One to One: https://www.entityframeworktutorial.net/code-first/configure-one-to-one-relationship-in-code-first.aspx

- Comentare cod **html**: <!-- comentariu -->
- Comentare cod **razor**: @* comentariu *@

Pentru restul codului mergeti la sectiunea "Cod".

Cod

Models

Book.cs

```
using System;
using System.Collections.Generic;
using System.ComponentModel.DataAnnotations;
using System.Data.Entity;
using System.Linq;
using System.Web;

namespace lab3_entity.Models
{
    public class Book
    {
        [Key]
        public int BookId { get; set; }
        public string Title { get; set; }
        public string Author { get; set; }
        public string Summary { get; set; }

        // one-to-many relationship
        public int PublisherId { get; set; }
        public virtual Publisher Publisher { get; set; }
        public virtual ICollection<Genre> Genres { get; set; }
    }

    public class DbCtx : DbContext
    {
        public DbCtx() : base("DbConnectionString")
        {
            // set the initializer here
            Database.SetInitializer<DbCtx>(new Initp());
            //Database.SetInitializer<DbCtx>(new CreateDatabaseIfNotExists<DbCtx>());
            //Database.SetInitializer<DbCtx>(new DropCreateDatabaseIfModelChanges<DbCtx>());
            //Database.SetInitializer<DbCtx>(new DropCreateDatabaseAlways<DbCtx>());
        }

        // link Book and Publisher models to the DB (create tabels in the databse for the specified
models)
        public DbSet<Book> Books { get; set; }
```

```
        public DbSet<Publisher> Publishers { get; set; }
        public DbSet<Genre> Genres { get; set; }
        public DbSet<ContactInfo> ContactsInfo { get; set; }
    }

    public class Initp : DropCreateDatabaseAlways<DbCtx>
    {   // custom initializer
        protected override void Seed(DbCtx ctx)
        {
            ctx.Books.Add(new Book
            {
                Title = "The Atomic Times",
                Author = "Michael Harris",
                Publisher = new Publisher { Name = "HarperCollins", ContactInfo = new ContactInfo {
PhoneNumber = "07123456789"} },
                Genres = new List<Genre> {
                    new Genre { Name = "Horror"}
                }
            });
            ctx.Books.Add(new Book
            {
                Title = "In Defense of Elitism",
                Author = "Joel Stein",
                Publisher = new Publisher { Name = "Macmillan Publishers", ContactInfo = new ContactInfo {
PhoneNumber = "07123458789" } },
                Genres = new List<Genre> {
                    new Genre { Name = "Humor"}
                }
            });
            ctx.Books.Add(new Book
            {
                Title = "The Canterbury Tales",
                Author = "Geoffrey Chaucer",
                Summary = "At the Tabard Inn, a tavern in Southwark, near London, the narrator joins a
company of twenty-nine pilgrims. The pilgrims, like the narrator, are traveling to the shrine of the
martyr Saint Thomas Becket in Canterbury. The narrator gives a descriptive account of twenty-seven of
these pilgrims, including a Knight, Squire, Yeoman, Prioress, Monk, Friar, Merchant, Clerk, Man of Law,
Franklin, Haberdasher, Carpenter, Weaver, Dyer, Tapestry-Weaver, Cook, Shipman, Physician, Wife, Parson,
Plowman, Miller, Manciple, Reeve, Summoner, Pardoner, and Host. (He does not describe the Second Nun or
the Nun’s Priest, although both characters appear later in the book.) The Host, whose name, we find out in
the Prologue to the Cook’s Tale, is Harry Bailey, suggests that the group ride together and entertain one
another with stories. He decides that each pilgrim will tell two stories on the way to Canterbury and two
on the way back. Whomever he judges to be the best storyteller will receive a meal at Bailey’s tavern,
courtesy of the other pilgrims. The pilgrims draw lots and determine that the Knight will tell the first
tale.",
                Publisher = new Publisher { Name = "Scholastic", ContactInfo = new ContactInfo {
PhoneNumber = "07113456789" } },
                Genres = new List<Genre> {
                    new Genre { Name = "Satire"},
                    new Genre { Name = "Fabilau"},
                    new Genre { Name = "Allegory"},
                    new Genre { Name = "Burlesque"}
                }
            });
            ctx.Books.Add(new Book
            {
                Title = "Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction to
Programming",
                Author = "Eric Matthers",
                Publisher = new Publisher { Name = "Schol", ContactInfo = new ContactInfo { PhoneNumber =
"07126656789" } },
                Genres = new List<Genre> {
                    new Genre { Name = "Programming"}
                }
            });
            //ctx.Books.Add(new Book { Title = "Data curenta", Author =
DateTime.Now.ToString() });
            ctx.SaveChanges();
            base.Seed(ctx);
```

Lasati aceasta linie comentata!!! Daca o decomentati veti avea o eroare de BD deoarece Book trebuie sa aibe cel mult un obiect de tipul Publisher

```
        }
    }
}
```

Publisher.cs

```
using System;
using System.Collections.Generic;
using System.ComponentModel.DataAnnotations;
using System.ComponentModel.DataAnnotations.Schema;
using System.Linq;
using System.Web;

namespace lab3_entity.Models
{
    public class Publisher
    {
        [Key]
        public int PublisherId { get; set; }
        public string Name { get; set; }

        // many-to-one relationship
        public virtual ICollection<Book> Books { get; set; }
        // one-to one-relationship
        [Required]
        public virtual ContactInfo ContactInfo { get; set; }

    }
}
```

Este foarte important ca in clasa Publisher pe campul ContactInfo sau in clasa ContactInfo pe campul Publisher sa puneti atributul [Required] !!!

Genre.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;

namespace lab3_entity.Models
{
    public class Genre
    {
        [Key]
        public int GenreId { get; set; }
        public string Name { get; set; }

        // many-to-many relationship
        public virtual ICollection<Book> books { get; set; }
    }
}
```

ContactInfo.cs

```
using System;
using System.Collections.Generic;
using System.ComponentModel.DataAnnotations;
using System.Linq;
using System.Web;

namespace lab3_entity.Models
{
    public class ContactInfo
    {
        [Key]
        public int ContactInfoId { get; set; }
        public string PhoneNumber { get; set; }
```

```
        // one-to one-relationship
        public virtual Publisher Publisher { get; set; }
    }
}
```

Controller

BookController

```
using lab3_entity.Models;
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.Mvc;

namespace lab3_entity.Controllers
{
    public class BookController : Controller
    {
        private DbCtx db = new DbCtx();

        [HttpGet]
        public ActionResult Index()
        {
            List<Book> books = db.Books.Include("Publisher").ToList();
            ViewBag.Books = books;

            return View();
        }

        [HttpGet]
        public ActionResult Details(int? id)
        {
            if (id.HasValue)
            {
                Book book = db.Books.Find(id);
                if (book != null)
                {
                    return View(book);
                }
                return HttpNotFound("Couldn't find the book with id " + id.ToString() + "!");
            }
            return HttpNotFound("Missing book id parameter!");
        }
    }
}
```

Views

Detials.cshtml

```
@model lab3_entity.Models.Book
@{
    ViewBag.Title = "Details";
}
<h2>@Model.Title</h2>

@Html.Label("Author", "Author:")
<br />
<p>@Model.Author</p>

@if (Model.Publisher != null)
{
    @Html.Label("Publisher", "Publisher:")
    <br />
```

```
    <p>@Model.Publisher.Name</p>

    @Html.Label("Publisher", "ContactInfo:")
    <br />
    <p>@Model.Publisher.ContactInfo.PhoneNumber</p>
}


@if (Model.Genres.Count > 0)
{
    @Html.Label("Genres", "Genres:")
    <br />
    <ul>
        @foreach (var genre in Model.Genres)
        {
            <li>@genre.Name</li>
        }
    </ul>
}


@Html.Label("Summary", "Summary:")
<br />
<div class="panel-body">
    @if (Model.Summary.IsEmpty())
    {
        <p>This book has no summary to print.</p>
    }
    else
    {
        <p>@Model.Summary</p>
    }
</div>
```

Index.cshtml

```
@{
    ViewBag.Title = "Books";
}


<h2>@ViewBag.Title</h2>

@if (ViewBag.Books != null)
{
    foreach (var book in ViewBag.Books)
    {
        <div class="panel-body">
            @Html.Label("Title", "Title:")
            <br />
            <p>@book.Title</p>

            @Html.Label("Author", "Author:")
            <br />
            <p>@book.Author</p>

            @using (Html.BeginForm(actionName: "Details", controllerName: "Book", method: FormMethod.Get,
routeValues: new { id = book.BookId }))
            {
                <button style="margin-right:5px" class="btn btn-primary col-lg-1"
type="submit">Summary</button>
            }
        </div>
    }
}
else
{
    @Html.Display("No books to show!")
}
```