

The screenshot shows the Visual Studio Code interface. The Explorer sidebar on the left displays the project structure for a MERN2 application. The file tree includes:

- JS user.js routes/api
- JS server.js (selected)
- MERN2
 - _description
 - .vscode
 - config
 - db.js
 - default.json
 - node_modules
 - routes/api
 - auth.js
 - post.js
 - profile.js
 - user.js
 - .gitignore
 - .prettierrc.json
 - package-lock.json
 - package.json
 - server.js

The main editor area shows the content of `server.js`:

```
1 //Import EXPRESS
2 const express = require("express");
3
4 //Import logic to CONNECT to a DATABASE
5 const connectDB = require("../config/db");
6
7 //Initialize a main APP variable
8 const app = express();
9
10 //Create a CONNECTION to DATABASE
11 connectDB();
12
13 //Create MAIN routes
14 app.use("/api/user", require("../routes/api/user"));
15 app.use("/api/profile", require("../routes/api/profile"));
16 app.use("/api/post", require("../routes/api/post"));
17 app.use("/api/auth", require("../routes/api/auth"));
18
19 //Create a variable to store port for server
20 const PORT = process.env.PORT || 5000;
21
22 //Create an APP LISTENER.
23 app.listen(PORT, () => {
24   console.log(`Server was started on port ${PORT}`);
25 });
26
```

MERN STACK

Social network

DevConnector

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1. Introduction.

There will be a general information about project, MERN stack and all side technologies

1.x VSCode

1.x.1 Prettier set up

<https://glebbahmutov.com/blog/configure-prettier-in-vscode/#settings>

VSCode setup

To use the Prettier we have just installed from VSCode we need to install the [Prettier VSCode extension](#):

1. Launch VS Code Quick Open (Ctrl+P)
2. Run the following command

```
1 ext install esbenp.prettier-vscode
```

Because you might have global settings related to code formatting, I prefer having in each repository a file with local workspace VSCode settings. I commit this file `.vscode/settings.json` to source control to make sure everyone uses the same extension to format the code.

```
.vscode/settings.json
1 {
2   "editor.defaultFormatter": "esbenp.prettier-vscode",
3   "editor.formatOnSave": true
4 }
```

Now every time we save a JavaScript file, it will be formatted using Prettier automatically. Here is me formatting `projectA/index.js`

2. Express & MongoDB Setup

2.1. MongoDB Atlas Setup

2.1.1 Create an account at MongoDB.com

2.1.2 Log in at MongoDB.com

2.1.3 Create a new project at mongoDB.com

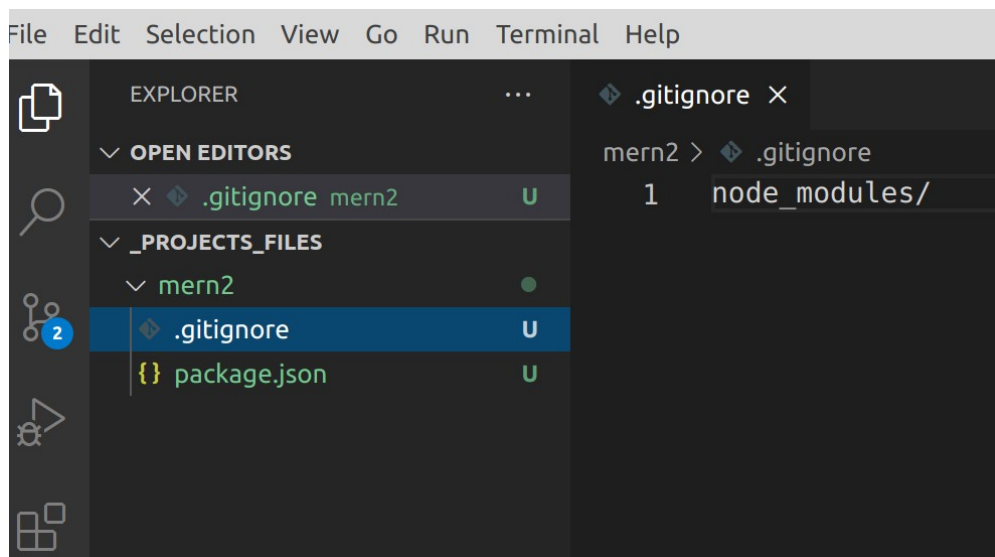
2.1.4 Create a new cluster

2.1.5 Create a new user

2.1.6 Change whitelist of IP addresses

2.2 Install Dependencies & Basic Express Setup

2.2.1 Create a file .gitignore. Add to that file folder node_modules/



2.2.2 Create GIT repository with [CLI=> git init]

2.2.3 Create NPM with [CLI=> npm init]

2.2.4 Install all the regular dependencies

[CLI=> npm i express express-validator bcryptjs config gravatar jsonwebtoken mongoose request]

2.2.5 Install all the developer dependencies

[CLI=> npm i -D nodemon concurrently]

2.2.6 Create a main entry file – server.js

[CLI=> touch server.js]

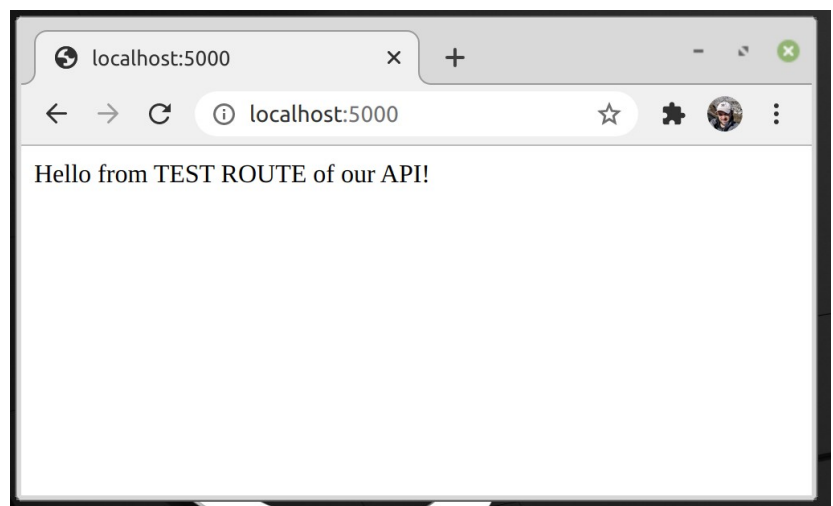
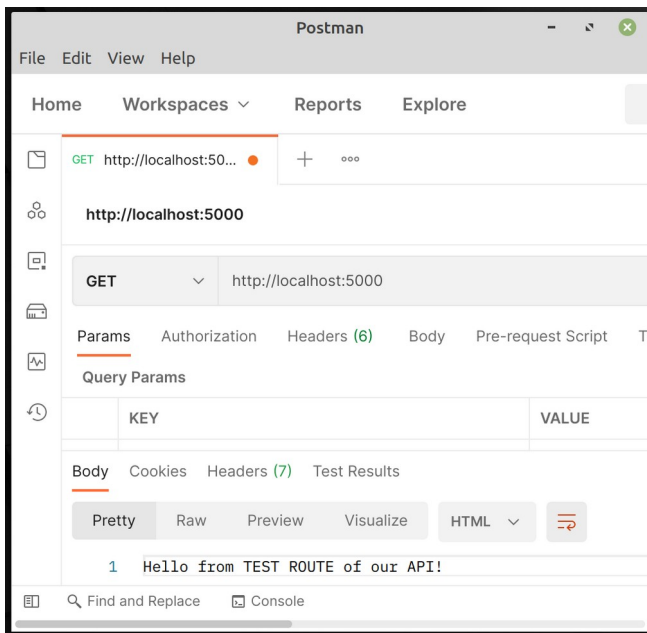
2.2.7 Change start scripts at package.json

```
{ } package.json X
{ } package.json > ...
1  {
2    "name": "mern-devconnector",
3    "version": "1.0.0",
4    "description": "social network MERN stack",
5    "main": "server.js",
   ▶ Debug
6    "scripts": {
7      "start": "node server",
8      "server": "nodemon server.js"
9    },
```

Now to start server: [CLI=> npm run server]. It will start SERVER.JS file with NODEMON

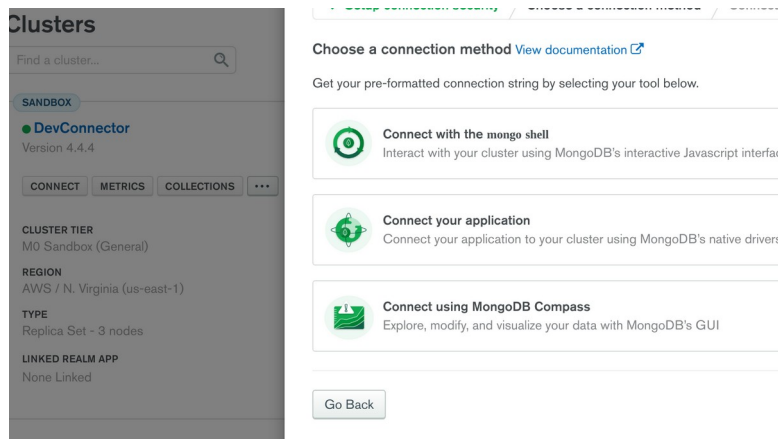
2.2.8 Create a SERVER with simple test route

```
JS server.js X
JS server.js > ...
1  //Import EXPRESS
2  const express = require("express");
3
4  //Initialize a main APP variable
5  const app = express();
6
7  //Create a TEST ROUTE (for GET request to root folder '/')
8  app.get("/", (req, res) => res.send("Hello from TEST ROUTE of our API!"));
9
10 //Create a variable to store port for server
11 const PORT = process.env.PORT || 5000;
12
13 //Create an APP LISTENER.
14 app.listen(PORT, () => {
15   console.log(`Server was started on port ${PORT}`);
16 });
```



2.3 Connecting To MongoDB With Mongoose

2.3.1 Create a connection to database



2.3.2 Create a connection logic on server

```
1  const mongoose = require("mongoose");
2
3  //Import CONFIG
4  const config = require("config");
5
6  //Import mongoURI from default.json in folder config
7  const db = config.get("mongoURI");
8
9  //Create a connection
10 const connectDB = async () => {
11   try {
12     //TRY to connect
13     await mongoose.connect(db, {
14       useNewUrlParser: true,
15       useUnifiedTopology: true,
16     });
17     // If DB was connected - log a message
18     console.log("MongoDB was connected ...");
19   } catch (error) {
20     //If ERROR log error and exit process with a failure
21     console.error(error.message);
22     process.exit(1);
23   }
24 };
25
26 module.exports = connectDB;
```

```

JS server.js X
JS server.js > ...
1 //Import EXPRESS
2 const express = require("express");
3
4 //Import logic to CONNECT to a DATABASE
5 const connectDB = require("./config/db");
6
7 //Initialize a main APP variable
8 const app = express();
9
10 //Create a CONNECTION to DATABASE
11 connectDB();
12
13 //Create a TEST ROUTE (for GET request to root folder '/')
14 app.get("/", (req, res) => res.send("Hello from TEST ROUTE of our API!"));
15
16 //Create a variable to store port for server
17 const PORT = process.env.PORT || 5000;
18
19 //Create an APP LISTENER.
20 app.listen(PORT, () => {
21   console.log(`Server was started on port ${PORT}`);
22 });
23

```

```

stslon@stslon-System-Product-Name:/media/stslon/8CB04F45B04F354C/
> mern-devconnector@1.0.0 server
> nodemon server

[nodemon] 2.0.7
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,json
[nodemon] starting `node server.js`
(node:24960) Warning: Accessing non-existent property 'MongoError'
(Use `node --trace-warnings ...` to show where the warning was created)
Server was started on port 5000
(node:24960) DeprecationWarning: Listening to events on the Db class
MongoDB was connected ...

```

2.4 Create route files with Express Router

```

JS server.js X
JS server.js > ...
1 //Import EXPRESS
2 const express = require("express");
3
4 //Import logic to CONNECT to a DATABASE
5 const connectDB = require("./config/db");
6
7 //Initialize a main APP variable
8 const app = express();
9
10 //Create a CONNECTION to DATABASE
11 connectDB();
12
13 //Create MAIN routes
14 app.use("/api/user", require("./routes/api/user"));
15 app.use("/api/profile", require("./routes/api/profile"));
16 app.use("/api/post", require("./routes/api/post"));
17 app.use("/api/auth", require("./routes/api/auth"));
18
19 //Create a variable to store port for server
20 const PORT = process.env.PORT || 5000;
21
22 //Create an APP LISTENER.
23 app.listen(PORT, () => {
24   console.log(`Server was started on port ${PORT}`);
25 });
26

```

```

EXPLORER
...
JS user.js X
routes > api > JS user.js > ...
1 //Import EXPRESS
2 const express = require("express");
3
4 //Import EXPRESS ROUTER
5 const router = express.Router();
6
7 router.get("/login", (req, res) => {
8   res.send("hello from api/user/login");
9 });
10
11 router.get("/", (req, res) => {
12   res.send("hello from api/user");
13 });
14
15 module.exports = router;
16

```


3. User API Routes & JWT Authentication

3.1 Create USER MODEL (SCHEMA)

```
JS User.js x
models > JS User.js > ...
1 //Import mongoose mongoose
2 const mongoose = require("mongoose");
3
4 const UserSchema = new mongoose.Schema({
5   name: {
6     type: String,
7     required: true,
8   },
9   email: {
10    type: String,
11    unique: true,
12    required: true,
13  },
14  password: {
15    type: String,
16    required: true,
17  },
18  avatar: {
19    type: String,
20  },
21  date: {
22    type: Date,
23    default: Date.now,
24  },
25 });
26
27 module.exports = User = mongoose.model("user", UserSchema);
28
```

3.2 Request & Body Validation

```
JS server.js x
JS server.js > ...
1 //Import EXPRESS
2 const express = require("express");
3
4 //Import logic to CONNECT to a DATABASE
5 const connectDB = require("./config/db");
6
7 //Initialize a main APP variable
8 const app = express();
9
10 //Create a CONNECTION to DATABASE
11 connectDB();
12
13 //Import MIDDLEWARE for work with body of REQUEST (bodyparser)
14 app.use(express.json({ extended: false }));
15
16 //Create MAIN routes
17 app.use("/api/user", require("./routes/api/user"));
18 app.use("/api/profile", require("./routes/api/profile"));
19 app.use("/api/post", require("./routes/api/post"));
20 app.use("/api/auth", require("./routes/api/auth"));
21
22 //Create a variable to store port for server
23 const PORT = process.env.PORT || 5000;
24
25 //Create an APP LISTENER.
26 app.listen(PORT, () => {
27   console.log(`Server was started on port ${PORT}`);
28 });
29
```

```
JS registration.js •
routes > api > user > JS registration.js > ...
1 //Import EXPRESS
2 const express = require("express");
3 //Import EXPRESS ROUTER
4 const router = express.Router();
5 //Import check and validationResult to work with data from REQUEST
6 const { check, validationResult } = require("express-validator");
7 router.post("/", [
8   check("name", "Check NAME and try again").trim().not().isBoolean().isLength({ min: 6 }),
9   check("email", "Check EMAIL and try again").trim().isEmail(),
10  check("password", "Check PASSWORD and try again").trim().isLength({ min: 6 }),
11 ], (req, res) => {
12   const errors = validationResult(req);
13   if (!errors.isEmpty()) return res.status(400).json({ errors: errors.array() });
14   res.send(req.body);
15 });
16
17 module.exports = router;
```

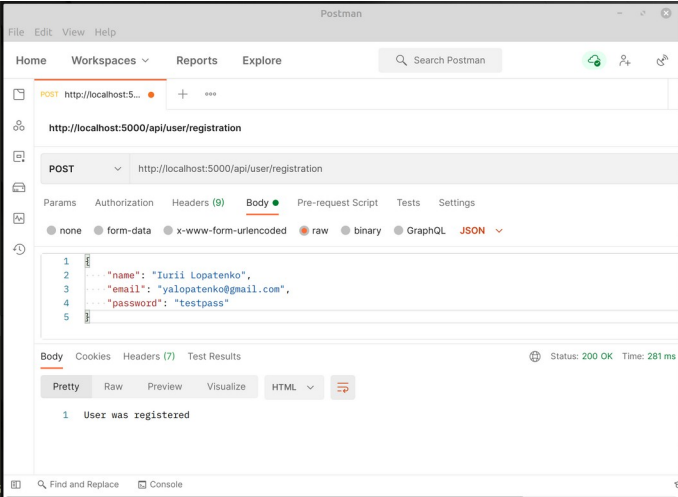
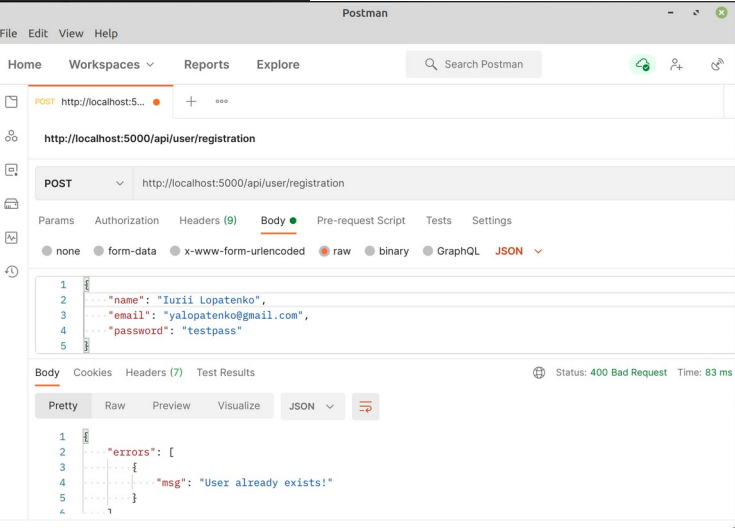
```
JS user.js x
routes > api > JS user.js > ...
1 //Import EXPRESS
2 const express = require("express");
3
4 //Import EXPRESS ROUTER
5 const router = express.Router();
6
7 //START_ROUT
8
9 router.use("/registration", require("./user/registration"));
10 router.use("/login", require("./user/login"));
11 //END_ROUT
12
13 module.exports = router;
```


3.3 User registration logic

```

JS registration.js
routes > api > user > JS registration.js > ...
1 //Import EXPRESS
2 const express = require("express");
3 //Import EXPRESS ROUTER
4 const router = express.Router();
5 //Import check and validationResult to work with data from REQUEST
6 const { check, validationResult } = require("express-validator");
7 //Import User model
8 const User = require("../models/User");
9 //Import gravatar
10 const gravatar = require("gravatar");
11 //Import BCRYPT
12 const bcrypt = require("bcryptjs");
13 router.post("/",
14 > [ ...
24 ],
25 async (req, res) => {
26   const errors = validationResult(req);
27   if (!errors.isEmpty()) {return res.status(400).json({ errors: errors.array() });}
28   //REGISTRATION ROUTE LOGIC
29   //Check if user (with email from req.body.email) exists in DATABASE
30   //(if exists - send status code and message if does not - create a new USER)
31   //DESTRUCTURING NAME, EMAIL and PASSWORD from request (req.body.name, req.body.em
32   const { name, email, password } = req.body;
33   try {
34     //Try to find USER with email from request in DATABASE
35     let user = await User.findOne({ email });
36     //If USER was found - return status code 400 with a message
37     if (user) {return res.status(400).json({ errors: [{ msg: "User already exists!" }] });}
38     //If USER was not found in DATABASE - create a new USER
39     //Create an avatar for new USER with GRAVATAR
40     const avatar = gravatar.url(email, {s: "200", r: "pg", d: "mm"});
41     //Create a new instance of USER
42     user = new User({ name, email, password, avatar });
43     //Create SALT for making a HASH of PASSWORD
44     const salt = await bcrypt.genSalt(10);
45     //Change USER.PASSWORD from direct PASSWORD to a HASH of PASSWORD
46     user.password = await bcrypt.hash(password, salt);
47     //SAVE new USER
48     await user.save();
49     //Return a message
50     res.send("User was registered");
51   } catch (error) {
52     console.error(error.message);
53     res.status(500).send("Server error!");
54   }
55 }
56 );
57 module.exports = router;

```

myFirstDatabase.users

COLLECTION SIZE: 266B TOTAL DOCUMENTS: 1 INDEXES TOTAL SIZE: 20KB

Find Indexes Schema Anti-Patterns 0 Aggregation Search Indexes

FILTER {"filter": "example"}

QUERY RESULTS 1-1 OF 1

```

_id: ObjectId("603823894e5f00189c1a843e")
name: "Iurii Lopatenko"
email: "yalopatenko@gmail.com"
password: "$2a$10$6RgBg23Ps3NnAjzeJulGuebkJfNm5Vf6jWrwOURE20P2vBW7KpKp."
avatar: "http://www.gravatar.com/avatar/29b33c4fbaf493f11e03469325fa5900?s=200&r=pg&d=mm"
date: 2021-02-25T22:24:09.841+00:00
__v: 0

```

3.4 JWT implementing (jwt.io)

JSON Web Tokens are an open, industry standard RFC 7519 method for representing data securely between two parties.

Encoded

PASTE A TOKEN HERE

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyfQ.SflKxwRJSMeKKF2QT4fwpMeJf36P0k6yJV_adQssw5c
```

Decoded

EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

PAYLOAD: DATA

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "iat": 1516239822
}
```

VERIFY SIGNATURE

```
HMACSHA256(
  base64UrlEncode(header) + ".",
  base64UrlEncode(payload),
  your-256-bit-secret
)
☐ secret base64 encoded
```

```
await user.save();
//Create a payload for generate a JWT
const payload = {
  user: { id: user.id },
};
//Generate a TOKEN
jwt.sign(
  payload,
  config.get("secretForJWT"),
  { expiresIn: 360000 },
  (err, token) => {
    if (err) throw err;
    res.json({ token });
  }
);
```

Postman interface showing a POST request to `http://localhost:5000/api/user/registration`. The body is a JSON object:

```
{
  "name": "Iurii Lopatenko",
  "email": "yalopatenko@gmail.com",
  "password": "testpass"
}
```

The response status is 200 OK, Time: 260 ms, Size: 43.

JWT.io interface showing a decoded JWT token. The token is `eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyfQ.SflKxwRJSMeKKF2QT4fwpMeJf36P0k6yJV_adQssw5c`. The decoded payload is:

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "iat": 1516239822
}
```

FILTER `{"filter": "example"}`

QUERY RESULTS 1-1 OF 1

```
{
  "_id": ObjectId("603831562564d61db69b88ba"),
  "name": "Iurii Lopatenko",
  "email": "yalopatenko@gmail.com",
  "password": "$2a$10$NxEbW3sCgbyJH15RZ9V3028iqB",
  "avatar": "http://www.gravatar.com/avatar/29b33c4fba",
  "date": "2021-02-25T23:23:02.076+00:00",
  "__v": 0
}
```

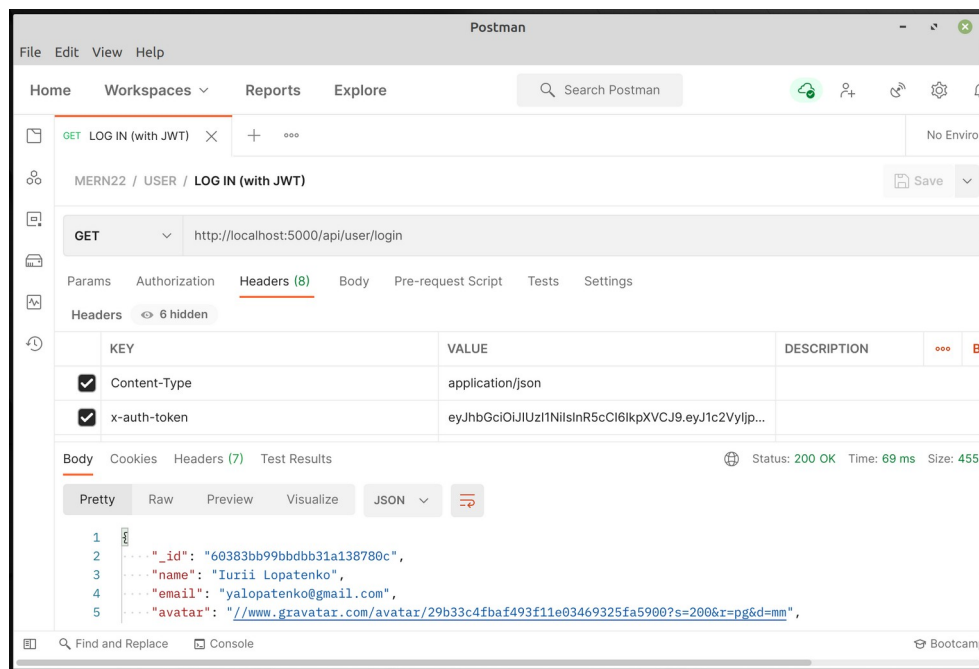
3.5 Custom auth middleware and JWT verify

```
1 //Import EXPRESS
2 const express = require('express');
3
4 //Import EXPRESS ROUTER
5 const router = express.Router();
6
7 //Import a MIDDLEWARE function
8 const auth = require('../../middleware/auth');
9
10 //Import User model
11 const User = require('../../models/User');
12
13 //Import check and validationResult to work with data from REQUEST
14 const { check, validationResult } = require('express-validator');
15
16 router.get('/', auth, async (req, res) => {
17   try {
18     const user = await User.findById(req.user.id).select('-password');
19     res.json(user);
20   } catch (error) {
21     console.error(error.message);
22   }
23 });
24 module.exports = router;
```

```

1 //Import JWT
2 const jwt = require('jsonwebtoken');
3
4 //Import CONFIG
5 const config = require('config');
6
7 module.exports = (req, res, next) => {
8   //get token from request - req.header
9   const token = req.header('x-auth-token');
10
11   //check if token does not exist - return status code 400 and message "No to
12   if (!token) {
13     return res.status(400).json({ msg: 'No token. Authorization denied!' });
14   }
15
16   //if token exists - verify the token
17   try {
18     // decode the TOKEN
19     const decoded = jwt.verify(token, config.get('secretForJWT'));
20     //Change USER at REQUEST to decoded USER (from TOKEN)
21     req.user = decoded.user;
22     //make a signal that a function has finished work
23     next();
24   } catch (error) {
25     res.status(401).json({ msg: 'Token is not valid' });
26   }
27 };

```



14. Basic GIT commands

14.1 Work with commit

14.1.1 Add all the changes from local work directory to a work tree

[CLI=> **git add .**] - will add all the changes

[CLI=> **git add [fileName.extension]**] – will add only a single file (fileName.extension) – **git add index.html**

14.1.2 Create a new commit

[CLI=> **git commit -[branch_name] '[commit message with meaningful description of changes]'**] – will create a new commit on branch (branch_name) with message (commit message with meaningful description of changes) – **git commit -main 'Create a user login functionality'**

14.1.3 Create a new branch and switch to it

[CLI=> **git switch -C [name_for_a_new_branch]**] - will create a new branch and then switch to a new branch - **git switch -C User-API-Routes-and-JWT-Authentication**