



**POLYTECHNIC UNIVERSITY OF THE PHILIPPINES**

**Calauan, Laguna Campus**

Bachelor of Science in Information Technology

# **INTEGRATIVE PROGRAMMING AND TECHNOLOGIES 1**

Final Project

“Pokémon: The Pokédex – A CRUD-Based Web Application”

An Academic Project Submitted to

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Project Team

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## **Summary**

The Pokédex API is a CRUD-based web API developed using ASP.NET Core MVC and Entity Framework Core. The primary goal of this project is to simulate a digital Pokédex that allows users to Create, Read, Update, and Delete Pokémon entries. Each Pokémon record includes essential details such as Name, Type, HP, Attack, Defense, and a Description. The application uses SQL Server as its database system, with data managed through Entity Framework Core using proper migrations and seed data for initial content. The API follows the MVC architectural pattern, promoting a clean and organized codebase by separating logic into Models, DTO and Controllers. For project documentation, we are using Razor Pages, which serves as an in-app documentation interface, and for API documentation, we are using Swagger for testing and developer access.

## **Programming Languages and Software**

The final project for Integrative Programming and Technologies 1 utilizes a combination of programming languages, frameworks, and software tools to build a functional and structured web application — a Pokédex API system that performs CRUD operations and stores data in a SQL Server database.

### **HyperText Markup Language (HTML)**

HTML is the foundation of the website's structure. It is used to build the layout and content of Razor Pages, forming the skeleton of how data — such as Pokémon information — is presented to users. It ensures that text, tables, and forms are properly structured within the web pages.

### **Cascading Style Sheets (CSS)**

CSS brings visual life to the web interface. It is used to style the Razor Pages, giving the Pokédex a polished and organized look. From coloring Pokémon type badges to arranging forms and buttons, CSS plays a crucial role in making the user experience both visually appealing and user-friendly.

### **C# (C-Sharp)**

C# is the core programming language used to develop the business logic and API functionalities. It handles the data models, controller logic, database access, and routing. C# enables the system to process user input, communicate with the database, and manage the application's overall logic effectively.

## Razor Pages

Razor is a syntax used in ASP.NET Core to combine HTML and C# in the same file. It is used for building dynamic web pages such as the documentation page, Pokémon listing pages, or forms for adding/editing entries. Razor helps bridge the gap between the frontend and backend by rendering dynamic content directly from the server.

This blend of technologies ensures that the Pokédex API is not only functional and reliable but also visually refined, interactive, and easy to navigate — simulating the experience of using a real-world digital Pokédex.

## How to Use?

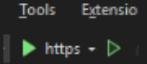
### Setup Instructions

#### Prerequisites

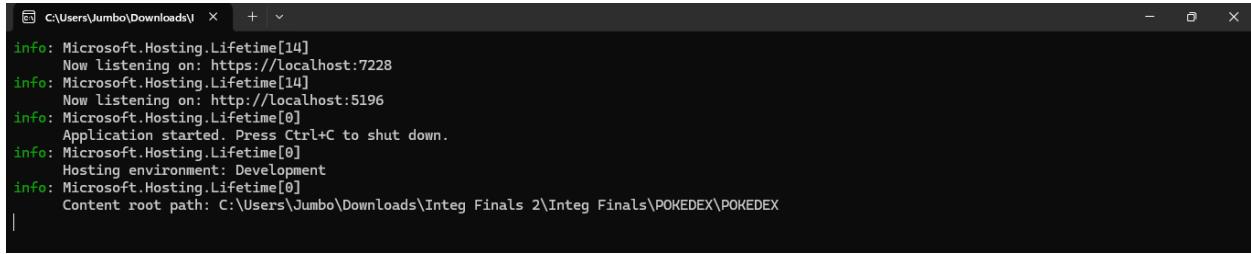
- Visual Studio 2022

#### Setup Steps:

1. Unzip and Open POKEDEX Folder: Click the POKEDEX.sln file and open it in Visual Studio 2022.
2. Open Tools > Nuget Package Manager > Package Manager Console: Type the following in Package Manager Console:

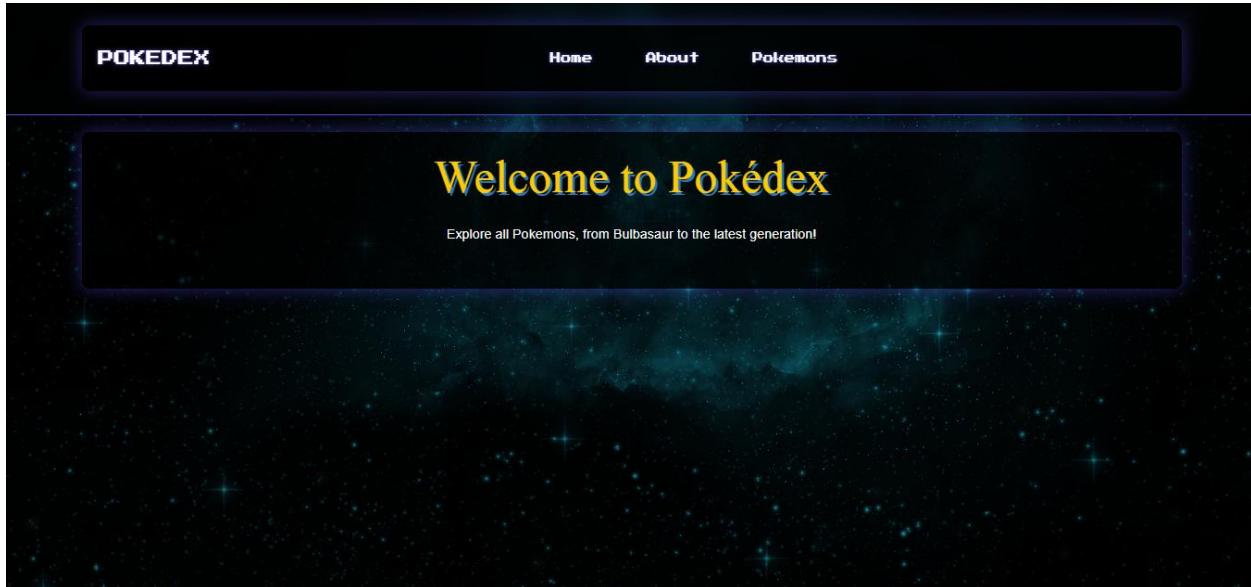
```
update-database
```
3. Run the project using the https button.
4. Access the Swagger UI and the Pokedex Website:
  - Swagger UI: <https://localhost:7228/swagger/index.html>
  - Pokedex Website: <https://localhost:7228/>

- When you run the project, it will direct here, just wait and it will automatically go to the Pokédex Website on your browser/chrome.

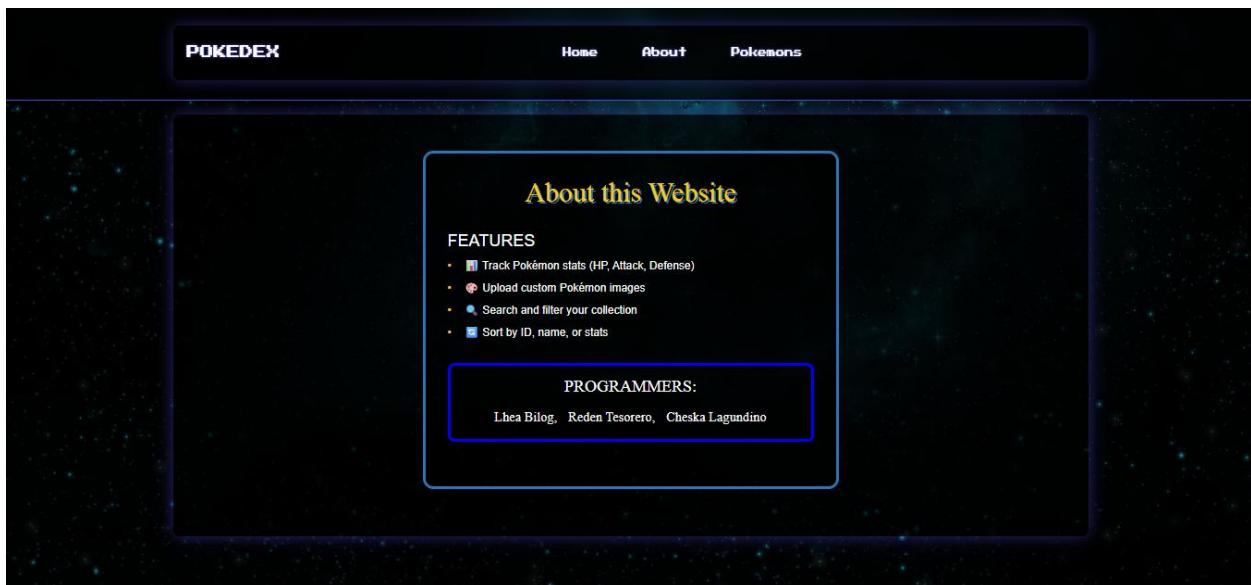


```
C:\Users\Jumbo\Downloads\ 
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: https://localhost:7228
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5196
info: Microsoft.Hosting.Lifetime[0]
      Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
      Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
      Content root path: C:\Users\Jumbo\Downloads\Integ Finals 2\Integ Finals\POKEDEX\POKEDEX
```

- Homepage



- About



- When you click the Pokémons, it will show all the Pokémon Lists.

LIST OF POKÉMON								
ID	NAME	TYPE		HP	ATK	DEF	ACTIONS	
#001	Bulbasaur	Grass	/	Poison	45	49	49	 
#002	Charizard	Fire	/	Flying	78	84	78	 
#003	Charmander	Fire			39	52	43	 
#004	Dragalge	Poison	/	Dragon	65	75	90	 
#005	Dragapult	Dragon	/	Ghost	88	120	75	 
#006	Garchomp	Dragon	/	Ground	108	130	95	 
#007	Pikachu	Electric			35	55	40	 
#008	Lucario	Fighting	/	Steel	70	110	70	 
#009	Gengar	Ghost	/	Poison	60	65	60	 

- On the left side, you can Add New Pokémons in the List

### Create Pokemon Details

Name	Dragapult
Type	Grass/Poison
HP	18
Attack	0
Defense	17
Description	.....
Upload Image	<input type="file"/> Choose File <small>Recommended size: 300x300 pixels</small>
	<input type="button" value="Create"/> <input type="button" value="Cancel"/>

- On the right side, you can search Pokémon names

The screenshot shows a "LIST OF POKÉMON" interface. At the top left is a green "+ ADD NEW" button. To its right is a search bar containing the text "Snorlax" with a magnifying glass icon. Below the search bar is a table header row with columns: ID, NAME, TYPE, HP, ATK, DEF, and ACTIONS. A single data row is shown below the header: #016, Snorlax, Normal, 160, 110, 65, and two small blue and red buttons under the ACTIONS column.

- When you click the Blue with Eye Buttons in Actions, you can see the Details of Pokémons.

The screenshot shows a detailed Pokédex entry for Bulbasaur. At the top, the name "Bulbasaur" and its Pokédex number "#001" are displayed. Below the name is a large image of the green and yellow plant-like Pokémon. Underneath the image are two buttons: "GRASS" and "POISON". A power bar indicates the current status of Bulbasaur's stats: HP, Attack, and Defense. The "HP" bar is at approximately 70%, "Attack" is at approximately 60%, and "Defense" is at approximately 50%. A "Pokédex Entry" section contains the following text: "Bulbasaur is the iconic Grass/Poison-type "Seed Pokémon" and the first Pokémon in the Kanto Pokédex (#001). Known for the plant bulb on its back, it absorbs sunlight to grow stronger (thanks to its ability Chlorophyll). Bulbasaur is calm, loyal, and evolves into Ivysaur (at Lv. 16) and later Venusaur (at Lv. 36)." At the bottom of the entry is a "Edit" button. At the very bottom of the screen are two buttons: "Edit" and "Back to List".

- There's also Edit Button in the Details so that you can easily change/update records.

Edit Pokemon Details

Name	Bulbasaur
Type	Grass/Poison
HP	45
Attack	49
Defense	49
Description	Bulbasaur is the iconic Grass/Poison-type "Seed Pokémon" and the first Pokémon in the Kanto Pokédex (#001). Known for the plant bulb on its back, it absorbs sunlight to grow stronger (thanks to its ability Chlorophyll). Bulbasaur is calm, loyal, and evolves into Ivysaur (at Lv. 16) and later Venusaur (at Lv. 36).
Current Image	
Upload New Image	<input type="button" value="Choose File"/> No file chosen <small>Note: You need to Upload New Image!</small>
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

- The Delete Button, when you click that button, you can still see the details of Pokémons.

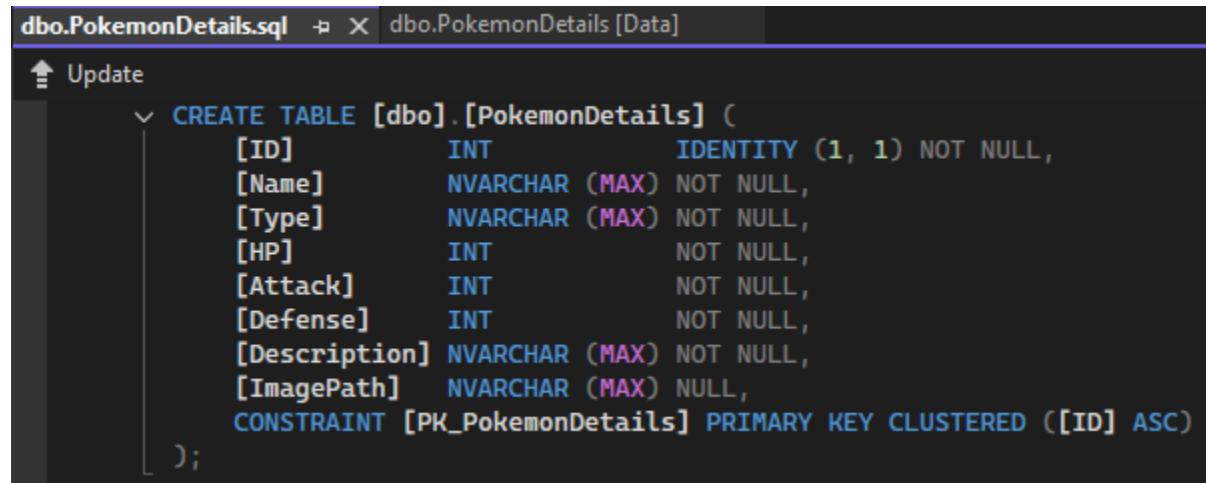
DELETE POKEMON

Are you sure you want to delete Bulbasaur?

	<b>ID</b> #001 <b>Name</b> Bulbasaur <b>Type</b> Grass/Poison <b>Stats</b> <table border="1"> <tbody> <tr> <td>HP: 45</td> </tr> <tr> <td>Attack: 49</td> </tr> <tr> <td>Defense: 49</td> </tr> </tbody> </table>	HP: 45	Attack: 49	Defense: 49
HP: 45				
Attack: 49				
Defense: 49				
<b>Description</b> <i>Bulbasaur is the iconic Grass/Poison-type "Seed Pokémon" and the first Pokémon in the Kanto Pokédex (#001). Known for the plant bulb on its back, it absorbs sunlight to grow stronger (thanks to its ability Chlorophyll). Bulbasaur is calm, loyal, and evolves into Ivysaur (at Lv. 16) and later Venusaur (at Lv. 36).</i>				
<input type="button" value="DELETE"/> <input type="button" value="CANCEL"/>				

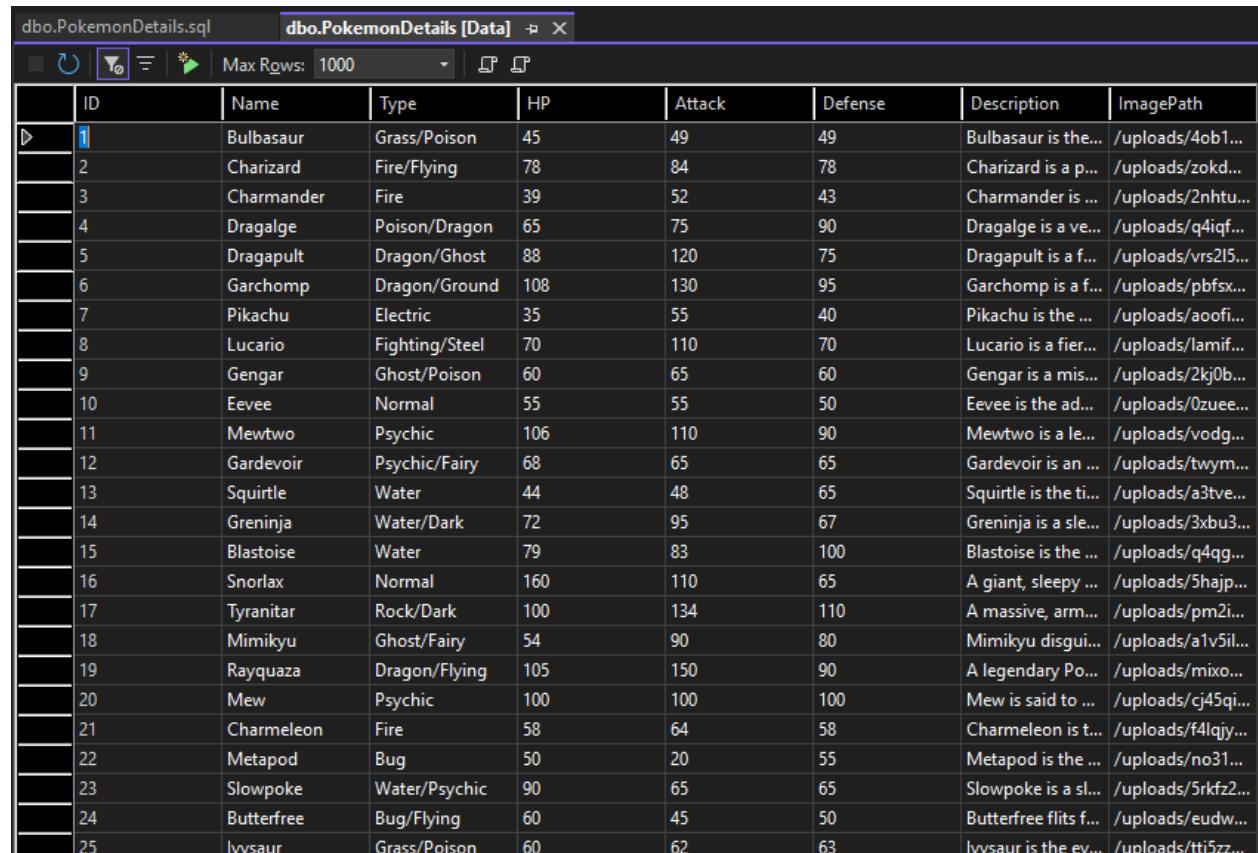
## SQL Database and Migration Files:

### SQL Table Creation



```
dbo.PokemonDetails.sql  ↳ X  dbo.PokemonDetails [Data]
↑ Update
CREATE TABLE [dbo].[PokemonDetails] (
    [ID] INT IDENTITY (1, 1) NOT NULL,
    [Name] NVARCHAR (MAX) NOT NULL,
    [Type] NVARCHAR (MAX) NOT NULL,
    [HP] INT NOT NULL,
    [Attack] INT NOT NULL,
    [Defense] INT NOT NULL,
    [Description] NVARCHAR (MAX) NOT NULL,
    [ImagePath] NVARCHAR (MAX) NULL,
    CONSTRAINT [PK_PokemonDetails] PRIMARY KEY CLUSTERED ([ID] ASC)
);
```

### Sample Data



ID	Name	Type	HP	Attack	Defense	Description	ImagePath
1	Bulbasaur	Grass/Poison	45	49	49	Bulbasaur is the...	/uploads/4ob1...
2	Charizard	Fire/Flying	78	84	78	Charizard is a p...	/uploads/zokd...
3	Charmander	Fire	39	52	43	Charmander is ...	/uploads/2nhtu...
4	Dragalge	Poison/Dragon	65	75	90	Dragalge is a ve...	/uploads/q4iqf...
5	Dragapult	Dragon/Ghost	88	120	75	Dragapult is a f...	/uploads/vrs2l5...
6	Garchomp	Dragon/Ground	108	130	95	Garchomp is a f...	/uploads/pbfsx...
7	Pikachu	Electric	35	55	40	Pikachu is the ...	/uploads/aoofi...
8	Lucario	Fighting/Steel	70	110	70	Lucario is a fier...	/uploads/lamif...
9	Gengar	Ghost/Poison	60	65	60	Gengar is a mis...	/uploads/2kj0b...
10	Eevee	Normal	55	55	50	Eevee is the ad...	/uploads/0zuee...
11	Mewtwo	Psychic	106	110	90	Mewtwo is a le...	/uploads/vodg...
12	Gardevoir	Psychic/Fairy	68	65	65	Gardevoir is an ...	/uploads/twym...
13	Squirtle	Water	44	48	65	Squirtle is the ti...	/uploads/a3tve...
14	Greninja	Water/Dark	72	95	67	Greninja is a sle...	/uploads/3xbu3...
15	Blastoise	Water	79	83	100	Blastoise is the ...	/uploads/q4qg...
16	Snorlax	Normal	160	110	65	A giant, sleepy ...	/uploads/5hajp...
17	Tyranitar	Rock/Dark	100	134	110	A massive, arm...	/uploads/pm2i...
18	Mimikyu	Ghost/Fairy	54	90	80	Mimikyu disgui...	/uploads/a1v5il...
19	Rayquaza	Dragon/Flying	105	150	90	A legendary Po...	/uploads/mixo...
20	Mew	Psychic	100	100	100	Mew is said to ...	/uploads/cj45qi...
21	Charmeleon	Fire	58	64	58	Charmeleon is t...	/uploads/f4lqjy...
22	Metapod	Bug	50	20	55	Metapod is the ...	/uploads/no31...
23	Slowpoke	Water/Psychic	90	65	65	Slowpoke is a sl...	/uploads/5rkfz...
24	Butterfree	Bug/Flying	60	45	50	Butterfree flits f...	/uploads/eudw...
25	Ivysaur	Grass/Poison	60	62	63	Ivysaur is the ev...	/uploads/ti57...

## Swagger Documentation:

Successful CRUD Operations:

GET

GET /api/Pokedex

Parameters

No parameters

Execute Clear

Responses

Curl

```
curl -X 'GET' \
  'https://localhost:7228/api/Pokedex' \
  -H 'accept: text/plain'
```

Request URL

<https://localhost:7228/api/Pokedex>

Server response

Code Details

200 Response body

```
[  
  {  
    "id": 1,  
    "name": "Bulbasaur",  
    "type": "Grass/Poison",  
    "hp": 45,  
    "attack": 49,  
    "defense": 49,  
    "description": "Bulbasaur is the iconic Grass/Poison-type \"Seed Pokémon\" and the first Pokémon in the Kanto Pokédex (#001). Known for the plant bulb on its back, it absorbs sunlight to grow stronger (thanks to its ability Chlorophyll). Bulbasaur is calm, loyal, and evolves into Ivysaur (at Lv. 16) and later Venusaur (at Lv. 36).",  
    "imagePath": "/uploads/4a01b1jve.Suz.png"  
  },  
  {  
    "id": 2,  
    "name": "Charizard",  
    "type": "Fire/Flying",  
    "hp": 78,  
    "attack": 84,  
    "defense": 78,  
    "description": "Charizard is a powerful Fire/Flying-type Pokémon and the final evolution of Charmander. Known for its fierce appearance, dragon-like wings, and blazing tail flame, Charizard is a fan-favorite for its strength and intimidating presence. It's proud, competitive, and fiercely loyal to its trainer. Charizard can Mega Evolve into Mega Charizard X (Fire/Dragon) or Mega Charizard Y (Fire/Flying) for even greater power.",  
    "imagePath": "/uploads/zokdqej2.etc.png"  
  },  
  {  
    "id": 3,  
    "name": "Charmander",  
    "type": "Fire",  
    "hp": 39,  
    "attack": 43,  
    "defense": 39,  
    "description": "Charmander is the first evolution of Charizard. It has a small, spiky tail and a single flame on its tail. It evolves into Charizard at level 16.",  
    "imagePath": "/uploads/4a01b1jve.Suz.png"  
  }]
```

Download

Response headers

```
content-type: application/json; charset=utf-8  
date: Mon, 23 Jun 2025 18:56:26 GMT  
server: Kestrel
```

Responses

Code Description Links

200 OK No links

Media type

text/plain

Controls Accept header.

Example Value | Schema

```
[  
  {  
    "id": 0,  
    "name": "string",  
    "type": "string",  
    "hp": 0,  
    "attack": 0,  
    "defense": 0,  
    "description": "string",  
    "imagePath": "string"  
  }]
```

## GET(ID)

GET /api/Pokedex/{ID}

Parameters

Name	Description
ID <small>required</small> integer(\$int32) (path)	23

Responses

Curl

```
curl -X 'GET' \
'https://localhost:7228/api/Pokedex/23' \
-H 'accept: text/plain'
```

Request URL

```
https://localhost:7228/api/Pokedex/23
```

Server response

Code Details

200 Response body

```
{
  "id": 23,
  "name": "Slowpoke",
  "type": "Water/Psychic",
  "hp": 98,
  "attack": 45,
  "defense": 65,
  "description": "Slowpoke is a slow and somewhat dim-witted Pokémon that often forgets what it's doing. It spends a lot of time lazing by the water, fishing with its tail. Though not quick to react, its relaxed nature makes it oddly charming.",
  "imagePath": "/uploads/5rkfz22u.rgw.png"
}
```

200 Response body

```
{
  "id": 23,
  "name": "Slowpoke",
  "type": "Water/Psychic",
  "hp": 98,
  "attack": 45,
  "defense": 65,
  "description": "Slowpoke is a slow and somewhat dim-witted Pokémon that often forgets what it's doing. It spends a lot of time lazing by the water, fishing with its tail. Though not quick to react, its relaxed nature makes it oddly charming.",
  "imagePath": "/uploads/5rkfz22u.rgw.png"
}
```

Response headers

```
content-type: application/json; charset=utf-8
date: Mon, 23 Jun 2025 19:03:40 GMT
server: Kestrel
```

Responses

Code Description Links

200 OK No links

Media type

text/plain

Controls Accept header.

Example Value | Schema

```
{
  "id": 0,
  "name": "string",
  "type": "string",
  "hp": 0,
  "attack": 0,
  "defense": 0,
  "description": "string",
  "imagePath": "string"
}
```

## POST

POST /api/Pokedex

Parameters

No parameters

Request body

application/json

Edit Value | Schema

```
{ "name": "Mewtwo", "type": "Psychic", "hp": 23, "attack": 30, "defense": 40, "description": "Mewtwo is a legendary Psychic-type Pokémon created through genetic engineering, known as the Genetic Pokémon. Designed to be the ultimate fighter, it possesses immense psychic power, unmatched intelligence, and a fierce, solitary demeanor. It's one of the most iconic and powerful Pokémon in existence." }
```

Execute Clear

Responses

Curl

```
curl -X 'POST' \
'https://localhost:7228/api/Pokedex' \
-H 'accept: text/plain' \
-H 'Content-Type: application/json' \
-d '{
  "id": 34,
  "name": "Mewtwo",
  "type": "Psychic",
  "hp": 23,
  "attack": 30,
  "defense": 40,
  "description": "Mewtwo is a legendary Psychic-type Pokémon created through genetic engineering, known as the Genetic Pokémon. Designed to be the ultimate fighter, it possesses immense psychic power, unmatched intelligence, and a fierce, solitary demeanor. It's one of the most iconic and powerful Pokémon in existence."
}'
```

Request URL

<https://localhost:7228/api/Pokedex>

Server response

Code Details

201 Response body

Undocumented

```
{
  "id": 34,
  "name": "Mewtwo",
  "type": "Psychic",
  "hp": 23,
  "attack": 30,
  "defense": 40,
  "description": "Mewtwo is a legendary Psychic-type Pokémon created through genetic engineering, known as the Genetic Pokémon. Designed to be the ultimate fighter, it possesses immense psychic power, unmatched intelligence, and a fierce, solitary demeanor. It's one of the most iconic and powerful Pokémon in existence.",
  "imagePath": null
}
```

Download

## PUT

PUT /api/Pokedex

Parameters

Name	Description
ID integer(\$int32) (query)	33

Request body

application/json

Edit Value | Schema

```
{ "name": "Blastoise",  
  "type": "Water",  
  "hp": 50,  
  "attack": 23,  
  "defense": 100,  
  "description": "Blastoise is the mighty Water-type \"Shellfish Pok\u00e9mon\" and the final evolution of Squirtle. Known for its powerful hydro cannons mounted on its shell, it can blast holes through steel and shrug off attacks WITH ITS' tank-like defense. It's a fan-favorite and a staple in battles!" }
```

Execute Clear

Responses

Curl

```
curl -X 'PUT' \  
  'https://localhost:7228/api/Pokedex?ID=33' \  
  -H 'accept: text/plain' \  
  -H 'Content-Type: application/json' \  
  -d {  
    "name": "Blastoise",  
    "type": "Water",  
    "hp": 50,  
    "attack": 23,  
    "defense": 100,  
    "description": "Blastoise is the mighty Water-type \"Shellfish Pok\u00e9mon\" and the final evolution of Squirtle. Known for its powerful hydro cannons mounted on its shell, it can blast holes through steel and sh  
}'
```

Request URL

```
https://localhost:7228/api/Pokedex?ID=33
```

Server response

## DELETE

DELETE /api/Pokedex/{ID}

Parameters

Name	Description
ID <small>* required</small>	integer(\$int32) (path) 33

Responses

Curl

```
curl -X 'DELETE' \
'https://localhost:7228/api/Pokedex/33' \
-H 'accept: */*'
```

Request URL

```
https://localhost:7228/api/Pokedex/33
```

Server response

Code Details

204 Undocumented

Response headers

```
date: Mon, 23 Jun 2025 19:16:01 GMT
server: Kestrel
```

Responses

## ERROR Handling:

### GET (ID)

GET /api/Pokedex/{ID}

Parameters

Name	Description
ID <small>* required</small>	integer(\$int32) (path) 45

Responses

Curl

```
curl -X 'GET' \
'https://localhost:7228/api/Pokedex/45' \
-H 'accept: text/plain'
```

Request URL

```
https://localhost:7228/api/Pokedex/45
```

Server response

Code Details

404 Undocumented

Error: response status is 404

Response body

```
Pokemon not found
```

Download

Response headers

## POST

Code	Details	Links
400 Undocumented	Error: response status is 400 <b>Response body</b> <pre>{ "type": "https://tools.ietf.org/html/rfc9118#section-15.5.1", "title": "One or more validation errors occurred.", "status": 400, "errors": { "\$": [ { "": " is invalid after a value. Expected either ',', ')', or ']'. Path: \$   LineNumber: 5   BytePositionInLine: 113." }, { "createDTO": [ { "": "The createDTO field is required." } ] } }, "traceId": "00-e5f13b09d278b0264aed4fb4790ba943-8c949eccd5098b7b-00" }</pre> <b>Response headers</b> <pre>content-type: application/problem+json; charset=utf-8 date: Mon,23 Jun 2025 19:41:31 GMT server: Kestrel</pre> <b>Responses</b>	<a href="#">Download</a>
200	OK <b>Media type</b> <input checked="" type="button"/> <a href="#">text/plain</a> <a href="#">application/json</a> Controls Accept header. <b>Example Value</b>   <b>Schema</b> <pre>{ "id": 0, "name": "string", "type": "string", "hp": 0, "attack": 0, "defense": 0, "description": "string", "imagePath": "string" }</pre>	<a href="#">No links</a>

## PUT

Code	Details	Links
400 Undocumented	Error: response status is 400 <b>Response body</b> <pre>{ "type": "https://tools.ietf.org/html/rfc9118#section-15.5.1", "title": "One or more validation errors occurred.", "status": 400, "errors": { "\$": [ { "": " is invalid after a value. Expected either ',', ')', or ']'. Path: \$   LineNumber: 6   BytePositionInLine: 54." }, { "updateDTO": [ { "": "The updateDTO field is required." } ] } ], "traceId": "00-569d38c92374f6cabddc03f2b1f5484f-c5b3de9f96eb8db1-00" }</pre> <b>Response headers</b> <pre>content-type: application/problem+json; charset=utf-8 date: Mon,23 Jun 2025 19:42:20 GMT server: Kestrel</pre> <b>Responses</b>	<a href="#">Download</a>
200	OK <b>Media type</b> <input checked="" type="button"/> <a href="#">text/plain</a> <a href="#">application/json</a> Controls Accept header. <b>Example Value</b>   <b>Schema</b> <pre>{ "id": 0, "name": "string", "type": "string", "hp": 0, "attack": 0, "defense": 0, "description": "string", "imagePath": "string" }</pre>	<a href="#">No links</a>

## DELETE

Code	Details	Links
<a href="#">404</a>	Error: response status is 404 <small>Undocumented</small>	
	<b>Response body</b> <pre>{ "message": "Pokemon with ID 70 not found." }</pre>	 <a href="#">Download</a>
	<b>Response headers</b> <pre>content-type: application/json; charset=utf-8 date: Mon, 23 Jun 2025 19:43:29 GMT server: Kestrel</pre>	
Responses		
Code	Description	Links
200	OK	<i>No links</i>