# Exception Handling Lab

Perform these labs on your own computer using Visual Studio 2022 to ensure you understand the lessons presented in the corresponding videos and lectures.

## Lab 1: Built-In Global Exception Handling

Open the **CustomerController.cs** file and in the Get() method, add the following line of code just after the line **List<Customer> list;**

```
// Intentionally Cause an Exception
throw new ApplicationException("ERROR!");
```

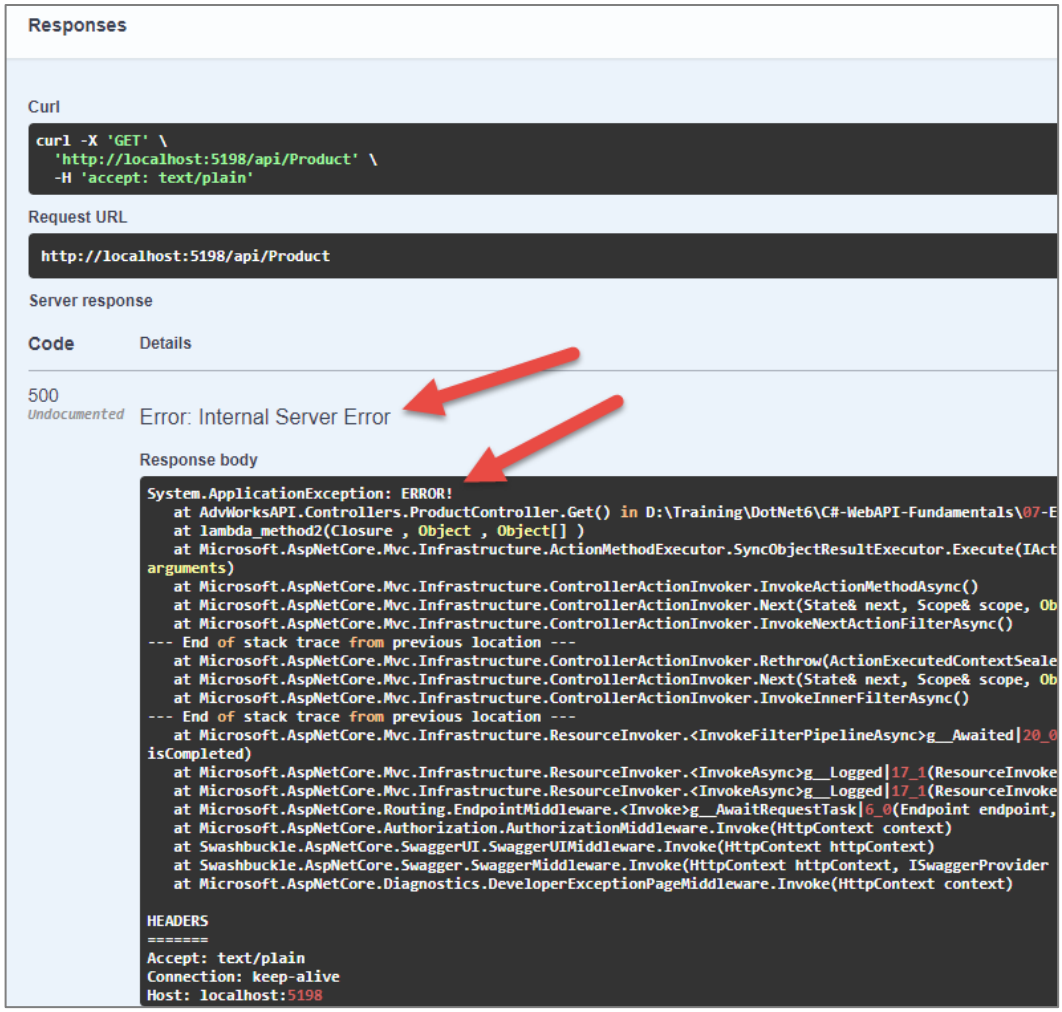
### Try it Out

Run the application.

Click on the **GET /api/Customer** button.

You may need to go back to Visual Studio and click **Continue**.

View the exception that is returned (500 Error: Internal Server Error) similar to that in the screen shot below.




# Lab 2: Add Error Handling Controller

Right mouse-click on the **Controllers** folder and add a class named **ErrorController**.

Replace the contents of this file with the following code.

```
using Microsoft.AspNetCore.Diagnostics;
using Microsoft.AspNetCore.Mvc;

namespace AdvWorksAPI.Controllers;

public class ErrorController : ControllerBase
{
  [Route("/ProductionError")]
  [ApiExplorerSettings(IgnoreApi = true)]
  public IActionResult ProductionErrorHandler()
  {
    string msg = "Unknown Error";

    var features =
HttpContext.Features.Get<IExceptionHandlerFeature>()!;
    if (features != null) {
      msg = features.Error.Message;
    }

    return
StatusCode(StatusCodes.Status500InternalServerError,
msg);
  }
}
```

Open the **Program.cs** file and add the following line of code just **before** the call to the **app.UseAuthorization()** method.

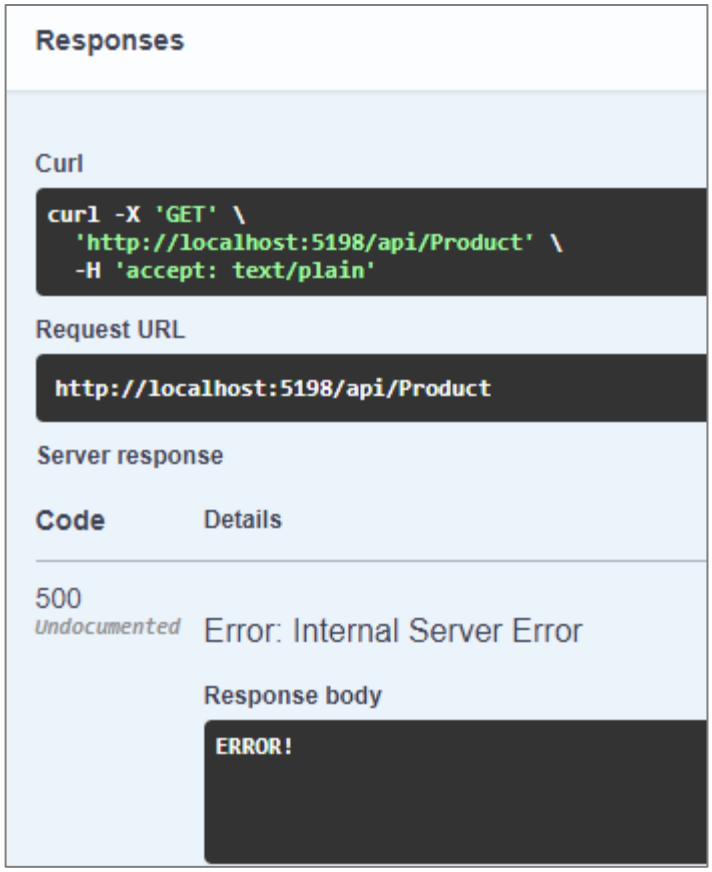
```
// Enable Exception Handling Middleware
app.UseExceptionHandler("/ProductionError");
```

# Try it Out

Run the application and click on the **GET /api/Customer** button.

You may need to go back to Visual Studio and click **Continue**.

View the exception that is returned (500 Error: Internal Server Error) similar to that in the screen shot below.




# Lab 3: Development and Production Exception Handling

Open the **Program.cs** file and replace the code from the last lab to the following lines of code.

```
// Enable Exception Handling Middleware
if (app.Environment.IsDevelopment()) {
  app.UseExceptionHandler("/DevelopmentError");
}
else {
  app.UseExceptionHandler("/ProductionError");
}
```

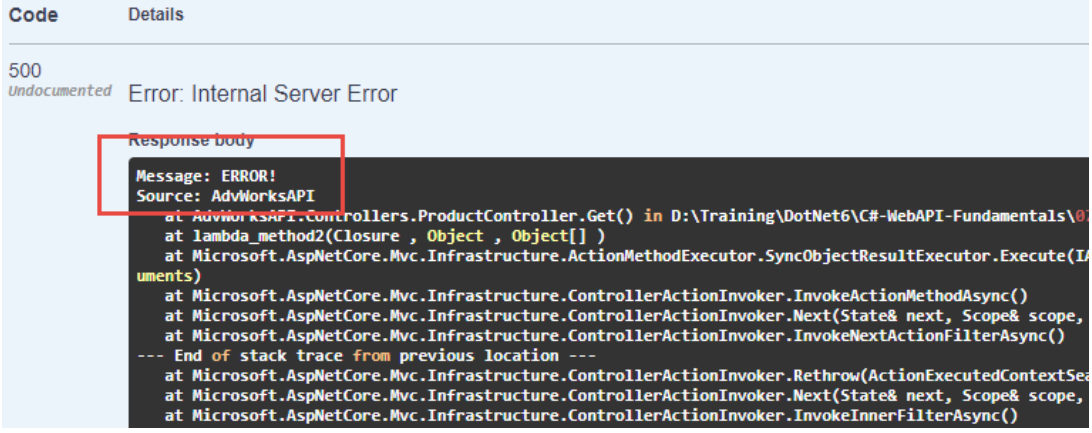
Open the **ErrorController.cs** file and add a new method named the **DevelopmentErrorHandler**() method.

```
[Route("/DevelopmentError")]
[ApiExplorerSettings(IgnoreApi = true)]
public IActionResult DevelopmentErrorHandler()
{
  string msg = "Unknown Error";

  var features =
HttpContext.Features.Get<IExceptionHandlerFeature>()!;

  if (features != null) {
    msg = "Message: " + features.Error.Message;
    msg += Environment.NewLine + "Source: " +
features.Error.Source;
    msg += Environment.NewLine +
features.Error.StackTrace;
  }

  return
StatusCode(StatusCodes.Status500InternalServerError,
msg);
}
```

## Try it Out

Run the application and click on the **GET /api/Customer** route to cause an exception.

You should now see the message, the source, and the stack trace.




# Lab 4: Add Production Profile

Open the **\Properties\launchSettings.json** file.

Copy the JSON object "AdvWorksAPI" to a new JSON object named "**AdvWorksAPI Production"**.

Change the areas in the copied JSON object with the values in **bold** below.

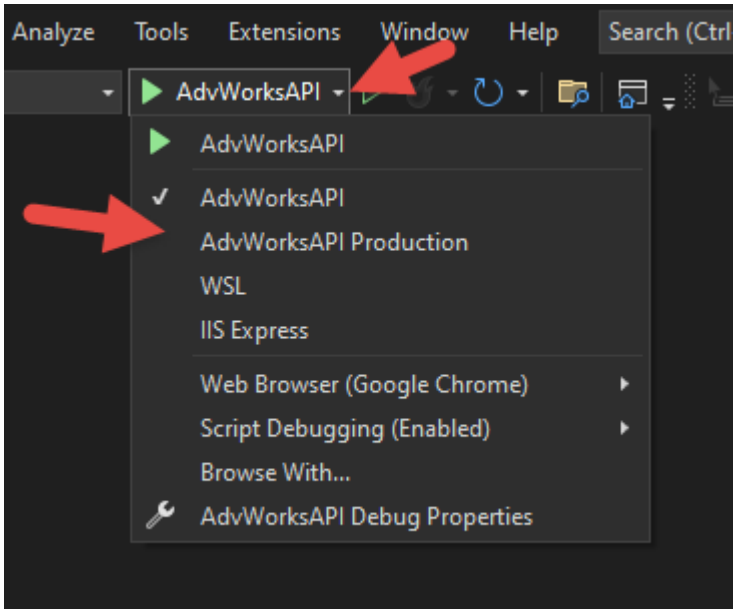
Replace the **nnnn** with your port number.

```
"AdvWorksAPI Production": {
  "commandName": "Project",
  "dotnetRunMessages": true,
  "launchBrowser": true,
  "launchUrl": "swagger",
  "applicationUrl": "http://localhost:nnnn",
  "environmentVariables": {
    "ASPNETCORE_ENVIRONMENT": "Production"
  }
},
```

**Save** the **launchSettings.json** file.

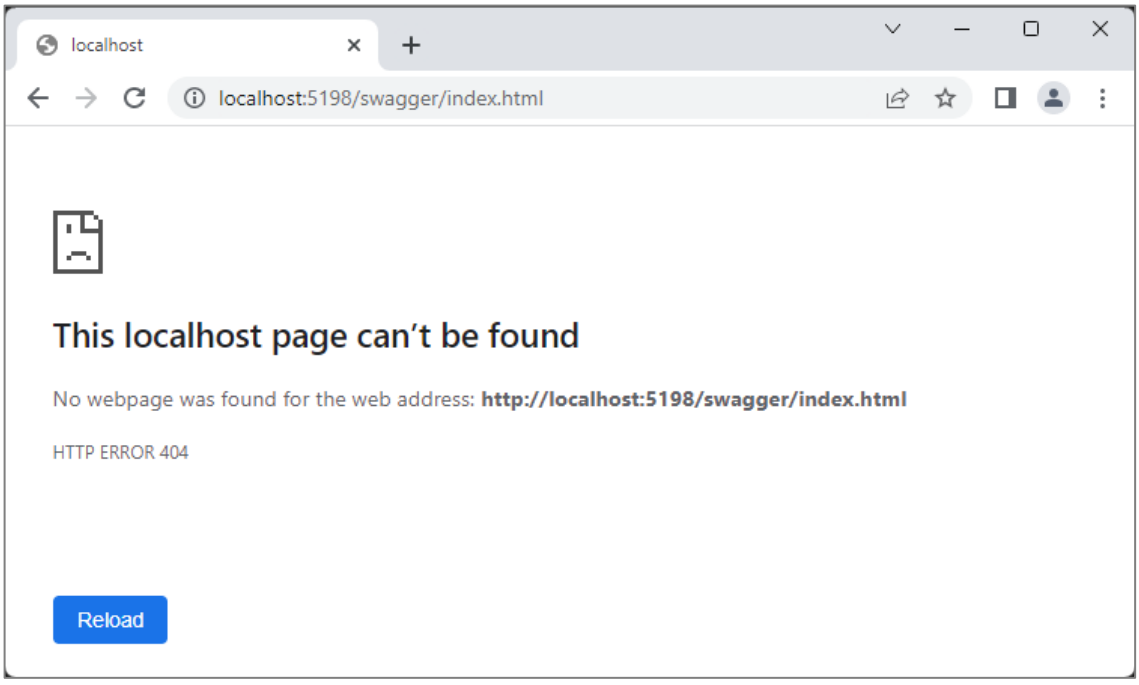
## Try it Out

Click on the down arrow next to "AdvWorksAPI" on the VS command bar.




Select the "**AdvWorksAPI Production**" profile.

Run the application and you will get a 404 error.



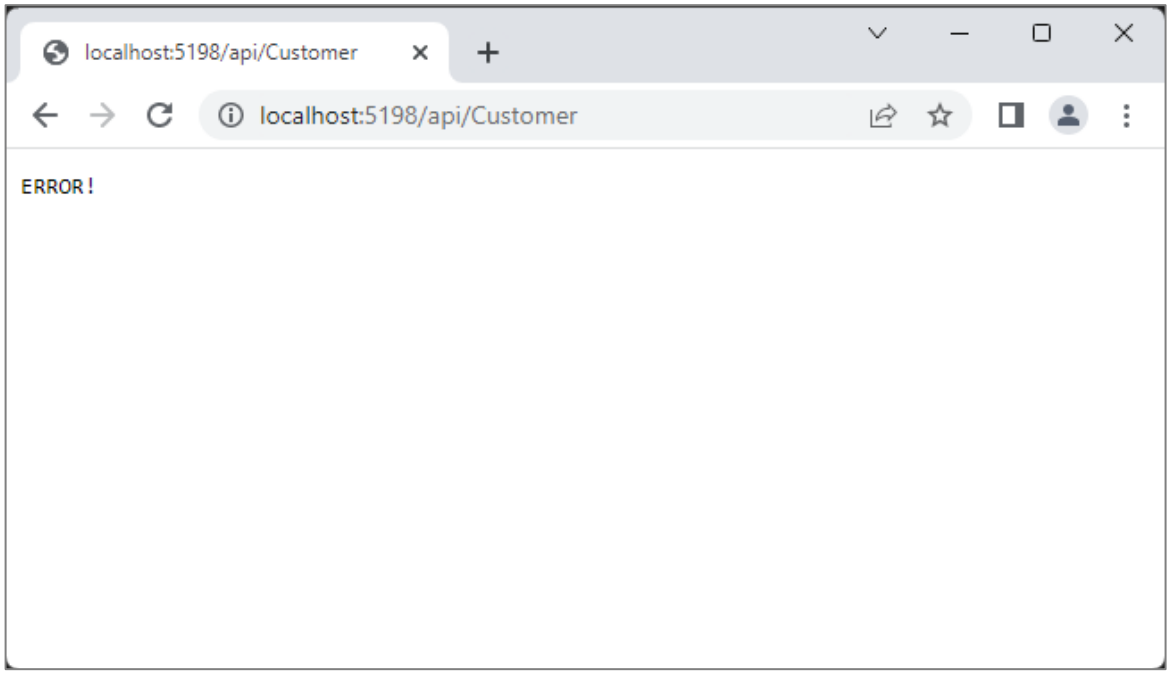

You get this error because Swagger does not appear when running in Production mode.

Type the following into the browser URL line (replacing your **PORT** number for the **nnnn**).

```
http://localhost:nnnn/api/Customer
```

Click **Continue** in Visual Studio when the exception occurs.

Now you just have the error message returned in the browser as shown below.




# Lab 5: Handle Status Codes

Open the **ErrorController.cs** file and add a new method.

```
[Route("/StatusCodeHandler/{code:int}")]
[ApiExplorerSettings(IgnoreApi = true)]
public IActionResult StatusCodeHandler(int code)
{
  IActionResult ret;
  string msg = $"Code is not handled: '{code}'";

  // Get some path information
  var feature =
HttpContext.Features.Get<IStatusCodeReExecuteFeature>();
  if (feature != null) {
    msg = feature.OriginalPathBase
        + feature.OriginalPath
        + feature.OriginalQueryString;
  }

  switch (code) {
    case 404:
      msg = $"API Route Was Not Found: '{msg}'";
      ret = StatusCode(StatusCodes.Status404NotFound,
msg);
      break;
    default:
      ret =
StatusCode(StatusCodes.Status500InternalServerError,
msg);
      break;
  }

  return ret;
}
```

Open **Program.cs** and just below the app.UseExceptionHandler() add

```
// Handle status code errors in the range 400-599
app.UseStatusCodePagesWithReExecute("/StatusCodeHandler/
{0}");
```

# Try it Out

While still in production mode, run the app.

You should now see the 404 status returned because swagger is not found.

# Lab 6: Log Exceptions and Informational Messages into Different Files

Open the **Program.cs** file and modify the configuration of SeriLog so you have two files: one for informational messages and higher and the other for exceptions.

```
// Configure logging to Console & File using Serilog
builder.Host.UseSerilog((ctx, lc) =>
{
  // Log to Console
  lc.WriteTo.Console();
  // Log to Rolling File
  lc.WriteTo.File("Logs/InfoLog-.txt",
    rollingInterval: RollingInterval.Day,
    restrictedToMinimumLevel:
LogEventLevel.Information);
  // Log Errors to Rolling File
  lc.WriteTo.File("Logs/ErrorLog-.txt",
    rollingInterval: RollingInterval.Day,
    restrictedToMinimumLevel: LogEventLevel.Error);
});
```

## Try it Out

**Delete** any log files under the **Logs** folder.

Switch your profile back to **AdvWorksAPI**.

Run the application and click on the **GET /api/Customer** button.

Stop the application.

View the **Logs** folder and you should see two different log files.

| | |
|---|---|
| **NOTE**: | You still get exceptions in the **InfoLog.txt** file because you can only set the minimum level. Look up Serilog.Filters.Expressions and how to configure which log levels go into which files. |

# Lab 7: Log Exceptions in Catch Block

Open the **CustomerController.cs** file and add a new field

```
private readonly ILogger<CustomerController> _Logger;
```

Modify the constructor.

```
public CustomerController(IRepository<Customer> repo,
ILogger<CustomerController> logger)
{
  _Repo = repo;
  _Logger = logger;
}
```

Modify the Get() method with the code shown in bold.

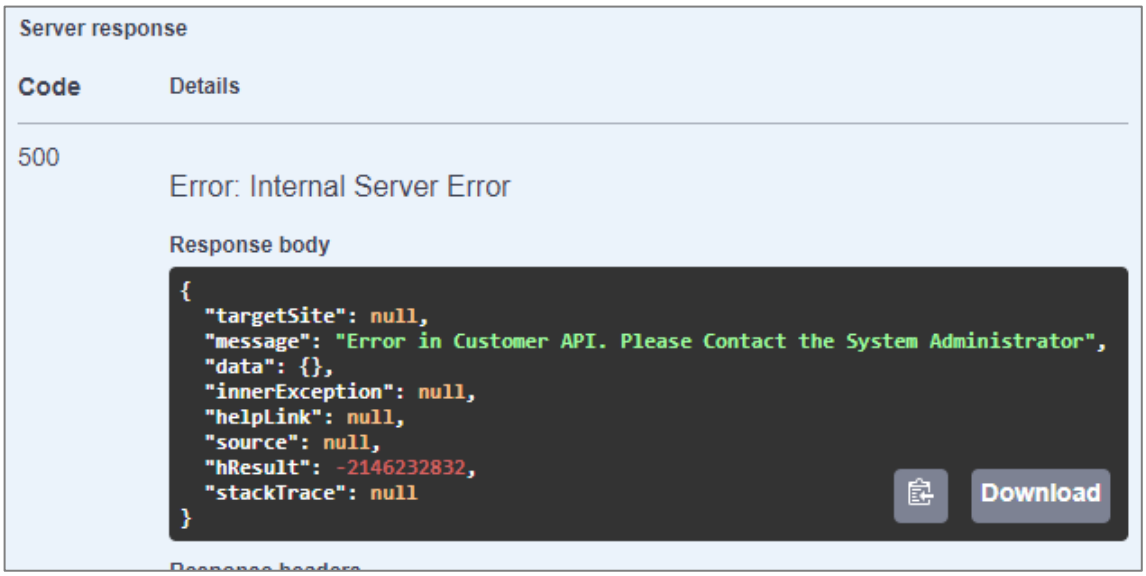
```
[HttpGet]
[ProducesResponseType(StatusCodes.Status200OK)]
[ProducesResponseType(StatusCodes.Status404NotFound)]
[ProducesResponseType(StatusCodes.Status500InternalServe
rError)]
public ActionResult<IEnumerable<Customer>> Get()
{
  ActionResult<IEnumerable<Customer>> ret;
  List<Customer> list;
  string msg = "No Customers are available.";

  try {
    // Intentionally Cause an Exception
    throw new ApplicationException("ERROR!");

    // Get all data
    list = _Repo.Get();

    if (list != null && list.Count > 0) {
      ret = StatusCode(StatusCodes.Status200OK, list);
    }
    else {
      ret = StatusCode(StatusCodes.Status404NotFound,
msg);
    }
  }
  catch (Exception ex) {
    msg = "Error in CustomerController.Get()";
    msg += $"{Environment.NewLine}Message:
{ex.Message}";
    msg += $"{Environment.NewLine}Source: {ex.Source}";

    _Logger.LogError(ex, "{msg}", msg);

    ret =
StatusCode(StatusCodes.Status500InternalServerError,
      new ApplicationException("Error in Customer API.
Please Contact the System Administrator."));
  }

  return ret;
}
```

# Try it Out

Delete any log files in the **Logs** folder.

Run the application and click on the **GET /api/Customer** button.

You should now see the error displayed.




Stop the application.

Open the **\Logs\ErrorLog-nnnn.txt** file and view the error information.