Tutorial: Get Started with Entity Framework 6 Code First using MVC 5

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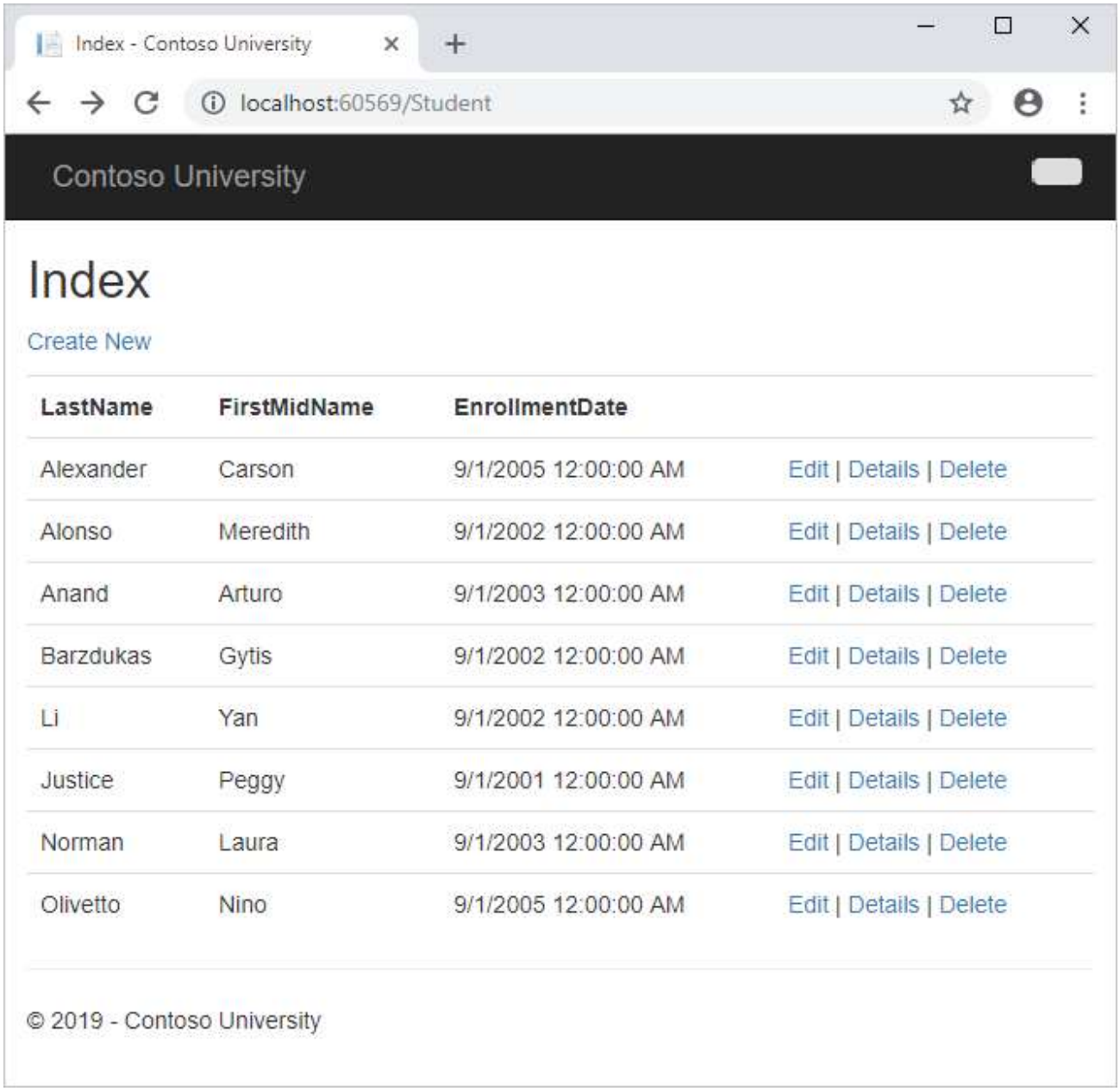
> **Note**
>
> For new development, we recommend **ASP.NET Core Razor Pages** over ASP.NET MVC controllers and views. For a tutorial series similar to this one using Razor Pages, see **Tutorial: Get started with Razor Pages in ASP.NET Core**. The new tutorial:
>
> - Is easier to follow.
> - Provides more EF Core best practices.
> - Uses more efficient queries.
> - Is more current with the latest API.
> - Covers more features.
> - Is the preferred approach for new application development.

In this series of tutorials, you learn how to build an ASP.NET MVC 5 application that uses Entity Framework 6 for data access. This tutorial uses the Code First workflow. For information about how to choose between Code First, Database First, and Model First, see Create a model.

This tutorial series explains how to build the Contoso University sample application. The sample application is a simple university website. With it, you can view and update student, course, and instructor information. Here are two of the screens you create:


Index - Contoso University
localhost:60569/Student
Contoso University
Index
Create New
LastName FirstMidName EnrollmentDate
Alexander Carson 9/1/2005 12:00:00 AM Edit | Details | Delete
Alonso Meredith 9/1/2002 12:00:00 AM Edit | Details | Delete
Anand Arturo 9/1/2003 12:00:00 AM Edit | Details | Delete
Barzdukas Gytis 9/1/2002 12:00:00 AM Edit | Details | Delete
Li Yan 9/1/2002 12:00:00 AM Edit | Details | Delete
Justice Peggy 9/1/2001 12:00:00 AM Edit | Details | Delete
Norman Laura 9/1/2003 12:00:00 AM Edit | Details | Delete
Olivetto Nino 9/1/2005 12:00:00 AM Edit | Details | Delete
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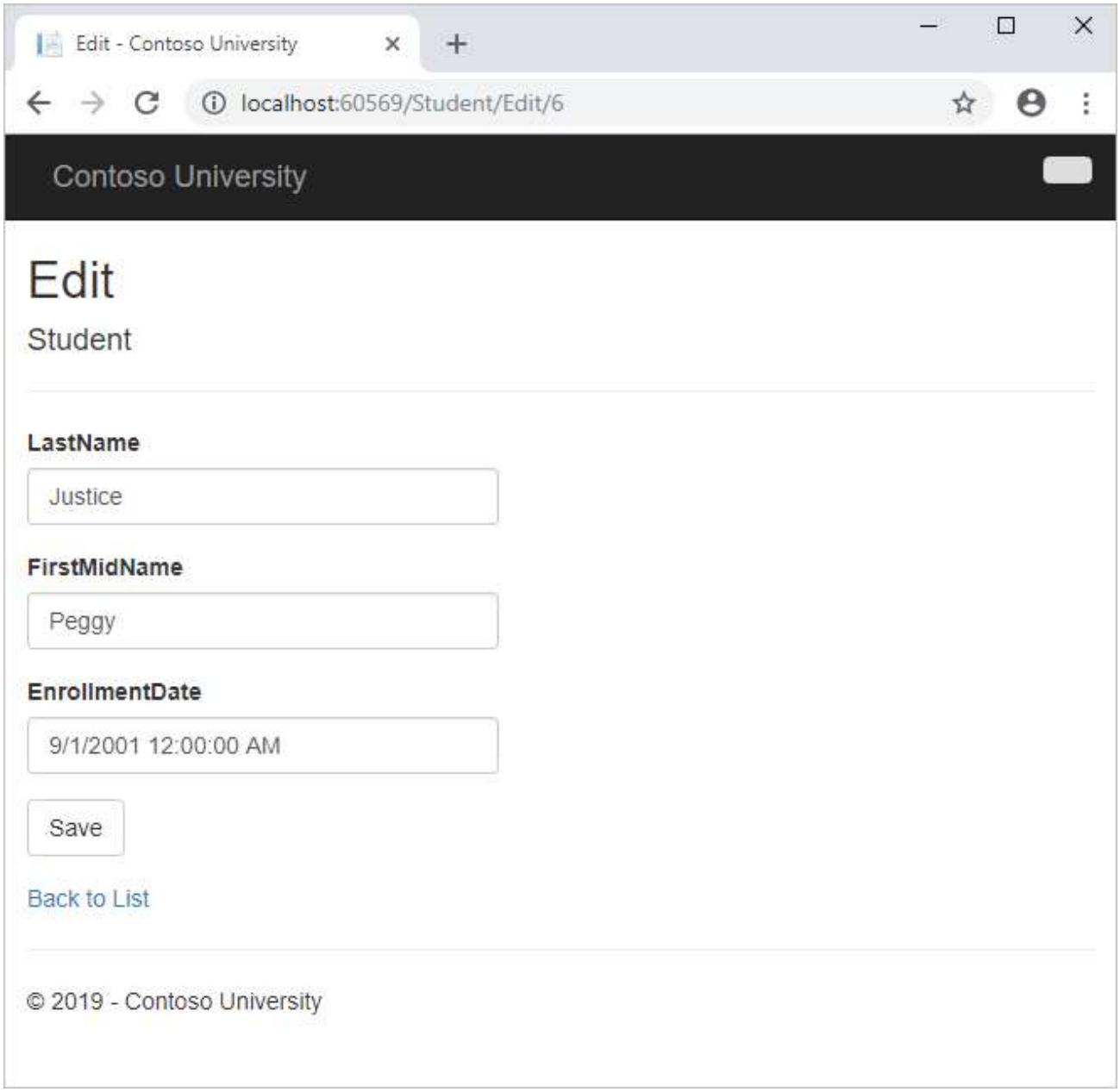


In this tutorial, you:

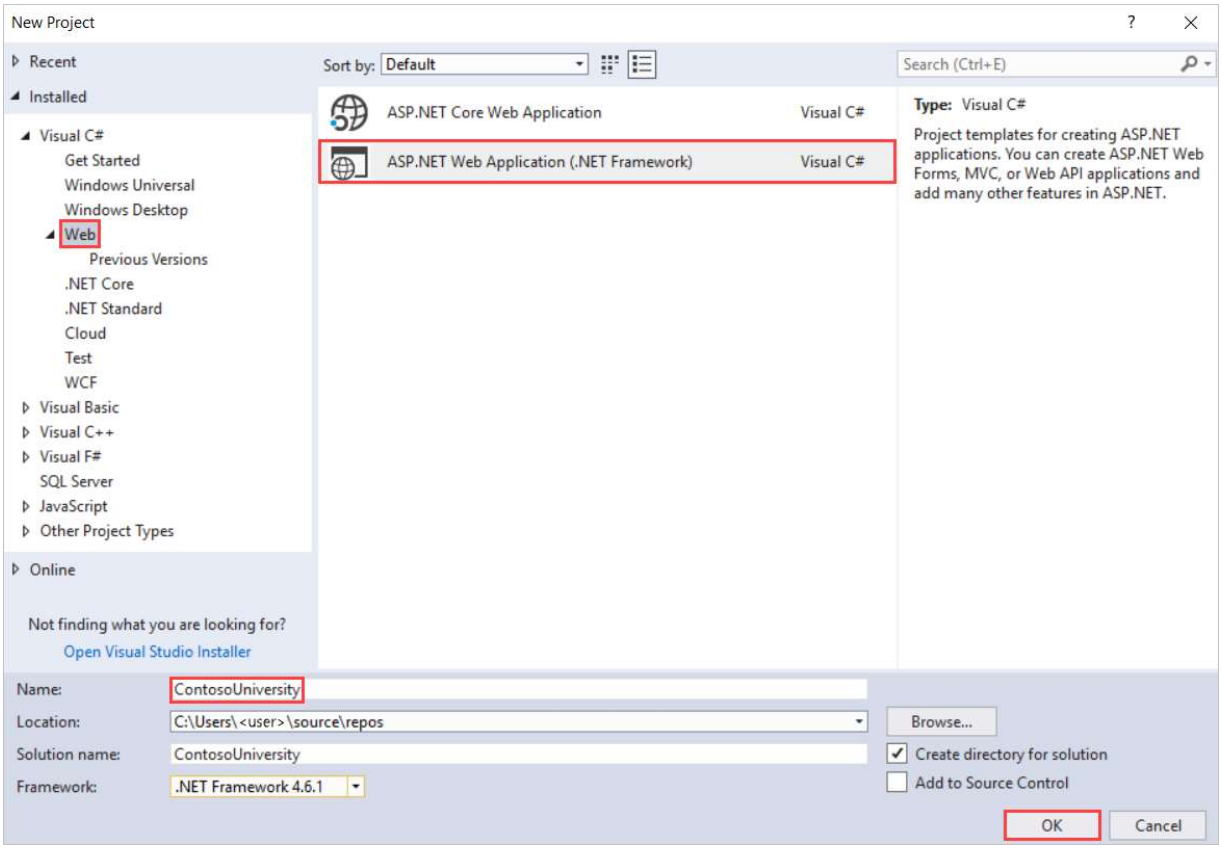
- ✓ Create an MVC web app
- ✓ Set up the site style
- ✓ Install Entity Framework 6
- ✓ Create the data model
- ✓ Create the database context
- ✓ Initialize DB with test data
- ✓ Set up EF 6 to use LocalDB
- ✓ Create controller and views
- ✓ View the database

Prerequisites

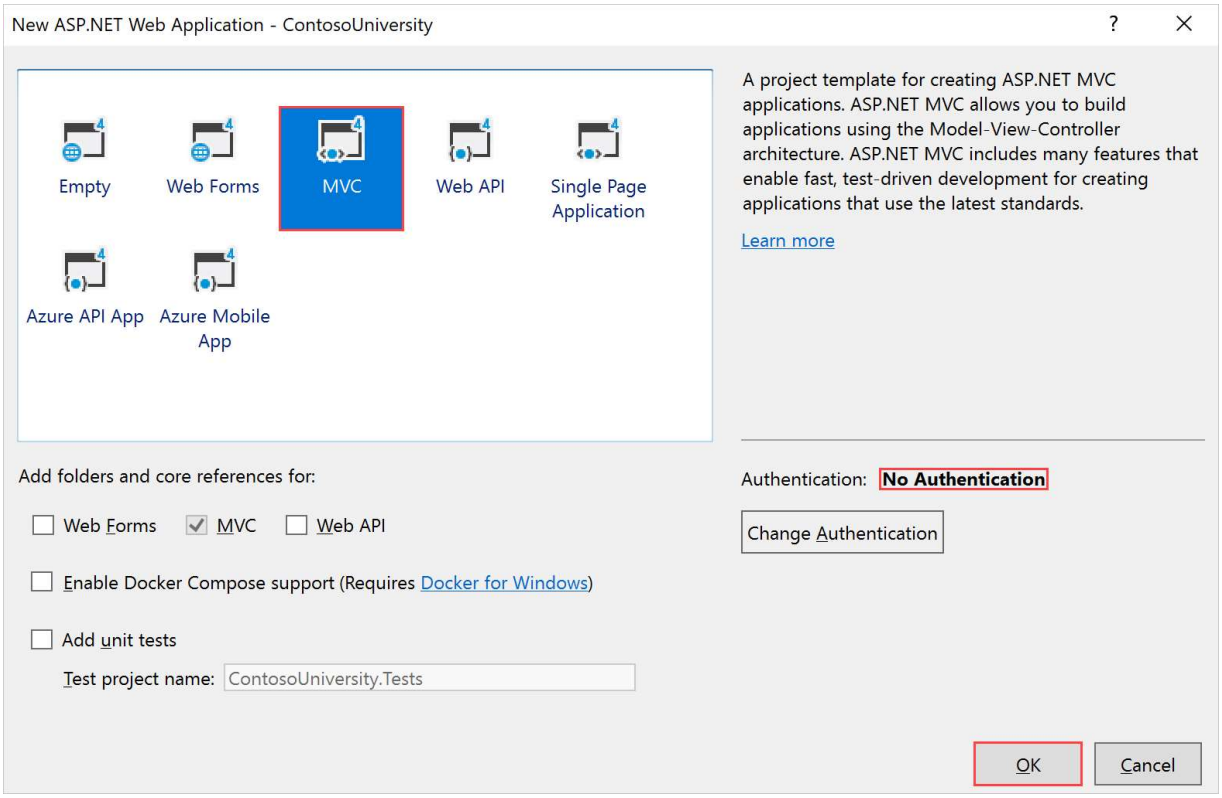
- Visual Studio 2017

Create an MVC web app

1. Open Visual Studio and create a C# web project using the **ASP.NET Web Application (.NET Framework)** template. Name the project *ContosoUniversity* and select **OK**.



2. In **New ASP.NET Web Application - ContosoUniversity**, select **MVC**.



> **Note**
>
> By default, the **Authentication** option is set to **No Authentication**. For this tutorial, the web app doesn't require users to sign in. Also, it doesn't restrict access based on who's signed in.

3. Select **OK** to create the project.

Set up the site style

A few simple changes will set up the site menu, layout, and home page.

1. Open *Views\Shared_Layout.cshtml*, and make the following changes:

   - Change each occurrence of "My ASP.NET Application" and "Application name" to "Contoso University".
   - Add menu entries for Students, Courses, Instructors, and Departments, and delete the Contact entry.

   The changes are highlighted in the following code snippet:

```
CSHTML
```

```
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>@ViewBag.Title - Contoso University</title>
    @Styles.Render("~/Content/css")
    @Scripts.Render("~/bundles/modernizr")
</head>
<body>
    <div class="navbar navbar-inverse navbar-fixed-top">
        <div class="navbar-inner">
            <div class="container">
                <button type="button" class="btn btn-navbar" data-
toggle="collapse" data-target=".nav-collapse">
                    <span class="icon-bar"></span>
                    <span class="icon-bar"></span>
                    <span class="icon-bar"></span>
                </button>
                @Html.ActionLink("Contoso University", "Index", "Home",
new { area = "" }, new { @class = "navbar-brand" })
                <div class="nav-collapse collapse">
                    <ul class="nav">
                        <li>@Html.ActionLink("Home", "Index", "Home")</li>
                        <li>@Html.ActionLink("About", "About", "Home")
</li>
                        <li>@Html.ActionLink("Students", "Index",
"Student")</li>
                        <li>@Html.ActionLink("Courses", "Index", "Course")
</li>
                        <li>@Html.ActionLink("Instructors", "Index",
"Instructor")</li>
                        <li>@Html.ActionLink("Departments", "Index",
"Department")</li>
                    </ul>
                </div>
            </div>
        </div>
    </div>

    <div class="container">
        @RenderBody()
        <hr />
        <footer>
            <p>&copy; @DateTime.Now.Year - Contoso University</p>
        </footer>
    </div>

    @Scripts.Render("~/bundles/jquery")
    @Scripts.Render("~/bundles/bootstrap")
    @RenderSection("scripts", required: false)
```

```
</body>
</html>
```

2. In *Views\Home\Index.cshtml*, replace the contents of the file with the following code to replace the text about ASP.NET and MVC with text about this application:

CSHTML

```
@{
    ViewBag.Title = "Home Page";
}

<div class="jumbotron">
    <h1>Contoso University</h1>
</div>
<div class="row">
    <div class="col-md-4">
        <h2>Welcome to Contoso University</h2>
        <p>Contoso University is a sample application that
        demonstrates how to use Entity Framework 6 in an
        ASP.NET MVC 5 web application.</p>
    </div>
    <div class="col-md-4">
        <h2>Build it from scratch</h2>
        <p>You can build the application by following the steps in the tu-
torial series on the ASP.NET site.</p>
        <p><a class="btn btn-default"
href="http://www.asp.net/mvc/tutorials/getting-started-with-ef-using-
mvc/">See the tutorial &raquo;</a></p>
    </div>
    <div class="col-md-4">
        <h2>Download it</h2>
        <p>You can download the completed project.</p>
        <p><a class="btn btn-default"
href="https://webpifeed.blob.core.windows.net/webpifeed/Partners/ASP.NET%2
0MVC%20Application%20Using%20Entity%20Framework%20Code%20First.zip">Downlo
ad &raquo;</a></p>
    </div>
</div>
```

3. Press Ctrl+F5 to run the web site. You see the home page with the main menu.

Install Entity Framework 6

1. From the **Tools** menu, choose **NuGet Package Manager**, and then choose **Package Manager Console**.

2. In the **Package Manager Console** window, enter the following command:

```
text
Install-Package EntityFramework
```

This step is one of a few steps that this tutorial has you do manually, but that could have been done automatically by the ASP.NET MVC scaffolding feature. You're doing them manually so that you can see the steps required to use Entity Framework (EF). You'll use scaffolding later to create the MVC controller and views. An alternative is to let scaffolding automatically install the EF NuGet package, create the database context class, and create the connection string. When you're ready to do it that way, all you have to do is skip those steps and scaffold your MVC controller after you create your entity classes.

Create the data model

Next you'll create entity classes for the Contoso University application. You'll start with the following three entities:

Course <-> Enrollment <-> Student

Entities	Relationship
Course to Enrollment	One-to-many
Student to Enrollment	One-to-many

There's a one-to-many relationship between `Student` and `Enrollment` entities, and there's a one-to-many relationship between `Course` and `Enrollment` entities. In other words, a student can be enrolled in any number of courses, and a course can have any number of students enrolled in it.

In the following sections, you'll create a class for each one of these entities.

> **Note**
>
> If you try to compile the project before you finish creating all of these entity classes, you'll get compiler errors.

The Student entity

- In the *Models* folder, create a class file named *Student.cs* by right-clicking on the folder in **Solution Explorer** and choosing **Add** > **Class**. Replace the template code with the following code:

```
C#

using System;
using System.Collections.Generic;

namespace ContosoUniversity.Models
{
    public class Student
    {
        public int ID { get; set; }
        public string LastName { get; set; }
        public string FirstMidName { get; set; }
        public DateTime EnrollmentDate { get; set; }

        public virtual ICollection<Enrollment> Enrollments { get; set; }
    }
}
```

The `ID` property will become the primary key column of the database table that corresponds to this class. By default, Entity Framework interprets a property that's named `ID` or *classname* `ID` as the primary key.

The `Enrollments` property is a *navigation property*. Navigation properties hold other entities that are related to this entity. In this case, the `Enrollments` property of a `Student` entity will hold all of the `Enrollment` entities that are related to that `Student` entity. In other words, if a given `Student` row in the database has two related `Enrollment` rows (rows that contain that student's primary key value in their `StudentID` foreign key column), that `Student` entity's `Enrollments` navigation property will contain those two `Enrollment` entities.

Navigation properties are typically defined as `virtual` so that they can take advantage of certain Entity Framework functionality such as *lazy loading*. (Lazy loading will be explained later, in the Reading Related Data tutorial later in this series.)

If a navigation property can hold multiple entities (as in many-to-many or one-to-many relationships), its type must be a list in which entries can be added, deleted, and updated,

such as `ICollection`.

The Enrollment entity

- In the *Models* folder, create *Enrollment.cs* and replace the existing code with the following code:

```
C#
```

```
namespace ContosoUniversity.Models
{
    public enum Grade
    {
        A, B, C, D, F
    }

    public class Enrollment
    {
        public int EnrollmentID { get; set; }
        public int CourseID { get; set; }
        public int StudentID { get; set; }
        public Grade? Grade { get; set; }

        public virtual Course Course { get; set; }
        public virtual Student Student { get; set; }
    }
}
```

The `EnrollmentID` property will be the primary key; this entity uses the *classname* `ID` pattern instead of `ID` by itself as you saw in the `Student` entity. Ordinarily you would choose one pattern and use it throughout your data model. Here, the variation illustrates that you can use either pattern. In a later tutorial, you'll see how using `ID` without `classname` makes it easier to implement inheritance in the data model.

The `Grade` property is an enum. The question mark after the `Grade` type declaration indicates that the `Grade` property is nullable. A grade that's null is different from a zero grade — null means a grade isn't known or hasn't been assigned yet.

The `StudentID` property is a foreign key, and the corresponding navigation property is `Student`. An `Enrollment` entity is associated with one `Student` entity, so the property can only hold a single `Student` entity (unlike the `Student.Enrollments` navigation property you saw earlier, which can hold multiple `Enrollment` entities).

The `CourseID` property is a foreign key, and the corresponding navigation property is `Course`. An `Enrollment` entity is associated with one `Course` entity.

Entity Framework interprets a property as a foreign key property if it's named *<navigation property name><primary key property name>* (for example, `StudentID` for the `Student` navigation property since the `Student` entity's primary key is `ID`). Foreign key properties can also be named the same simply *<primary key property name>* (for example, `CourseID` since the `Course` entity's primary key is `CourseID`).

The Course entity

- In the *Models* folder, create *Course.cs*, replacing the template code with the following code:

```
C#
```

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

namespace ContosoUniversity.Models
{
    public class Course
    {
        [DatabaseGenerated(DatabaseGeneratedOption.None)]
        public int CourseID { get; set; }
        public string Title { get; set; }
        public int Credits { get; set; }

        public virtual ICollection<Enrollment> Enrollments { get; set; }
    }
}
```

The `Enrollments` property is a navigation property. A `Course` entity can be related to any number of `Enrollment` entities.

We'll say more about the DatabaseGeneratedAttribute attribute in a later tutorial in this series. Basically, this attribute lets you enter the primary key for the course rather than having the database generate it.

Create the database context

The main class that coordinates Entity Framework functionality for a given data model is the *database context* class. You create this class by deriving from the System.Data.Entity.DbContext class. In your code, you specify which entities are included in the data model. You can also customize certain Entity Framework behavior. In this project, the class is named `SchoolContext`.

- To create a folder in the ContosoUniversity project, right-click the project in **Solution Explorer** and click **Add**, and then click **New Folder**. Name the new folder *DAL* (for Data Access Layer). In that folder, create a new class file named *SchoolContext.cs*, and replace the template code with the following code:

```
C#
```

```
using ContosoUniversity.Models;
using System.Data.Entity;
using System.Data.Entity.ModelConfiguration.Conventions;

namespace ContosoUniversity.DAL
{
    public class SchoolContext : DbContext
    {

        public SchoolContext() : base("SchoolContext")
        {
        }

        public DbSet<Student> Students { get; set; }
        public DbSet<Enrollment> Enrollments { get; set; }
        public DbSet<Course> Courses { get; set; }

        protected override void OnModelCreating(DbModelBuilder model-
Builder)
        {

modelBuilder.Conventions.Remove<PluralizingTableNameConvention>();
        }
    }
}
```

Specify entity sets

This code creates a DbSet property for each entity set. In Entity Framework terminology, an *entity set* typically corresponds to a database table, and an *entity* corresponds to a row in the table.

> **Note**
>
> You can omit the `DbSet<Enrollment>` and `DbSet<Course>` statements and it would work the same. Entity Framework would include them implicitly because the `Student` entity references the `Enrollment` entity and the `Enrollment` entity references the `Course` entity.

Specify the connection string

The name of the connection string (which you'll add to the Web.config file later) is passed in to the constructor.

C#

```
public SchoolContext() : base("SchoolContext")
{
}
```

You could also pass in the connection string itself instead of the name of one that is stored in the Web.config file. For more information about options for specifying the database to use, see Connection strings and models.

If you don't specify a connection string or the name of one explicitly, Entity Framework assumes that the connection string name is the same as the class name. The default connection string name in this example would then be `SchoolContext`, the same as what you're specifying explicitly.

Specify singular table names

The `modelBuilder.Conventions.Remove` statement in the OnModelCreating method prevents table names from being pluralized. If you didn't do this, the generated tables in the database would be named `Students`, `Courses`, and `Enrollments`. Instead, the table names will be `Student`, `Course`, and `Enrollment`. Developers disagree about whether table names should be pluralized or not. This tutorial uses the singular form, but the important point is that you can select whichever form you prefer by including or omitting this line of code.

Initialize DB with test data

Entity Framework can automatically create (or drop and re-create) a database for you when the application runs. You can specify that this should be done every time your application runs or only when the model is out of sync with the existing database. You can also write a `Seed` method that Entity Framework automatically calls after creating the database in order to populate it with test data.

The default behavior is to create a database only if it doesn't exist (and throw an exception if the model has changed and the database already exists). In this section, you'll specify that the database should be dropped and re-created whenever the model changes. Dropping the database causes the loss of all your data. This is generally okay during development, because the `Seed` method will run when the database is re-created and will re-create your test data. But in production you generally don't want to lose all your data every time you need to change the database schema. Later you'll see how to handle model changes by using Code First Migrations to change the database schema instead of dropping and re-creating the database.

1. In the DAL folder, create a new class file named *SchoolInitializer.cs* and replace the template code with the following code, which causes a database to be created when needed and loads test data into the new database.

```
C#

using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Data.Entity;
using ContosoUniversity.Models;

namespace ContosoUniversity.DAL
{
    public class SchoolInitializer : System.Data.Entity.
DropCreateDatabaseIfModelChanges<SchoolContext>
    {
        protected override void Seed(SchoolContext context)
        {
            var students = new List<Student>
            {
            new
Student{FirstMidName="Carson",LastName="Alexander",EnrollmentDate=DateTime
.Parse("2005-09-01")},
            new
```

```
Student{FirstMidName="Meredith",LastName="Alonso",EnrollmentDate=DateTime.
Parse("2002-09-01")},
            new
Student{FirstMidName="Arturo",LastName="Anand",EnrollmentDate=DateTime.Par
se("2003-09-01")},
            new
Student{FirstMidName="Gytis",LastName="Barzdukas",EnrollmentDate=DateTime.
Parse("2002-09-01")},
            new
Student{FirstMidName="Yan",LastName="Li",EnrollmentDate=DateTime.Parse("20
02-09-01")},
            new
Student{FirstMidName="Peggy",LastName="Justice",EnrollmentDate=DateTime.Pa
rse("2001-09-01")},
            new
Student{FirstMidName="Laura",LastName="Norman",EnrollmentDate=DateTime.Par
se("2003-09-01")},
            new
Student{FirstMidName="Nino",LastName="Olivetto",EnrollmentDate=DateTime.Pa
rse("2005-09-01")}
            };

            students.ForEach(s => context.Students.Add(s));
            context.SaveChanges();
            var courses = new List<Course>
            {
            new Course{CourseID=1050,Title="Chemistry",Credits=3,},
            new Course{CourseID=4022,Title="Microeconomics",Credits=3,},
            new Course{CourseID=4041,Title="Macroeconomics",Credits=3,},
            new Course{CourseID=1045,Title="Calculus",Credits=4,},
            new Course{CourseID=3141,Title="Trigonometry",Credits=4,},
            new Course{CourseID=2021,Title="Composition",Credits=3,},
            new Course{CourseID=2042,Title="Literature",Credits=4,}
            };
            courses.ForEach(s => context.Courses.Add(s));
            context.SaveChanges();
            var enrollments = new List<Enrollment>
            {
            new Enrollment{StudentID=1,CourseID=1050,Grade=Grade.A},
            new Enrollment{StudentID=1,CourseID=4022,Grade=Grade.C},
            new Enrollment{StudentID=1,CourseID=4041,Grade=Grade.B},
            new Enrollment{StudentID=2,CourseID=1045,Grade=Grade.B},
            new Enrollment{StudentID=2,CourseID=3141,Grade=Grade.F},
            new Enrollment{StudentID=2,CourseID=2021,Grade=Grade.F},
            new Enrollment{StudentID=3,CourseID=1050},
            new Enrollment{StudentID=4,CourseID=1050,},
            new Enrollment{StudentID=4,CourseID=4022,Grade=Grade.F},
            new Enrollment{StudentID=5,CourseID=4041,Grade=Grade.C},
            new Enrollment{StudentID=6,CourseID=1045},
            new Enrollment{StudentID=7,CourseID=3141,Grade=Grade.A},
            };
```

```
            enrollments.ForEach(s => context.Enrollments.Add(s));
            context.SaveChanges();
        }
    }
}
```

The `Seed` method takes the database context object as an input parameter, and the code in the method uses that object to add new entities to the database. For each entity type, the code creates a collection of new entities, adds them to the appropriate `DbSet` property, and then saves the changes to the database. It isn't necessary to call the `SaveChanges` method after each group of entities, as is done here, but doing that helps you locate the source of a problem if an exception occurs while the code is writing to the database.

2. To tell Entity Framework to use your initializer class, add an element to the `entityFramework` element in the application *Web.config* file (the one in the root project folder), as shown in the following example:

XML

```
<entityFramework>
  <contexts>
    <context type="ContosoUniversity.DAL.SchoolContext,
ContosoUniversity">
      <databaseInitializer type="ContosoUniversity.DAL.SchoolInitializer,
ContosoUniversity" />
    </context>
  </contexts>
  <defaultConnectionFactory
type="System.Data.Entity.Infrastructure.LocalDbConnectionFactory,
EntityFramework">
    <parameters>
      <parameter value="v11.0" />
    </parameters>
  </defaultConnectionFactory>
  <providers>
    <provider invariantName="System.Data.SqlClient"
type="System.Data.Entity.SqlServer.SqlProviderServices,
EntityFramework.SqlServer" />
  </providers>
</entityFramework>
```

The `context type` specifies the fully qualified context class name and the assembly it's in, and the `databaseinitializer type` specifies the fully qualified name of the

initializer class and the assembly it's in. (When you don't want EF to use the initializer, you can set an attribute on the `context` element: `disableDatabaseInitialization="true"`.) For more information, see Configuration File Settings.

An alternative to setting the initializer in the *Web.config* file is to do it in code by adding a `Database.SetInitializer` statement to the `Application_Start` method in the *Global.asax.cs* file. For more information, see Understanding Database Initializers in Entity Framework Code First .

The application is now set up so that when you access the database for the first time in a given run of the application, Entity Framework compares the database to the model (your `SchoolContext` and entity classes). If there's a difference, the application drops and re-creates the database.

> **Note**
>
> When you deploy an application to a production web server, you must remove or disable code that drops and re-creates the database. You'll do that in a later tutorial in this series.

Set up EF 6 to use LocalDB

LocalDB is a lightweight version of the SQL Server Express database engine. It's easy to install and configure, starts on demand, and runs in user mode. LocalDB runs in a special execution mode of SQL Server Express that enables you to work with databases as *.mdf* files. You can put LocalDB database files in the *App_Data* folder of a web project if you want to be able to copy the database with the project. The user instance feature in SQL Server Express also enables you to work with *.mdf* files, but the user instance feature is deprecated; therefore, LocalDB is recommended for working with *.mdf* files. LocalDB is installed by default with Visual Studio.

Typically, SQL Server Express is not used for production web applications. LocalDB in particular is not recommended for production use with a web application because it's not designed to work with IIS.

- In this tutorial, you'll work with LocalDB. Open the application *Web.config* file and add a `connectionStrings` element preceding the `appSettings` element, as shown in the

following example. (Make sure you update the *Web.config* file in the root project folder. There's also a *Web.config* file in the *Views* subfolder that you don't need to update.)

```
XML
```

```
<connectionStrings>
    <add name="SchoolContext" connectionString="Data Source=
(LocalDb)\MSSQLLocalDB;Initial Catalog=ContosoUniversity1;Integrated
Security=SSPI;" providerName="System.Data.SqlClient"/>
</connectionStrings>
<appSettings>
  <add key="webpages:Version" value="3.0.0.0" />
  <add key="webpages:Enabled" value="false" />
  <add key="ClientValidationEnabled" value="true" />
  <add key="UnobtrusiveJavaScriptEnabled" value="true" />
</appSettings>
```

The connection string you've added specifies that Entity Framework will use a LocalDB database named *ContosoUniversity1.mdf*. (The database doesn't exist yet but EF will create it.) If you want to create the database in your *App_Data* folder, you could add `AttachDBFilename=|DataDirectory|\ContosoUniversity1.mdf` to the connection string. For more information about connection strings, see SQL Server Connection Strings for ASP.NET Web Applications.

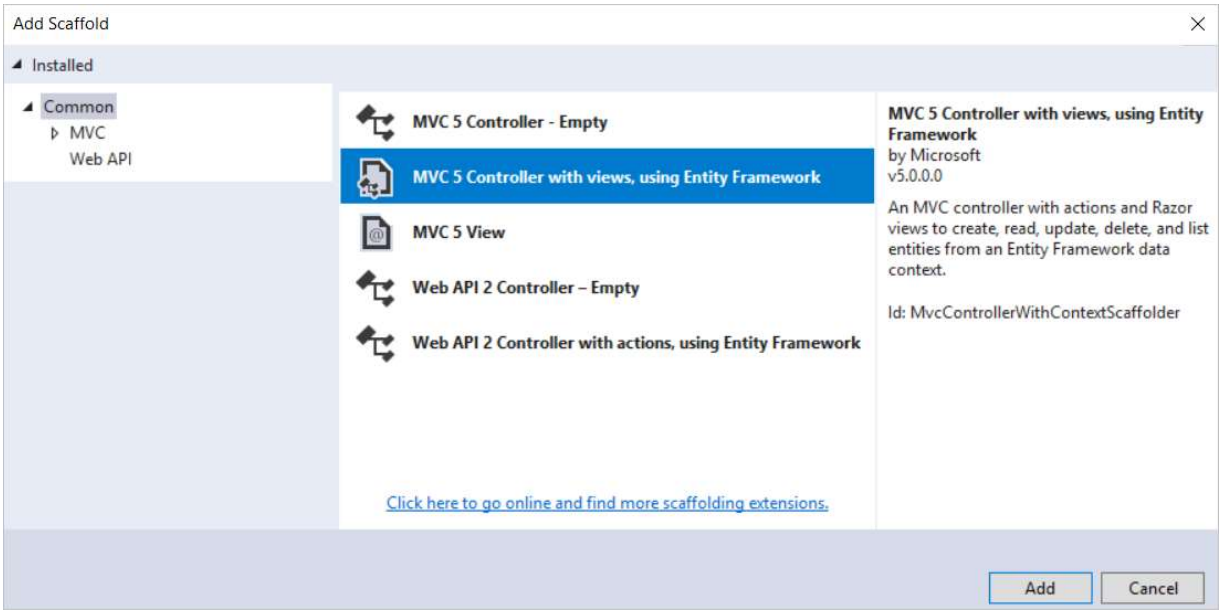
You don't actually need a connection string in the *Web.config* file. If you don't supply a connection string, Entity Framework uses a default connection string based on your context class. For more information, see Code First to a New Database.

Create controller and views

Now you'll create a web page to display data. The process of requesting the data automatically triggers the creation of the database. You'll begin by creating a new controller. But before you do that, build the project to make the model and context classes available to MVC controller scaffolding.

1. Right-click the **Controllers** folder in **Solution Explorer**, select **Add**, and then click **New Scaffolded Item**.

2. In the **Add Scaffold** dialog box, select **MVC 5 Controller with views, using Entity Framework**, and then choose **Add**.



3. In the **Add Controller** dialog box, make the following selections, and then choose **Add**:

   - Model class: **Student (ContosoUniversity.Models)**. (If you don't see this option in the drop-down list, build the project and try again.)
   - Data context class: **SchoolContext (ContosoUniversity.DAL)**.
   - Controller name: **StudentController** (not StudentsController).
   - Leave the default values for the other fields.

     When you click **Add**, the scaffolder creates a *StudentController.cs* file and a set of views (*.cshtml* files) that work with the controller. In the future when you create projects that use Entity Framework, you can also take advantage of some additional functionality of the scaffolder: create your first model class, don't create a connection string, and then in the **Add Controller** box specify **New data context** by selecting the **+** button next to **Data context class**. The scaffolder will create your `DbContext` class and your connection string as well as the controller and views.

4. Visual Studio opens the *Controllers\StudentController.cs* file. You see that a class variable has been created that instantiates a database context object:

```
C#

private SchoolContext db = new SchoolContext();
```

The `Index` action method gets a list of students from the *Students* entity set by reading the `Students` property of the database context instance:

C#

```
public ViewResult Index()
{
    return View(db.Students.ToList());
}
```

The *Student\Index.cshtml* view displays this list in a table:

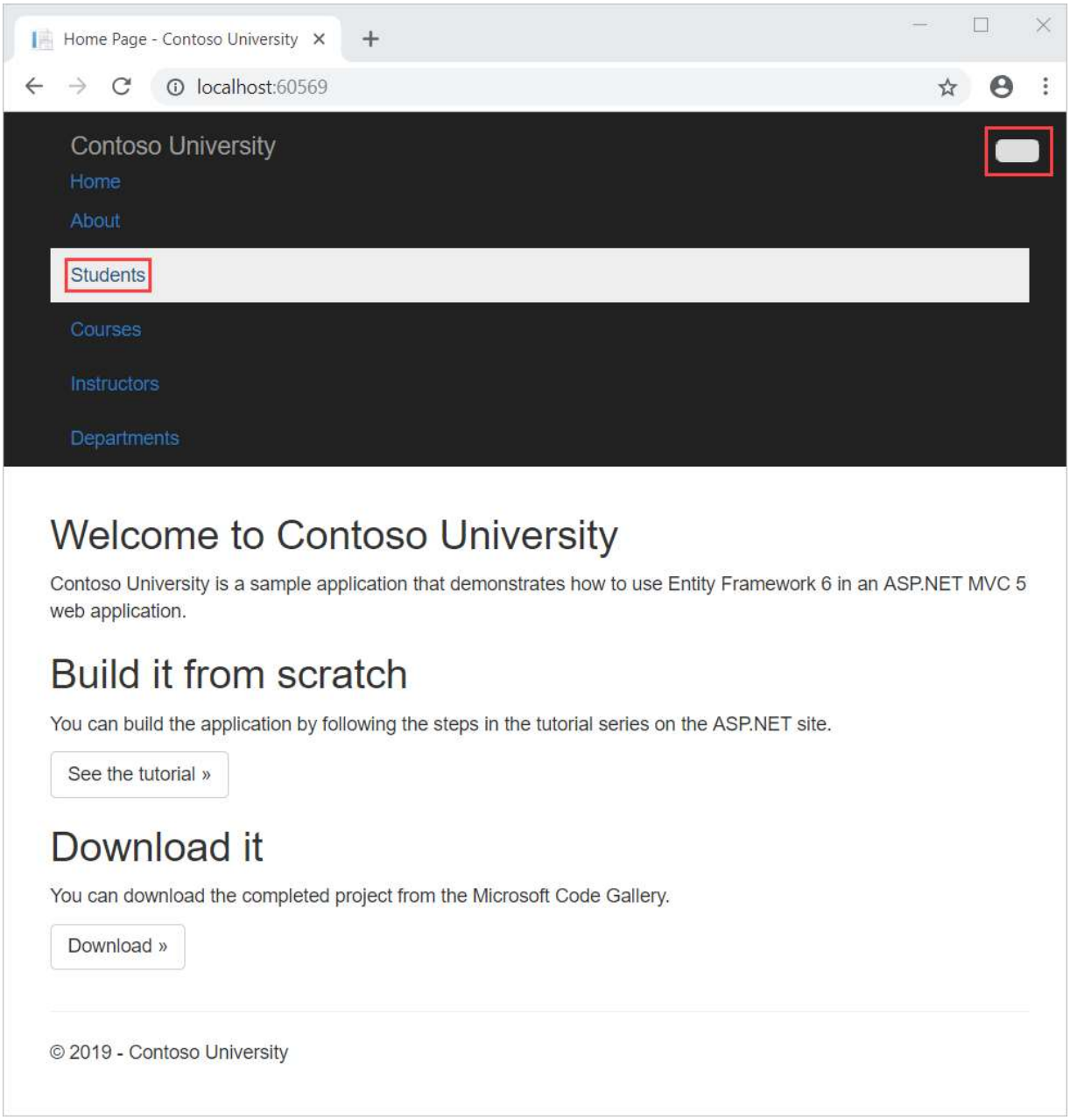
CSHTML

```
<table>
    <tr>
        <th>
            @Html.DisplayNameFor(model => model.LastName)
        </th>
        <th>
            @Html.DisplayNameFor(model => model.FirstMidName)
        </th>
        <th>
            @Html.DisplayNameFor(model => model.EnrollmentDate)
        </th>
        <th></th>
    </tr>

@foreach (var item in Model) {
    <tr>
        <td>
            @Html.DisplayFor(modelItem => item.LastName)
        </td>
        <td>
            @Html.DisplayFor(modelItem => item.FirstMidName)
        </td>
        <td>
            @Html.DisplayFor(modelItem => item.EnrollmentDate)
        </td>
        <td>
            @Html.ActionLink("Edit", "Edit", new { id=item.ID }) |
            @Html.ActionLink("Details", "Details", new { id=item.ID }) |
            @Html.ActionLink("Delete", "Delete", new { id=item.ID })
        </td>
    </tr>
}
```

5. Press Ctrl+F5 to run the project. (If you get a "Cannot create Shadow Copy" error, close the browser and try again.)

   Click the **Students** tab to see the test data that the `Seed` method inserted. Depending on how narrow your browser window is, you'll see the Student tab link in the top address bar or you'll have to click the upper right corner to see the link.



View the database

When you ran the Students page and the application tried to access the database, EF discovered that there was no database and created one. EF then ran the seed method to populate the database with data.

You can use either **Server Explorer** or **SQL Server Object Explorer** (SSOX) to view the database in Visual Studio. For this tutorial, you'll use **Server Explorer**.

1. Close the browser.

2. In **Server Explorer**, expand **Data Connections** (you may need to select the refresh button first), expand **School Context (ContosoUniversity)**, and then expand **Tables** to see the tables in your new database.

3. Right-click the **Student** table and click **Show Table Data** to see the columns that were created and the rows that were inserted into the table.

4. Close the **Server Explorer** connection.

The *ContosoUniversity1.mdf* and *.ldf* database files are in the *%USERPROFILE%* folder.

Because you're using the `DropCreateDatabaseIfModelChanges` initializer, you could now make a change to the `Student` class, run the application again, and the database would automatically be re-created to match your change. For example, if you add an `EmailAddress` property to the `Student` class, run the Students page again, and then look at the table again, you'll see a new `EmailAddress` column.

Conventions

The amount of code you had to write in order for Entity Framework to be able to create a complete database for you is minimal because of *conventions*, or assumptions that Entity Framework makes. Some of them have already been noted or were used without your being aware of them:

- The pluralized forms of entity class names are used as table names.
- Entity property names are used for column names.
- Entity properties that are named `ID` or *classname* `ID` are recognized as primary key properties.
- A property is interpreted as a foreign key property if it's named <*navigation property name*><*primary key property name*> (for example, `StudentID` for the `Student` navigation property since the `Student` entity's primary key is `ID`). Foreign key properties can also be named the same simply <primary key property name> (for example, `EnrollmentID` since the `Enrollment` entity's primary key is `EnrollmentID`).

You've seen that conventions can be overridden. For example, you specified that table names shouldn't be pluralized, and you'll see later how to explicitly mark a property as a foreign key property.

Get the code

Download Completed Project

Additional resources

For more about EF 6, see these articles:

- ASP.NET Data Access - Recommended Resources
- Code First Conventions
- Creating a More Complex Data Model

Next steps

In this tutorial, you:

- ✓ Created an MVC web app
- ✓ Set up the site style
- ✓ Installed Entity Framework 6
- ✓ Created the data model
- ✓ Created the database context
- ✓ Initialized DB with test data
- ✓ Set up EF 6 to use LocalDB
- ✓ Created controller and views
- ✓ Viewed the database

Advance to the next article to learn how to review and customize the create, read, update, delete (CRUD) code in your controllers and views.

Implement basic CRUD functionality