

## Week – 5 & 6

### Task-1

**Aim:** Develop an ExpressJS API to perform CRUD operations using In Memory Database & Test it.

#### Description:

- In Express JS, CRUD refers to the four basic operations that can be performed on a database or resource - Create, Read, Update, and Delete.
- ExpressJS API to perform CRUD (Create, Read, Update, Delete) operations using an in-memory database.
- Use a tool like Postman or a web browser to test the API endpoints. Test each CRUD operation to ensure they work correctly.

#### Source Code & Output:

The image shows a VS Code editor with a file named `Task_1.js` containing the following JavaScript code:

```

1 const express = require('express');
2 const app = express();
3 const port = 3000;
4 app.use(express.json());
5 app.use(express.urlencoded({ extended: true }));
6 var users = [];
7 app.post('/user', (req, res) => {
8   const { id, name, age, gender } = req.body;
9   if (!id || !name || !age || !gender) {
10     return res.status(400).json("Data is not entered properly!");
11   }
12   const newData = { id, name, age, gender };
13   users.push(newData);
14   res.status(201).json("Entered successfully");
15 });
16 app.get('/user', (req, res) => {
17   res.status(200).json(users);
18 });
19 app.get('/user/:id', (req, res) => {
20   const id = req.params.id;
21   const data = users.find(x => x.id === id);
22   if (!data) {
23     return res.status(404).json("User not found");
24   }
25   res.status(200).json(data);
26 });
27 app.put('/user/:id', (req, res) => {
28   const id = req.params.id;
29   const { newName } = req.body;
30   if (!newName) {
31     return res.status(400).json("Enter a valid new Name.");
32   }
33   const userIndex = users.findIndex(x => x.id === id);
34   if (userIndex === -1) {
35     return res.status(404).json("User not found");
36   }
37   users[userIndex].name = newName;
38   res.status(200).json("Username updated successfully");
39 });
40 app.delete('/user/:id', (req, res) => {
41   const id = req.params.id;
42   const userIndex = users.findIndex(x => x.id === id);
43   if (userIndex === -1) {
44     return res.status(404).json("User not found");
45   }
46   users.splice(userIndex, 1);
47   res.status(200).json("User deleted successfully");
48 });
49 app.listen(port, () => {
50   console.log(`Server is running on port no. ${port}`);
51 });
52

```

On the right, a Postman "New Request" window is shown for a POST request to `http://localhost:3000/user`. The response is:

```

1 "Entered successfully"

```

At the bottom, a terminal window shows the command `PS D:\21IT145\Week 5\Task 1> node Task_1.js` and the output `Server is running on port no. 3000`.

The image displays three screenshots of a REST client interface, likely Postman, showing various HTTP requests and their corresponding responses.

**Top Screenshot:** A GET request to `http://localhost:3000/user/1` is shown. The status is **200 OK**, size is **52 Bytes**, and time is **4 ms**. The response is a JSON object:

```
{
  "id": "1",
  "name": "rush",
  "age": "19",
  "gender": "male"
}
```

**Middle Screenshot:** A POST request to `http://localhost:3000/user` is shown. The status is **201 Created**, size is **22 Bytes**, and time is **3 ms**. The response is a plain text message:

```
"Entered successfully"
```

**Bottom Screenshot:** Two panels are shown side-by-side. The left panel shows a DELETE request to `http://localhost:3000/user/1` with a status of **200 OK**, size of **27 Bytes**, and time of **26 ms**. The response is a plain text message:

```
"User deleted successfully"
```

The right panel shows a GET request to `http://localhost:3000/user` with a status of **200 OK**, size of **105 Bytes**, and time of **3 ms**. The response is a JSON array containing two objects:

```
[
  {
    "id": "2",
    "name": "manav",
    "age": "19",
    "gender": "male"
  },
  {
    "id": "2",
    "name": "jay",
    "age": "19",
    "gender": "male"
  }
]
```

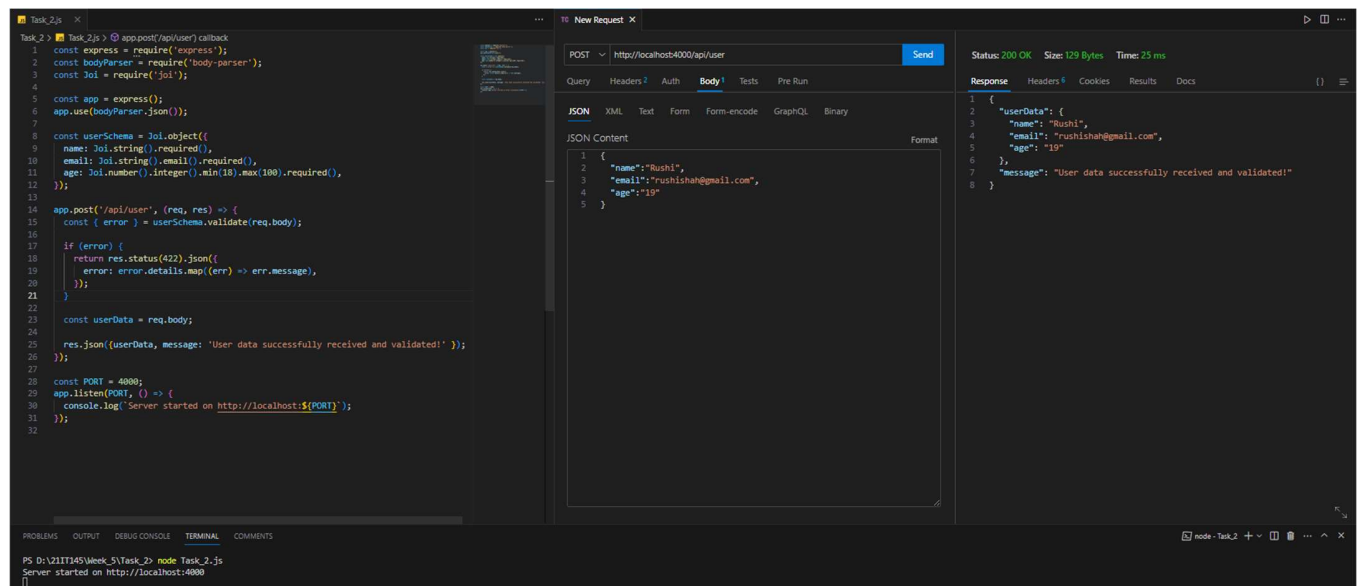
## Task-2

**Aim: Validate API-Form/Data at server-side using validator/joi module**

### Description:

- Joi module is a popular module for data validation. This module validates the data based on schemas. There are various functions like optional(), required(), min(), max(), etc which make it easy to use and a user-friendly module for validating the data.
- It allows you to define a schema that represents the expected structure and constraints of your data.
- Schema: A schema is an object that represents the rules and constraints applied to the data. It defines the allowed keys, data types, lengths, formats, and any other validations needed for each field.
- Validation: The process of checking the input data against the defined schema. If the data meets the schema's requirements, it is considered valid otherwise validation errors are generated.
- Sanitization: Joi can also handle data sanitization, which involves modifying the input data to ensure it adheres to the desired format, such as trimming extra spaces or converting strings to lowercase.

### Source Code & Output:



The screenshot displays a development environment with two main panels. The left panel shows the source code for `Task_2.js`, which implements a REST API endpoint `POST /api/user` using Express.js and the Joi validation module. The code defines a `userSchema` with required fields `name`, `email`, and `age`, and applies these to the incoming request body. The right panel shows the REST client interface with a POST request to `http://localhost:4000/api/user`. The request body is a JSON object: `{ "name": "Rushi", "email": "rushishah@gmail.com", "age": 19 }`. The response is a 200 OK status with a JSON body: `{ "userData": { "name": "Rushi", "email": "rushishah@gmail.com", "age": 19 }, "message": "User data successfully received and validated!" }`. The bottom status bar indicates the server is running on `http://localhost:4000`.

```
Task_2.js
1 const express = require('express');
2 const bodyParser = require('body-parser');
3 const Joi = require('joi');
4
5 const app = express();
6 app.use(bodyParser.json());
7
8 const userSchema = Joi.object({
9   name: Joi.string().required(),
10  email: Joi.string().email().required(),
11  age: Joi.number().integer().min(18).max(100).required(),
12 });
13
14 app.post('/api/user', (req, res) => {
15   const { error } = userSchema.validate(req.body);
16
17   if (error) {
18     return res.status(422).json({
19       error: error.details.map(err => err.message),
20     });
21   }
22
23   const userData = req.body;
24   res.json(userData, message: 'User data successfully received and validated!');
25 });
26
27 const PORT = 4000;
28 app.listen(PORT, () => {
29   console.log('Server started on http://localhost:${PORT}');
30 });
```

REST Client Output:

```
POST http://localhost:4000/api/user
Status: 200 OK, Size: 129 Bytes, Time: 25 ms
Response: {
  "userData": {
    "name": "Rushi",
    "email": "rushishah@gmail.com",
    "age": 19
  },
  "message": "User data successfully received and validated!"
}
```

Terminal Output:

```
PS D:\21IT145\Week_5\Task_2> node Task_2.js
Server started on http://localhost:4000
```

## Task-3

**Aim:** Create API to upload file & Test it.

### Description:

- Handling File Uploads in Express.js: To handle file uploads in Express.js, we can use the multer middleware. Multer is a popular package that simplifies file upload handling. It allows us to specify the destination folder for uploaded files and other options.
- Creating an Upload Route: Now that we have the multer middleware set up, we can create a route to handle file uploads.
- Multer allows us to easily parse incoming file uploads and store them on the server.

### Source Code & Output:

The screenshot displays the source code for `Task_3.js` in VS Code and the output of a REST client request.

**Source Code (Task\_3.js):**

```
1 const express = require('express');
2 const multer = require('multer');
3 const path = require('path');
4
5 const app = express();
6
7 const storage = multer.diskStorage({
8   destination: (req, file, cb) => {
9     cb(null, 'uploads/');
10   },
11   filename: (req, file, cb) => {
12     const uniqueSuffix = Date.now() + '-' + Math.round(Math.random() * 1E9);
13     const extension = path.extname(file.originalname);
14     cb(null, file.fieldname + '-' + uniqueSuffix + extension);
15   },
16 });
17
18 const upload = multer({ storage: storage });
19
20 app.post('/api/upload', upload.single('file'), (req, res) => {
21   if (!req.file) {
22     return res.status(400).json({ error: 'No file uploaded' });
23   }
24
25   const fileUrl = req.file.path;
26   res.json({ message: 'File uploaded successfully', fileUrl });
27 });
28
29 const PORT = 5000;
30 app.listen(PORT, () => {
31   console.log('Server started on http://localhost:5000');
32 });
```

**REST Client Request:**

- Method:** POST
- URL:** http://localhost:5000/api/upload
- Body:** Form (multipart/form-data)
- Form Fields:** file (selected)
- Files:** file (selected)

**Response:**

```
1 {
2   "message": "File uploaded successfully",
3   "fileUrl": "uploads\\file-1691403512887-631574232.js"
4 }
```

**Terminal Output:**

```
PS D:\21IT145\Week_5\Task_3> node Task_3.js
Server started on http://localhost:5000
```

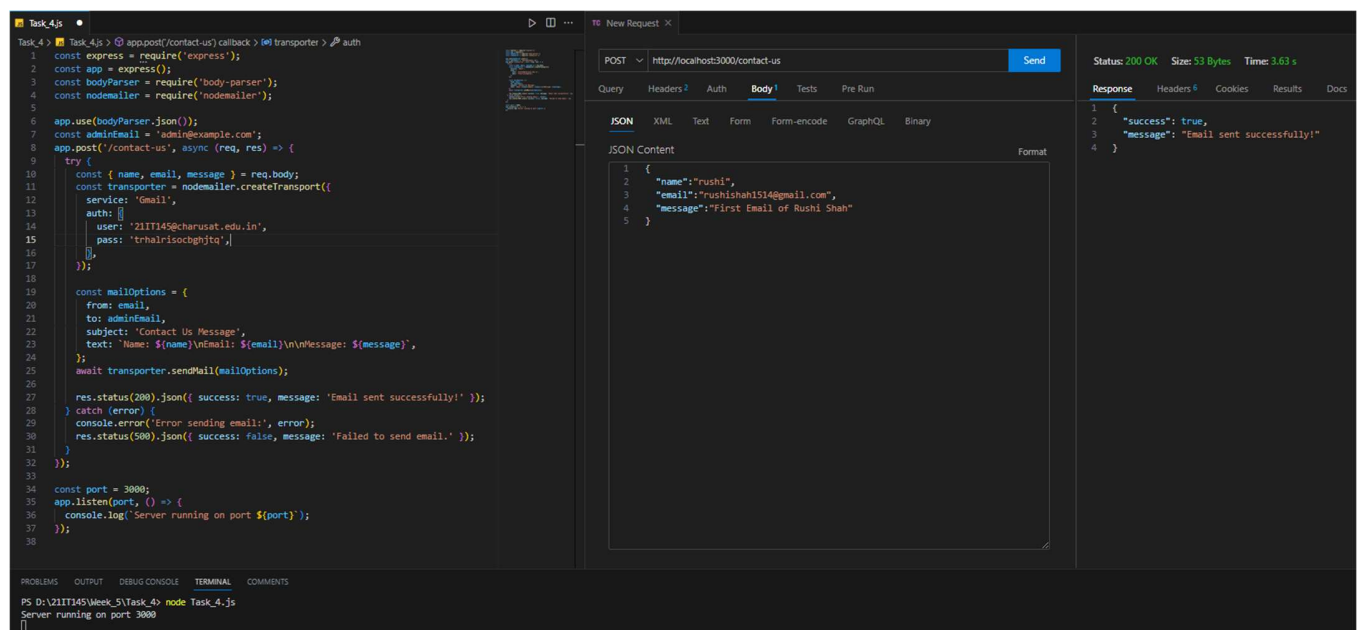
## Task-4

**Aim:** Create Contact us API to send email to predefined admin using nodemailer module

### Description:

- Nodemailer is a module for Node.js that simplifies sending emails. It supports multiple transport methods like SMTP, sendmail, and direct transport, making it versatile for different email providers.
- The Contact Us API is an endpoint in your Node.js application that allows users to send messages to predefined administrators or support teams via email.
- Provide the necessary configuration for your email service. For example, if you're using a Gmail account to send emails, you would need to provide your Gmail credentials.

### Source Code & Output:



```
Task_4.js
1 const express = require('express');
2 const app = express();
3 const bodyParser = require('body-parser');
4 const nodemailer = require('nodemailer');
5
6 app.use(bodyParser.json());
7 const adminEmail = 'admin@example.com';
8 app.post('/contact-us', async (req, res) => {
9   try {
10     const { name, email, message } = req.body;
11     const transporter = nodemailer.createTransport({
12       service: 'Gmail',
13       auth: {
14         user: '21IT145@charusat.edu.in',
15         pass: 'trhailisochghjta',
16       },
17     });
18
19     const mailOptions = {
20       from: email,
21       to: adminEmail,
22       subject: 'Contact Us Message',
23       text: `Name: ${name}\nEmail: ${email}\n\nMessage: ${message}`,
24     };
25     await transporter.sendMail(mailOptions);
26
27     res.status(200).json({ success: true, message: 'Email sent successfully!' });
28   } catch (error) {
29     console.error('Error sending email:', error);
30     res.status(500).json({ success: false, message: 'Failed to send email.' });
31   }
32 });
33
34 const port = 3000;
35 app.listen(port, () => {
36   console.log('Server running on port ${port}');
37 });
38
```

10. New Request X

POST http://localhost:3000/contact-us Send

Status: 200 OK Size: 53 Bytes Time: 3.63 s

Query Headers Auth Body Tests Pre Run

JSON Content

```
1 {
2   "name": "Rushi",
3   "email": "rushi.shah1514@gmail.com",
4   "message": "First Email of Rushi Shah"
5 }
```

Response Headers Cookies Results Docs

```
1 {
2   "success": true,
3   "message": "Email sent successfully!"
4 }
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL COMMENTS

PS D:\21IT145\Week\_5\Task\_4> node Task\_4.js  
Server running on port 3000

## Task-5

**Aim:** Create a program that uses the os module to display all the environment variables on the system.

### Description:

- Environmental variables, often referred to as environment variables or env variables, are values that can be accessed by applications at runtime to determine the environment they are running in and to configure various aspects of the application's behavior.
- In Node.js, you can use environmental variables to manage configuration settings, sensitive information, API keys, database connection strings, and more without hardcoding them directly into your code.
- Environment variables can be set in various ways depending on the platform or runtime environment in which the Node.js application is running
- The process.env object is a part of the process global object available in every Node.js application.

### Source Code & Output:

```

Task_5.js
1 const os = require('os');
2 const envVariables = process.env;
3 console.log('Environment variables are displayed from here :');
4 Object.keys(envVariables).forEach(key => {
5   console.log(`${key}: ${envVariables[key]}`);
6 });
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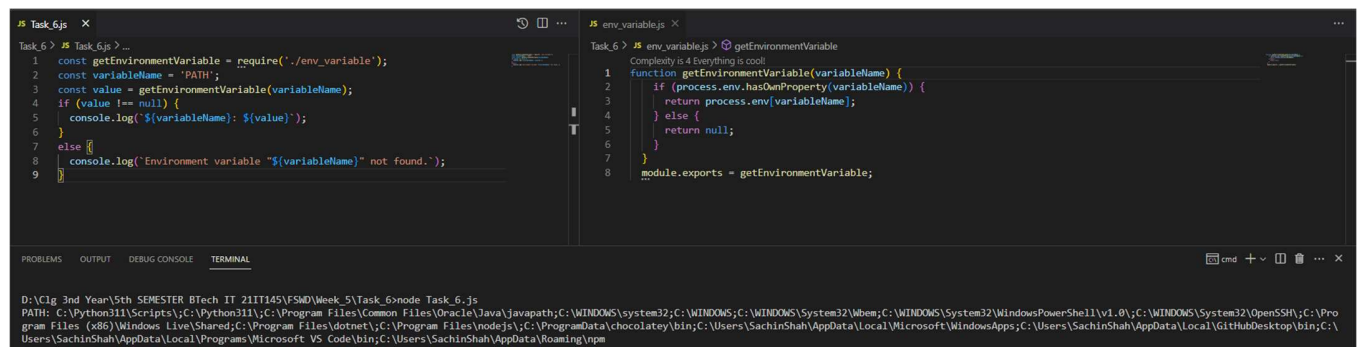
## Task-6

**Aim:** Implement a function that takes an environment variable name as input and uses the `process.env` object to display its corresponding value.

### Description:

- To use this script, ensure that you have a custom `getEnvironmentVariable` function defined in the `env_variable.js` file.
- The function should take the `variableName` as an argument and return the value of the specified environment variable. Also make sure the script is executed in an environment that contains the specified environment variable.
- Keep in mind that the provided code is just a part of the implementation, and the behavior of the `getEnvironmentVariable` function will determine the actual functionality of the script.
- Use environment variables for more complex configuration settings and access them throughout the application as needed.

### Source Code & Output:



```
Task_6.js
1 const getEnvironmentVariable = require('./env_variable');
2 const variableName = 'PATH';
3 const value = getEnvironmentVariable(variableName);
4 if (value !== null) {
5   console.log(`${variableName}: ${value}`);
6 }
7 else {
8   console.log('Environment variable "${variableName}" not found.');
```

```
env_variable.js
1 function getEnvironmentVariable(variableName) {
2   if (process.env.hasOwnProperty(variableName)) {
3     return process.env[variableName];
4   } else {
5     return null;
6   }
7 }
8 module.exports = getEnvironmentVariable;
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

D:\Clg 3rd Year\5th SEMESTER BTech IT 21IT145\FSWD\Week 5\Task\_6>node Task\_6.js  
PATH: C:\Python311\Scripts;C:\Python311;C:\Program Files\Common Files\Oracle\Java\javapath;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;C:\WINDOWS\System32\WindowsPowerShell\v1.0;C:\WINDOWS\System32\OpenSSH;C:\Program Files (x86)\Windows Live\Shared;C:\Program Files\dotnet;C:\Program Files\nodejs;C:\ProgramData\chocolatey\bin;C:\Users\SachinShah\AppData\Local\Microsoft\WindowsApps;C:\Users\SachinShah\AppData\Local\GitHubDesktop\bin;C:\Users\SachinShah\AppData\Local\Programs\Microsoft VS Code\bin;C:\Users\SachinShah\AppData\Roaming\npm

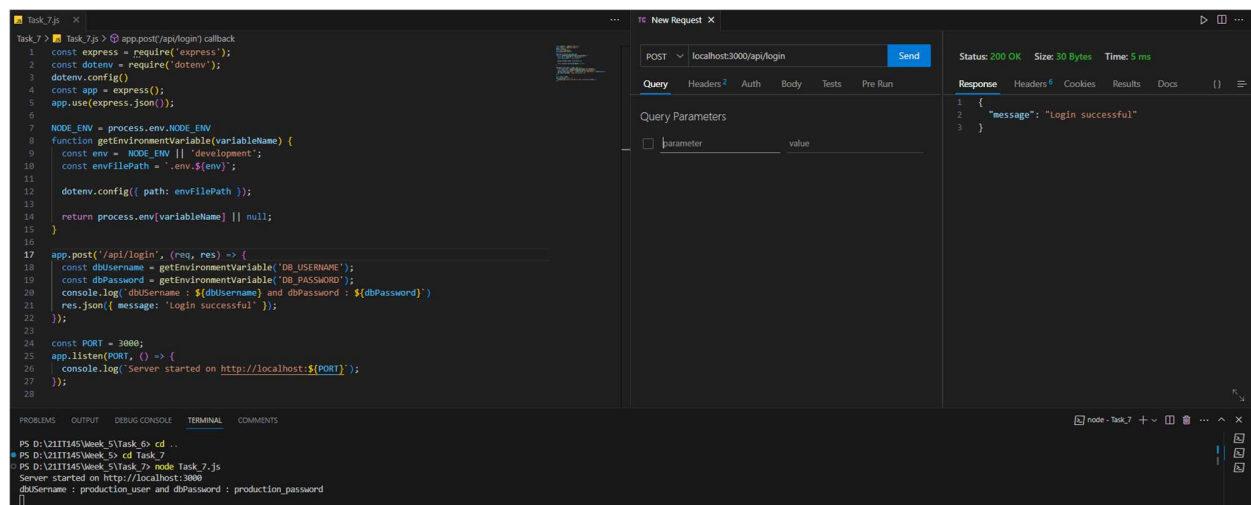
## Task-7

**Aim:** Experiments with dotenv external module & set diff. Credentials for testing, UAT and production environments.

### Description:

- The dotenv external module allows developers to load environment variables from .env files. These files are used to store environment-specific configuration settings, sensitive information, and credentials. By creating separate .env files for testing, UAT, and production environments, developers can ensure that the correct credentials and settings are used for each stage of the development lifecycle.
- The dotenv module simplifies the process of loading these environment-specific variables into the application, ensuring that the correct credentials are used based on the deployment environment. This approach enhances security by preventing sensitive information from being hard-coded into the codebase.

### Source Code & Output:



The screenshot displays a VS Code editor with a JavaScript file named 'Task\_7.js'. The code implements an Express.js application that uses the 'dotenv' module to load environment variables from a '.env' file. It defines a 'getEnvironmentVariable' function and a POST endpoint at '/api/login'. The endpoint retrieves 'dbUsername' and 'dbPassword' from the environment and returns a success message. To the right, a REST client window shows a successful POST request to 'localhost:3000/api/login' with a 200 OK status and a response body of { "message": "Login successful" }. The bottom terminal window shows the command 'node Task\_7.js' being executed, with output indicating the server is running on http://localhost:3000 and displaying the loaded environment variables: dbUsername: production\_user and dbPassword: production\_password.

```
Task_7.js
1 const express = require('express');
2 const dotenv = require('dotenv');
3 dotenv.config();
4 const app = express();
5 app.use(express.json());
6
7 NODE_ENV = process.env.NODE_ENV
8 function getEnvironmentVariable(variableName) {
9   const env = NODE_ENV || 'development';
10   const envFilePath = `.env.${env}`;
11   dotenv.config({ path: envFilePath });
12   return process.env[variableName] || null;
13 }
14
15
16
17 app.post('/api/login', (req, res) => {
18   const dbUsername = getEnvironmentVariable('DB_USERNAME');
19   const dbPassword = getEnvironmentVariable('DB_PASSWORD');
20   console.log('dbUsername: ', dbUsername, 'dbPassword: ', dbPassword);
21   res.json({ message: 'Login successful' });
22 });
23
24 const PORT = 3000;
25 app.listen(PORT, () => {
26   console.log('Server started on http://localhost:${PORT}');
27 });
28
```

10 New Request X

POST localhost:3000/api/login Send

Status: 200 OK Size: 30 Bytes Time: 5 ms

Query Headers Auth Body Tests Pre Run

Response Headers Cookies Results Docs {}

```
1 {
2   "message": "Login successful"
3 }
```

Query Parameters

parameter value

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL COMMENTS

```
PS D:\21IT145\Week_5\Task_6> cd ..
PS D:\21IT145\Week_5> cd Task_7
PS D:\21IT145\Week_5\Task_7> node Task_7.js
Server started on http://localhost:3000
dbUsername: production_user dbPassword: production_password
```

### Learning Outcome:

From this practical, I learnt about

- CRUD operations
- validator/joi module
- nodemailer module
- environmental variables
- .env and dotenv module

CO4: Demonstrate the use of JavaScript to fulfill the essentials of front-end development To back-end development.