شركة تحالف الإمارات للحلول التقنية ذ.م.م.
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Web Application Programming Interface (API)

Tahaluf Training Center 2021

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Chapter 02

Overview of CRUD Operations

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CRUD (create, read, update, delete) is an acronym that refers to the four functions we use to implement persistent storage applications and relational database applications, including the Oracle Database, Microsoft SQL Server, and MySQL.

Overview of CRUD Operations

To make this library system usable, we would want to make sure there were clear mechanisms for completing the CRUD operations:

- Create — This would consist of a function which we would call when a new library book is being added to the catalog. The program calling the function would supply the values for “title”, “author”, and “isbn”. After this function is called, there should be a new entry in the books resource corresponding to this new book.

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- Read — This would consist of a function which would be called to see all of the books currently in the catalog. This function call would not alter the books in the catalog - it would simply retrieve the resource and display the results. We would also have a function to retrieve a single book, for which we could supply the title, author, or ISBN. Again, this book would not be modified, only retrieved.

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- Update — There should be a function to call when information about a book must be changed. The program calling the function would supply the new values for “title”, “author”, and “isbn”. After the function call, the corresponding entry in the books resource would contain the new fields supplied.

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- Delete — There should be a function to call to remove a library book from the catalog. The program calling the function would supply one or more values (“title”, “author”, and/or “isbn”) to identify the book, and then this book would be removed from the books resource. After this function is called, the books resource should contain all of the books it had before, except for the one just deleted.

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Overview of CRUD in REST Environment

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In a REST environment, CRUD often corresponds to the HTTP methods POST, GET, PUT, and DELETE, respectively. These are the fundamental elements of a persistent storage system.

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Create

To create resources in a REST environment, we most commonly use the HTTP POST method. POST creates a new resource of the specified resource type.

Read

To read resources in a REST environment, we use the GET method. Reading a resource should never change any information - it should only retrieve it. If you call GET on the same information 10 times in a row, you should get the same response on the first call that you get on the last call.

Update

PUT is the HTTP method used for the CRUD operation, Update.

Delete

The CRUD operation Delete corresponds to the HTTP method DELETE. It is used to remove a resource from the system.

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Overview of HTTP Methods

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The **HTTP verbs** comprise a major portion of our “uniform interface” constraint and provide us the action counterpart to the noun-based resource. The primary or most-commonly-used HTTP verbs (or methods, as they are properly called) are POST, GET, PUT, PATCH, and DELETE.

Overview of HTTP Methods

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Overview of HTTP Methods

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HTTP Verb	CRUD	Entire Collection (e.g. /customers)	Specific Item (e.g. /customers/{id})
POST	Create	201 (Created), 'Location' header with link to /customers/{id} containing new ID.	404 (Not Found), 409 (Conflict) if resource already exists..
GET	Read	200 (OK), list of customers. Use pagination, sorting and filtering to navigate big lists.	200 (OK), single customer. 404 (Not Found), if ID not found or invalid.
PUT	Update/Replace	405 (Method Not Allowed), unless you want to update/replace every resource in the entire collection.	200 (OK) or 204 (No Content). 404 (Not Found), if ID not found or invalid.
PATCH	Update/Modify	405 (Method Not Allowed), unless you want to modify the collection itself.	200 (OK) or 204 (No Content). 404 (Not Found), if ID not found or invalid.
DELETE	Delete	405 (Method Not Allowed), unless you want to delete the whole collection—not often desirable.	200 (OK). 404 (Not Found), if ID not found or invalid.

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Create the First Project

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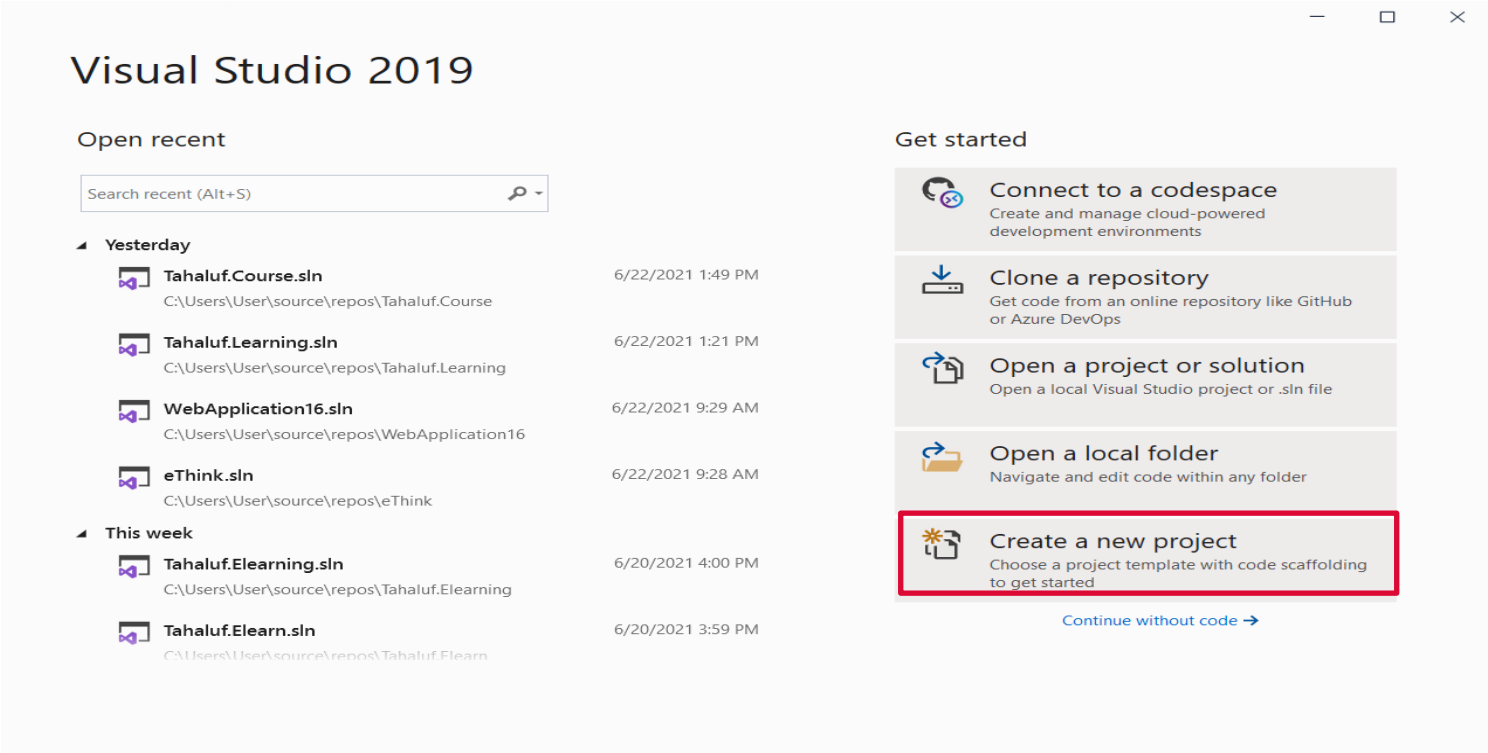
Open Visual Studio 2019 => Select Create a new project



Create the First Project

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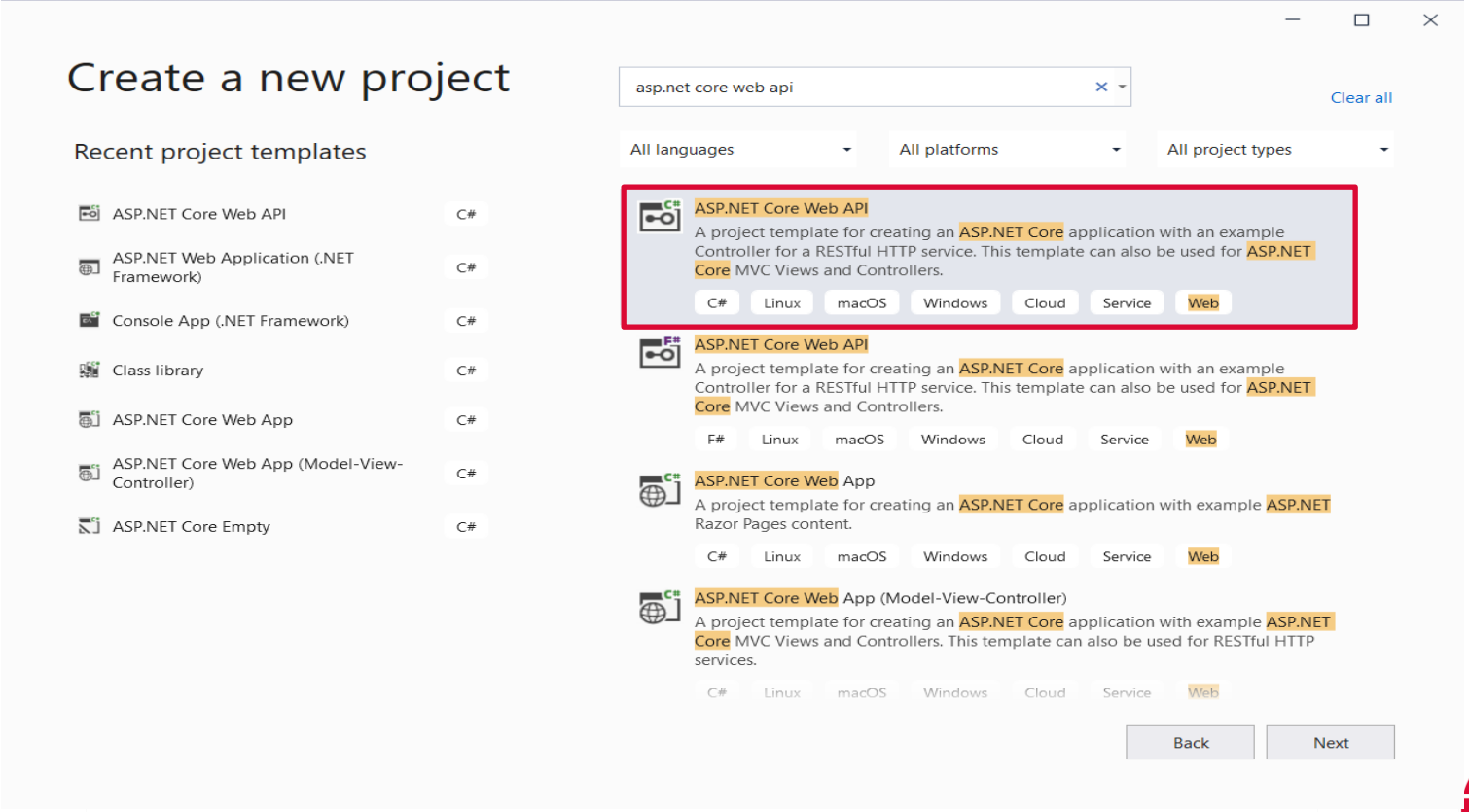
Select ASP.NET Core Web API



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Create Course Class:

```
public class Course
{
    public int CourseId { get; set; }
    public string CourseName { get; set; }
    public DateTime CreatDate { get; set; }
    public string Category { get; set; }
}
```

Create the First Project

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Create Course Controller (Right Click on Controllers => Add => Controller => API Empty.

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```
private static readonly List<Course> Courses =
new List<Course>
{
new Course()
{
CourseId = 1,
CourseName = "Math101",
CreateDate = new DateTime(),
Category = "Math"
},
```

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```
new Course()
{
 CourseId = 2,
 CourseName = "Math102",
 CreateDate = new DateTime(),
 Category = "Math"
},
 new Course()
{
 CourseId = 3,
 CourseName = "Stat102",
 CreateDate = new DateTime(),
 Category = "Stat"
}

};
```

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```
[HttpGet]
[ProducesResponseType(typeof(List<Course>),
StatusCodes.Status200OK)]
public List<Course> GetAll()
{
    return Courses;
}

[Route("{CourseId}")]
[HttpGet]
[ProducesResponseType(typeof(Course), StatusCodes.Status200OK)]
public Course GetByCourseCourseId(int CourseId)
{
    return Courses.FirstOrDefault(r => r.CourseId == CourseId);
}
```

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```
[HttpPost]
[ProducesResponseType(typeof(Course), StatusCodes.Status200OK)]
[ProducesResponseType(StatusCodes.Status400BadRequest)]

public Course Create([FromBody] Course Course)
{
    return Course;
}
```

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```
[HttpPut]
[ProducesResponseType(typeof(Course), StatusCodes.Status200OK)]
[ProducesResponseType(StatusCodes.Status400BadRequest)]
public Course Update([FromBody] Course Course)
{
    return Course;
}

[HttpDelete("{CourseId}")]
public bool Delete(int CourseId)
{
    return true;
}
```

Create the First Project

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Test the Code using Postman:

1. Start Debugging

https://localhost:44307/api/Cour

localhost:44307/api/Course

[{"courseId":1,"courseName":"Math101","createDate":"0001-01-01T00:00:00","category":"Math"},{"courseId":2,"courseName":"Stat101","createDate":"0001-01-01T00:00:00","category":"Stat"},
{"courseId":3,"courseName":"English101","createDate":"0001-01-01T00:00:00","category":"English"}]

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Test the Code using Postman:

2. Test Get

https://localhost:44307/api/Course

Save

GET https://localhost:44307/api/Course Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

Query Params

KEY	VALUE	DESCRIPTION	ooo Bulk Edit
Key	Value	Description	

Body Cookies Headers (5) Test Results Status: 200 OK Time: 29 ms Size: 462 B Save Response

Pretty Raw Preview Visualize JSON


```
[
    {
        "courseId": 1,
        "courseName": "Math101",
        "createDate": "0001-01-01T00:00:00",
        "category": "Math"
    },
    {
        "courseId": 2,
        "courseName": "Stat101",
        "createDate": "0001-01-01T00:00:00",
        "category": "Stat"
    },
    {
        "courseId": 3,
        "courseName": "English101",
```

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Test the Code using Postman:

3. Test Get by Id

https://localhost:44307/api/Course/1

Save

GET https://localhost:44307/api/Course/1 Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

Query Params

KEY	VALUE	DESCRIPTION	ooo	Bulk Edit
Key	Value	Description		

Body Cookies Headers (5) Test Results Status: 200 OK Time: 40 ms Size: 264 B Save Response

Pretty Raw Preview Visualize JSON


```
{
    "courseId": 1,
    "courseName": "Math101",
    "createDate": "0001-01-01T00:00:00",
    "category": "Math"
}
```

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Test the Code using Postman:

4. Test Get With Optional Value

https://localhost:44307/api/Course/CourseName/Math101

Save

GET https://localhost:44307/api/Course/CourseName/Math101 Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

Query Params

KEY	VALUE	DESCRIPTION	••• Bulk Edit
Key	Value	Description	

Body Cookies Headers (5) Test Results Status: 200 OK Time: 27 ms Size: 274 B Save Response

Pretty Raw Preview Visualize JSON


```
[
    {
        "courseId": 1,
        "courseName": "Math101",
        "createDate": "0001-01-01T00:00:00",
        "category": "Math"
    }
]
```

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Test the Code using Postman:

5. Test Post

https://localhost:44307/api/Course

Save

POST https://localhost:44307/api/Course Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL JSON Beautify

```
1 {
2     "courseId": 4,
3     "courseName": "Math102",
4     "createDate": "0001-01-01T00:00:00",
5     "category": "Math"
6 }
7
```

Body Cookies Headers (5) Test Results Status: 200 OK Time: 60 ms Size: 264 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2     "courseId": 4,
3     "courseName": "Math102",
4     "createDate": "0001-01-01T00:00:00",
5     "category": "Math"
6 }
```

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Test the Code using Postman:

6. Test Put

https://localhost:44307/api/Course

Save

PUT https://localhost:44307/api/Course Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL JSON Beautify

```
{
    "courseId": 1,
    "courseName": "Math103",
    "createDate": "0001-01-01T00:00:00",
    "category": "Math"
}
```

Body Cookies Headers (5) Test Results Status: 200 OK Time: 55 ms Size: 272 B Save Response

Pretty Raw Preview Visualize JSON

```
{
    "courseId": 1,
    "courseName": "Math103",
    "createDate": "0001-01-01T00:00:00",
    "category": "Math"
}
```

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Test the Code using Postman:

7. Test Delete