WORKBOOK ++
EDITION

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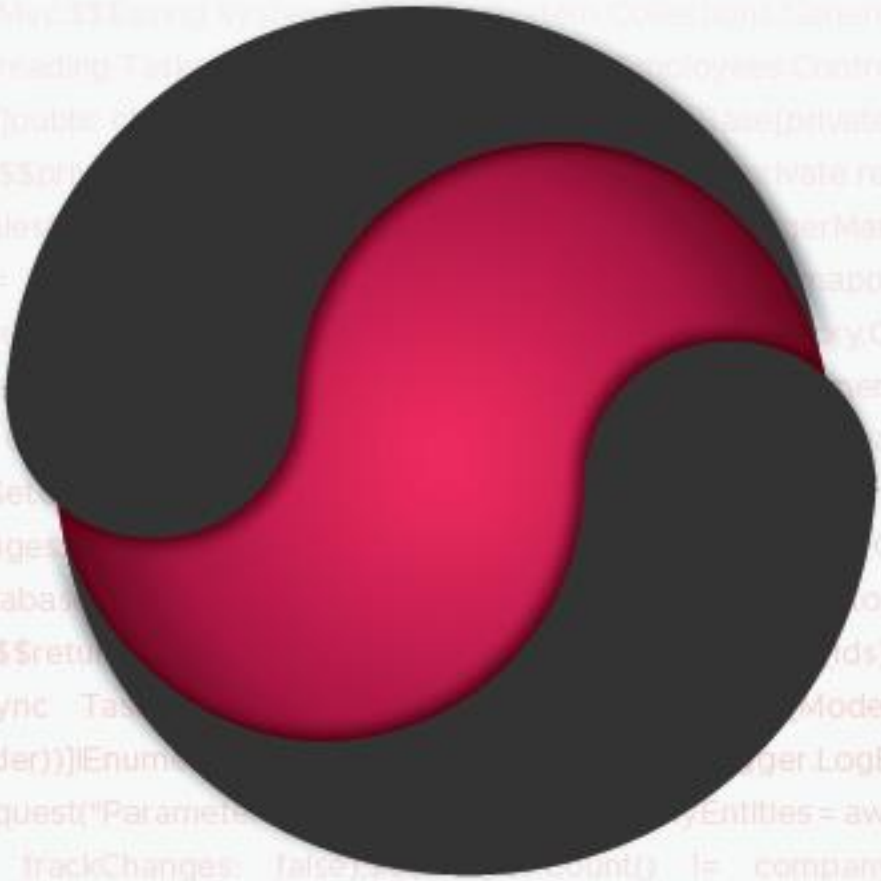
ULTIMATE ASP.NET CORE WEB API

From Complete Noob To Six-Figure Backend Developer



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Time to Improve Your Knowledge

With this workbook, your main goal is to continue building on everything you've learned from our book. That way you can maintain and improve your knowledge and achieve your goal – Mastering ASP.NET Core Web API. The key to success is putting into practice everything you've learned so far and to improve your understanding of the topic. This workbook provides the means to do that.

So, how should you use this book to improve your skills?

First of all, we strongly recommend you take your time while reading the Ultimate ASP.NET Core Web API book. It covers a lot of ground in detail with a lot of examples. So, take your time, understand each concept well, and **code while reading it**. We can't stress enough the value of the practical implementation while learning.

After you are finished coding your project, you can test your knowledge with questions and tasks from this workbook. But keep in mind that this is not about evaluating your knowledge, this is about fortifying your knowledge and helping you understand how much you've learned and what topics you need to revisit in the book in order to understand them properly.

Additionally, you can use this workbook in parallel with Web API book, but then, once you are done, return here one more time and prove yourself how well you have conquered the ASP.NET Core Web API world. **THAT'S how you become a better software developer and how you earn more money because you are better than your competitors.**

How to make most out of these questions and tasks?

Try to give your own answers first. If we ask for a code-snippet or pseudo-code, write it down in this workbook and then check it out with the book. Of course, once you answer a question, check it in the book to verify how did you do it. By doing this, you will make sure you really understand the material and that you haven't have missed anything while reading the book.

The main goal of this workbook is to provide additional practice and thus lead you to your ultimate goal.

So, roll up your sleeves and let's acquire the knowledge waiting for you.

Note: this is a bonus book, so if you have any trouble with some of the answers, you can ask for help in the Facebook group.

Workbook Questions & Tasks

1. In your project, you want to disable your application to launch the browser as soon as it starts and you want to change the port as well. Where do you do that and how?

2. What is the entry point of every ASP.NET Core Web API application?

3. What methods exist in the Startup.cs class, and what's their purpose?

4. You have an object of type Student and you want to extend its behavior. How are you going to do that?

5. How can you configure your project for different environments?

6. What is dependency injection?

7. What is inversion of control principle?

8. In what ways can we register services in ASP.NET Core in the IOC container?

9. What is the purpose of the model classes in Entity Framework Core?

10. You have two tables in your database: Students and Subjects. Create a class which is a middleware component for communication with the database.

11. As soon as you start the project, you want to run the Update-Database command, to populate the data in the Students and the Subjects tables. How can you do that in your project?

12. Create a repository environment for your project (no need for implementation methods, just the Shema) with the two tables from the previous questions.

13. What is Web API routing and in what ways you can implement them?

14. You want to fetch all the Students from the database. How would you do that? (try to write down complete flow: interface => user repository class => controller)

15. What is DTO?

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16. Why is DTO so important when creating a response in the controller?

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17. Your Student entity has the FirstName, LastName and the Age properties. Your DTO class has the FullName and Age properties. How would you map your Entity to the DTO class? Write a code snippet along with the class.

18. What middleware from the IApplicationBuilder interface should you use to enable global error handling functionality?

19. Which attribute should you use to decorate an action as the GET action? How would that attribute look like if your action returns a single entity?

20. What is a default response format in ASP.NET Core Web API?

21. Your client requires you to write an application that has a possibility to return an XML response format and to restrict all the other unsupported formats. How would you implement that in your application?

22. How would you explain method safety and idempotency? Write down the HTTP Methods you know and next to each of them, whether it is safe, idempotent, or both and why.

23. Which POST action is correct:

a)
```
[HttpPost]
public IActionResult CreateCompany([FromQuery]Company company)
{
    ...
    return CreatedAtRoute(...);
}
```

b)
```
[HttpGet]
public IActionResult CreateCompany([FromBody]CompanyDto company)
{
    ...
    return Ok(...);
}
```

c)
```
[HttpPost]
public IActionResult CreateCompany([FromBody]CompanyDto company)
{
    ...
    return CreatedAtRoute(...);
```

```
}
```

24. If you want to create a child resource in your database, what would be a route to the controller for that resource? (Use the parent and child terms to represent each entity in the route. For example https://localhost:port/parent/child/parentId/childId ...).

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25. You are creating a collection of resources. Once your action is done, it returns a 201 Created response with the link which contains comma-separated guid values as a string. Once you try to send that request you get 415 Unsupported Media Type response. Why is that and how would you solve this problem? (Explain the process)

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26. What is a correct HTTP attribute for the Delete actions? (Include parameters as well, if there are any)

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27. You are updating your resource and you only update a single property, all the others are the same. But as soon as action is finished, you notice in the console log the SQL update statement with all the properties updated. How can you solve this situation so that your app generates an SQL statement that updates only the changed property?

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28. Which status code HTTP PUT action should return and which method should you use to provide a valid status code?

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29. How is PATCH different from PUT? When do we use one or the other?

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30. You have a task to create actions that partially update the Student entity. One action should modify the Name property and another should add value to the Age property. Create bodies for those two PATCH requests.

31. Create a pseudo code for the PATCH action, try to cover as many details as you know, then check with the source code in the project.

32. Which expression is used for the model validation?

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33. Create a class with three properties: Name, Age, Address. The name can't be null. The age must be a minimum of 20 and a maximum of 67. The Address can't exceed the limit of 60. Apply proper attributes for each property and for each add an error message.

34. What is the default response if the model is invalid? And how can you modify that to use another response with a different status code? Which method would you use?

35. Which expression would you use to add the custom model error in your action?

36. What is Asynchronous Programming and what are the advantages of it?

37. Convert these synchronous methods to the asynchronous ones

```
public IEnumerable<Student> GetAll(bool trackChanges) =>
    FindAll(trackChanges)
    .OrderBy(c => c.Name)
    .ToList();

public void WriteToFile(string text, string path) =>
    CreateFile(path)
    .WriteAsync();
```

38. Create definitions for both synchronous and asynchronous action filters (class, interface implementation, and method signatures).

39. On which levels Action Filters can be added and what is the order of invocation?

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40. In several actions in your controller, you have a repeating code (for example check if an object is null). You want to extract that code from all the actions which are all asynchronous. Also, you want this check to be executed before the request gets into the action. Write down pseudo code for all the steps required for the solution.

41. Your client wants you to create an action that returns a large number of products, but he wants a minimum of twenty and no more than forthy rows per page. How would you create such a solution? Write down the pseudo-code or a scheme that could help you in a process.

42. What information should X-Pagination contain in the response header?

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43. You have created an action that returns all the products to the client, as it was asked from you. But now, that client looks at the front end page and asks from you a possibility to select results by providing the min and max price in the query. Write down the pseudo-code or scheme for this functionality.

44. What is the difference between filtering and searching?

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45. Create a method that would help you to create a search functionality in your application (The method where search really happens. You can even inject this code into the previous example, question 43)

46. You want to implement sorting in your application as well. But you are not aware of the sorting condition (a client could ask only to sort by product name or by name and then by price, etc). Which library could you use to help you create the required feature?

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47. Write down a pseudo-code for the method that will sort the data by any condition sent from the client.

48. What is data shaping? Should data shaping always be included in your API? Why?

49. Why is using of ExpandoObject necessary for the data shaping functionality?

50. Try to write down all the steps required to shape the data from a collection.

51. Why is HATEOAS important for the REST API?

52. How can you add custom media types in the configuration? Write the pseudo-code for the XML formatter which registers the „application/vnd.workbook.codemaze.xml“ media type.

53. When should you use the OPTION HTTP request?

54. When should you use the HEAD HTTP request?

55. What is the correct way to create an action for the Root Document:

a)
```
[HttpPost(Name = "GetRoot")]
public IActionResult GetRoot([FromHeader(Name = "Accept")] string mediaType)
```

b)
```
[HttpGet(Name = "GetRoot")]
public IActionResult GetRoot([FromQuery(Name = "Accept")] string mediaType)
```

c)
```
[HttpGet(Name = "GetRoot")]
public IActionResult GetRoot([FromHeader(Name = "Accept")] string mediaType)
```

56. Why should you use versioning in your project?

57. What types of versioning can you implement in your API?

58. If you have a lot of versions in your project, and you want to keep the configuration in a single place (without using the [ApiVersion] attribute), how can you do that?

59. What is caching and why is it important?

60. What type of caching do you know?

61. While inspecting headers of your response, you found the Cache-Control with value public,max-age=120, and the Age with value 60. Can you explain what these headers represent in the response?

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62. Explain the Expiration model in caching. How caching benefits from it? You can create diagrams as well (it will help with the understanding for sure).

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63. Explain the Validation model in caching. Provide an example of how caching uses this model to validate responses.

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64. You want to protect your API by limiting the number of requests to 100 per 1 minute for all the endpoints. Create a code snippet with the necessary registered services to enable this feature.

65. You want to include ASP.NET Core Identity into your project with EF Core already implemented. You want to configure your API to always require a unique email while registering a new user. Additionally, you want to configure a password policy to always require lowercase letters, digits and the length must be at least 7. Furthermore, you want your

users to have the Locale property in the AspNetUsers table. Create a code snippet which covers all these cases in your application (No need to cover the user registration process).

66. Create a pseudo-code for JWT registration in your Web API application (appsettings file, an environment variable, ConfigureServices method).

67. What does JWT consist of?

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68. What is Swagger, and why you would use it in your project?

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69. Your API has three different versions. Create a configuration pseudo-code for Swagger which supports all the API versions. Include authorization support in it.

70. Could you describe the process of deploying your application on IIS? Explain with your own words, but try to cover all the steps.

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71. **Write your custom projects. With all the knowledge you have, you can start your projects and implement even more features. This should be the icing on the cake and make your skills even better. To start off, select a completely different domain, and follow the steps we've used in the book to create your own application. Let us know what you've made in the Facebook group.**