ASP.net REST API

demo code from:
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Introduction

Target Framework: net5.0

Entry Point: Program.cs (as in all .net apps)

Startup.cs

Startup.cs will be the class invoked by the Program.cs Host initiator

- Configuration property gets passed in the constructor (used for env files and more)
- Configure Services method is used to register SERVICES used throughout the API
- Configure method is used to manage the request handling pipeline configuration(MIDDLEWARE).

/Controllers

/Controllers/ folder is for classes that handles the ROUTES that the API exposes

appsettings.json

In the folder /Properties/ you can create multiple appsettings files for settings such as the log level.

Example:

appsettings.DEVELOPMENT.json

appsettings.PRODUCTION.json

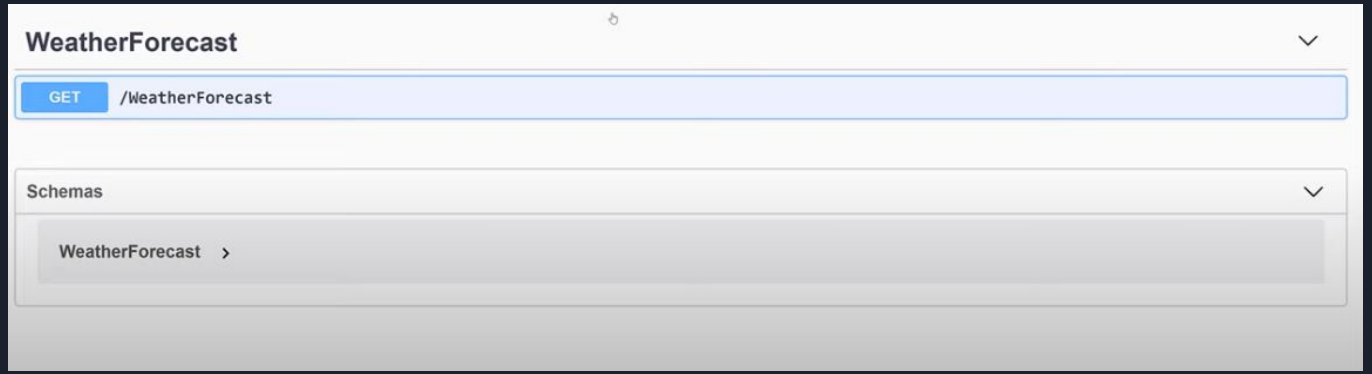
appsettings.TESTING.json

launchSettings.json

Server configuration such as application URL , port numbers , IIS configuration

Swagger

Swagger is an open API specification application that makes your life a lot easier in testing the API.



Entities - Models

Lets see an example of a Model class inside a /Model/ Folder with usage of RecordTypes , and init accessor instead of set (c# 9 , net5.0)

```
using System;

namespace Catalog.Entities
{
    public record Item
    {
        public Guid Id { get; init; }
        public string Name { get; init; }
        public decimal Price { get; init; }
        public DateTimeOffset CreatedDate {get; init; }
    }
}
```

Repositories

The repository layer isolates Business layer from the Data Access Layer. The Repository contains Data Mapper entity. This entity can be used as a model entity for providing schema of the data for performing CRUD operations, by using the CRUD operations defined in the repository.

```
using System;
using System.Collections.Generic;
using System.Linq;
using Catalog.Entities;

namespace Catalog.Repositories
{
    public class InMemItemsRepository
    {
        private readonly List<Item> items = new()
        {
            new Item { Id = Guid.NewGuid(), Name = "Potion", Price = 9, CreatedDate = DateTimeOffset.UtcNow },
            new Item { Id = Guid.NewGuid(), Name = "Iron Sword", Price = 20, CreatedDate = DateTimeOffset.UtcNow },
            new Item { Id = Guid.NewGuid(), Name = "Bronze Shield", Price = 18, CreatedDate = DateTimeOffset.UtcNow }
        };

        public IEnumerable<Item> GetItems()
        {
            return items;
        }

        public Item GetItem(Guid id)
        {
            return items.Where(item => item.Id == id).SingleOrDefault();
        }
    }
}
```

Example controller class

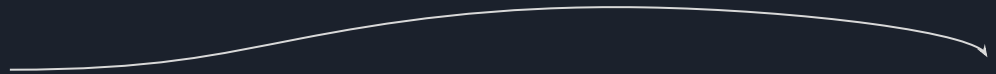
The following class binds with the ItemRepository and the ItemEntity

```
using System;
using System.Collections.Generic;
using Catalog.Entities;
using Catalog.Repositories;
using Microsoft.AspNetCore.Mvc;

namespace Catalog.Controllers
{
    [ApiController]
    [Route("items")]
    public class ItemsController : ControllerBase
    {
        private readonly InMemItemsRepository repository;

        public ItemsController()
        {
            repository = new InMemItemsRepository();
        }

        // GET /items
        [HttpGet]
        public IEnumerable<Item> GetItems()
        {
            var items = repository.GetItems();
            return items;
        }

        // GET /items/{id}
        [HttpGet("{id}")]
        public ActionResult<Item> GetItem(Guid id)
        {
            var item = repository.GetItem(id);

            if (item is null)
            {
                return NotFound();
            }

            return item;
        }
    }
}
```

Dependency Injection

Up untill now our code generates a new list of Items every time the Repository class is being called. To avoid that we will inject the repository class in the controller class constructor.

```
public ItemsController()
{
    repository = new ItemsRepository();
}
```



```
public ItemsController(repository)
{
    this.repository = repository;
}
```

Implementation of injection

We will be using the IServiceProvider for this

1. Extract interface for ItemRepository class
2. Create interface class and paste the extracted interface
3. Make sure repository implements the interface
4. Change repository variable (in controller) from ItemRepository type to the interface type.
5. Receive repository in Controller constructor paremeters
6. Startup.cs -> ConfigureServices -> services.addSingleton(

DTO - data transfer object

DTOs help to further decouple presentation from the service layer and the domain model. When DTOs are used, the presentation layer and the service layer share data contracts rather than classes. Eventually hiding our models from the outside world.

```
using System;

namespace Catalog.Dtos
{
    public record ItemDto
    {
        public Guid Id { get; init; }
        public string Name { get; init; }
        public decimal Price { get; init; }
        public DateTimeOffset CreatedDate { get; init; }
    }
}
```

DTO - Extensions.cs

We will create a new root file Extensions.cs which will extend the definitions of our types.

MUST be static!

```
using Catalog.Dtos;
using Catalog.Entities;

namespace Catalog
{
    public static class Extensions
    {
        public static ItemDto AsDto(this Item item)
        {
            return new ItemDto
            {
                Id = item.Id,
                Name = item.Name,
                Price = item.Price,
                CreatedDate = item.CreatedDate
            };
        }
    }
}
```

DTO - final

No we can actually do the following in the controller getItem method

```
var items = repository.GetItems().Select(item => item.AsDto());
return items;
```

And in the getItem(id) method

```
var item = repository.GetItem(id);

            if (item is null)
            {
                return NotFound();
            }

            return item.AsDto();
```