24 CRUD App - Express.JS & MySQL

1. Set Up The Project

1. **Create a new directory for project 'CRUD APP 2'**

```
cd CRUD\ APP\ 2/
```

2. **Initialize a new Node.js project**

```
npm init -y
```

3. **Install the required packages**

```
npm install express mysql2 body-parser
```

2. Set Up Your MySQL Database

1. **Create a MySQL database and table:**

```
USE CRUD_APP;

CREATE TABLE users (
 id INT AUTO_INCREMENT PRIMARY KEY,
 name VARCHAR(100) NOT NULL,
 email VARCHAR(100) NOT NULL UNIQUE
);
```

```
mysql> USE CRUD_APP;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SELECT*FROM users;
+----+------------+---------------------+
| id | name       | email               |
+----+------------+---------------------+
|  1 | Dare Devil | daredevil@gmail.com |
|  2 | Jester     | itzjester@gmail.com |
+----+------------+---------------------+
2 rows in set (0.00 sec)
```

3. Create Your Express.js Application

1. Create the `routes` Directory

```
mkdir routes
```

2. Create the Route Files

- `express`
  - This imports the Express framework, which is used to create web applications and APIs
- `router`
  - This creates a new instance of an Express router, which allows you to define route handlers (endpoints) modularly
- `db`
  - This imports the MySQL database connection from a separate file (`../db`)
  - This file export a MySQL connection object
- `module.exports`
  - This exports the router object

routes/getUsers.js

```
const express = require('express');
const router = express.Router();
const db = require('../db');

// Read all users
router.get('/', (req, res) => {
  db.query('SELECT * FROM users', (err, results) => {
    if (err) {
      return res.status(500).json({ error: err.message });
    }
    res.json(results);
    console.log(results);
  });
});

module.exports = router;
```

- `router.get('/')`
  - defines a route handler for the HTTP GET request on the root path of this router
- `req` : This is the request object, representing the HTTP request
- `res` : This is the response object, used to send a response back to the client

- `db.query('SELECT * FROM users', (err, results) => {...})`
  - executes a SQL query to select all records from the `users` table in the MySQL database
    - `err`: This is an error object that will be non-null if an error occurs during the query execution
    - `results`: This contains the results of the query, which will be an array of user records
- `if (err) {...}`
  - If there is an error during the query execution, this block sends a 500 Internal Server Error response to the client, with the error message in JSON format
- `res.json(results)`
  - If the query is successful, this sends the query results (i.e., the list of users) back to the client in JSON format
- `console.log(results)`
  - This logs the results of the query to the console for debugging purposes

routes/createUser.js

```
const express = require('express');
const router = express.Router();
const db = require('../db');

// Create a new user
router.post('/', (req, res) => {
  const { name, email } = req.body;
  db.query('INSERT INTO users (name, email) VALUES (?, ?)', [name, email],
(err, results) => {
    if (err) {
      return res.status(500).json({ error: err.message });
    }
    res.status(201).json({ id: results.insertId, name, email });
  });
});

module.exports = router;
```

- `router.post('/')`
  - This defines a route handler for the HTTP POST request on the root path of this router
- `const { name, email } = req.body;`
  - This line extracts the `name` and `email` properties from the request body
  - The client should send a JSON object containing these fields in the body of the POST request

- `db.query('INSERT INTO users (name, email) VALUES (?, ?)', [name, email], (err, results) => {...})`
  - This executes a SQL query to insert a new record into the `users` table with the provided `name` and `email`
- `res.status(201).json({ id: results.insertId, name, email });`
  - If the query is successful, this sends a 201 Created response to the client with a JSON object containing the ID of the newly created user, along with the `name` and `email` provided

routes/updateUser.js

```
const express = require('express');
const router = express.Router();
const db = require('../db');

// Update a user
router.put('/:id', (req, res) => {
  const id = req.params.id;
  const { name, email } = req.body;
  db.query('UPDATE users SET name = ?, email = ? WHERE id = ?', [name,
email, id], (err, results) => {
    if (err) {
      return res.status(500).json({ error: err.message });
    }
    res.json({ id, name, email });
  });
});

module.exports = router;
```

- `router.put('/:id')`
  - This defines a route handler for the HTTP PUT request on the path `/:id` of this router
  - The `:id` is a route parameter representing the ID of the user to be updated
- `const id = req.params.id;`
  - This line extracts the `id` parameter from the request URL
  - This represents the ID of the user to be updated

routes/deleteUser.js

```
const express = require('express');
const router = express.Router();
const db = require('../db');
```

```
// Delete a user
router.delete('/:id', (req, res) => {
  const id = req.params.id;
  db.query('DELETE FROM users WHERE id = ?', [id], (err, results) => {
    if (err) {
      return res.status(500).json({ error: err.message });
    }
    res.status(204).send();
  });
});

module.exports = router;
```

- `router.delete('/:id')`
  - This defines a route handler for the HTTP DELETE request on the path `/:id` of this router
  - The `:id` is a route parameter representing the ID of the user to be deleted

3. Create a Separate DB Connection File

db.js

```
const mysql = require('mysql2');

// Create MySQL connection
const db = mysql.createConnection({
  host: 'localhost',
  user: 'root',
  password: 'mysql',
  database: 'CRUD_APP'
});

db.connect((err) => {
  if (err) {
    console.error('Error connecting to MySQL:', err);
    return;
  }
  console.log('Connected to MySQL');
});

module.exports = db;
```

4. `app.js` to Import and Use the Route Files

app.js

```
const express = require('express');
const bodyParser = require('body-parser');

const getUsersRouter = require('./routes/getUsers');
const createUserRouter = require('./routes/createUser');
const updateUserRouter = require('./routes/updateUser');
const deleteUserRouter = require('./routes/deleteUser');

const app = express();
const port = 3000;

// Middleware
app.use(bodyParser.json());
app.use(bodyParser.urlencoded({ extended: true }));

// Routes
app.use('/', getUsersRouter);
app.use('/users', createUserRouter);
app.use('/users', updateUserRouter);
app.use('/users', deleteUserRouter);

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

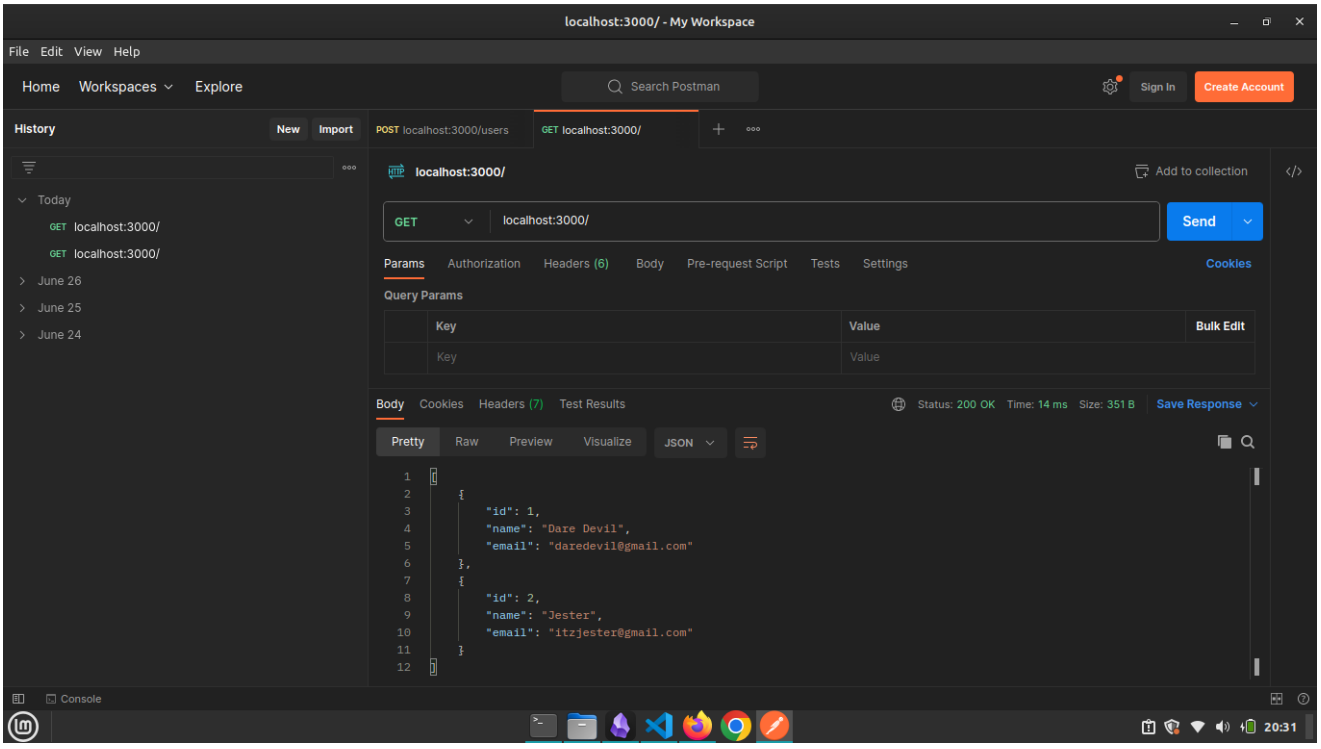
- `express`
  - Imports the Express framework, which is used to build the web server and handle HTTP requests and responses.\
- `bodyParser`
  - Imports the `body-parser` middleware, which parses incoming request bodies in a middleware before handling them
- `app.use(bodyParser.json())`
  - Adds middleware to parse JSON request bodies
  - This is essential for handling POST and PUT requests where the request body is JSON
- `app.use(bodyParser.urlencoded({ extended: true }))`
  - Adds middleware to parse URL-encoded request bodies (e.g., form submissions)
  - The `extended: true` option allows for rich objects and arrays to be encoded into the URL-encoded format

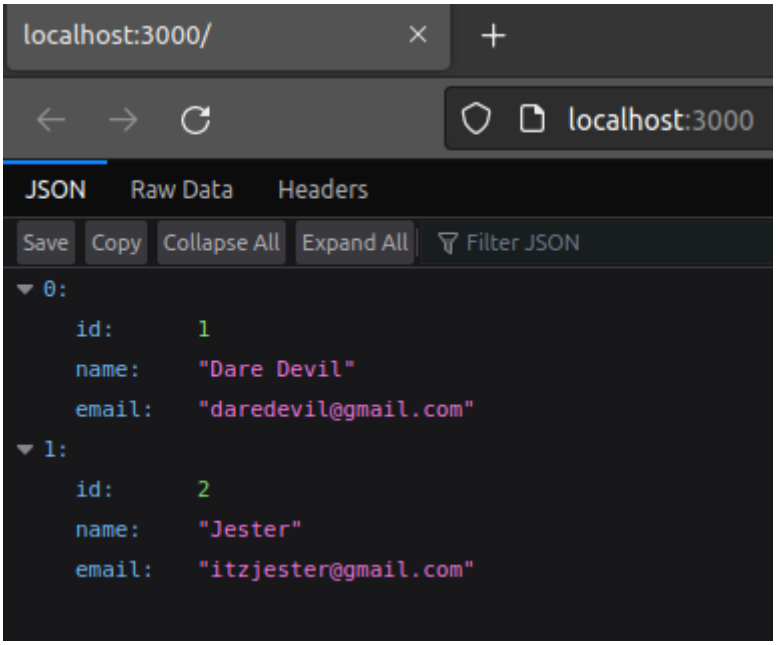
4. Run Your Application

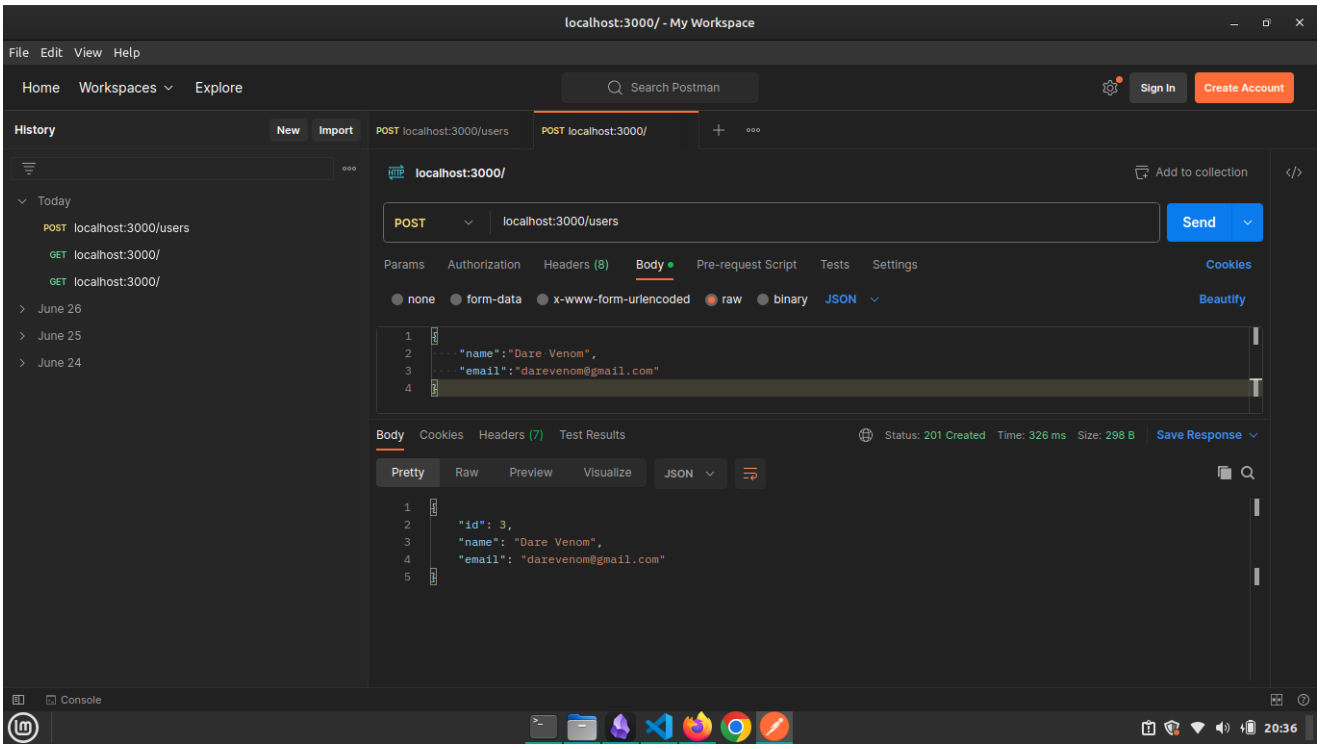
```
node app.js
```

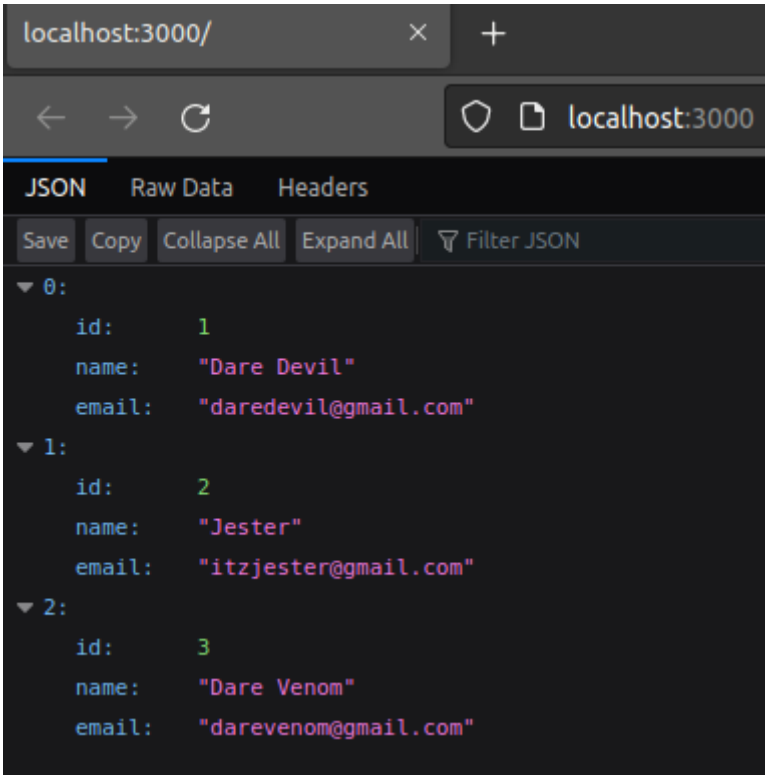
5. Test the CRUD operations

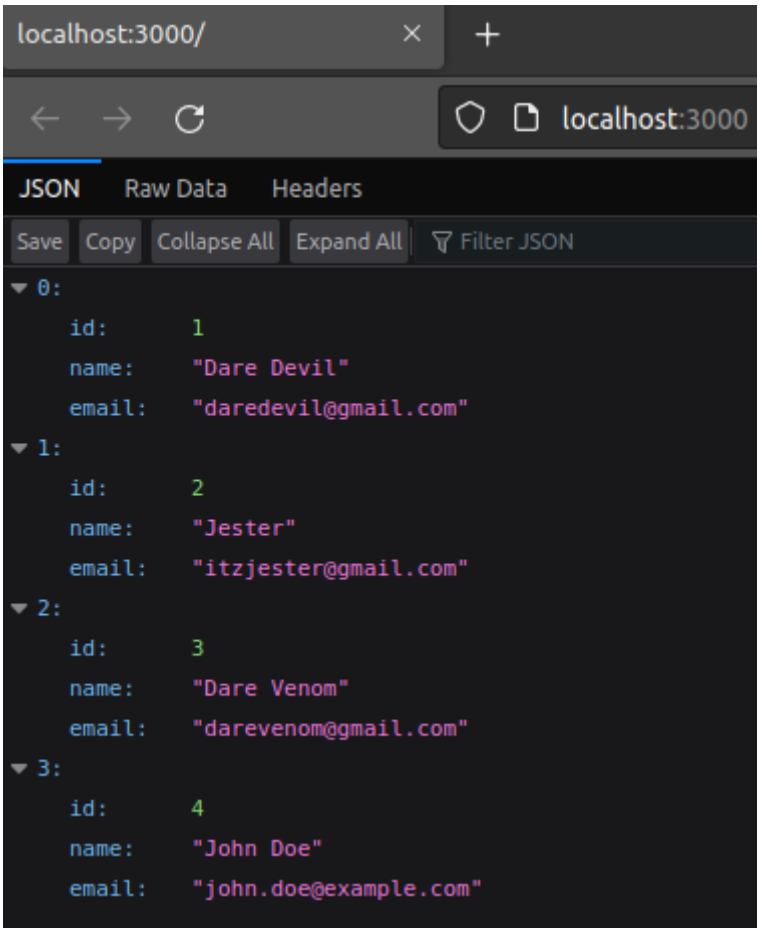
01 POSTMAN to test the CRUD operations

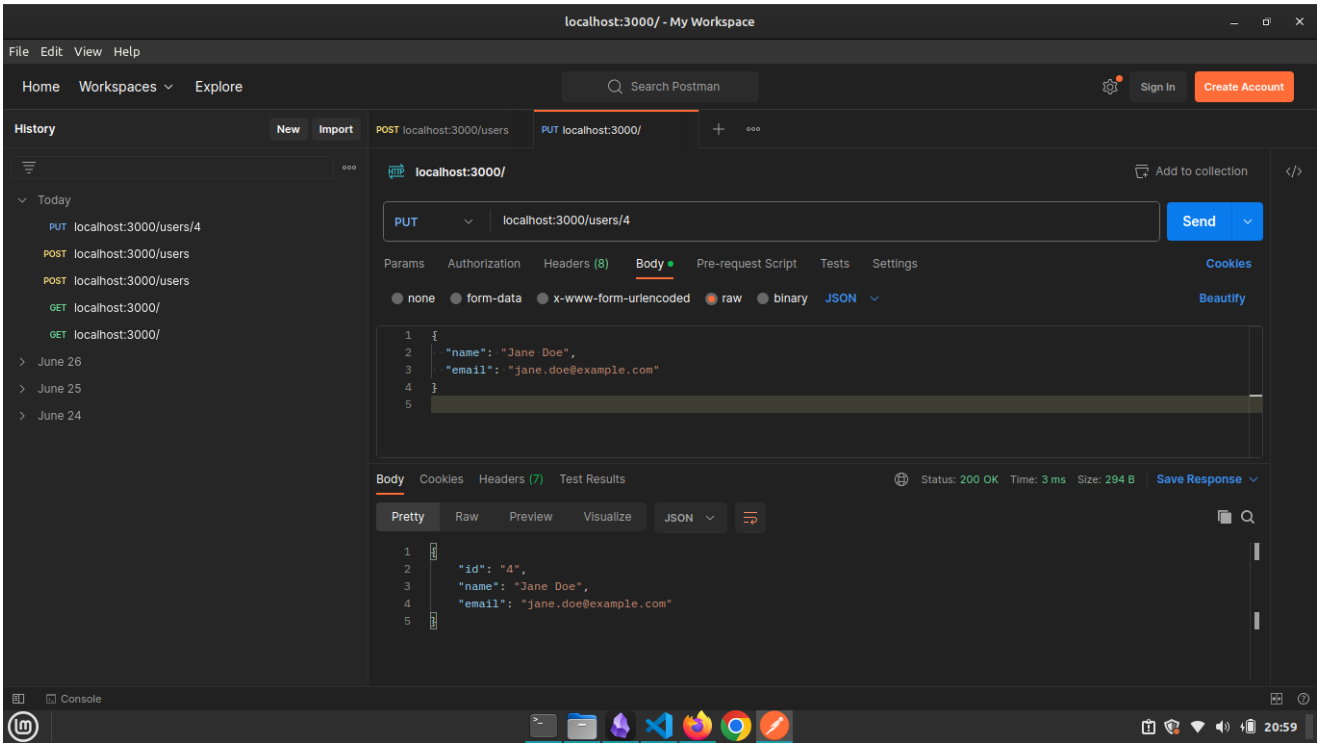


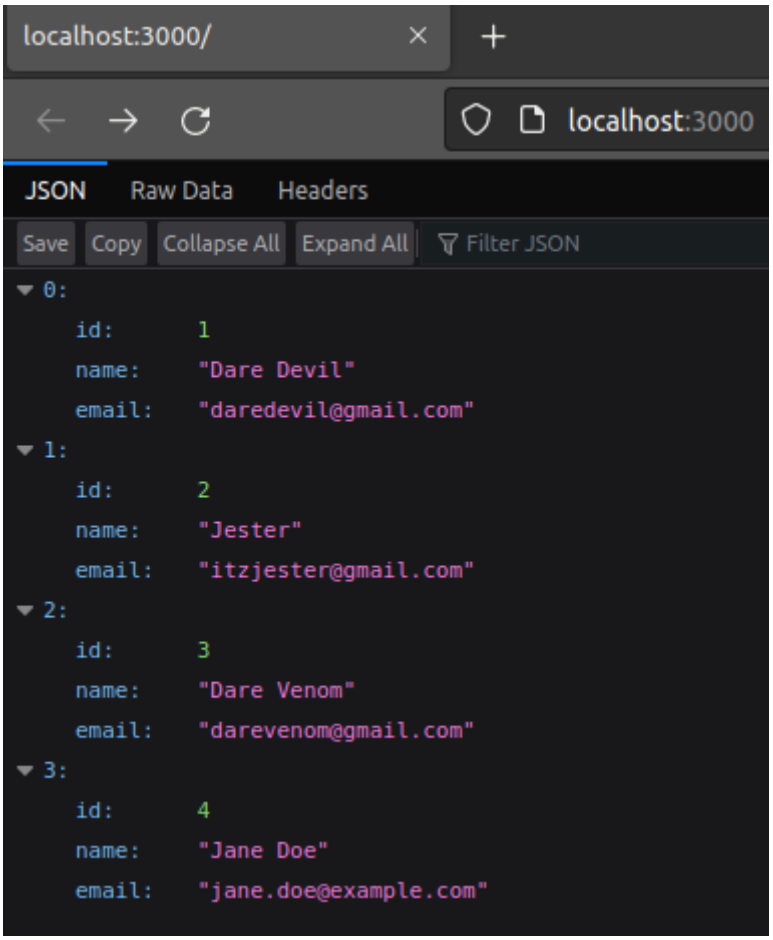


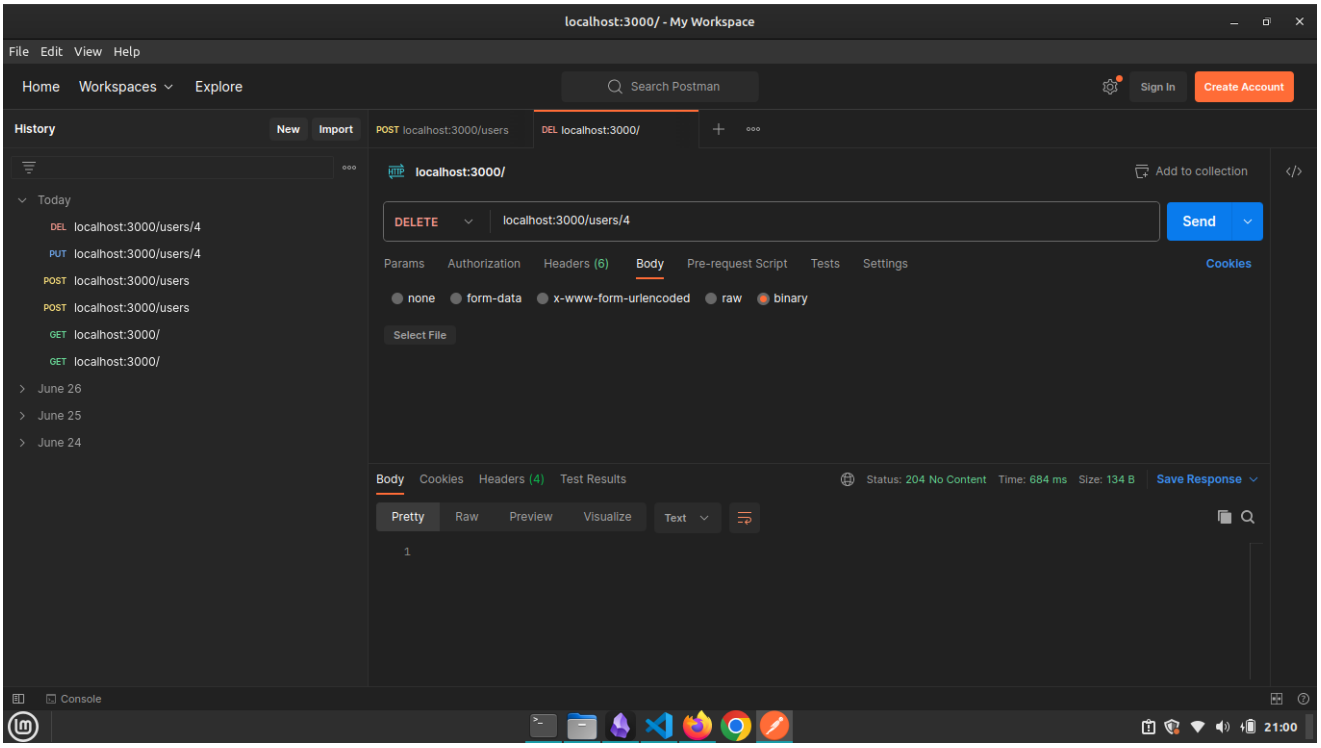

localhost:3000/ - My Workspace
File Edit View Help
Home Workspaces Explore
Search Postman
Sign In
Create Account
History
New
Import
POST localhost:3000/users
POST localhost:3000/
Today
POST localhost:3000/users
GET localhost:3000/
GET localhost:3000/
June 26
June 25
June 24
localhost:3000/
Add to collection
POST
localhost:3000/users
Send
Params
Authorization
Headers (8)
Body
Pre-request Script
Tests
Settings
Cookies
none
form-data
x-www-form-urlencoded
raw
binary
JSON
Beautify
{
"name":"Dare Venom",
"email":"darevenom@gmail.com"
}
Body
Cookies
Headers (7)
Test Results
Status: 201 Created
Time: 326 ms
Size: 298 B
Save Response
Pretty
Raw
Preview
Visualize
JSON
{
"id": 3,
"name": "Dare Venom",
"email": "darevenom@gmail.com"
}
Console
20:36

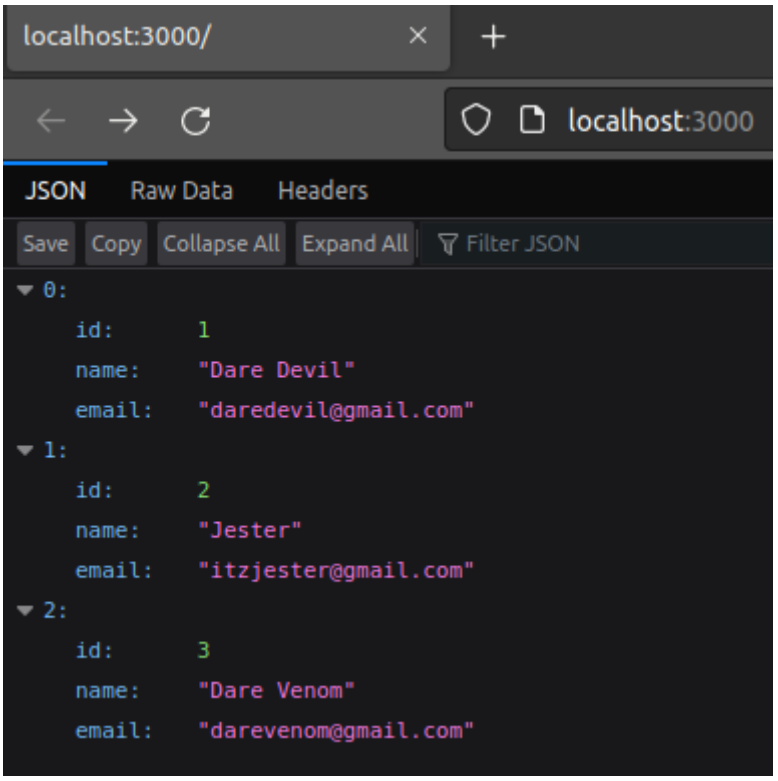

localhost:3000/
localhost:3000
JSON
Raw Data
Headers
Save
Copy
Collapse All
Expand All
Filter JSON
0:
id: 1
name: "Dare Devil"
email: "daredevil@gmail.com"
1:
id: 2
name: "Jester"
email: "itzjester@gmail.com"
2:
id: 3
name: "Dare Venom"
email: "darevenom@gmail.com"


localhost:3000/
localhost:3000
JSON
Raw Data
Headers
Save
Copy
Collapse All
Expand All
Filter JSON
0:
id: 1
name: "Dare Devil"
email: "daredevil@gmail.com"
1:
id: 2
name: "Jester"
email: "itzjester@gmail.com"
2:
id: 3
name: "Dare Venom"
email: "darevenom@gmail.com"
3:
id: 4
name: "John Doe"
email: "john.doe@example.com"


localhost:3000/ - My Workspace
File Edit View Help
Home
Workspaces
Explore
Search Postman
Sign In
Create Account
History
New
Import
POST localhost:3000/users
PUT localhost:3000/
localhost:3000/
Add to collection
Today
PUT localhost:3000/users/4
POST localhost:3000/users
POST localhost:3000/users
GET localhost:3000/
GET localhost:3000/
June 26
June 25
June 24
PUT
localhost:3000/users/4
Send
Params
Authorization
Headers (8)
Body
Pre-request Script
Tests
Settings
Cookies
none
form-data
x-www-form-urlencoded
raw
binary
JSON
Beautify
{
"name": "Jane Doe",
"email": "jane.doe@example.com"
}
Body
Cookies
Headers (7)
Test Results
Status: 200 OK
Time: 3 ms
Size: 294 B
Save Response
Pretty
Raw
Preview
Visualize
JSON
{
"id": "4",
"name": "Jane Doe",
"email": "jane.doe@example.com"
}
Console
20:59


localhost:3000/
localhost:3000
JSON
Raw Data
Headers
Save
Copy
Collapse All
Expand All
Filter JSON
0:
id: 1
name: "Dare Devil"
email: "daredevil@gmail.com"
1:
id: 2
name: "Jester"
email: "itzjester@gmail.com"
2:
id: 3
name: "Dare Venom"
email: "darevenom@gmail.com"
3:
id: 4
name: "Jane Doe"
email: "jane.doe@example.com"


localhost:3000/ - My Workspace
File Edit View Help
Home
Workspaces
Explore
Search Postman
Sign In
Create Account
History
New
Import
POST localhost:3000/users
DEL localhost:3000/
localhost:3000/
Add to collection
Today
DEL localhost:3000/users/4
PUT localhost:3000/users/4
POST localhost:3000/users
POST localhost:3000/users
GET localhost:3000/
GET localhost:3000/
June 26
June 25
June 24
DELETE
localhost:3000/users/4
Send
Params
Authorization
Headers (6)
Body
Pre-request Script
Tests
Settings
Cookies
none
form-data
x-www-form-urlencoded
raw
binary
Select File
Body
Cookies
Headers (4)
Test Results
Status: 204 No Content
Time: 684 ms
Size: 134 B
Save Response
Pretty
Raw
Preview
Visualize
Text
1
Console
21:00



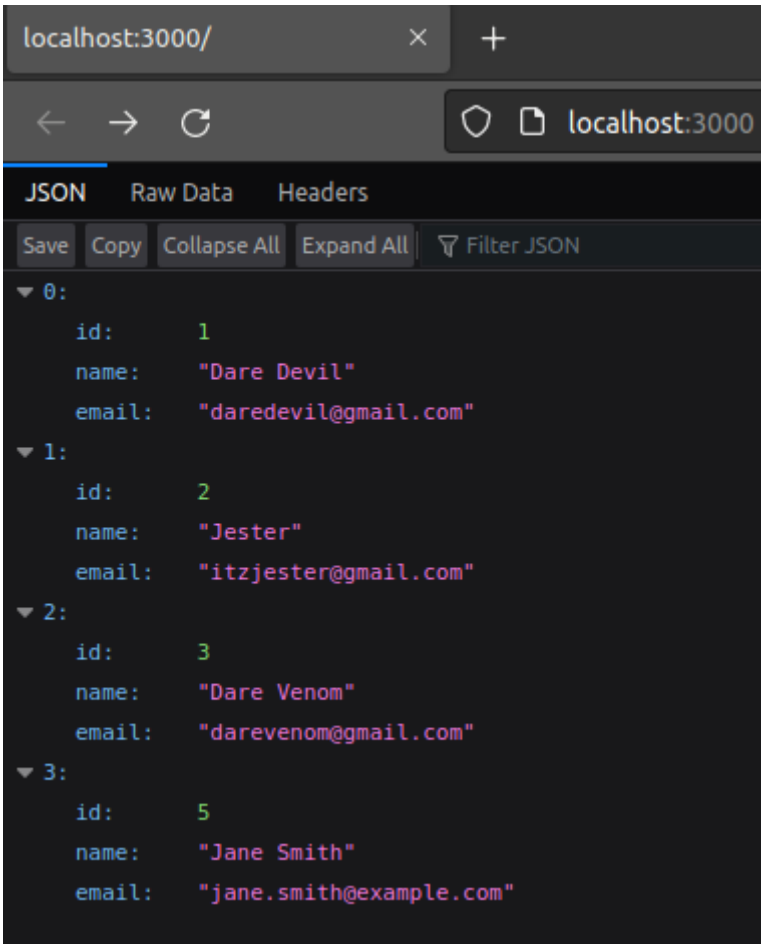
02 `curl` to test the CRUD operations

- **Read all users**

```
curl http://localhost:3000/
```

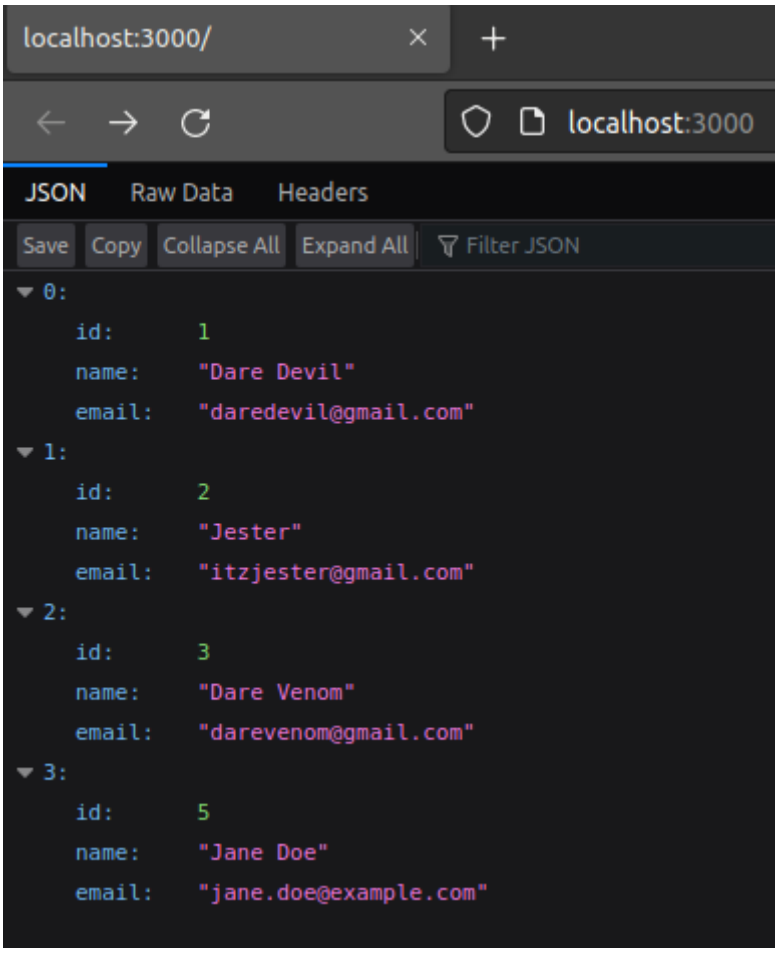
- **Create a new user**

```
curl -X POST http://localhost:3000/users -H "Content-Type:
application/json" -d '{"name": "Jane Smith", "email":
"jane.smith@example.com"}'
```



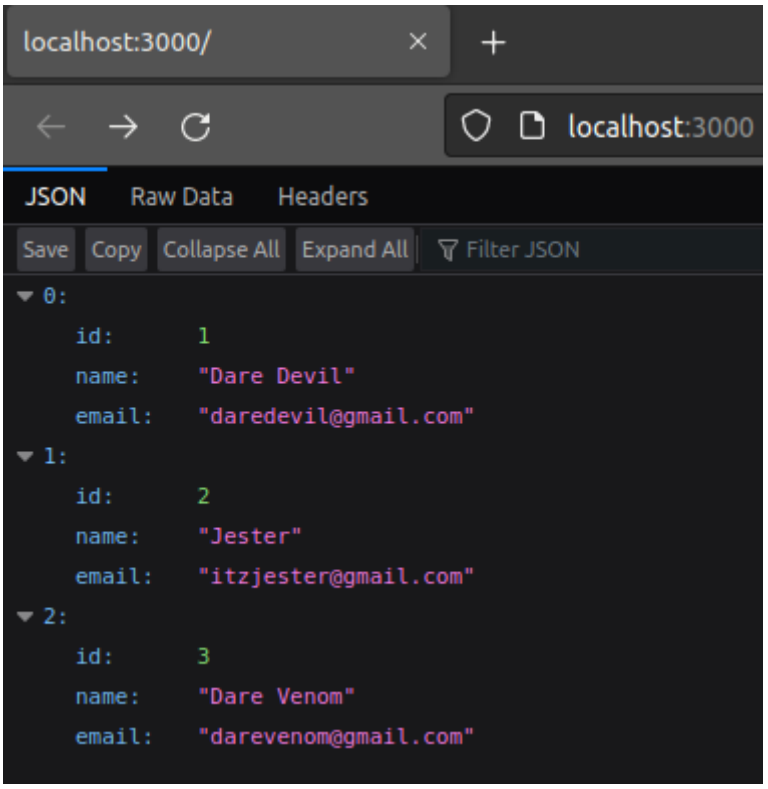
- **Update a user**

```
curl -X PUT http://localhost:3000/users/5 -H "Content-Type:
application/json" -d '{"name": "Jane Doe", "email":
"jane.doe@example.com"}'
```



- **Delete a user**

```
curl -X DELETE http://localhost:3000/users/5
```



6. Verify Output

```
mysql> SELECT*FROM users;
+----+------------+---------------------+
| id | name       | email               |
+----+------------+---------------------+
|  1 | Dare Devil | daredevil@gmail.com |
|  2 | Jester     | itzjester@gmail.com |
|  3 | Dare Venom | darevenom@gmail.com |
+----+------------+---------------------+
3 rows in set (0.00 sec)
```