NodeJS

Setup Installation of the NodeJS's:

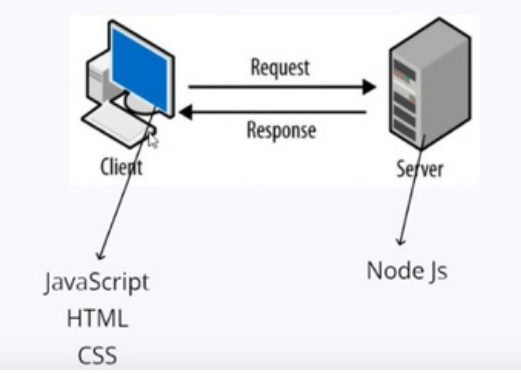
- Click here to download
-
- Use the sudo su mode:
- curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.40.1/install.sh | bash
- source ~/.bashrc
- nvm list-remote
- nvm install <nvm – version>
- nvm install 22.13.0
- node -v || node -- version //To Check

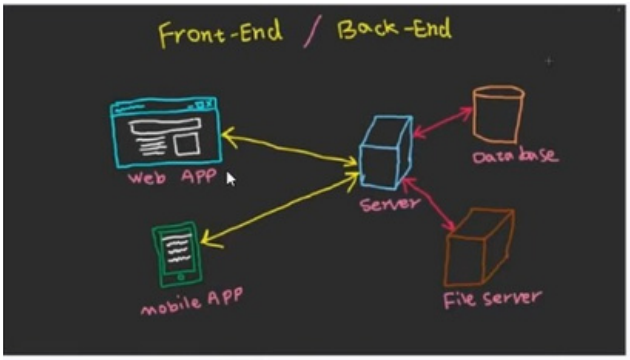
- YouTube Channel: Code Step By Step

Features:

- - Node is using JavaScript internally and using V8 engine.
- - NodeJS is a server side environment and JS run on the browser side environment
- - You are able to connect to the Database
- - It mostly used for API. So, we can connect to the same database with Web-App and Mobile App
- - It is super – fast for APIs

Basic Before getting into:





- It communicates between them through the APIs

- Open the Directory with super-user:

```
codium . --no-sandbox --puser-data-dir /home/your_user_name/dir
```

- Always create a file with the name of the – “index.js”

Code:

```
// Printing the program
console.log("Madara Uchiha");

// Taking the var as int, float and double
var a = 20.5; // "a" is a Float
var b = 10; // "b" is a Int
var c = "Hello"; // "c" is a String

var f = true; // "f" is a boolean

var d = a + b;

console.log(d); // For printing.
```

- Is "console.log()" from browser and IDE’s same?

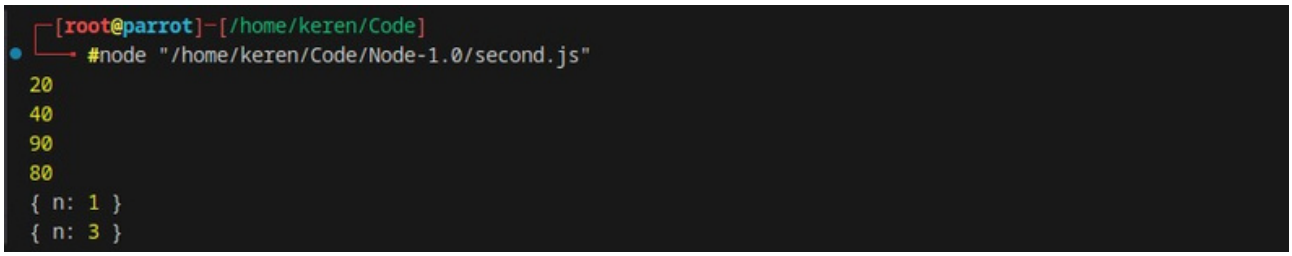
-> No. (Reason – Search it on internet)

Fundamentals of Node JS:

Code of Data-types:

```
var x = 20; // "var" can be re-declared anywhere, and it is mostly used in the global declarationn of the variables
console.log(x);
var x = 40; //Here, you can see that we are re-declaring the x = 40.
console.log(x);


// Now, let's talk about the "let":
let y = 10; //It is used in the local declaration in the functions or loops
// let y = 20; //You can't re-declare
y = 90;       //But, you can re-assign the value to that one.
console.log(y);

// Now, "const":

const a = 80; //It is some similar to "let", but has very different properties:
// const a = 30; //Here, you can't re-declare the that const with same name again.
// a = 90; //Even though you can't re-assign the value to that same name's variable

console.log(a);

// But, you can make changes in the "object" of the "const"
const mad = {n: 1};
console.log(mad); //It gives an output - { n: 1 }
// Here, you can change the object's value -
mad.n = 3;
console.log(mad); //Here, it gaves an output { n: 3}
```

- Output:



Code of Conditions:

```
var x = 20;
if(x === 20){
console.log("matched");
}

// Here, we are using the "===", for the "Strict Equality":
// In the abovre it got matched and the answer is "matched"

// Now, if we compare the String with value then it doesn't give an answer:

var y = '229';
if(y === 229){
console.log("Matched");
}
else{
console.log("Not matched");
}

// Here, answer is - "not matched" because we are comparing that one for the Strict equality

var z = 30;
if(z == '39'){
    console.log("Done");
}
// The above one doesn't give an answer
console.log(z == '39'); //Here, value is compared and give an answer in the comparision form.

console.log(5 == '54');

console.log(5 == '5'); // true (number 5 is converted to string '5')
console.log(true == 1); // true (boolean true is converted to number 1)
console.log(null == undefined); // true (null and undefined are considered equal)
console.log([1, 2] == '1,2'); // true (array is converted to string '1,2')
```

Output:

```
node "/home/keren/Code/Node-1.0/third.js"
┌─[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/third.js"
matched
Not matched
false
false
true
true
true
true
```

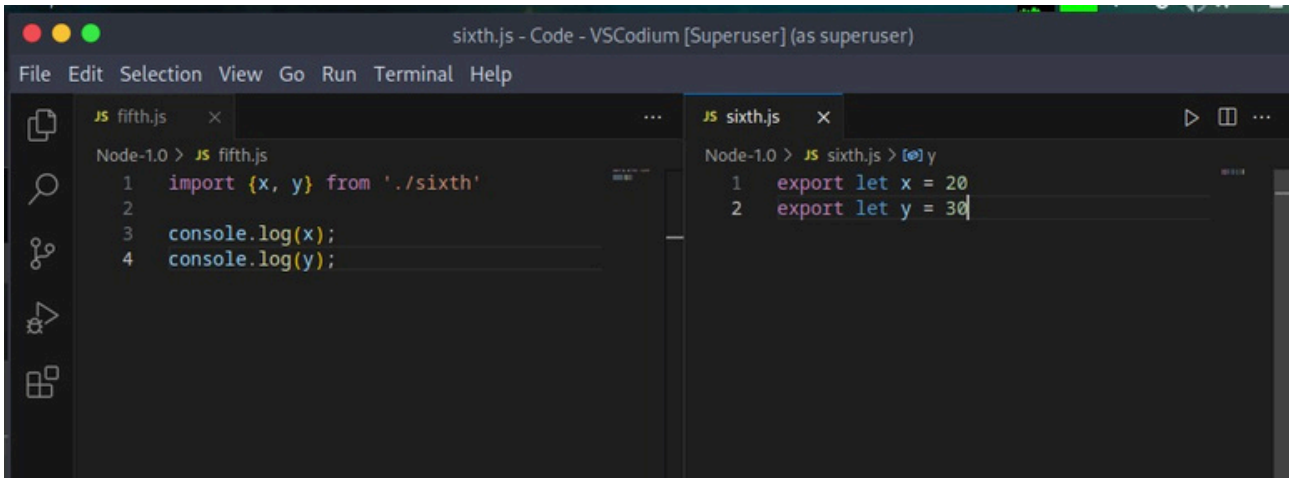
Code of an Array:

```
let numbers = [1, 2, 3, 4, 5]

let fruits = ["appple","banana","cherry"]

let mixedArray = [1, "hello-world", true,{key:"value"},[1, 2, 3]]; // var, string, boolean and "key: value", and multidimensional array

// Here, we can add ";" at the end or not, it's our choice
console.log(numbers)
console.log(fruits)
console.log(mixedArray)
console.log(mixedArray[1])
```

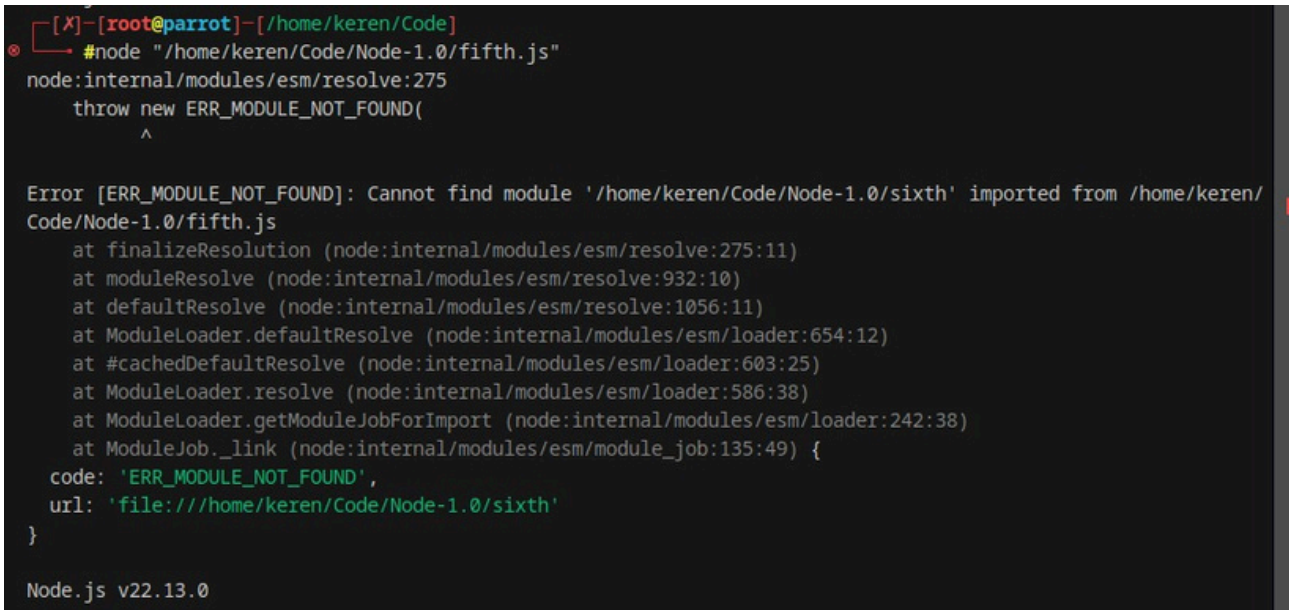
Output:

```
┌─[✗]─[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/forth.js"
[ 1, 2, 3, 4, 5 ]
[ 'appple', 'banana', 'cherry' ]
[ 1, 'hello-world', true, { key: 'value' }, [ 1, 2, 3 ] ]
hello-world
```

- We can’t exports directly in the NodeJS like we exports in the JS.
- Here, we are trying to export and import from the two files:



- But, it gives an error:



- This error is happened because in the NodeJS, it uses some little bit old JavaScript. That’s why it can’t handle that.
- To solve this we are using some different methods.

Sixth.js’s file’s code:

```
module.exports = {
  x: 10,
  y: 20,
  z: function () {
  return 11;
  },
```

```
}
//Here, we are making an object and putting all those value inside it
// Here, we are exporting the file's code to another file.
```

Fifth.js's file's code:

```
const app = require('./sixth.js')
console.log(app.x);
console.log(app.y);
console.log(app.z);
console.log(app);
//Here are updating the values with Particular object
// Here, we are importing the other file's object's value.
```

Output:

```
┌──[✗]─[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/fifth.js"
10
20
[Function: z]
{ x: 10, y: 20, z: [Function: z] }
```

- What is the use of the **filter()** function?

-> filter is used to filter out with a particular condition, and it is going to printout that particular value.

E.g.: Code -

```
const arr = [2, 4, 7, 1, 3, 8, 3]
// Here, we are using an Arrow Function (() => {})
let result = arr.filter((item) => {
return item > 4;
})
console.log(result);
```

Output:

```
┌──[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/seventh.js"
[ 7, 8 ]
```

- Here, we are taking the values which were greater than 4 and it gives an output.

Core Module in Node Js

- It is like Library, which is known as the Core Module in the Node Js

- It doesn't required the additional installation

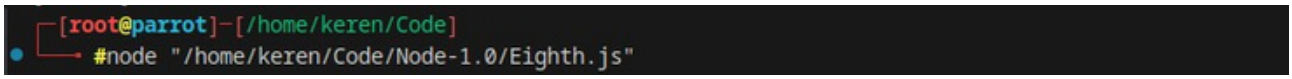
- http and https: Create HTTP and HTTPS servers and clients
- fs (File System): Interact with the file systems (Read, Write, Update and Delete files)
- path: Handle and transform the paths
- os: Provide operating system – related utility methods and properties
- url: Parse and format URLs, etc.

- The module that need to import that is known as the **non – global module**. And vice – versa known as the **global module**.

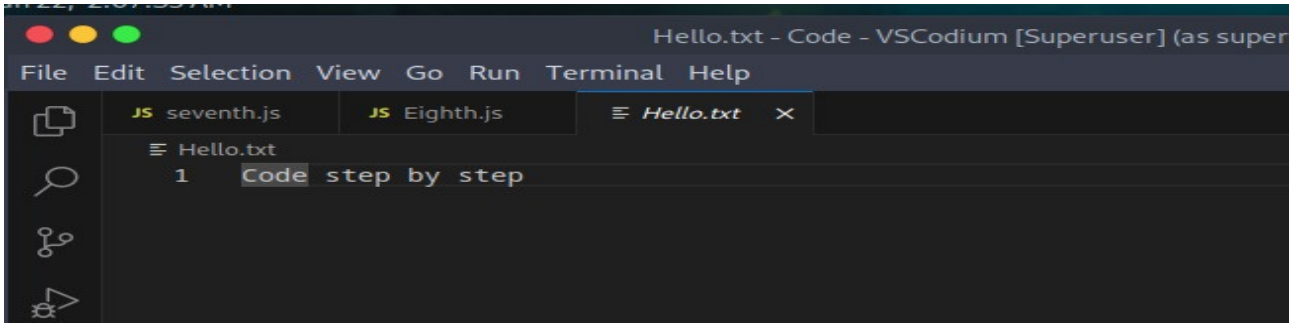
Code:

```
const fs = require('fs');
fs.writeFileSync("Hello.txt","Code step by step");
```

Output:



- It creates a file named as the – "Hello.txt", and text written inside that file is the next text that we have provided.



Code:

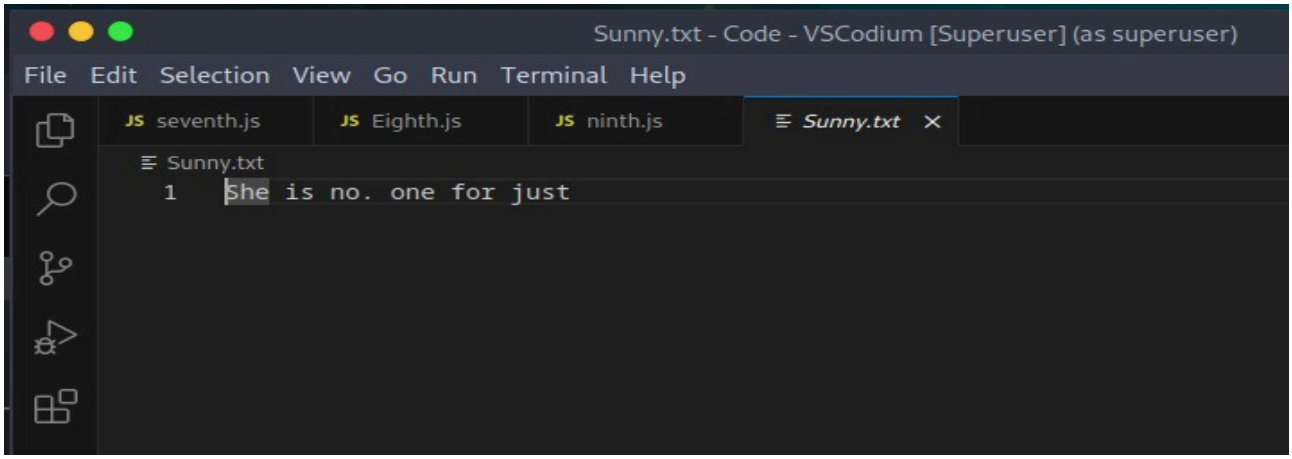
```
// Now, we are printing the name of the directory where we are performing these operations:
console.log(__dirname) //The output is the: /home/keren/Code/Node-1.0

// Another way to create a write file:
```

```
const gs = require('fs').writeFileSync
gs("Sunny.txt","She is no. one for just")
```

Output:

```
┌─[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/ninth.js"
/home/keren/Code/Node-1.0
```

- It creates a file named as the Sunny.txt and here is the text inside that one:



-We can give any name of the variable (const) after const, like instead of “fs”, we can put the “gs”:

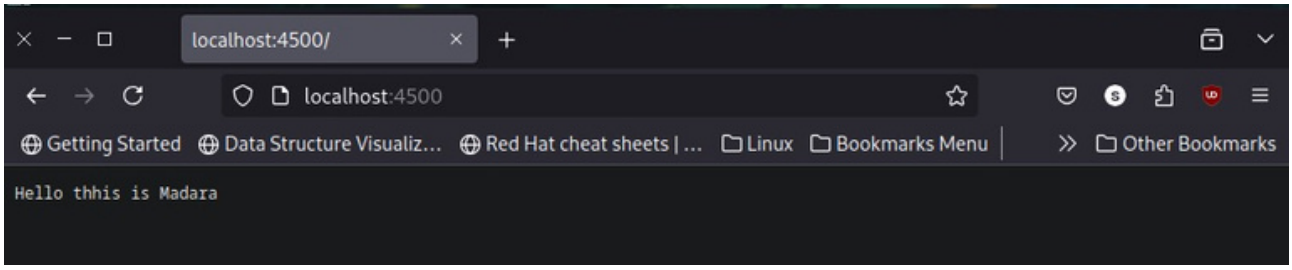
- `const gs = require('fs').writeFileSync;`

Basic Server:

Code:

```
const ht = require('http');
// ht.createServer().listen(4500);
// Instead of passing variables, we can even pass the full function inside for the calculation
// test(a,b){
// }
// Now, we are using "an Arrow", function for passing a data.
// Here, we are taking this because we want to store the "request" and gave a "response", according to that
ht.createServer((req, resp) => {
resp.write("Hello thhis is Madara");


    resp.end();
}).listen(4500)
```

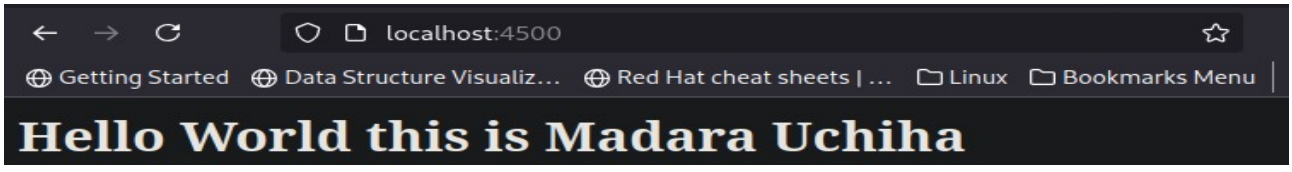
Output:



Now, we are creating a one function and add some HTML's elements:

Code:

```
// Now, we are runnning our server for the HTML file:
function first(req, resp) {
resp.write("<h1>Hello World this is Madara Uchiha </h1>")
    resp.end();
}
ht.createServer(first).listen(4500)
```



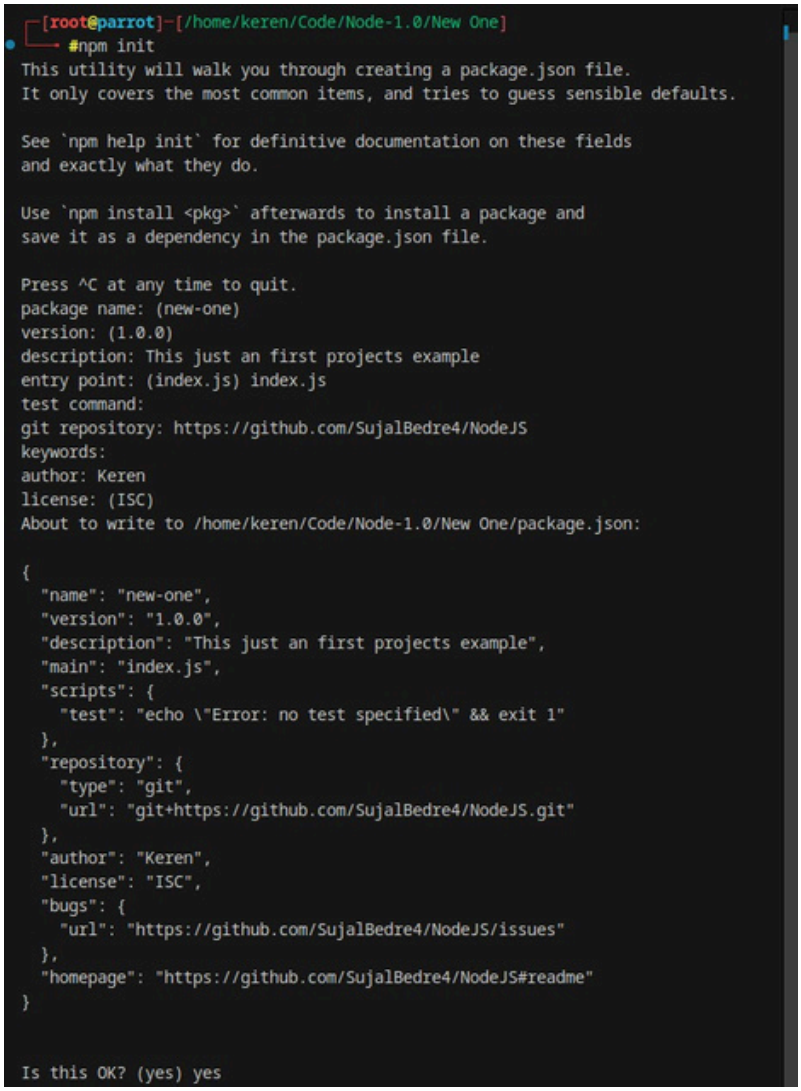
- Remember that you have to run the code again after changing some things in the Code.
- Try to create an Arrow function.

All About Package Json file:

It stores all the information about Project's imported module version, command's and packages details.

- To create a packages:

```
npm init #To create a packages
```



- Output of this file as follows:

- package.json:

```
{
 "name": "new-one",
"version": "1.0.0",
```

```
"description": "This just an first projects example",
"main": "index.js",
"scripts": {
"test": "echo \"Error: no test specified\" && exit 1"
},
"repository": {
    "type": "git",
 "url": "git+https://github.com/SujalBedre4/NodeJS.git"
},
"author": "Keren",
"license": "ISC",
"bugs": {
"url": "https://github.com/SujalBedre4/NodeJS/issues"
},
"homepage": "https://github.com/SujalBedre4/NodeJS#readme"
}
```

- After installing the packages it will automatically add in this packages file:
- Here, we are using the **"yarn"** instead of the "npm" package manager.
- Now, add the colors's package:

```
- npm install colors | npm i colors
```

OR

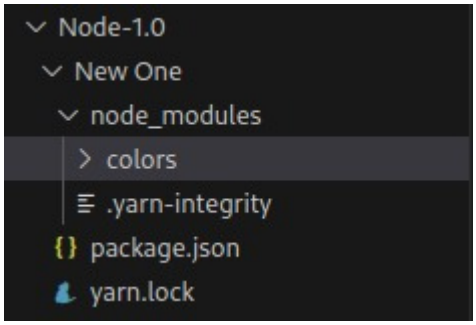
```
- yarn add colors
```

- Output:

```
{
  "name": "new-one",
 "version": "1.0.0",
"description": "This just an first projects example",
"main": "index.js",
"scripts": {
"test": "echo \"Error: no test specified\" && exit 1"
},
"repository": {
    "type": "git",
```

```
 "url": "git+https://github.com/SujalBedre4/NodeJS.git"
},
"author": "Keren",
"license": "ISC",
"bugs": {
"url": "https://github.com/SujalBedre4/NodeJS/issues"
},
"homepage": "https://github.com/SujalBedre4/NodeJS#readme",
"dependencies": {
   "colors": "^1.4.0"
 }
}
```

- Here, you can see that after adding the **colors** package it got updated at the end, means ***dependencies section***.
- Even one directory also added after adding this package, which is known as the - node-modules.



- Here, we are using the "yarn", that's why it creates a file named as the - .yarn-integrity
- This will stores all the details about the packages:

```
{
  "systemParams": "linux-x64-127",
 "modulesFolders": [
"node_modules"
],
"flags": [],
"linkedModules": [],
"topLevelPatterns": [
"colors@^1.4.0"
```

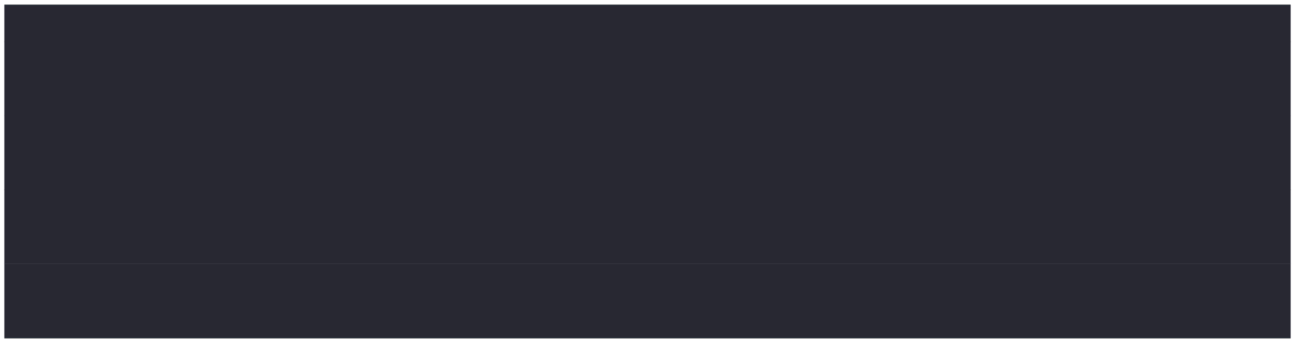
```
],  "lockfileEntries": {  "colors@^1.4.0": "https://registry.yarnpkg.com/colors/-/colors-1.4.0.tgz#c50491479d4c1bdaed2c9ced32cf7c7dc2360f 78" }, "files": [], "artifacts": {} }
```

- Now, we are using a colors packages for doing some work:

Code:

```
const color = require('colors')

console.log("Hello".red);

console.log("Hello".blue);

console.log("Hello".gray);

console.log("Hello".yellow);
```

Output:



```
┌─[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/New One/node_modules/index.js"
Hello
Hello
Hello
Hello
```

- Here, you can see that the console's log values has been changed.

- Questions:

- NodeJS is Single Threaded or Multi-threaded?

-> Single – threaded

Small Challenges for you:

- import chalk packages:

```
yarn add chalk
```

Code:

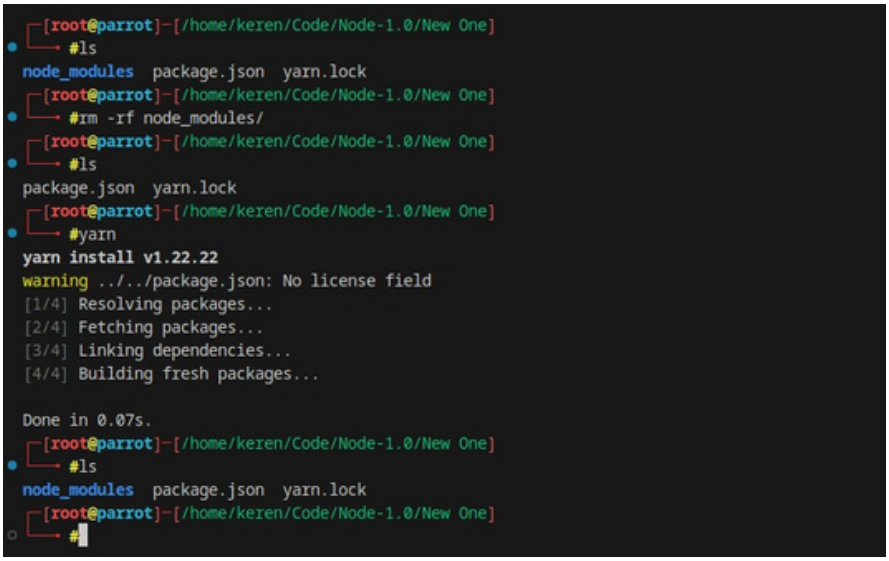
```
import chalk from 'chalk'

console.log(chalk.yellow('Hello world'));
```

Output:

```
┌──[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-1.0/New One/node_modules/index.js"
Hello world
```

- If someone deleted the node-modules directory, then we can re-add that directory by using the command:

```
yarn || npm install
```



- Here, you can see that we are able to re – add that directory.

- Never push the **node_modules** in the GitHub's repository.

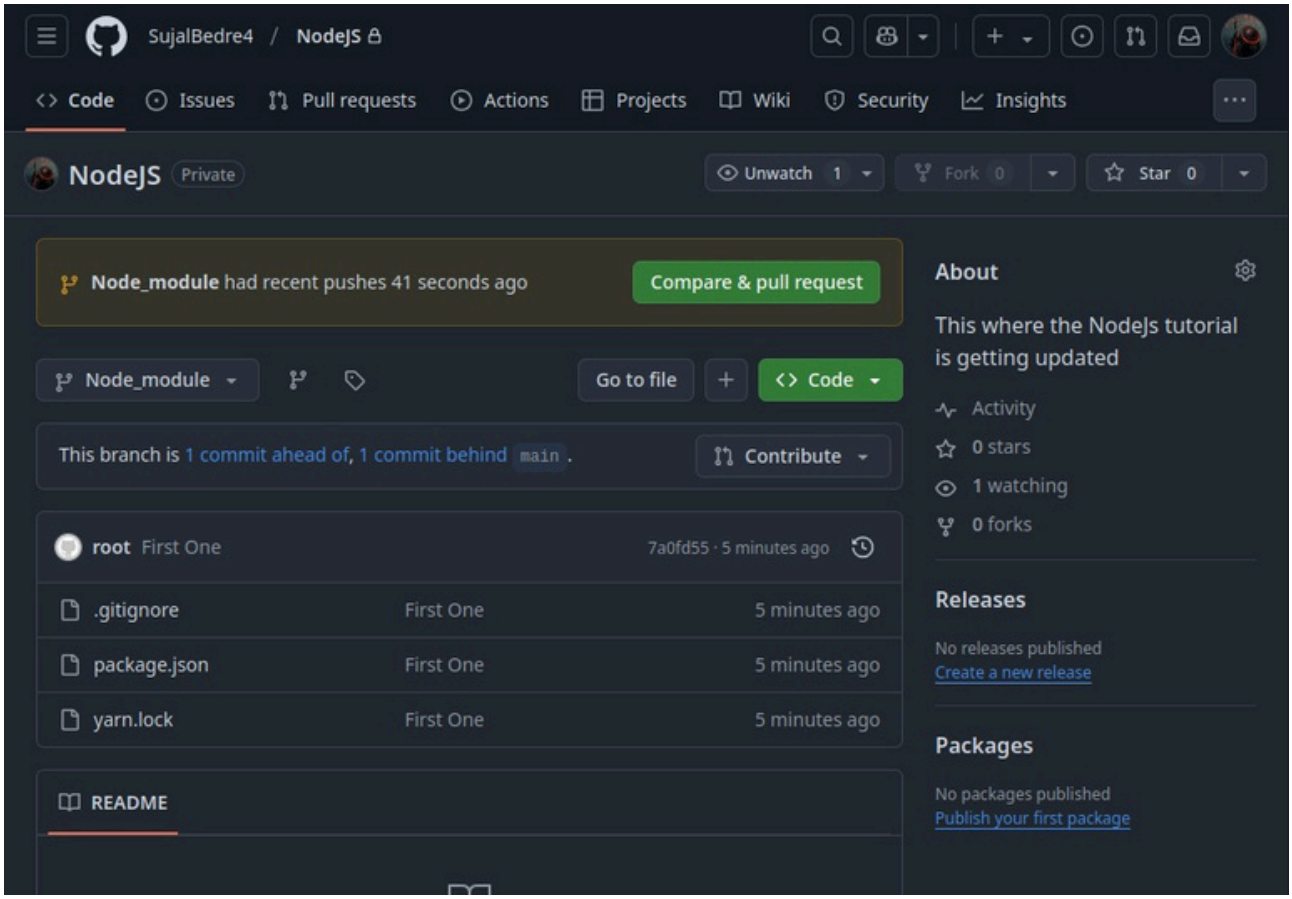
- To avoid to push this file in the GitHub, we have to create a gitignore file for the better working.

```
touch .gitignore
```

Now, add the directory and other files that you don't wanna push in the GitHub.

```
/node_modules
```

- Now, push the code to the GitHub's repo:

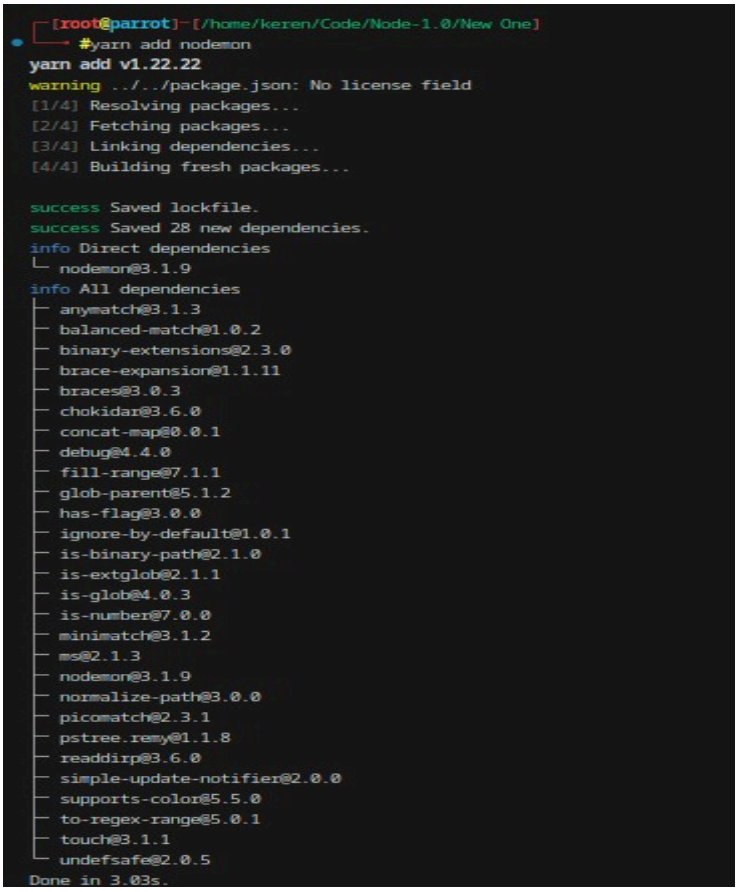


- Here, you can see that we have pushed the code to the GitHub's repository

Nodemon | time saving module:

- It is like a live – server, and it saves a time. It automatically runs the code.

```
- yarn add nodemon
```



- Here, how you can install with the – yarn package manager instead of the npm.

- To add globally packages through the “yarn”, we are using the given below command:

```
yarn global add nodemon
```

Or using the npm:

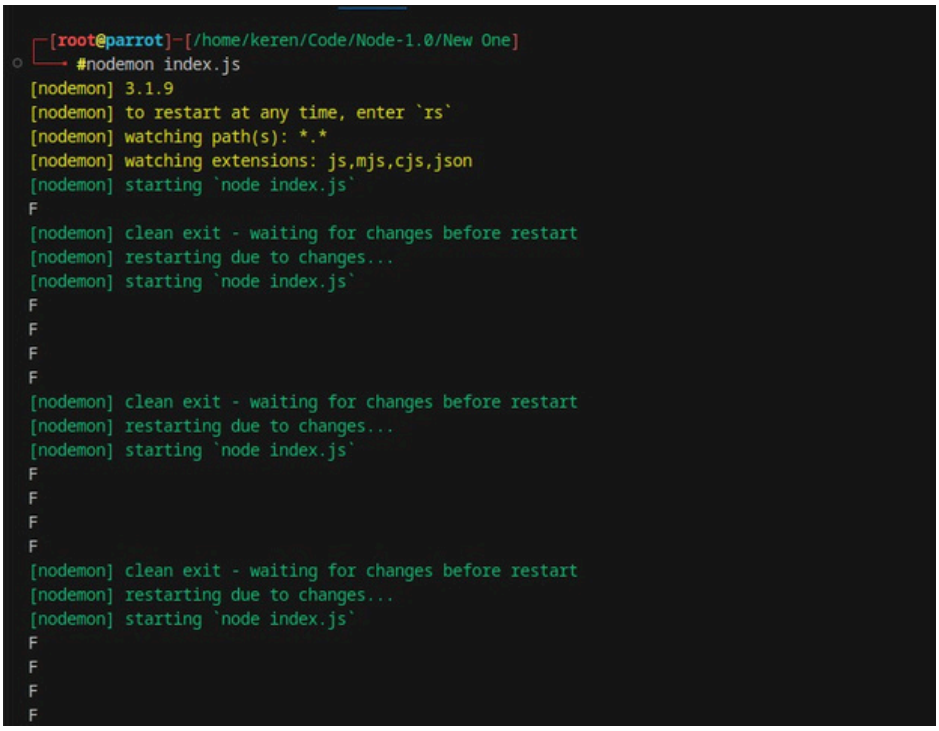
```
npm i nodemon -g
```

Index.js Code:

```
console.log("F")
console.log("F")
console.log("F")
console.log("F")
```

Output:

- After saving the code it will automatically run inside the – nodemon.



- Node JS is async.

- In the Sync, it will run the command step – by – step. But, in the "**async**", it will directly run without thinking of the other modules.

Make a Simple API:

- Here, we are creating a Static data model on the web – server.

First initialize the packages:

```
yarn init
```

```
┌─[root@parrot]─[/home/keren/Code/Node-2.0]
└──╼ #yarn init
yarn init v1.22.22
warning ../package.json: No license field
question name (Node-2.0): Simple_API
question version (1.0.0):
question description: Here, we are making a Simple API
question entry point (index.js): index.js
question repository url: https://github.com/SujalBedre4/NodeJS
question author: Sujal
question license (MIT):
question private:
success Saved package.json
Done in 66.53s.
```

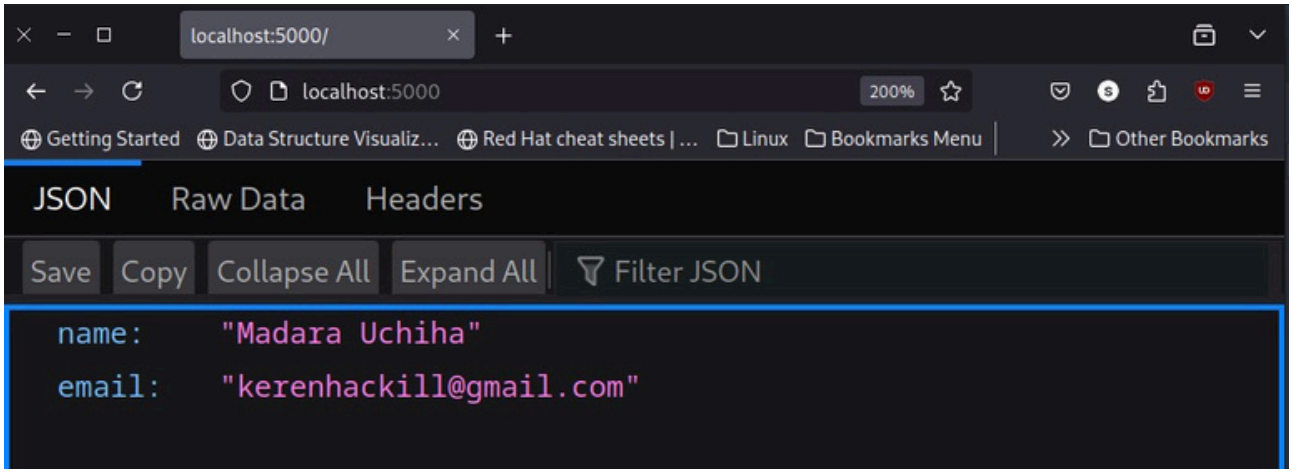
```
touch index.js
```

Code:

```
const http = require('http')
http.createServer((req, resp) => {
    resp.writeHead(200, { 'Content-Type': 'application/json' })
    resp.write(JSON.stringify({
        name: 'Madara Uchiha',
        email: 'kerenhackill@gmail.com',
    }))
    resp.end();
}).listen(5000, () => {
    console.log("Server is running on the localhost: http://localhost:5000")
})
```

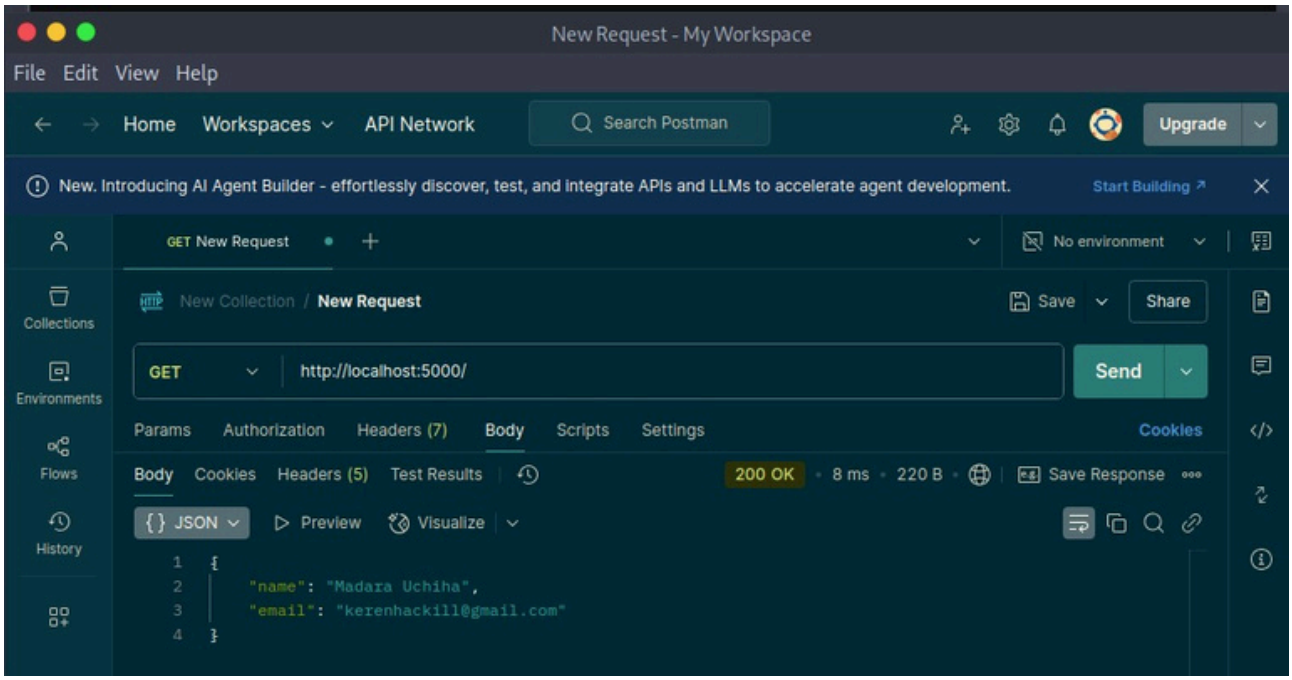
- Output:

- Here, we are writing a static data and then passing the JSON format, for an output in the web – browser.



- Here, you can see that the we are getting an output in the format of the JSON data.
- Now, we are using a POSTMAN.
    - First install the POSTMAN, if you don't have
        - First download the POSTMAN
        - Setup the POSTMAN

- Now, create a separate collection after that put the URL (http://localhost:5000/), in the URL bar, with value of the GET.



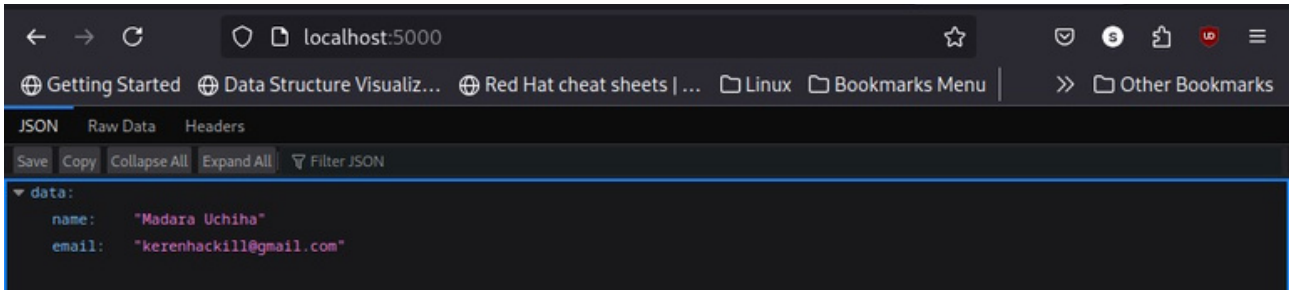
- Here, you can see that the we are getting the values. That we already got in the Browsers.
- And even "200", value is getting OK After fetching the data.

- Now, we are connecting the two files:

Code:

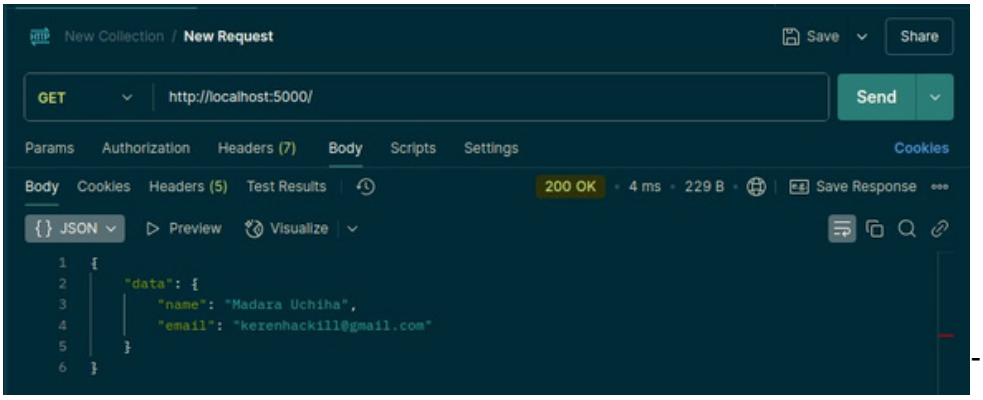
```
const http = require('http')
// Now, here we are importing that data
const data = require('./data')
http.createServer((req, resp) => {
    resp.writeHead(200, { 'Content-Type': 'application/json' })
    resp.write(JSON.stringify({ data }))
    resp.end(); //This is one necessary to execute a particualr API.
}).listen(5000, () => {
    console.log("Server is running on the localhost: http://localhost:5000")
})
```

- Output:



- Here, is the new one output.

Now, we are changing only in the database, where we are taking the data in an Array format.



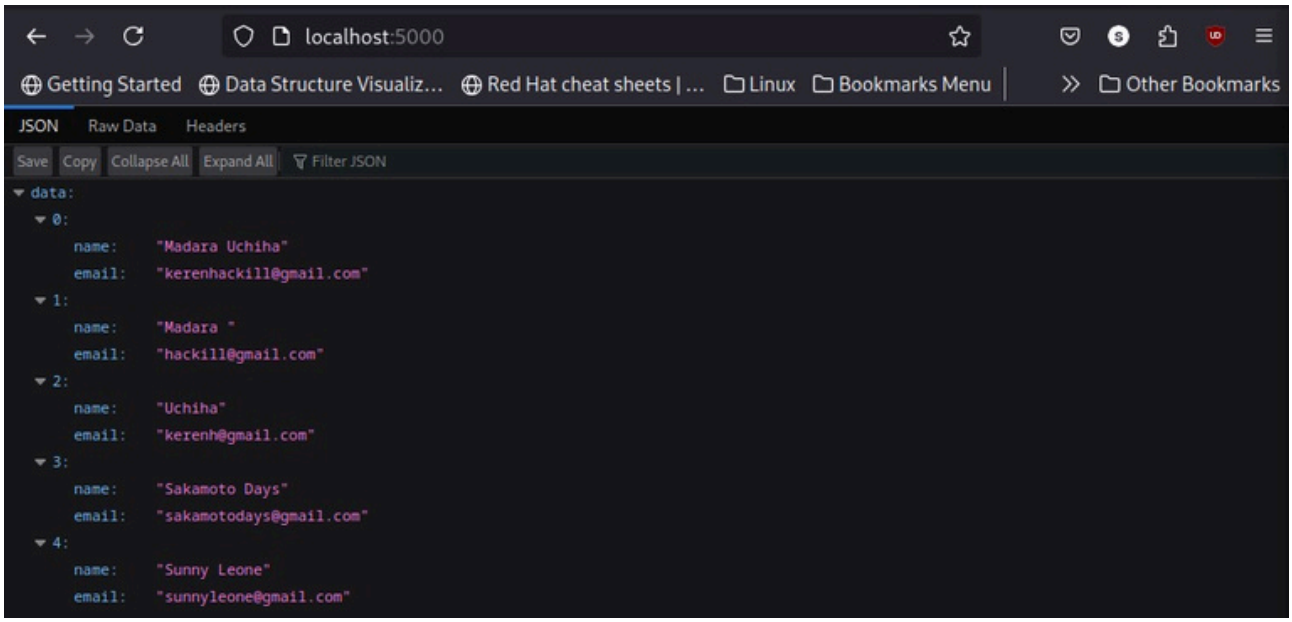
- Here, is the updated database:

Code:

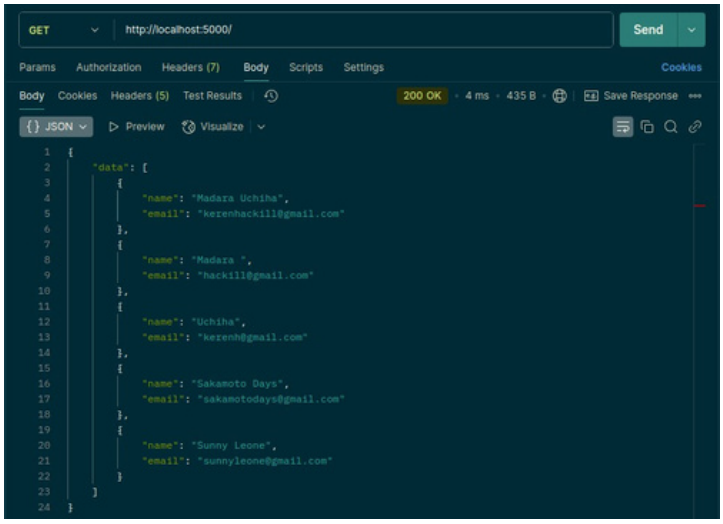
```
const data = [{ name: 'Madara Uchiha', email: 'kerenhackill@gmail.com', },
```

```
{ name: 'Madara ', email: 'hackill@gmail.com', },
{ name: 'Uchiha', email: 'kerenh@gmail.com', },
{ name: 'Sakamoto Days', email: 'sakamotodays@gmail.com', },
{ name: 'Sunny Leone', email: 'sunnyleone@gmail.com', },
]
module.exports = data;
```

- Now, output of the system is the -



- And the output in the POSTMAN API is the:



- Now, Questions:

Why only we use the 200? Can we use other numbers?

-> Yes, we can use other HTTP status codes besides 200. The HTTP status code 200 indicates that the request was successful.

- 2XX Success:
  - - 200 OK: The request was successful
  - - 201 Created: The request was successful and a **new** resource was created
  - - 204 No Content: The request was successful, but there is no content to send back.
- 3xx Redirection:
  - - 301 Moved Permanently: The resource has been moved to a **new** URL permanently.
  - - 302 Found: The resource has been moved temporarily to a different URL.
  - - 304 Not Modified: The resource has not been modified since the last request.
- 4xx Client Error:
  - - 400 Bad Request: The request could not be understood or was missing required parameters.
  - - 401 Unauthorized: The client must authenticate itself to get the requested response.
  - - 403 Forbidden: The client does not have access rights to the content.
  - - 404 Not Found: The server can not find the requested resource.
  - - 409 Conflict: The request could not be completed due to a conflict **with** the current state **of** the resource.
- 5xx Server Error:
  - - 500 Internal Server **Error**: The server has encountered a situation it doesn't know how to handle.
  - - 502 Bad Gateway: The server received an invalid response **from** the upstream server.
  - - 503 Service Unavailable: The server is not ready to handle the request.

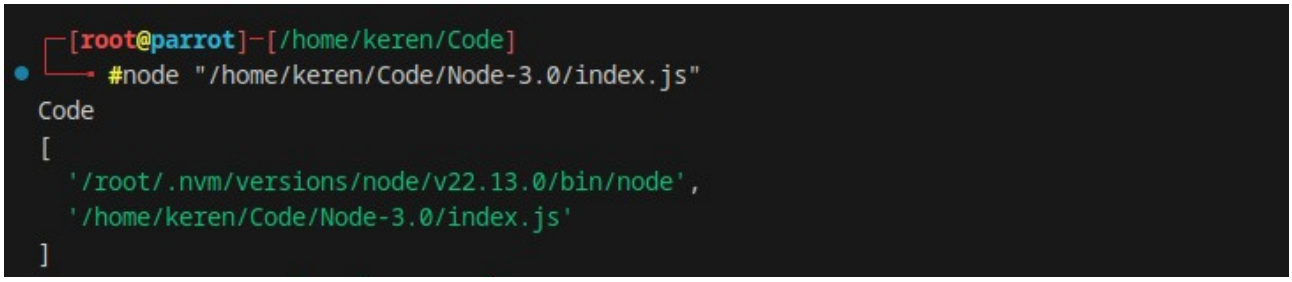
- Here, is proper numbers of the which indicates some errors, redirection and success.

Input from Command Line:

Code:

```
console.log("Code"); //It only run in the console
// Now, we are just want some infromation about files of this program,
// First is NodeJS's file's location and where the File of the Node JS is getting saved.


console.log(process.argv); //argv = It means "argument vector"
```

- Output:



Now, we are taking an input from the user and getting an output:

- Code:

```
// Now, we can take the paricular input as an an input
// By running the "node file_name.js argument"
// E.g.: node index.js Hello -> It will give an input.
// Try this one command also:
// node index.js Hello Hi
console.log(process.argv[2]);
```

- Output:

- Now, we are using this in one of the usage.

Here, we are creating that one file for the creating a file's and giving an input:

Code:

```
const fs = require('fs')
const input = process.argv;
fs.writeFileSync(input[2], input[3]);
```

Output:

```
┌──[root@parrot]─[/home/keren/Code/Node-3.0]
└──╼ #node "/home/keren/Code/Node-3.0/just.js" madara.txt "This is a fruit"
```

- Now, you can see that **madara.txt** file has been generated with input text like – This is a fruit.

Now,

We are making a file operation where we are creating a file, delete or give an output.

Code:

```
const fs = require('fs')
const input = process.argv;
if (input[2] == 'add') {
    fs.writeFileSync(input[3], input[4]);
} else if (input[2] == 'remove') {
    fs.unlinkSync(input[3]);
} else {
    console.log("Invalid input")
}
```

- Here, you can see that we are creating a file with particular values and remove it.

```
┌──[root@parrot]─[/home/keren/Code/Node-3.0]
└──╼ #node "/home/keren/Code/Node-3.0/just.js" add orange.txt "This is a color and fruit"
```

- Now, we are removing:

```
┌──[root@parrot]─[/home/keren/Code/Node-3.0]
└──╼ #node "/home/keren/Code/Node-3.0/just.js" remove orange.txt
```

- You can change the file name or type and then it will get removed.

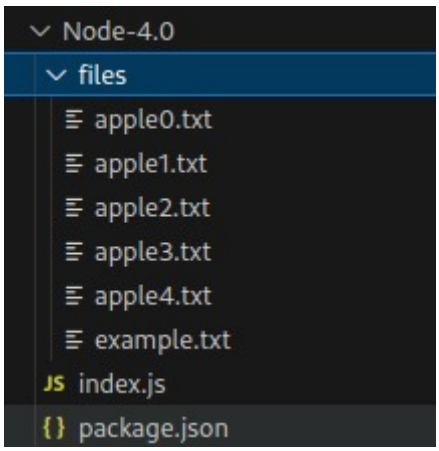
Show file List:

- Now, we are the different directories.

Code:

```
const fs = require('fs') // fs.writeFileSync("apple.txt","This is an apple.txt file") //-> It creates a file with given text // Now, we are creating a 10 - 15 filse at a time: const path = require('path') // Now, we are taking the path // const dirPath = path.join(__dirname) //This gives me the path of the directorie's where code is running. // -> Here, we are getting a Path of the current directory. // console.warn(dirPath) const dirPath = path.join(__dirname, 'files') //Here, we are getting the path of // console.log(dirPath) for (i = 0; i < 5; i++) {

   // fs.writeFileSync("apple.txt","A simple text file through the loop ")
   // The above is executed at least 5 times and it overwrite again and again same fies
   // Now, we are creating a Dynamic file.
   // fs.writeFileSync("apple" + i + ".txt", "A simple text file through the loop ")
   // Or use the given below syntax:
   // fs.writeFileSync(`apple${i}.txt`, "A simple text file through the loop ")
   // Here, we are running the code in the same directory that's why we didn't give the dirctorie's path.
   //fs.unlinkSync(`apple${i}.txt`, "A simple text file through the loop ") //Here, we are deleting those files.
   // Now, we are creating files in the Particular directorie's path:
   // fs.writeFileSync(dirPath, "apple" + i + ".txt", "A simple text file through the loop ")
   // fs.writeFileSync(dirPath + `apple${i}.txt`, "A simple text file through the loop ")

   const filePath = path.join(dirPath, `apple${i}.txt`)
 fs.writeFileSync(filePath, "A simple text file through the loop")
}
```

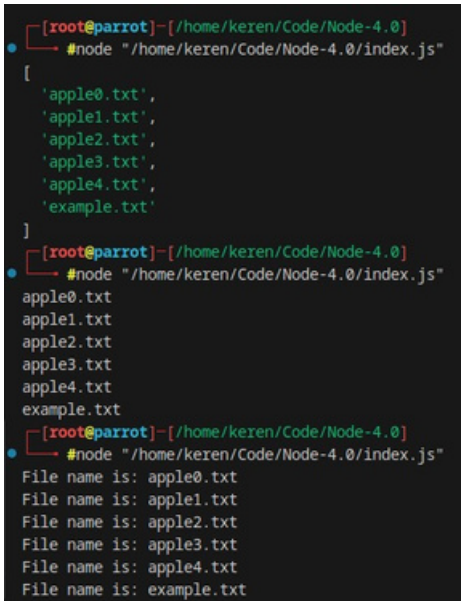
- Output:



Code:

```
// Now, we are reading the file's content:
fs.readdir(dirPath, (err, files) => {
// console.warn(files); //Here, we are getting a files in the format of an array. What if you just want a single file.\
files.forEach((item) => {

        console.log("File name is:",item);
    })
})
```

- Output:



Question:

- Can we access the files from the PC’s other drives?

-> No, because whenever you are working in particular directory then it will create a web – server, and that's why it can't access out of the file's content.

- This is because security concern.

Asynchronous Programming Languages:

CRUD with FILE Systems (Create, Read, Update and Delete):

Code:

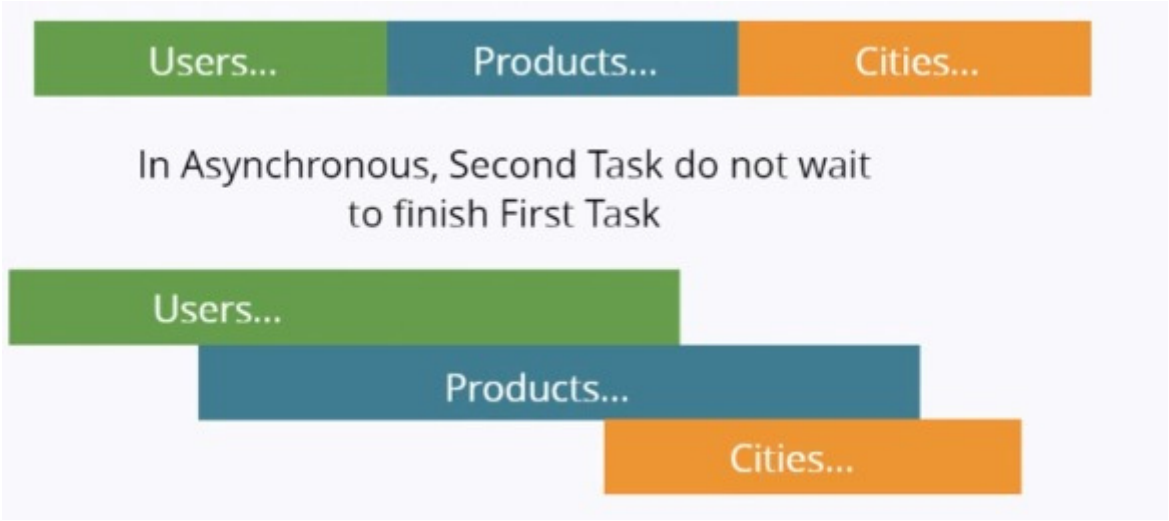
```
const fs = require('fs')
const path = require('path')
const dirPath = path.join(__dirname, "crud"); //It gives a path of the crud's
const filePath = `${dirPath}/apple.txt`;
// fs.writeFileSync(filePath, "This is just") //This is for creating a file.
// Here, we have create a file inside the directory.
// Now,we want to read the Code:
// fs.readFile(filePath, 'utf-8', (err, item) => {

// // if(err){} // Now, we want to update a particular file, then here
is the Code:// fs.appendFile(filePath,'updated file name is apple.txt',
(err)=> {
    console.log(item)
    return console.error("Error reading file", err);




//     if (!err) {
//         console.log("File is updated")
//     }
// });
// Now, we are re - naming the files name:
// fs.rename(filePath, `${dirPath}/fruit.txt`, (err) => {
//     if (!err) {
//         console.log("Renamed file successfully")
```

```
// //} else { // Now, we are deleting a particular file: // We have changed the file's name from
apple..txt -> fruits.txt // This is the new name of the
filePath
}
const newPath = `${dirPath}/fruit.txt`;

fs.unlinkSync(newPath)

// This is how we perform all the basic operations on the directories.
```

- What is Buffer?

-> It is a temporary memory to perform an operations

Basic of Asynchronous



- Now, we are doing some program:

Code:

```
console.log("Start time...")

// console.log("Logic time...")

// Now, we are using to execute our program delay

// Here, we are using a setTimeout();

setTimeout(() => {

console.log("logic time...")

}, 2000) //Here, 2000 is a mili second.

console.log("Complete time...")

//Here, we are using this for better implimentations.
```

- Output:

```
┌─[root@parrot]─[/home/keren/Code/Node-6.0]
└──╼ #node "/home/keren/Code/Node-6.0/index.js"
Start time...
Complete time...
logic time...
```

Drawback's of Asynchronous:

```
- // Now, for the Drawback, we are working on that thing
let a = 10
let b = 0
setTimeout(() => {
    b = 20;
}, 2000)
console.log(a + b)
```

- Here, actually we want an output as a 30. But, we are getting an output as 10. To solve these we are using an exception handling. And, one more thing is that This is one of the drawback. Because, if we want a particular answer and that is being late then it gave the bad impact on the people. That's why to solve this we are using some exception handling cases.

Handle Asynchronous Data:

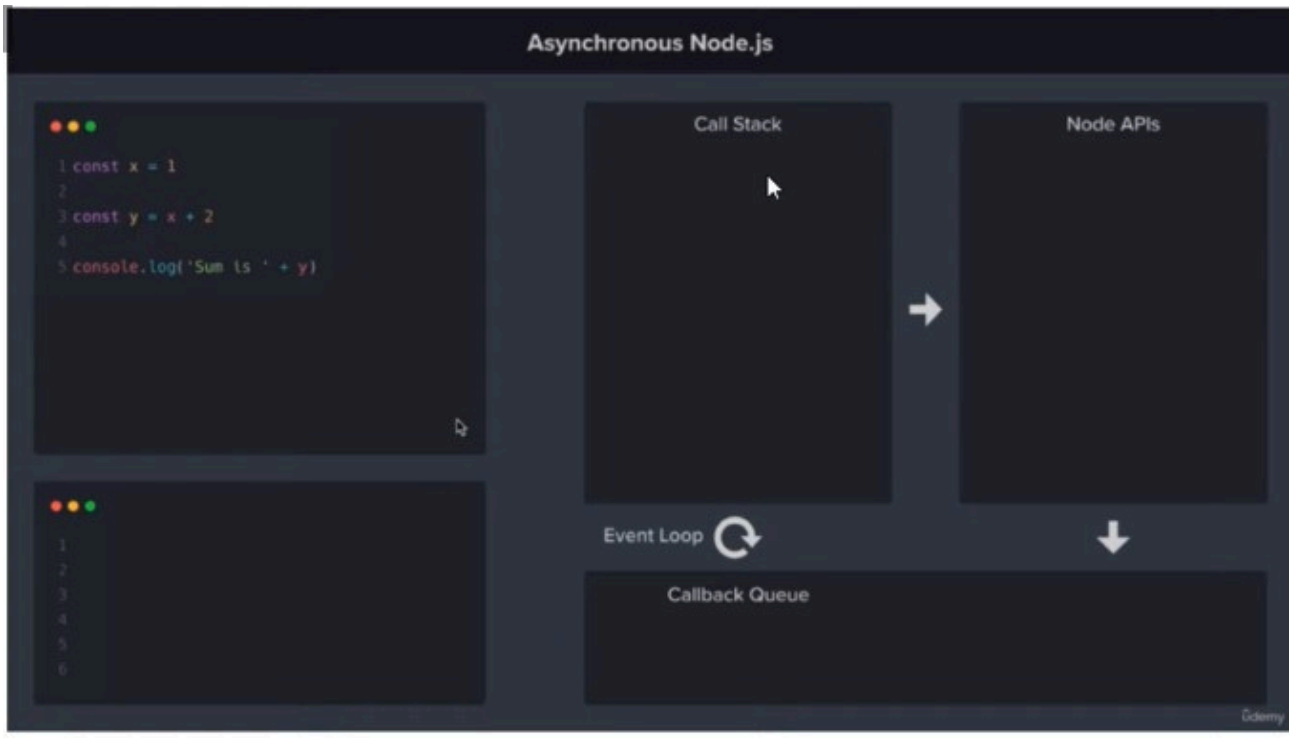
Code:

```
let a = 10

let b = 0

// Now, we are handling the excptions to get an exact output that we want. So, we are using Promise to solve this..
// This Promise wait for a particular result and then it executes an output.

let waitingData = new Promise((resolve, reject) => {
 setTimeout(() => {


      b = 30;

      resolve(30); //Here, we can pass other data - types also like Array, Variables, and Strings

   }, 2000)

})

waitingData.then((data) => {

   b = data;

   console.log(a + b)

})
```

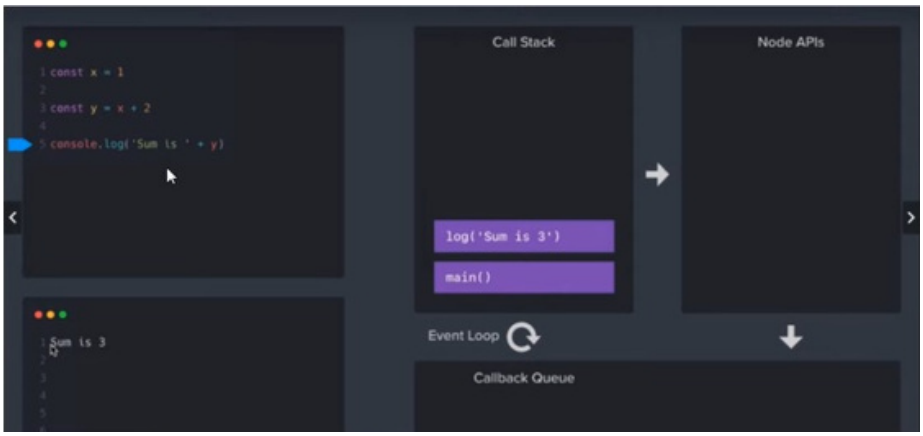
- Output:

How Node JS Works:

Architecture of the Node JS program's run:



- Call Stack
  - First it goes to the Call Stack
  - Call Stack is mandatory
  - - main() *function* is by default added



- Here, first is main() and then log(), after that it checks other required things and then executes it.

- It checks all the Syntax error and checks the functions and register it in the Series.

Now, here is one example to know that how Call Stack is working:

```
console.log("Starting appp.....")

setTimeout(() => {

    console.log("2 Second log....");

}, 2000)

setTimeout(() => {

    console.log("0 Seconds delay")

}, 0.19)


console.log("fininshing up.....")
```

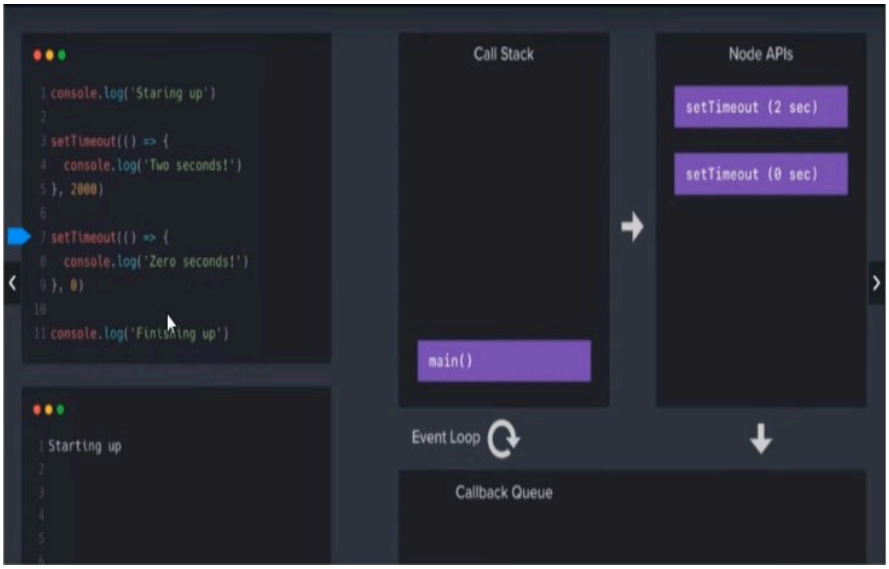
- Output:

```
┌─[root@parrot]─[/home/keren/Code]
└──╼ #node "/home/keren/Code/Node-7.0/index.js"
Starting appp.....
fininshing up.....
0 Seconds delay
2 Second log....
```

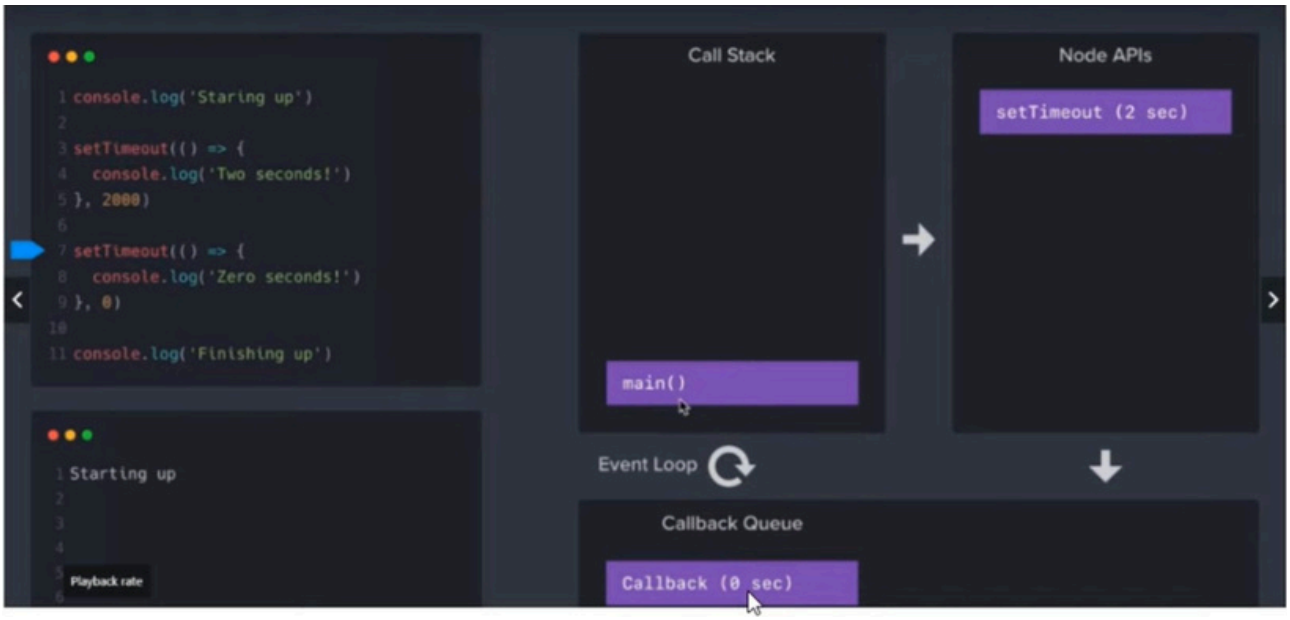
But, you can see that First output is Starting app, Second is finishing up, third is 0 seconds delay and last one is 2 Second log

- Now, after executing all the functions, this where the Node API's are getting stored and then after particular time it got to executed.

- setTimeout() is the function of the C++



- Now, the last one is the Event loop



- It compare the timeout and pass it to the Event Loop and then it got to be executed.

Express JS

- It is a framework of the Node JS

- It is used in the 90% of the program

Install:

- yarn global add express

Now, create a new directory and initialize the yarn:

- yarn init

Now, create a new file:

- touch index.js

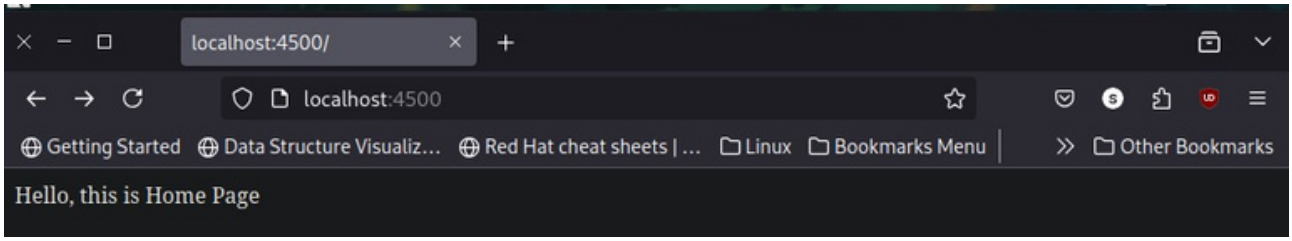
Now, here is the code:

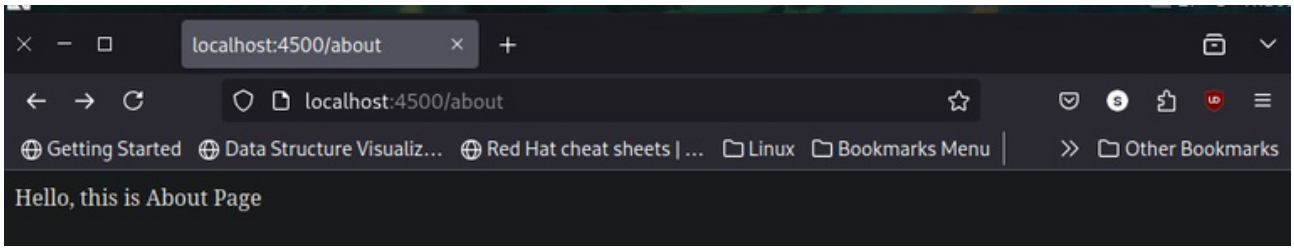
```
const express = require('express')

const app = express();

app.get('/', (req, resp) => { //"' '" This Means Home page and here we are adding a CallBack function (req, resp)=>{}
 resp.send('Hello, this is Home Page');
})

app.get('/about', (req, resp) => {


    resp.send('Hello, this is About Page');
})

app.get('/help', (req, resp) => {

    resp.send('Hello, this is Help Page');
})

app.listen(4500, () => {

    console.log('Server is running on port 4500')
})
```

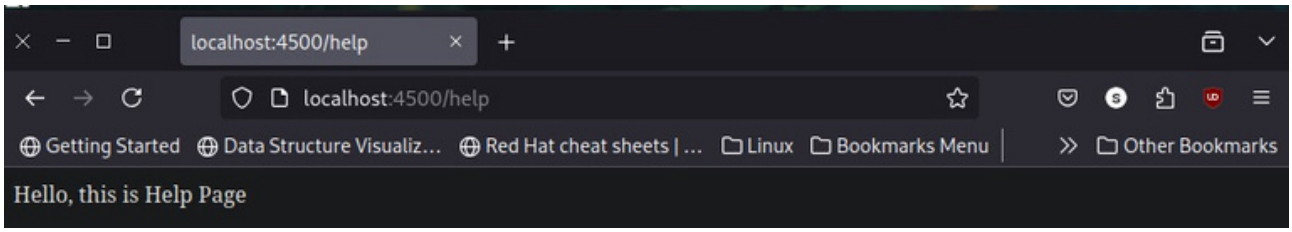
- Now, run this with the nodemon or node. But, for live changes try to run with nodemon

```
- nodemon index.js
```

Output:







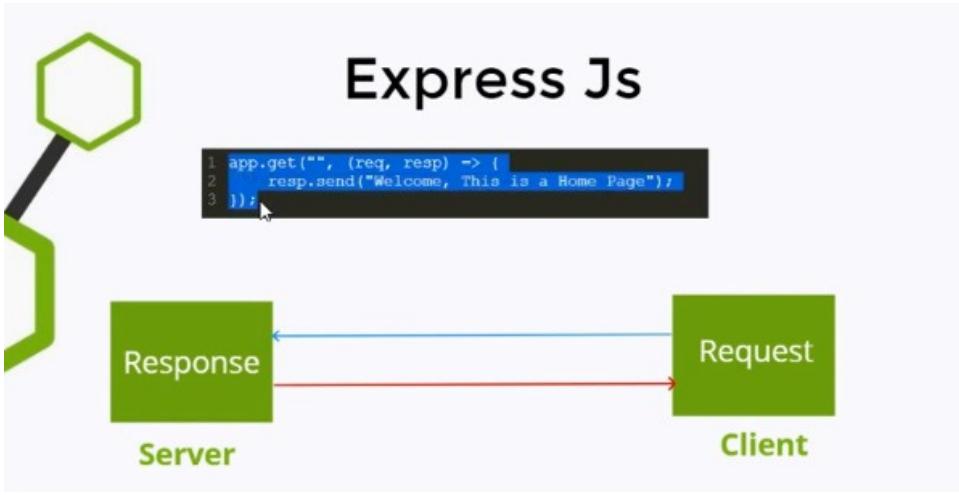
- Here, you can see that we have even changed the URL's route (Like, '/', '/about', '/help').

Routing Parameters – Request and Response:

```
app.get('/', (req, resp) => {
```

```
resp.send('Hello, this is Home Page');
})
```

- Here, we are learning about the request and response's section.



- We can even put any name instead of the req and resp in that section.

Like:

```
app.get('/about', (a, b) => {
    b.send('Hello, this is About Page');
})
```

- To just for understanding neat clean code. We are using the req , and resp .

- Generally,

- Request is done from the Client side and Response is done from the Server side.

- Req is generally used to send the data from the client side to the server side.

Now, we are taking the input from the Browser's URL's section:

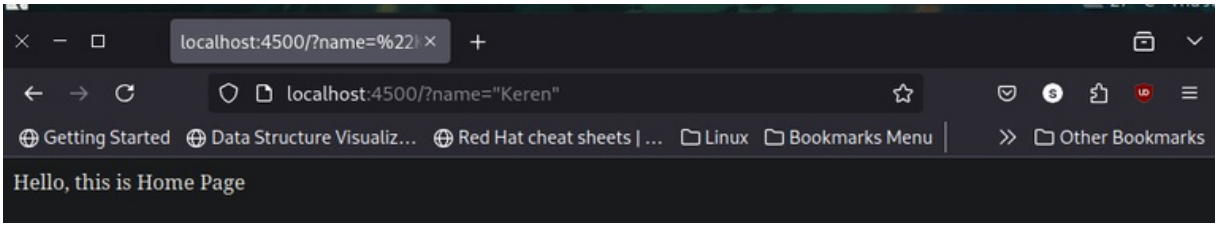
Code:

```
app.get('/', (req, resp) => {

    console.log("The data from the user is the: ", req.query.name);
 resp.send('Hello, this is Home Page');
}}
```

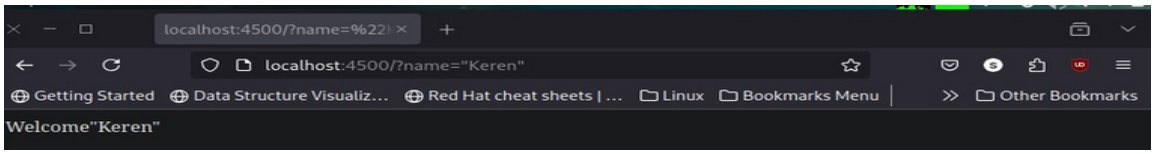
- Here, is the output in the console of the terminals:

```
^C^X┌─[✗]─[root@parrot]─[/home/keren/Code/Express]
└──╼ #nodemon index.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 index.js`
Server is running on port 4500
The data from the user is the:  "Keren"
```

- Here, you can see that, the data from the URL's which is Keren (This name was added manually).



Now, we are making some changes by putting the Static data:



Code:

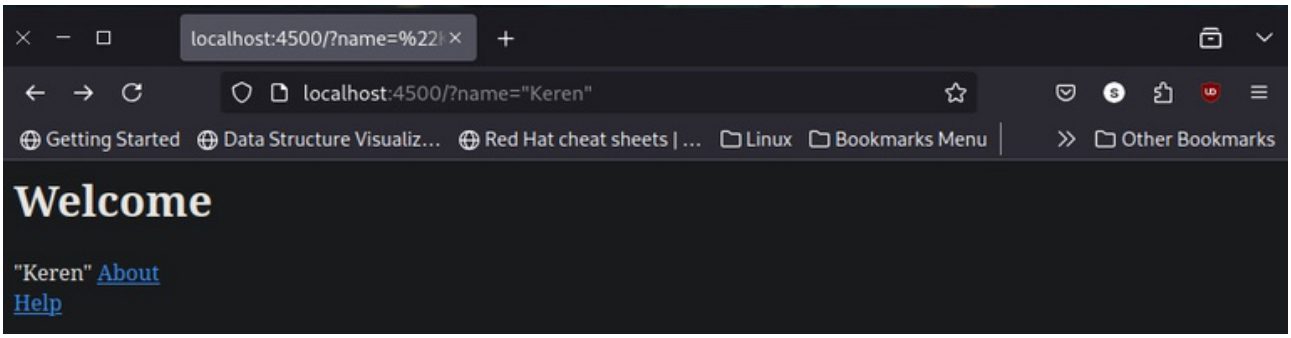
```
app.get('/', (req, resp) => {
console.log("The data from the user is the: ", req.query.name);
resp.send('Welcome' + req.query.name);
})
```

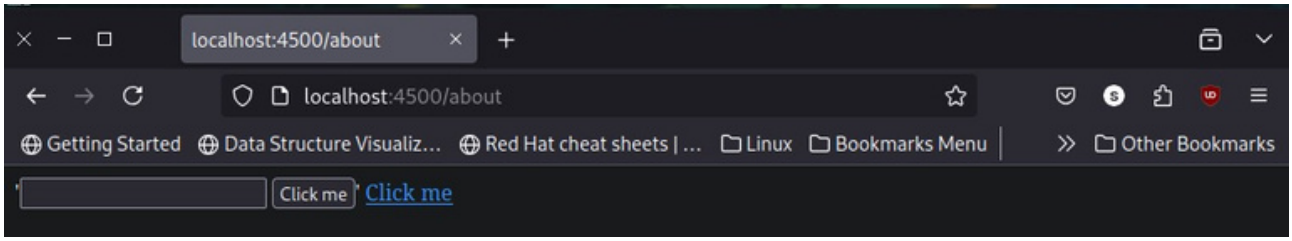
Render HTML and JSON:

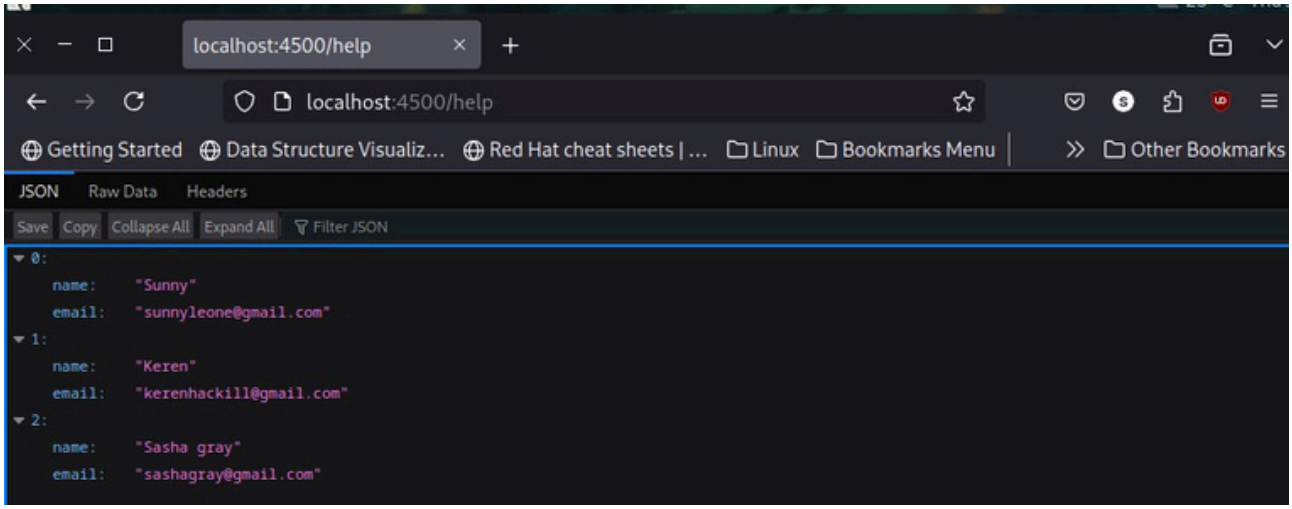
Code:

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

```
const app = express();

app.get('/', (req, resp) => {

console.log("The data from the user is the: ", req.query.name);

resp.send(` <h1>Welcome</h1> ${req.query.name} <a href="/about"> About </a> <br> <a href="/help"> About </a> `)
})

app.get('/about', (req, resp) => {

    // Now, we are routing the pages from one page to another:

 resp.send(` '<input type="text" placeholder="Username"/> <button> Click me </button>' <a href="/">Click me </a> `);
})

app.get('/help', (req, resp) => {

    // resp.send('Hello, this is Help Page');

    // Here, we are rendering the JSON data:

    resp.send( // Now, for multiple user:

        [{ name: "Sunny", email: "sunnyleone@gmail.com" },

        { name: "Keren", email: "kerenhackill@gmail.com" },

        { name: "Sasha gray", email: "sashagray@gmail.com" },

        ],

    )
})

app.listen(4500, () => {
    console.log('Server is running on port 4500')
})
```


localhost:4500/?name=%22
localhost:4500/?name="Keren"
Getting Started
Data Structure Visualiz...
Red Hat cheat sheets | ...
Linux
Bookmarks Menu
Other Bookmarks
Welcome
"Keren" About
Help


localhost:4500/about
localhost:4500/about
Getting Started
Data Structure Visualiz...
Red Hat cheat sheets | ...
Linux
Bookmarks Menu
Other Bookmarks
Click me
Click me


localhost:4500/help
localhost:4500/help
Getting Started
Data Structure Visualiz...
Red Hat cheat sheets | ...
Linux
Bookmarks Menu
Other Bookmarks
JSON
Raw Data
Headers
Save
Copy
Collapse All
Expand All
Filter JSON
0:
name: "Sunny"
email: "sunnyleone@gmail.com"
1:
name: "Keren"
email: "kerenhackill@gmail.com"
2:
name: "Sasha gray"
email: "sashagray@gmail.com"

Make HTML Pages:

- Here, we are accessing the files from the directory.

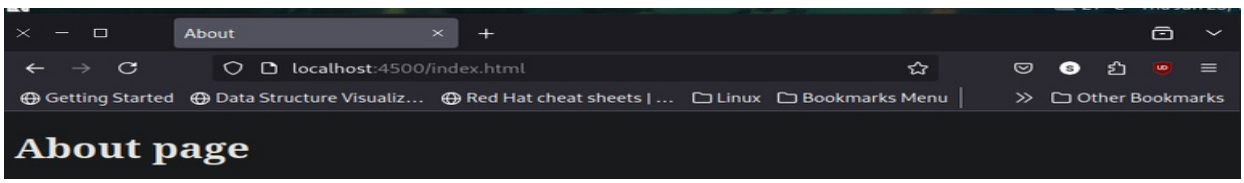
Code:

```
const express = require('express') //the const "express" is known as a different function
const path = require('path')
const app = express() //This one is known as the executed funcntion which is a "express()"
// console.log((__dirname)); //First we need the path
// Here, we are adding the two path
const publicPath = path.join(__dirname, 'Compone')
// Here, we are using "use", and "use" is a middleware
app.use(express.static(publicPath)); //static() method loads the static pages
app.listen(4500)
```

HTML Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <meta name="viewport" content="width=device-width, initial-scale=1.0">

   <title>About</title>
</head>
<body>
   <h1> About page</h1>
</body>
</html>
```

Output:



Remove extension from URL:

- In the above pages there is a one picture, where there is a "html" in the URL. And, now we are removing that.

- This is for the security purpose.

- And we are even making the '404' error page.

Code:

```
const express = require('express') //the const "express" is known as a different function
const path = require('path')
const app = express() //This one is known as the executed funcntion which is a "express()"



// Here, we are adding the two path
const publicPath = path.join(__dirname, 'Compone')

// Here, we are using "use", and "use" is a middleware

app.get('', (_, resp) => {
resp.sendFile(`${publicPath}/index.html`);
})

app.get('/about', (_, resp) => {

 resp.sendFile(`${publicPath}/about.html`)
})

app.get('/help', (_, resp) => {
resp.sendFile(`${publicPath}/help.html`)
})

// If the particular page's URL is removed or not availabled:
app.get('*', (_, resp) => {
resp.sendFile(`${publicPath}/404.html`)
})
app.listen(4500)
```

- HTML's code:

index.html:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>About</title>
</head>

<body>
   <h1> About page</h1>
</body>
</html>
```

about.html:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>About</title>
</head>
<body>
   <h1>This a page of the About</h1>
</body>
</html>
```

help.html:

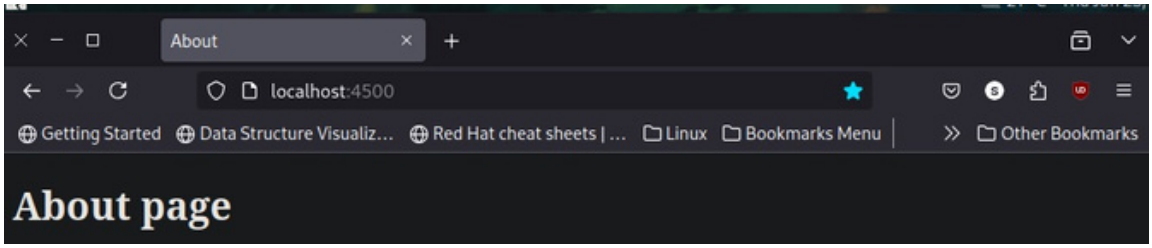
```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Help</title>
```

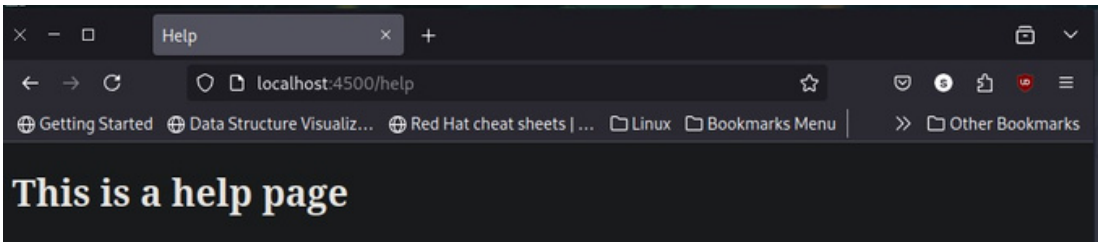
```
</head>
<body>
   <h1>This is a help page</h1>
</body>

</html>
```

404.html:

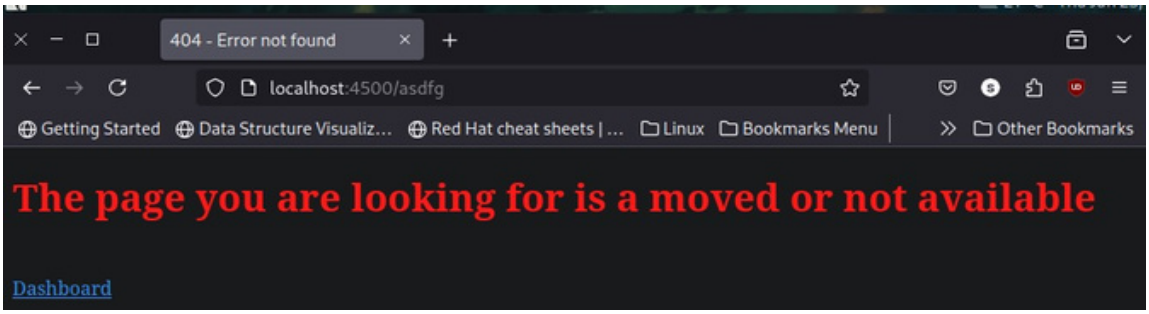
```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>404 - Error not found</title>
   <style>
      h1 {
         color: red;
      }
   </style>
</head>
<body>
<h1>The page you are looking for is a moved or not available</h1> <br>
   <a href="/">Dashboard</a>
</body>

</html>
```

Output:





Now, for an Error page:



- Question:
- How to remove the extension from the URL?
-> By using the “get” method

- How to handle the different URL’s?
-> By creating a separate file and routing them.

Template Engine:

- Here, we are adding the “ejs” – Embedded JavaScript Template

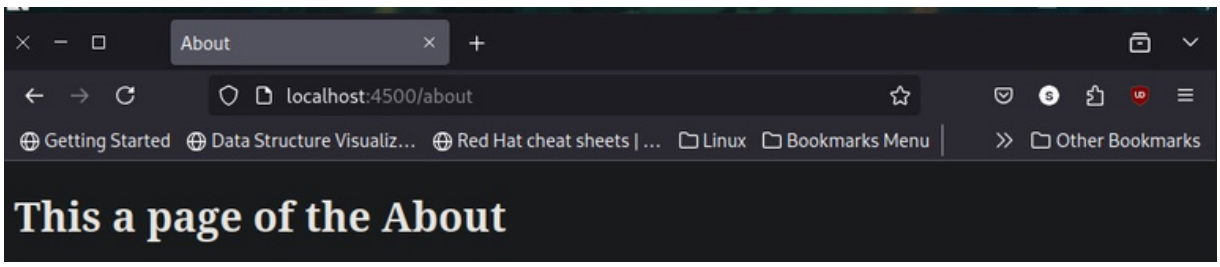
- yarn add ejs || yarn global add ejs

- We have to create a directory named as the “**view**”, this is because **ejs** by default uses the **views**.

- And even we are using the - **.ejs** as an extension for a file.

Code:

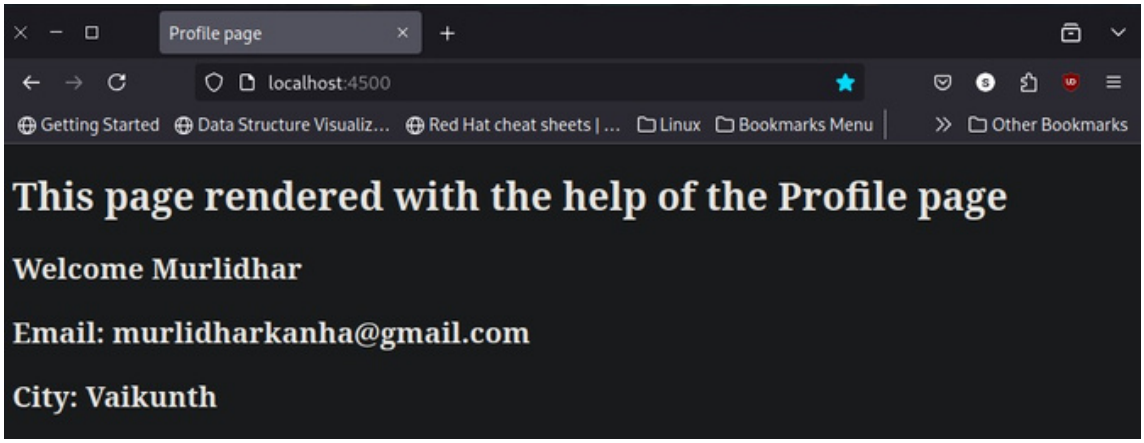
```
const express = require('express')

const app = express()



// Now, we are adding a EJS

app.set('view engine', 'ejs');

app.get('', (_, resp) => {

   const user = {

      name: "Murlidhar",

      email: "murlidharkanha@gmail.com",

      city: "Vaikunth",

   }

   r e s p . r e n d e r ( ' i n d e x ' ,   { u s e r } )

})

app.listen(4500

)
```



- index.ejs:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Profile page</title>
</head>
<body>
   <h1>This page rendered with the help of the Profile page</h1>
 <!-- Here, we are taking the dynamic data -->
<h2>Welcome <%= user.name %></h2>
<h2>Email: <%= user.email %></h2>
<h2>City: <%= user.city%></h2>
</body>
</html>
```

- Now, the output:



Dynamic Page with ejs:

- Here, we are taking the things in the loops:

Code:

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

const app = express()

// Now, we are adding a EJS

app.set('view engine', 'ejs');

app.get('', (_, resp) => {



   const user = {

      name: "Murlidhar",

      email: "murlidharkanha@gmail.com",

      city: "Vaikunth",

      skills: ['Python Django', 'CS', 'C++','Java'],

      // Now, we are iterating the things on our website. In the file of the index.ejs

   }

   r e s p . r e n d e r ( ' i n d e x ' ,  {  u s e r  } )

})

app.listen(4500)
```

index.ejs Code:

```
<body>

   <h1>This page rendered with the help of the Profile page</h1>

   <!-- Here, we are taking the dynamic data -->

 <h2>Welcome <%= user.name %>

   </h2>

 <h2>Email: <%= user.email %>

   </h2>
```

```
<h2>City: <%= user.city%>
  </h2>
  <ul>
    <% user.skills.forEach((item)=>{ %> <!--Here, <% %> is used for just definint the value-->
      <li><%= item %></li> <!--Here, <%= %> is used to print out the value-->
      <% }) %>
  </ul>
</body>
```

- Here, you can see that we have used the **forEach** loop:

```
<% variableName.forEach((item)=>{ %>
<%= item %>
<% }) %>
```

- This above one is a syntax for an iterating **forEach** loop:

Now, we are creating a one more directory inside the views with the name of the “common”,

- “common” name because it is used everywhere of the code. – navbar, footer, header and other things

index.js’s Code:

```
const express = require('express')
const app = express()
app.set('view engine', 'ejs');
app.get('', (_, resp) => {
  const user = {
    name: "Murlidhar",
    email: "murlidharkanha@gmail.com",
    city: "Vaikunth",
    skills: ['Python Django', 'CS', 'C++', 'Java'],
```

```
  }
  resp.render('index', { user })
}) app.get('/login', (_, resp) =>
{
  resp.render('login')
})
app.listen(4500)
```

- Now, the index's.js Code:

```
<body>
<%- include('common/header')%>
  <h1>This page rendered with the help of the Profile page</h1>
  <!-- Here, we are taking the dynamic data -->
 <h2>Welcome <%= user.name %>
  </h2>
 <h2>Email: <%= user.email %>
  </h2>
 <h2>City: <%= user.city%>
  </h2>
  <ul>
    <% user.skills.forEach((item)=>{ %> <!--Here, <% %> is used for just definint the value-->
      <li><%= item %></li> <!--Here, <%= %> is used to print out the value-->
      <% }) %>
  </ul>
</body>
```

- Here, we have included the file from another destination and it is going to be pasted here:

```
<%- include('dir_path'/ 'file_name') %>
```

- And login.ejs file's code:

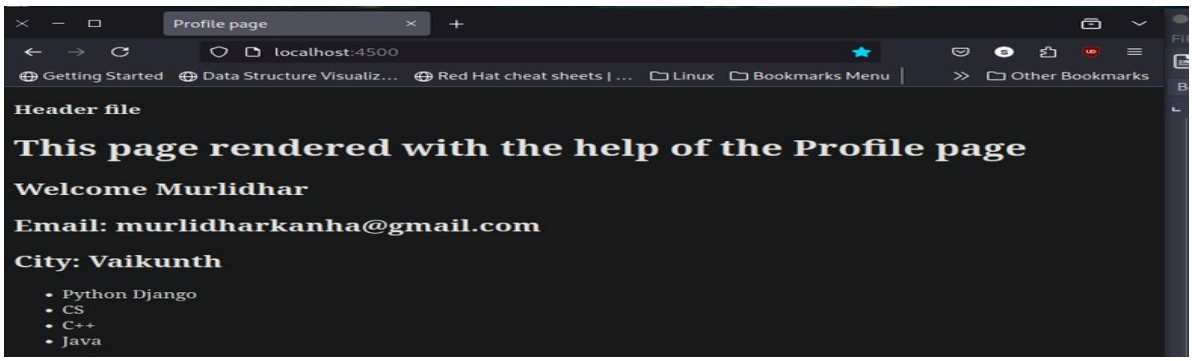
```
<body>
<%- include('common/header')%> <!--Here, we are using <%- %> for importing the files -->
    <h1>This is a login page</h1>
</body>
```

- And the code from the file named as the header from other directory:

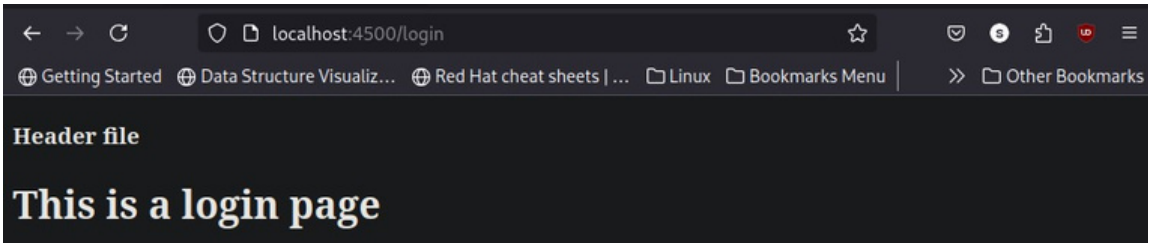
header.ejs:

```
<nav>
  <h3>Header file</h3>
</nav>
```

- Output:



- And,



- This is how we are importing one code to another in the format of other files.

Middleware:

- These are some function which are widely used with routes, and it access the request and response and modify it.

- Used for the user – authentication, is user TRUE or FALSE
- Blocking website for the specific country

Code:

```
const express = require('express')
const app = express()
app.set('view engine', 'ejs')
// Now, we are adding a middleware here:
// Here, we are getting 3 input fields
const reqFilter = (req, resp, next) => {
    // Now, we are applying some conditions:
    if (!req.query.age) {
        resp.send('Please provide age');
    }else{
        next();
    }
}
app.use(reqFilter)
app.get('/', (req, resp) => {
    resp.send('index')
})
app.listen(4500)
```

Here, if we are getting an error like this –

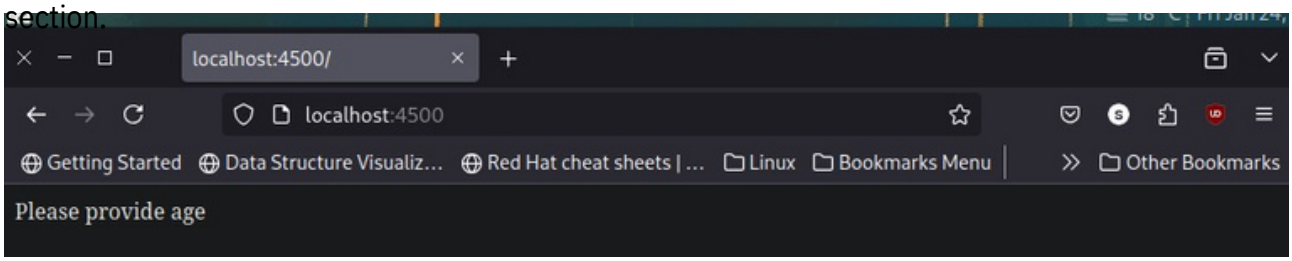
```
┌──[root@parrot]─[/home/keren/Code/Express/E-0.4]
└─── #nodemon index.js
[nodemon] 3.1.9
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,cjs,json
[nodemon] starting `node index.js`
[nodemon] restarting due to changes...
[nodemon] starting `node index.js`
[nodemon] restarting due to changes...
[nodemon] starting `node index.js`
Error [ERR_HTTP_HEADERS_SENT]: Cannot set headers after they are sent to the client
    at ServerResponse.setHeader (node:_http_outgoing:699:11)
    at ServerResponse.header (/home/keren/Code/Express/E-0.4/node_modules/express/lib/response.js:794:10)
    at ServerResponse.send (/home/keren/Code/Express/E-0.4/node_modules/express/lib/response.js:174:12)
    at /home/keren/Code/Express/E-0.4/index.js:19:10
    at Layer.handle [as handle_request] (/home/keren/Code/Express/E-0.4/node_modules/express/lib/router/layer
.js:95:5)
    at next (/home/keren/Code/Express/E-0.4/node_modules/express/lib/router/route.js:149:13)
    at Route.dispatch (/home/keren/Code/Express/E-0.4/node_modules/express/lib/router/route.js:119:3)
    at Layer.handle [as handle_request] (/home/keren/Code/Express/E-0.4/node_modules/express/lib/router/layer
.js:95:5)
    at /home/keren/Code/Express/E-0.4/node_modules/express/lib/router/index.js:284:15
    at Function.process_params (/home/keren/Code/Express/E-0.4/node_modules/express/lib/router/index.js:346:1
2)
```

- So, to solve this by using the if – else condition:

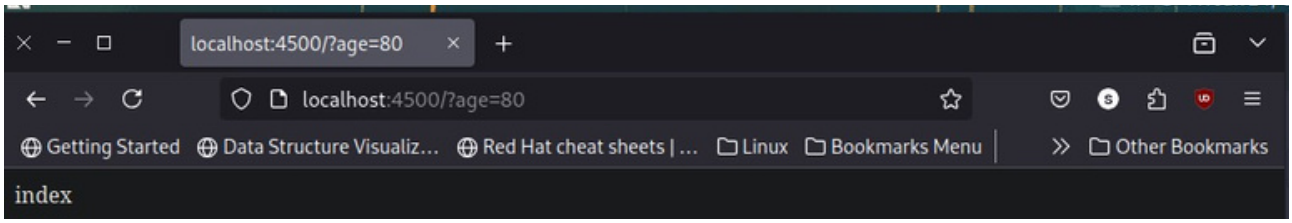
Code:

```
const reqFilter = (req, resp, next) => {

  // Now, we are applying some conditions:
  if (!req.query.age) {
     resp.send('Please provide age');
  }else{
     next();
  }
}
```

- Here, we are even using the URL base condition to apply this on the condition in the URL's section.



- Now, after giving some particular values in the URL to



- Here, you can see that our after giving the input, it opens up the next page.

Route Level Middleware:

- Now, we are applying the Middleware on multiple routes

Single Middleware's Code:

```
const express = require('express')
const app = express()
// This is our MiddleWare Condition
const reqFilter = (req, resp, next) => {
    // Now, we are applying some conditions:
    if (!req.query.age) {
        resp.send('Please provide age');
    } else {
        next();
    }
}    // Now, we are applying the middleware at the multiple points
// Now, we are applying that condition on separte one's -> This is also known as the signle router.
// We can even add this on other one also.
app.get('/', reqFilter, (req, resp) => {
resp.send("Welcome");
})
app.get('/home', reqFilter, (req, resp) => {
resp.send('Welcome to home')
})
app.listen(4500)
```

- Now, we can create a separate directory for this one:
middleware.js:

```
// This is our MiddleWare Condition

module.exports = reqFilter = (req, resp, next) => {

   // Now, we are applying some conditions:

   if (!req.query.age) {

      resp.send('Please provide age');

   } else {

      next();

   }

}
```

- index.js:

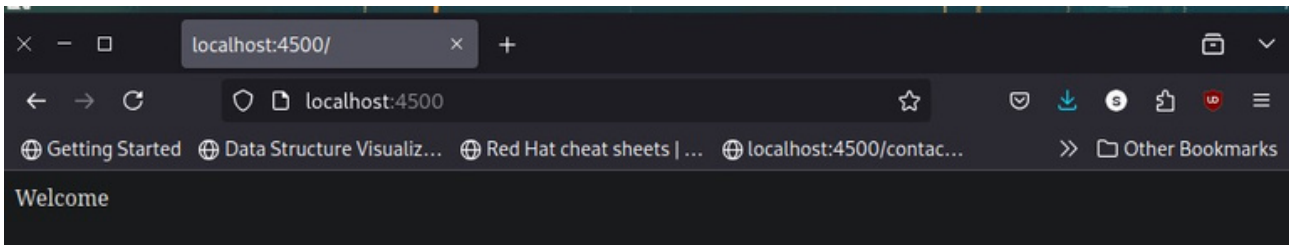
```
const express = require('express') const app = express() // Now, we are importing the middleware.js file: const reqFilter = require('./middleware') // Now, we are applying the middleware at the multiple points // Now, we are applying that condition on separte one's -> This is also known as the signle router. // We can even add this on other one also. app.get('/', reqFilter, (req, resp) => {    resp.send("Welcome"); }) app.get('/home', reqFilter, (req, resp) => { resp.send('Welcome to home') }) app.listen(4500)
```

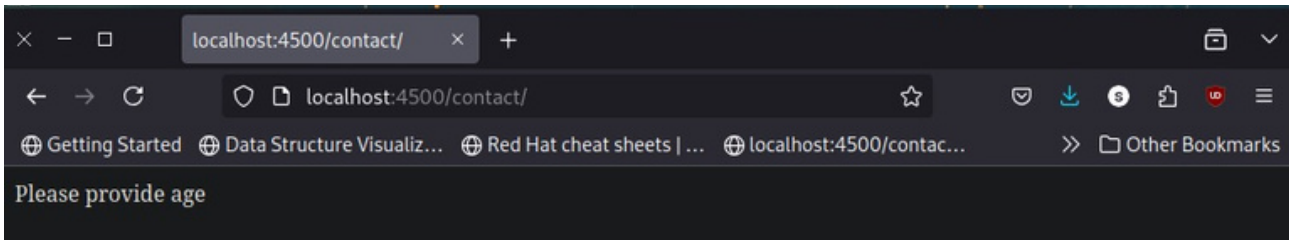
- The output is same as the others. Now, we want to add the route for multiple routes without adding the **reqFilter** inside.

Here, we have applied the route for particular route:

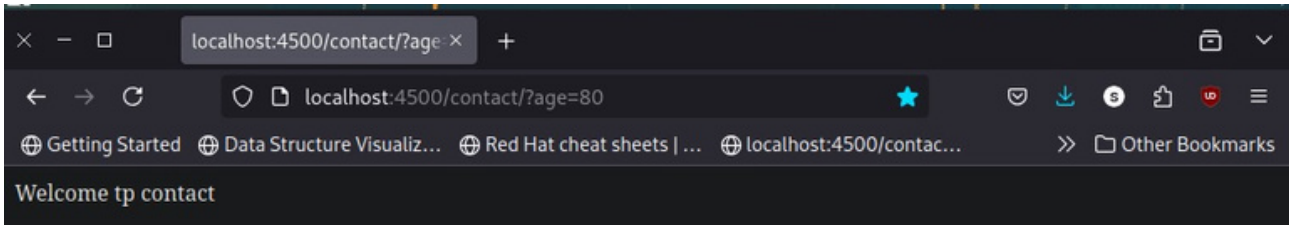
```
const express = require('express')
const app = express()
// Now, we are importing the middleware.js file:
const reqFilter = require('./middleware')
// Now, we are creating an instance for the route:
const route = express.Router()
route.use(reqFilter)
app.get('/', (req, resp) => {
 resp.send("Welcome");
})
app.get('/home', (req, resp) => {
 resp.send('Welcome to home')
})
route.get('/contact', reqFilter, (req, resp) => {
 resp.send("Welcome tp contact");
})
// If we want to apply the middle-ware then we are using the - "route" instead of the app.
route.get('/contact', reqFilter, (req, resp) => {
 resp.send("Welcome tp contact");
})
// after adding the "route" instead of "app", we have to add the given belowo line:
app.use('/', route);
app.listen(4500)
```

- Output:





- After providing the age:



- Question difference between Global route and Local route, and how to apply the middleware.

- -> Global Middleware route:
  - Applies to all the routes
  - Executed for every incoming request
- -> Local Middleware route:
  - Only executed for specific route handlers
  - More targeted application

MongoDB:

- Download MongoDB

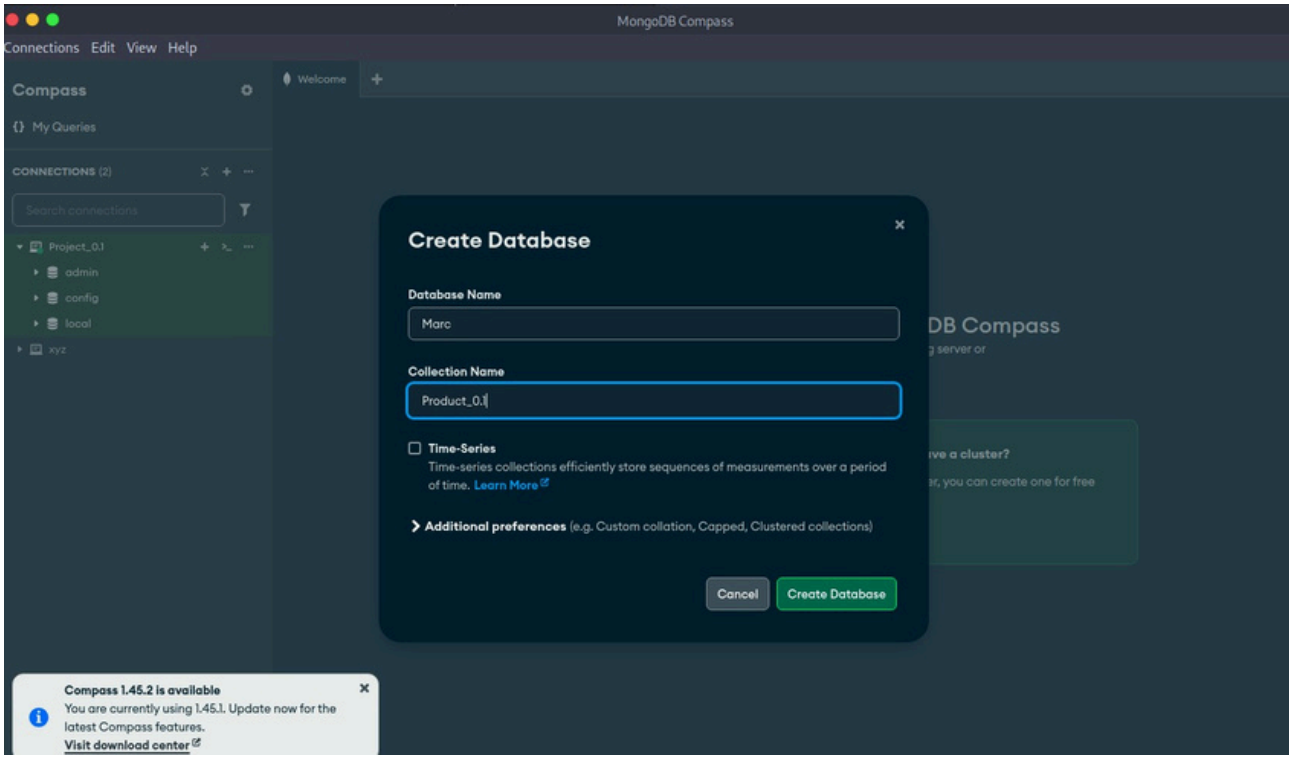
- Click here, to check more about the MongoDB.

Now,

- By reading the documents regarding about the MongoDB.

CRUD Operations in MongoDB:

- Before that create a new Database:



- Now, create a new collection as per your choices:

- And, **remember** that on which “collection” you are working just click and connect that collection after that you are able to perform some actions inside that.

- Questions:

- Difference between MongoDB vs MySQL?
- Why we use the MongoDB?

Connect Node with MongoDB:

- Install the yarn package of the MongoDB’s:

- Click here to download the MongoDB:

```
yarn global add mongodb | yarn add mongodb #(For locally)
```

Make sure of installing the:

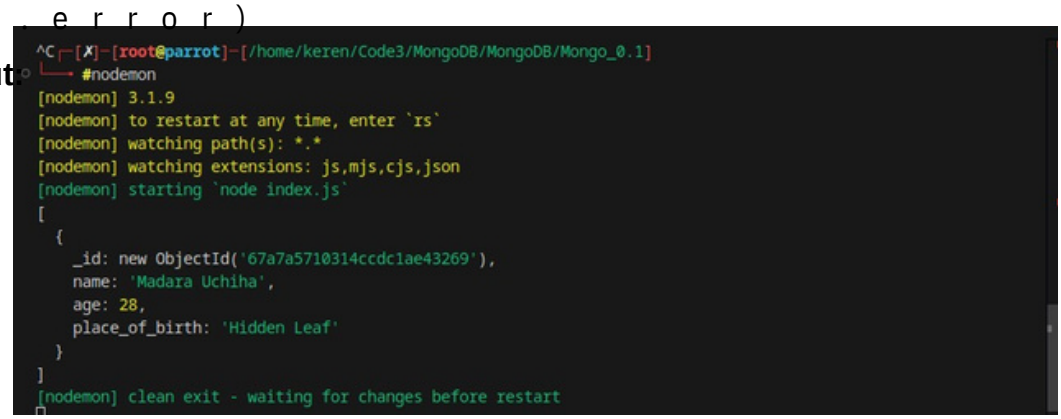
```
yarn add nodemon
```

Code:

```
const { MongoClient } = require('mongodb')

// Now, we are taking the path of the Path.

const url = "mongodb://localhost:27017"


// Now, we are passing the url to the MongoClient

const client = new MongoClient(url)

const database = "Marc"

// Function for GET data:

// function getData() {

// let result = client.connect();

// }


// The above one is a normal function. Even we have to handle an error.

// That's why we are using an error handle with an "async" keyword


async function getData() {

    try {

        let result = await client.connect();

        // Now, we are giving exact path of the Database in the MongoDB's. So, that it coonnects with it.

        db = result.db(database)

        // Now, we have connected the database. Now, we are connecting the "collections"

        let collection = db.collection('Products') //"Marc is name of the collection in the database of the "Project_0.1"

        let response = await collection.find({}).toArray()

        console.log(response)
```

```
  } catch (error) {
      console.error("An error occured", error)
  } finally {
      await client.close()
  }
}
getData().catch(console.error)
```

Output:



- Can we connect the two databases at a time?

-> Yes, you can connect the two databases.

Read Data from MongoDB:

- Now, we are creating a separate file for the connection between the Node and MongoDB.

- By making this we can handle an error smoothly.

Code:

```
const { MongoClient } = require('mongodb')
const url = "mongodb://localhost:27017"
const client = new MongoClient(url)
const database = "Marc"
async function dbConnection() {
  try {
```

```
        let result = await client.connect();
        db = result.db(database)
        return db.collection('Products')


    } catch (error) {
        console.error("An error occured", error)
    } finally {
        await client.close()
    }
}
dbConnection().catch(console.error)
console.warn(dbConnection()) //This line is for know which types of an error we should have to handle here.
```

Output:

- Here, you can see the "Promise <pending>". Now, we are handling this promise

- What is Promise?

-> Whenever we try to do the heavy operations with the data, then to handle an **async** and **await**.

- Here, first we are handling the first promise which is generated for the handling the

return db.collection('products');

Code:

```
const { MongoClient } = require('mongodb')

const url = "mongodb://localhost:27017"

const client = new MongoClient(url)
```

```
const database = "Marc"

async function dbConnection() {

    let result = await client.connect();

    db = result.db(database)

    return db.collection('Products')

} const main = async () => {

// console.log("Main")



    let data = await dbConnection()

    data = await data.find({}).toArray()

    console.warn(data)

} main(); - Here, you can see that we are creating an async function. - Now, we are creating another

file with named as the – mongodb.js and paste it all the connection
```

code.

Mongodb.js:

Code:

```
const { MongoClient } = require('mongodb')

const url = "mongodb://localhost:27017"

const client = new MongoClient(url)

const database = "Marc"

async function dbConnection() {

    let result = await client.connect();

    db = result.db(database)

    return db.collection('Products')
```

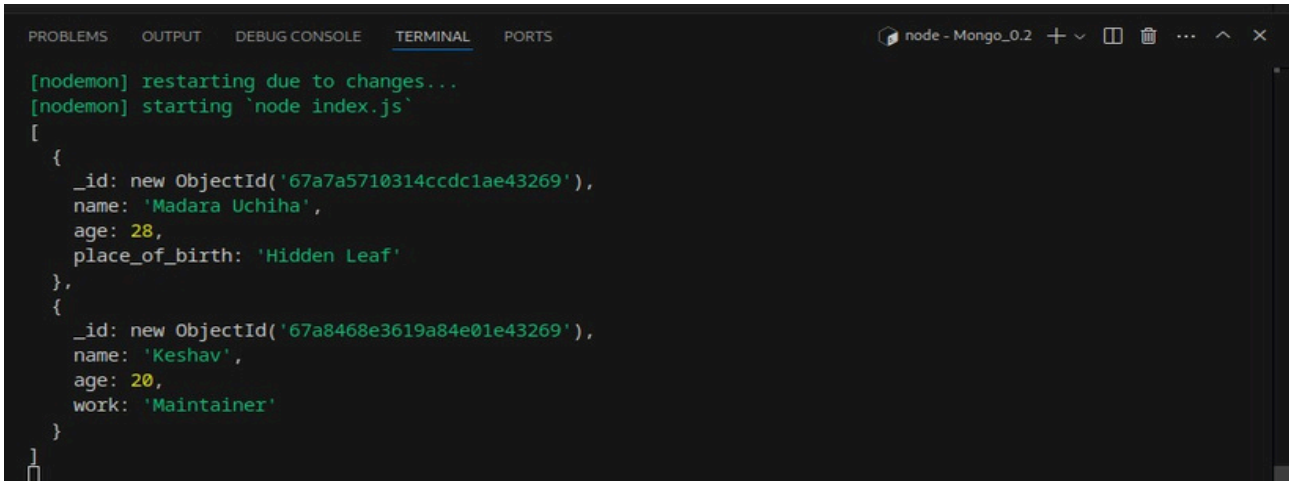
```
}

// module.exports = dbConnection() //Don't call here the functino, just directly pass it.

module.exports = dbConnection
```

- Now, we are importing this file another one.

Code:

```
const dbConnection = require('./mongodb')

const main = async () => {

// console.log("Main")

    let data = await dbConnection()

    data = await data.find({}).toArray()

    console.warn(data)

} main();
```

Output:



- In the upcoming session, we are keeping the same file which is of the – mongodb.js's

insert.js:

```
const dbConnection = require('./mongodb')

const insert = async () => {

    const db = await dbConnection()
```

```
    // Now, this one is for the single.
    // const result = await db.insertOne({ name: "Vallabh", age: "21", work: "Swami", place: "Vaikunth" })
//Now, for the multiple data inserting by using an Array
 const result = await db.insertMany([{ name: "Vallabh", age: "21", work: "Swami", place: "Vaikunth" },
{ name: "Kanha", age: 4, work: "Fun", place: "Vrindavan" },
    ])
 // Whenever I tried to change somethings then it will automatically saves the changes.
    if (result.acknowledged) {
        console.log("Data inserted")
    }
}
insert()
```

- By doing this we can solve most of the inserting problems

Update Data in MongoDB:

- Create a new file with named as the: - **update.js**

Code:

```
const dbConnection = require('./mongodb')


const update = async () => {
    let data = await dbConnection();
 let result = await data.updateMany({ name:"Vallabh" }, { $set: { name: "Nityananda" } })
    console.warn(result)
}
update()
```

- Question:

- Is `update` and `updateOne` are same?

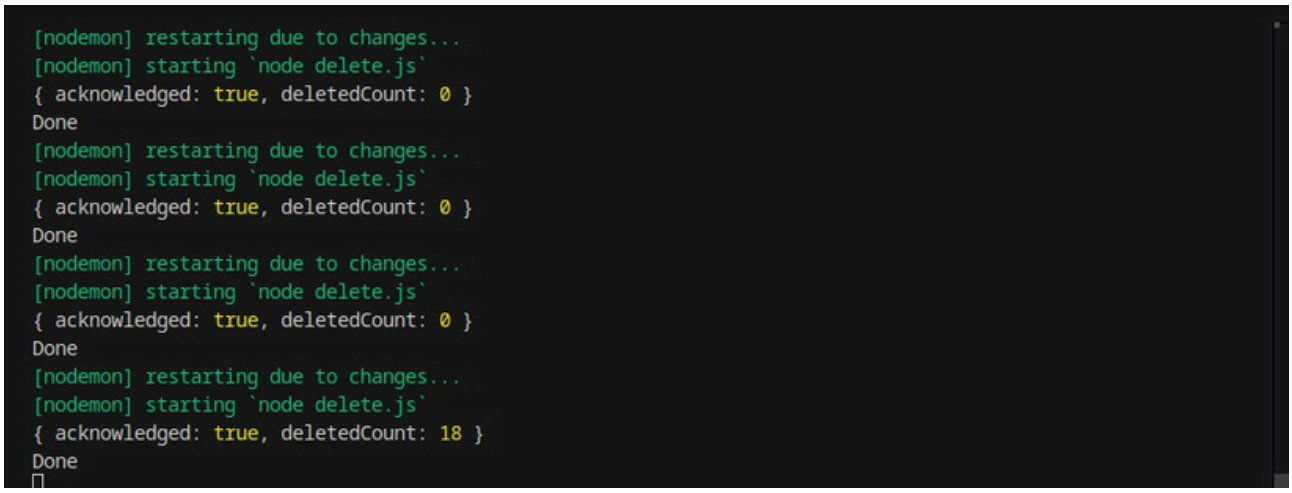
-> No, they are different, `updateOne` is used for updating only single value, and `update` is used for updating the multiple values. It means that `update` and `updateMany` are the same

Delete Data in MongoDB:

- Create a new file with named as the **delete.js**:

Code:

```
const dbConnection = require('./mongodb')
const deleteData = async () => {
    // console.log("function coal")
    let data = await dbConnection()
    // console.warn(data)
 let result = await data.deleteMany({ name: "Nityananda" })
    console.warn(result)
    if(result.acknowledged){
        console.log("Done")
    }
}
d e l e
t e D a
t a ( )
```



Basic GET API with MongoDB:

- GET – Fetch data from the Database POST
- – Upload data in the Database PUT –
- Update data from the Database DELETE –
- Delete data from the Database

- In this we are using our previous code of the MongoDB for configuring the code space:

mongodbConnection.js:

```
const { MongoClient } = require('mongodb')
const url = "mongodb://localhost:27017"

const client = new MongoClient(url)
const database = "Marc"

async function dbConnection() {
   let result = await client.connect();
```

```
    db = result.db(database)
    return db.collection('Products')


}
// module.exports = dbConnection() //Don't call here the functino, just directly pass it.
module.exports = dbConnection
```

- Install the given below dependencies:

  - - express = yarn add express
  - - mongodb = yarn add mongodb
  - - nodemon = yarn add nodemon

Now, the code for GET means fetching the data from the Database:

Code:

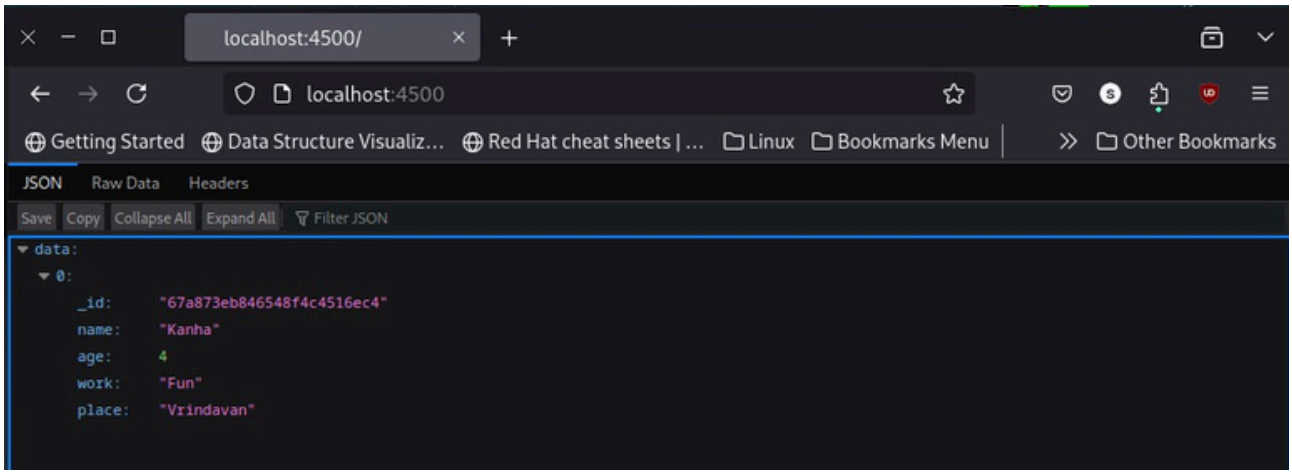
```
const exp = require('express')
const dbConnection = require('./mongodb')


const app = exp()


//'get' means we are making a route for the GET Api
// Here, we are combining an Express and MongoDB.


app.get('/', async (req, resp) => {
    let data = await dbConnection()
    data = await data.find().toArray()
    console.log(data)
    // You'll get a data in the terminal. Now, you can put that data in the Browser
    resp.send({ data })
}).listen(4500, (err) => {
    console.error("Error found", err)
})
```

- Now, the run with the – nodemon

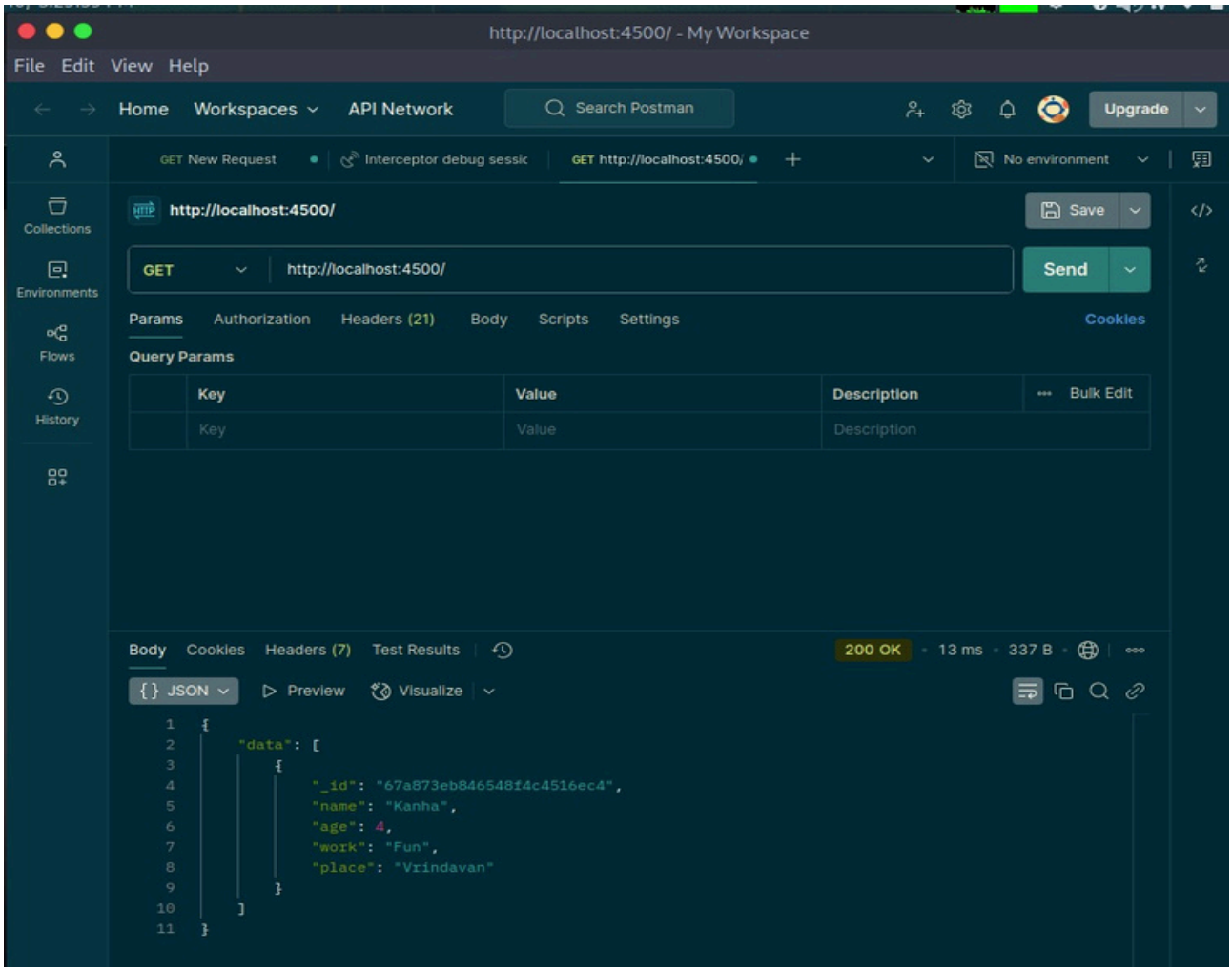
Output:

```
┌─[root@parrot]─[/home/keren/Code3/MongoDB/MongoDB/Mongo_0.3]
└──╼ #nodemon index.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 index.js`
Error found undefined
[
  {
    _id: new ObjectId('67a873eb846548f4c4516ec4'),
    name: 'Kanha',
    age: 4,
    work: 'Fun',
    place: 'Vrindavan'
  }
]
```

- In the Browser's page:



- In the Postman:



- Question:

- Can we pass the ***body*** in the **GET** method?

-> No.

Now, the different file's code looks a like:

GET.js:

```
const dbConnection = require('./mongodb');
async function getData(resp) {

    try {
        const client = await dbConnection();
        const data = await client.find().toArray();
        console.log(data);
        resp.send({ data });
    } catch (error) {
        console.error('Error fetching data:', error);
        resp.status(500).send('Internal Server Error');
    }
}
m o d u l e . e
x p o r t s =
g e t D a t a ;
```

index.js:

```
const exp = require('express')
const GET = require('./GET')
const app = exp() app.get('/',
async (req, resp) => {
    await GET(resp)
}).listen(4500, (err) => {
    console.log("It's running on the localhost 4500")
})
```

POST API method:

```
const exp =
require('express') const GET
= require('./GET')
```

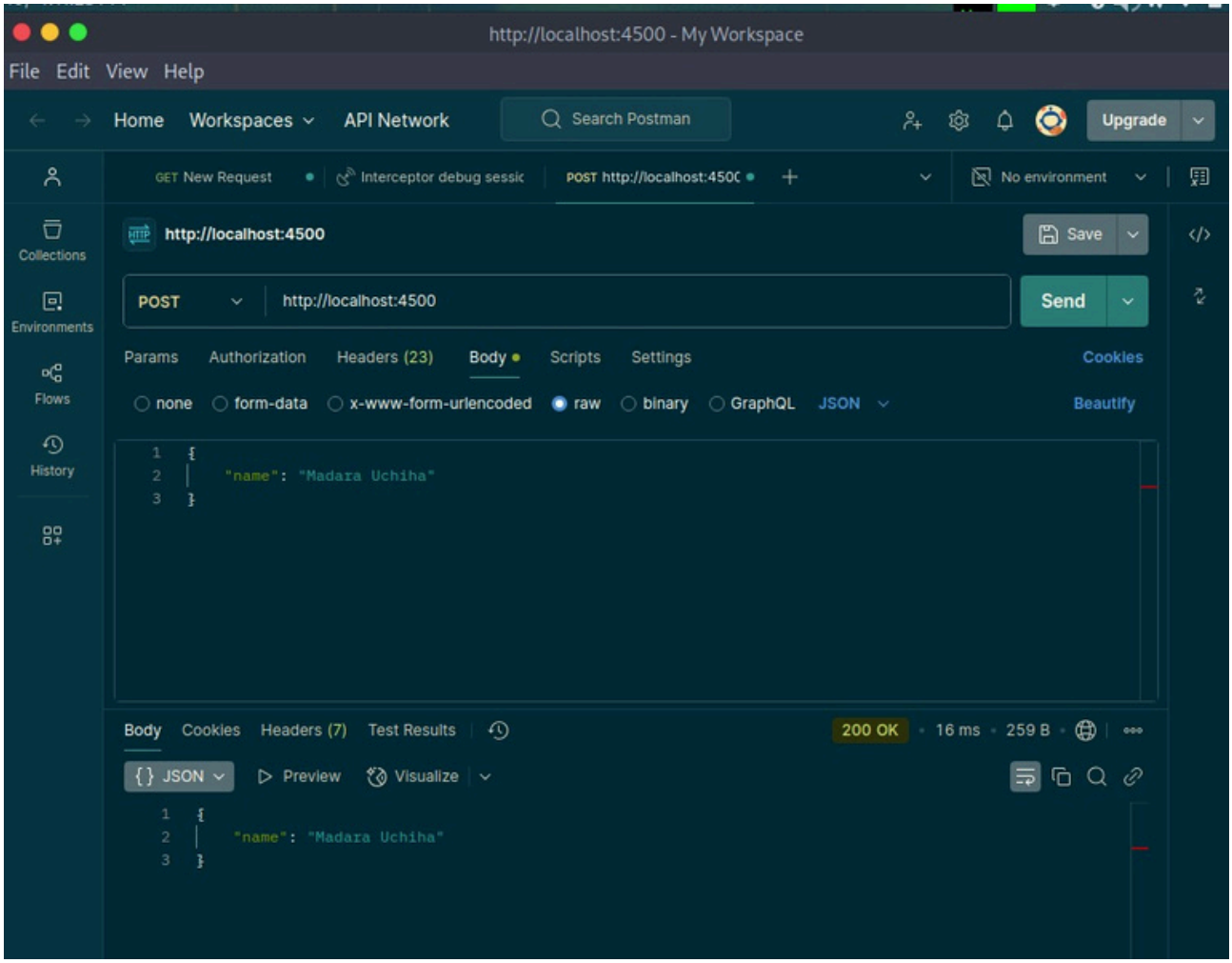
```
const app = exp()


// Now, here data is getting converted into the JSON format:
app.use(exp.json())


app.get('/data', async (req, resp) => {
    await GET(resp)
})
app.post('/', async (req, resp) => {
 // We can give "'/'" this to the GET and POST at a time, it doesn't contradict. If the Operation of GET is happening theh GET's "/" is working otherwise POST's
 // resp.send({ name: "Murlidhar" })
 // Remember that, POST sends one request at a time.
    // Now. we are taking a input from the Postman and giving an output.
    console.log(req.body)
    resp.send(req.body)
})
app.listen(4500, (err) => {
    console.log("It's running on the localhost 4500")
})
```

- Here, we are using the POSTMAN for performing all an operations:

Open the POSTMAN and put the listening link and then choose an operation.

- Here we are choosing the POST operation for performing the actions.

- Then, we go to the Body's section and then choose the JSON data structure. And putting all the data inside that.

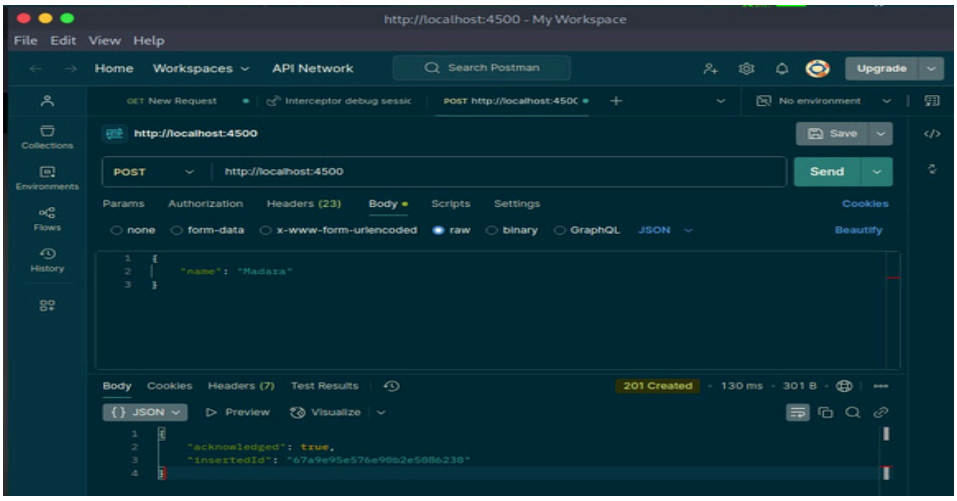


- Now, we are taking an input from the Postman and putting it in the MongoDB's collections

Now, we have to make some changes for the Data usages:

Post API's code:

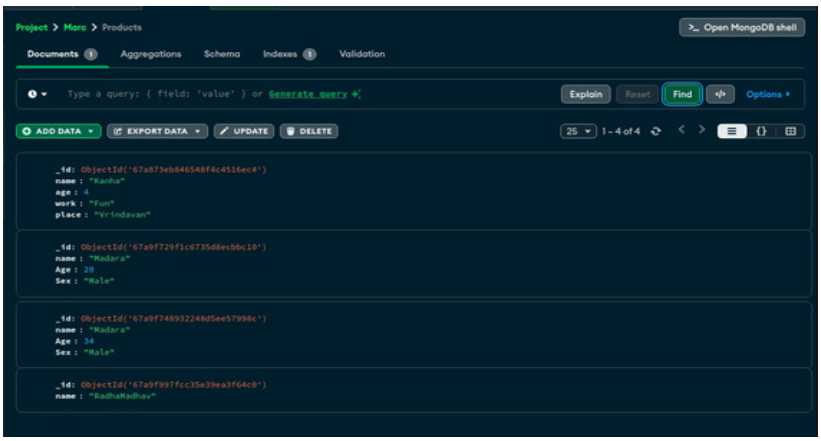
```
app.post('/products', async (req, resp) => {
  try {
    const collection = await dbConnection();
    const result = await collection.insertOne(req.body);
    resp.status(201).send(result);
  } catch (error) {
    console.error('Error inserting data:', error);
    resp.status(500).send('Internal Server Error: ' + error.message);
  }
});
```



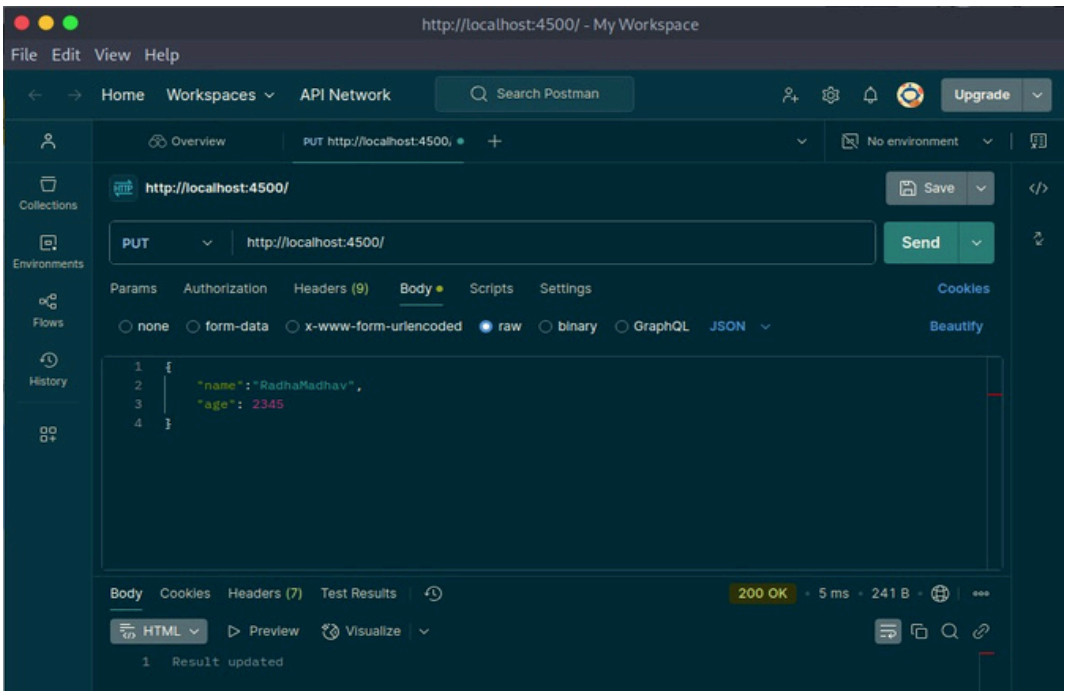
- Here, is how we can communicate with the data.

PUT API

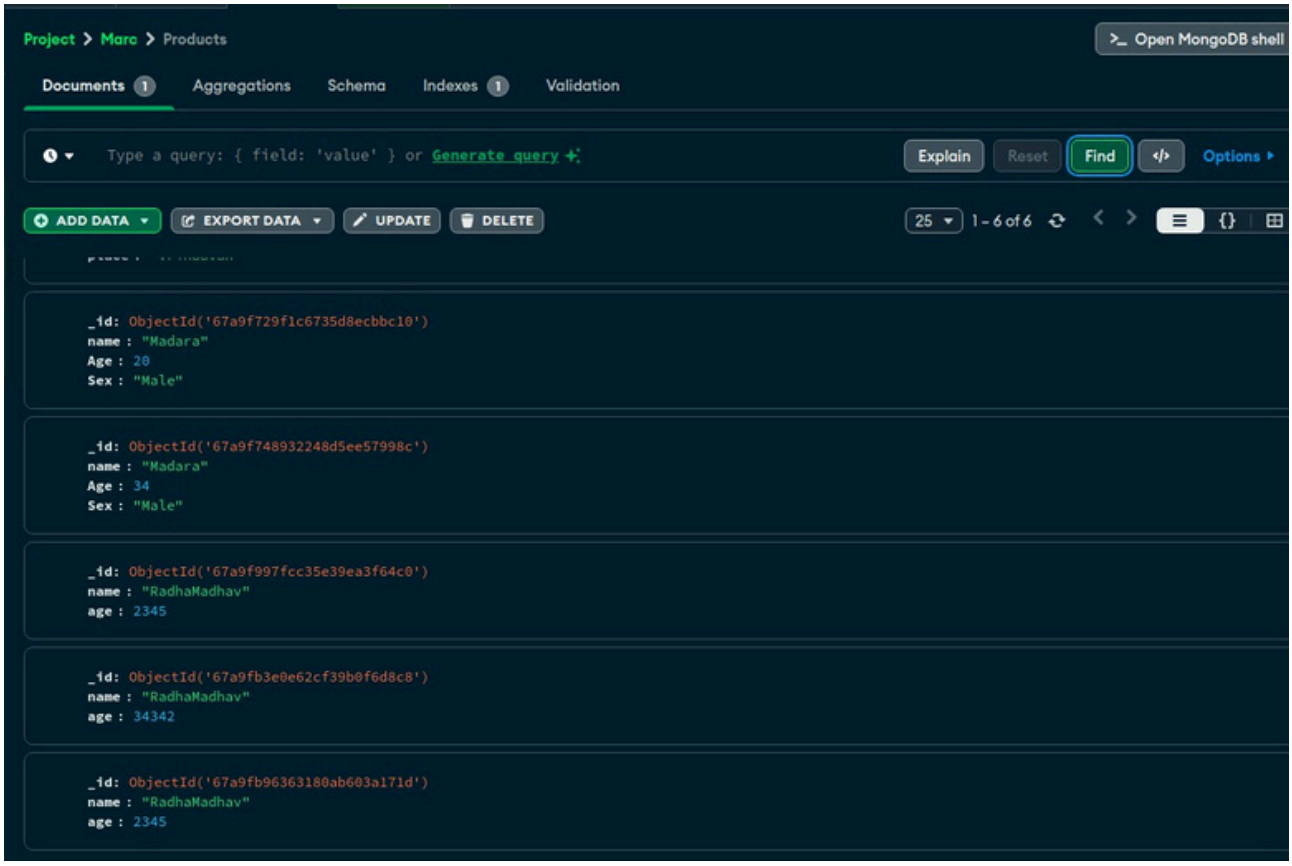
```
app.put("/", async (req, resp) => {

  // console.log(req.body)
  let data = await dbConnection()
  let result = data.updateOne(
    // {name: "Madara"}, {$set:{Age:20}} //This method is for updating manually
    { name: req.body.name }, //This one is for the dynamic data.
    { $set: req.body }
  )
  resp.send("Result updated")
})
```



- In the above one you can see that the data is not updated. After putting the PUT request from the POSTMAN it’s getting updated.



- Here, you can see that we are using the PUT request to update the data **dynamically**.

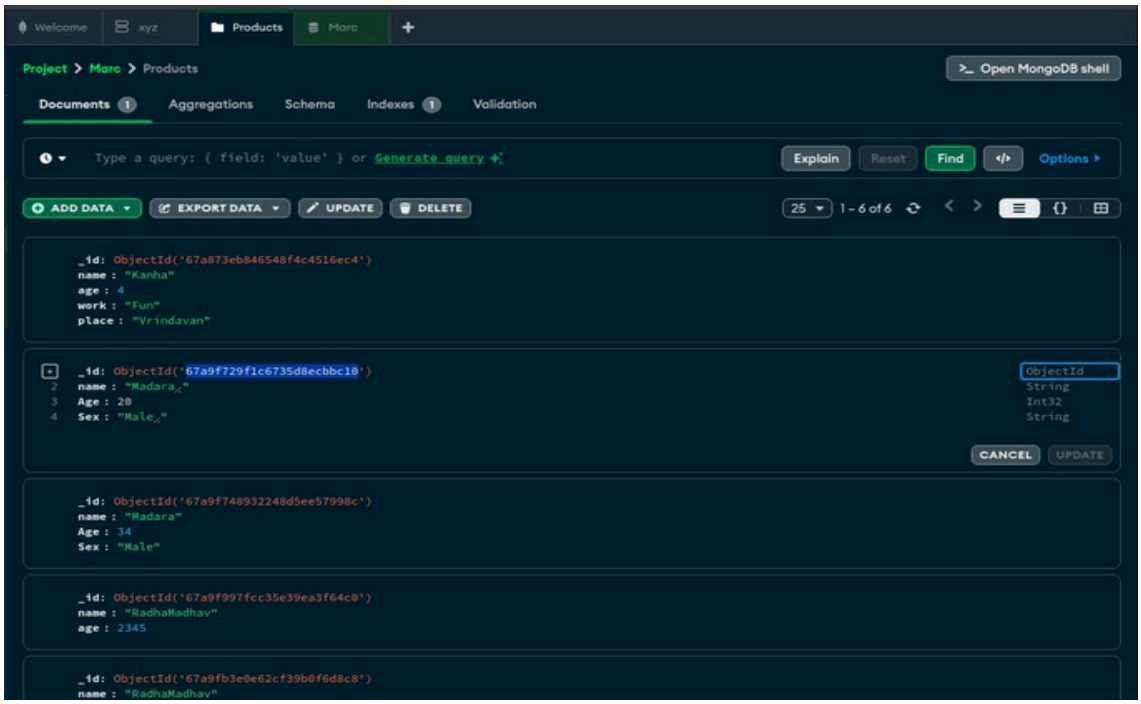


- Here, is the updated data.

- We can even send the data in the parameter format:

```
app.put("/:name", async (req, resp) => {
   // console.log(req.body)
   let data = await dbConnection()
   let result = data.updateOne(
      // {name: "Madara"}, {$set:{Age:20}} //This method is for updating manually
      { name: req.param.name },
      { $set: req.body }
   )
   r e s p . s e n d ( " R e s u l t  u p d a t e d " )
})
```

Delete API:



- We are deleting the Highlighted one ID:

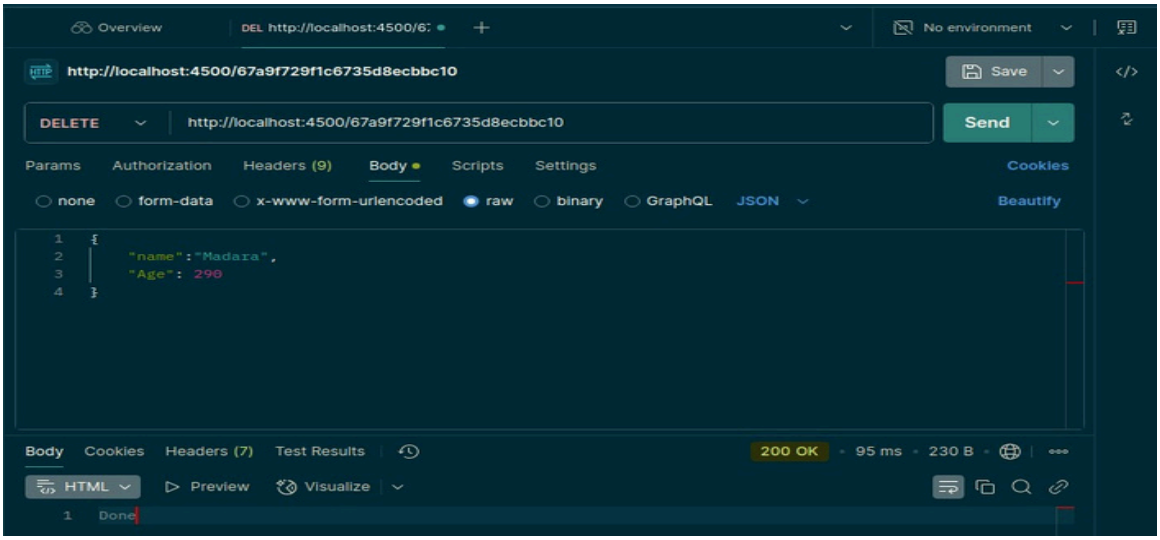
id: 67a9f729f1c6735d8ecbbc10

Now, Code:

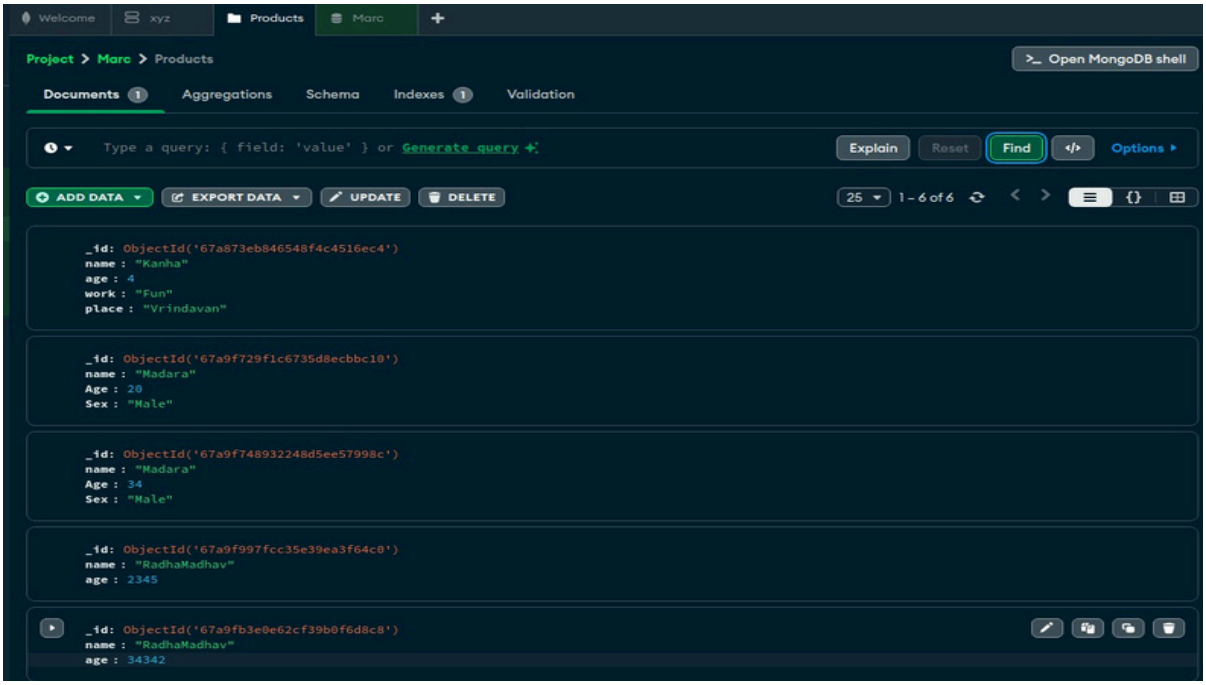
```
app.delete("/:id", async (req, resp) => {
   let data = await dbConnection()
   let result = await
   console.log(req.params.id)
```

```
    resp.send("Done")
})
```

- After performing the operation. It got successful.



- Now, the result is as follows:



- Here, you can see that in the result that Data is got deleted.

Code:

```
const exp = require('express')


const dbConnection = require('./mongodb')
```

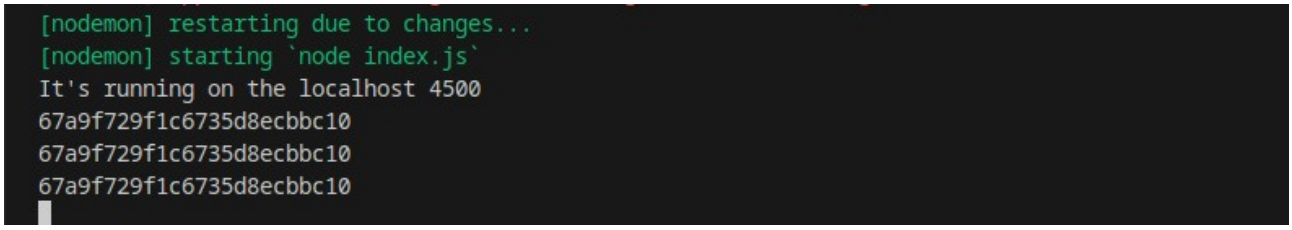
```
const app = exp()
const mongodb = require('mongodb')

app.use(exp.json())

app.get('/', async (req, resp) => {
    let data = await dbConnection()
    data = await data.find().toArray()
    console.log(data)
    resp.send({ data })
})

app.post('/', async (req, resp) => {
    try {
        const collection = await dbConnection();
        const result = await collection.insertOne(req.body);
        resp.status(201).send(result);
    } catch (error) {
        console.error('Error inserting data:', error);
        resp.status(500).send('Internal Server Error: ' + error.message);
    }
});

app.put("/", async (req, resp) => {
    let data = await dbConnection()
    let result = await data.updateOne(
        { name: req.params.name },
        { $set: req.body }
    )
    resp.send("Result updated")
})
```

```
app.delete("/:id", async (req, resp) => {
    let data = await dbConnection()
 let result = await data.deleteOne({ _id: new mongodb.ObjectId(req.params.id) })
console.log(req.params.id)
    resp.send(result)
})


app.listen(4500, (err) => {
    console.log("It's running on the localhost 4500")
})
```

- Here, we are creating a separate object for performing the id operation.

- And here we are not directly using the – “id”, instead of that we are using the - “_id”

- Here, how it shows an output in console:



Mongoose

In the MongoDB there are some limitations which full-fill by the Mongoose

- In the MongoDB’s we were not able to use the **Model** and **Schema**.

  - E.g.: While entering the data there is some specific data that you want but user put some extra data. That data is taken by the MongoDB.

So, to make this proper thing we can make the **schemas** in the **Mongoose** and stop it.

- Here, we can identify the specific values according to our need. Like, specific data type input in the data.

Click here to go the Mongoose package manager at the “yarn”

```
yarn add mongoose | npm i mongoose
```

-Required packages:

- nodemon
- mongodb

Now, what is mean by Schemas?

-> It validates the field in the Database.

What is model?

-> It uses the Schema and then make a connection between the NodeJS and MongoDB

Code for inserting with Particular conditions:

```
const mongoose = require('mongoose')

// Importing the "moongose"

const url = "mongodb://localhost:27017/Marc"

// Here, we are providing the databases's name.

const main = async () => {

await mongoose.connect(url)


   // Here, we are making an Schema:

 const ProductSchema = new mongoose.Schema( //Here, we are making an object

      {

         name: String

      }

   )

 const ProductsModel = mongoose.model('Products', ProductSchema) //Here, we are passing the collection name and rules

 let data = new ProductsModel({ name: "m19" })
```

```
    let result = await data.save()

    console.log(result)

}

main()
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS        node - Mongo_0.4

┌─[root@parrot]─[/home/keren/Code3/MongoDB/MongoDB/Mongo_0.4]
└──╼ #nodemon index.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 index.js`
{ name: 'm19', _id: new ObjectId('67ab8126ba3fe57eaf714a20'), __v: 0 }
```

Data in the MongoDB:

```
Marc> db.products.find()
[
  { _id: ObjectId('67ab7dd0b6de9d3f3d7d1366'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7dd98e65dadb8ba471d6'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7eb5539d5f02a525c827'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7ec5be0c60954b81a9da'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7eca672afe982b0e9929'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7f09f2d89896264210cf'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7f3fe48b1bdd9a113b6f'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab7fc727017c2719f0ad8a'), name: 'm19', __v: 0 },
  { _id: ObjectId('67ab7fff6b87206e545307ce'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab8084d1a65ae734e6da2b'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab810d88c9b349b2d65722'), name: 'm8', __v: 0 },
  { _id: ObjectId('67ab811a71aed44cbda02010'), name: 'm19', __v: 0 },
  { _id: ObjectId('67ab8126ba3fe57eaf714a20'), name: 'm19', __v: 0 }
]
Marc>
```

CRUD with

Mongoose:

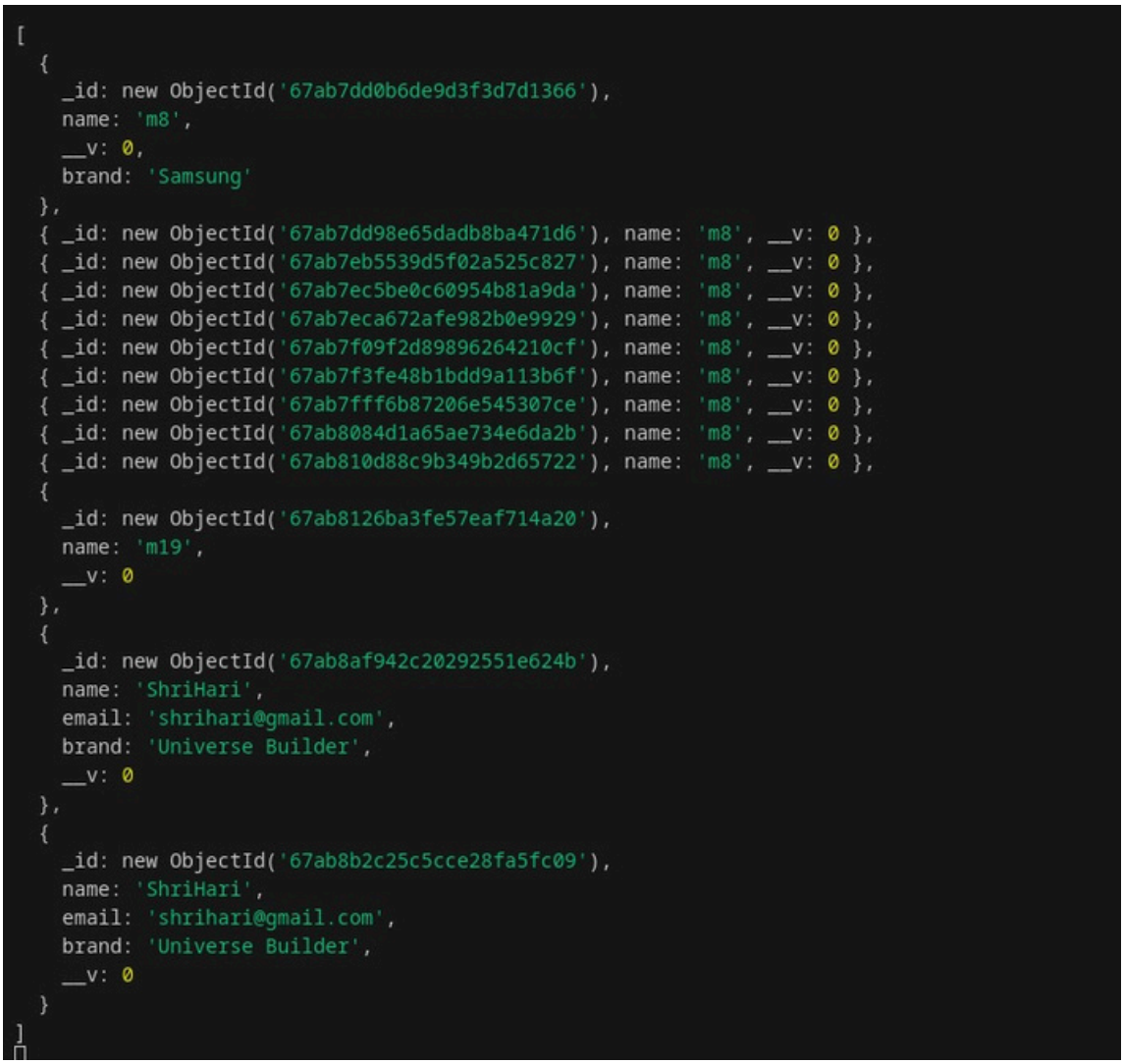
- Here, we are performing the CRUD operation on the Data.

Code:

```
const mongoose = require('mongoose')

const url = 'mongodb://localhost:27017/Marc'



mongoose.connect(url);
```

```
const userSchema = new mongoose.Schema({
name: String,  age: Number,  email: String,



    brand: String,
});


const User = mongoose.model('Products', userSchema);


const SaveInDB = async () => {
    let data = new User({
        name: "ShriHari",
        aga: 1,
        email: "shrihari@gmail.com",
        brand: "Universe Builder"
    })


    let result = await data.save()


    console.log(result)
}


const updateInDB = async () => {
    // Here, we are upadting the data for the "m8"
 let data = await User.updateOne({ name: "m8" }, { $set: { brand: "Samsung" } })
    // Here, we don't need to save the data.
```

```
    // let result = await data.save()
    console.log(data)
}
const deleteInDB = async () => {
let data = await User.deleteOne({ name: "m19" })
    // let result = await data.save()
    console.log(data)
} const find = async () => {

    let data = await User.find({})
    console.log(data)
} SaveInDB() updateInDB() deleteInDB() find() - You can changes the MongoDB's
query to get your data according to your condition.
```



- There are different types of an Output. But, most of them are vanished after using the Delete function.

- But, you can check all the files according to your needs.

POST API with Mongoose:

- Require packages:

- nodemon
- mongoose
- mongodb
- express

- Make three files with name of the:

- - config.js
- - Product.js
- - index.js

Code of config.js:

```
//Here, we are making the separate connection.
const mongoose = require('mongoose') const uri =
"mongodb://localhost:27017/Marc"
mongoose.connect(uri)
```

Code of Product.js:

```
const mongoose = require('mongoose') const
productSchemas = new mongoose.Schema({
name: String, price: Number,


  brand: String,
  category: String
}) module.exports = mongoose.model('products',
productSchemas)
```

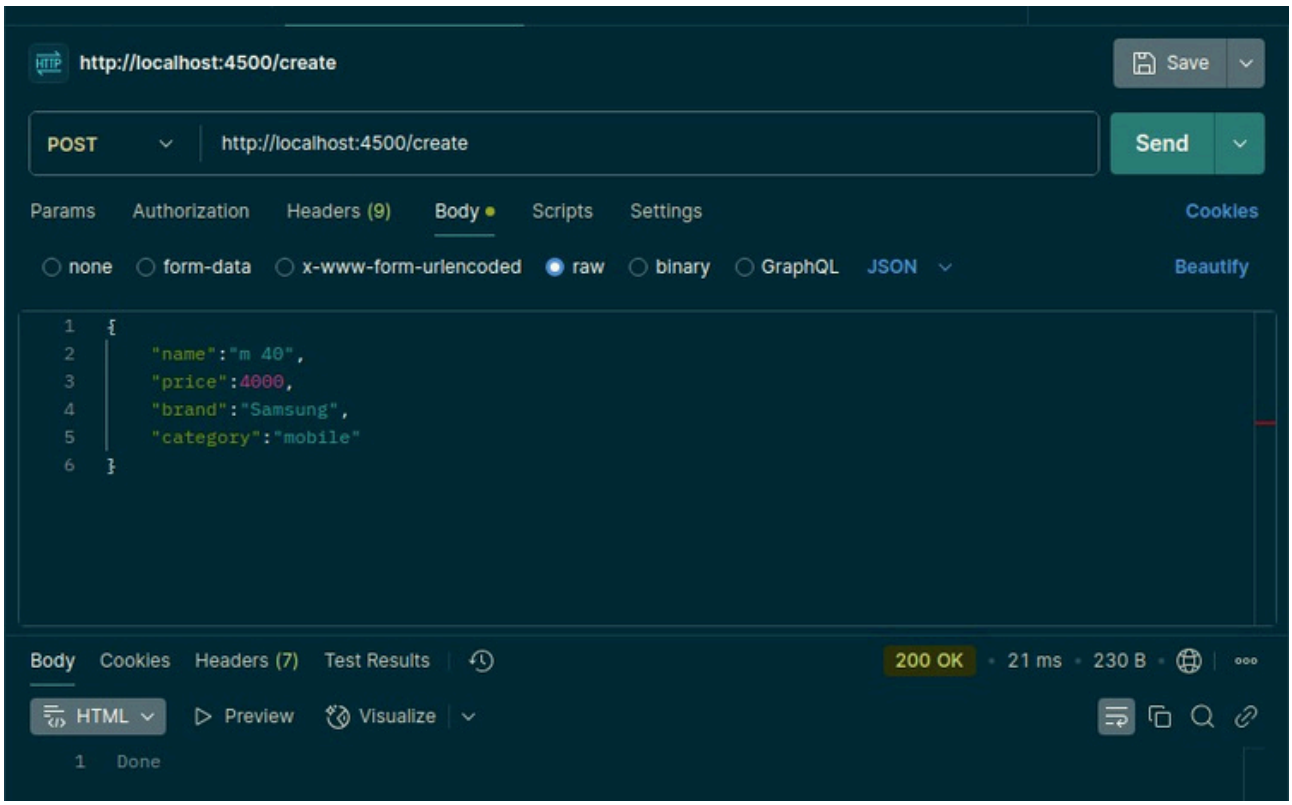
code of index.js:

```
const express = require('express')
require('./config')
```

```
const Product = require('./Product')

const app = express()

app.use(express.json()) //This is used for taking the data from the Body and it will automatically convert it into the JSON file.

app.post("/create", async (req, resp) => {

    let data = new Product(req.body)

    // Here, we are gettinng that data from the ""

    resp.send("Done")

    console.log(req.body)

 // Now, saving the data inside the MongoDB database

    let result = await data.save()

    console.log(result)

})

app.listen(4500)
```

- Output:

And, input from the POSTMAN's API:

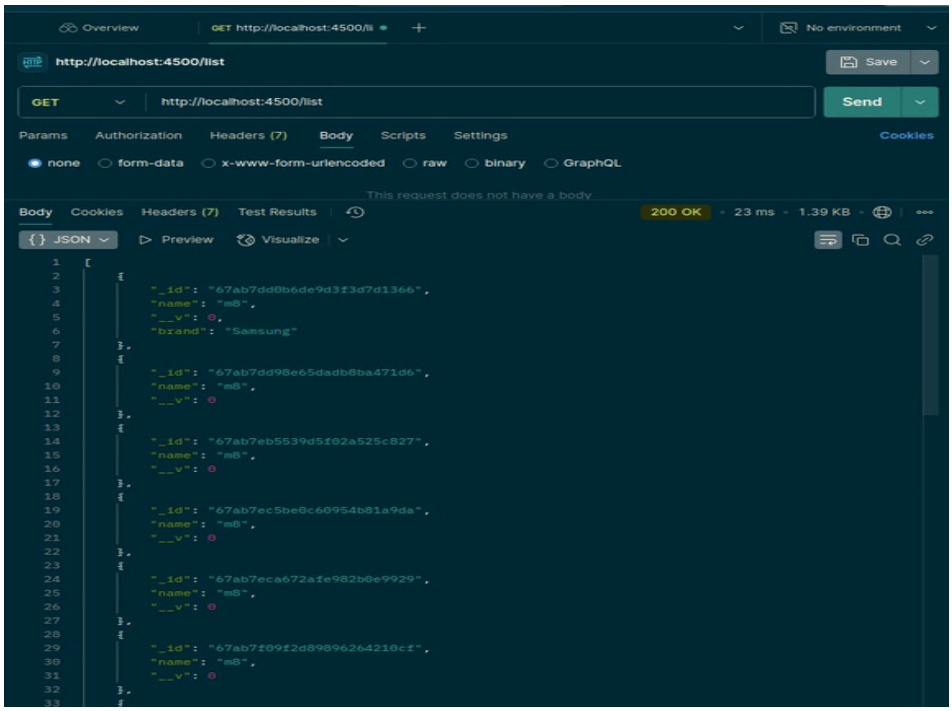


Now, the data got in the MongoDB's database:

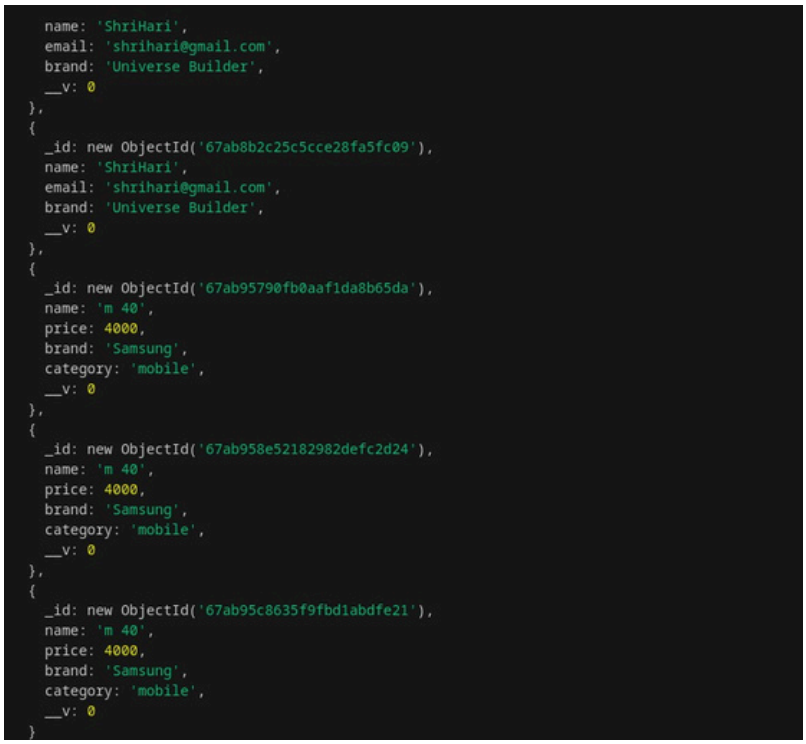
GET API's:

```
app.get("/list", async (req, resp) => {
    let data = await Product.find()
    resp.send(data)
    console.log(data)
})
```

Output:



And output from the console:

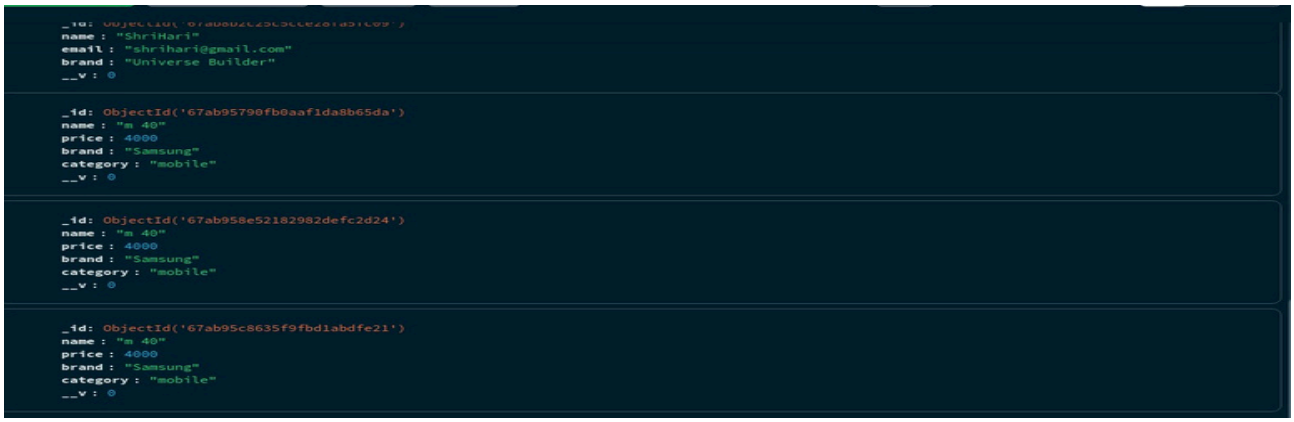


DELETE API's Code:

```
app.delete("/delete/:_id", async (req, resp) => {

console.log(req.params)

let data = await Product.deleteOne(req.params)

    resp.send("done")

})
```

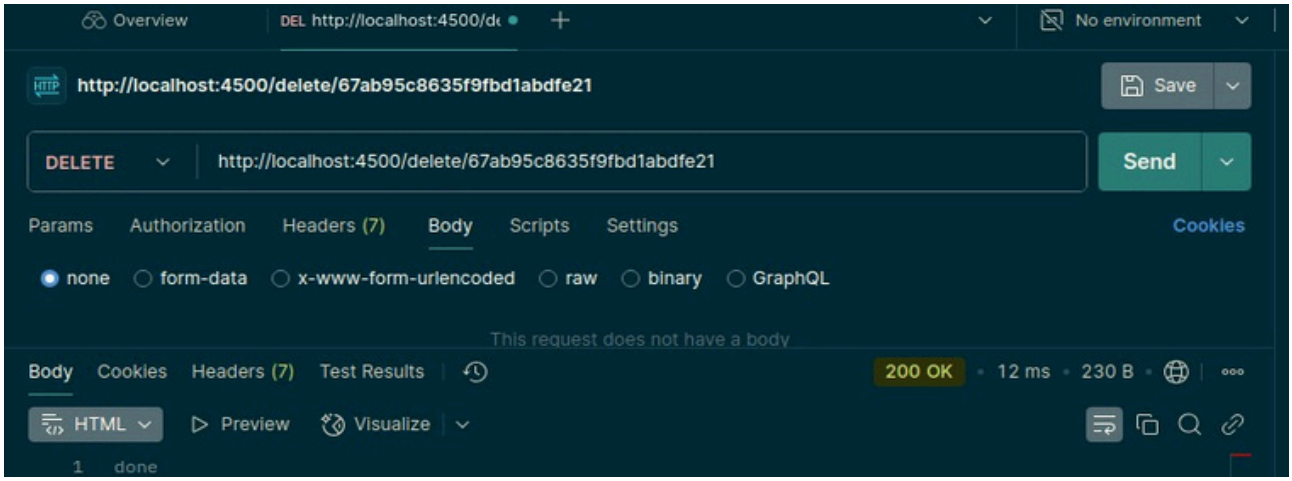
- Here, we are passing an Object's ID.

Before deleting the Data:



Now, we are taking the last one's object ID:

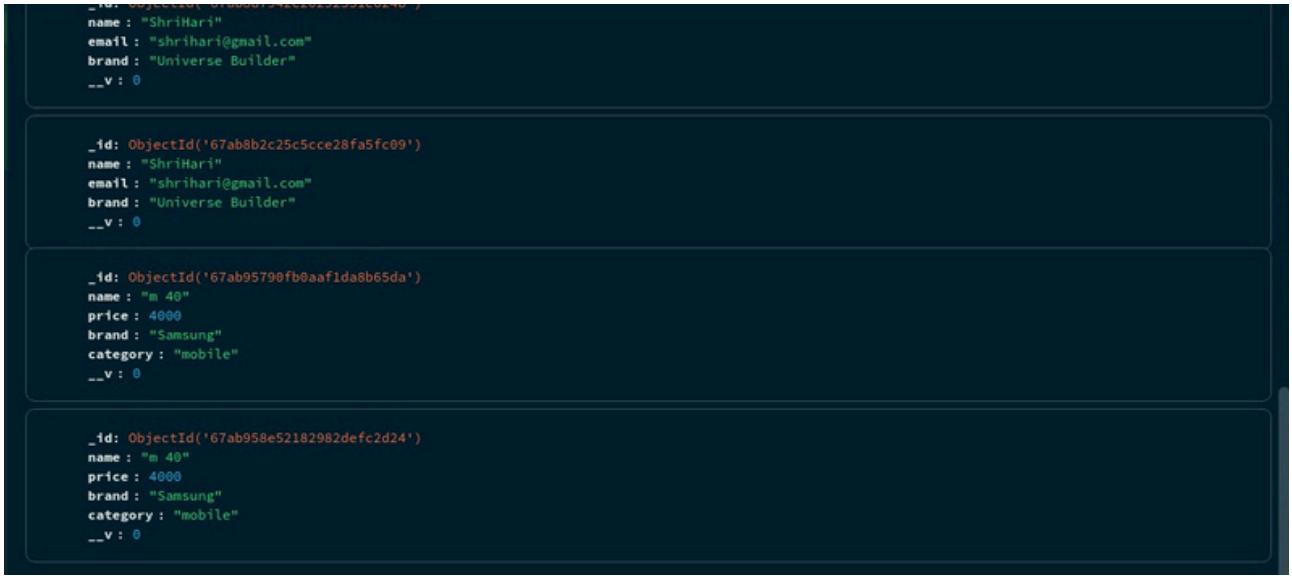
```
67ab95c8635f9fbd1abdfe21
```



- After performing this operation, we will get an output in console also.

```
┌─[root@parrot]─[/home/keren/Code3/MongoDB/MongoDB/Mongo_0.5]
└──╼ #nodemon index.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 index.js`
Port is running on the localhost 4500
{ id: 'max' }
[nodemon] restarting due to changes...
[nodemon] starting `node index.js`
Port is running on the localhost 4500
{ id: '67ab95c8635f9fbd1abdfe21' }
```

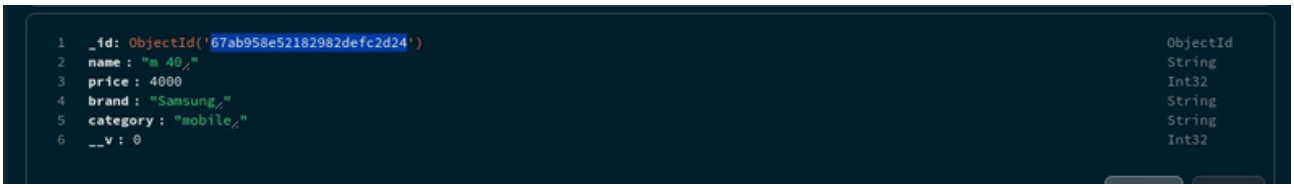
Now, an output in the MongoDB's database is like:



PUT's Update's API's Code:

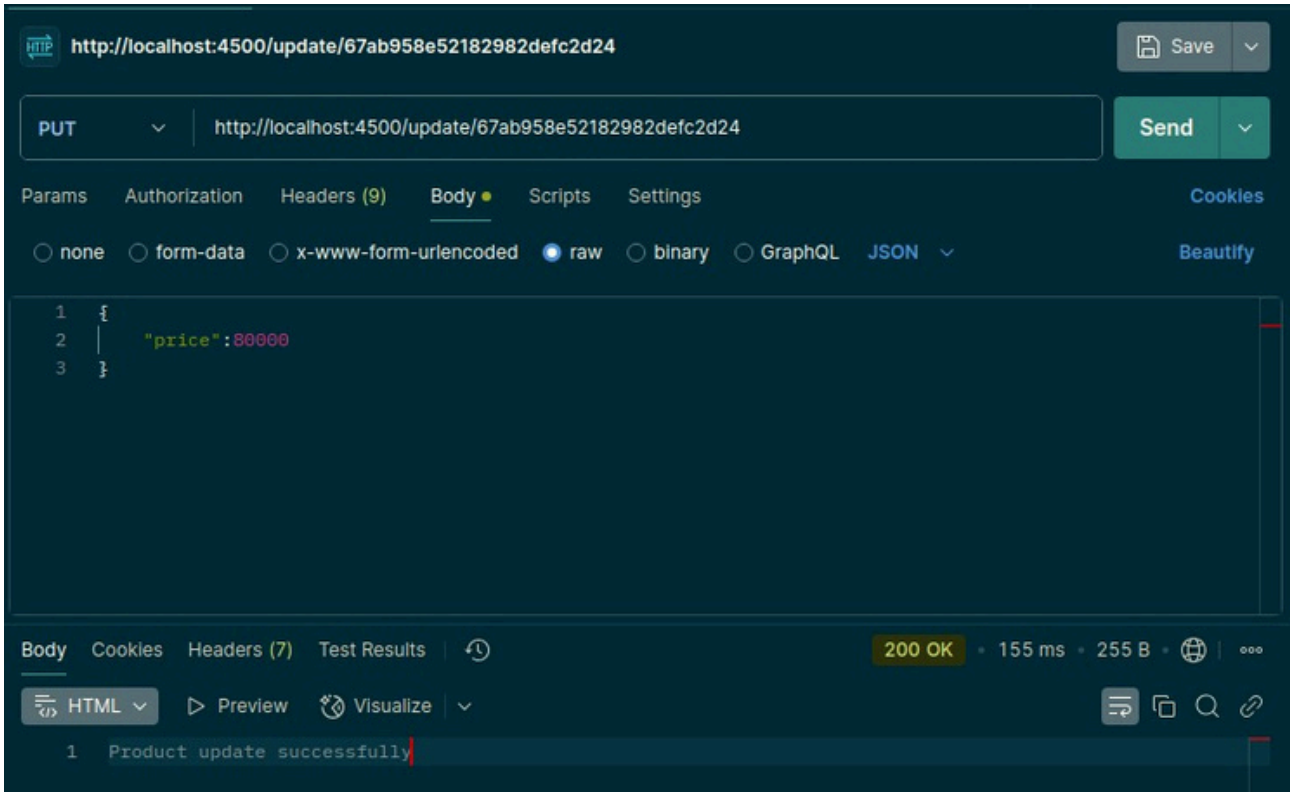
```
app.put("/update/:_id", async (req, resp) => {


  try {

    const productId = req.params._id

    const updateData = req.body



    let data = await Product.findByIdAndUpdate(productId, updateData, { new: true })
```

```
    if (data) {
        let result = await data.save()
        console.log(result)
        resp.status(200).send("Product update successfully")
    }
    e l s e    {
        res.status(404).send("Product not found")
    }
  } catch (error) {
    console.error("Error updating products:", error)
    res.status(500).send("Internal server error")
  }
} )
```



- Here, the price is 4000, and now we are updating that price with the Object ID:

Postman’s data:



- Terminal's output.

Final Code of the Mongoose CRUD API's:

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

```
require('./config')
const Product = require('./Product')
const app = express()

app.use(express.json()) //This is used for taking the data from the Body and it will automatically convert it into the JSON file.
app.post("/create", async (req, resp) => {
    let data = new Product(req.body)
    // Here, we are gettinng that data from the ""
    resp.send("Done")
    console.log(req.body)
 // Now, saving the data inside the MongoDB database
    let result = await data.save()
    console.log(result)
})

app.get("/list", async (req, resp) => {
    let data = await Product.find()
    resp.send(data)
    console.log(data)
})

app.delete("/delete/:_id", async (req, resp) => {
 console.log(req.params)
 let data = await Product.deleteOne(req.params)
    resp.send("done")
})

app.put("/update/:_id", async (req, resp) => {

    try {
        const productId = req.params._id
```

```
        const updateData = req.body

        let data = await Product.findByIdAndUpdate(productId, updateData, { new: true })

        if (data) {
            let result = await data.save()
            console.log(result)
            resp.status(200).send("Product update successfully")
        }
        e l s e     {
            res.status(404).send("Product not found")
        }
    } catch (error) {
        console.error("Error updating products:", error)
        res.status(500).send("Internal server error")
    }
} )



app.listen(4500, () => {
    console.log("Port is running on the localhost 4500")
})
```

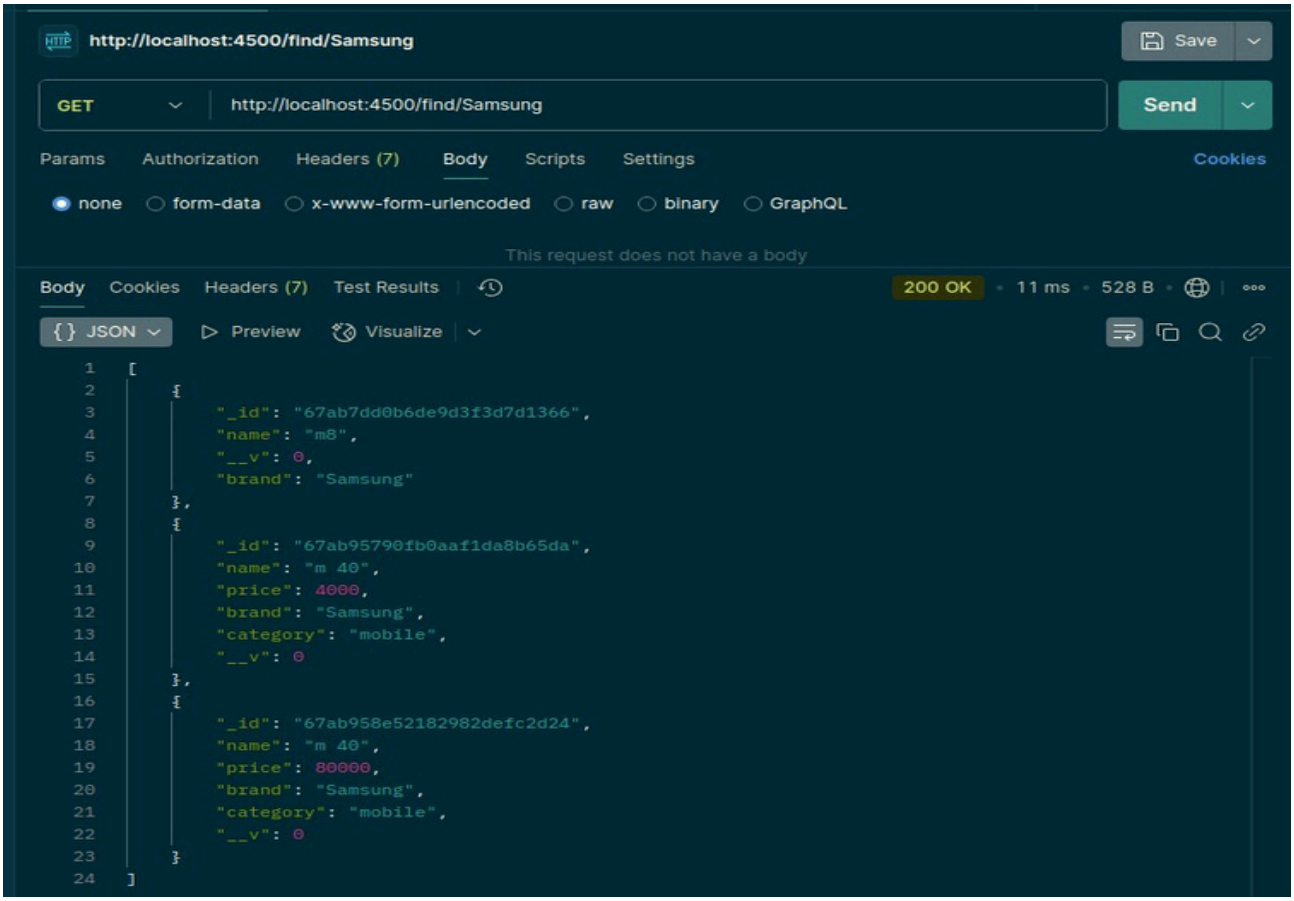
Search API in Mongoose:

Code:

```
app.get("/find/:key", async (req, resp) => {
```

```
const key = req.params.key;

   // let data = await Product.find({ brand: key }) //This is normal method to find the data from the database

   // Now, we are working with the "regex"

   let data = await Product.find({

      "$or": [

         { "brand": { $regex: key } }

      ]

   })

   resp.send(data)

})
```

- The key should be **case – sensitive**.



- Now, we want to search different types of data in the field then we are using the:

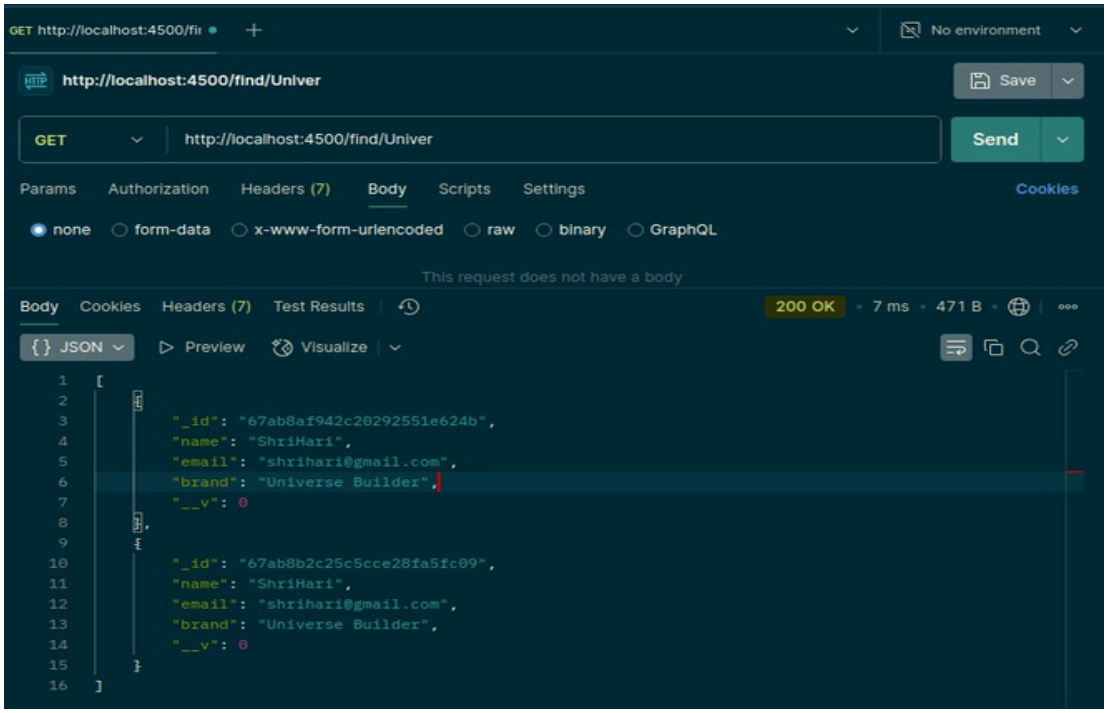
```
$or:[]
```

- You can add as much as field that you want to get the result.

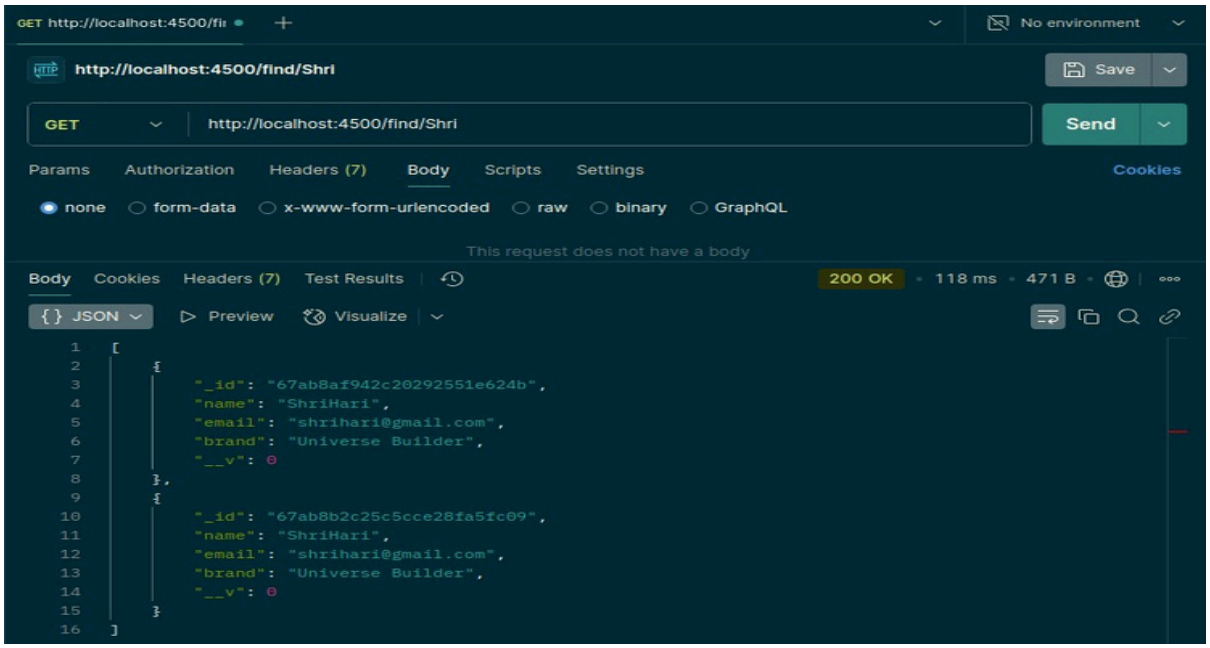
```
app.get("/find/:key", async (req, resp) => {
 const key = req.params.key;
   let data = await Product.find({
   //Here, "$or":[] - It is used for the finding multiple data field at once, without changing the data
- types
      "$or": [
        { "name": { $regex: key } },
        { "brand": { $regex: key } }
      ]
   })
   resp.send(data)
})
```

- Output:

Here, you can see we are just searching the – “Univer”, and it shows me the data.



And, one more thing that. Now, we are trying to search the data with name:



Question: Can we search using the DELETE, POST, and PUT method?

-> Yes, we can do that. But, as per Coding standard it’s not recommended to do that.

Upload File:

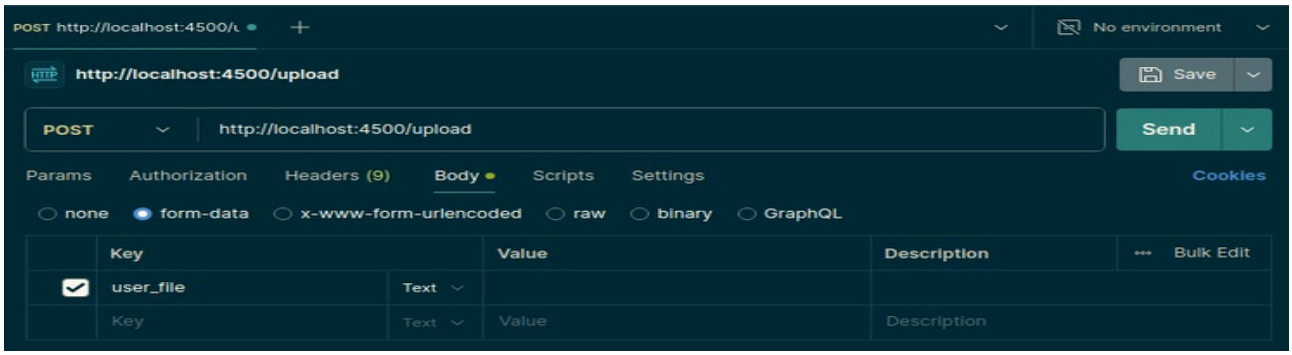
- Here, we are installing the – **multer** package

```
yarn add multer
```

- Code will be given later:

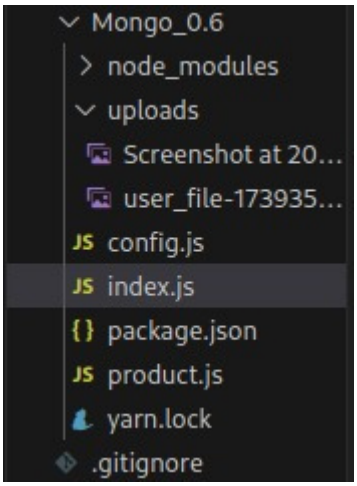
Steps from the POSTMAN API's application:

- Choose the **POST** method, and then choose the ***form-data*** after that put the some value in the **key**



- After that choose the **files** instead of the texts, and upload it.

Now, directories order:



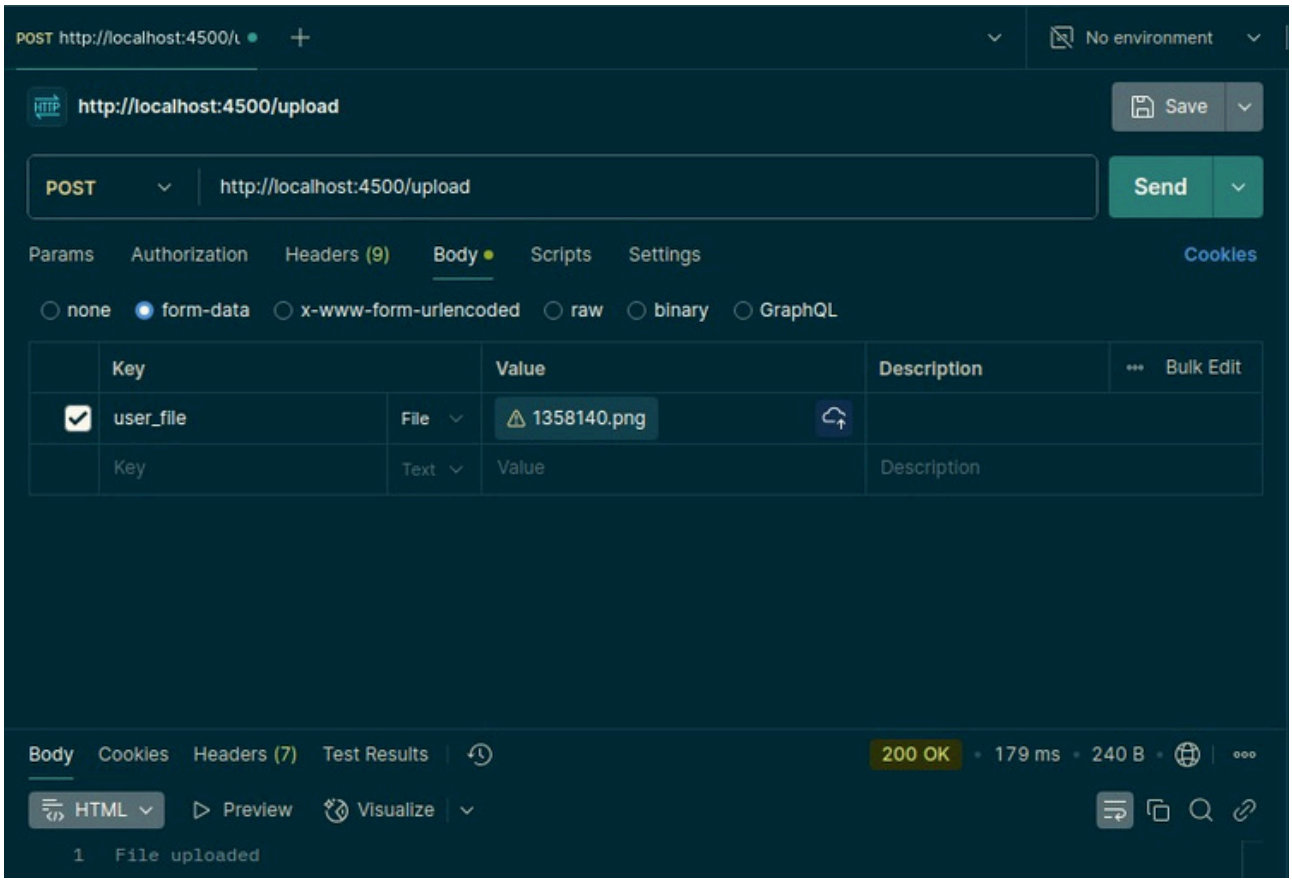
Code:

```
const express = require('express')
const multer = require('multer')
require('./config')
const Product = require('./product')


const app = express()


const upload = multer({
storage: multer.diskStorage({
        destination: function (req, files, cb) {
            cb(null, "uploads") //"uploads" -> It is a destination directory
        },
        filename: function (req, file, cb) {
            cb(null, file.fieldname + "-" + Date.now() + ".jpg")
        }
    })
    //Here, we are defininng the should we have to upload the - "single" file or "multiple" file at a time
}).single("user_file") //Here, we are definin the parameter of the function


app.post("/upload",upload, async (req, resp) => {
    resp.send("File uploaded").status(200)
})
```

```
app.listen(4500, (err) => {
  if (err) {
    console.error("Error occurred", err)
  }
  e l s e   {
    console.log("Site is running on the 4500 port")
  }
} )
```

- Here, you can see that we are uploading the file from the different directories.

And stores data inside the – “upload directories”



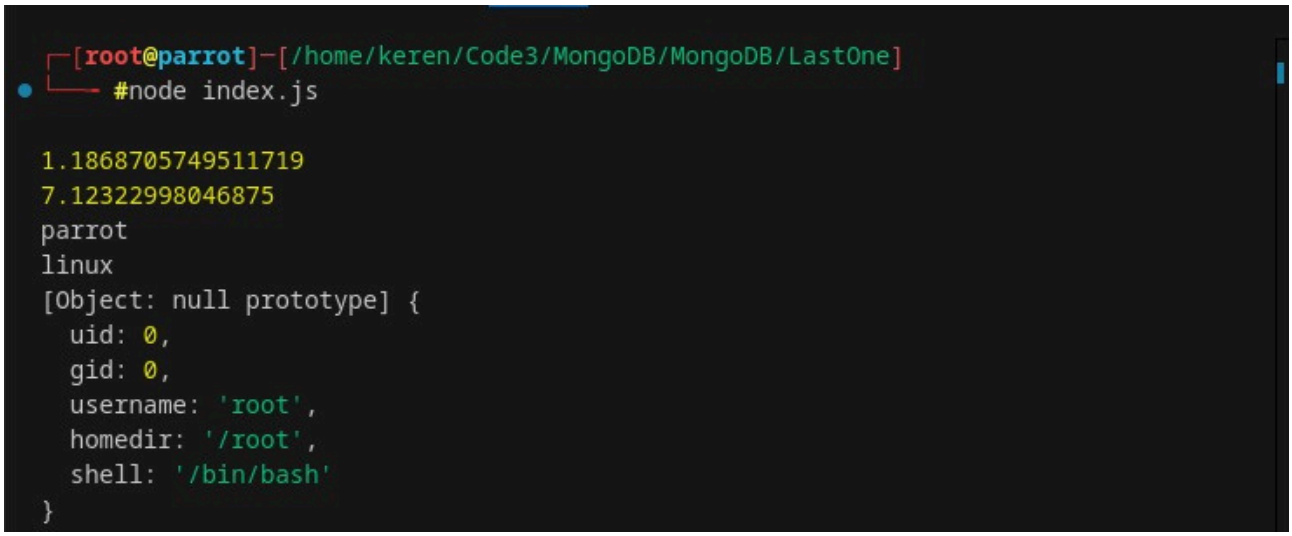
- Here, you can see that the file has been updloaded inside the upload directory.

OS Module:

It is for the Operating System's information

```
const os = require('os')

// console.log(os)

console.log(os.freemem()/(1024*1024*1024)) //Just some memeory

console.log(os.totalmem()/(1024*1024*1024)) //Shows the totla memory in the system.



// Now, checking the HOSTName

console.log(os.hostname())

console.log(os.platform())


console.log(os.userInfo())
```

Output:



Events and Event Emitter in NodeJS:

- In simple language, **event** means the signal. It's like the ReactJS's **onClick** event

- Buttons are made up in the HTML, CSS and JS but and it is called through the API of the NodeJS's

- Event is also inbuilt module inside the NodeJS.

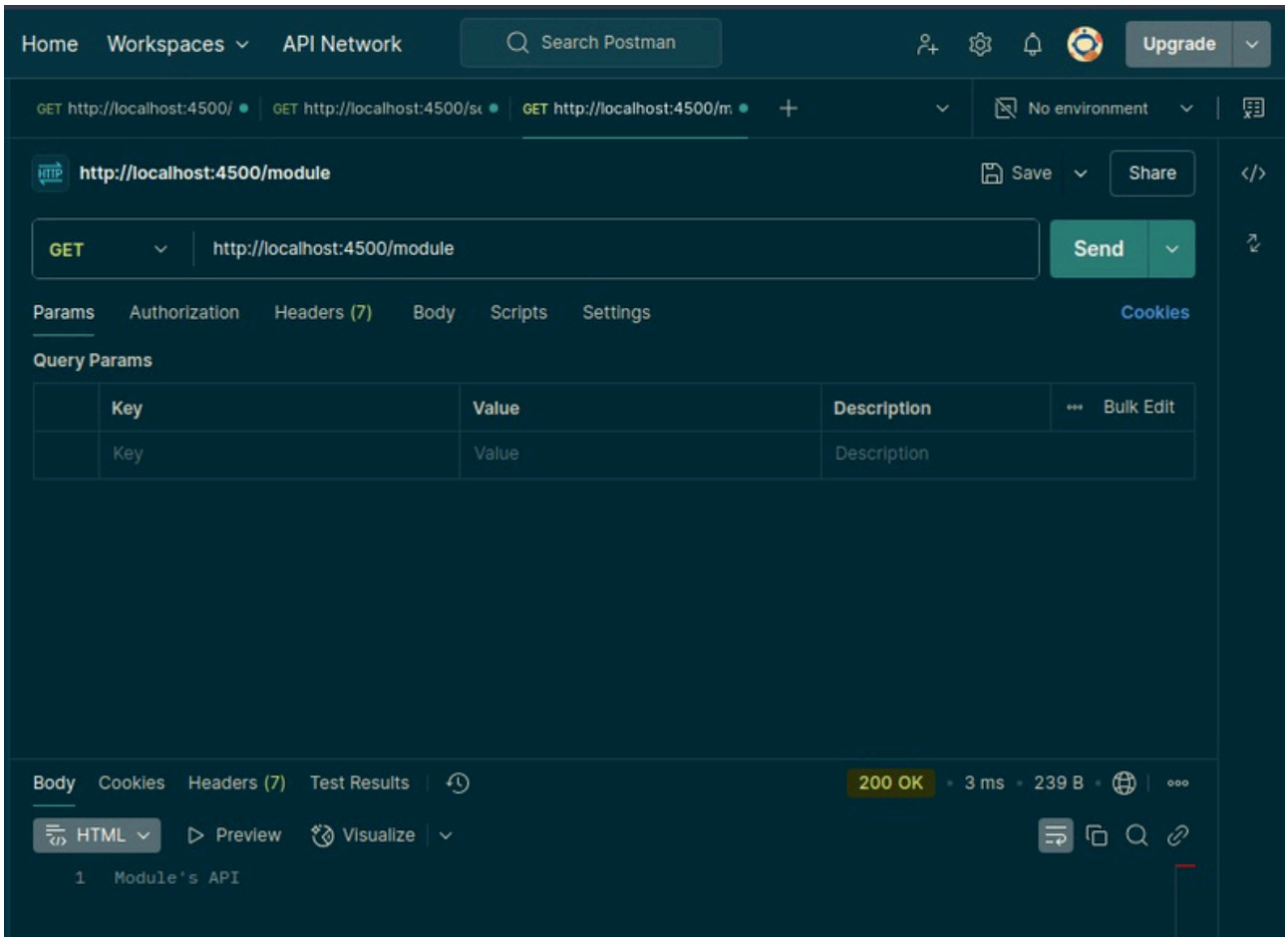
Code:

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



// Here, we are taking some capital letter's "EventEmitter", this is because it's an object and it's a function


const EventEmitter = require('events')



const app = express()

let count = 0;

// Now, we want to count that how many API's are inside in my project. So, that's why we are making an event

const event = new EventEmitter()


event.on("CountAPI", () => {

    count++;

    console.log(`Event called ${count}`)

})


app.get("/", async (req, resp) => {

resp.send("Main API")
```

```
 event.emit("CountAPI")
})

app.get("/search", async (req, resp) => {
    resp.send("Search API")
     event.emit("CountAPI")

})

app.get("/module", async (req, resp) => {
resp.send("Module's API")
event.emit("CountAPI")

})

app.listen(4500, (err) => {
   if (err) {
       console.error("Error occurred", err)
   }
   e l s e    {
       console.log("Site runningg on the PORT 4500")
   }
} )
```

- Output:

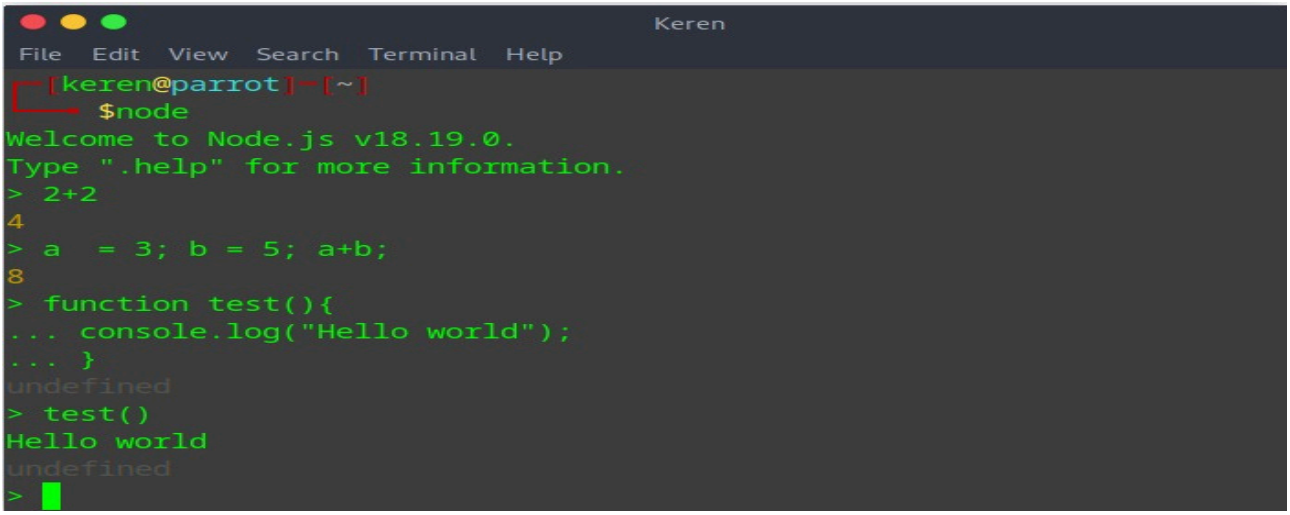
```
┌─[root@parrot]─[/home/keren/Code3/MongoDB/MongoDB/LastOne]
└──╼ #nodemon Event.js
[nodemon] 3.1.9
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,cjs,json
[nodemon] starting `node Event.js`
Site runningg on the PORT 4500
Event called 1
Event called 2
Event called 3
Event called 4
Event called 5
Event called 6
```



- By changing the different API's and performing an Event operation. It will get completed.

REPL (Read – Eval (Evaluation) – Print – Loop)

- It is a command line tool of the NodeJS's where you can run the NodeJS's and JS's code on that.

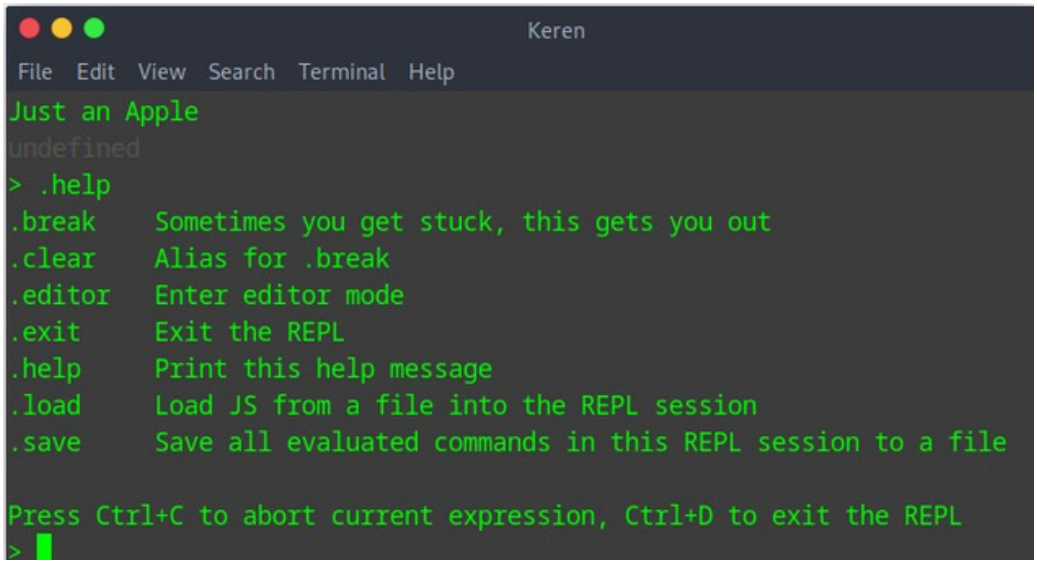


- This is just for the very simple operations. But, we need the editor of the NodeJS's then we use given below command:

.editor

```
> .editor
// Entering editor mode (Ctrl+D to finish, Ctrl+C to cancel)
function apple(){
console.log("Just an Apple")
}
apple()

Just an Apple
undefined
```

To know more about this: .help



Question:

```
const x = 10

console.log(x++)
```

-> We have taken the **const** that's why **x** will not be change, and gives an error

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Libraries():

- - filter(): //Used to filter out the particular things from the set
- - console.warn(): //It gives a particular warning and warning symbol.
- - setTimeOut(): //It used to delay the output and apply a particular time boundation on the output