# Task 1: First Web API Using .NET Core

## Objectives and Concepts

### 1. RESTful Web Service

A RESTful Web Service is based on the principles of REST (Representational State Transfer). It uses standard HTTP methods to perform CRUD operations (Create, Read, Update, Delete) on resources.

**Features of REST Architecture:**

- **Stateless Communication:** Each request from the client to the server must contain all necessary information.
- **Uniform Interface:** Uses standard HTTP verbs (GET, POST, PUT, DELETE).
- **Resource-Based:** Operates on resources (URI identifies resources).
- **Representation:** Response can be in XML, JSON, or plain text, but JSON is widely used.
- **Microservices Friendly:** Supports building modular services which can be independently deployed.

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### 2. Web API vs Web Service

| Feature | Web API | Web Service |
|---|---|---|
| Protocol | HTTP/HTTPS | SOAP/HTTP |
| Format | JSON, XML, plain text | Mostly XML |
| Lightweight | Yes | No |
| Platform Dependency | Platform Independent | Platform Dependent |
| Modern Use | Common in REST, Microservices | Used in legacy applications |

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### 3. HttpRequest & HttpResponse

- **HttpRequest:** Represents the client's request. Contains headers, method, URI, and body.
- **HttpResponse:** Represents the response sent to the client. Includes status code, headers, and response body.

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## 4. Action Verbs in Web API

| HTTP Verb | Description | Attribute in Web API |
|---|---|---|
| GET | Retrieve data | [HttpGet] |
| POST | Add new data | [HttpPost] |
| PUT | Update existing data | [HttpPut] |
| DELETE | Delete data | [HttpDelete] |

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## 5. HTTP Status Codes in Web API

| Status Code | Meaning | Usage in ActionResult |
|---|---|---|
| 200 OK | Success | `return Ok()` |
| 400 BadRequest | Invalid client request | `return BadRequest()` |
| 401 Unauthorized | Authorization header/token missing | Auto from `[Authorize]` |
| 500 Server Error | Unhandled exception | Custom or global filter |

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## 6. Configuration Files in .NET Core Web API

| File | Description |
|---|---|
| **Program.cs** | Contains app startup logic, dependency injection, routing.\nIn .NET 6+, replaces `Startup.cs`. |
| **appSettings.json** | Stores configuration values like connection strings, tokens, etc. |
| **launchSettings.json** | Defines profiles for running the project (IIS Express, ports, etc.) |
| **WebApi.config / Route.config** | Used in .NET Framework (pre-Core) to define routing and settings. Not used in .NET Core. |

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# Implementation

## 1. Project Creation

- Create new project in Visual Studio:
- `Template: ASP.NET Core Web API`
- `Framework: .NET 6 or .NET 7`

## 2. Auto-Generated ValuesController

```
[ApiController]
[Route("[controller]")]
public class ValuesController : ControllerBase
{
    private static List<string> values = new() { "value1", "value2" };

    [HttpGet]
    public IEnumerable<string> Get() => values;

    [HttpPost]
    public IActionResult Post([FromBody] string value)
    {
        values.Add(value);
        return Ok(value);
    }
}
```

- Inherits from `ControllerBase`
- Uses `[HttpGet]`, `[HttpPost]` to map HTTP methods
- `Get()` returns list, `Post()` adds a value

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## 3. Run and Test Application

- Run project using `dotnet run` or Visual Studio
- Open browser:
- `http://localhost:<port>/swagger`
- Execute GET method in Swagger UI.

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## Screenshot Placeholders

1. Swagger UI showing `ValuesController` with GET and POST
2. Output of GET method execution in Swagger (200 OK)

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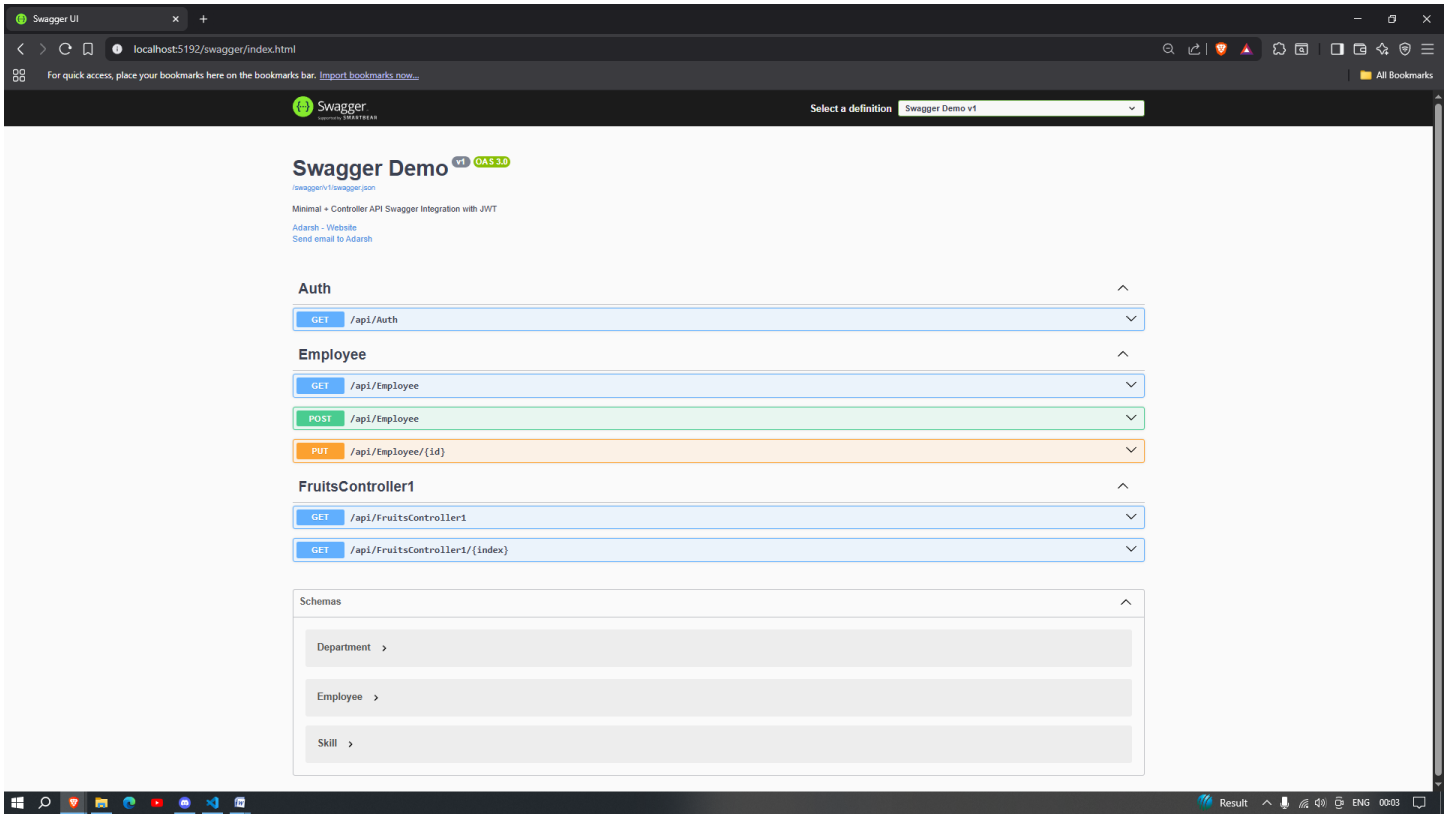
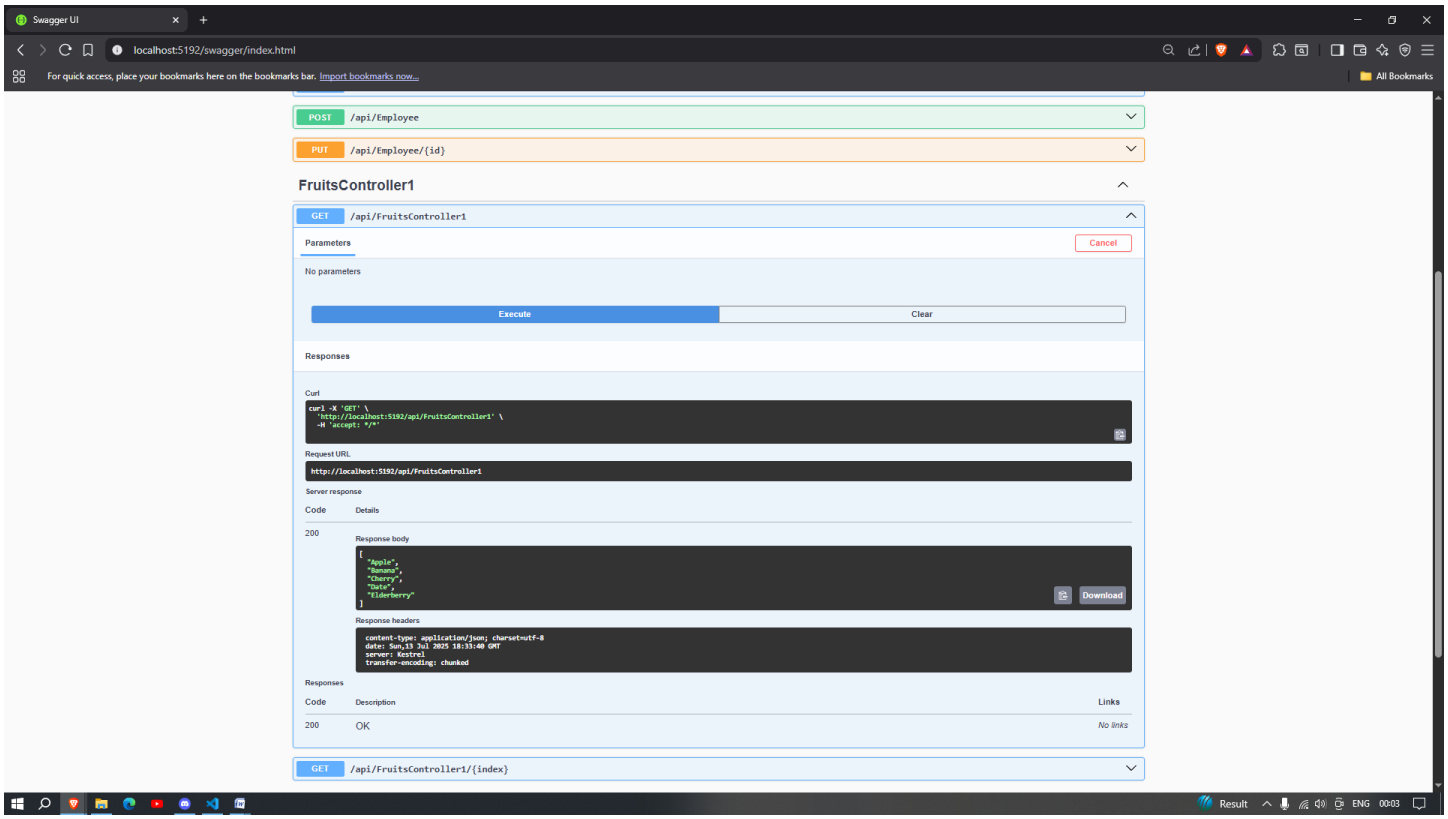
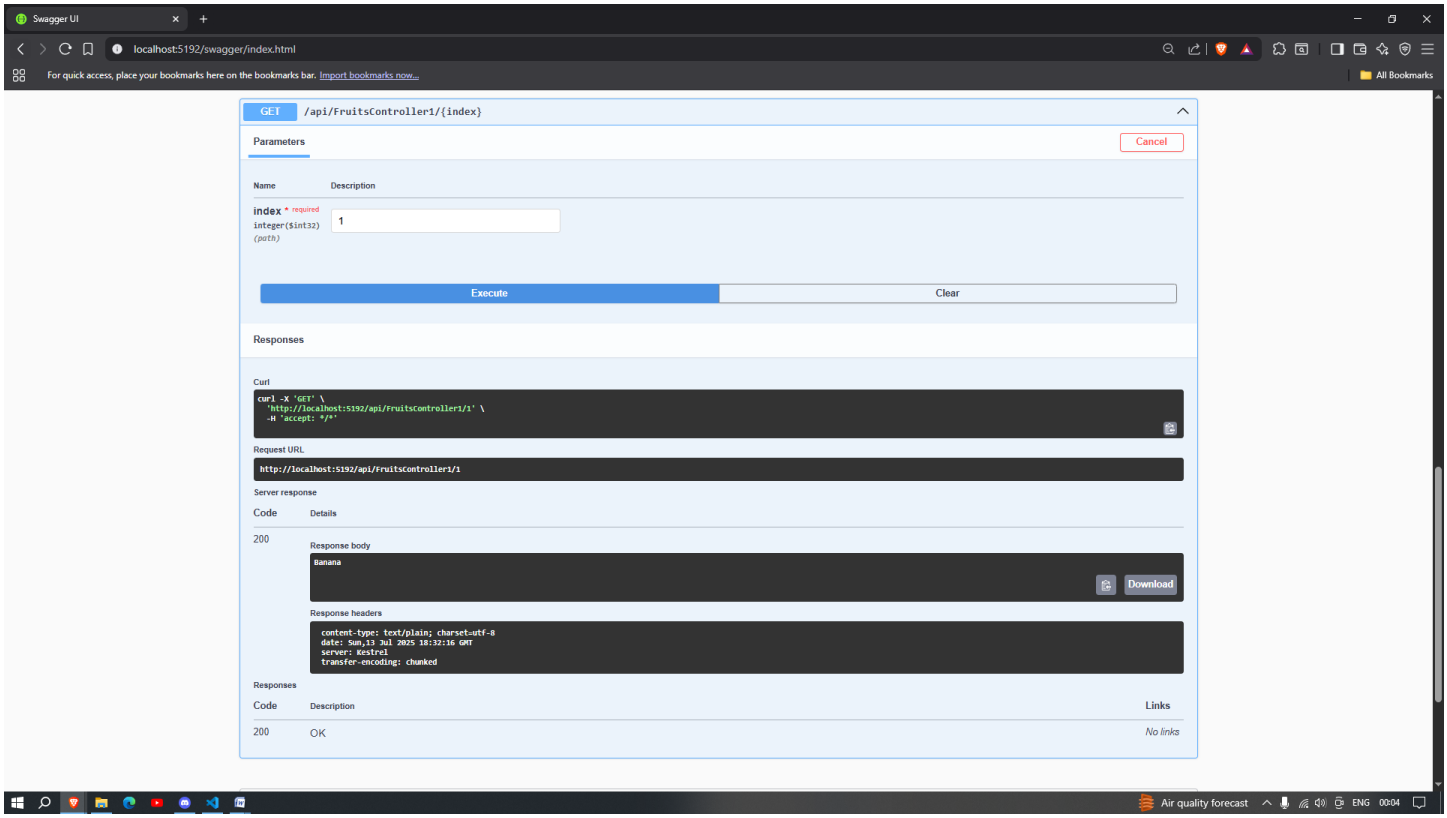
# Screenshots






# Conclusion

Task 1 introduces the fundamentals of Web API structure, action methods, HTTP verbs, status codes, and REST concepts. It also establishes the ability to test APIs using built-in tools like Swagger.