

LAB 1

DEVELOP ASP.NET CORE WEB APP (P1)

❖ CONTENT

- Create an ASP.NET Core MVC project
- Setup database connection & implement Authentication (login/logout, register)
- Create tables with ORM technique
- Implement CRUD features with Scaffolding technique
- Customize web layout (template) & identity pages
- Set default role for user registration
- Seed (populate) initial data to database
- Setup Authorization (role-based access) for different features

❖ INSTRUCTION

1. Open Visual Studio and create new ASP.NET Core MVC web app

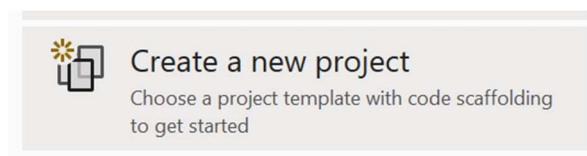


Figure 1 - Create new project in Visual Studio

2. Config ASP.NET Core project

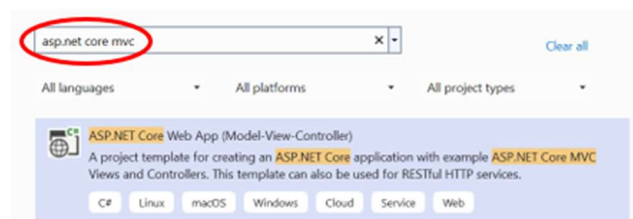


Figure 2 - Search & select ASP.NET Core Web App (MVC)

Configure your new project

ASP.NET Core Web App (Model-View-Controller) C# Linux macOS Windows

Project name
web

Location
D:\workspace\Teaching\netcore-course\codes\

Solution name
web

☒ Place solution and project in the same directory

Project will be created in "D:\workspace\Teaching\netcore-course\codes\web\"

Figure 3 – Set project location, solution & project name

ASP.NET Core Web App (Model-View-Controller) C# Linux macOS

Framework
.NET Core 3.1 (Out of support)

Authentication type
Individual Accounts

☒ Configure for HTTPS

☐ Enable container support

Container OS
Linux

Container build type
Dockerfile

☒ Enable Razor runtime compilation

Figure 4 – Select framework version & authentication type

3. Add model to automatically create table

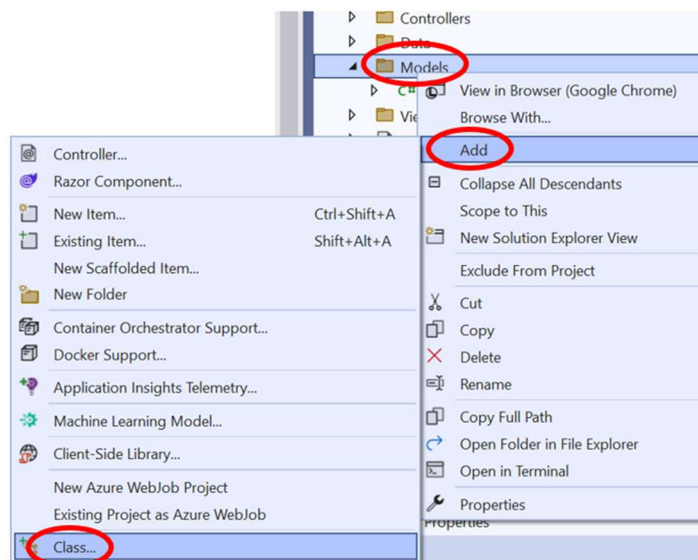


Figure 5 - Add new Model (class)

```

public class Book
{
    public int BookId { get; set; }
    public string BookTitle { get; set; }
    public double BookPrice { get; set; }
    public string BookCover { get; set; }
}

```

Figure 6 – Models/Book.cs

4. Generate Controller with Views for CRUD features with Scaffolding technique

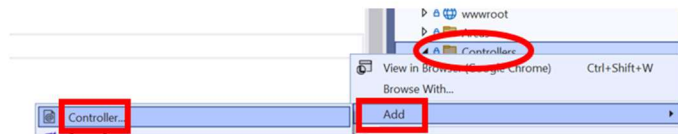


Figure 7 - Add new controller (class)

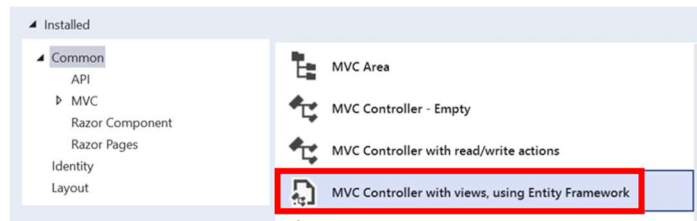


Figure 8 - Select MVC Controller with views

A screenshot of the 'Add MVC Controller with views, using Entity Framework' dialog box. The 'Model class' is set to 'Book (web.Models)'. The 'DbContext class' is set to 'ApplicationDbContext (web.Data)'. Under the 'Views' section, the checkboxes for 'Generate views', 'Reference script libraries', and 'Use a layout page' are all checked. The 'Controller name' field contains 'BooksController'. At the bottom right, there are 'Add' and 'Cancel' buttons.

Figure 9 - Select Model class & DbContext class

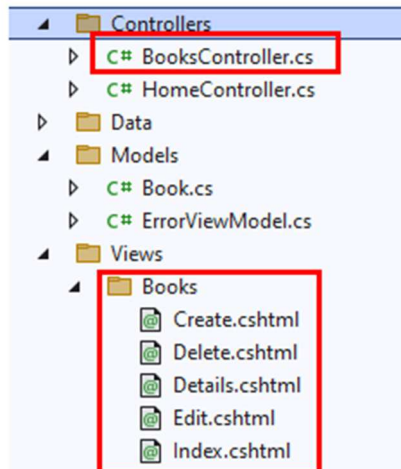


Figure 10 - Controller & Views have been generated for selected Model

5. Override Identity pages to customize view of Authentication (Login, Register,...)

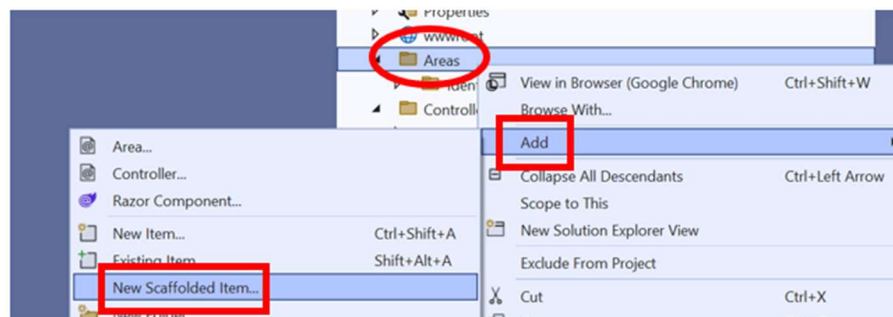


Figure 11 - Add new Scaffolded Item

Add New Scaffolded Item

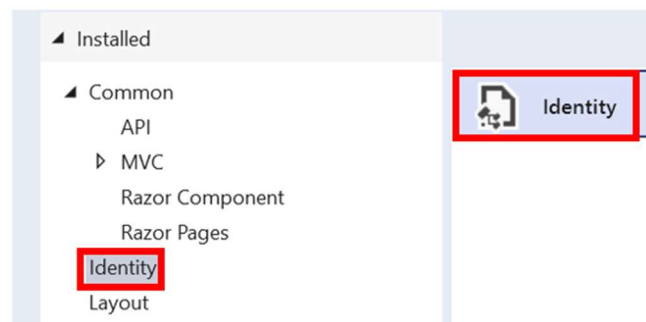


Figure 12 - Select option **Identity**

Add Identity

Select an existing layout page, or specify a new one:
/Areas/Identity/Pages/Account/Manage/_Layout.cshtml
(If you specify a file, it is not in a Razor _viewstart file)

☒ Override all files

Choose files to override

<input checked="" type="checkbox"/> Account/StatusMessage	<input checked="" type="checkbox"/> Account/AccessDenied	<input checked="" type="checkbox"/> Account/ConfirmEmail
<input checked="" type="checkbox"/> Account/ConfirmEmailChange	<input checked="" type="checkbox"/> Account/ExternalLogin	<input checked="" type="checkbox"/> Account/ForgotPassword
<input checked="" type="checkbox"/> Account/ForgotPasswordConfirmation	<input checked="" type="checkbox"/> Account/Lockout	<input checked="" type="checkbox"/> Account/Login
<input checked="" type="checkbox"/> Account/LoginWith2fa	<input checked="" type="checkbox"/> Account/LoginWithRecoveryCode	<input checked="" type="checkbox"/> Account/Logout
<input checked="" type="checkbox"/> Account/Manage/Layout	<input checked="" type="checkbox"/> Account/Manage/ManageNav	<input checked="" type="checkbox"/> Account/Manage/StatusMessage
<input checked="" type="checkbox"/> Account/Manage/ChangePassword	<input checked="" type="checkbox"/> Account/Manage/DeletePersonalData	<input checked="" type="checkbox"/> Account/Manage/Disable2fa
<input checked="" type="checkbox"/> Account/Manage/DownloadPersonalData	<input checked="" type="checkbox"/> Account/Manage/Email	<input checked="" type="checkbox"/> Account/Manage/EnableAuthenticator
<input checked="" type="checkbox"/> Account/Manage/ExternalLogins	<input checked="" type="checkbox"/> Account/Manage/GenerateRecoveryCodes	<input checked="" type="checkbox"/> Account/Manage/Index
<input checked="" type="checkbox"/> Account/Manage/PersonalData	<input checked="" type="checkbox"/> Account/Manage/ResetAuthenticator	<input checked="" type="checkbox"/> Account/Manage/SetPassword
<input checked="" type="checkbox"/> Account/Manage/ShowRecoveryCodes	<input checked="" type="checkbox"/> Account/Manage/TwoFactorAuthentication	<input checked="" type="checkbox"/> Account/Register
<input checked="" type="checkbox"/> Account/RegisterConfirmation	<input checked="" type="checkbox"/> Account/ResendEmailConfirmation	<input checked="" type="checkbox"/> Account/ResetPassword
<input checked="" type="checkbox"/> Account/ResetPasswordConfirmation		

DbContext class:

Database provider:

User class:

Figure 13 - Override all files & select DbContext class

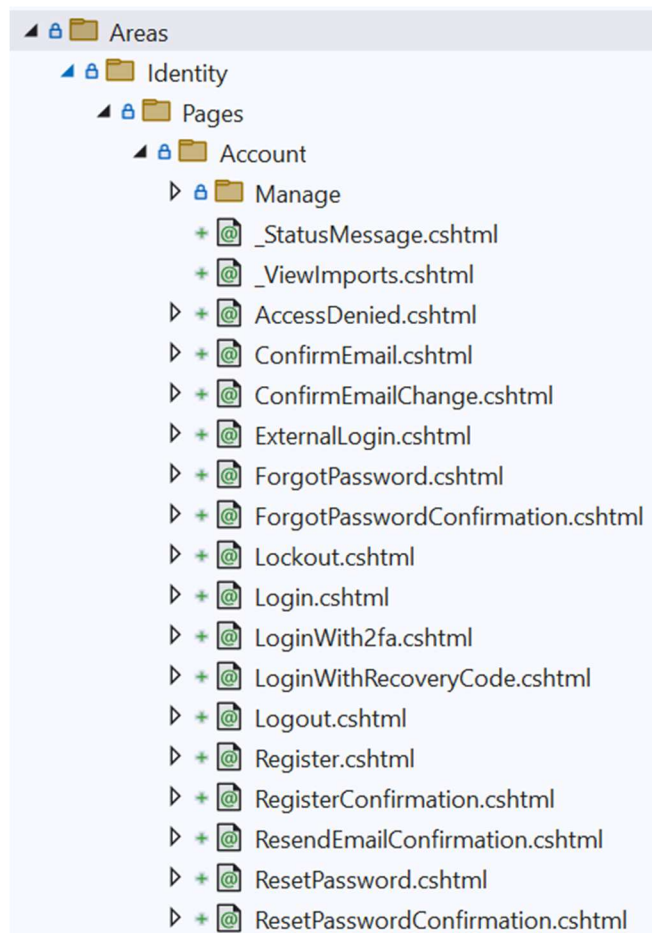


Figure 14 - All Identity pages were displayed to be overridden

6. Customize web layout & other web pages

```
<div class="navbar-collapse collapse d-sm-inline-flex flex-sm-row-reverse">
  <partial name="_LoginPartial" />
  <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="Books" asp-action="Index">Book</a>
    </li>
  </ul>
</div>
```

Figure 15 - Views/Shared/_Layout.cshtml

```
<div class="text-center">
  
</div>
```

Figure 16 - Views/Home/Index.cshtml

```
<p>
  <a class="btn btn-primary" asp-action="Create">Create New</a>
</p>
```

Figure 17 - Views/Books/Index.cshtml (1)

```
<td>
  <a class="btn btn-warning" asp-action="Edit" asp-route-id="@item.BookId">Edit</a>
  <a class="btn btn-info" asp-action="Details" asp-route-id="@item.BookId">Details</a>
  <a class="btn btn-danger" asp-action="Delete" asp-route-id="@item.BookId">Delete</a>
</td>
```

Figure 18 - Views/Books/Index.cshtml (2)

```
<td>
  
</td>
```

Figure 19 - Views/Laptops/Index.cshtml (3)

7. Seed initial data to database

```
protected override void OnModelCreating(ModelBuilder builder)
{
    base.OnModelCreating(builder);

    //Seed data for User & Role
    SeedUserRole(builder);

    //Seed data for table Book
    SeedBook(builder);
}
```

Figure 20 - Data/ApplicationDbContext.cs (1)

```
private void SeedUserRole(ModelBuilder builder)
{
    //A) Setup IdentityUser
    //1. Create accounts
    var adminAccount = new IdentityUser
    {
        Id = "user1",
        UserName = "admin@gmail.com",
        Email = "admin@gmail.com",
        NormalizedUserName = "ADMIN@GMAIL.COM",
        NormalizedEmail = "ADMIN@GMAIL.COM",
        EmailConfirmed = true
    };

    var readerAccount = new IdentityUser
    {
        Id = "user2",
        UserName = "reader@gmail.com",
        Email = "reader@gmail.com",
        NormalizedUserName = "READER@GMAIL.COM",
        NormalizedEmail = "READER@GMAIL.COM",
        EmailConfirmed = true
    };

    //2. Declare hasher for password encryption
    var hasher = new PasswordHasher<IdentityUser>();

    //3. Setup password for accounts
    adminAccount.PasswordHash = hasher.HashPassword(adminAccount, "123456");
    readerAccount.PasswordHash = hasher.HashPassword(readerAccount, "123456");

    //4. Add accounts to database
    builder.Entity<IdentityUser>().HasData(adminAccount, readerAccount);
}
```

Figure 21 - Data/ApplicationDbContext.cs (2)


```

//B) Setup IdentityRole
builder.Entity<IdentityRole>().HasData(
    new IdentityRole
    {
        Id = "role1",
        Name = "Admin",
        NormalizedName = "ADMIN"
    },
    new IdentityRole
    {
        Id = "role2",
        Name = "Reader",
        NormalizedName = "READER"
    });

//C) Setup IdentityUserRole
builder.Entity<IdentityUserRole<string>>().HasData(
    new IdentityUserRole<string>
    {
        UserId = "user1",
        RoleId = "role1"
    },
    new IdentityUserRole<string>
    {
        UserId = "user2",
        RoleId = "role2"
    }
);
}

```

Figure 22 - *Data/ApplicationDbContext.cs (3)*

```

private void SeedBook(ModelBuilder builder)
{
    builder.Entity<Book>().HasData(
        new Book
        {
            BookId = 1,
            BookTitle = "Clean Code",
            BookPrice = 12.34,
            BookCover = "https://images-na.ssl-images-amazon.com/images/I/51E2055ZGUL.jpg"
        },
        new Book
        {
            BookId = 2,
            BookTitle = "How to win friends & influence people",
            BookPrice = 9.99,
            BookCover = "https://rukminim2.flixcart.com/image/850/1000/kkr72q80/book/k/4/l/how-to-win-friends-influence-people-international-bestseller-original-imageyf2wgzsbqvba.jpeg?q=90&crop=false"
        },
        new Book
        {
            BookId = 3,
            BookTitle = "Harry Porter",
            BookPrice = 6.78,
            BookCover = "https://nhasachphuongnam.com/images/detailed/160/81Y0u06FCJL.jpg"
        }
    );
}

```

Figure 23 - *Data/ApplicationDbContext.cs (4)*

8. Config system to use roles for web authorization

```
services.AddDefaultIdentity<IdentityUser>(options => options.SignInOptions.AddDefault())
    .AddRoles<IdentityRole>();
services.AddEntityFrameworkStores<ApplicationDbContext>();
services.AddControllersWithViews();
services.AddRazorPages();
```

Figure 24 - Startup.cs

9. Setup role-based access for different features

- Restrict user access in backend (controller)

```
//Setup role for a controller
[Authorize(Roles = "Admin")]
public class BooksController : Controller
```

Figure 25 - Controllers/BooksController.cs (1)

```
//Setup mutiple roles for an action
[Authorize(Roles = "Admin, Reader")]
public async Task<IActionResult> Index()
```

Figure 26 - Controllers/BooksController.cs (2)

```
//Setup single role for an action
[Authorize(Roles = "Admin")]
public IActionResult Create()
```

Figure 27 - Controllers/BookssController.cs (3)

```
//Setup access for all roles (logged in users)
[Authorize]
public async Task<IActionResult> Index()
```

Figure 28 - Controllers/BooksController.cs (4)

- Restrict user access in frontend (view)

```
<p>  
    @if (User.Identity.IsAuthenticated && User.IsInRole("Admin"))  
    {  
        <a asp-action="Create">Create New</a>  
    }  
</p>
```

Figure 29 - Views/Laptops/Index.cshtml

10. Set default role for user registration (optional)

```
var callbackUrl = Url.Page(  
    "/Account/ConfirmEmail",  
    pageHandler: null,  
    values: new { area = "Identity", userId = user.Id, code = code, returnUrl = returnUrl },  
    protocol: Request.Scheme);  
  
//Set default role "Reader" for new user registration  
var role = "Reader";  
await _userManager.AddToRoleAsync(user, role);  
  
await _emailSender.SendEmailAsync(Input.Email, "Confirm your email",  
    $"Please confirm your account by <a href='{HtmlEncoder.Default.Encode(callbackUrl)}'>clicking here</a>." );
```

Figure 30 - Areas/Identity/Pages/Account/Register.cshtml.cs

11. Migrate data to database

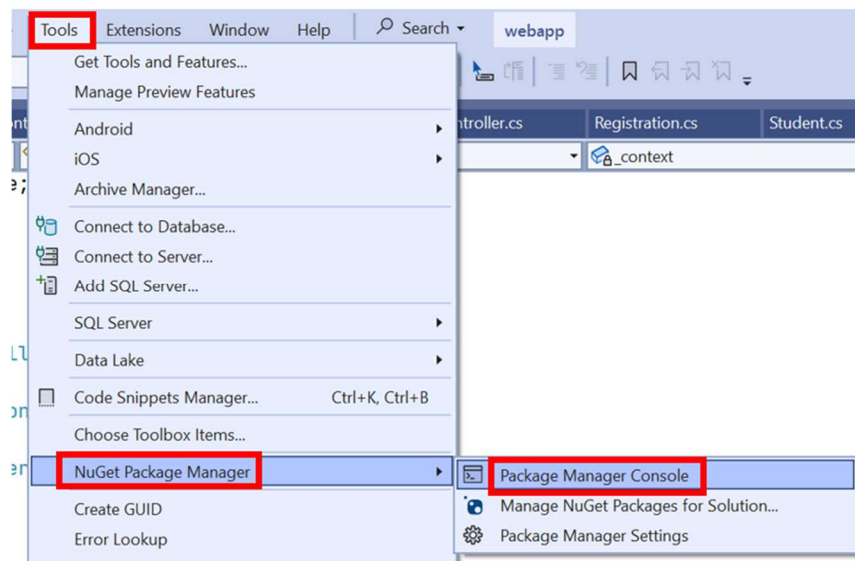


Figure 31 - Open Package Manager Console (PMC)

Log in

Email

Password

☐ Remember me?

Log in

[Forgot your password?](#)

[Register as a new user](#)

Figure 35 - Login page

Register

Email

Password

Confirm Password

Register

Figure 36 - Register page

Index

Create New


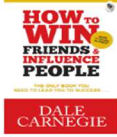

BookTitle	BookPrice	BookCover	Menu
Clean Code	\$12.34		Edit Details Delete
How to win friends & influence people	\$9.99		Edit Details Delete
Harry Potter	\$6.78		Edit Details Delete

Figure 37 - View book list

Create Book

BookTitle

BookPrice

BookCover

Create

[Back to List](#)

Figure 38 - Create new book

Edit

Book

BookTitle

Clean Code

BookPrice

12.34

BookCover

https://images-na.ssl-images-amazon.com/im

Save

[Back to List](#)

Figure 39 - Edit existing book

Delete

Are you sure you want to delete this?

Book

BookTitle

How to win friends & influence people

BookPrice

9.99

BookCover

https://rukminim2.flixcart.com/image/850/1000/kkr72q80/book/k/4/l/how-to-win-friends-influence-people-international-bestseller-original-image/f2wgzsbgvba.jpeg?q=90&crop=false

Delete

[Back to List](#)

Figure 40 - Delete existing book

Access denied

You do not have access to this resource.

Figure 41 - Access denied page