Развој на серверски WEB апликации

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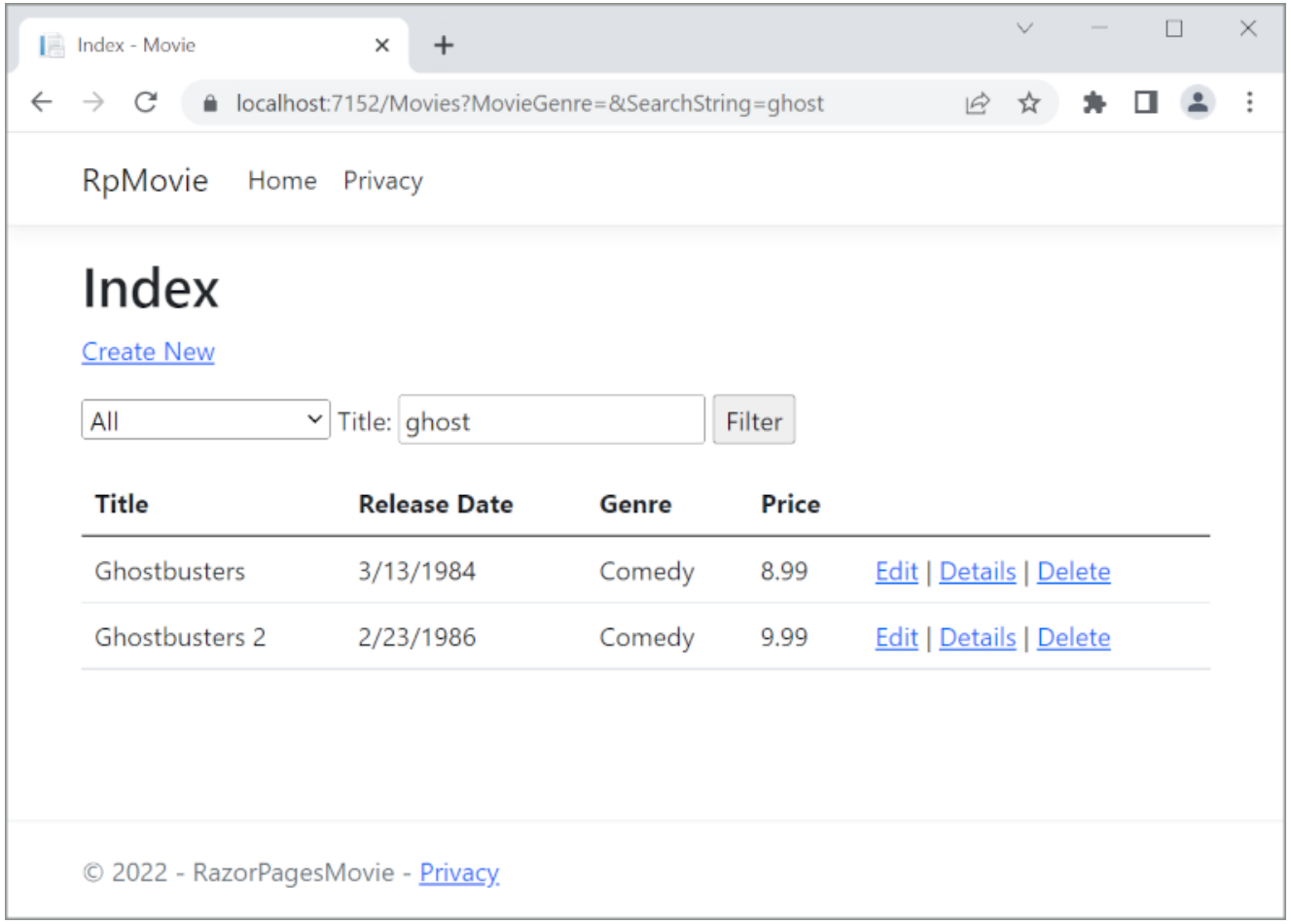
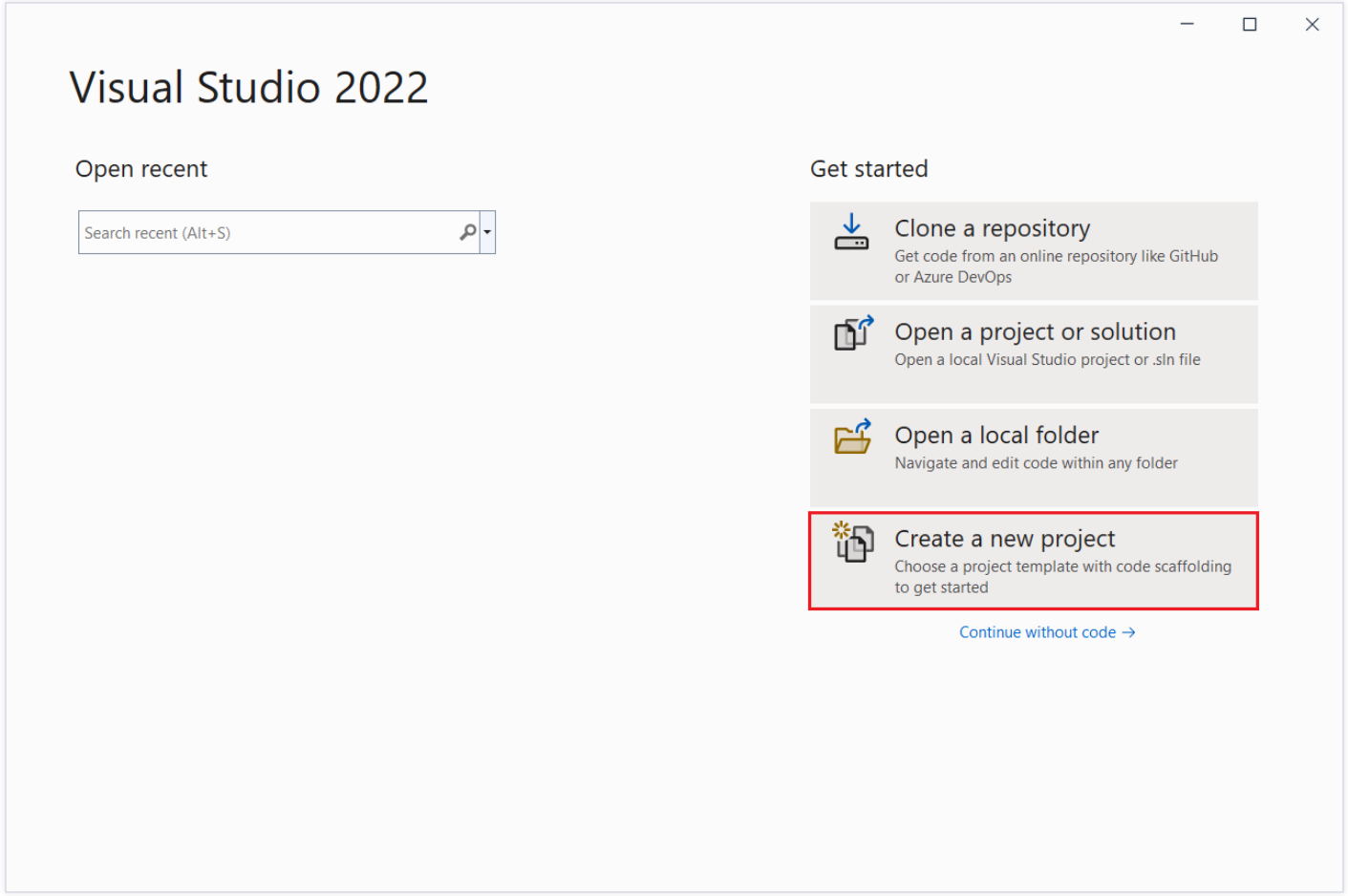
Пример на Razor Pages web app with ASP.NET Core

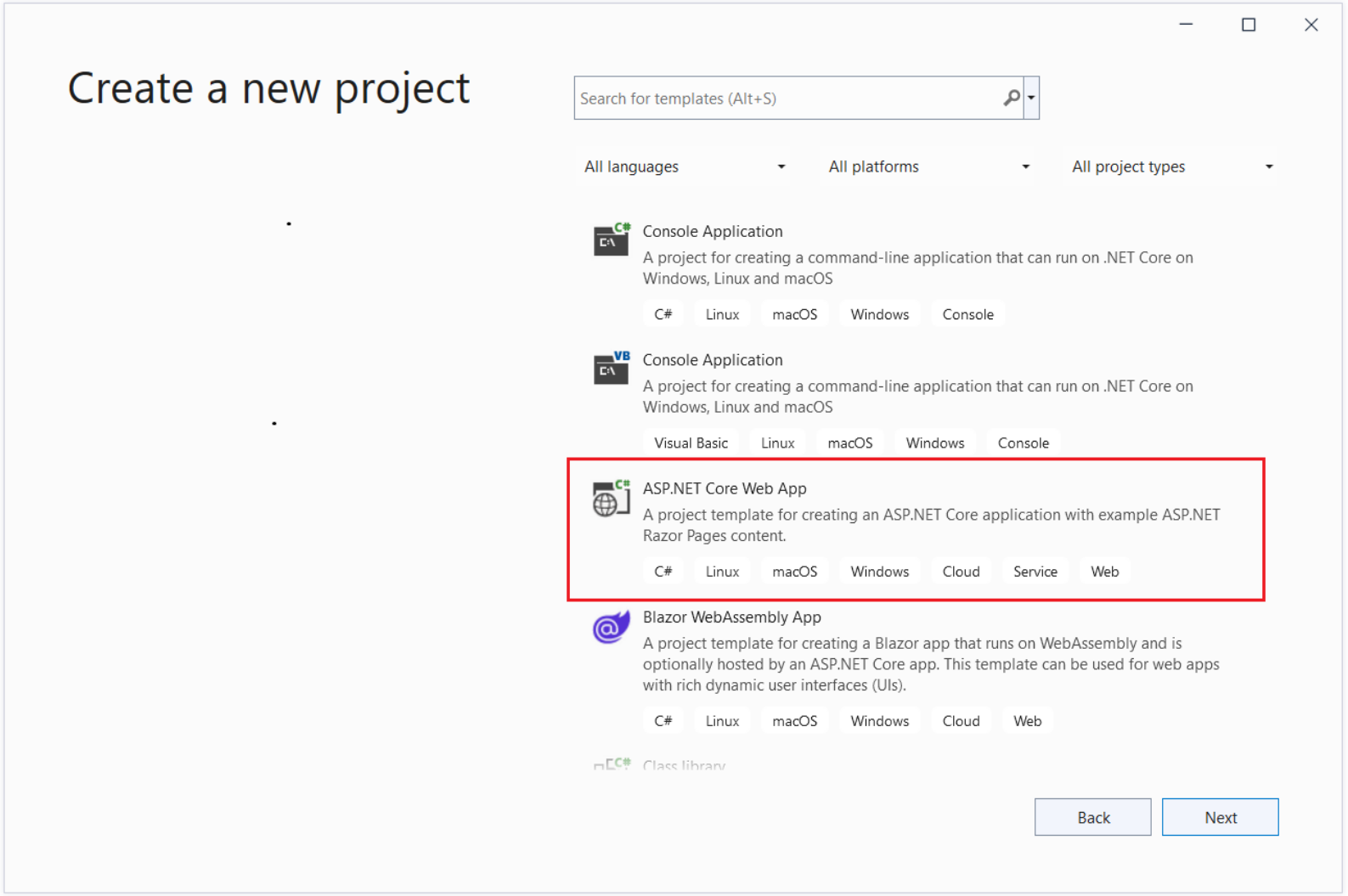


https://learn.microsoft.com/en-us/aspnet/core/tutorials/razor-pages/?view=aspnetcore-6.0

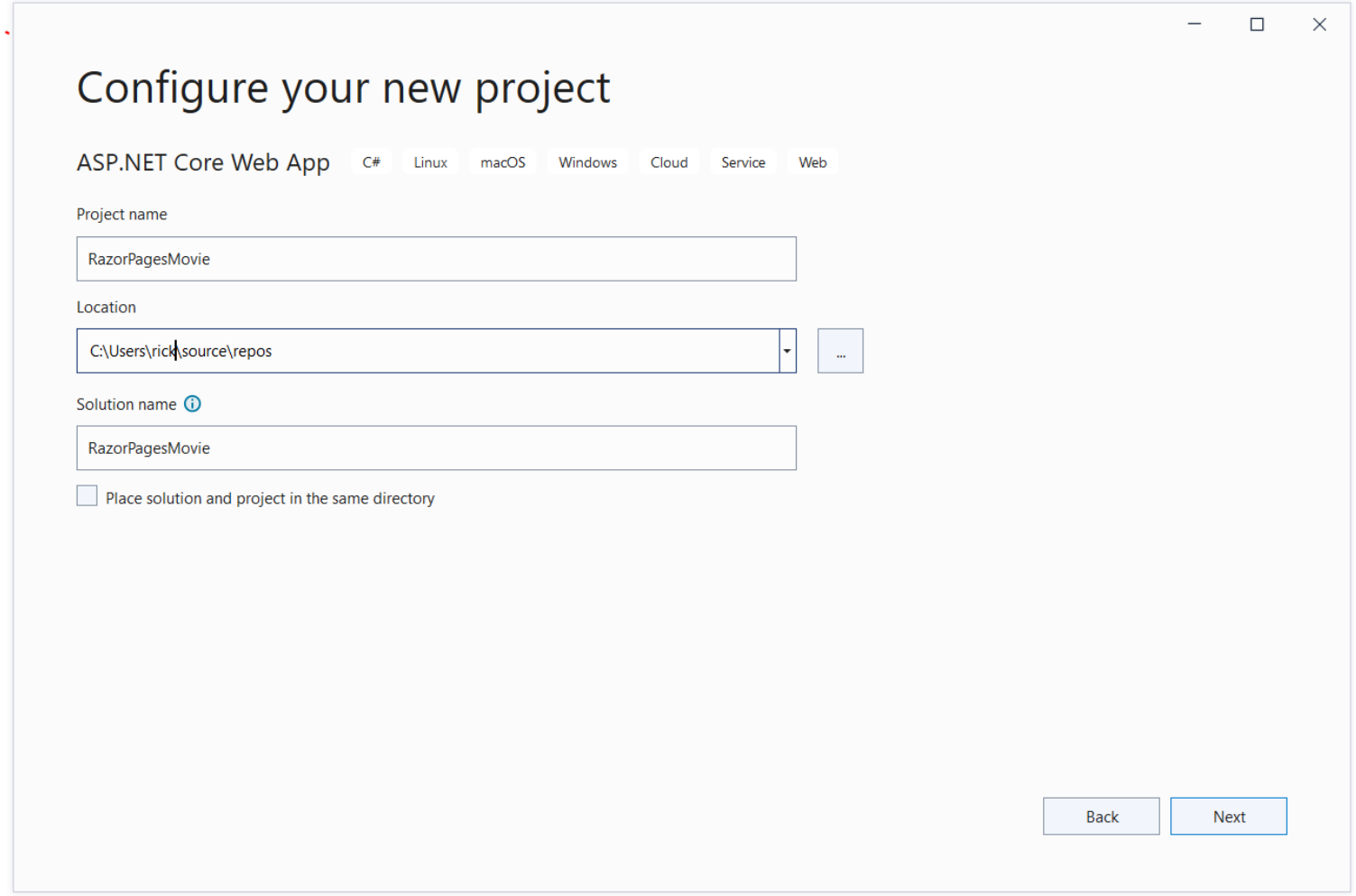
Start Visual Studio 2022 and select **Create a new project**.



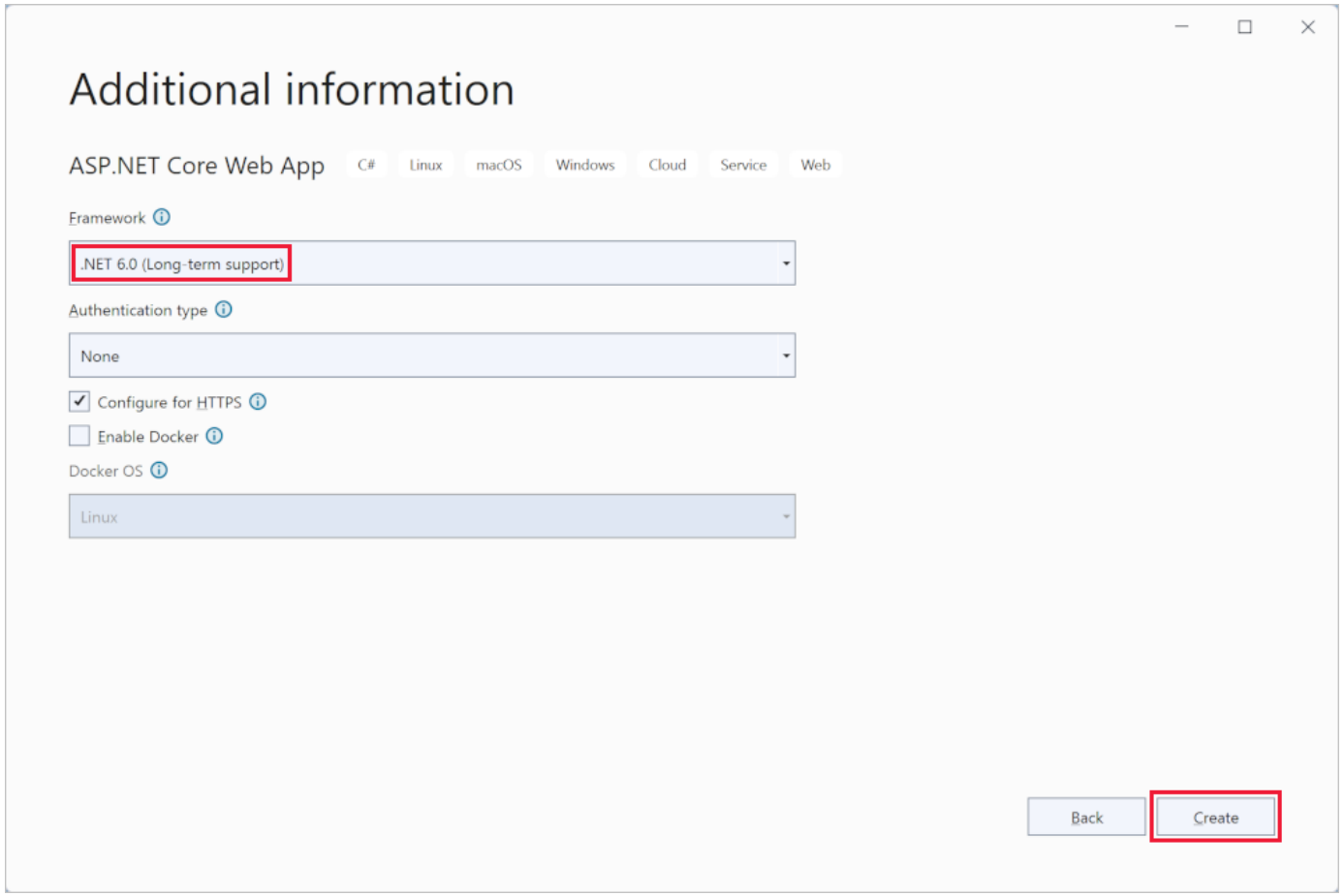
In the **Create a new project** dialog, select **ASP.NET Core Web App**, and then select **Next**.



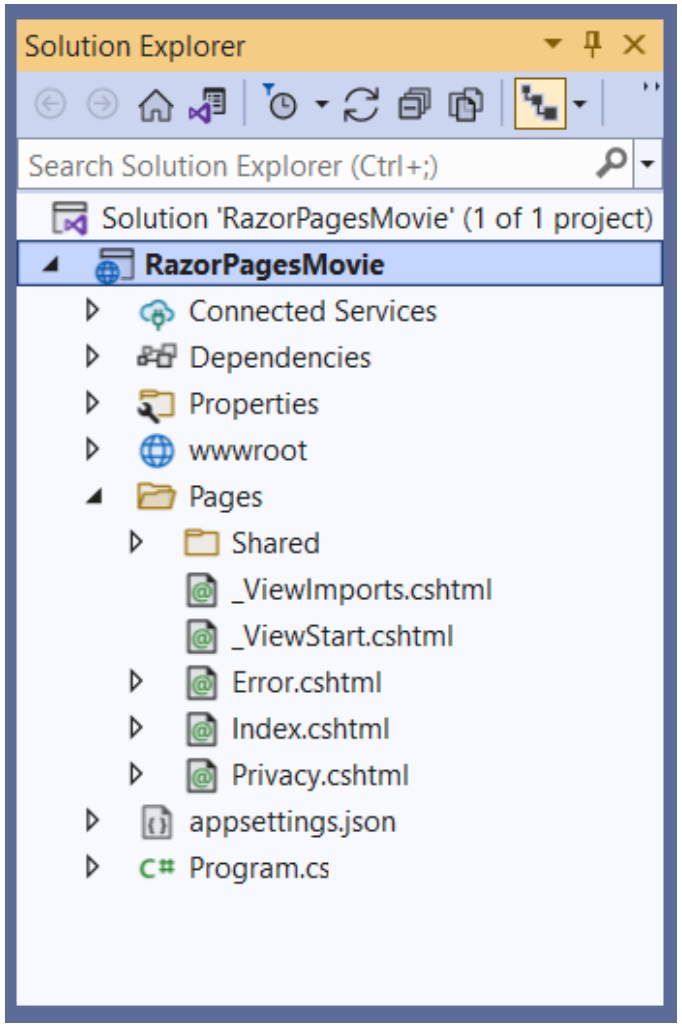
In the **Configure your new project** dialog, enter RazorPagesMovie for **Project name**. It's important to name the project *RazorPagesMovie*, including matching the capitalization, so the namespaces will match when you copy and paste example code.



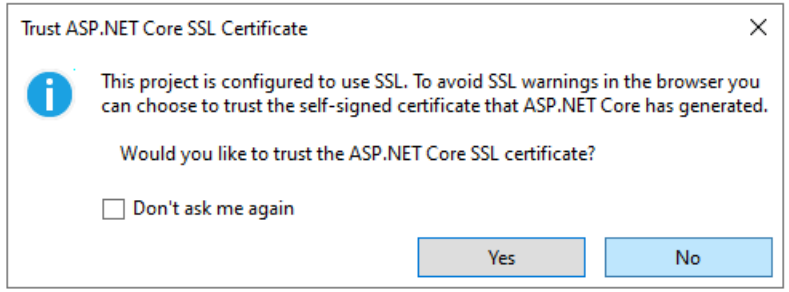
Select **Next**.
In the **Additional information** dialog, select **.NET 6.0 (Long-term support)** and then select **Create**.

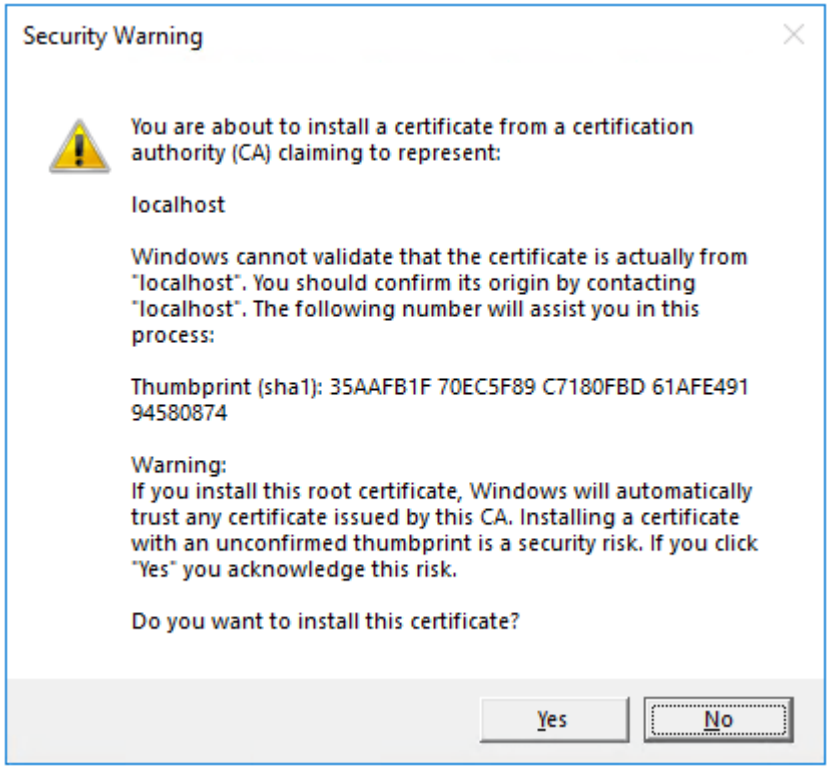


The following starter project is created:



Select **RazorPagesMovie** in **Solution Explorer**, and then press Ctrl+F5 to run without the debugger.





Program.cs

- The following code enables various Middleware:

- app.UseHttpsRedirection(); : Redirects HTTP requests to HTTPS.
- app.UseStaticFiles(); : Enables static files, such as HTML, CSS, images, and JavaScript to be served.
- app.UseRouting(); : Adds route matching to the middleware pipeline. app.MapRazorPages();: Configures endpoint routing for Razor Pages.
- app.UseAuthorization(); : Authorizes a user to access secure resources. This app doesn't use authorization, therefore this line could be removed.
- app.Run(); : Runs the app.

Part 2, add a model to a Razor Pages app in ASP.NET Core

- In this tutorial, classes are added for managing movies in a database.
- The app's model classes use Entity Framework Core (EF Core) to work with the database.
  - EF Core is an object-relational mapper (O/RM) that simplifies data access. You write the model classes first, and EF Core creates the database.
- The model classes are known as POCO classes (from "**P**lain-**O**ld **C**LR **O**bjects") because they don't have a dependency on EF Core. They define the properties of the data that are stored in the database.
  - Each POCO class maps to a table in the database, and each property of the class represents a column in the table.
  - The ORM framework is responsible for generating SQL queries to map the objects to the database and vice versa.

Add a data model

1.In **Solution Explorer**, right-click the *RazorPagesMovie* project > **Add** > **New Folder**. Name the folder ***Models***.
2.Right-click the Models folder. Select **Add** > **Class**. Name the class ***Movie***.
3.Add the following properties to the Movie class:

```
using System.ComponentModel.DataAnnotations;

namespace RazorPagesMovie.Models
{
    public class Movie
    {
        public int ID { get; set; }
        public string Title { get; set; } = string.Empty;

        [DataType(DataType.Date)]
        public DateTime ReleaseDate { get; set; }
        public string Genre { get; set; } = string.Empty;
        public decimal Price { get; set; }
    }
}
```

The Movie class contains:

The ID field is required by the database for the primary key.

A [DataType] attribute that specifies the type of data in the ReleaseDate property. With this attribute:

- The user isn't required to enter time information in the date field.
- Only the date is displayed, not time information.

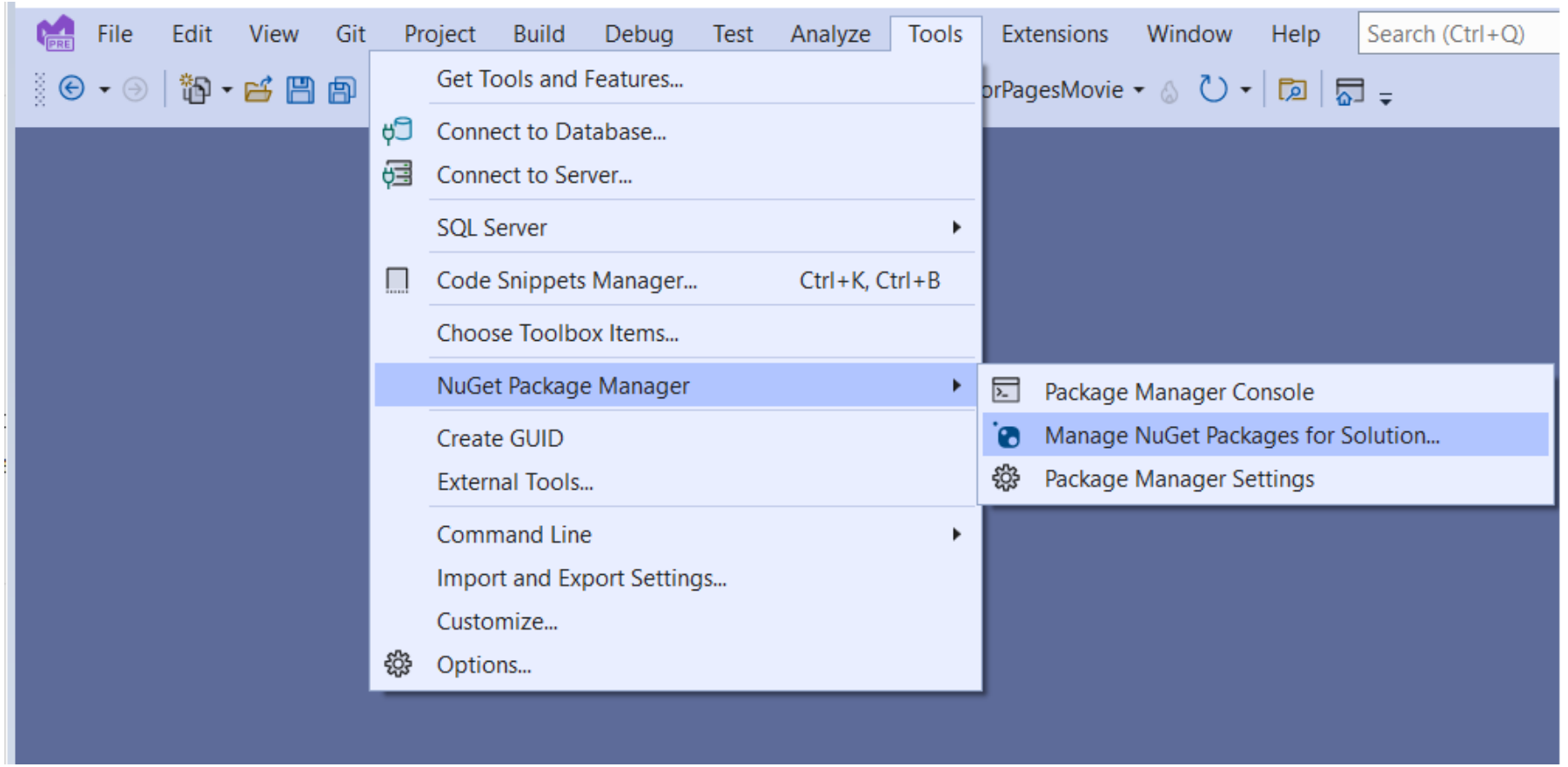
Build the project to verify there are no compilation errors.

Scaffold the movie model

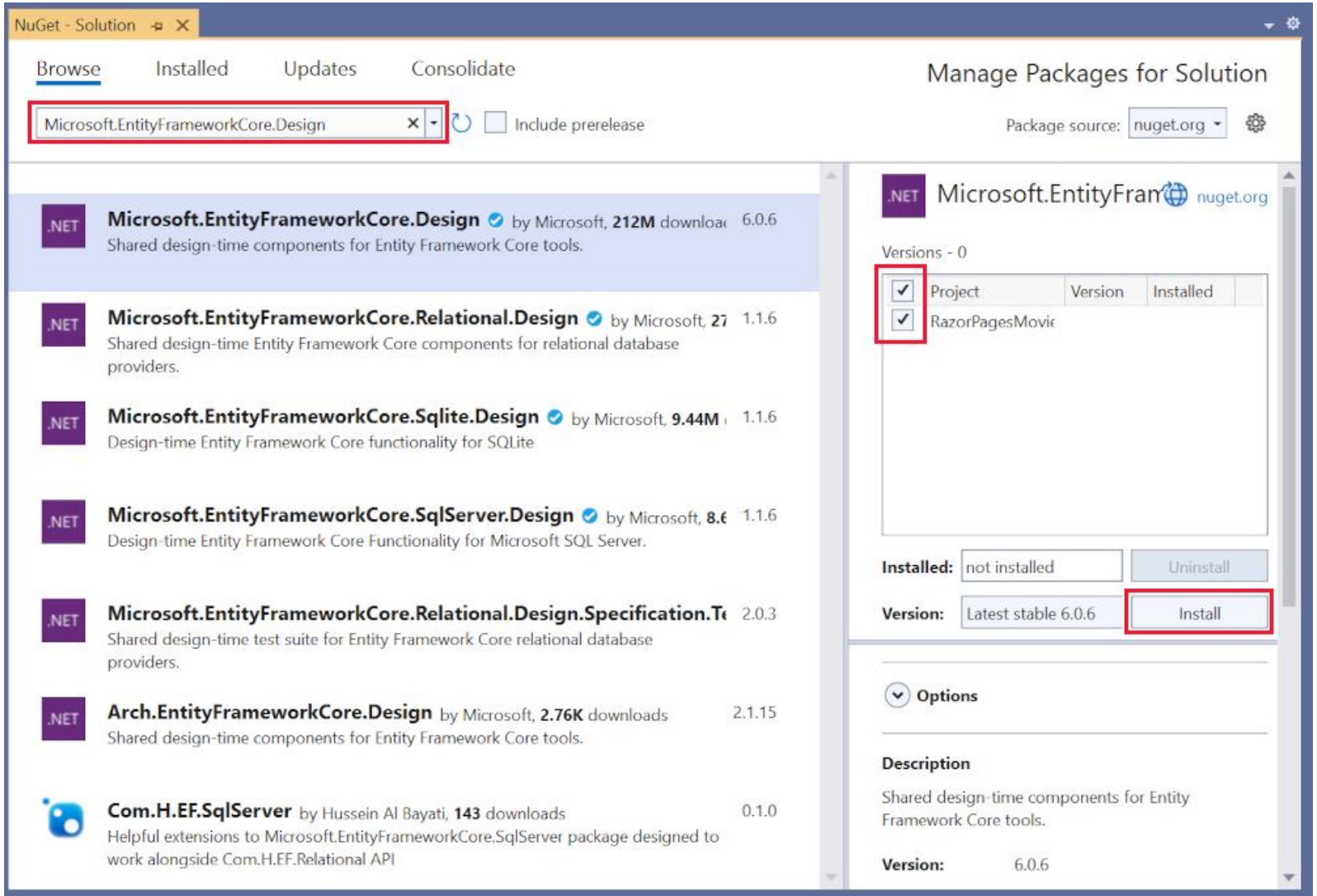
In this section, the movie model is scaffolded. That is, the scaffolding tool produces pages for Create, Read, Update, and Delete (CRUD) operations for the movie model.

Add the NuGet package Microsoft.EntityFrameworkCore.Design, which is required for the scaffolding tool.

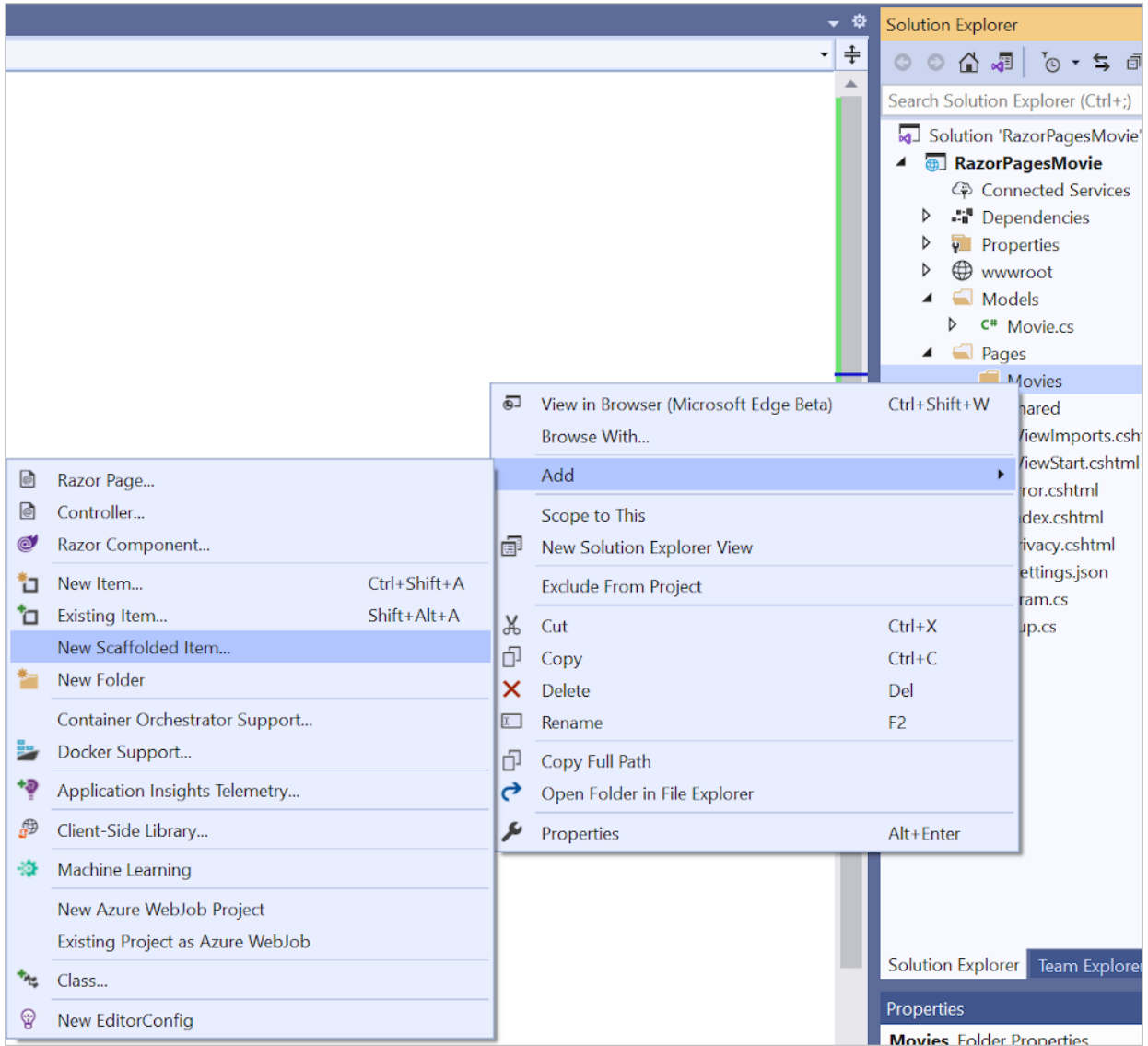
From the **Tools** menu, select **NuGet Package Manager > Manage NuGet Packages for Solution**



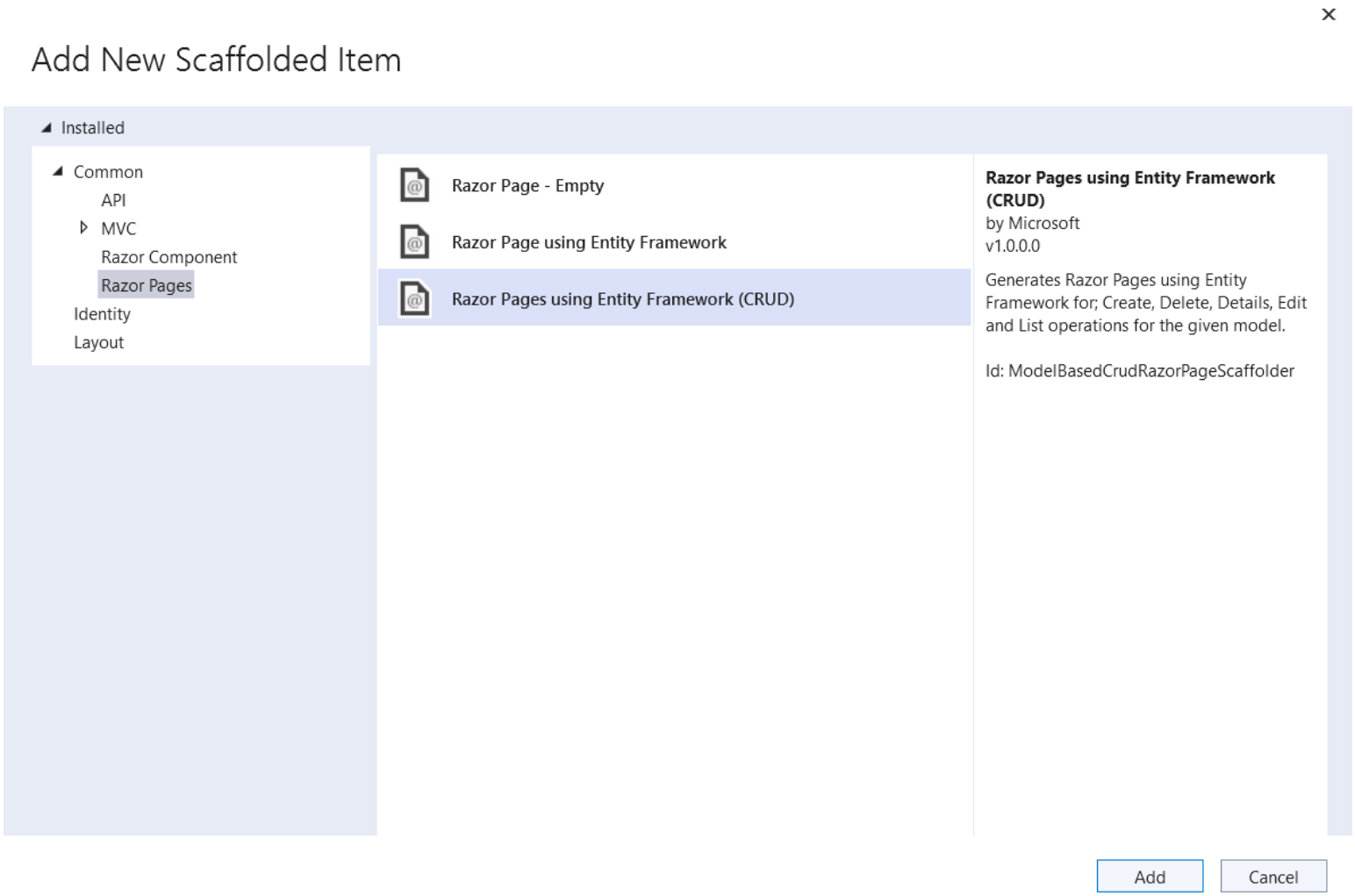
1.Select the **Browse** tab.
2.Enter Microsoft.EntityFrameworkCore.Design and select it from the list.
3.Check **Project** and then Select **Install**
4.Select **I Accept** in the **License Acceptance** dialog.



Create the *Pages/Movies* folder:
Right-click on the *Pages* folder > **Add** > **New Folder**.
Name the folder *Movies*.
Right-click on the *Pages/Movies* folder > **Add** > **New Scaffolded Item**.



In the **Add New Scaffold** dialog, select **Razor Pages using Entity Framework (CRUD)** > **Add**.



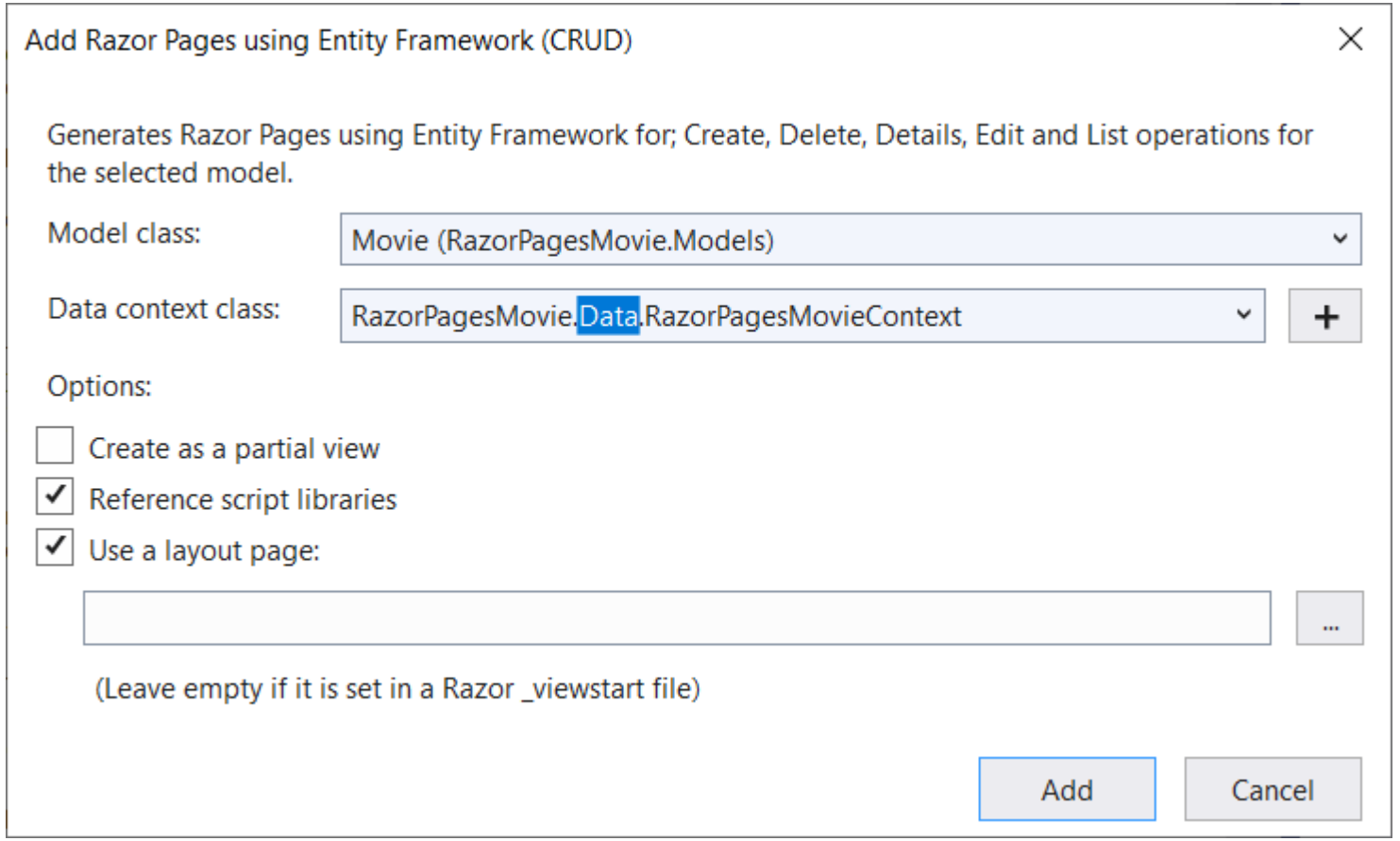
Complete the **Add Razor Pages using Entity Framework (CRUD)** dialog:

1.In the **Model class** drop down, select **Movie (RazorPagesMovie.Models)**.

2.In the **Data context class** row, select the **+** (plus) sign.

1.In the **Add Data Context** dialog, the class name RazorPagesMovie.Data.RazorPagesMovieContext is generated.

3.Select **Add**.



If you get an error message that says you need to install the Microsoft.EntityFrameworkCore.SqlServer package, repeat the steps starting with Add > New Scaffolded Item.

The appsettings.json file is updated with the connection string used to connect to a local database.

Files created and updated

The scaffold process creates the following files:

- *Pages/Movies*: Create, Delete, Details, Edit, and Index.
- Data/RazorPagesMovieContext.cs

The scaffold process adds the following highlighted code to the Program.cs file:

```
using Microsoft.EntityFrameworkCore;
using Microsoft.Extensions.DependencyInjection;
using RazorPagesMovie.Data;
var builder = WebApplication.CreateBuilder(args);

// Add services to the container.
builder.Services.AddRazorPages();
builder.Services.AddDbContext<RazorPagesMovieContext>(options =>
    options.UseSqlServer(builder.Configuration.GetConnectionString("RazorPagesMovieContext") ?

var app = builder.Build();

// Configure the HTTP request pipeline.
if (!app.Environment.IsDevelopment())
{
    app.UseExceptionHandler("/Error");
    // The default HSTS value is 30 days. You may want to change this for production scenarios
    app.UseHsts();
}

app.UseHttpsRedirection();
app.UseStaticFiles();

app.UseRouting();

app.UseAuthorization();

app.MapRazorPages();

app.Run();
```

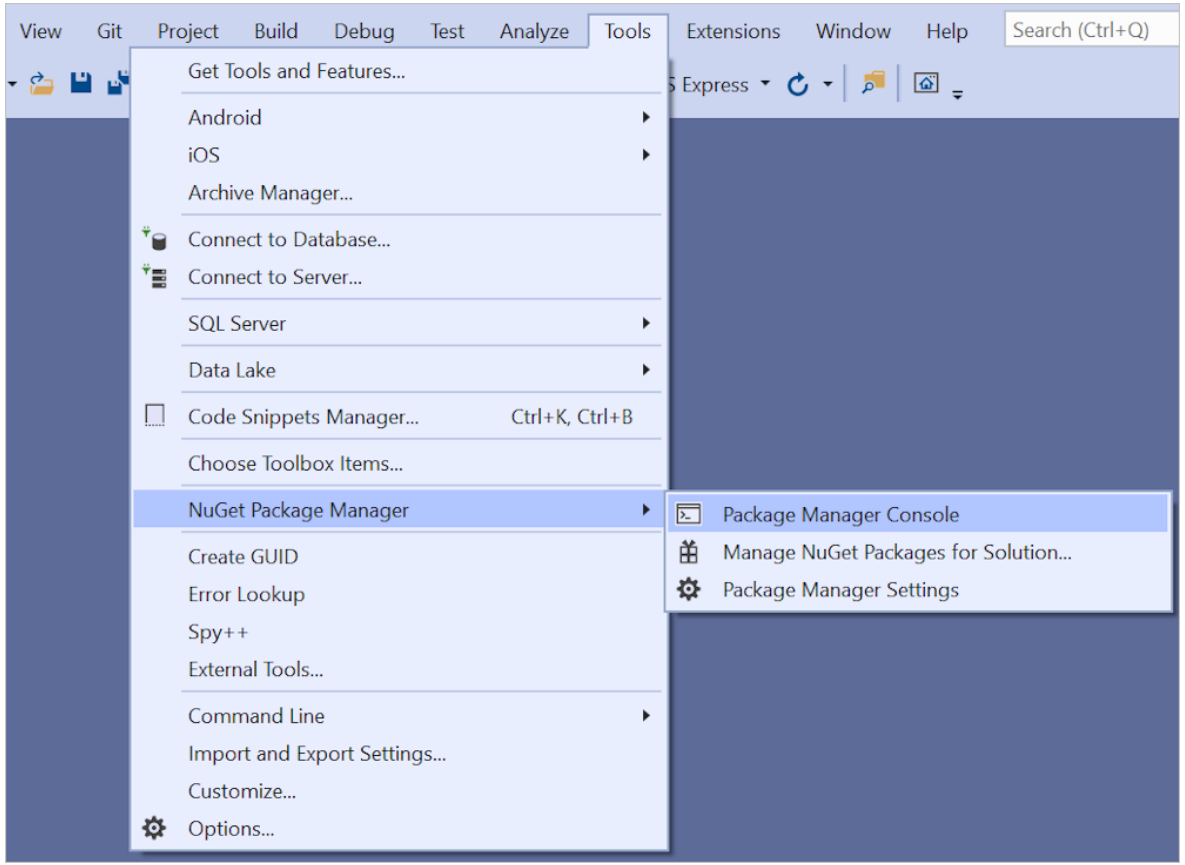
add a DbContext to the dependency injection container.

The options parameter is a lambda expression that configures the DbContext to use SQL Server as the database provider, and reads the connection string from the appsettings.json file.

Create the initial database schema using EF's migration feature

The migrations feature in Entity Framework Core provides a way to:
Create the initial database schema.
Incrementally update the database schema to keep it in sync with the app's data model. Existing data in the database is preserved.

The **Package Manager Console** (PMC) window is used to:
Add an initial migration.
Update the database with the initial migration.
From the **Tools** menu, select **NuGet Package Manager** > **Package Manager Console**.



In the PMC, enter the following commands:

Add-Migration InitialCreate

Update-Database

The preceding commands install the Entity Framework Core tools and run the migrations command to generate code that creates the initial database schema.

The **migrations** command generates code to create the initial database schema. The schema is based on the model specified in **DbContext**. The **InitialCreate** argument is used to name the migrations. Any name can be used, but by convention a name is selected that describes the migration.

The **update** command runs the **Up** method in migrations that have not been applied. In this case, **update** runs the **Up** method in the **Migrations/<time-stamp>_InitialCreate.cs** file, which creates the database.

Data context class

- In Entity Framework, a data context class is a class that inherits from the DbContext class. It provides a bridge between the application and the database, and is responsible for managing the connection to the database, querying and updating data, and tracking changes to entities.

- The data context class contains a set of properties that represent the database tables and views, called DbSets, which can be queried and manipulated in the application.

The data context RazorPagesMovieContext:

- Derives from Microsoft.EntityFrameworkCore.DbContext.
- Specifies which entities are included in the data model.
- Coordinates EF Core functionality, such as Create, Read, Update and Delete, for the Movie model.

```
using
using System.Collections.Generic;
using System.Linq;
using System.Threading.Tasks;
using Microsoft.EntityFrameworkCore;
using RazorPagesMovie.Models;

namespace RazorPagesMovie.Data
{
    public class RazorPagesMovieContext : DbContext
    {
        public RazorPagesMovieContext (DbContextOptions<RazorPagesMovieContext> options)
            : base(options)
        {
        }

        public DbSet<RazorPagesMovie.Models.Movie> Movie { get; set; } = default!;
    }
}
```

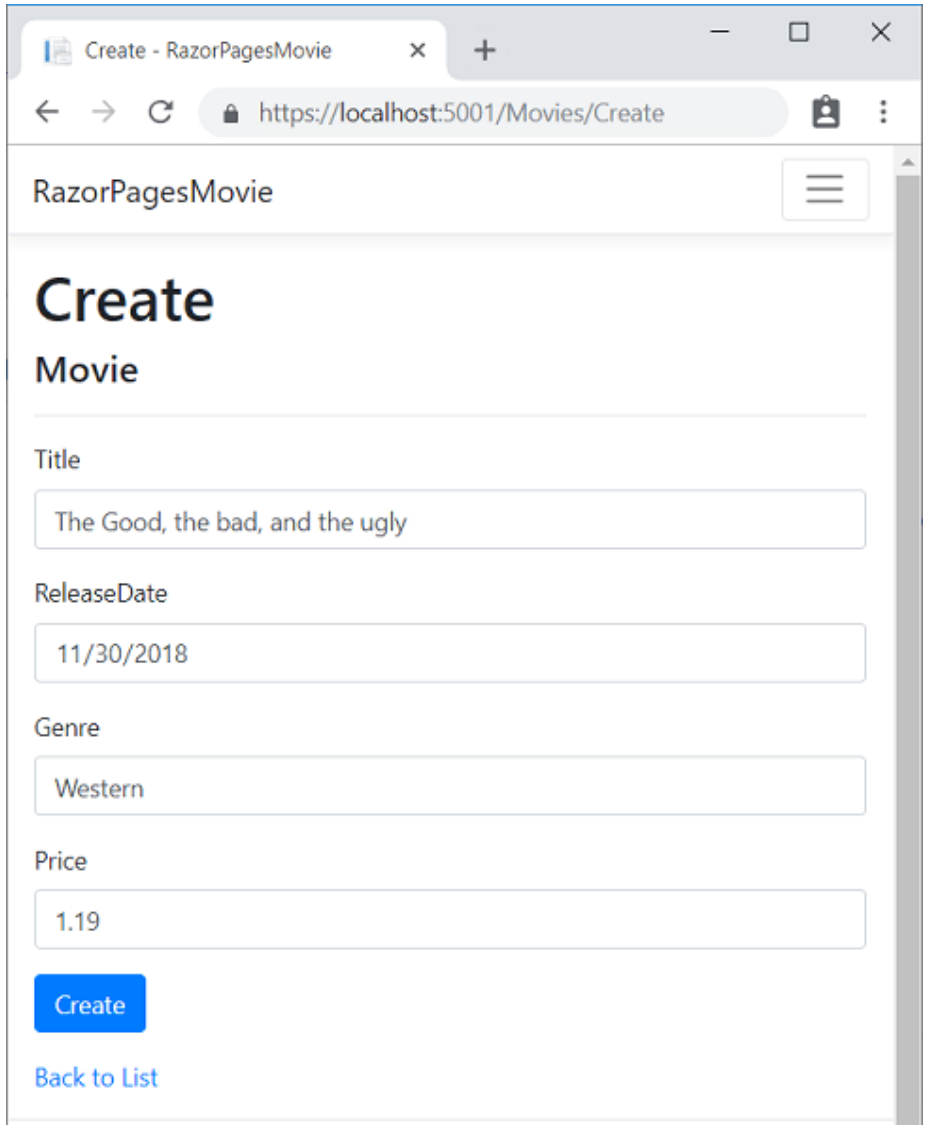
The code creates a DbSet<Movie> property for the entity set. In Entity Framework terminology, an entity set typically corresponds to a database table. An entity corresponds to a row in the table.

The name of the connection string is passed in to the context by calling a method on a DbContextOptions object. For local development, the Configuration system reads the connection string from the appsettings.json file.

Test the app

1.Run the app and append /Movies to the URL in the browser (http://localhost:port/movies).

Test the Create New link.



Test the **Edit**, **Details**, and **Delete** links.

Seed the database

Create a new class named SeedData in the Models folder with the following code:

```
using Microsoft.EntityFrameworkCore;
using RazorPagesMovie.Data;

namespace RazorPagesMovie.Models;

public static class SeedData
{
    public static void Initialize(IServiceProvider serviceProvider)
    {
        using (var context = new RazorPagesMovieContext(
            serviceProvider.GetRequiredService<
                DbContextOptions<RazorPagesMovieContext>>()))
        {
            if (context == null || context.Movie == null)
            {
                throw new ArgumentNullException("Null RazorPagesMovieContext");
            }

            // Look for any movies.
            if (context.Movie.Any())
            {
                return;   // DB has been seeded
            }

            context.Movie.AddRange(
```

If there are any movies in the database, the seed initializer returns and no movies are added.

Add the seed initializer

Update the Program.cs with the following highlighted code:

```
var app = builder.Build();

using (var scope = app.Services.CreateScope())
            {
                var services = scope.ServiceProvider;
                SeedData.Initialize(services);
            }
```

Get a database context instance from the dependency injection (DI) container.

Call the seedData.Initialize method, passing to it the database context instance.

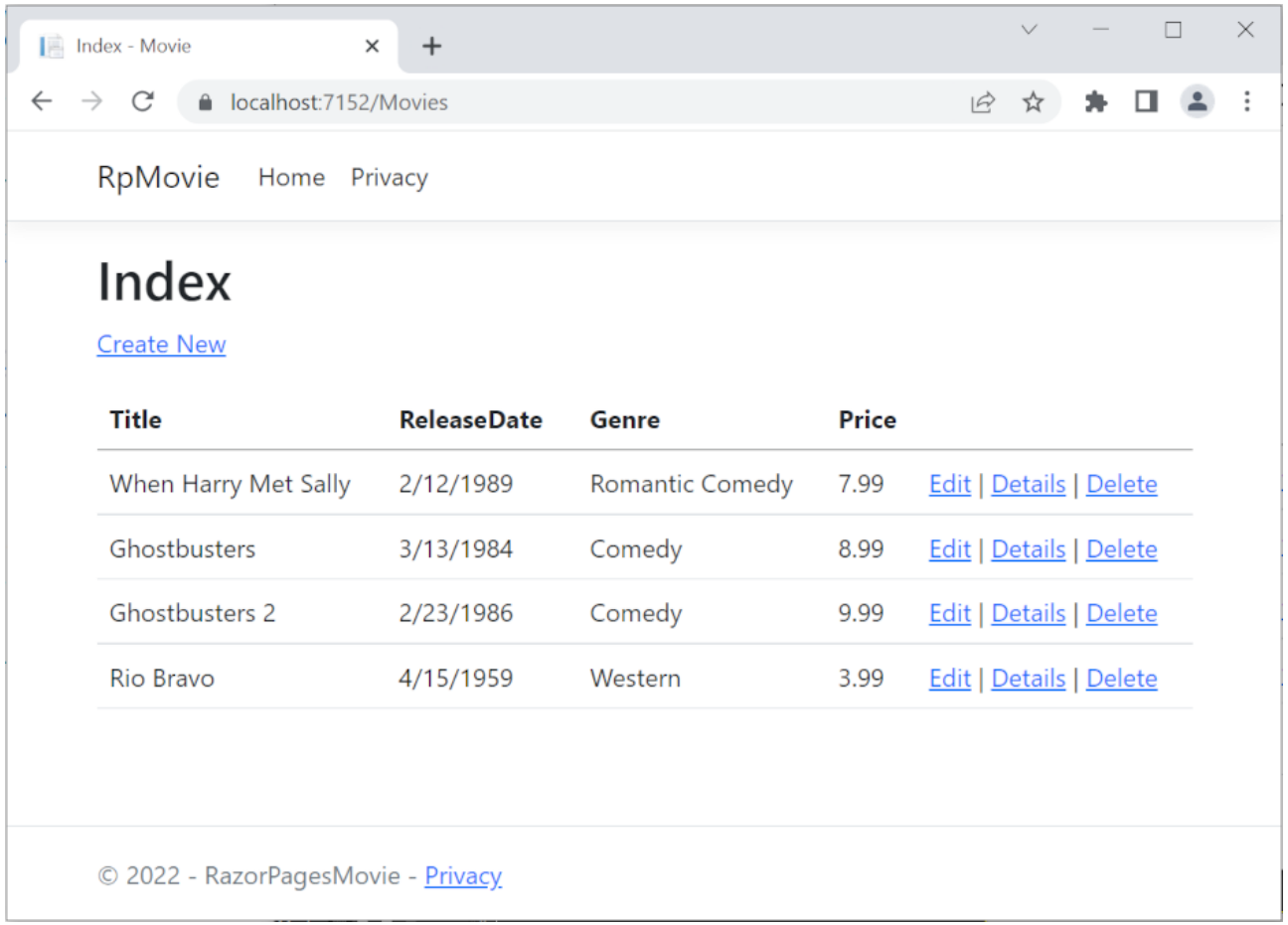
Dispose the context when the seed method completes. The using statement ensures the context is disposed.

In ASP.NET Core dependency injection, there are three main lifetime options for registered services: singleton, scoped, and transient.
Singleton services are created once and reused for the lifetime of the application.
Scoped services are created once per scope (e.g. per HTTP request) and are disposed of when the scope is disposed of.
Transient services are created each time they are requested and are not reused.

Test the app

Delete all the records in the database so the seed method will run. Stop and start the app to seed the database.

The app shows the seeded data:



Examine the Pages/Movies/Index.cshtml.cs Page Model:

When a GET request is made for the page, the OnGetAsync method returns a list of movies to the Razor Page.

On a Razor Page, OnGetAsync or OnGet is called to initialize the state of the page. In this case, OnGetAsync gets a list of movies and displays them.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Threading.Tasks;
using Microsoft.AspNetCore.Mvc;
using Microsoft.AspNetCore.Mvc.RazorPages;
using Microsoft.EntityFrameworkCore;
using RazorPagesMovie.Data;
using RazorPagesMovie.Models;

namespace RazorPagesMovie.Pages.Movies
{
    public class IndexModel : PageModel
    {
        private readonly RazorPagesMovie.Data.RazorPagesMovieContext _context;

        public IndexModel(RazorPagesMovie.Data.RazorPagesMovieContext context)
        {
            _context = context;
        }

        public IList<Movie> Movie { get;set; } = default!;

        public async Task OnGetAsync()
        {
            if (_context.Movie != null)
            {
                Movie = await _context.Movie.ToListAsync();
            }
        }
    }
}
```

Asynchronous EF methods in ASP.NET Core web apps

- Asynchronous programming is the default mode for ASP.NET Core and EF Core.
- A web server has a limited number of threads available, and in high load situations all of the available threads might be in use. When that happens, the server can't process new requests until the threads are freed up.
  - With synchronous code, many threads may be tied up while they aren't doing work because they're waiting for I/O to complete.
  - With asynchronous code, when a process is waiting for I/O to complete, its thread is freed up for the server to use for processing other requests. As a result, asynchronous code enables server resources to be used more efficiently, and the server can handle more traffic without delays.
- Asynchronous code does introduce a small amount of overhead at run time. For low traffic situations, the performance hit is negligible, while for high traffic situations, the potential performance improvement is substantial.

OnGetAsync()

- In the following code, the async keyword, Task return value, await keyword, and ToListAsync method make the code execute asynchronously.

```
public async Task OnGetAsync()
        {
            if (_context.Movie != null)
            {
                Movie = await _context.Movie.ToListAsync();
            }
        }
```

- The async keyword tells the compiler to:
  - Generate callbacks for parts of the method body.
  - Create the Task object that's returned.
- The Task return type represents ongoing work.
- The await keyword causes the compiler to split the method into two parts. The first part ends with the operation that's started asynchronously. The second part is put into a callback method that's called when the operation completes.
- ToListAsync is the asynchronous version of the ToList extension method.

The Create page model

- The OnGet method initializes any state needed for the page. The Create page doesn't have any state to initialize, so Page is returned.
  - The Page method creates a PageResult object that renders the Create.cshtml page.

- The Movie property uses the [BindProperty] attribute to take part to model binding. When the Create form posts the form-values, the ASP.NET Core runtime binds the posted values to the Movie model.

- The OnPostAsync method is run when the page posts form-data.

- If there are any model errors, the form is redisplayed, along with any form data posted.
  - Most model errors can be caught on the client-side before the form is posted. An example of a model error is posting a value for the date field that cannot be converted to a date.

- If there are no model errors:
  - The data is saved.
  - The browser is redirected to the Index page.