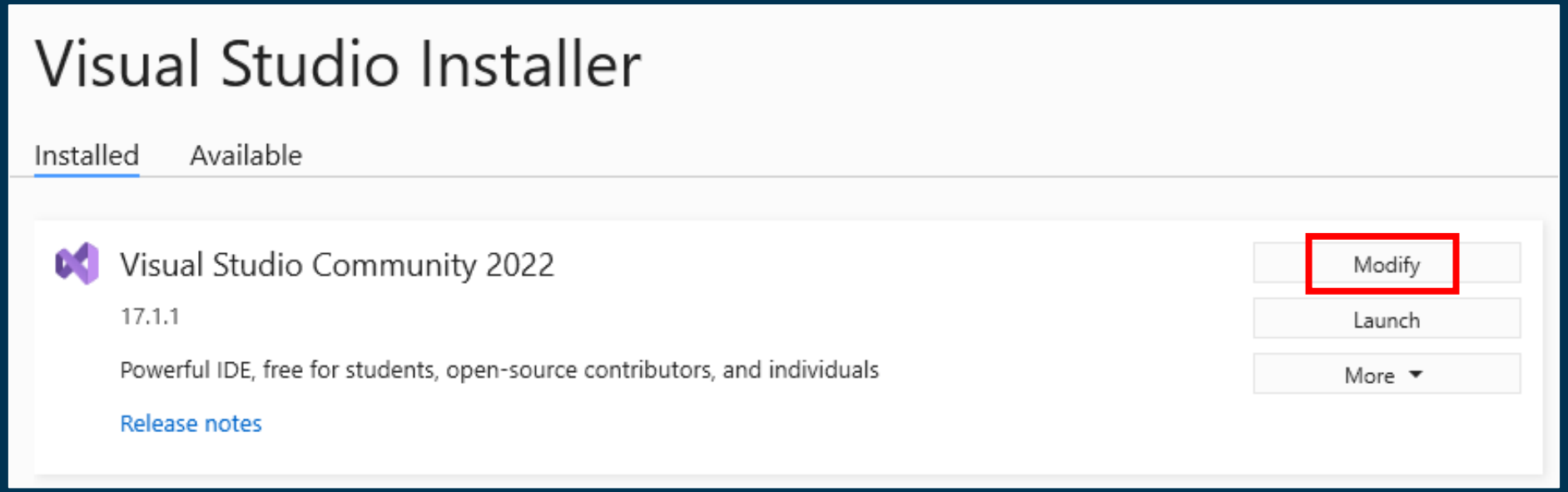
Introduction to ASP.NET Blazor

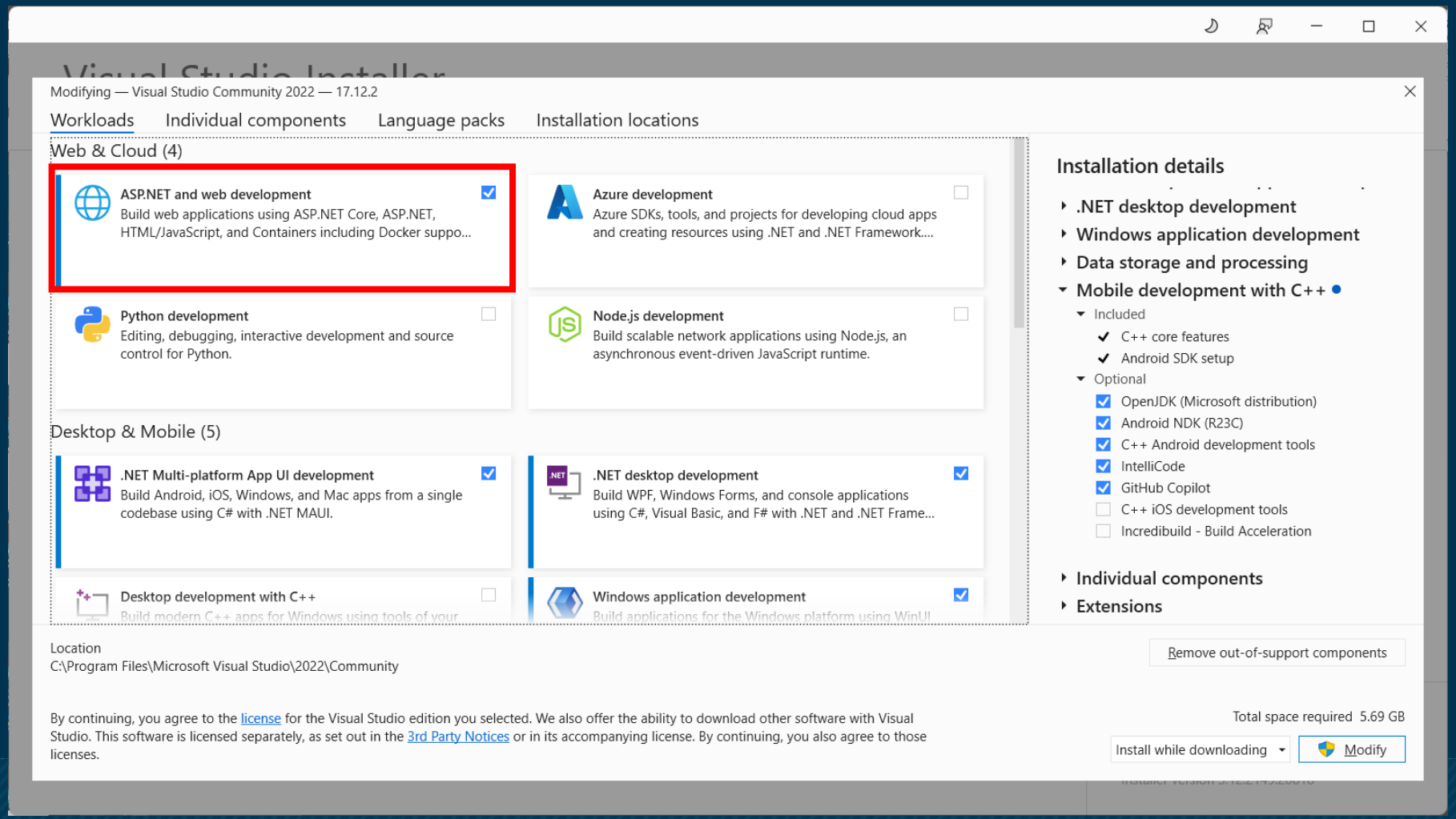
Installing ASP.NET and Web Development Workload in Visual Studio

- You may not have the ASP.NET and Web Development workload installed in Visual Studio.
- To install, you must run the Visual Studio Installer again.
- You can do this from the Start menu by searching for Visual Studio Installer.
- When you are presented with the list of installed products, click Modify.



Installing ASP.NET and Web Development Workload in Visual Studio

- Then check the ASP.NET and Web Development option before clicking Modify to install the selected options.



Blazor Web Apps in VS Code

- Blazor Web Apps can be developed in VS Code as well.
- VS Code instructions can be found here:
  - https://dotnet.microsoft.com/en-us/learn/aspnet/blazor-tutorial/intro

Introduction to Web Apps

- A web app (short for web application) is a software program that runs in a web browser and is accessed through the internet or an intranet.
- Unlike traditional desktop applications, you don't need to install anything to use a web app.
  - Just a browser like Chrome, Firefox, Safari, or Edge.

- Key Features of a Web App:
  - Runs in a browser: You access it through a URL (e.g., https://www.google.com).
  - No installation required: Everything is stored and runs on a server.
  - Cross-platform: Works on any device with a browser (PC, tablet, smartphone).
  - Interactive: Unlike regular websites, web apps allow user input and interaction.

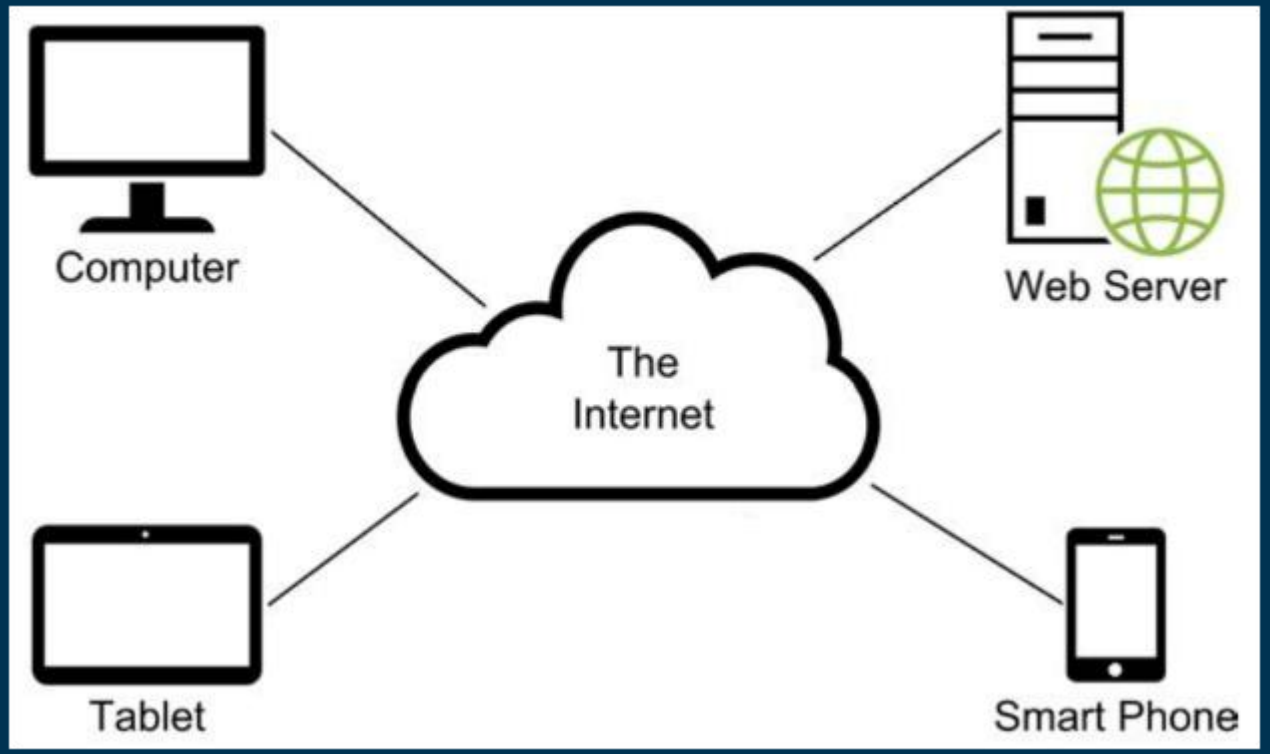
Introduction to Web Apps

- Examples of Web Apps:
  - Gmail: email client
  - Google Docs: online word processor
  - Facebook: social media platform
  - Spotify Web Player: music streaming

- Web App vs Website:
  - A website is mostly informational (like blogs or company sites).
  - A web app is dynamic and interactive (you can log in, fill out forms, manage data, etc.).

Introduction to Web Apps

- A web app consists of clients, a web server, and a network.
- The clients use web browsers to request web pages from the web server.
- Clients are often computers, smart phones, or tablets.
- The web server returns the pages, that are requested, to the browser.
- A network connects the clients to the web server.

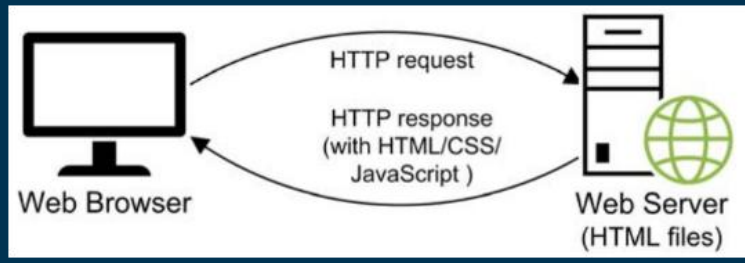


Static Web Page

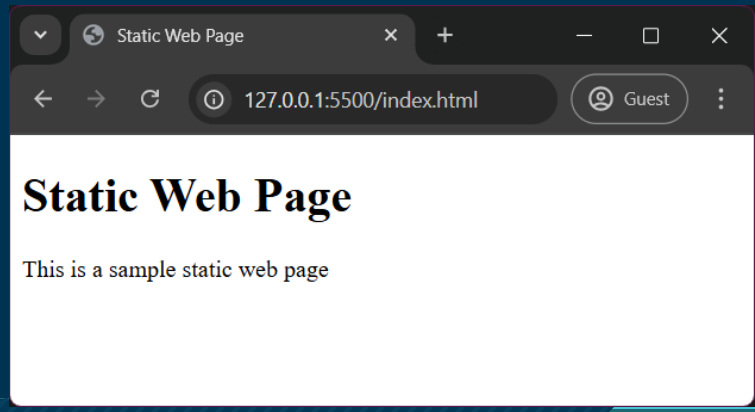
- A static web page is a simple web page that displays same content to every visitor.
- It is written in plain HTML, CSS, JS and does not involve any server-side scripting.

- Fixed Content: The content doesn't change unless someone manually edits the HTML file.
- Fast Loading: Since it doesn't rely on databases or server-side code, it loads quickly.
- Simple to Create: Just need HTML, CSS and JS.
- No User Interaction: It doesn't respond to user inputs (like logins or form submissions) in real-time.

- **Examples**:
  - Personal portfolios.
  - Company "About Us" pages.
  - Simple informational websites (e.g., small business brochures).

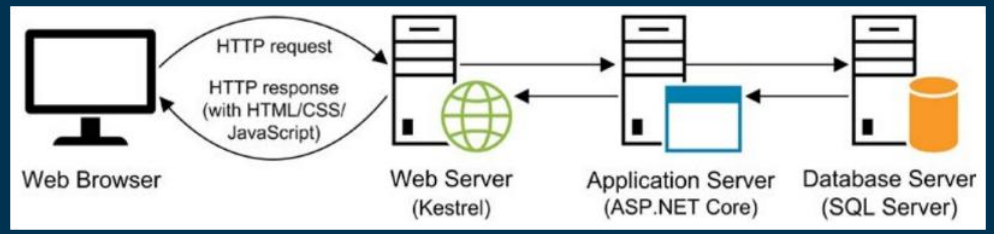



```html
<!DOCTYPE html>
<html>
    <head>
        <title>Static Web Page</title>
    </head>

    <body>
        <h1>Static Web Page</h1>
        <p>This is a sample static web page</p>
    </body>
</html>
```



Dynamic Web Page

- A dynamic web page displays different content and allows interaction based on user input, time, database content, or other variables.
- Unlike static pages, dynamic pages are generated in real-time using server-side technologies like ASP.NET, PHP, Node.js, or frameworks like React, Angular, etc.



- Content Changes Automatically: Can show different information to different users (e.g., news feeds, weather updates, user dashboards).
- Database Driven: Often pulls data from a database (e.g., SQL Server, MySQL).
- Interactive: Supports user interaction like logging in, posting comments, searching, or filtering content.
- Backend Logic: Has scripts running on the server to handle data processing and user input.

- **Examples**:
  - Social media platforms (e.g., Facebook, Instagram).
  - E-commerce sites (e.g., Amazon, eBay).
  - Online banking portals.
  - News websites that update frequently.

Introduction to ASP.NET Core

- ASP.NET Core is a modern, open-source, cross-platform framework developed by Microsoft for building web applications, APIs, and microservices.
- It's a rebuild of the original ASP.NET framework, and is designed for performance, flexibility, and scalability.

- ASP.NET Core can be used for:
  - Building websites.
  - Creating RESTful APIs.
  - Developing real-time apps (like chat apps).
  - Hosting microservices and cloud-native apps.

Members of the ASP.NET Core Family

- **Blazor**:
  - Build interactive web UIs with C# (instead of JavaScript or other tools).
  - This module is based on ASP.NET Blazor (https://dotnet.microsoft.com/en-us/apps/aspnet/web-apps/blazor)
- **ASP.NET Core MVC**:
  - Model-View-Controller pattern for building enterprise web apps and APIs.
  - Learn more: https://dotnet.microsoft.com/en-us/apps/aspnet/mvc
- **Razor Pages**:
  - Simpler page-focused approach to web UI.
  - Learn more: https://learn.microsoft.com/en-us/aspnet/core/razor-pages/
- **SignalR**:
  - Real-time web functionality (e.g., chat, live dashboards).
  - Learn more: https://dotnet.microsoft.com/en-us/apps/aspnet/signalr
- **Minimal APIs**:
  - Lightweight way to build REST APIs with minimal boilerplate code.
  - Learn more: https://learn.microsoft.com/en-us/aspnet/core/tutorials/min-web-api/

Introduction to ASP.NET Blazor

- Blazor is a web framework from Microsoft that lets you build interactive web applications.
- It is a modern frontend web framework based on HTML, CSS, and C#.
- It's part of the ASP.NET Core family and is great for developers who are already familiar with .NET and want to build rich web UIs without switching to other frameworks.

- Key Features of Blazor:
  - C# Everywhere: Handle UI events from the browser and implement logic all in C#.
  - Component-Based: Build reusable UI components (like in React or Angular).
  - One Development Stack: Build entire web app from the frontend to the backend using a single development stack.
  - WebAssembly Support: Runs in the browser using WebAssembly (https://webassembly.org/).
  - Server Hosting: Runs on the server (Blazor Server).
  - Full .NET Integration: Access .NET libraries, tools, and packages.

Types of Blazor

Blazor WebAssembly (WASM):

- Runs completely in the browser.
- Downloads the .NET runtime to the browser.
- Works offline once loaded.
- Ideal for static hosting (e.g., GitHub Pages, Azure Static Web Apps).

Blazor Server:

- Executes code on the server.
- Uses SignalR to update the UI via a persistent connection.
- Smaller initial load, good for enterprise apps.
- Requires constant internet connection.

Blazor Components

- Blazor apps are built from components.
- A Blazor component is a reusable piece of web UI.
- A Blazor component encapsulates both its rendering and UI event handling logic.
- Blazor includes various built-in components for form handling, user input validation, displaying large data sets, authentication, and authorization.
- Developers can also build and share their own custom components, and many prebuilt Blazor components are available from the Blazor ecosystem.

Blazor Uses Standard Web Technologies

- You create Blazor components using Razor syntax, a convenient mixture of HTML, CSS, and C#.
- A Razor file contains plain HTML and then C# to define any rendering logic, like for conditionals, control flow, and expression evaluation.
- Razor files are then compiled into C# classes that encapsulate the component's rendering logic.

UI Event Handling and Data Binding

- Interactive Blazor components can handle standard web UI interactions using C# event handlers.
- Components can update their state in response to UI events and adjust their rendering accordingly.
- Blazor also includes support for two-way data binding to UI elements as a way to keep component state in sync with UI elements.

Blazor Example

- This example is a simple Blazor counter component implemented in Razor.

- Most of the content is HTML, while the `@code` block contains C#.
- Every time the button is pressed the `IncrementCount` method is invoked, which increments the `currentCount` field, and then the component renders the updated value.

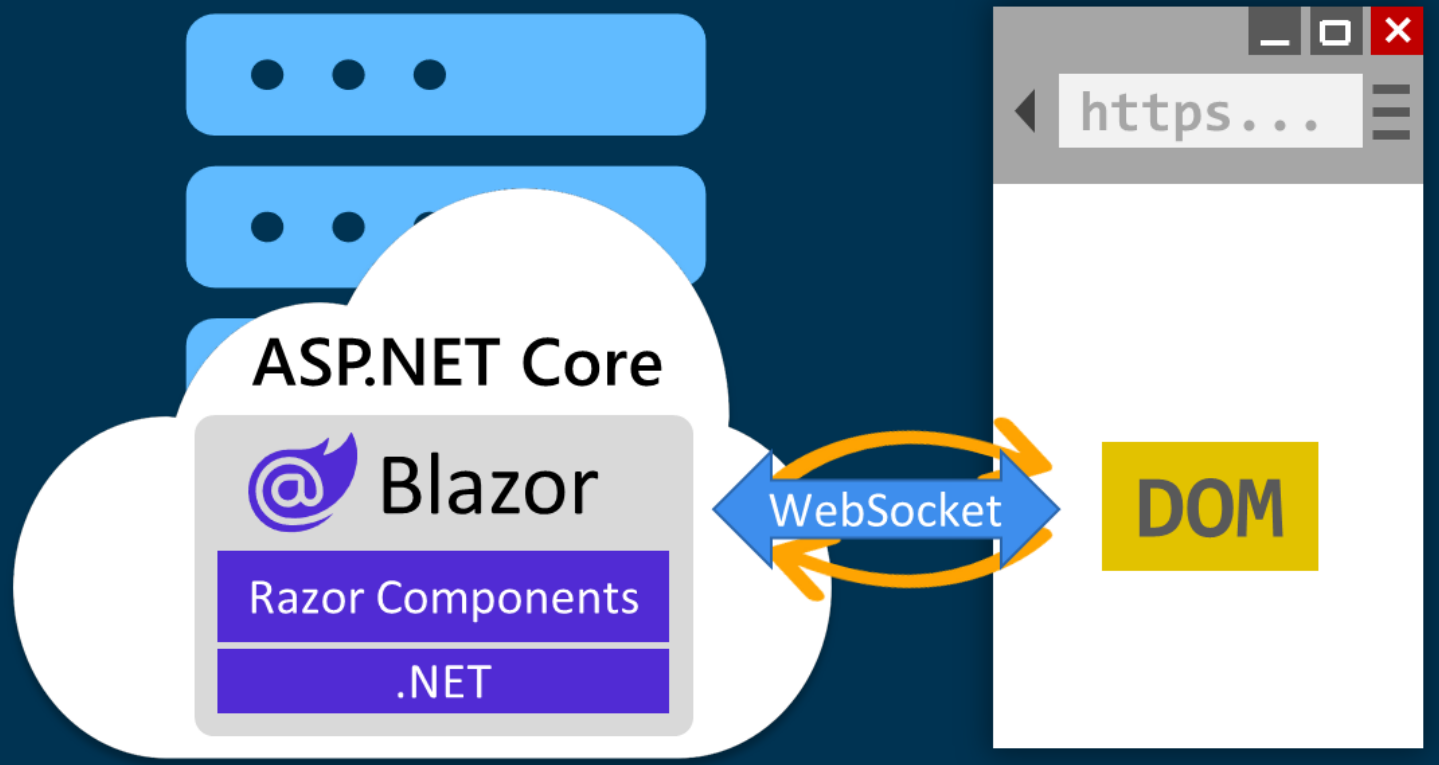
```
<h1>Counter</h1>

<p>Current count: @currentCount</p>

<button @onclick="IncrementCount">Click me</button>

@code {
    private int currentCount = 0;

    private void IncrementCount()
    {
        currentCount++;
    }
}
```

Server and Client-Side Rendering

- Blazor supports both server and client-side rendering of components to handle various web UI architectures.
- Components rendered from the server can access server resources, like databases and backend services.
- By default, Blazor components are rendered from the server, generating HTML in response to requests.

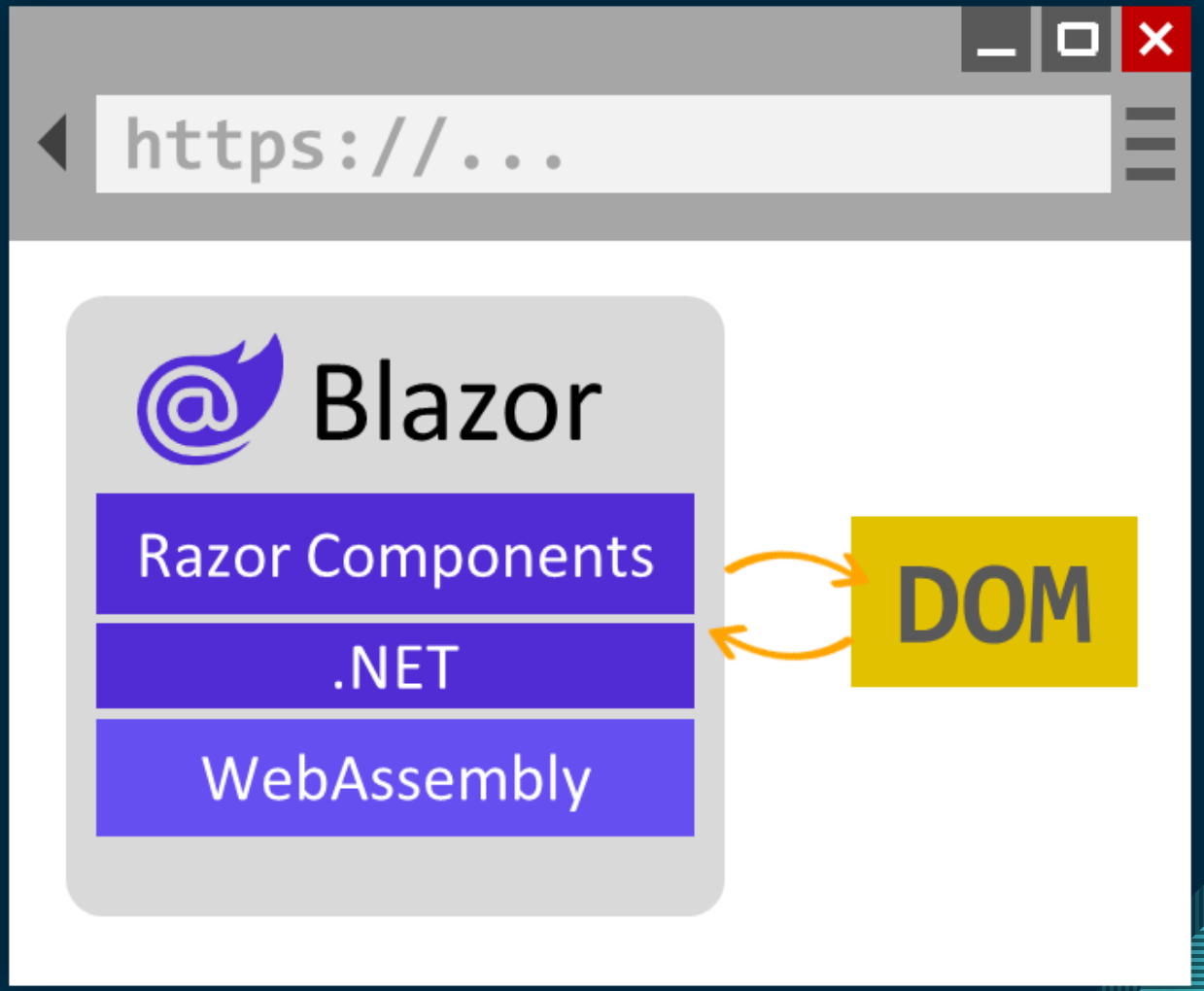
Server and Client-Side Rendering

- You can also configure server components to be interactive, so they can handle UI events, maintain state across interactions, and render updates dynamically.
- Interactive server components handle UI interactions and updates over a WebSocket connection with the browser.



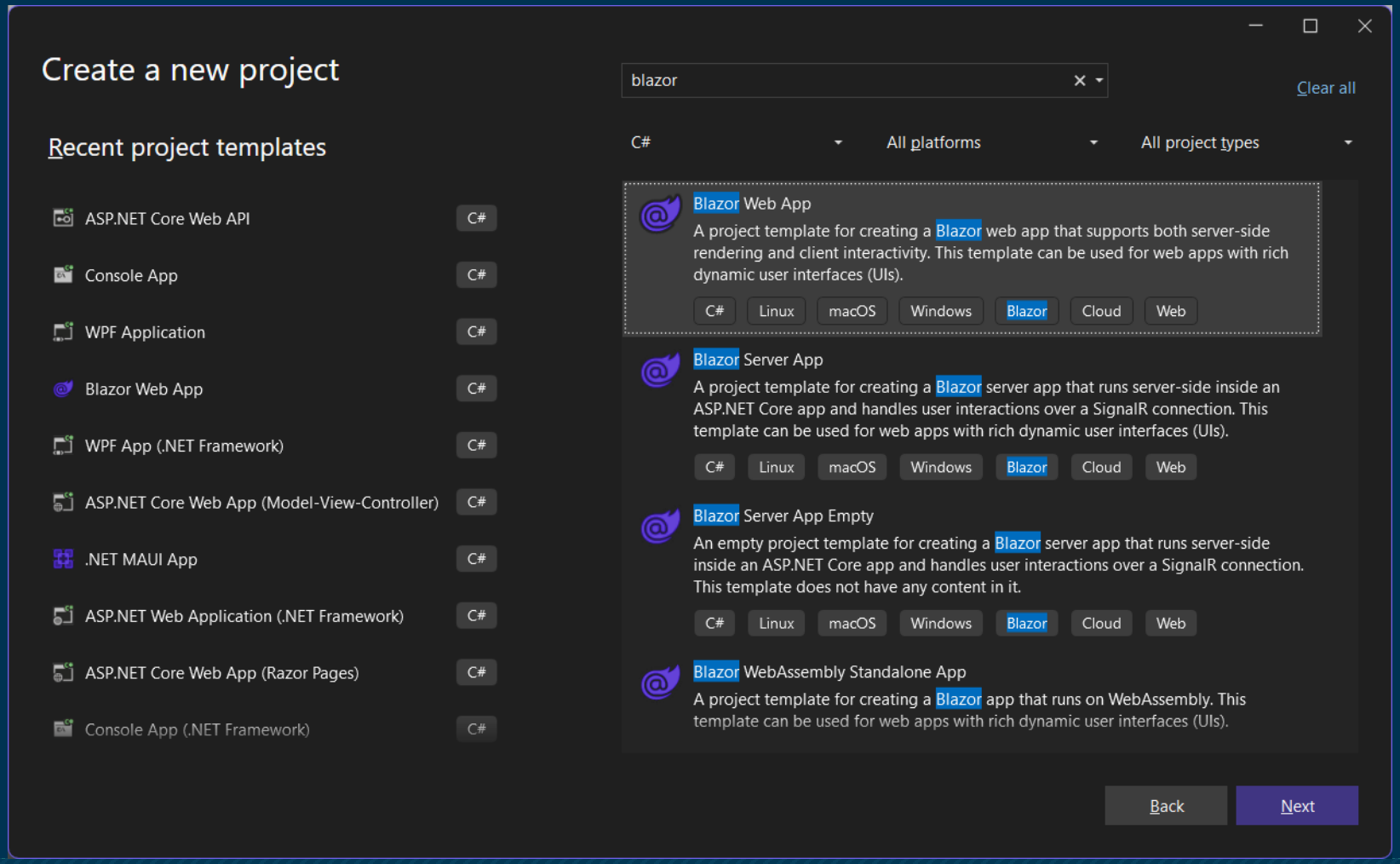
Server and Client-Side Rendering

- Alternatively, Blazor components can be rendered interactively from the client.
- The component is downloaded to the client and run from the browser via WebAssembly.
- Interactive WebAssembly components can access client resources through the web platform, like local storage and hardware, and can even function offline once downloaded.



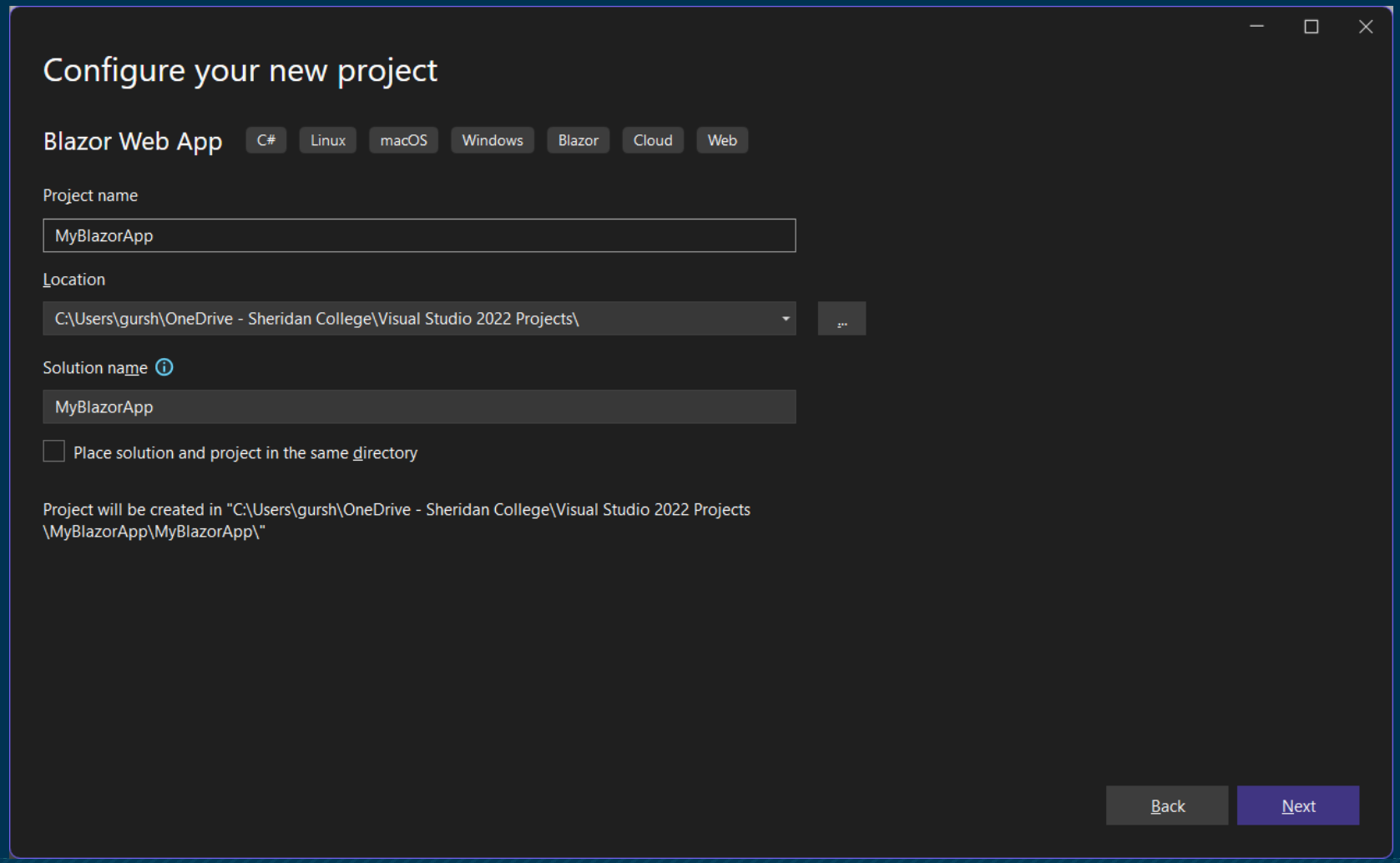
Create a Blazor Web App

- Create a new Blazor Web App.



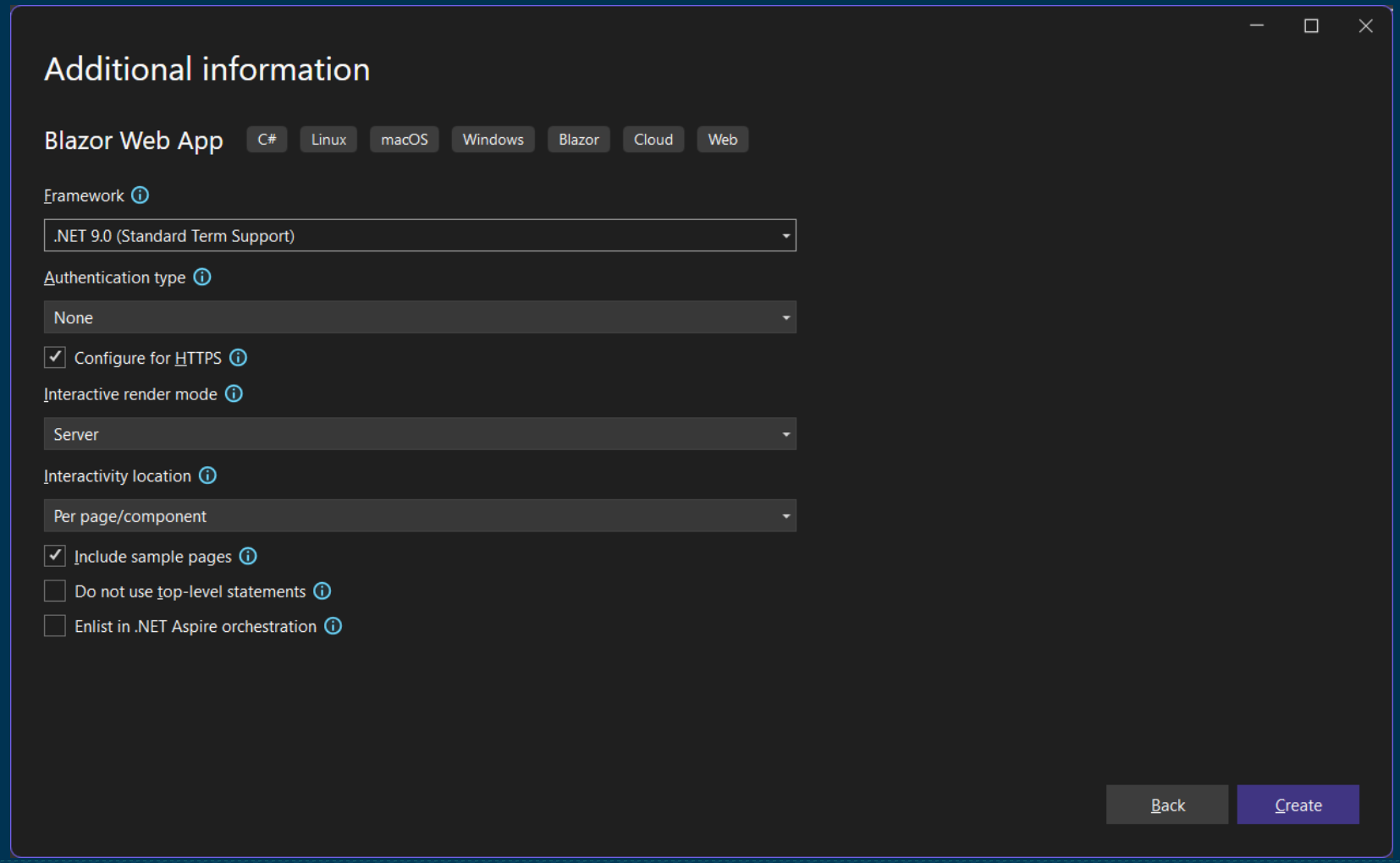
Create a Blazor Web App

- Give it a name and location.



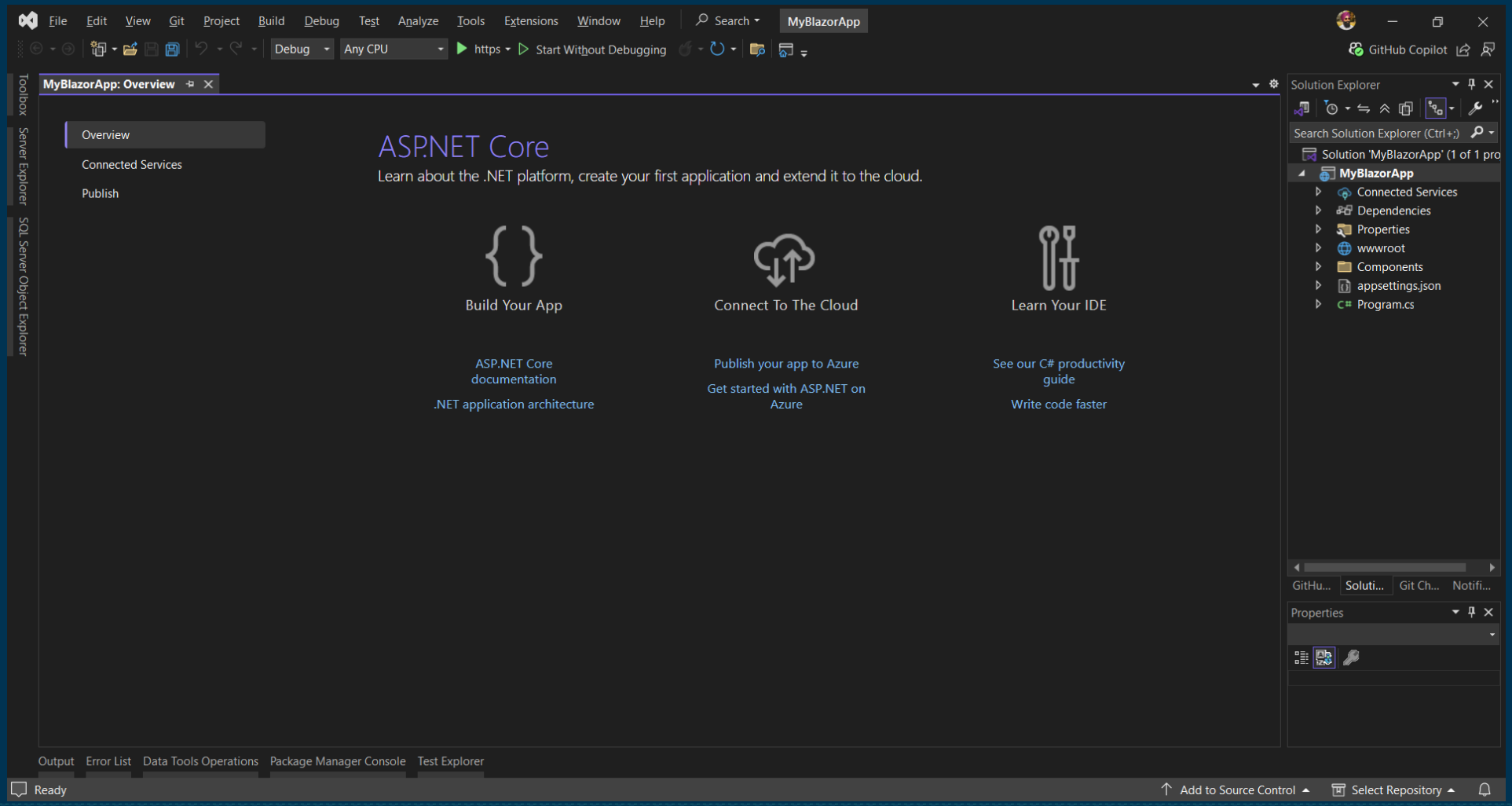
Create a Blazor Web App

- Leave these as defaults and click Create.



Create a Blazor Web App

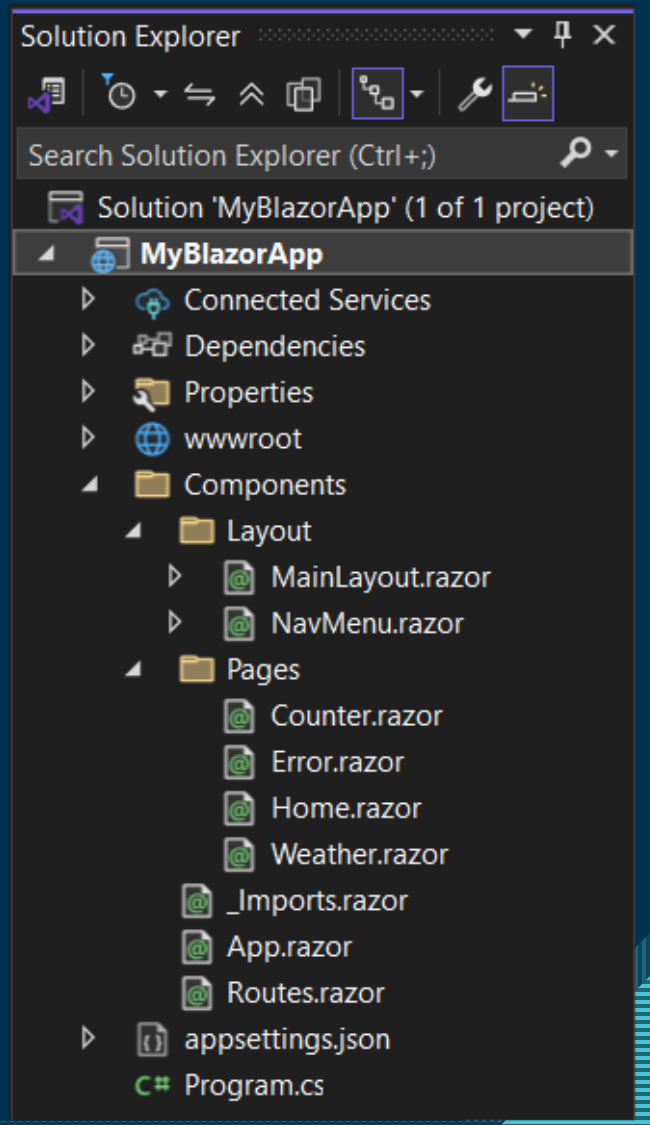
- Your project is created and loaded in Visual Studio.



Blazor Web App File Structure

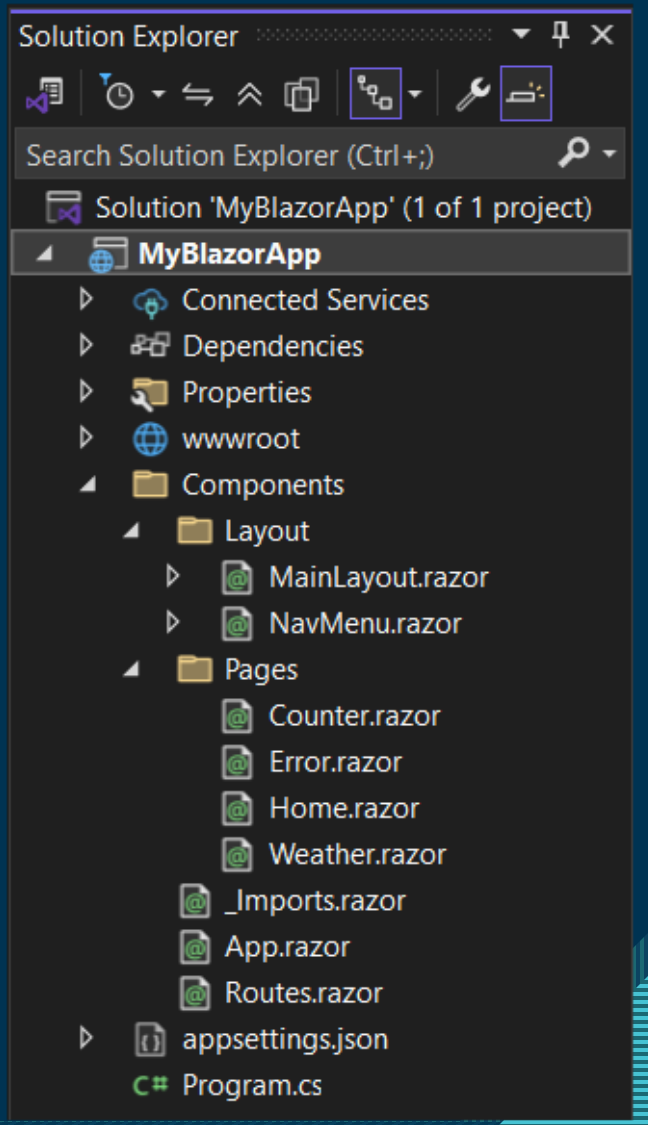
- Take a look at the contents of your project using Solution Explorer.

- Connected Services:
  - Used to connect your app to external services like Azure, REST APIs, or databases.
  - Often empty unless you configure something specific.
- Dependencies:
  - Holds all NuGet packages your project relies on, including .NET libraries, third-party packages, etc.
- Properties:
  - Contains project-level metadata such as launchSettings.json, which defines how your app runs during development (e.g., port number, environment variables).
- wwwroot:
  - The public folder, similar to the www or static directory in other frameworks.
  - Used for:
    - Static files like images, CSS, JavaScript
    - favicon.ico, logos
    - Client-side libraries



Blazor Web App File Structure

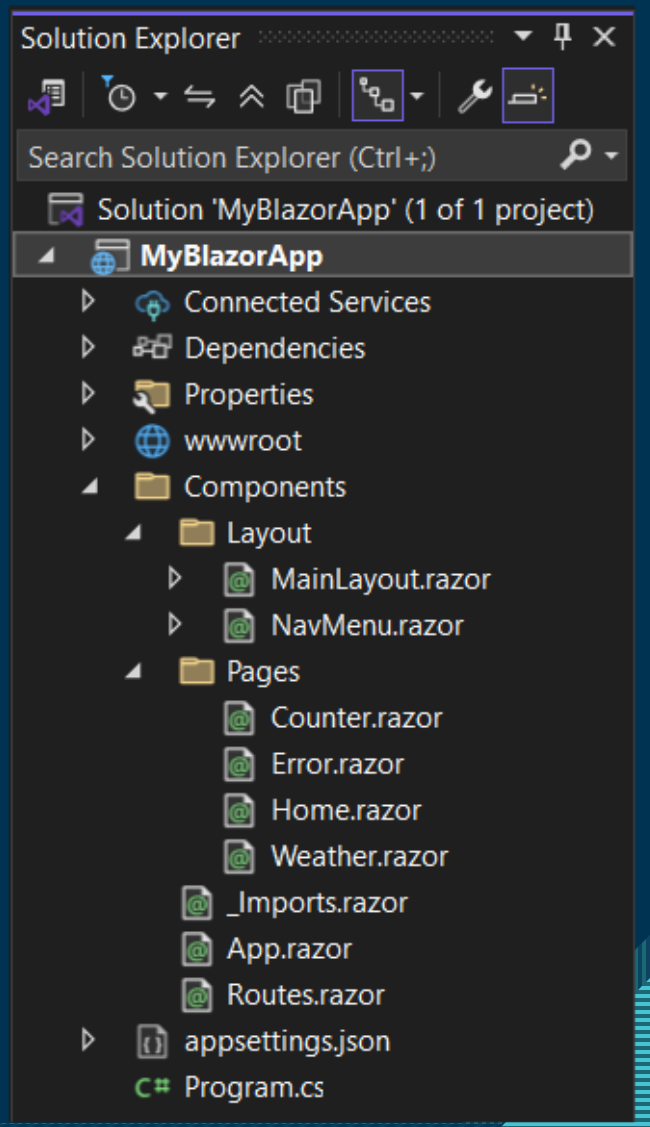
- Components:
  - Holds reusable UI building blocks (also called Razor components).
- Layout:
  - MainLayout.razor: Defines the general page structure (e.g., header, sidebar, footer).
  - NavMenu.razor: The navigation menu component usually displayed in the sidebar.
  - These layout files act like templates shared across multiple pages.
- Pages:
  - Holds the actual web pages users can navigate to. Each .razor file is a page or view.
  - Counter.razor: A sample page that demonstrates interactivity (click button to increase count).
  - Error.razor: Error-handling page.
  - Home.razor: The default landing page.
  - Weather.razor: Typically shows a weather forecast sample.
  - _Imports.razor: A special file for global `@using` statements, shared across components in the folder.
  - App.razor: The root component of your app. This sets up routing and includes layouts.
  - Routes.razor: Manages routing logic.



Blazor Web App File Structure

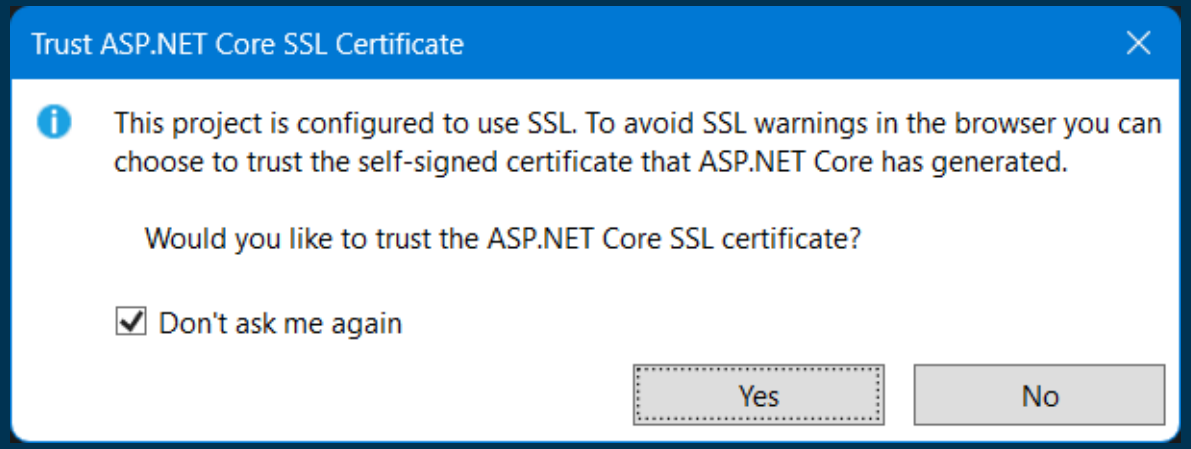
- appsettings.json:
  - Used for configuration settings like endpoints, connection strings, etc.
  - Similar to web.config in older .NET apps.
- Program.cs:
  - The entry point of your Blazor app.
  - It configures services and starts the application.

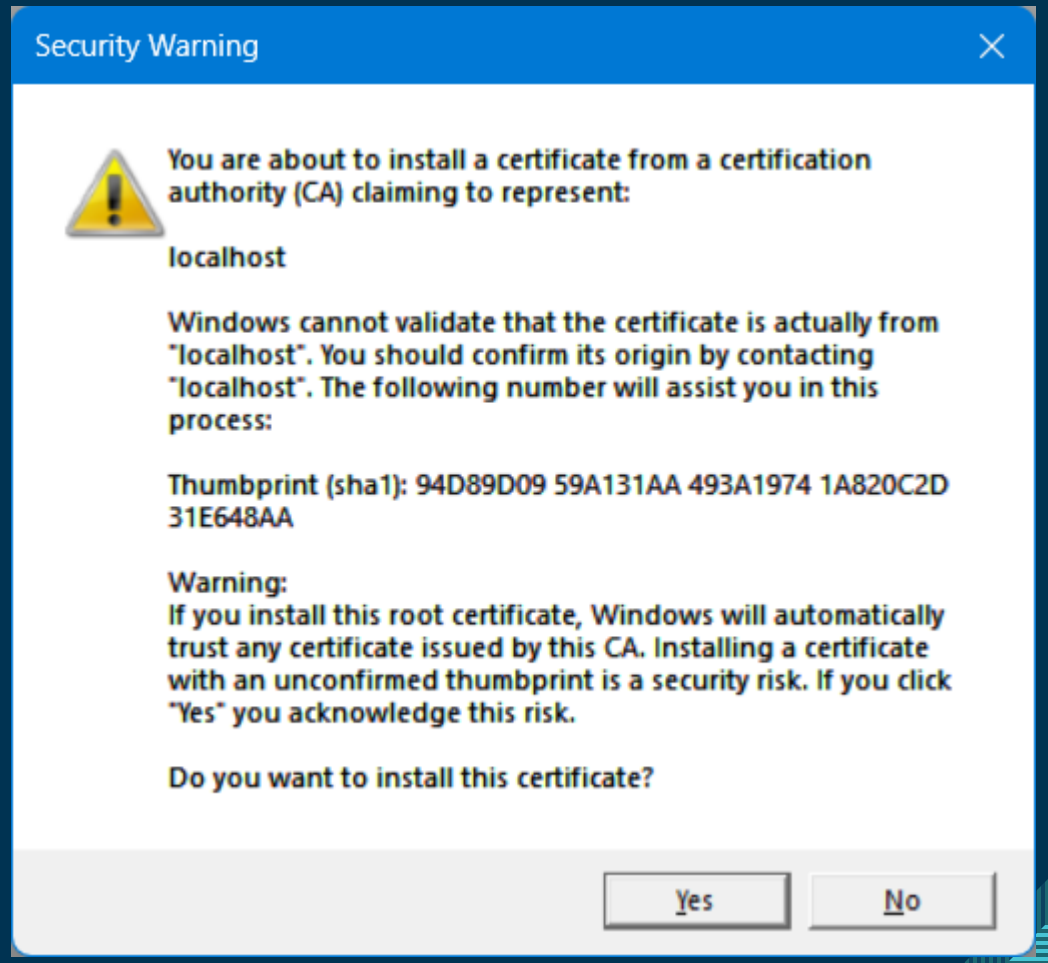
```
using MyBlazorApp.Components;

var builder = WebApplication.CreateBuilder(args);

// Add services to the container.
builder.Services.AddRazorComponents()
    .AddInteractiveServerComponents();

var app = builder.Build();

app.UseHttpsRedirection();
app.UseAntiforgery();

app.MapStaticAssets();
app.MapRazorComponents<App>()
    .AddInteractiveServerRenderMode();

app.Run();
```



Run the App

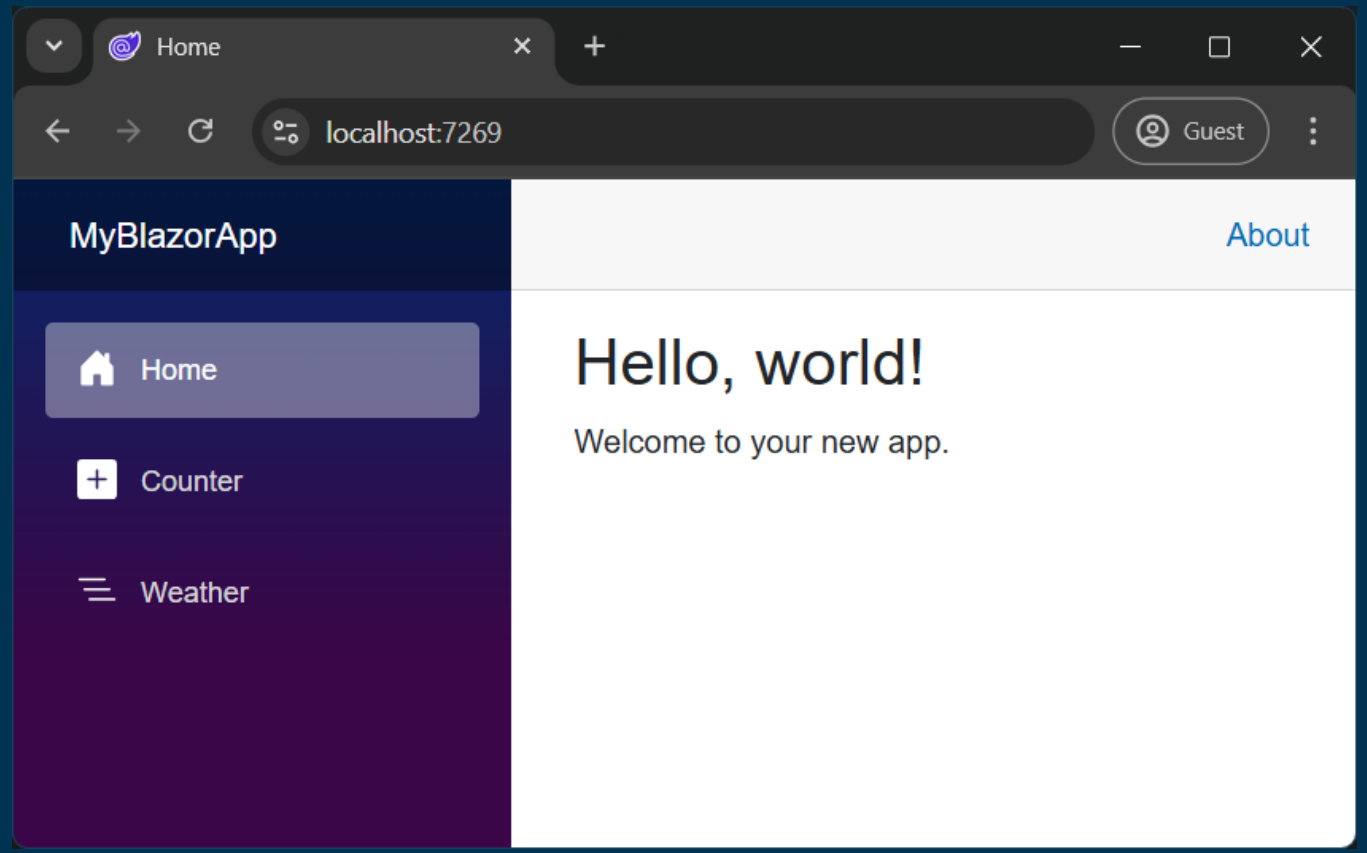
- If you get these SSL Certificate and Security Warning messages, click Yes.





Run the App

- The displayed page is defined by the Home.razor file located inside the Components/Pages directory.

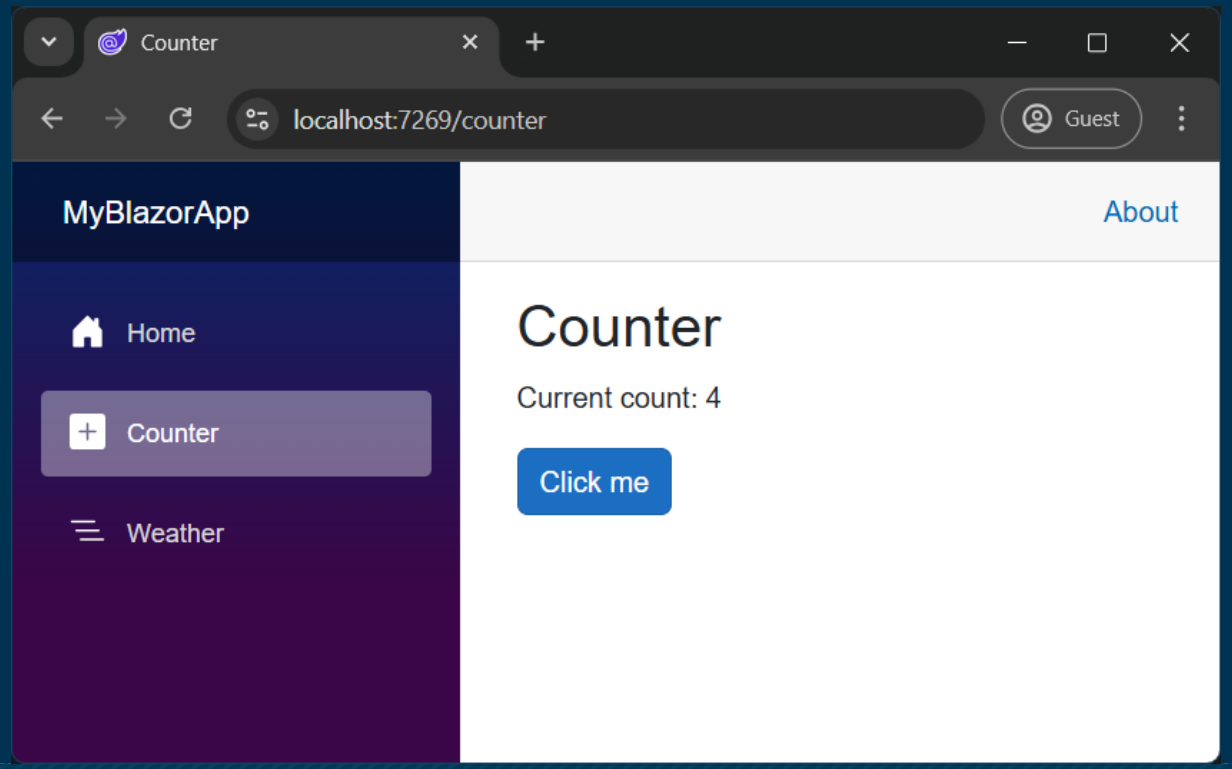



```razor
@page "/"

<PageTitle>Home</PageTitle>

<h1>Hello, world!</h1>

Welcome to your new app.
```

Home.razor

Run the App

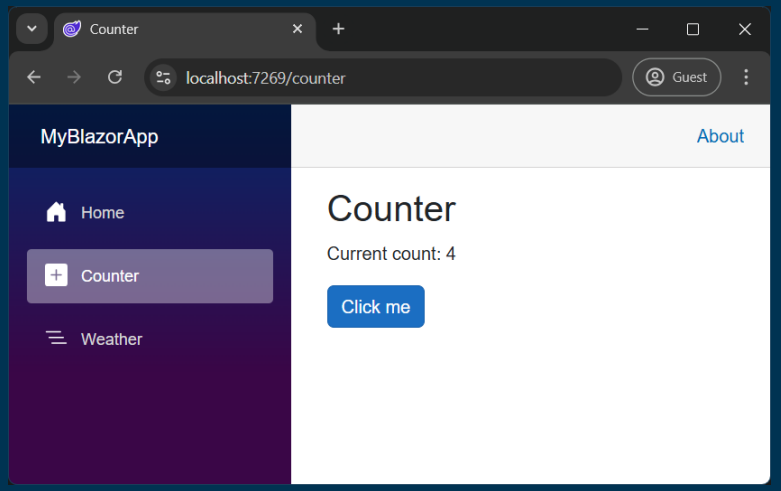
- In the running app, navigate to the Counter page by clicking the Counter tab in the sidebar on the left.
- Select the Click me button to increment the count without a page refresh.
- Incrementing a counter in a webpage normally requires writing JavaScript, but with Blazor you can use C#.



Run the App

- You can find the implementation of the Counter component at Counter.razor file located inside the Components/Pages directory.

```razor
@page "/counter"
@rendermode InteractiveServer

<PageTitle>Counter</PageTitle>

<h1>Counter</h1>

<p role="status">Current count: @currentCount</p>

<button class="btn btn-primary" @onclick="IncrementCount">Click me</button>

@code {
    private int currentCount = 0;

    private void IncrementCount()
    {
        currentCount++;
    }
}
```

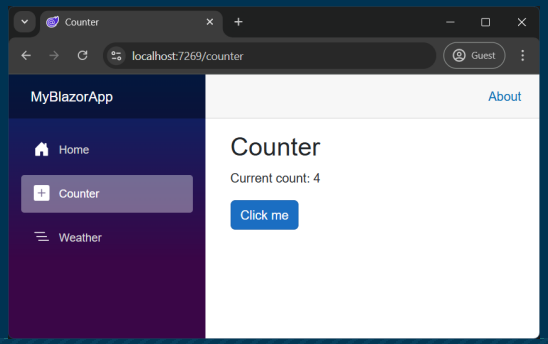


Run the App

- A request for /counter in the browser, as specified by the `@page` directive at the top, causes the Counter component to render its content.
- The `@rendermode` directive enables interactive server rendering for the component, so that it can handle user interface events from the browser.

```
@page "/counter"
@rendermode InteractiveServer

<PageTitle>Counter</PageTitle>

<h1>Counter</h1>

<p role="status">Current count: @currentCount</p>

<button class="btn btn-primary" @onclick="IncrementCount">Click me</button>

@code {
    private int currentCount = 0;

    private void IncrementCount()
    {
        currentCount++;
    }
}
```

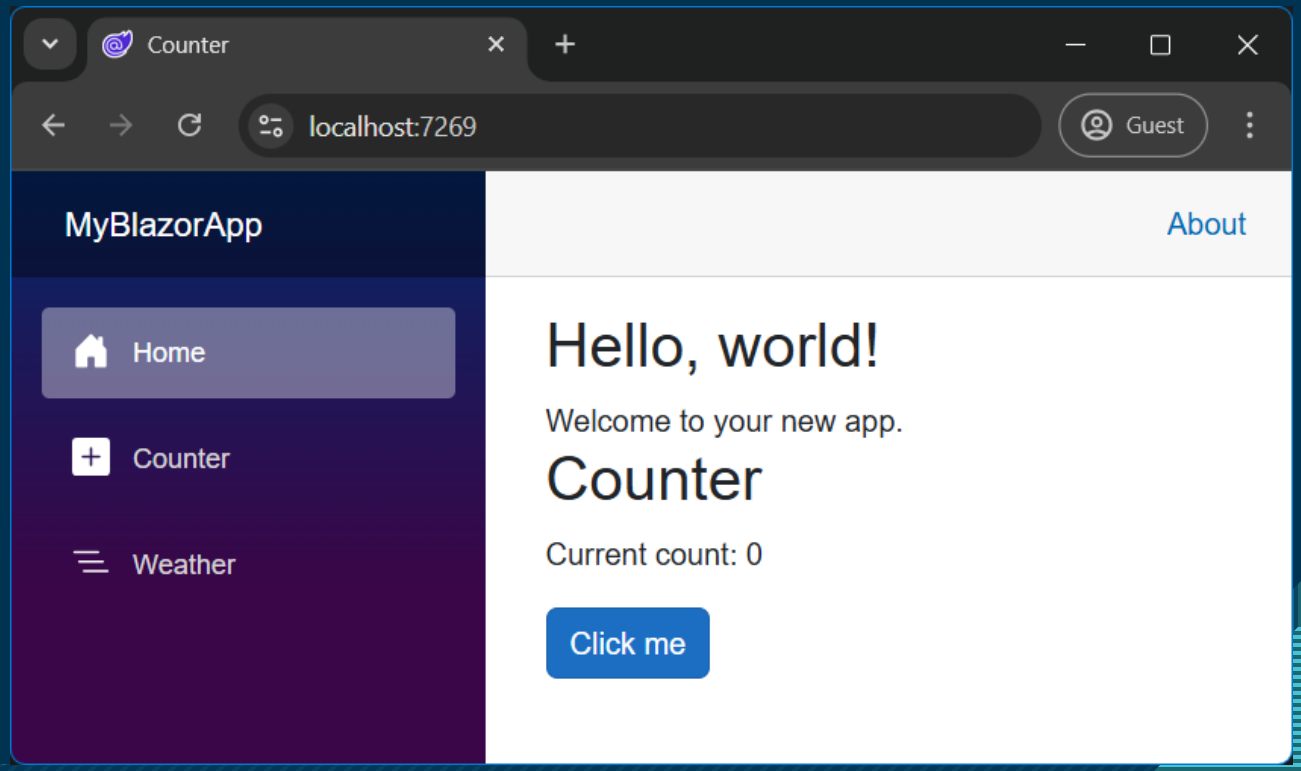
- Each time the Click me button is selected:
  - The `onclick` event is fired.
  - The `IncrementCount` method is called.
  - The `currentCount` is incremented.
  - The component is rendered to show the updated count.



Razor Component are Reusable

- Each of the .razor files defines a UI component that can be reused.
- Open the Home.razor file in Visual Studio, located in the Components/Pages folder.
- Add a Counter component to the app's homepage by adding a `<Counter />` element at the end of the Home.razor file.

```
@page "/"

<PageTitle>Home</PageTitle>

<h1>Hello, world!</h1>

Welcome to your new app.

<Counter />
```



Parameters in Razor Component

- Component parameters are specified using attributes, which allow you to set properties on the child component.
- Define a parameter on the Counter component for specifying how much it increments with every button click.
  - Add a public property for `IncrementAmount` with a `[Parameter]` attribute.
  - Change the `IncrementCount` method to use the `IncrementAmount` when incrementing the value of `currentCount`.

```
@page "/counter"
@rendermode InteractiveServer

<PageTitle>Counter</PageTitle>

<h1>Counter</h1>

<p role="status">Current count: @currentCount</p>

<button class="btn btn-primary" @onclick="IncrementCount">Click me</button>

@code {
    private int currentCount = 0;

    [Parameter]
    public int IncrementAmount { get; set; } = 1;

    private void IncrementCount()
    {
        currentCount += IncrementAmount;
    }
}
```

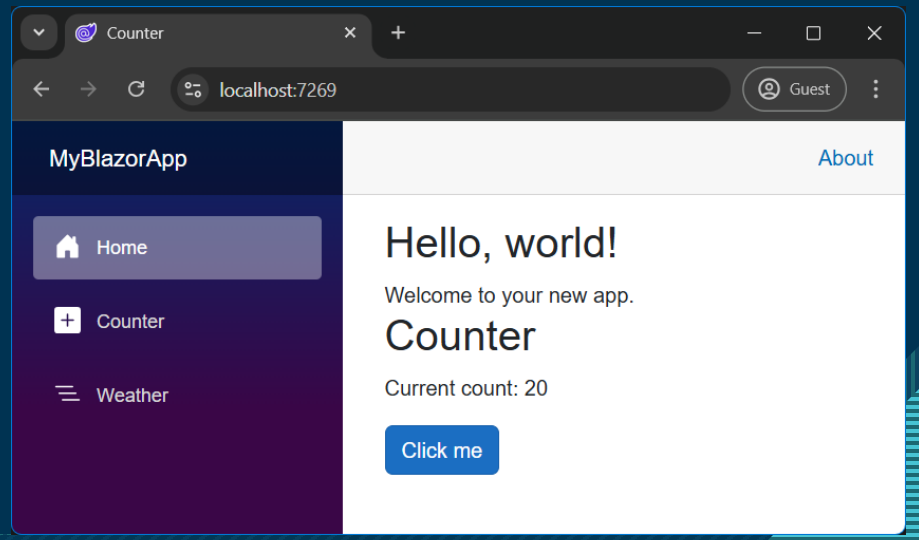
Parameters in Razor Component

- In Home.razor, update the `<Counter>` element to add an `IncrementAmount` attribute that changes the increment amount to ten.

- The Home component now has its own counter that increments by ten each time the Click me button is selected.

- The Counter component (Counter.razor) at /counter still increments by one.

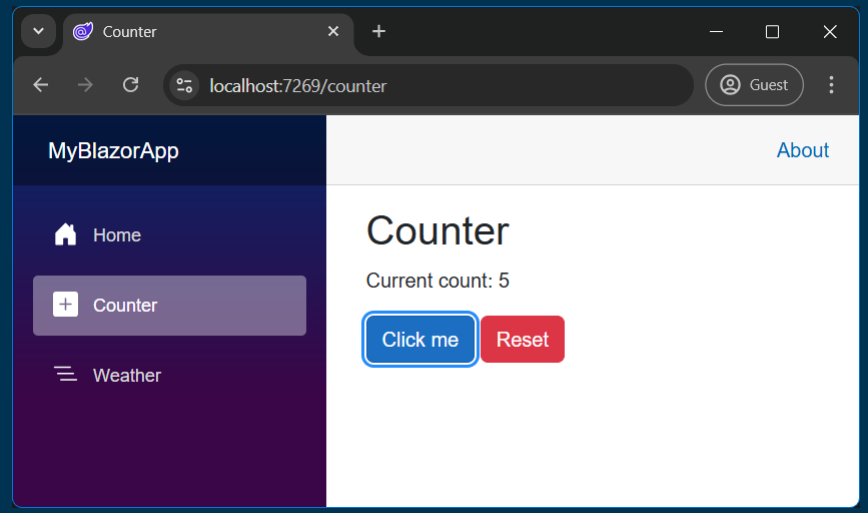
```
@page "/"

<PageTitle>Home</PageTitle>

<h1>Hello, world!</h1>

Welcome to your new app.

<Counter IncrementAmount="10" />
```

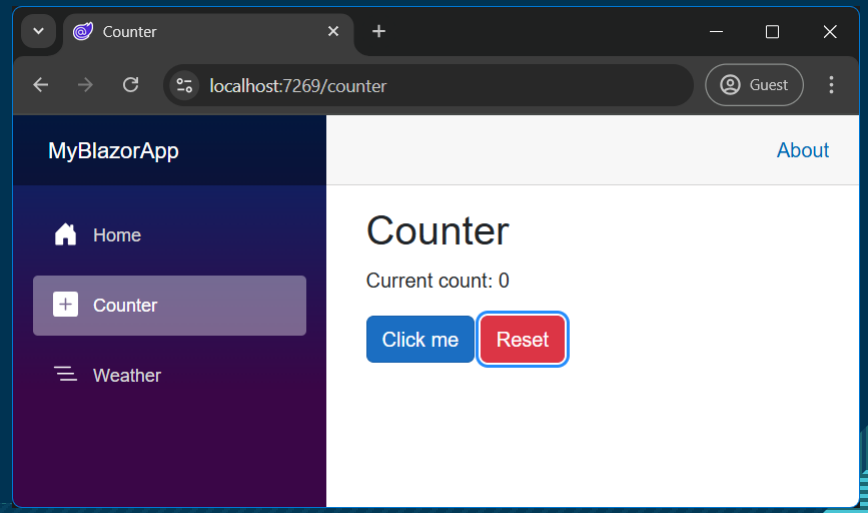


Exercise - Reset the Counter

- Modify the Counter component to allow users to reset the counter.

```razor
@page "/counter"
@rendermode InteractiveServer

<PageTitle>Counter</PageTitle>

<h1>Counter</h1>

<p role="status">Current count: @currentCount</p>

<button class="btn btn-primary" @onclick="IncrementCount">Click me</button>

<button class="btn btn-danger" @onclick="ResetCount">Reset</button>

@code {
    private int currentCount = 0;

    [Parameter]
    public int IncrementAmount { get; set; } = 1;

    private void IncrementCount()
    {
        currentCount += IncrementAmount;
    }

    private void ResetCount()
    {
        currentCount = 0;
    }
}
```

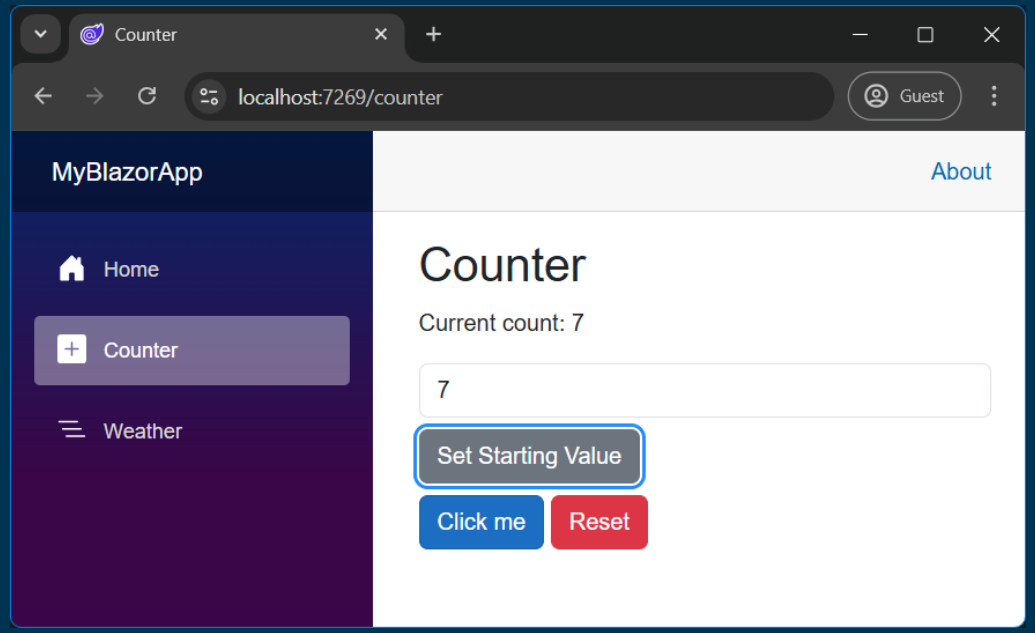




Exercise - Set the Starting Counter Value

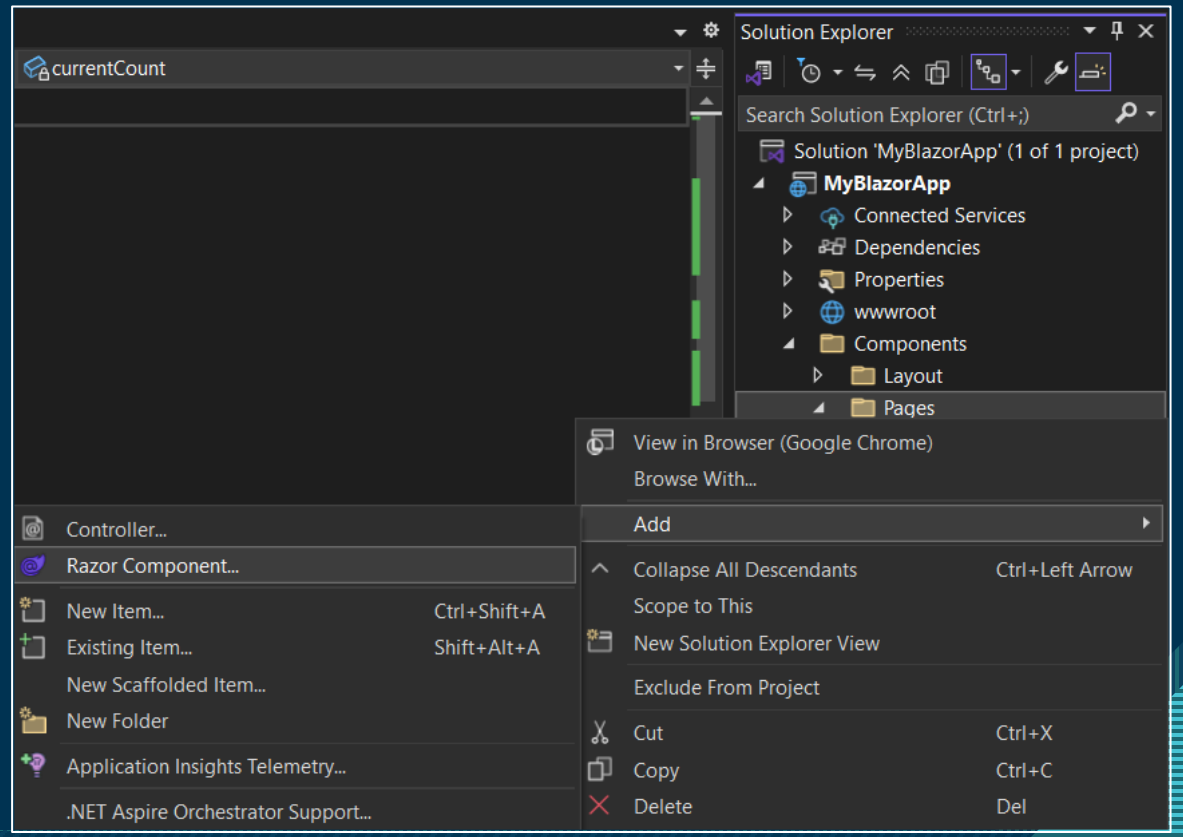
- Modify the Counter component to set a starting count using a text input.

```razor
@page "/counter"
@rendermode InteractiveServer

<PageTitle>Counter</PageTitle>

<h1>Counter</h1>

<p role="status">Current count: @currentCount</p>

<div class="mb-2">
    <input type="number" @bind="startingValue" class="form-control" />
    <button class="btn btn-secondary mt-2" @onclick="SetStartingValue">Set Starting Value</button>
</div>

<button class="btn btn-primary" @onclick="IncrementCount">Click me</button>
<button class="btn btn-danger" @onclick="ResetCount">Reset</button>

@code {
    private int currentCount = 0;
    private int startingValue = 0;

    [Parameter]
    public int IncrementAmount { get; set; } = 1;

    private void IncrementCount()...

    private void ResetCount()
    {
        currentCount = 0;
        startingValue = 0;
    }

    private void SetStartingValue()
    {
        currentCount = startingValue;
    }
}
```



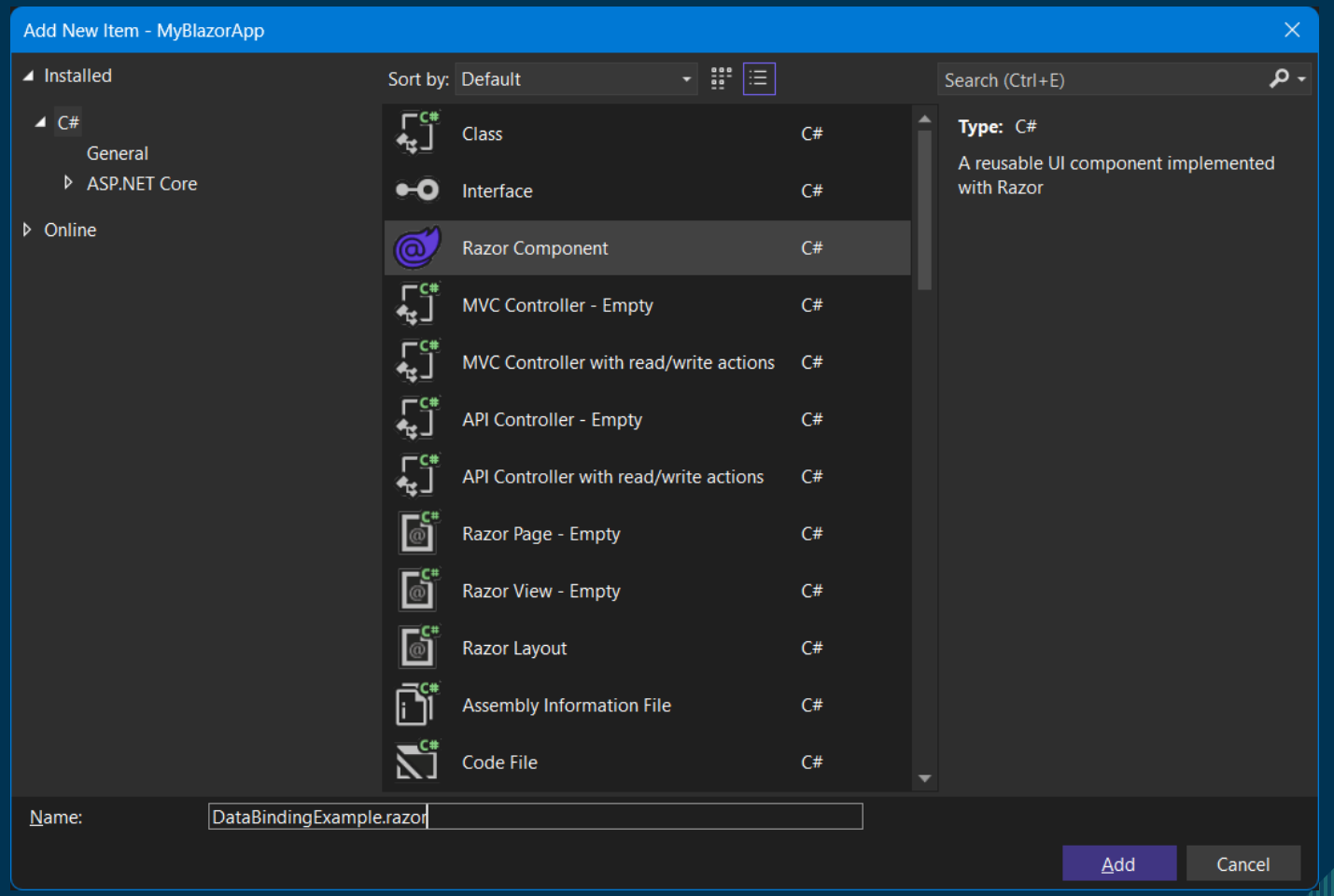
Data Binding in Blazor

- Data binding is when you link (or "bind") a variable in your C# code to something in the UI, like a text box.
- So, when the variable changes, the UI updates automatically, and vice versa.
- Let's say we want the user to type their name, and we display it right away.
- Add a new Razor Component by right-clicking on Pages folder.



Data Binding in Blazor

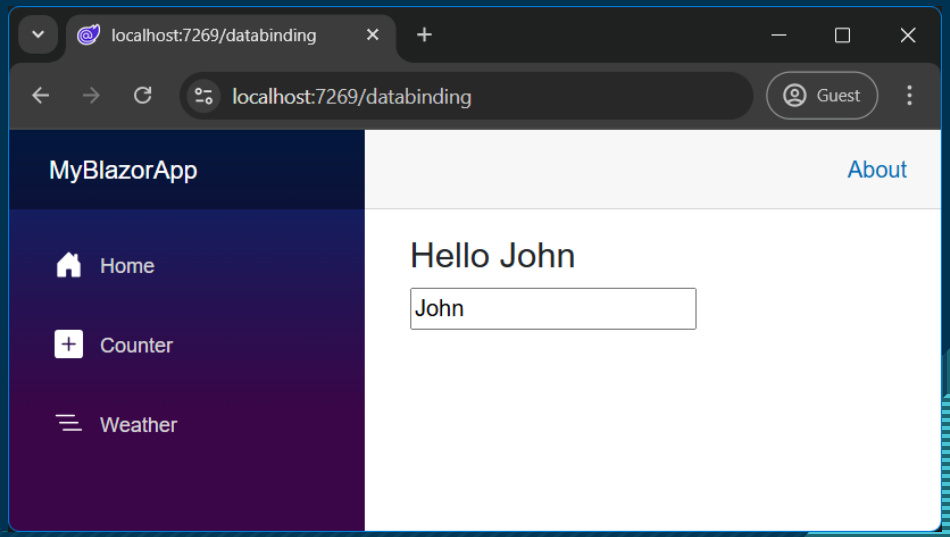
- Give it a meaningful name.
- *Razor component file names require a capitalized first letter.*
- The file name should be DataBindingExample.razor.



Data Binding in Blazor

- The input field is bound to the name variable.
- Whatever you type in the textbox updates name.
- Since @name is in the UI, it updates it instantly.
- *You need to click outside the textbox for the name to appear.*
- Two-Way Binding ⇔ Automatic Sync
  - UI → Variable
  - Variable → UI

```
@page "/databinding"
@rendermode InteractiveServer

<h3>Hello @name</h3>

<input type="text" @bind="name" placeholder="Type your name" />

@code {
    private string name = "";
}
```



Data Binding in Blazor

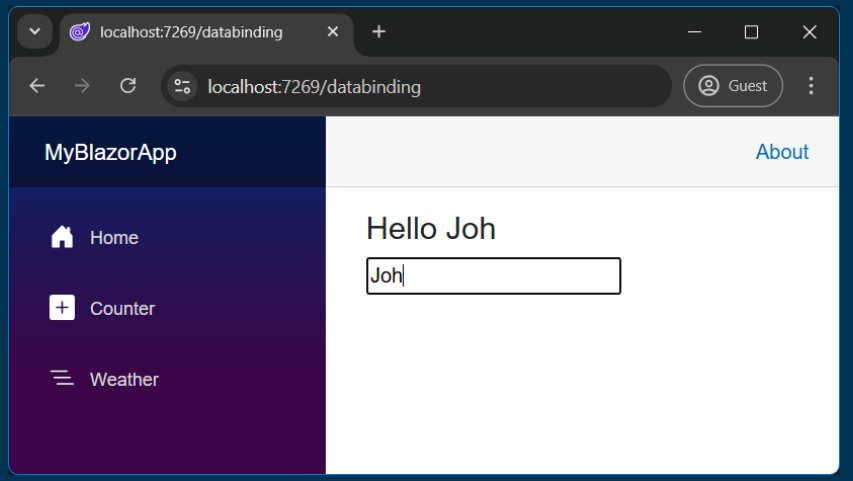
- By default, `@bind` updates the value when the input loses focus (`onchange` event).
- But you can make it update as you type by changing the event to `oninput`.
- Use:
  - `@bind-value="name"`
  - `@bind-value:event="oninput"`

```
@page "/databinding"
@rendermode InteractiveServer

<h3>Hello @name</h3>

<input type="text" @bind-value="name" @bind-value:event="oninput" placeholder="Type your name" />

@code {
    private string name = "";
}
```

Data Binding in Blazor

- `@bind-value="name"` tells Blazor to bind the input to the name variable.
- `@bind-value:event="oninput"` means:
  - Update the variable every time the user types, not just when they click away.

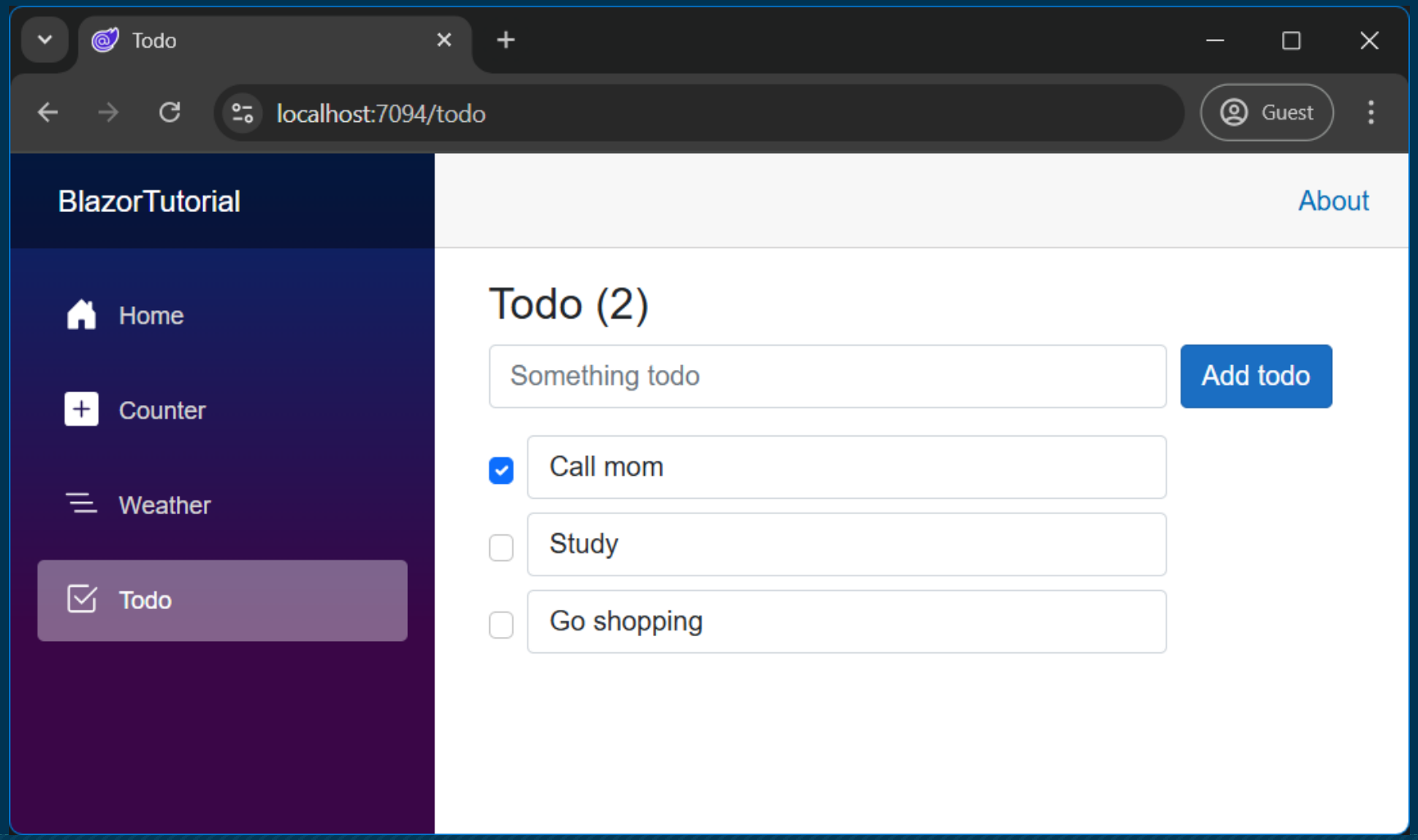
```razor
@page "/databinding"
@rendermode InteractiveServer

<h3>Hello @name</h3>

<input type="text" @bind-value="name" @bind-value:event="oninput" placeholder="Type your name" />

@code {
    private string name = "";
}
```



- `@bind` by itself is shorthand for `@bind-value` and defaults to `@bind-value:event="onchange"`.
- But if you want to change the event (like to `oninput`), you must use the full form: `@bind-value` and `@bind-value:event`.

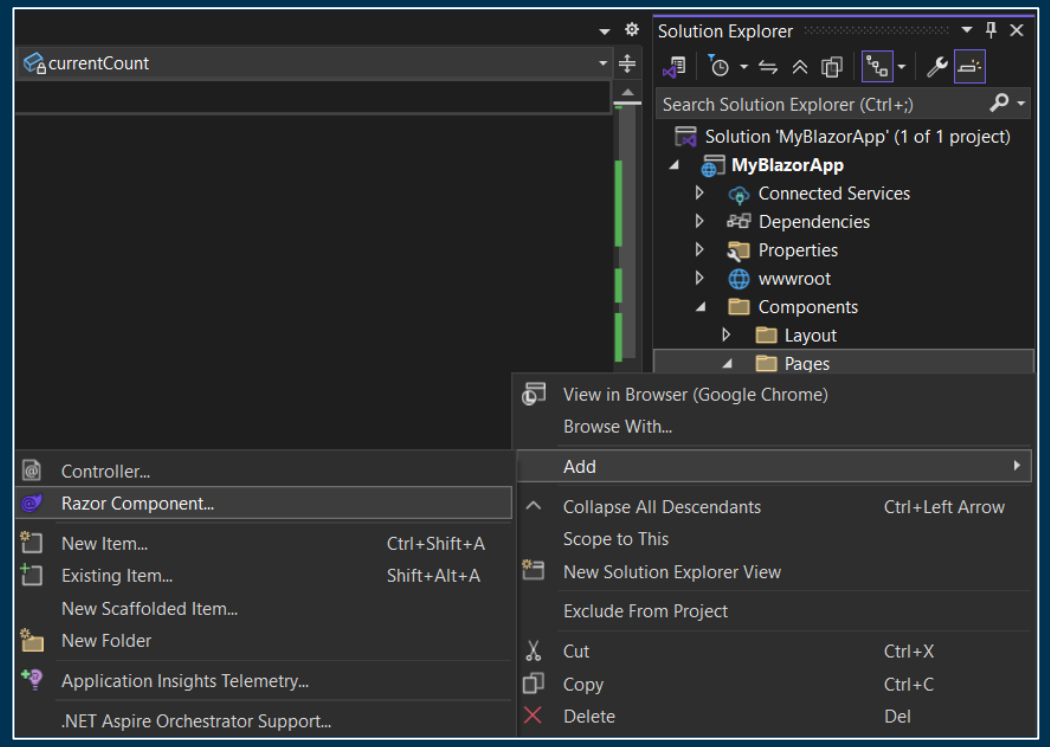
Exercise - Create a To-Do List

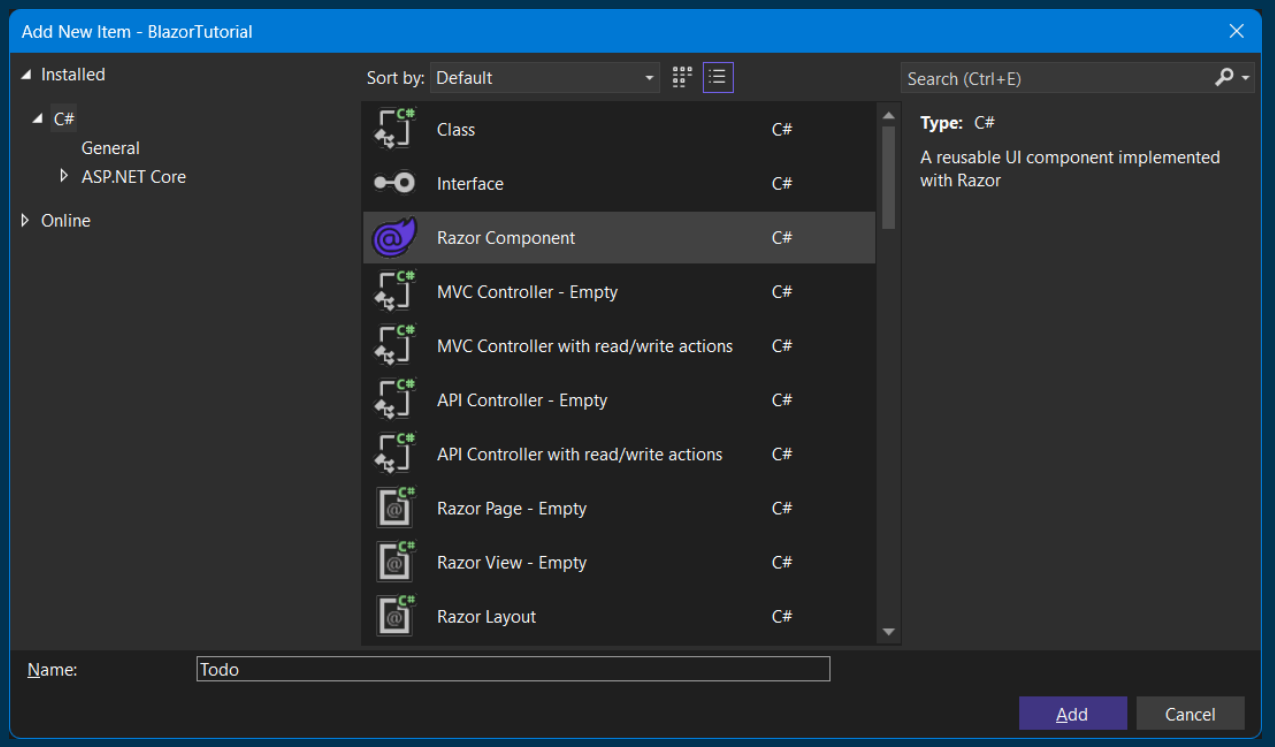
- Add a new Razor component to manage the Todo list.



Add a Razor Component

- Add a new Todo Razor component to the app.





- *Razor component file names require a capitalized first letter.*
- Make sure that Todo component file name starts with a capital letter T.

Add a Razor Component

- In the Todo component:
  - Add an `@page` Razor directive with a relative URL of /todo.
  - Enable interactivity on the page so that it isn't just statically rendered.
    - The Interactive Server render mode enables the component to handle UI events from the server.
  - Add a page title with the `PageTitle` component, which enables adding an HTML `<title>` element to the page.
- Save the Todo.razor file.

```
@page "/todo"
@rendermode InteractiveServer

<PageTitle>Todo</PageTitle>

<h3>Todo</h3>

@code {

}
```

Add the Todo Component to the Navigation Bar

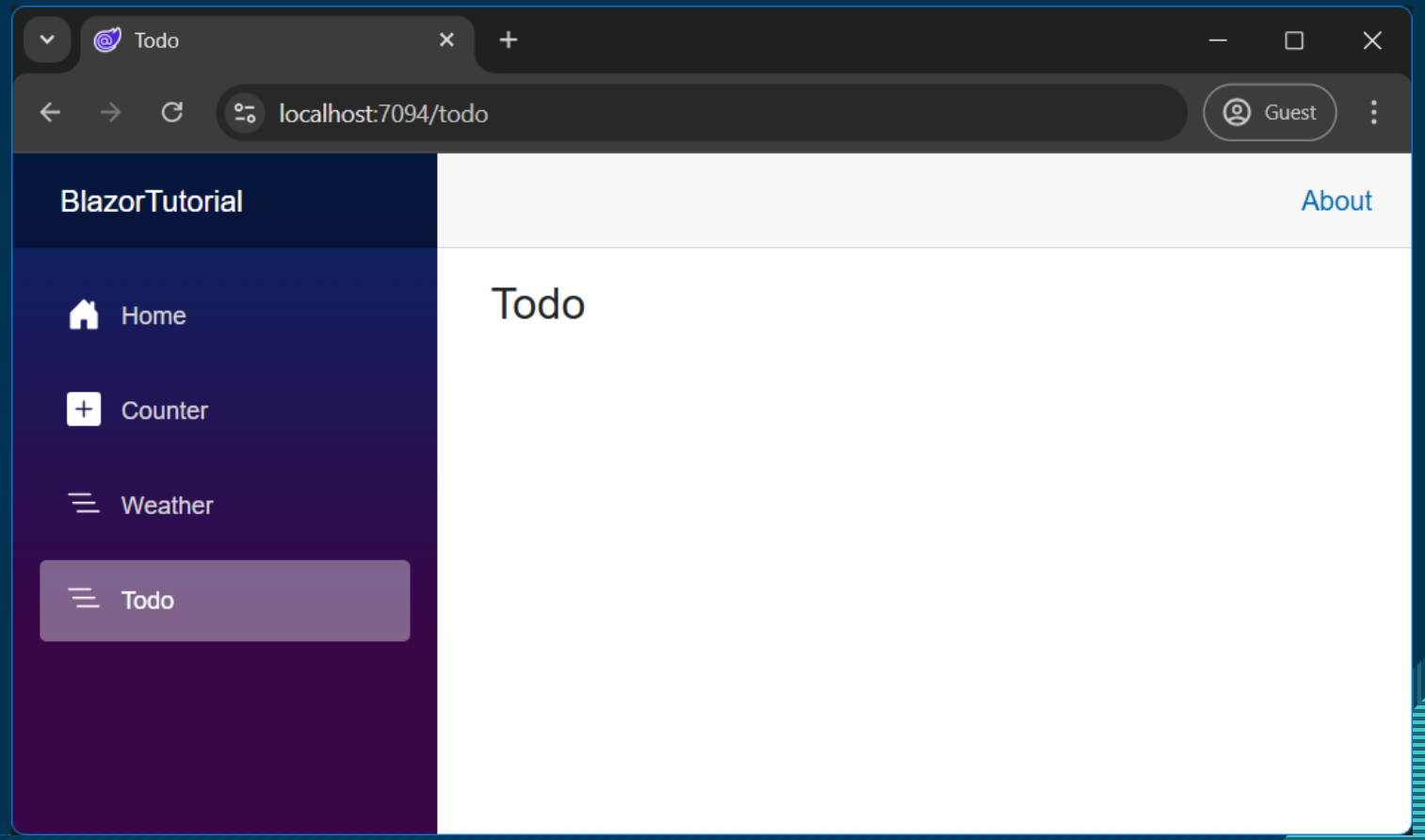
- The NavMenu component (inside the Components/Layout folder) is used in the app's layout.
- Layouts are components that allow you to avoid duplication of content in an app.
- The NavLink component provides a link in the app's UI when the URL is loaded by the app.
- In the navigation element (<nav>) of the NavMenu component, add the following element for the Todo component.

NavMenu.razor

```
        <div class="nav-item px-3">
            <NavLink class="nav-link" href="weather">
                <span class="bi bi-list-nested-nav-menu" aria-hidden="true"></span> Weather
            </NavLink>
        </div>

        <div class="nav-item px-3">
            <NavLink class="nav-link" href="todo">
                <span class="bi bi-list-nested-nav-menu" aria-hidden="true"></span> Todo
            </NavLink>
        </div>
    </nav>
</div>
```

Run the App

- Run the app and visit the new Todo page by selecting the Todo link in the app's navigation bar, which loads the page at /todo.
- Leave the app running.
- Each time a file is saved, the app is automatically rebuilt, and the page in the browser is automatically reloaded.



Add a New Class

- Add a new class TodoItem.cs to the project to represents a todo item.

```
public class TodoItem
{
    0 references
    public string? Title { get; set; }
    0 references
    public bool IsDone { get; set; } = false;
}
```

Modify Todo.razor

- Return to the Todo component.
- Add a variable (field) for the todo items in the @code block.
- The Todo component uses this variable to maintain the state of the todo list.

```
@page "/todo"
@rendermode InteractiveServer

<PageTitle>Todo</PageTitle>

<h3>Todo</h3>

@code {
    private List<TodoItem> todos = new List<TodoItem>();
}
```

Modify Todo.razor

- Add unordered list markup and a `foreach` loop to render each todo item as a list item (`<li>`).

```
@page "/todo"
@rendermode InteractiveServer

<PageTitle>Todo</PageTitle>

<h3>Todo</h3>

<ul>
    @foreach (var todo in todos)
    {
        <li>@todo.Title</li>
    }
</ul>

@code {
    private List<TodoItem> todos = new List<TodoItem>();
}
```

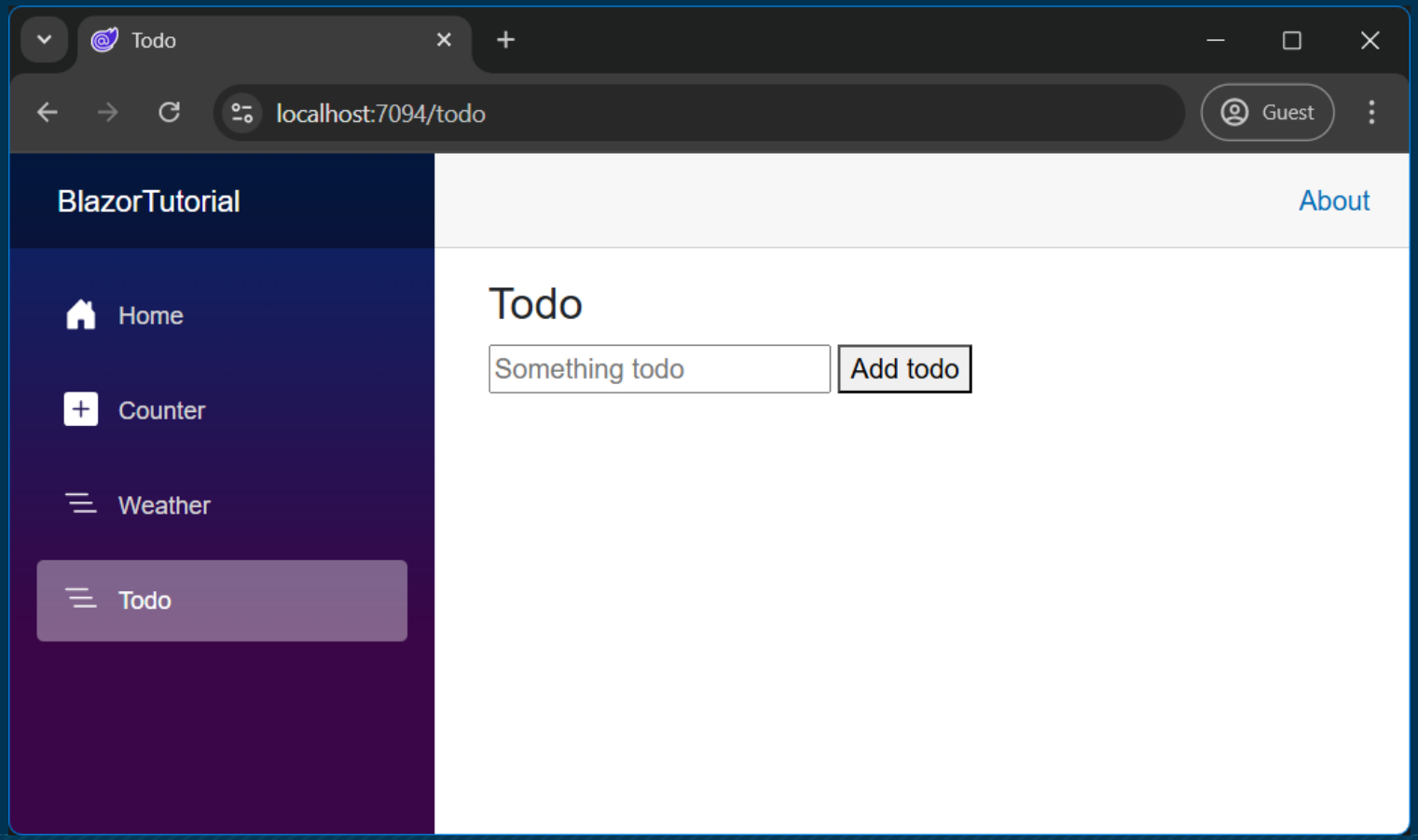
Modify Todo.razor

- The app requires UI elements for adding todo items to the list.
- Add a text input (`<input>`) and a button (`<button>`) above the unordered list (`<ul>...</ul>`).

```
<h3>Todo</h3>

<input type="text" placeholder="Something todo" />
<button>Add todo</button>

<ul>
    @foreach (var todo in todos)
    {
        <li>@todo.Title</li>
    }
</ul>
```

Run the App

- Save the changes.
- The app is automatically rebuilt and the browser reloads the page.



Modify Todo.razor

- When the Add todo button is clicked, nothing happens because an event handler isn't attached to the button.
- Add an `AddTodo` method to the Todo component.
- Also, to get the title of the new todo item, add a `newTodo` string field to the `@code` block.

```
@code {
    private List<TodoItem> todos = new List<TodoItem>();
    private string? newTodo;

    private void AddTodo()
    {
        // Todo: Add the todo
    }
}
```

Modify Todo.razor

- Modify the text `<input>` element to bind `newTodo` with the `@bind` attribute.
- And register the `AddTodo` method for the button using the `@onclick` attribute.

```
<h3>Todo</h3>

<input type="text" placeholder="Something todo" @bind="newTodo" />
<button @onclick="AddTodo">Add todo</button>

<ul>
    @foreach (var todo in todos)
    {
        <li>@todo.Title</li>
    }
</ul>
```

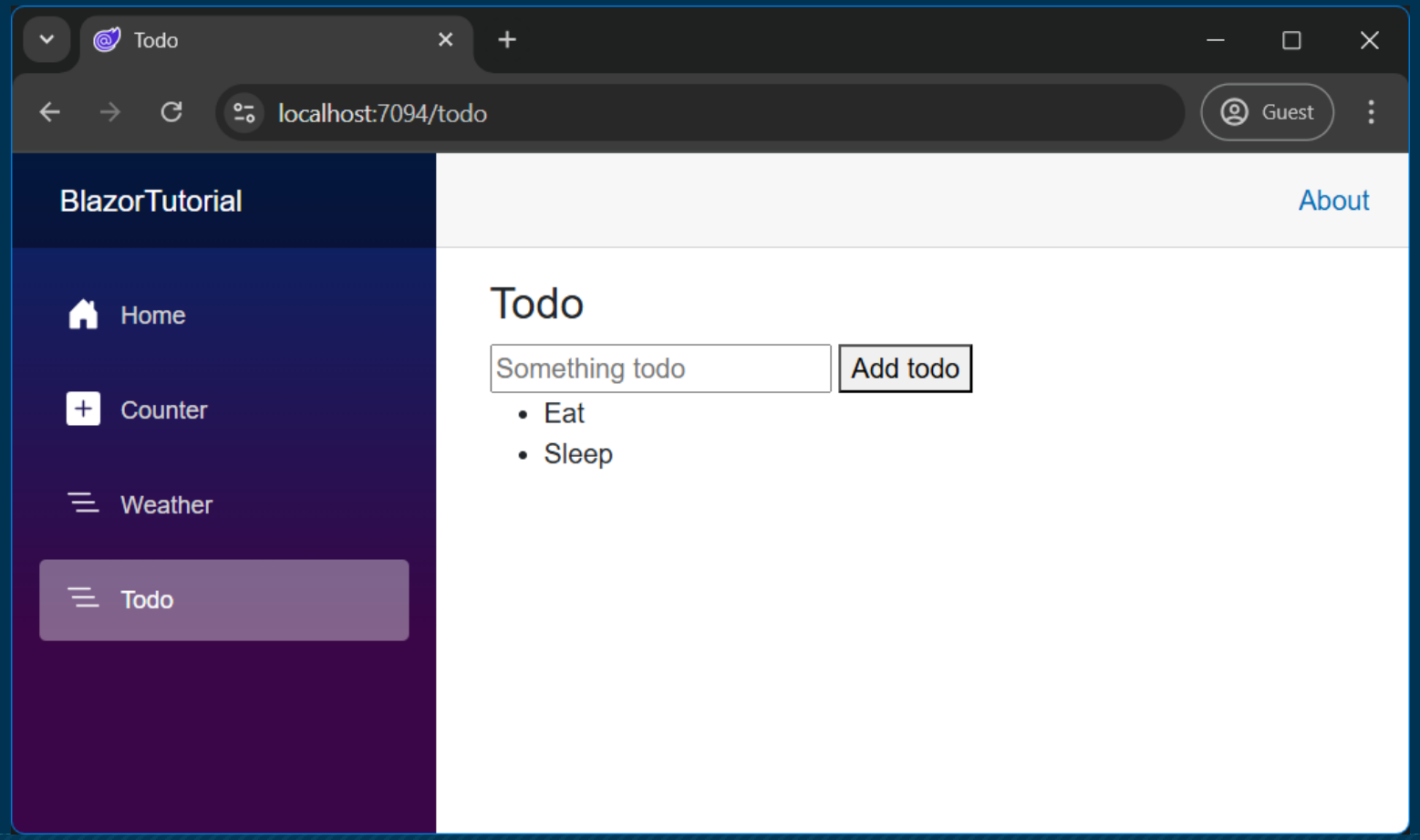
Modify Todo.razor

- Update the `AddTodo` method to add the `TodoItem` with the specified title to the list.
- Clear the value of the text input by setting `newTodo` to an empty string.

```
@code {
    private List<TodoItem> todos = new List<TodoItem>();
    private string? newTodo;

    private void AddTodo()
    {
        if (!string.IsNullOrWhiteSpace(newTodo))
        {
            TodoItem todoItem = new TodoItem { Title = newTodo };
            todos.Add(todoItem);
            newTodo = string.Empty;
        }
    }
}
```

Run the App

- Save the Todo.razor file.
- The app is automatically rebuilt and the page reloads in the browser.



Modify Todo.razor

- The title text for each todo item can be made editable, and a checkbox can help the user keep track of completed items.
- Add a checkbox input for each todo item and bind its value to the `IsDone` property.
- Change `@todo.Title` to an `<input>` element bound to `todo.Title` with `@bind`.

```
<ul>
    @foreach (var todo in todos)
    {
        <li>
            <input type="checkbox" @bind="todo.IsDone" />
            <input type="text" @bind="todo.Title" />
        </li>
    }
</ul>
```

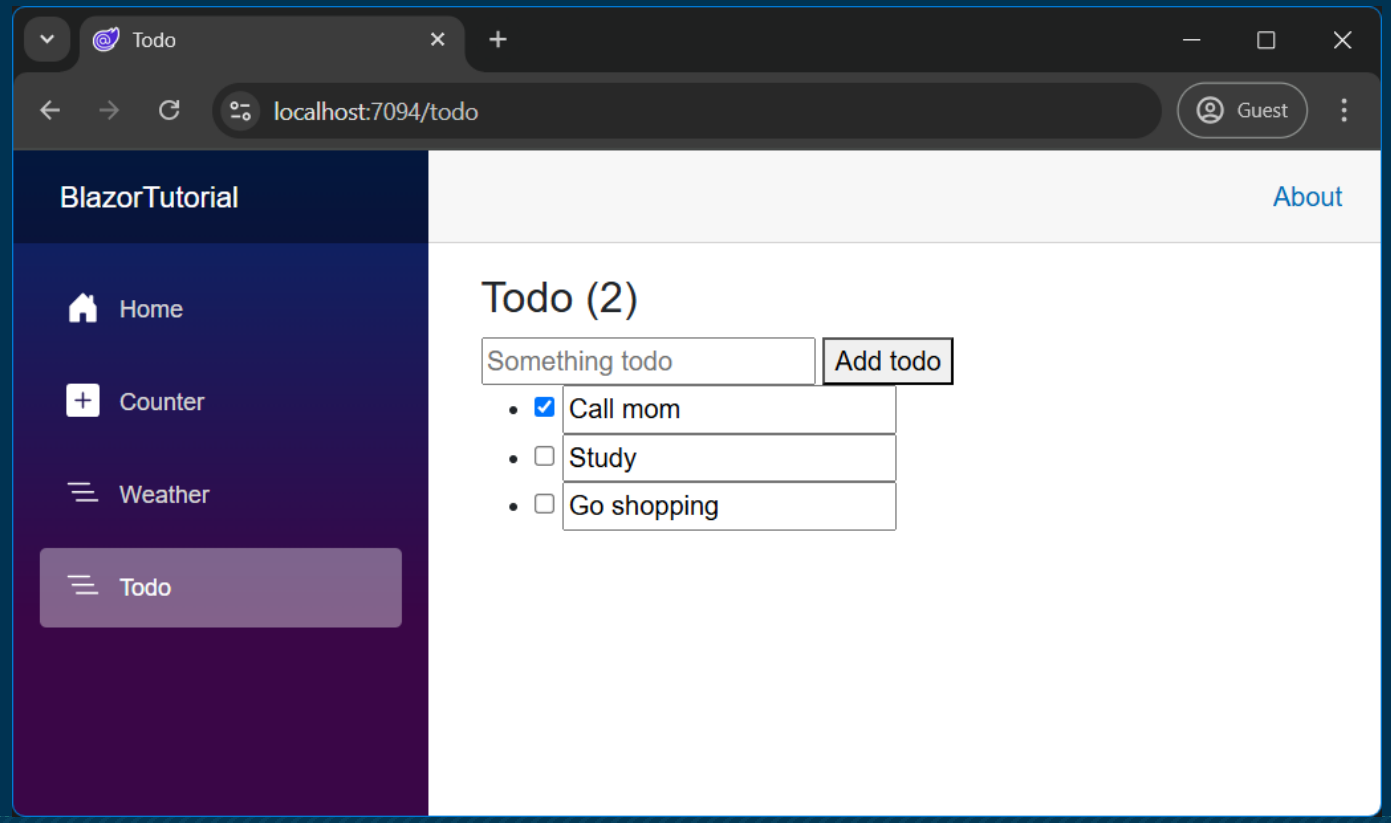
Modify Todo.razor

- Update the `<h3>` header to show a count of the number of todo items that aren't complete (`IsDone` is `false`).
- The Razor expression in the following header evaluates each time Blazor re-renders the component.

```
<PageTitle>Todo</PageTitle>

<h3>Todo (@todos.Count(todo => !todo.IsDone)) </h3>

<input type="text" placeholder="Something todo" @bind="newTodo" />
<button @onclick="AddTodo">Add todo</button>
```

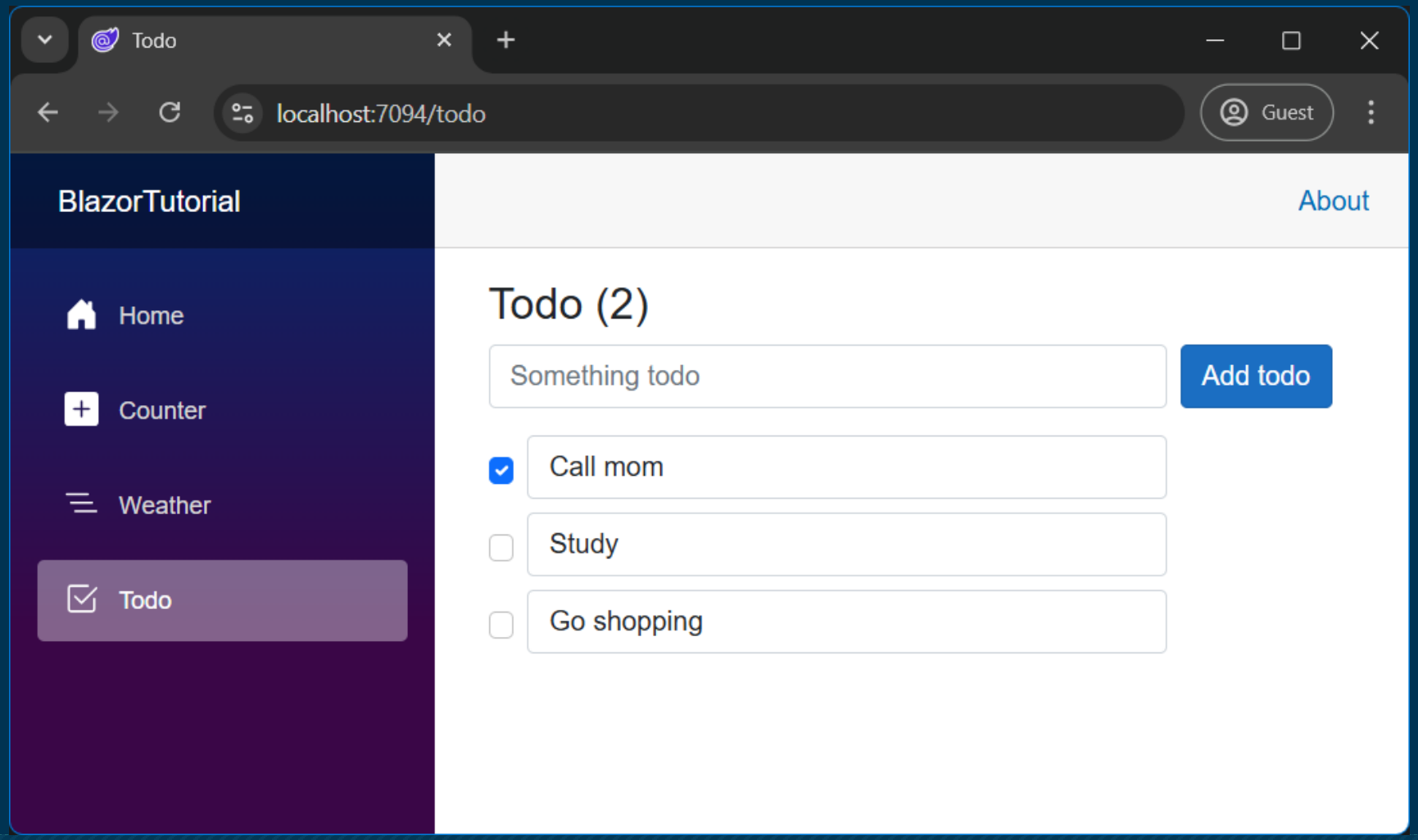
Run the App

- Save the Todo.razor file.
- The app is automatically rebuilt and the page reloads in the browser.
- Add items, edit items, and mark todo items done to test the component.



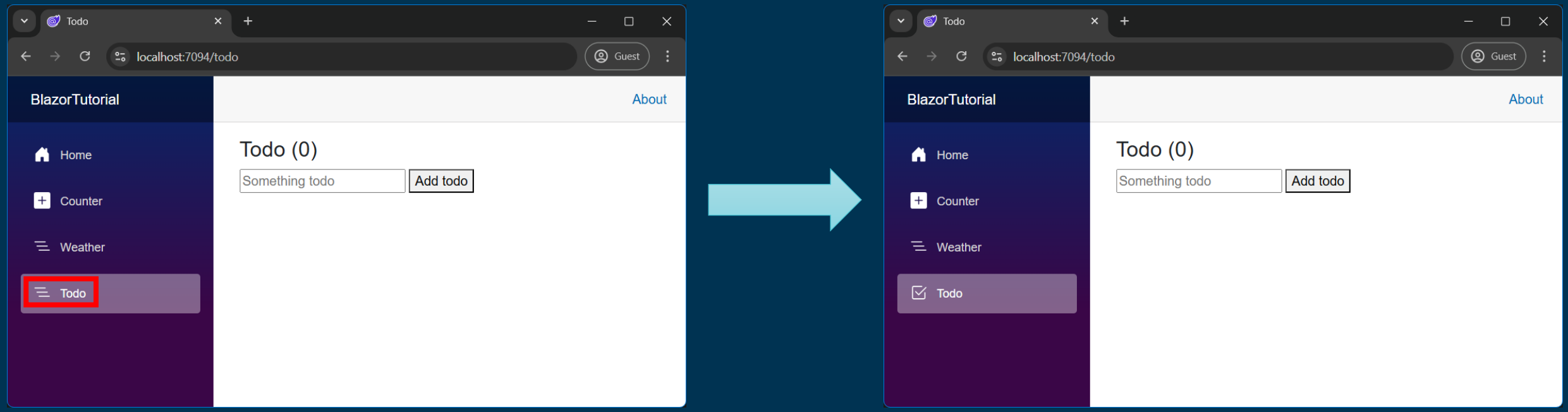
Make the App Look Modern

- Now let's make that app look clean and modern by using Bootstrap.



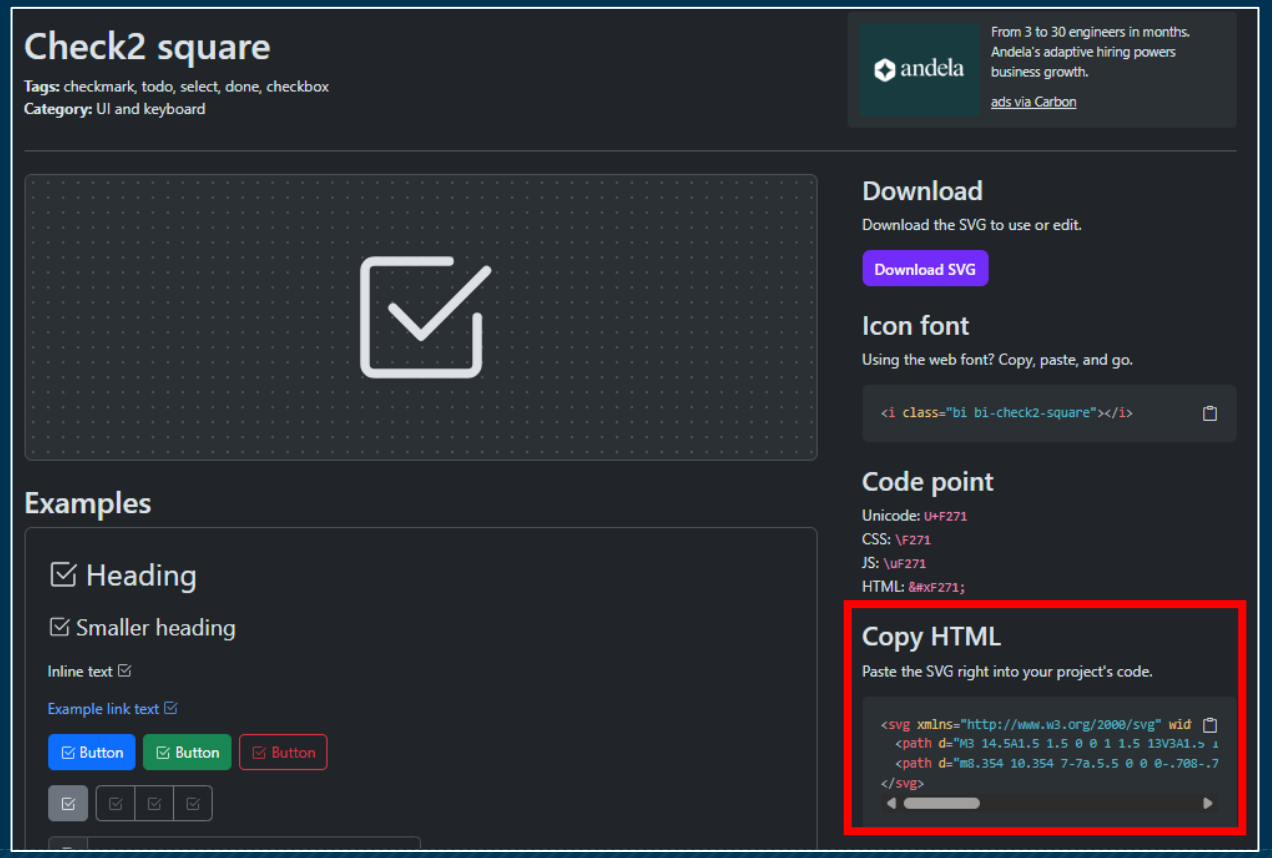
Change the Todo Icon

- First of all, let's change the Todo navigation's icon.



Change the Todo Icon

- Go to this link to get the icon's HTML code.
  - https://icons.getbootstrap.com/icons/check2-square/
- Copy the `<svg>` HTML code.



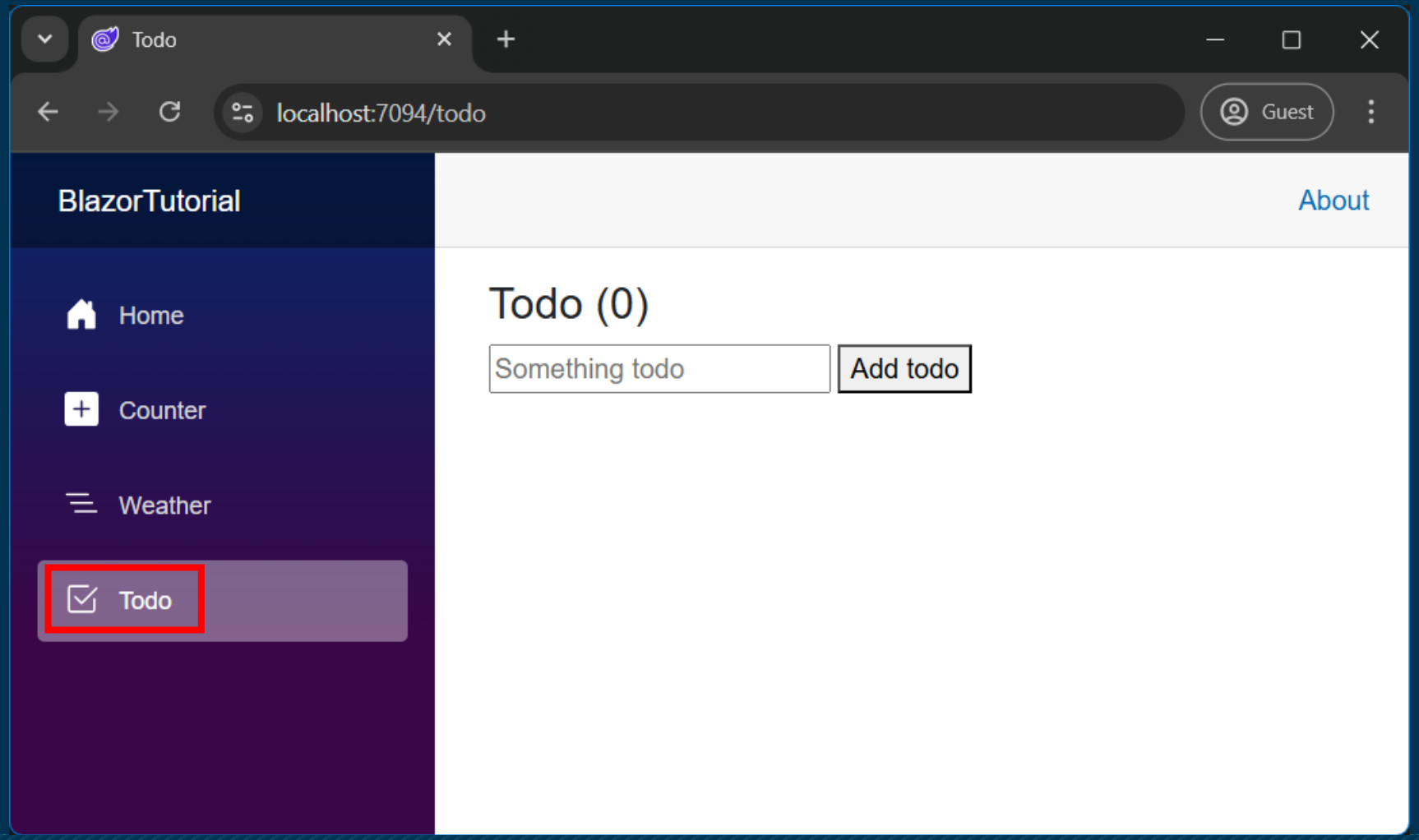
Change the Todo Icon

- Open NavMenu.razor.
- Remove the element and paste the copied <svg> code.

```
<div class="nav-item px-3">
    <NavLink class="nav-link" href="todo">
        <svg xmlns="http://www.w3.org/2000/svg" width="16" height="16"
          fill="currentColor" class="bi bi-check2-square" viewBox="0 0 16 16">
            <path d="M3 14.5A1.5 1.5 0 0 1 1.5 13V3A1.5 1.5 0 0 1 3 1.5h8a.5.5 0 0 1 0
              1H3a.5.5 0 0 0-.5.5v10a.5.5 0 0 0 .5.5h10a.5.5 0 0 0 .5-.5V8a.5.5 0 0 1 1
              0v5a1.5 1.5 0 0 1-1.5 1.5z" />
            <path d="m8.354 10.354 7-7a.5.5 0 0 0-.708-.708L8 9.293 5.354 6.646a.5.5 0
              1 0-.708.708l3 3a.5.5 0 0 0 .708 0" />
        </svg> Todo
    </NavLink>
</div>
```

Run the App

- Save the NavMenu.razor file and check the output.



Apply Bootstrap

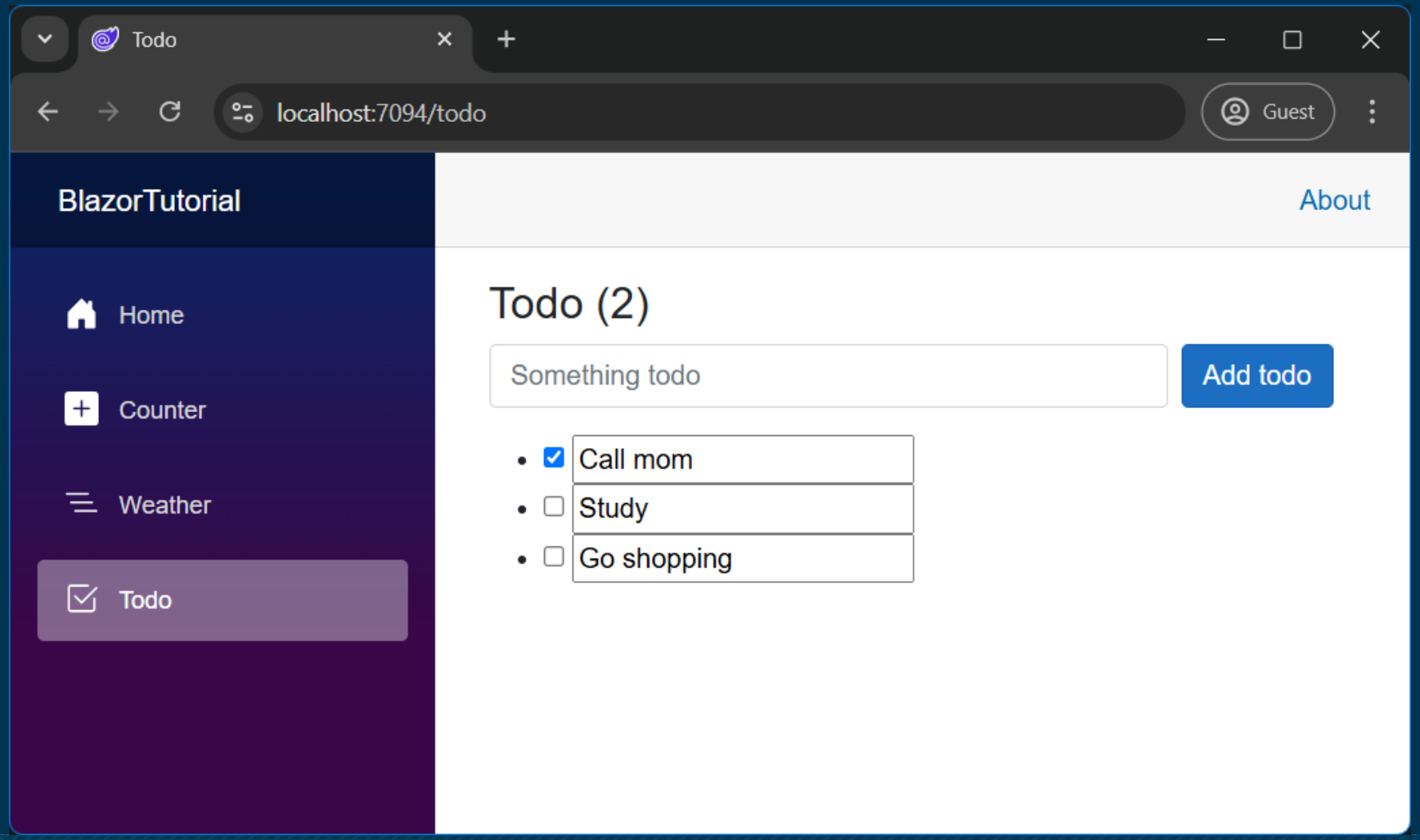
- Go back to Todo.razor.
- Enclose the input and button elements in a `<div>`.
- Apply Bootstrap classes to the `<div>`, `<input>` and `<button>`.

```
<h3>Todo (@todos.Count(todo => !todo.IsDone))</h3>

<div class="d-flex align-items-center mb-3">
    <input type="text" placeholder="Something todo"
           class="form-control me-2" style="max-width: 400px;"
           @bind="newTodo" />
    <button class="btn btn-primary" @onclick="AddTodo">Add todo</button>
</div>
```

- `d-flex` → (`display: flex`) puts input and button side by side.
- `align-items-center` → vertically aligns the button and input.
- `mb-3` → adds bottom margin to separate the div from the list.
- `me-2` → adds some right margin to the input for spacing.

Run the App

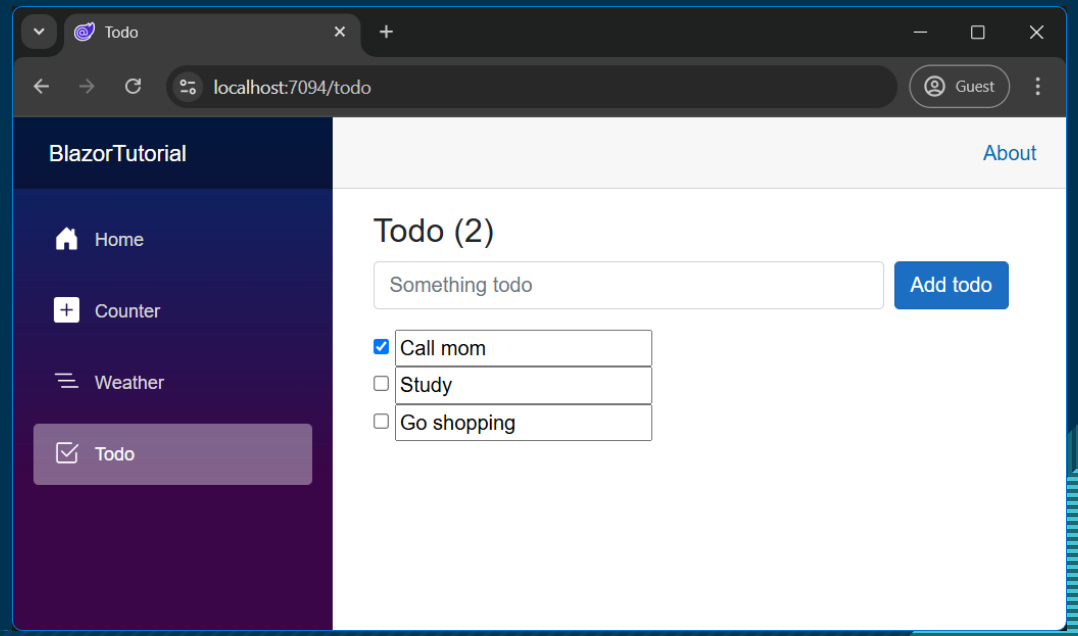
- Save the Todo.razor file and check the output.



Apply Bootstrap

- Now, let's update the `<ul>` and make it look modern as well.
- Apply class `list-unstyled` to the `<ul>` to get rid off the bullet points.

```
<ul class="list-unstyled">
    @foreach (var todo in todos)
    {
        <li>
            <input type="checkbox" @bind="todo.IsDone" />
            <input type="text" @bind="todo.Title" />
        </li>
    }
</ul>
```



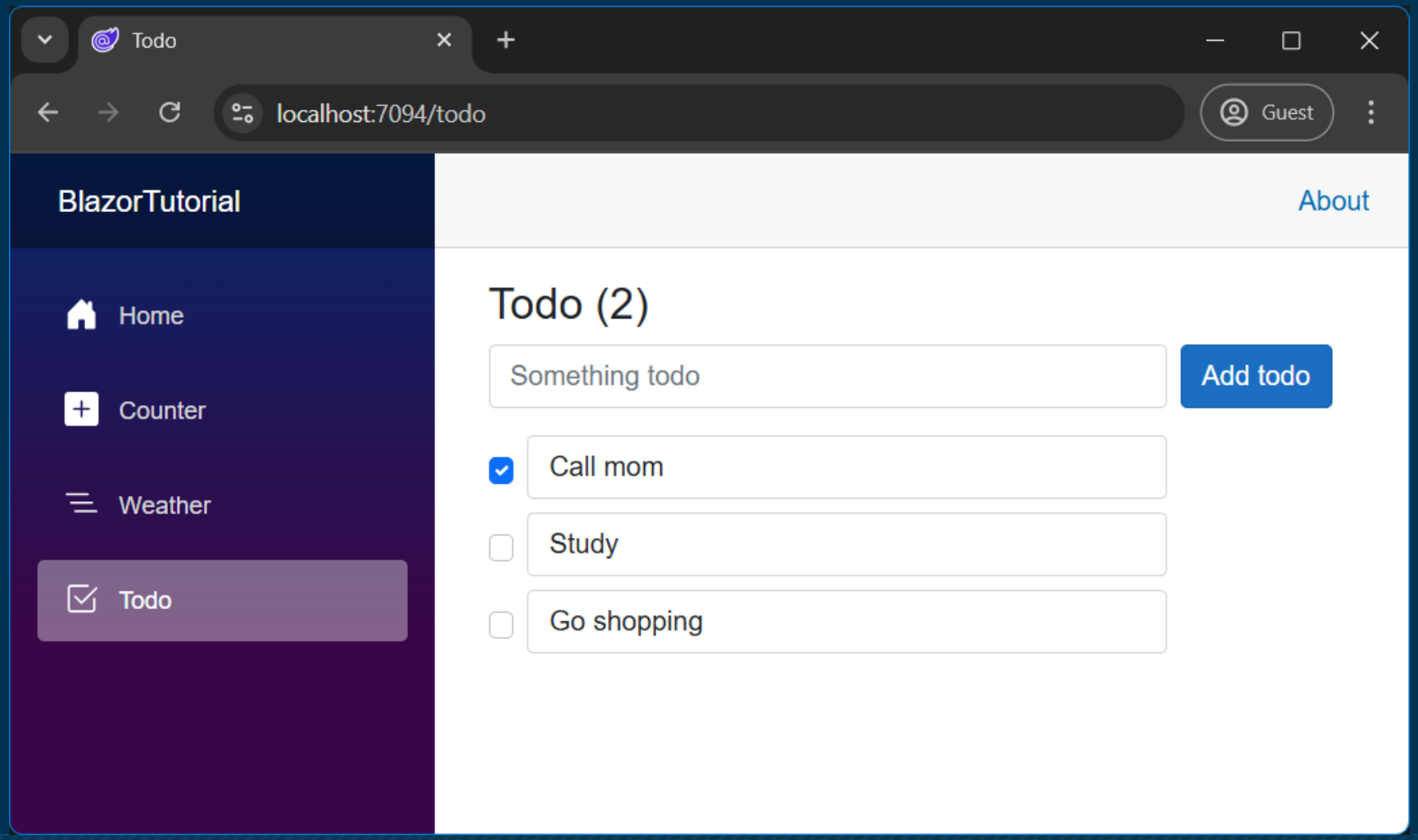
Apply Bootstrap

- Apply Bootstrap classes to the `<li>` and the `<input>` elements contained within it.

```
<ul class="list-unstyled">
    @foreach (var todo in todos)
    {
        <li class="d-flex align-items-center mb-2" style="max-width: 400px;">
            <input type="checkbox" class="form-check-input me-2" @bind="todo.IsDone" />
            <input type="text" class="form-control" @bind="todo.Title" />
        </li>
    }
</ul>
```

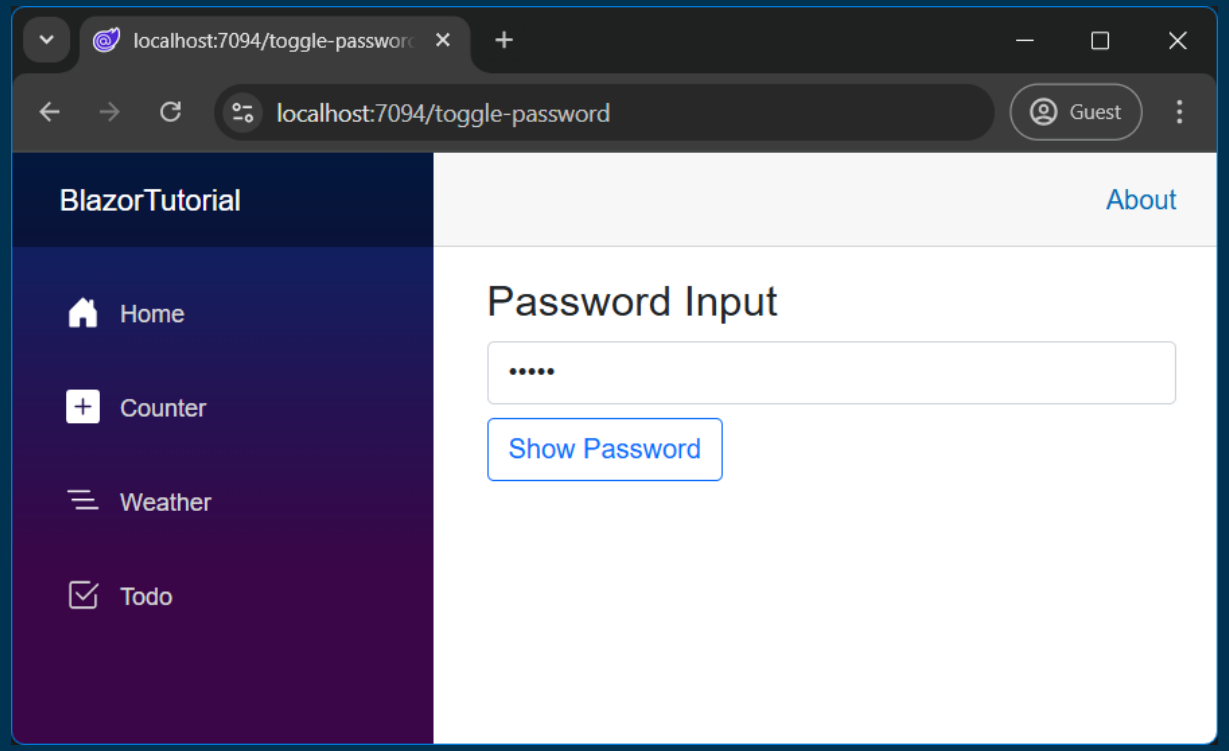
Run the App

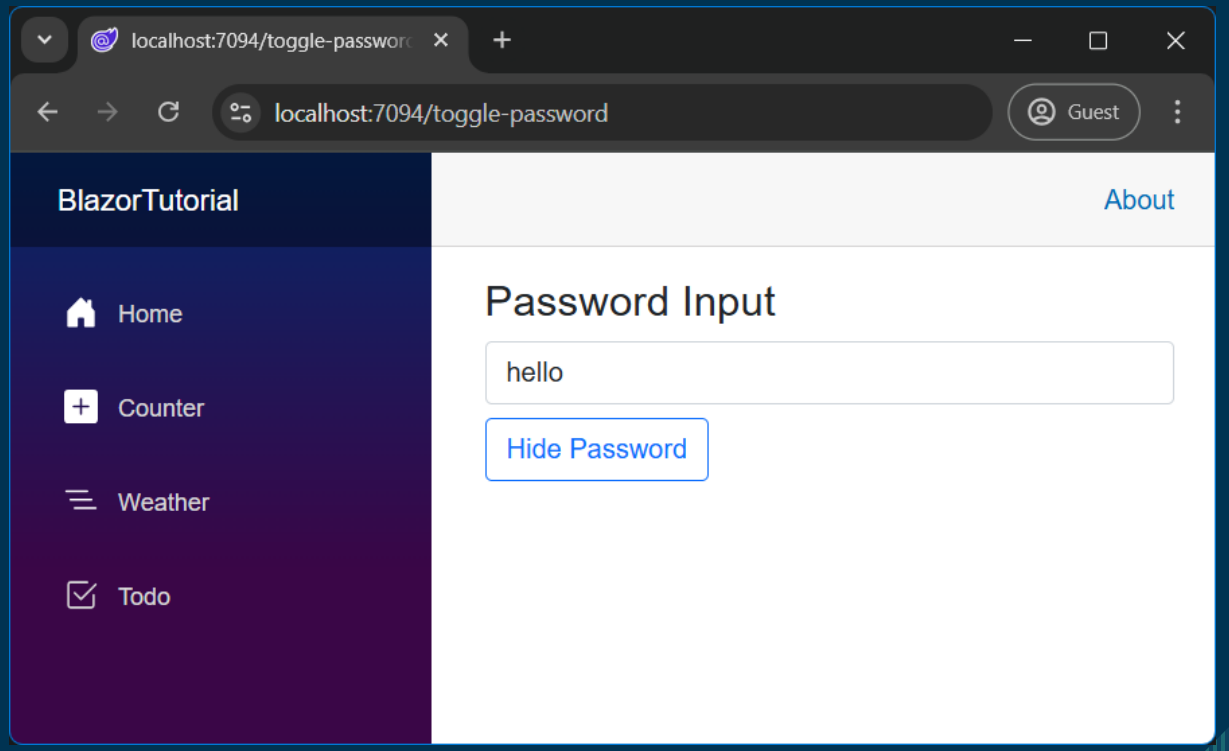
- Save the Todo.razor file and check the output.



Do It Yourself!

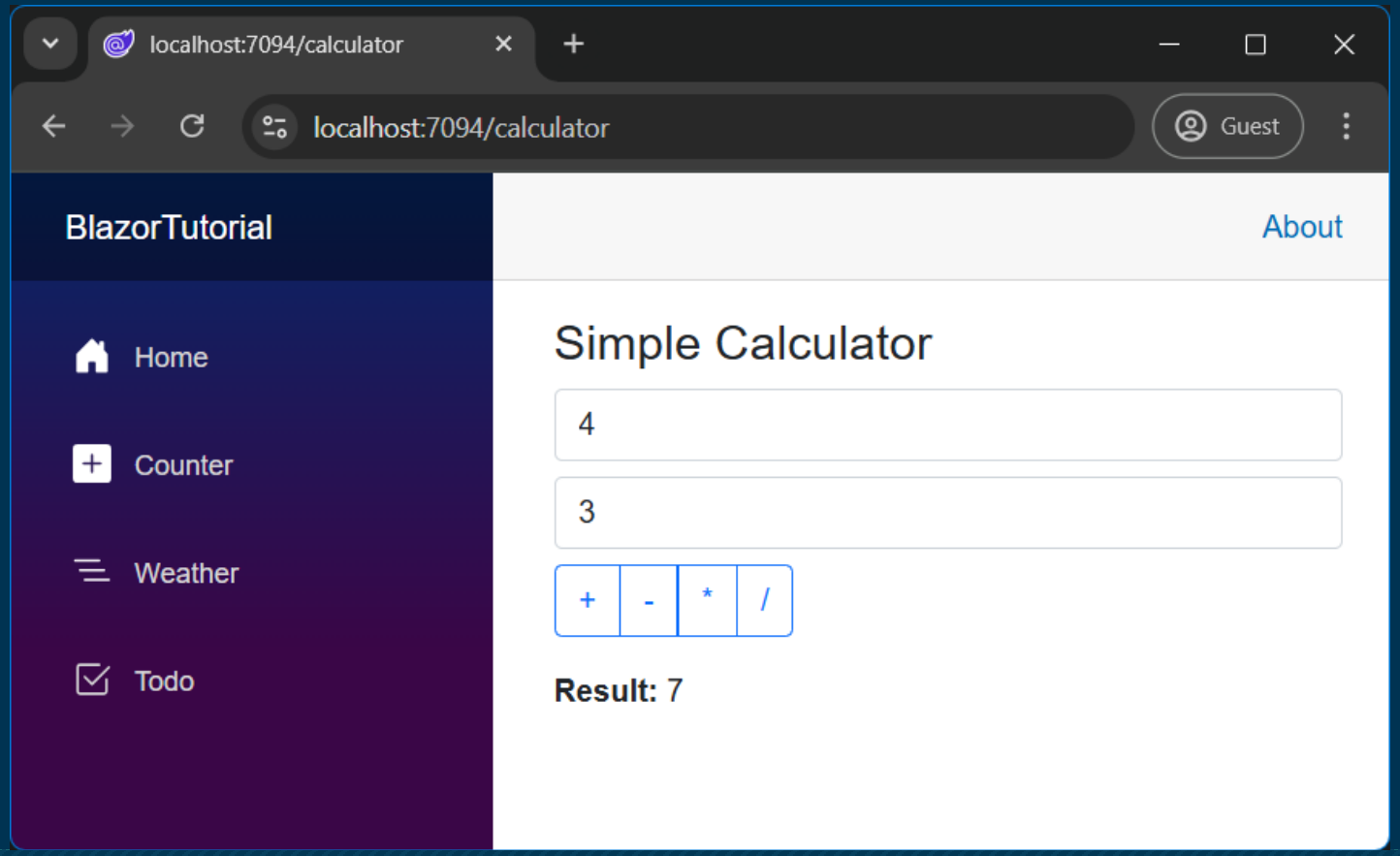
- **Show/Hide Password Toggle**:
  - Create a password box with a toggle button to show or hide the password.





Do It Yourself!

- **Simple Calculator**:
  - Build a basic calculator that lets users input two numbers and perform add, subtract, multiply, or divide operations.



Thank You

References

Some material has been taken from:

- ASP.NET Core Blazor:
  - https://dotnet.microsoft.com/en-us/apps/aspnet/web-apps/blazor
- Introduction to Web Development with Blazor:
  - https://learn.microsoft.com/en-us/training/modules/blazor-introduction/2-what-is-blazor
- Build your first web app with ASP.NET Core using Blazor:
  - https://dotnet.microsoft.com/en-us/learn/aspnet/blazor-tutorial/intro
- Build a Blazor todo list app:
  - https://learn.microsoft.com/en-us/aspnet/core/blazor/tutorials/build-a-blazor-app
- [Book] – Murach's ASP.NET Core MVC, Chapter 1

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