Basic Web

MVC, ASP.NET Core, Razor

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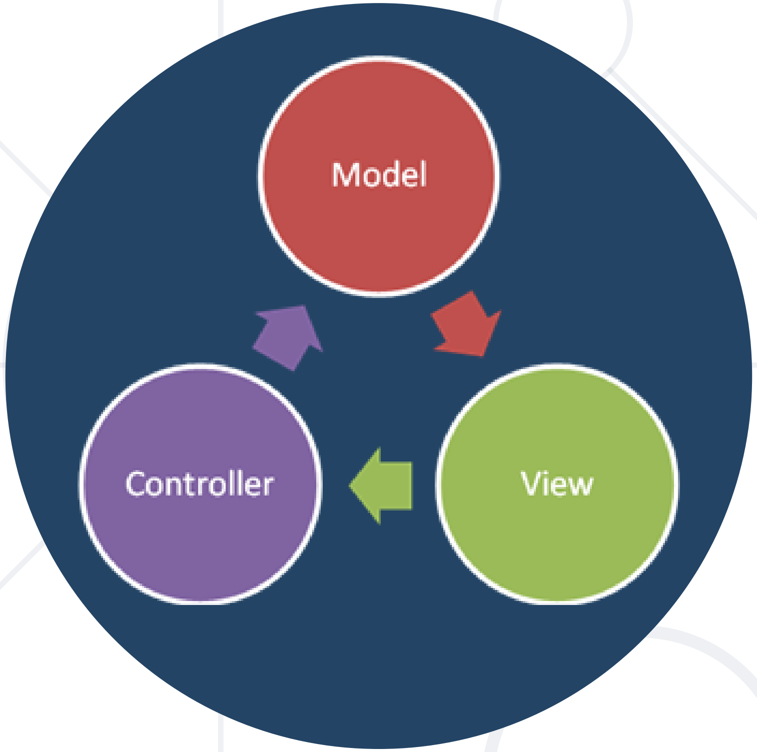
Have a Question?

sli.do

#fund-csharp



Model – View – Controller

MVC

MVC

- **Model-View-Controller** (MVC) is an architectural pattern
- Separates an application into **three main groups**
  - **Views, controller, models**
- Helps to achieve **separation of concerns**
- Delineation of responsibilities makes the application
  - Easy to read and understand the logic (better structure)
  - Easy to implement new functionalities and extensions
  - Easy to test and debug

Controller (Logic)

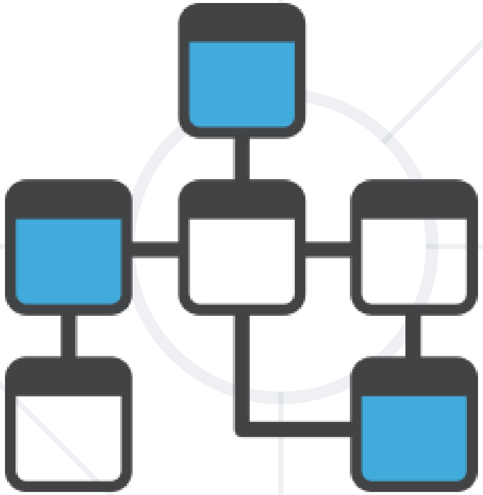
- The **core** MVC component – holds the **logic**
- Processes the requests and renders the views
- A set of classes that handles
  - **Handling data** submitted by the user
  - Overall application **flow**
  - Application-specific **logic** (business logic)
- Every controller has one or more **"actions"**

View (User Interface)

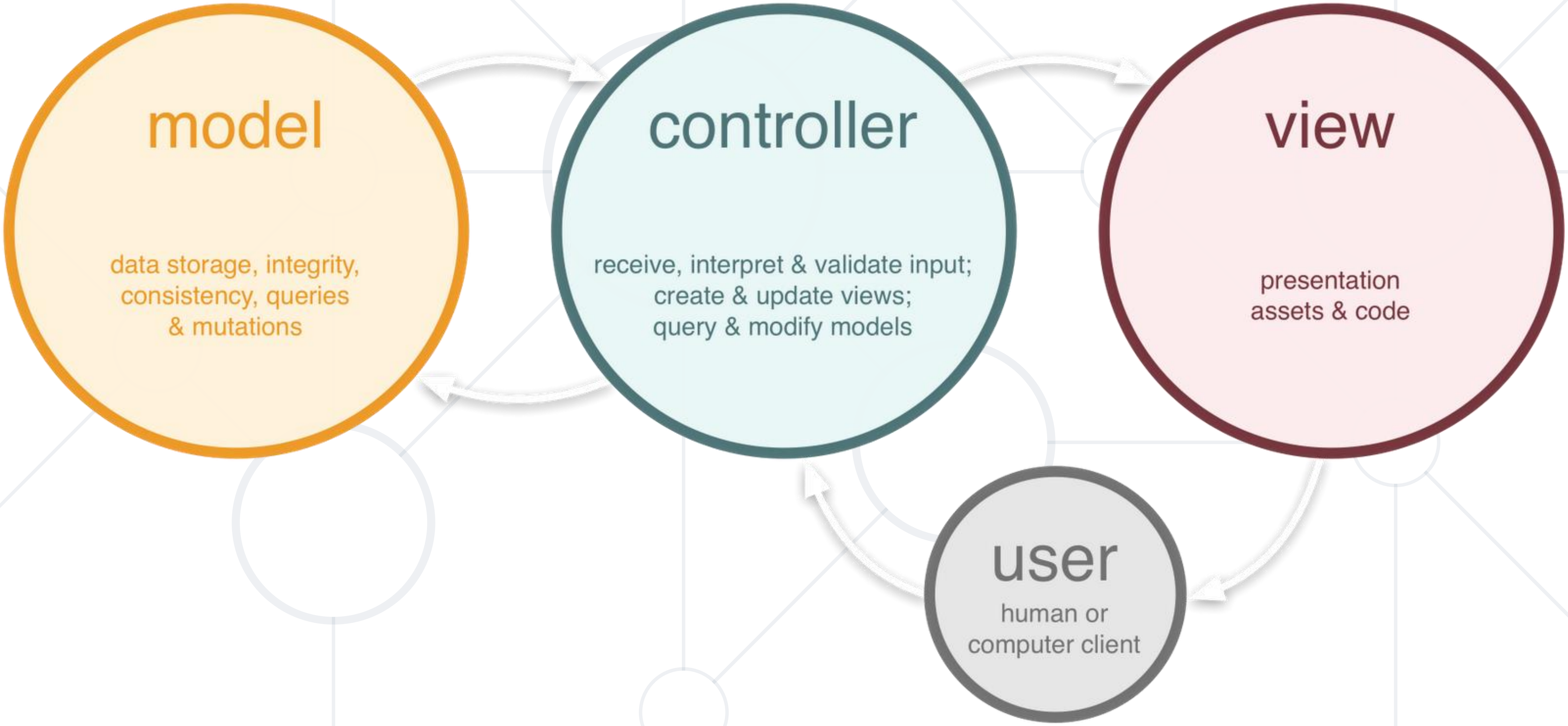
- Defines how the application's **user interface** (UI) will be displayed
- May support master views (**layouts**)
- May support sub-views (**partial views** or controls)
- May use **templates** to **dynamically generate** HTML

Model (Data)

- Set of **classes** that describes the **data** we are working with
- Rules for **how** the data can be **changed** and **manipulated**
- May contain **data validation rules**
- Often **encapsulates** data stored in a database



MVC


model
data storage, integrity, consistency, queries & mutations
controller
receive, interpret & validate input; create & update views; query & modify models
view
presentation assets & code
user
human or computer client

ASP.NET Core Framework

Web Application MVC Framework for C# and .NET

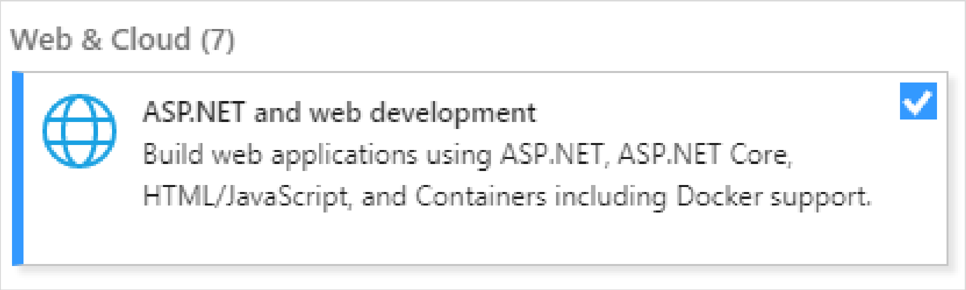
Web Framework

- **Framework** == set of resources and tools, used as base for building a software system
- **Web application framework** – provides a standard way to build and deploy **Web applications**
- Designed to support the development of
  - Web services
  - Web resources
  - Web APIs

ASP.NET Core MVC

- Lightweight, open-source and highly testable Web application framework
- Uses the **Model-View-Controller** design pattern
- Cross-platform – targeting the .NET Core platform
  - Runs on multiple operating systems

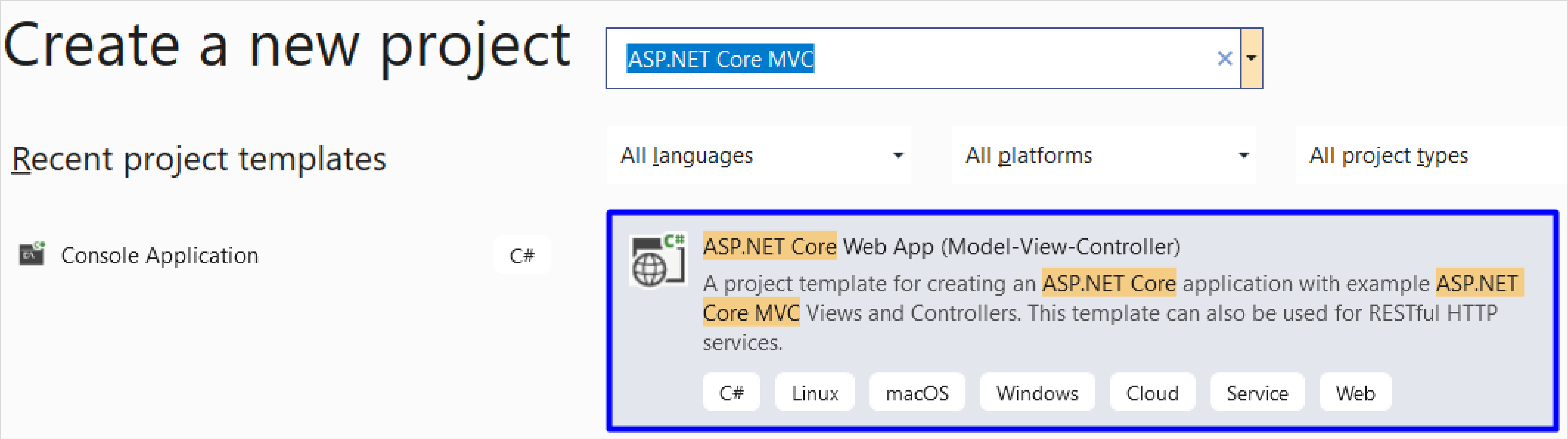
Create ASP.NET Core MVC App: Project Type



Web & Cloud (7)

☑ ASP.NET and web development
Build web applications using ASP.NET, ASP.NET Core, HTML/JavaScript, and Containers including Docker support.

Install this in **Visual Studio**!



Create a new project

ASP.NET Core MVC

Recent project templates

Console Application C#

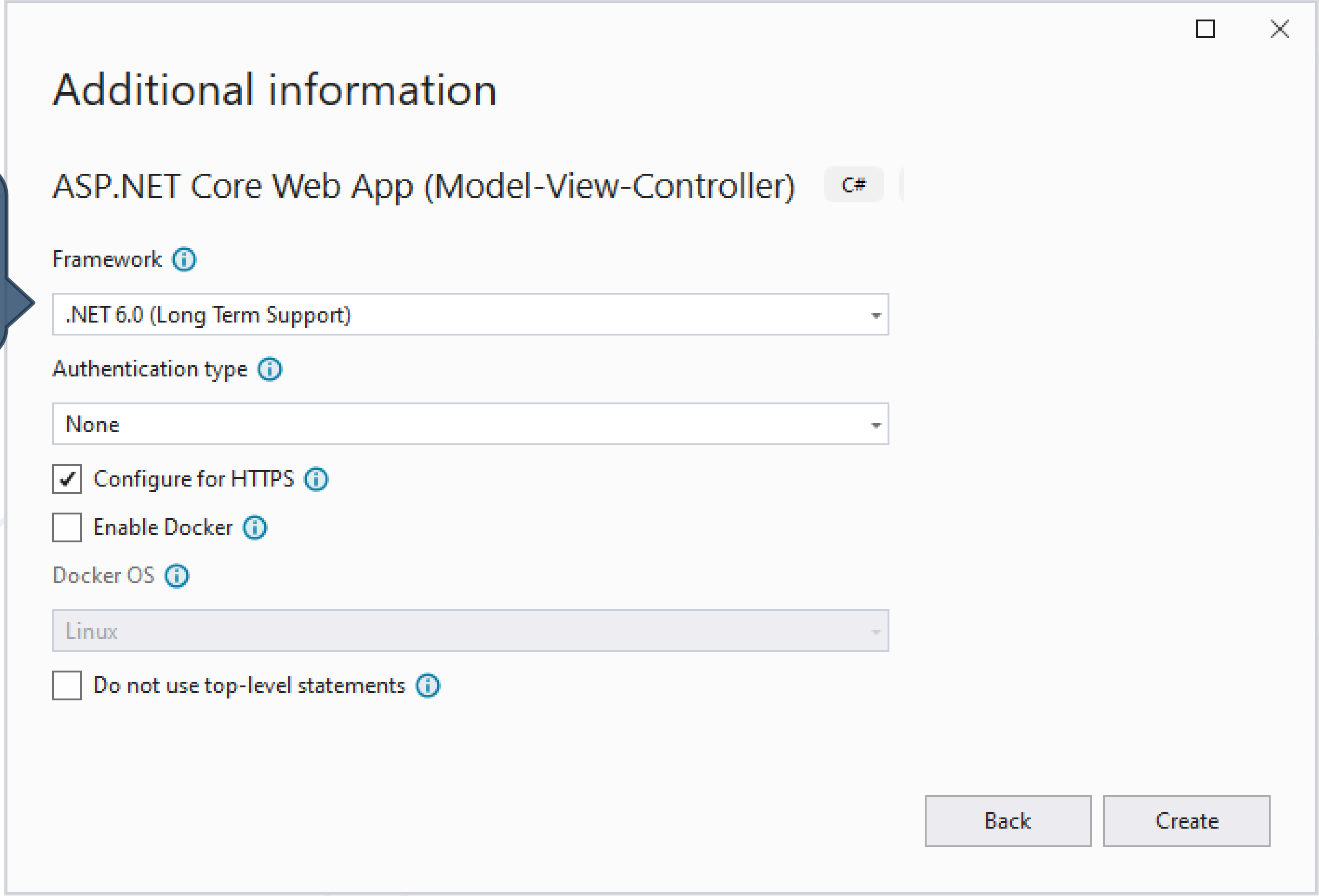
All languages | All platforms | All project types

ASP.NET Core Web App (Model-View-Controller)
A project template for creating an ASP.NET Core application with example ASP.NET Core MVC Views and Controllers. This template can also be used for RESTful HTTP services.

C# | Linux | macOS | Windows | Cloud | Service | Web

Create ASP.NET MVC App: Choose Template

Choose the .NET version



Additional information

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

Framework: .NET 6.0 (Long Term Support)

Authentication type: None

☑ Configure for HTTPS

□ Enable Docker

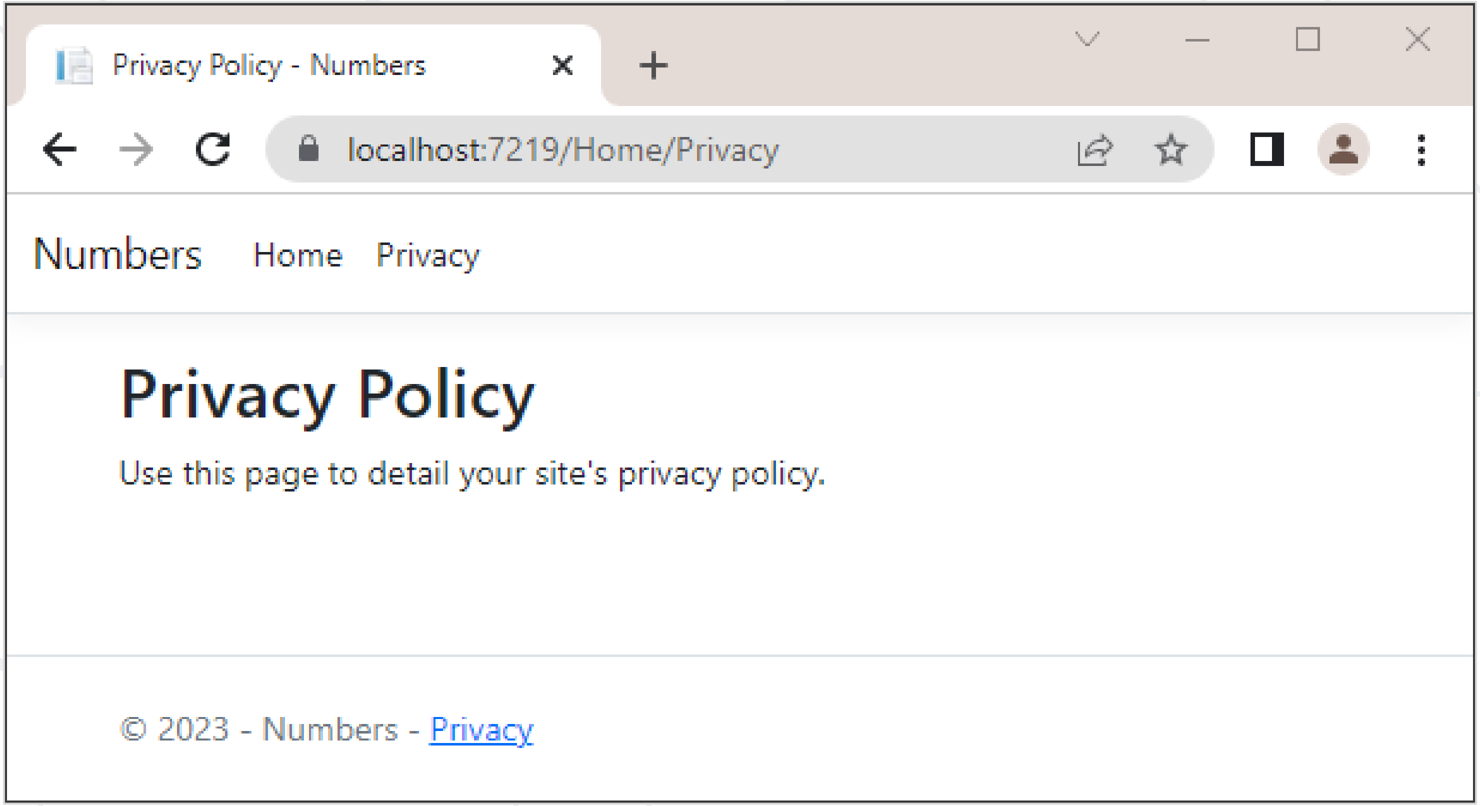
Docker OS: Linux

□ Do not use top-level statements

The "Privacy" Page in the Browser

- Run the app, by pressing **[Ctrl + F5]**
  - Open the "**Privacy**" page on https://localhost:7219/Home/Privacy

The **port number** is auto-generated



Privacy Policy

Use this page to detail your site's privacy policy.

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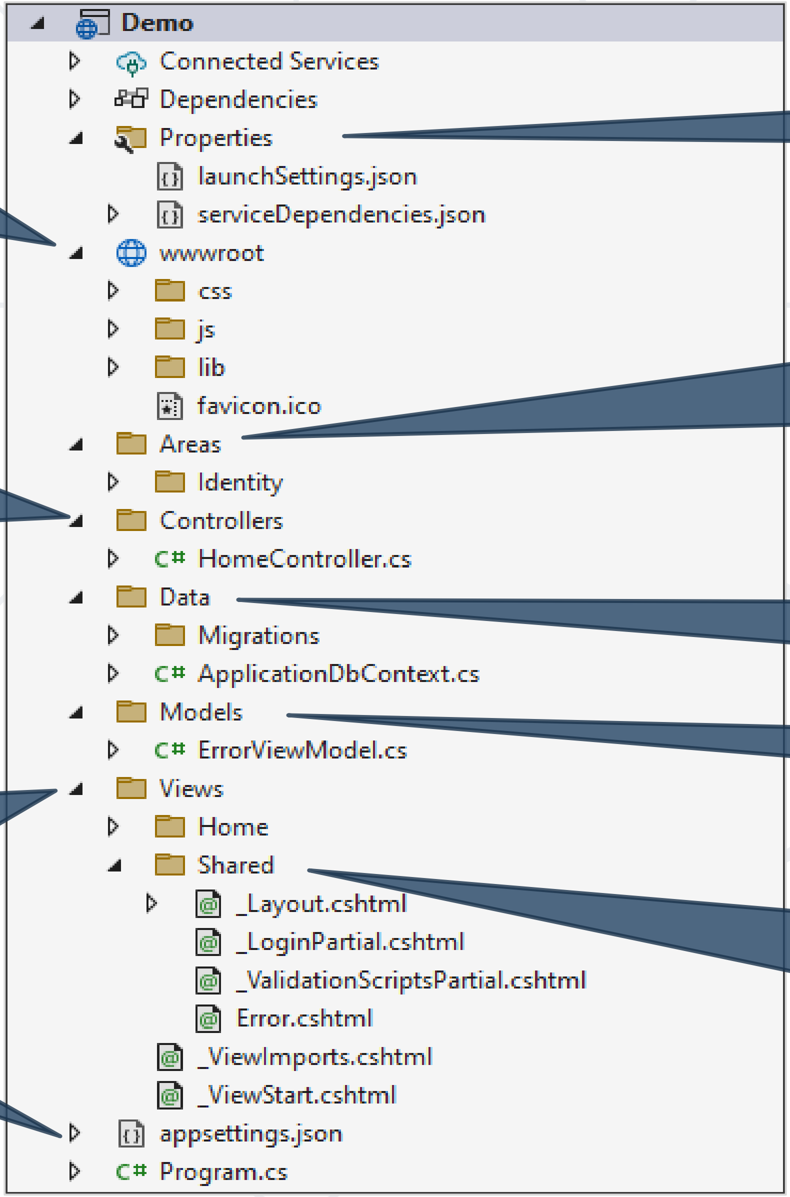
MVC App: What's Inside?

Static files: CSS styles images, fonts, …

Controller classes holding actions

Views: HTML templates for the pages

App start files



```
Demo
  Connected Services
  Dependencies
  Properties
    launchSettings.json
    serviceDependencies.json
  wwwroot
    css
    js
    lib
    favicon.ico
  Areas
    Identity
  Controllers
    HomeController.cs
  Data
    Migrations
    ApplicationDbContext.cs
  Models
    ErrorViewModel.cs
  Views
    Home
    Shared
      _Layout.cshtml
      _LoginPartial.cshtml
      _ValidationScriptsPartial.cshtml
      Error.cshtml
    _ViewImports.cshtml
    _ViewStart.cshtml
  appsettings.json
  Program.cs
```

NuGet packages

Areas: physically partition a web app in separate units

Data: EF models + DB context + migrations

Models: view models

Shared views: layout for all pages + partial views

Controllers in ASP.NET Core

- MVC controllers hold logic to process user interactions
- The URL **/Home/Privacy** invokes **HomeController** → **Privacy()**

\Controllers\HomeController.cs

```
public class HomeController : Controller
{
  public IActionResult Privacy()
  {
     return View();
  }
}
```

Controller's methods are called actions

Renders Views\Home\Index.cshtml

ASP.NET Core App Routing

- Routing is configured within Configure Method in the **Program** Class

```
app.MapControllerRoute(
    name: "default",
    pattern: "{controller=Home}/{action=Index}/{id?}");
});
```

id route parameter is optional

Route values are determined by splitting the URL into segments

- Template Matches URL path like
  - **/Orders/Details/17**
  - **/Orders/All**
- Also match the URL path **"/"**, **{controller}** and **{action}** parameters have default values **Home** and **Index**

Views in ASP.NET Core

- Views render the HTML code for the **invoked action**
- Views combine **HTML** and **C# code**
- ASP.NET MVC uses **Razor** view engine
  - **Markup syntax** for embedding server-based code into webpages
  - Syntax consists of **Razor markup**, **C#**, and **HTML**
  - Files generally have a `.cshtml` file extension
- By convention **Action** and **View** name are identical

The "Razor" Syntax (Templating Engine)

```
\Views\Home\Index.cshtml
```

```
@{
   ViewData["Title] = "Home Page";
}
<h2>@title</h2>
<h3>@ViewBag.Message</h3>
<p>Use this page to detail your site's info.</p>
```

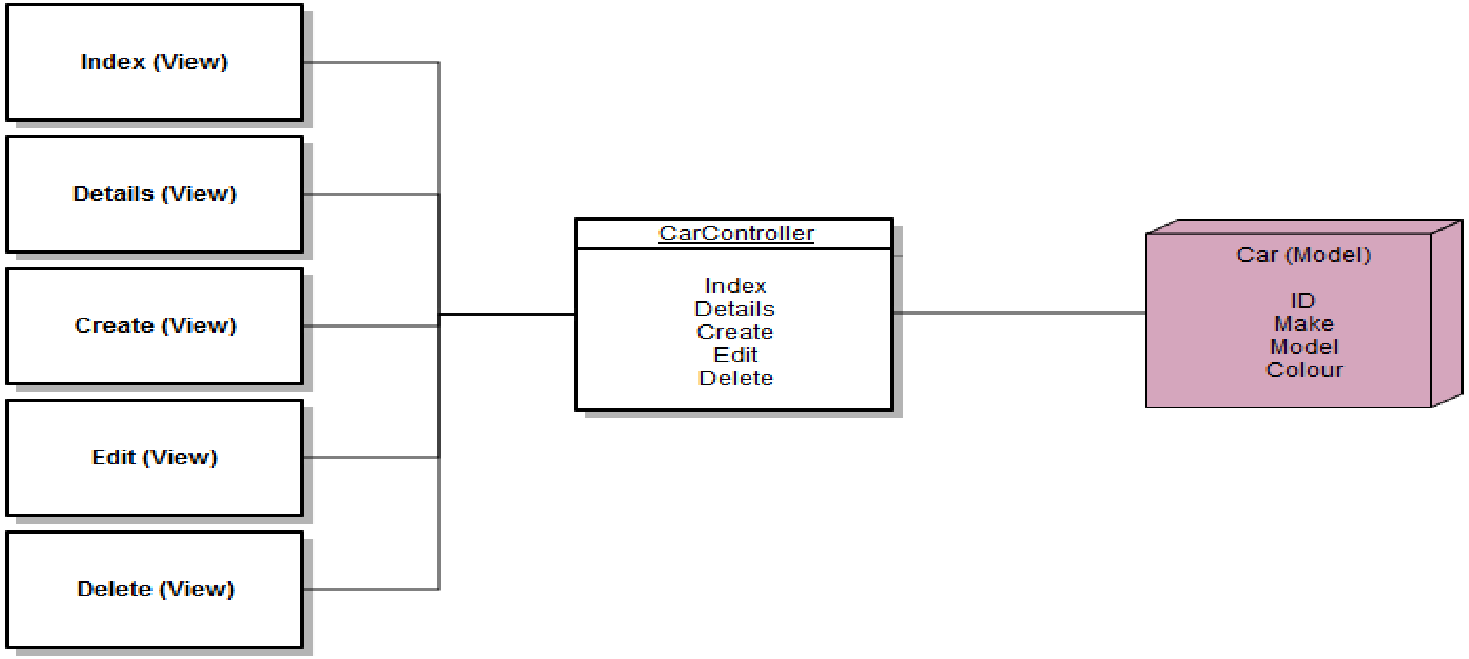
@ { … } inserts C# code block

@Something
prints a C# variable

Everything else
is HTML code

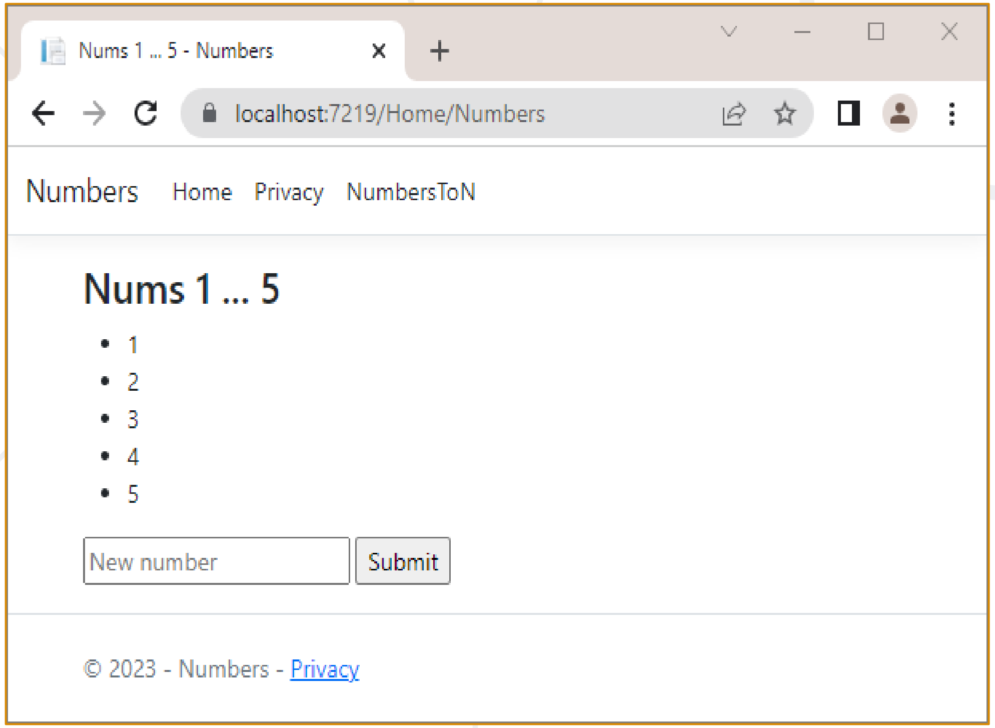
Models in ASP.NET Core

- Represent the state of the application
- May be used by controllers to pass data to Views
- Determine how the data will be stored



Example: Number Generator

- Let's create an application that displays the numbers in range [1…n], where n will be given by the user via a form input



Nums 1 ... 5

- 1
- 2
- 3
- 4
- 5

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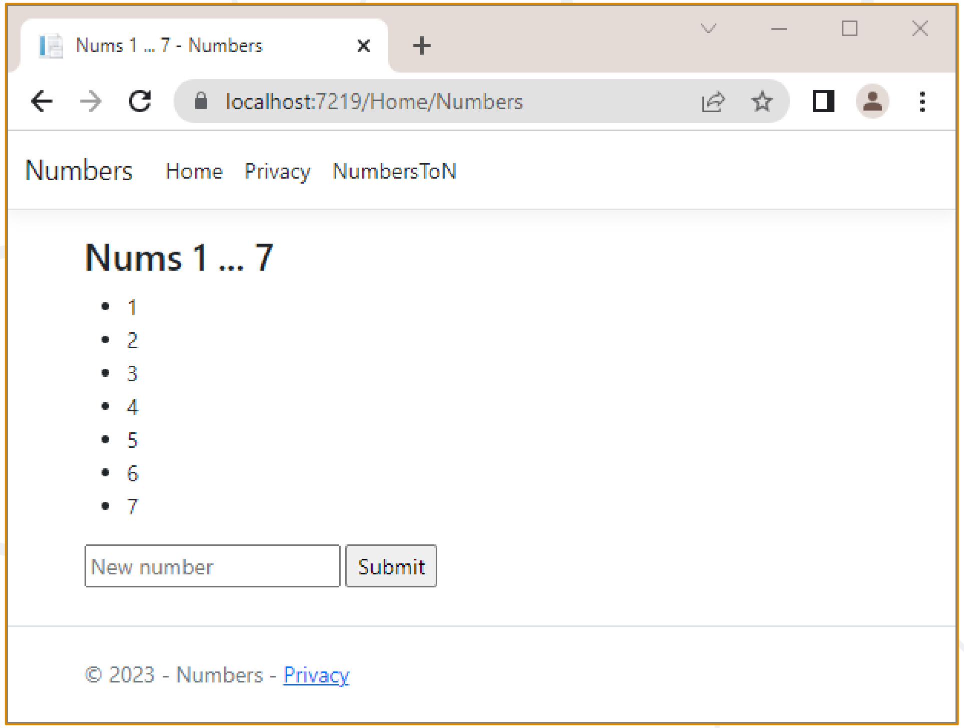

Nums 1 ... 7

- 1
- 2
- 3
- 4
- 5
- 6
- 7

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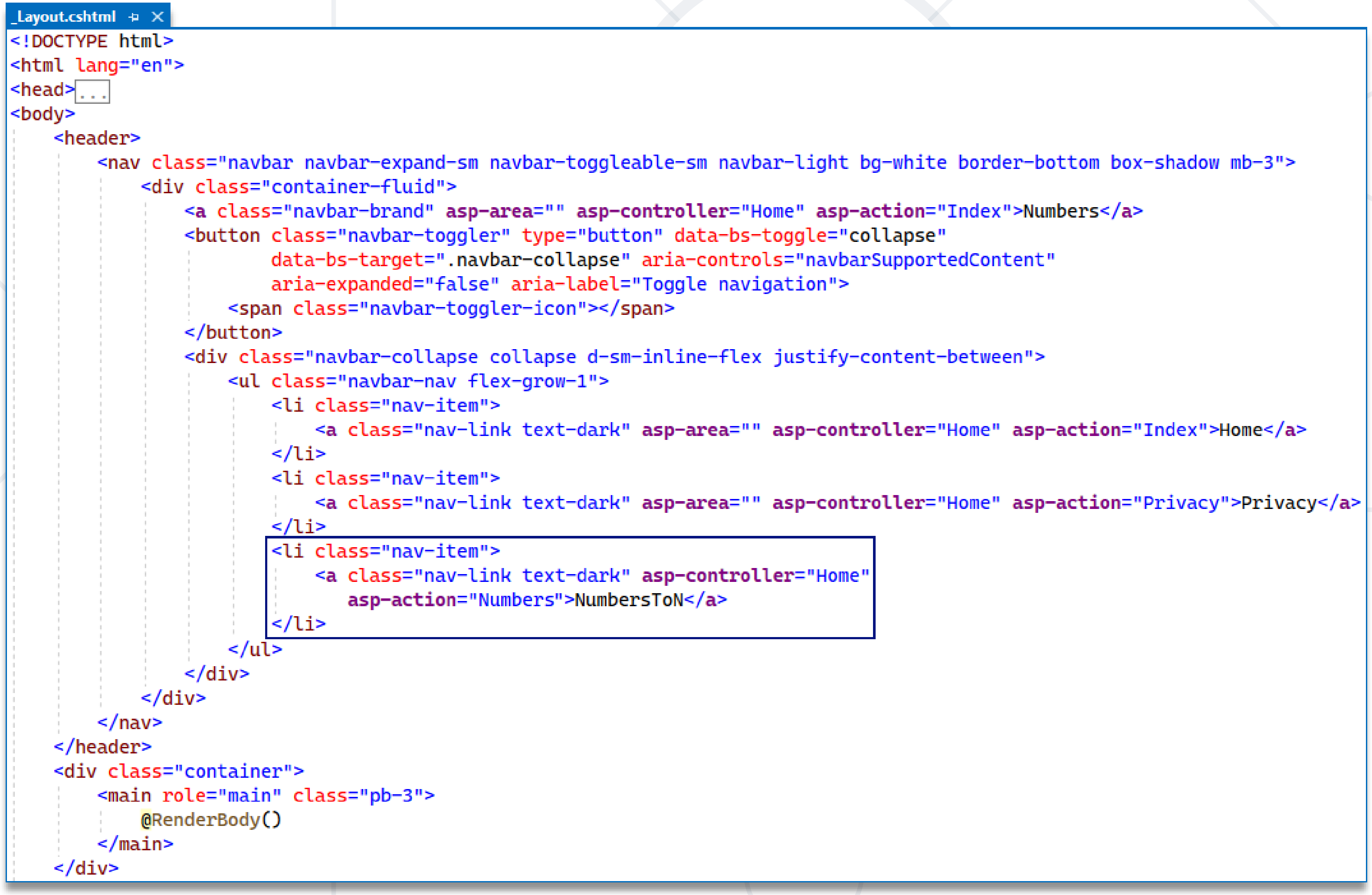
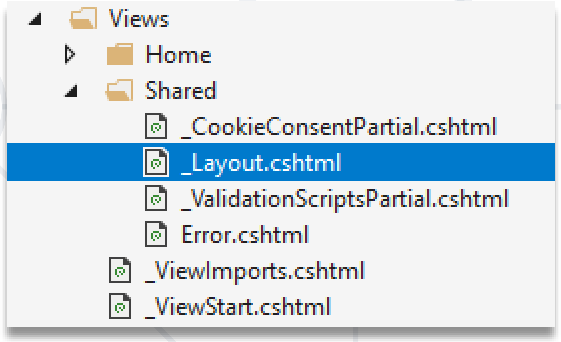
Adding Navigation

- Change the `_Layout.cshtml` file in your project



_Layout.cshtml

```
<!DOCTYPE html>
<html lang="en">
<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-fluid">
                <a class="navbar-brand" asp-area="" asp-controller="Home" asp-action="Index">Numbers</a>
                <button class="navbar-toggler" type="button" data-bs-toggle="collapse"
                        data-bs-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="Home" asp-action="Privacy">Privacy</a>
                        </li>
                        <li class="nav-item">
                            <a class="nav-link text-dark" asp-controller="Home"
                               asp-action="Numbers">NumbersToN</a>
                        </li>
                    </ul>
                </div>
            </div>
        </nav>
    </header>
    <div class="container">
        <main role="main" class="pb-3">
            @RenderBody()
        </main>
    </div>
```



Process GET Request

- We need a **functionality** to handle our interaction
- Create new action method **Numbers** in **HomeController.cs**
- The **id** from **URL** will be passed as **parameter**

IActionResult represents the view result

```
public IActionResult Numbers(int id)
{
    int numbersRange = id;
    ViewBag.numbersRange = numbersRange;
    return this.View();
}
```

ViewBag is used to pass data to the **View**

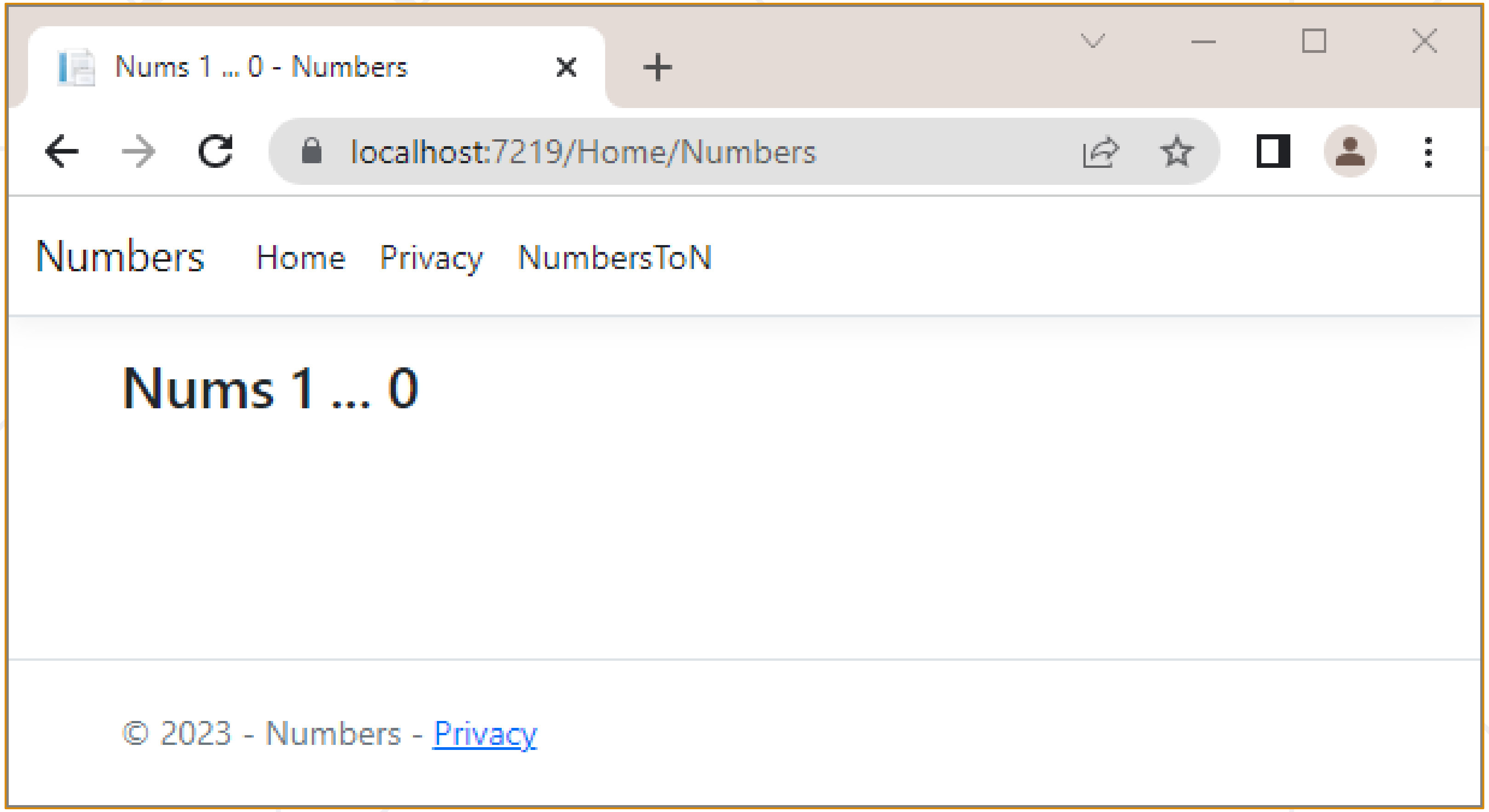
Create View

- Create a new Razor View **Numbers.cshtml** in **Views\Home** folder
- Use **Razor View Engine** to generate appropriate title and render unordered HTML list of numbers

```
@{
  ViewBag.Title ="Nums 1 .. " + ViewBag.Count;
}
<h2>@ViewBag.Title</h2>
<ul>
     @for (int i = 1; i <= ViewBag.Count; i++)
     {
        <li>@i</li>
     }
</ul>
```

Nums 1 … 10

- After clicking on **`NumbersToN`** we should be able to see this



Nums 1 … 0

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Process POST Request (1)

- Add **Form** at the end of the **Numbers.cshtml**, so we can post the number range we want to generate

We must specify the **request method**

The **name** must be exactly the same as the **action parameter name**

```
<form method="POST">
    <input type="text" placeholder="New number" name="number" />
    <button type="submit">Submit</button>
</form>
```

Process POST Request (2)

- Create new **Action** method in **HomeController**

If we want to procces POST request, we must use **[HttpPost] attribute**

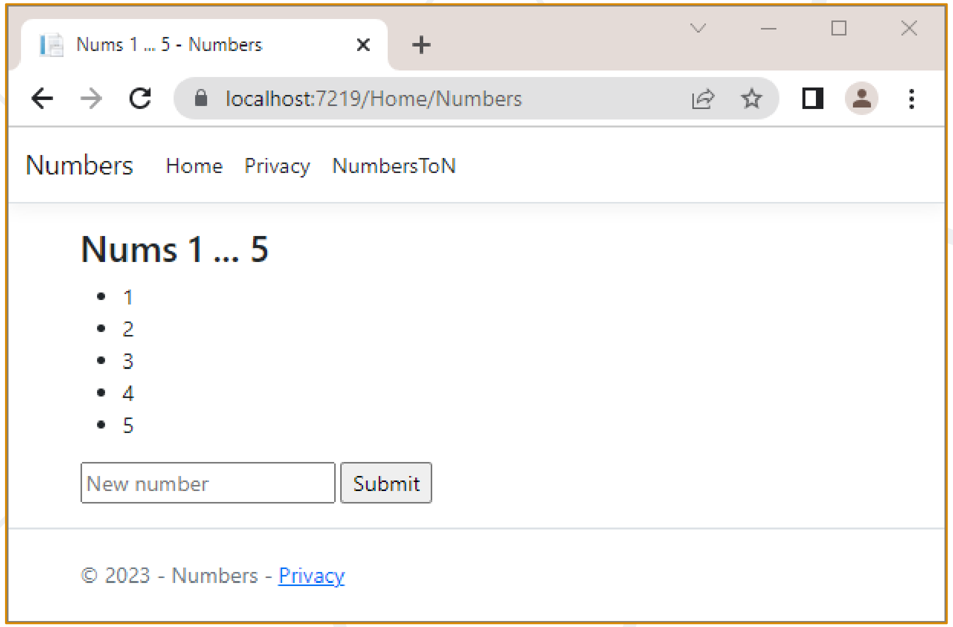
Both actions have identical names, but parameter types are different

```
[HttpPost]
public IActionResult Numbers(string number)
{
   int numbersRange = int.Parse(number);
   ViewBag.numbersRange = numbersRange;
   return this.View();
}
```

Use the same **ViewBag** property name to pass the data

Number Generator

- Now the app should be able to generate custom range



Nums 1 ... 5 - Numbers

localhost:7219/Home/Numbers

Numbers Home Privacy NumbersToN

Nums 1 ... 5

- 1
- 2
- 3
- 4
- 5

New number | Submit

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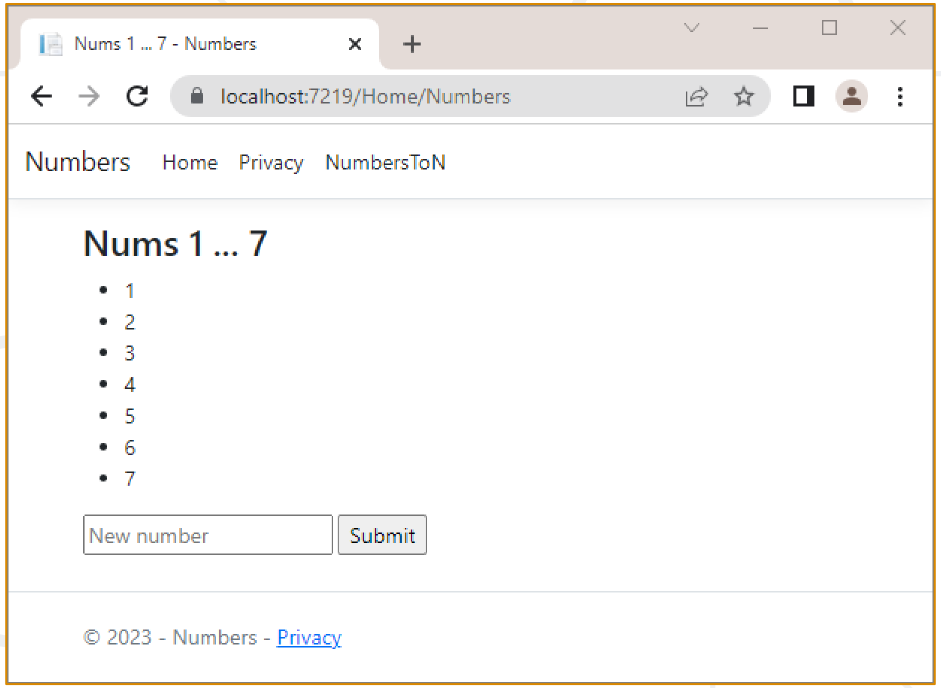

Nums 1 ... 7 - Numbers

localhost:7219/Home/Numbers

Numbers Home Privacy NumbersToN

Nums 1 ... 7

- 1
- 2
- 3
- 4
- 5
- 6
- 7

New number | Submit

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Summary

- **Framework** is a set of resources and tools for app building
- **MVC** is an architectural pattern
- **Views** and **Controllers** functionalities
- **View Engine** (like Razor) is used to create dynamic Web pages

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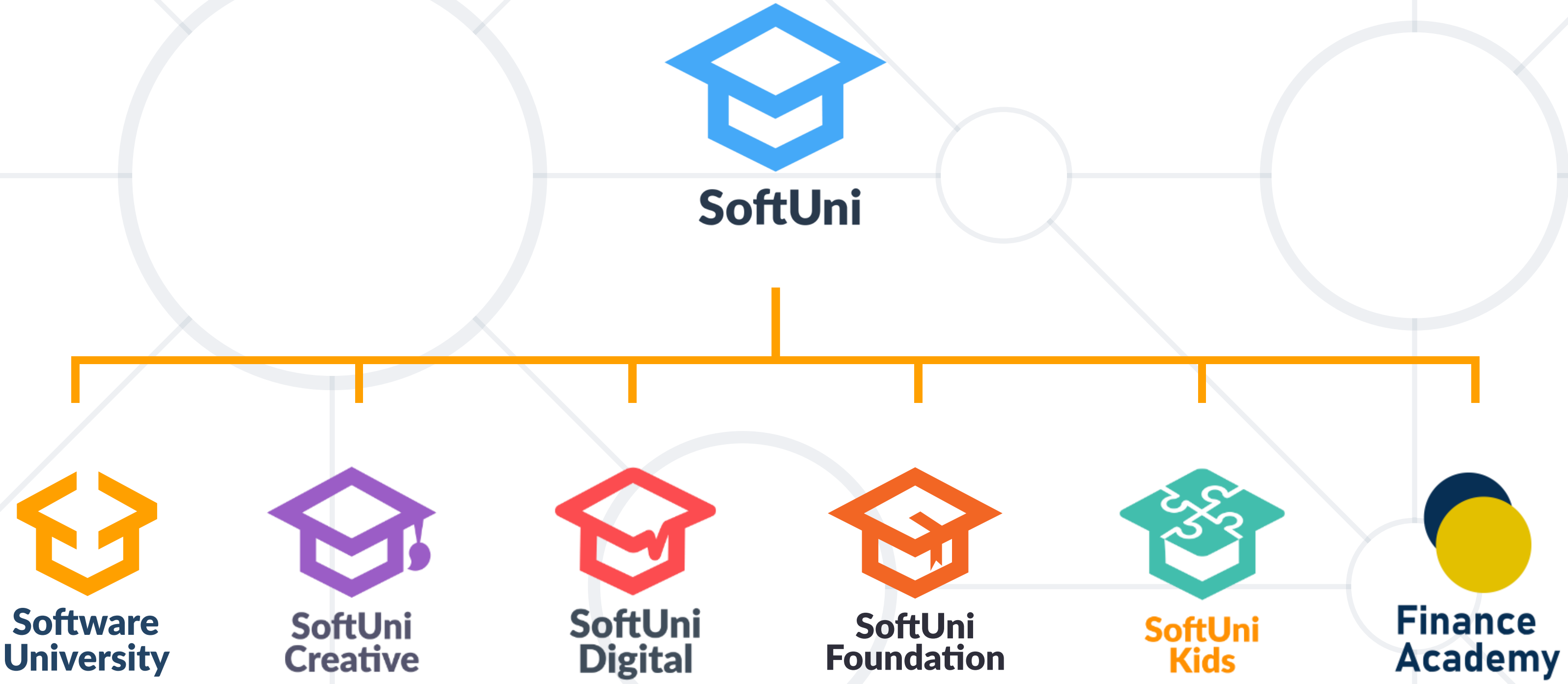
Questions?



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