JAVASCRIPT FRAMEWORKS

Lab-Assignment#3

Group Members:

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Assignment Instructions:

You will create an express application using 3 JavaScript files:

1. Install the full Express required and recommended dependencies:

- Install Express
- Install Nodemon

2. Add a folder named “data” inside the project folder

3. Inside the “data” folder add a JSON file with at least 6 objects

4. Add/Create 3 different .js files with any label/title you prefer but each file name for each JavaScript file will end with a number: 1, 2, and 3 accordingly

5. Follow the instructions to write the code for each file as explained below

6. Add full comments to explain your code/lines briefly and clearly

7. You will need to use nodemon to run your .js files

8. You will need to install Postman in this lab (for JS file#3)

Assignment Submission Materials:

1. The PDF file that contains the screenshots explained below:

- Use MS-Word to collect all the assignment images (screenshots), put and arrange them all in one professional document then convert it to a PDF file to be uploaded/submitted. Please consider the following screenshots (images):
- The folder structure inside IntelliJ IDEA/Visual Studio Code or any other Editor that you are using that shows the 2 listed files above
- The VS Code embedded terminal window that shows the current working directory (the path of your folder)
- The PDF file should prepared in a professional way with a cover page

2. The link to your GitHub repository where you have your assignment (project) uploaded

1. Introduction

The Train Management System is a simple CRUD (Create, Read, Update, Delete) API built using Node.js and Express.js. This project demonstrates how to manage train details using API endpoints. Users can fetch train details, add new trains, update existing trains, and delete trains using HTTP requests.

2. Technologies Used

- Node.js – JavaScript runtime for backend development
- Express.js – Web framework for handling routes and requests
- Postman – API testing tool
- JSON – Data storage format
- Nodemon – Auto-restart server during development

Step1 : Install Node.js

Node.js is required for this project because it provides the runtime environment necessary to execute JavaScript code outside of a web browser.

Runs JavaScript on the server-side
Required for Express.js and npm package installation
Handles HTTP requests for APIs
Supports non-blocking, asynchronous programming
Essential for local development and testing

Step2: Create Project Folder

We will create a folder named as Express-crud-app and after that we will Initialize Node.js Project to create a package.json file with default configurations.

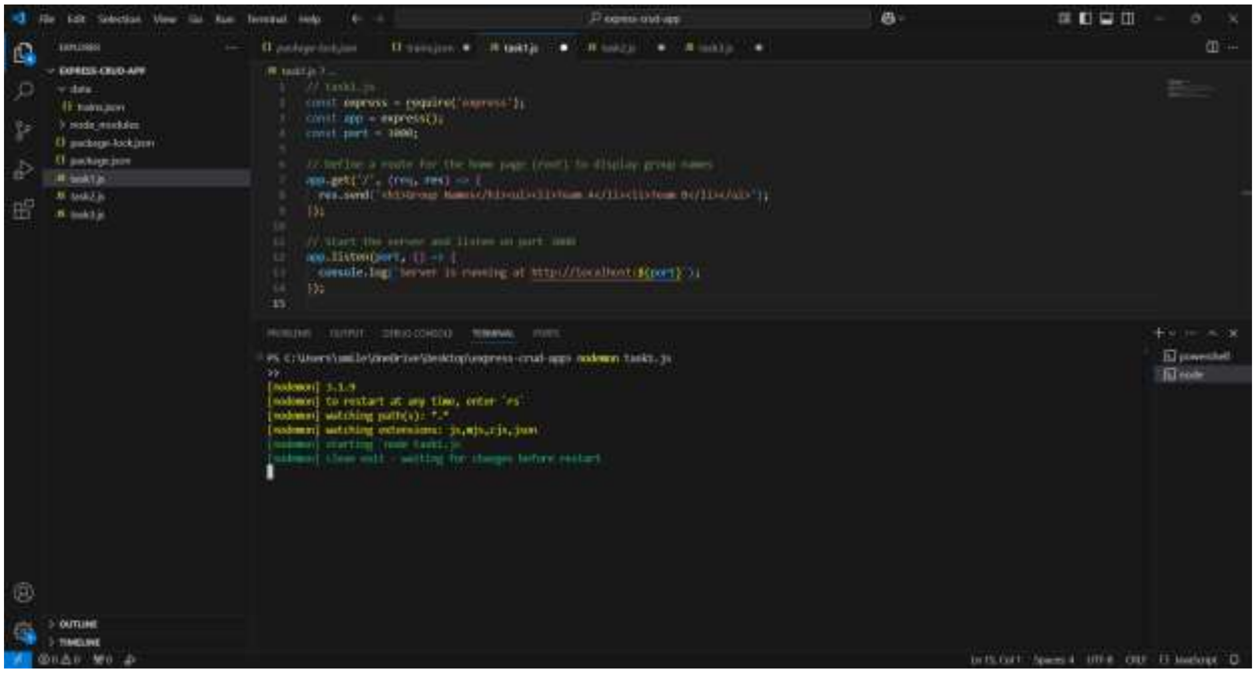
Step 3: Install Required Packages

In this step we will Install Express.js and Install Nodemon (for automatic server restart)

Step 4: Create Project Files

In step 4 ,we will create all the essential files to get the output and the project structure is as following

```
express-crud-app/
 ├─ data/
 |    └──── train.json        # JSON file containing train data
 ├─── task1.js             # Displays group names
 ├─── task2.js             # Fetches train data from JSON file
 ├─── task3.js             # CRUD operations for trains
 ├─── package.json         # Project dependencies
 ├─── package-lock.json     # Dependency lock file
 └──── README.md            # Project documentation
```



```
// task1.js
const express = require('express');
const app = express();
const port = 3000;

// Define a route for the home page (root) to display group names
app.get('/', (req, res) => {
  res.send('<h1>Group Names</h1><ul><li>Team A</li><li>Team B</li></ul>');
});

// Start the server and listen on port 3000
app.listen(port, () => {
  console.log(`Server is running at http://localhost:${port}`);
});
```

```
PS C:\Users\smile\OneDrive\Desktop\express-crud-app> nodemon task1.js
>>
[nodemon] 3.1.9
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,cjs,json
[nodemon] starting `node task1.js`
[nodemon] clean exit - waiting for changes before restart
```

Step 5: Our Express.js CRUD application consists of three JavaScript files:

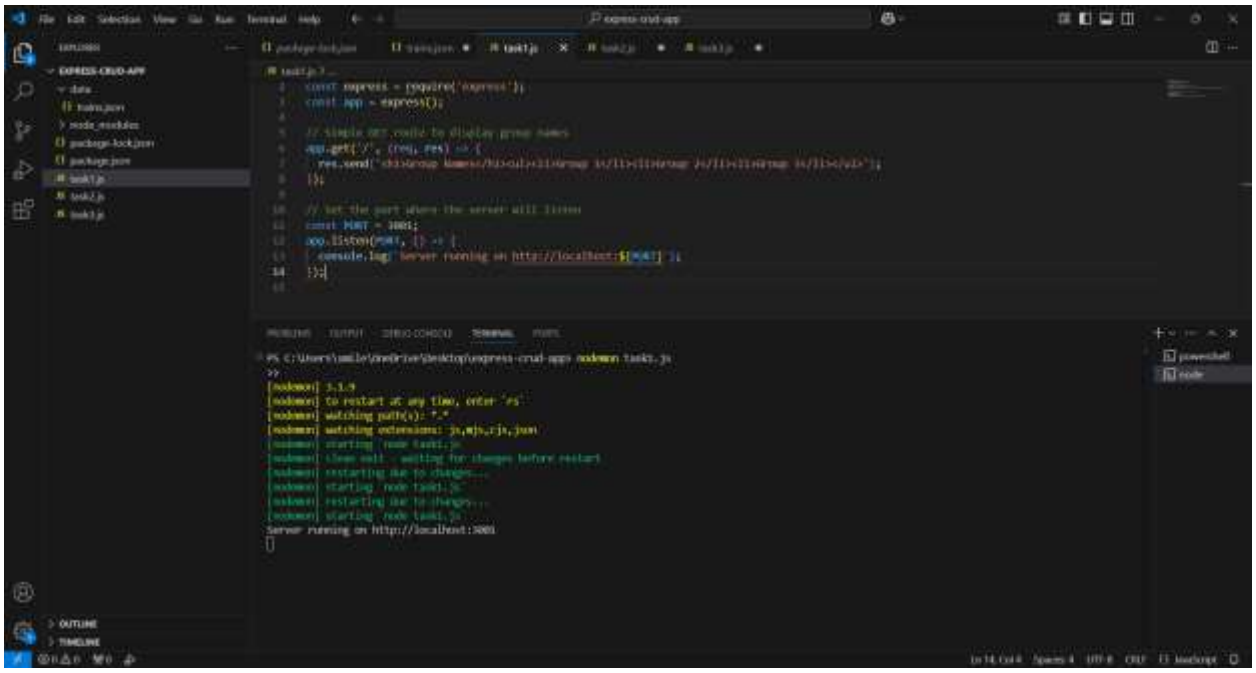
- task1.js → Displays a simple webpage with group names.
- task2.js → Reads and displays JSON data (train details).
- task3.js → Implements CRUD operations (Create, Read, Update, Delete) for train data.

task1.js – Basic Express Server with Homepage

Role:
It Sets up an Express server on port 3001
It Handles a simple GET request (/)
It Displays group names in an HTML list

Functionality:

- When a user visits http://localhost:3001/, we will see:

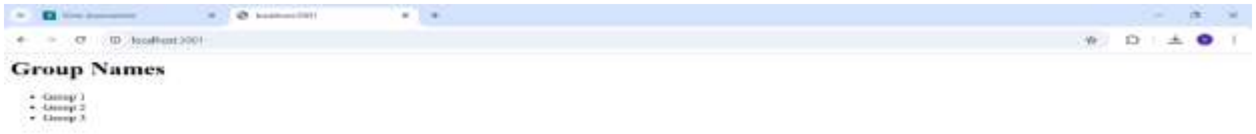


```
const express = require('express');
const app = express();

// Simple GET route to display group names
app.get('/', (req, res) => {
  res.send('<h1>Group Names</h1><ul><li>Group 1</li><li>Group 2</li><li>Group 3</li></ul>');
});

// Set the port where the server will listen
const PORT = 3001;
app.listen(PORT, () => {
  console.log(`Server running on http://localhost:${PORT}`);
});
```

```
PS C:\Users\smile\OneDrive\Desktop\express-crud-app> nodemon task1.js
>>
[nodemon] 3.1.9
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,cjs,json
[nodemon] starting `node task1.js`
[nodemon] clean exit - waiting for changes before restart
[nodemon] restarting due to changes...
[nodemon] starting `node task1.js`
[nodemon] restarting due to changes...
[nodemon] starting `node task1.js`
Server running on http://localhost:3001
```



localhost:3001

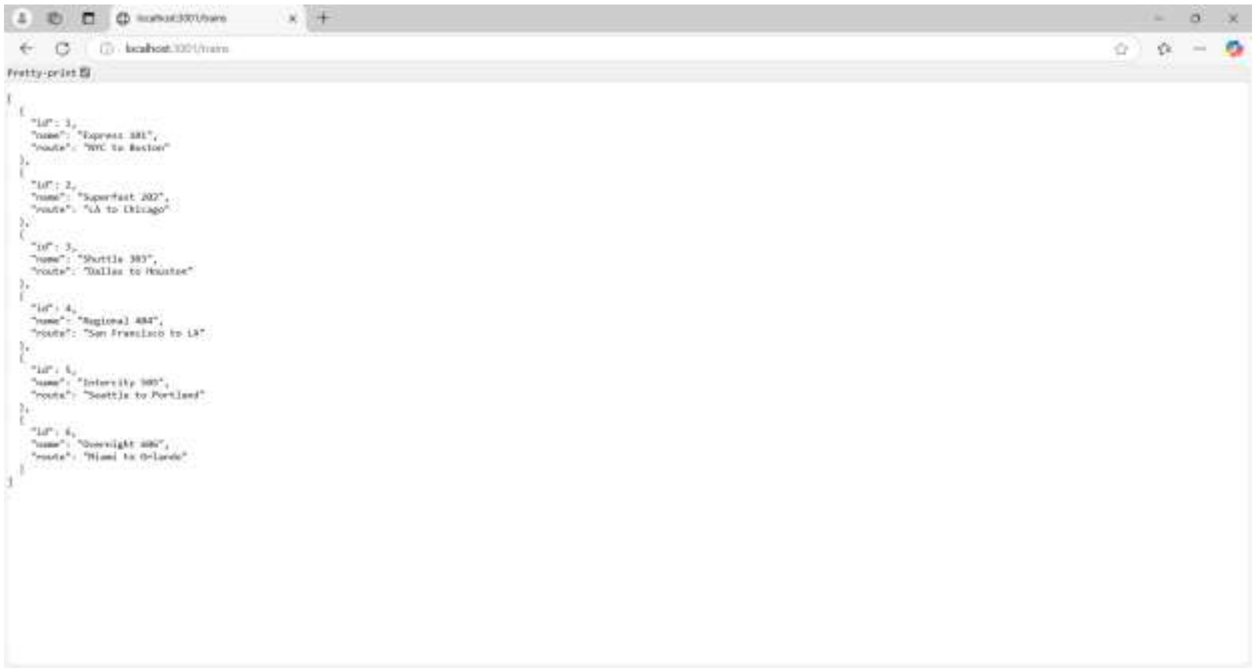
Group Names

- Group 1
- Group 2
- Group 3

task2.js – Display JSON Data in Browser

Role:
It Reads data from train.json (which contains train details)
It Sends JSON data as a response to a GET request

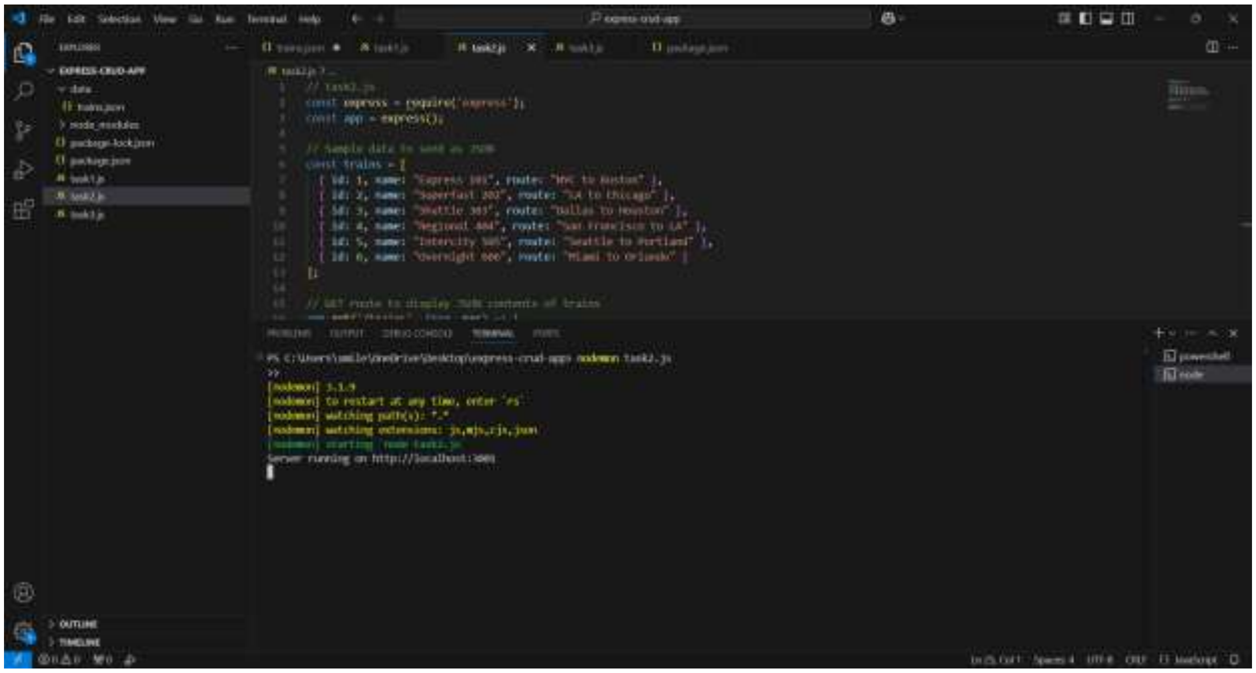
Functionality:When a user visits http://localhost:3001/trains, we will see raw JSON data



localhost:3001/trains

Pretty-print

```
[
  {
    "id": 1,
    "name": "Express 101",
    "route": "NYC to Boston"
  },
  {
    "id": 2,
    "name": "Superfast 202",
    "route": "LA to Chicago"
  },
  {
    "id": 3,
    "name": "Shuttle 303",
    "route": "Dallas to Houston"
  },
  {
    "id": 4,
    "name": "Regional 404",
    "route": "San Francisco to LA"
  },
  {
    "id": 5,
    "name": "Intercity 505",
    "route": "Seattle to Portland"
  },
  {
    "id": 6,
    "name": "Overnight 606",
    "route": "Miami to Orlando"
  }
]
```



```
// task2.js
const express = require('express');
const app = express();

// Sample data to send as JSON
const trains = [
  { id: 1, name: "Express 101", route: "NYC to Boston" },
  { id: 2, name: "Superfast 202", route: "LA to Chicago" },
  { id: 3, name: "Shuttle 303", route: "Dallas to Houston" },
  { id: 4, name: "Regional 404", route: "San Francisco to LA" },
  { id: 5, name: "Intercity 505", route: "Seattle to Portland" },
  { id: 6, name: "Overnight 606", route: "Miami to Orlando" }
];

// GET route to display JSON contents of trains
```

```
PS C:\Users\smile\OneDrive\Desktop\express-crud-app> nodemon task2.js
>>
[nodemon] 3.1.9
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,cjs,json
[nodemon] starting `node task2.js`
Server running on http://localhost:3000
```

task3.js – CRUD Operations with Express API

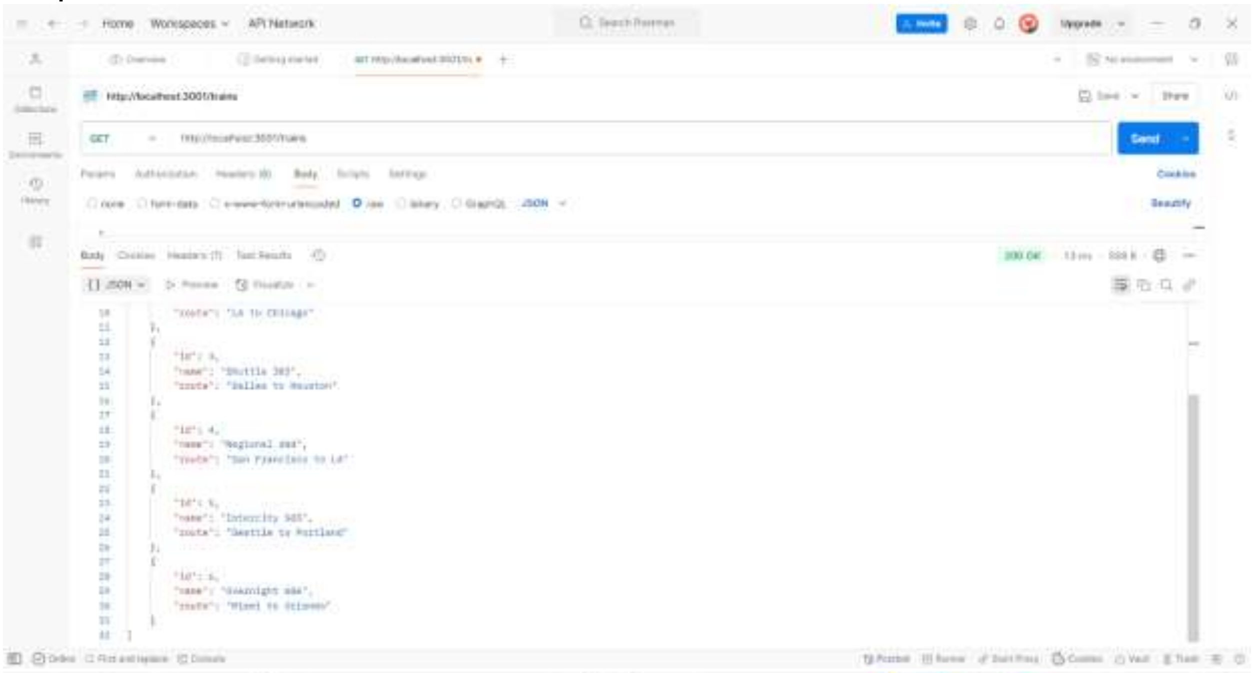
Role:
 Implements Create, Read, Update, and Delete (CRUD) operations
 Uses Express.js methods:

- POST (/addTrain) → Adds a new train
- GET (/trains) → Fetches all trains
- PUT (/updateTrain/:id) → Updates train details
- DELETE (/deleteTrain/:id) → Removes a train
  It Allows us to test API endpoints using Postman

Functionality: Get Request:This route retrieves all trains.

- Method: GET
- URL: http://localhost:3001/trains

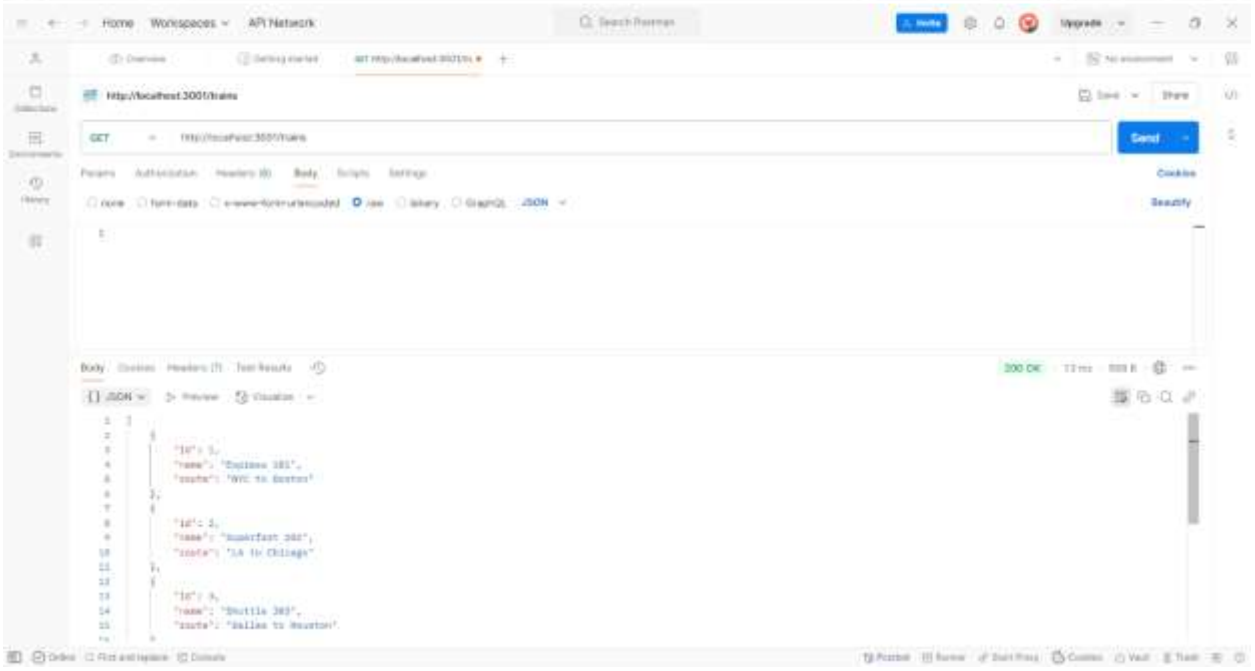
Response:



```
GET http://localhost:3001/trains
```

200 OK

```
        "route": "LA to Chicago"
    },
    {
        "id": 3,
        "name": "Shuttle 303",
        "route": "Dallas to Houston"
    },
    {
        "id": 4,
        "name": "Regional 404",
        "route": "San Francisco to LA"
    },
    {
        "id": 5,
        "name": "Intercity 505",
        "route": "Seattle to Portland"
    },
    {
        "id": 6,
        "name": "Overnight 606",
        "route": "Miami to Orlando"
    }
]
```



```
GET http://localhost:3001/trains
```

200 OK

```
[
    {
        "id": 1,
        "name": "Express 101",
        "route": "NYC to Boston"
    },
    {
        "id": 2,
        "name": "Superfast 202",
        "route": "LA to Chicago"
    },
    {
        "id": 3,
        "name": "Shuttle 303",
        "route": "Dallas to Houston"
```

- POST Request: Adds a new train
    - URL: http://localhost:3001/addTrain

    Body (JSON): {

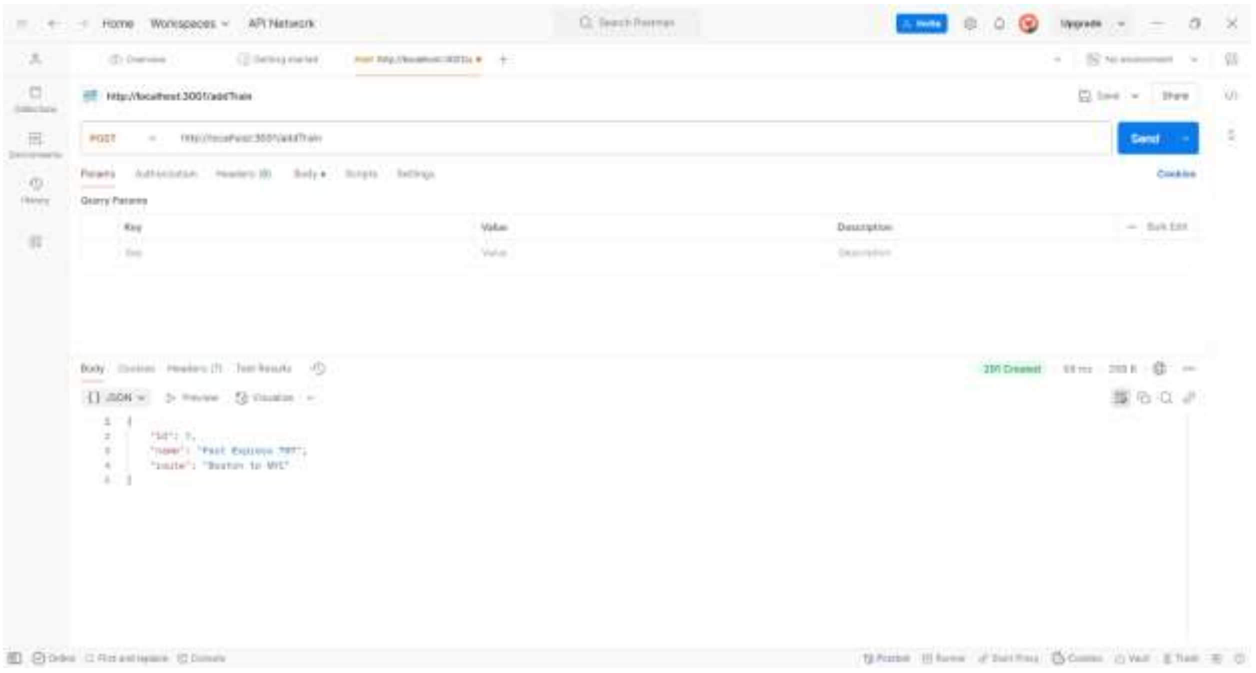
     "id": 7,

      "name": "Fast Express 707",

      "route": "Boston to NYC"

    }

     Response:



http://localhost:3001/addTrain

POST http://localhost:3001/addTrain

201 Created

```
{
    "id": 7,
    "name": "Fast Express 707",
    "route": "Boston to NYC"
}
```

PUT Request: Updates a train

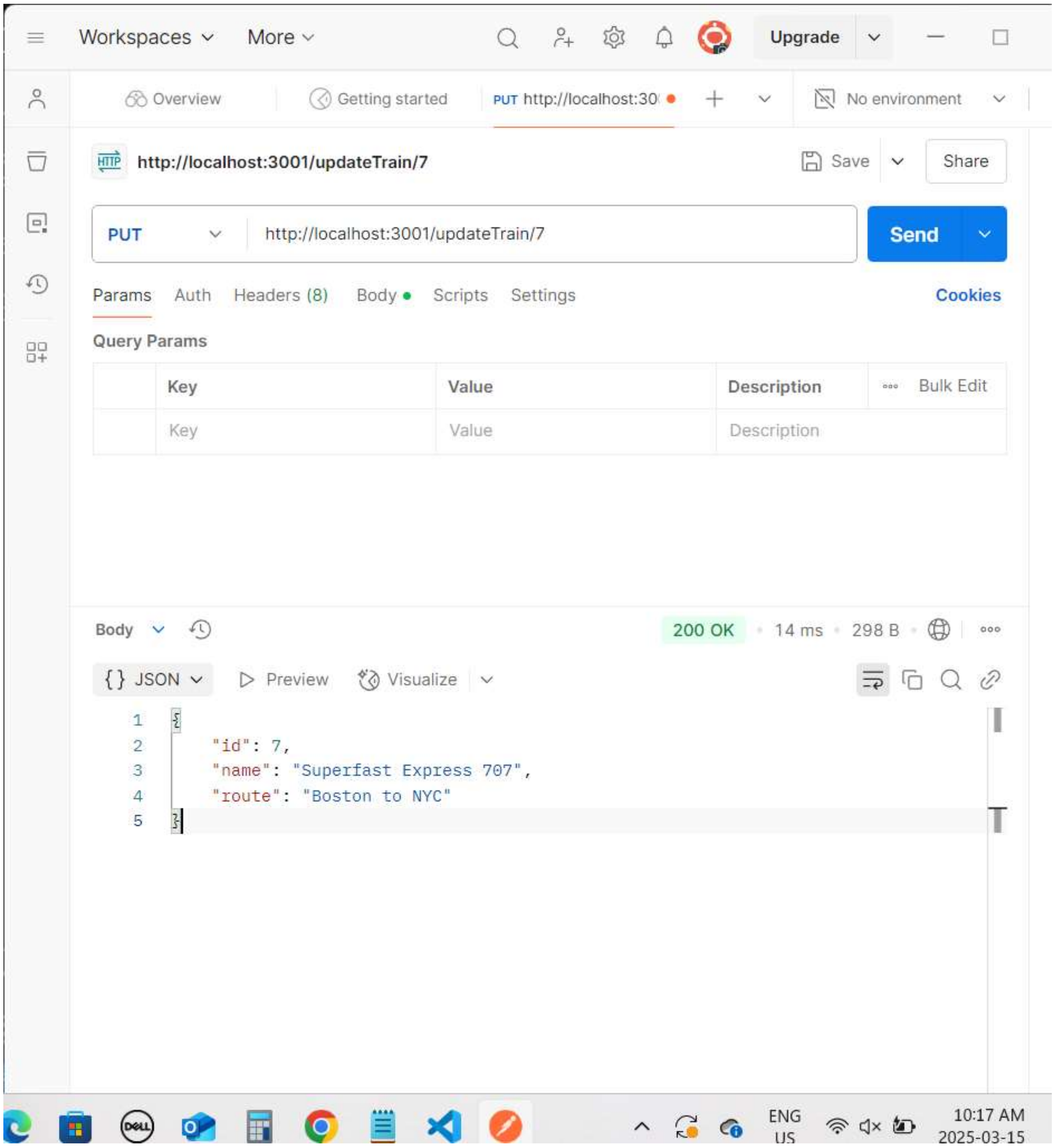
- URL: http://localhost:3001/updateTrain/7

Body (JSON): {

  "name": "Superfast Express 707",

```
  "route": "Boston to NYC"
}
```

Response:

- 

Workspaces More Upgrade

Overview Getting started PUT http://localhost:30 No environment

http://localhost:3001/updateTrain/7 Save Share

PUT http://localhost:3001/updateTrain/7 Send

Params Auth Headers (8) Body Scripts Settings Cookies

Query Params

	Key	Value	Description
	Key	Value	Description

Body 200 OK · 14 ms · 298 B

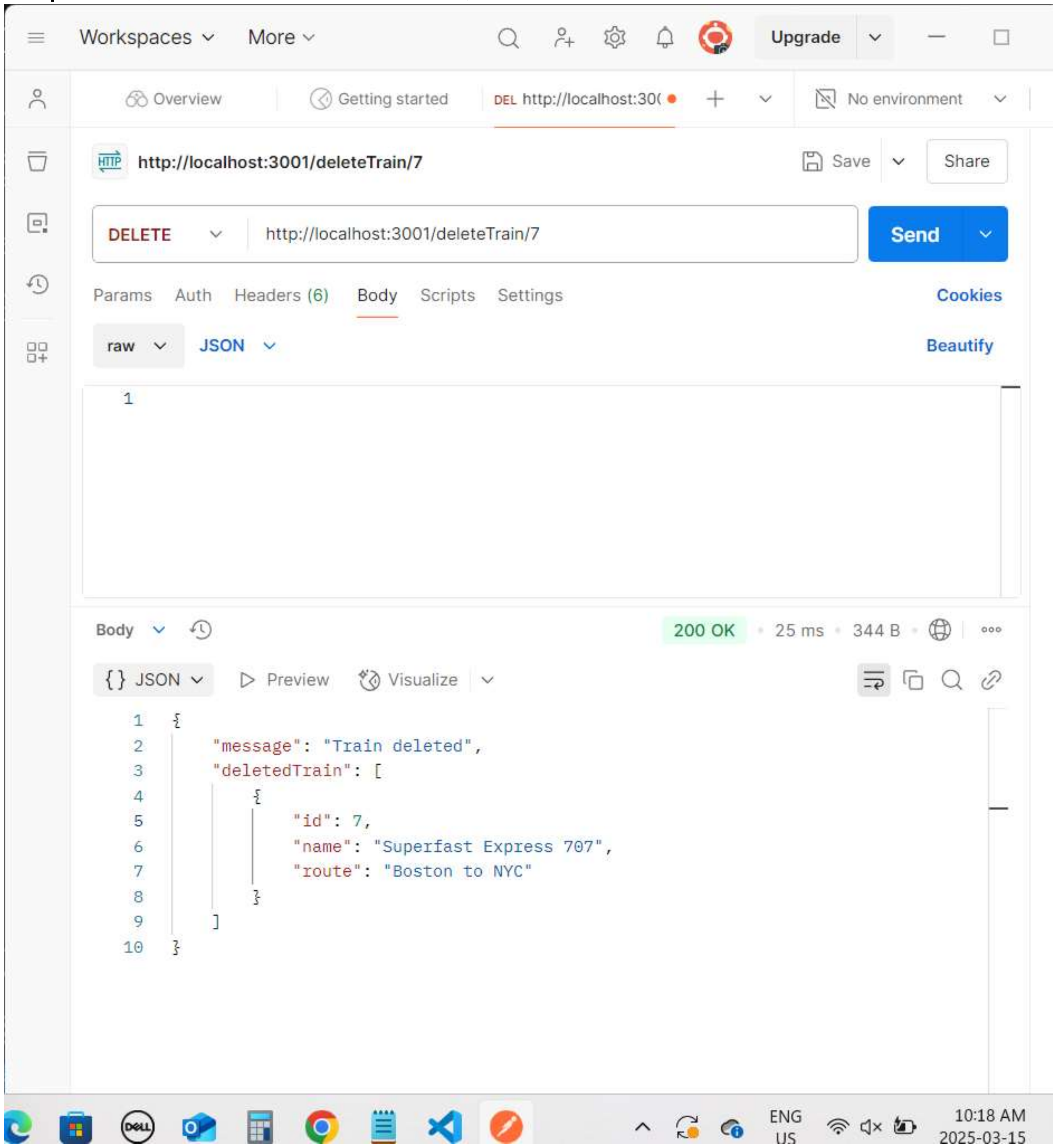
{} JSON Preview Visualize

```
{
    "id": 7,
    "name": "Superfast Express 707",
    "route": "Boston to NYC"
}
```

ENG US 10:17 AM 2025-03-15

DELETE Request: Removes a train

- URL: http://localhost:3001/deleteTrain/1
- Response : (if the train with ID 7 exists)



http://localhost:3001/deleteTrain/7

DELETE http://localhost:3001/deleteTrain/7

```
{
    "message": "Train deleted",
    "deletedTrain": [
        {
            "id": 7,
            "name": "Superfast Express 707",
            "route": "Boston to NYC"
        }
    ]
}
```