Implement the JWT base authentication and role base authorization

Muhmmad Yaqoob
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Introduction

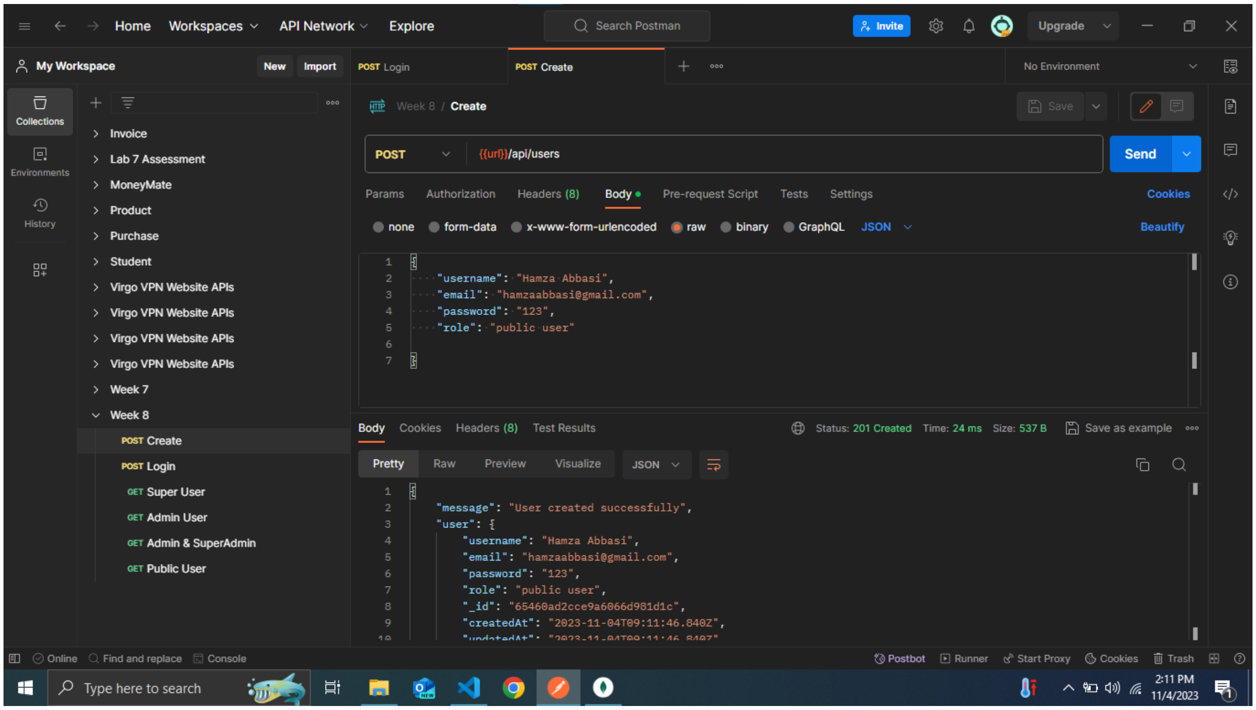
In today's digital age, securing web applications is of paramount importance. One of the key aspects of application security is user authentication and authorization. JSON Web Tokens (JWTs) provide a robust and efficient way to authenticate users and grant them specific permissions based on their roles. In this report, I will demonstrate how to build a web application with JWT-based authentication and role-based authorization.

Directory Structure

The project's directory structure is as follows:

```
lab_8_home_task"/

 controllers/
    userController.js

 routes/
    userRoutes.js

 middleware/
    authMiddleware.js

 models/
    User.js

 config/
    config.js

 utils/
    db.js
    auth_middleware.js
    roles_middleware.js

 app.js
 server.js
 package.json
```

API Operations



POST {{url}}/api/users

Send

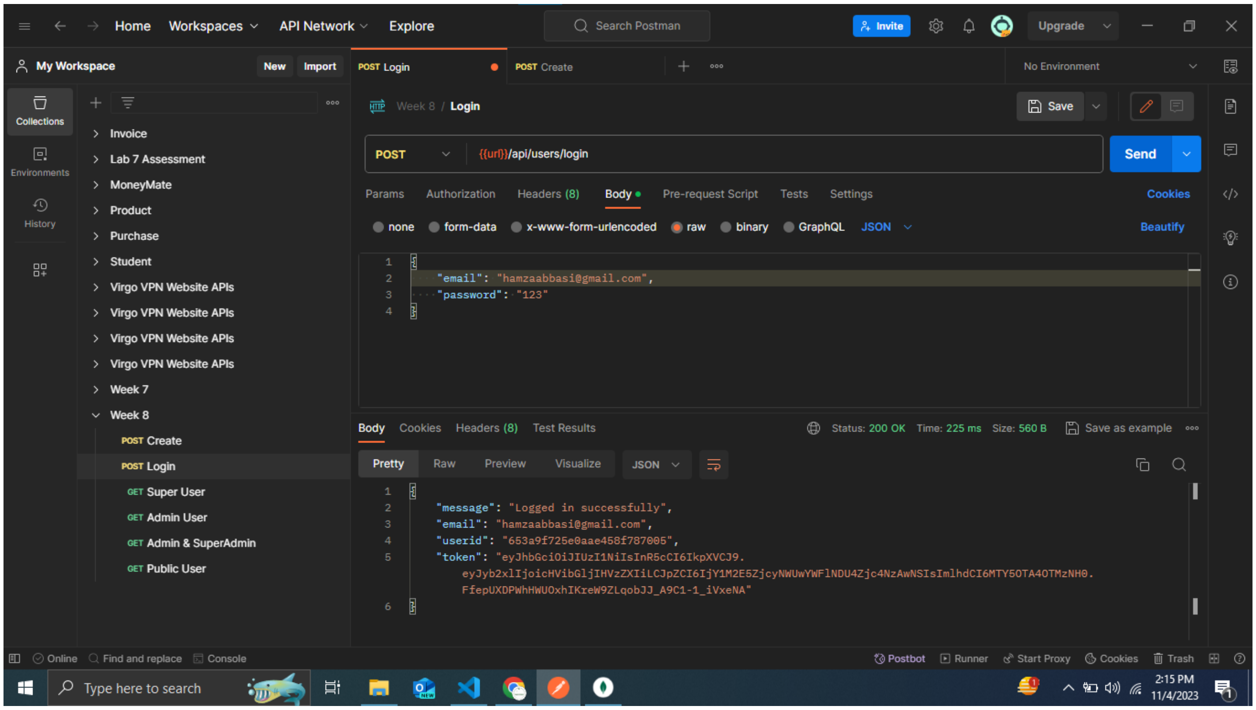
○ none ○ form-data ○ x-www-form-urlencoded ● raw ○ binary ○ GraphQL JSON

```
{
    "username": "Hamza Abbasi",
    "email": "hamzaabbasi@gmail.com",
    "password": "123",
    "role": "public user"

}
```

Status: 201 Created Time: 24 ms Size: 537 B

```
{
    "message": "User created successfully",
    "user": {
        "username": "Hamza Abbasi",
        "email": "hamzaabbasi@gmail.com",
        "password": "123",
        "role": "public user",
        "_id": "65460ad2cce9a6066d981d1c",
        "createdAt": "2023-11-04T09:11:46.840Z",
        "updatedAt": "2023-11-04T09:11:46.840Z"
```

Figure 1: Screenshot of Create User API Call



POST {{url}}/api/users/login

Send

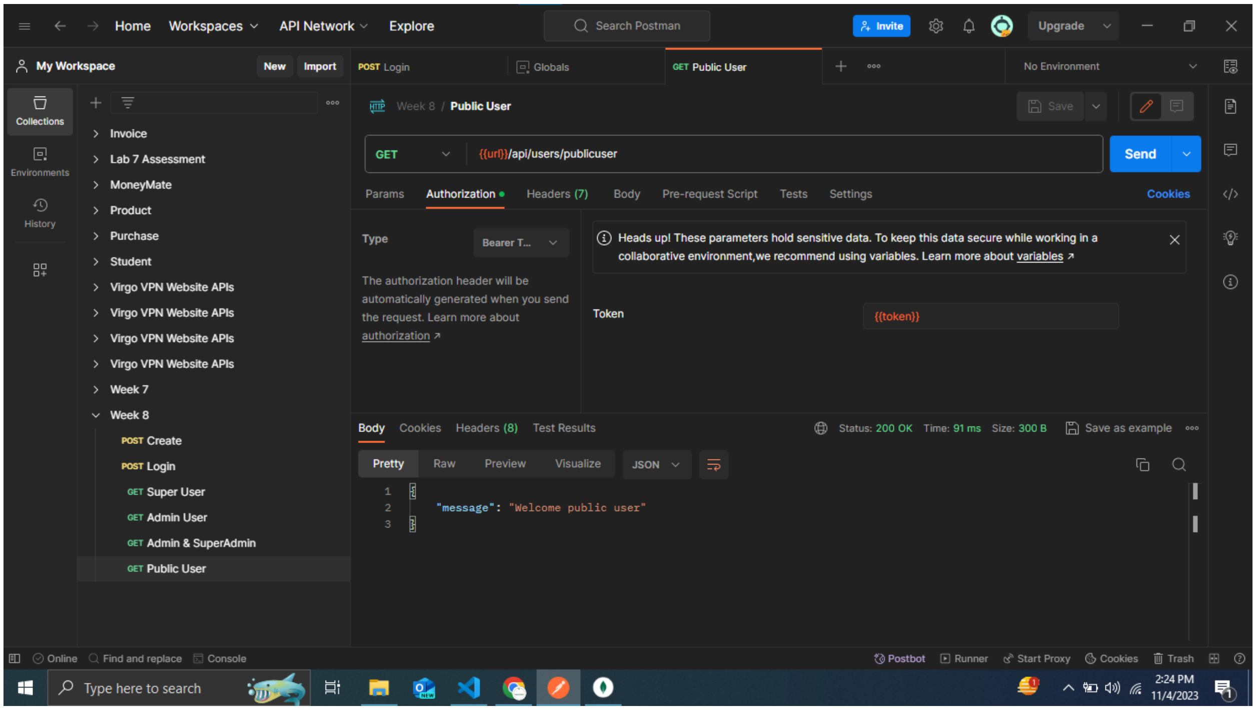
○ none ○ form-data ○ x-www-form-urlencoded ● raw ○ binary ○ GraphQL JSON

```
{
    "email": "hamzaabbasi@gmail.com",
    "password": "123"
}
```

Status: 200 OK Time: 225 ms Size: 560 B

```
{
    "message": "Logged in successfully",
    "email": "hamzaabbasi@gmail.com",
    "userid": "653a9f725e0aae458f787005",
    "token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
        eyJyb2xlIjoicHVibGljIHVzZXIiLCJpZCI6IjY1M2E5ZjcyNWUwYWFlNDU4Zjc4NzAwNSIsImlhdCI6MTY5OTA4OTMzNH0.
        FfepUXDPWhHWUOxhIKreW9ZLqobJJ_A9C1-1_iVxeNA"
}
```

Figure 2: Screenshot of Login User API Call



GET {{url}}/api/users/publicuser

Type Bearer T...

The authorization header will be automatically generated when you send the request. Learn more about authorization ↗

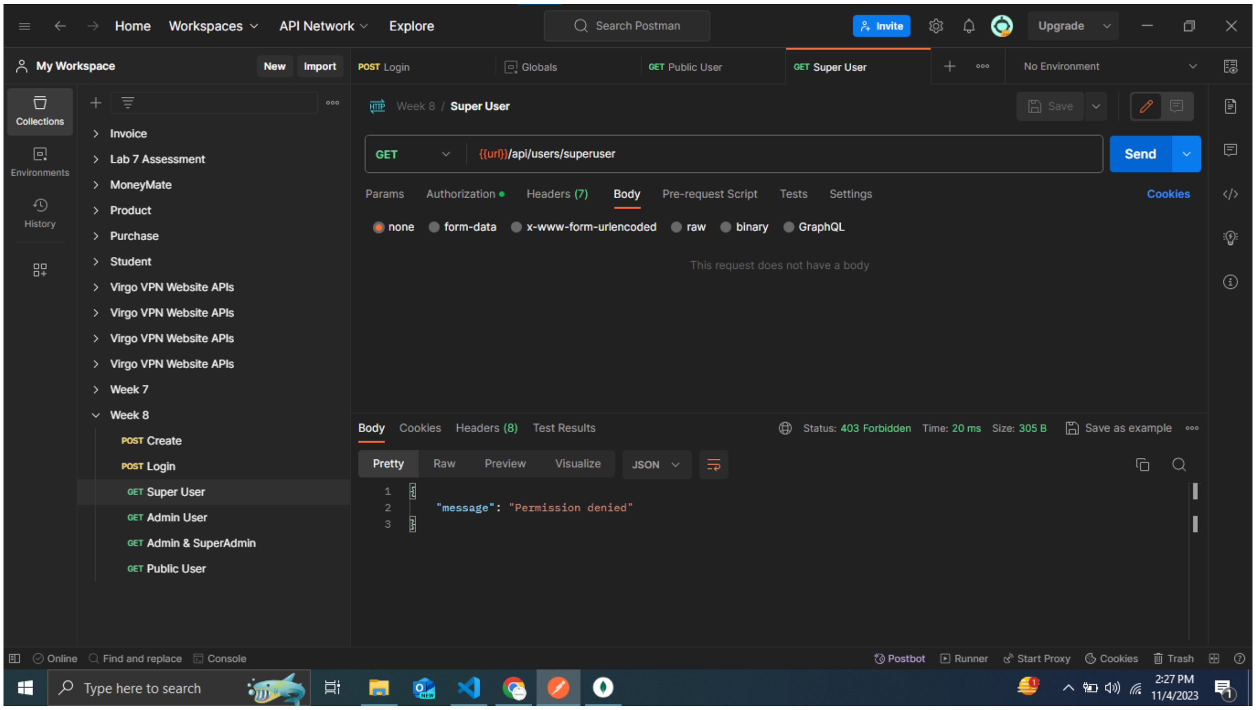
Heads up! These parameters hold sensitive data. To keep this data secure while working in a collaborative environment,we recommend using variables. Learn more about variables ↗

Token {{token}}

Status: 200 OK Time: 91 ms Size: 300 B

```
{
    "message": "Welcome public user"
}
```

Figure 3: Screenshot of Public User Login by validating his role



GET {{url}}/api/users/superuser

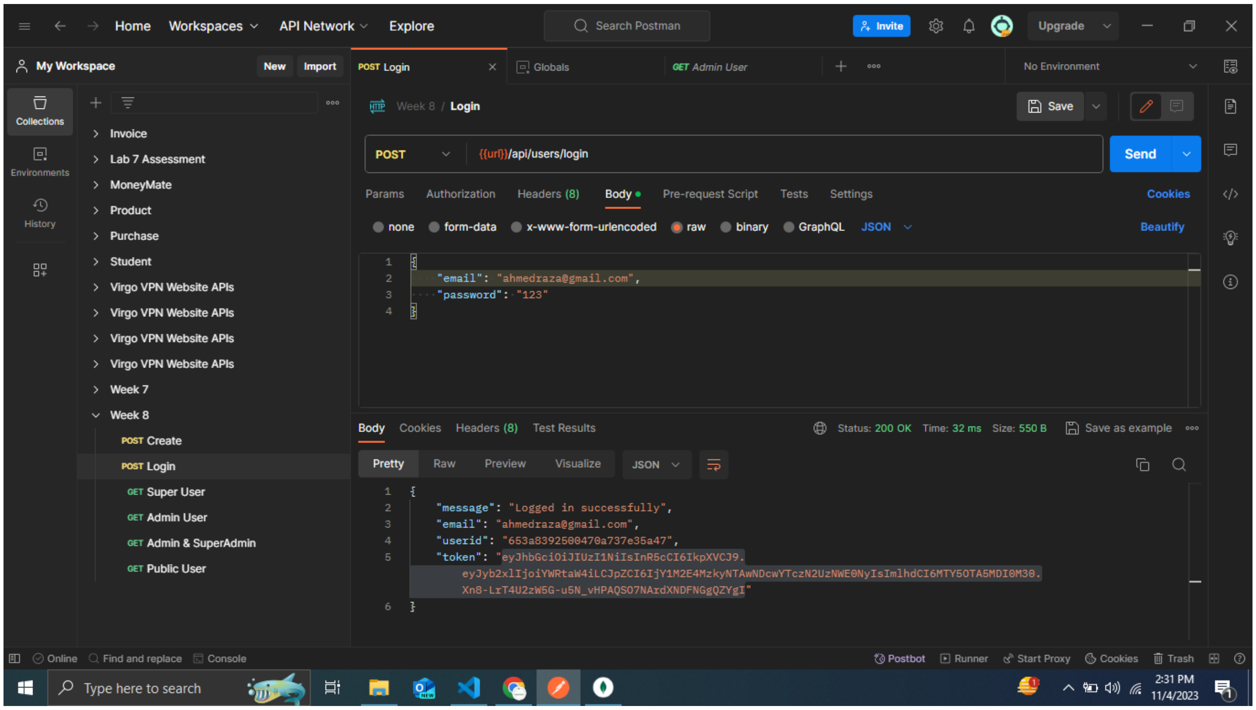
● none ○ form-data ○ x-www-form-urlencoded ○ raw ○ binary ○ GraphQL

This request does not have a body

Status: 403 Forbidden Time: 20 ms Size: 305 B

```
{
    "message": "Permission denied"
}
```

Figure 4: Screenshot of Public User When he tried to access Super User roll



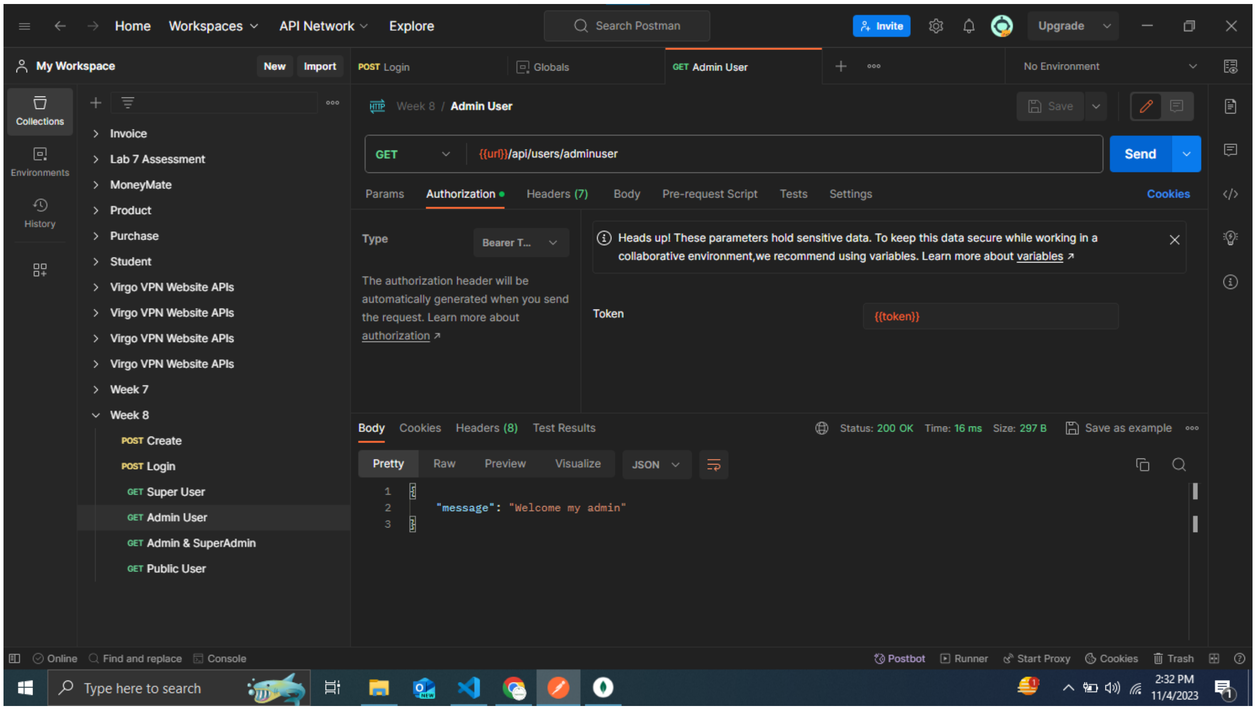
POST {{url}}/api/users/login

```
{
    "email": "ahmedraza@gmail.com",
    "password": "123"
}
```

Status: 200 OK Time: 32 ms Size: 550 B

```
{
    "message": "Logged in successfully",
    "email": "ahmedraza@gmail.com",
    "userid": "653a8392500470a737e35a47",
    "token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
        eyJyb2xlIjoiYWRtaW4iLCJpZCI6IjY1M2E4MzkyNTAwNDcwYTczN2UzNWE0NyIsImlhdCI6MTY5OTA5MDI0M30.
        Xn8-LrT4U2zW5G-u5N_vHPAQSO7NArdXNDFNGgQZYgI"
}
```

Figure 5: Screenshot of Admin Login API Call



GET {{url}}/api/users/adminuser

Type: Bearer T...

The authorization header will be automatically generated when you send the request. Learn more about authorization ↗

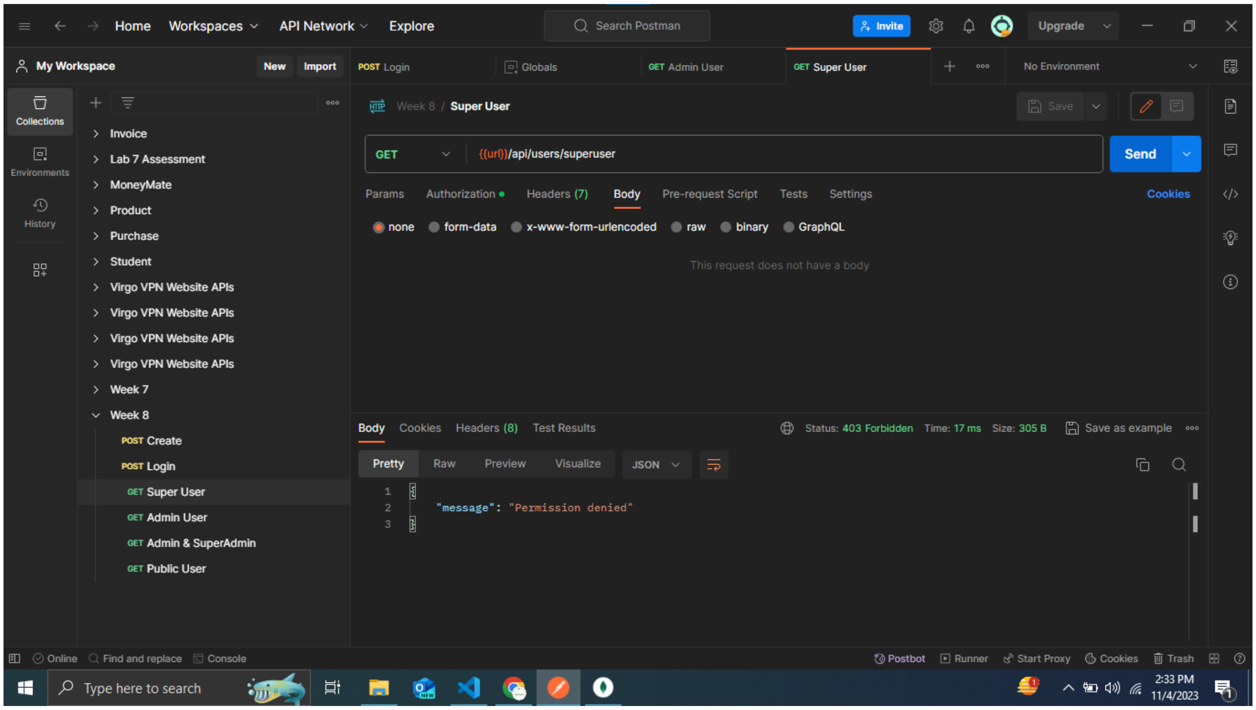
Heads up! These parameters hold sensitive data. To keep this data secure while working in a collaborative environment,we recommend using variables. Learn more about variables ↗

Token: {{token}}

Status: 200 OK Time: 16 ms Size: 297 B

```
{
    "message": "Welcome my admin"
}
```

Figure 6: Screenshot of Admin Authentication



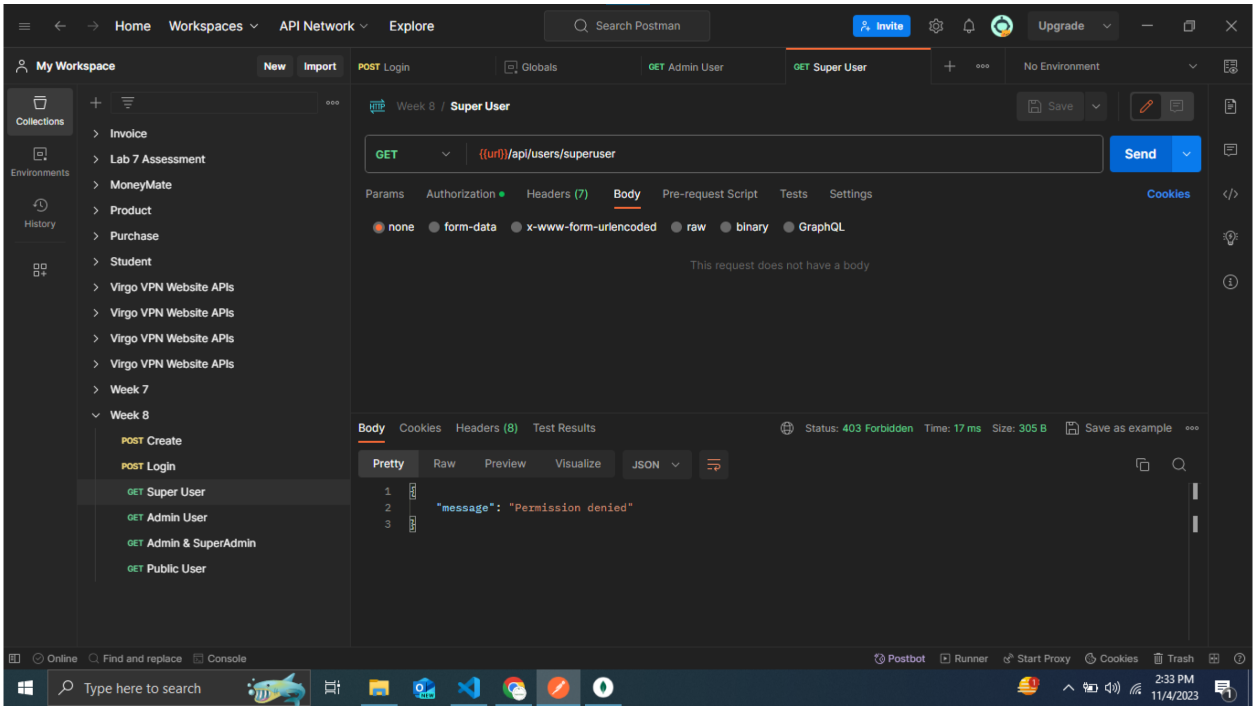
GET {{url}}/api/users/superuser

This request does not have a body

Status: 403 Forbidden Time: 17 ms Size: 305 B

```
{
    "message": "Permission denied"
}
```

Figure 7: Screenshot of Admin When he tries to login as Super Admin



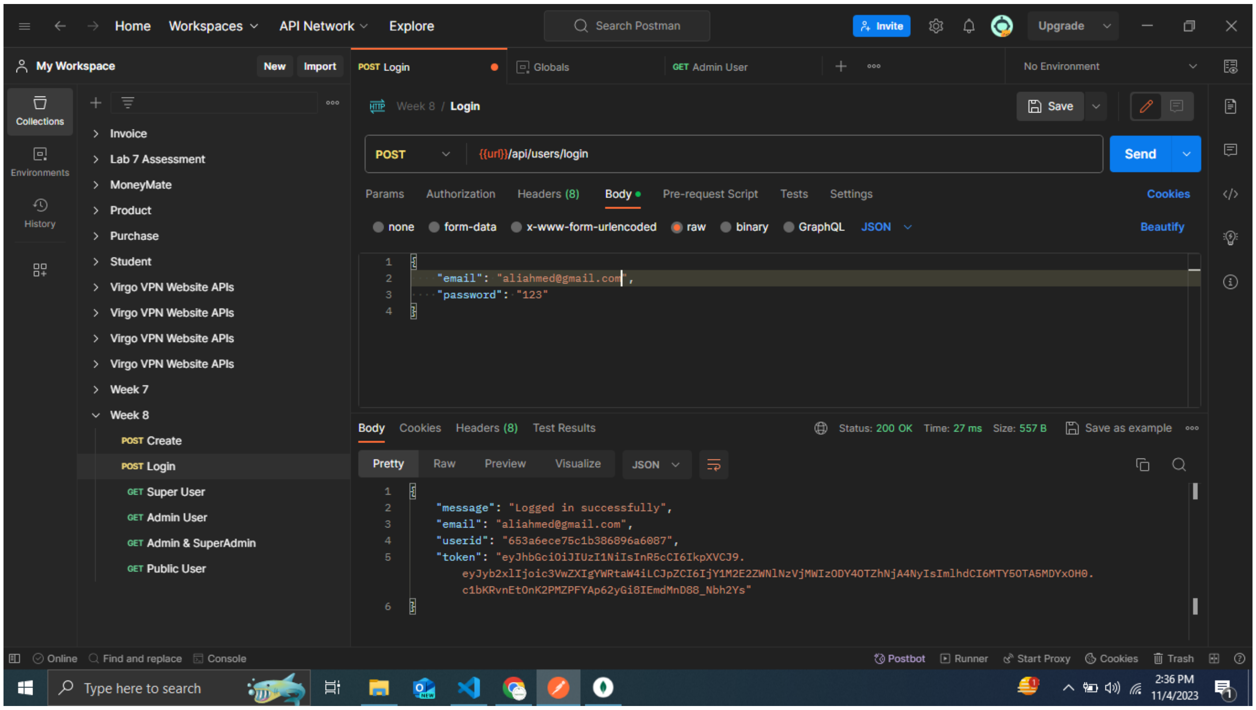
GET {{url}}/api/users/superuser

This request does not have a body

Status: 403 Forbidden Time: 17 ms Size: 305 B

```
{
    "message": "Permission denied"
}
```

Figure 8: Screenshot of Admin/Superuser combined endpoint API Call



POST {{url}}/api/users/login

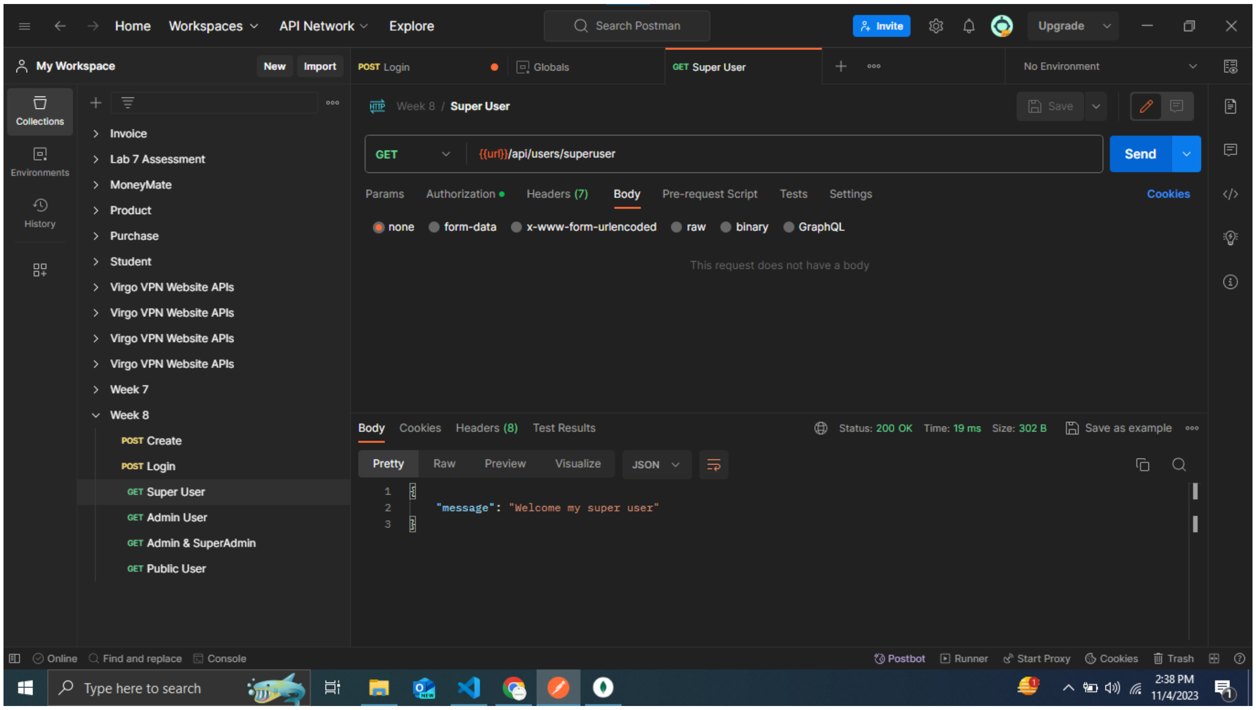
○ none ○ form-data ○ x-www-form-urlencoded ● raw ○ binary ○ GraphQL JSON

```
{
    "email": "aliahmed@gmail.com",
    "password": "123"
}
```

Body Cookies Headers (8) Test Results Status: 200 OK Time: 27 ms Size: 557 B

```
{
    "message": "Logged in successfully",
    "email": "aliahmed@gmail.com",
    "userid": "653a6ece75c1b386896a6087",
    "token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
        eyJyb2xlIjoic3VwZXIgYWRtaW4iLCJpZCI6IjY1M2E2ZWNlNzVjMWIzODY4OTZhNjA4NyIsImlhdCI6MTY5OTA5MDYxOH0.
        c1bKRvnEtOnK2PMZPFYAp62yGi8IEmdMnD88_Nbh2Ys"
}
```

Figure 9: Screenshot of Superuser Login endpoint API Call



GET {{url}}/api/users/superuser

● none ○ form-data ○ x-www-form-urlencoded ○ raw ○ binary ○ GraphQL

This request does not have a body

Body Cookies Headers (8) Test Results Status: 200 OK Time: 19 ms Size: 302 B

```
{
    "message": "Welcome my super user"
}
```

Figure 10: Screenshot of Superuser Authentication endpoint API Call

User Model

```
const mongoose = require("mongoose");

const userSchema = mongoose.Schema(
  {
    username: String,
    email: String,
    password: String,
    role: String,
  },
  { timestamps: true }
);

module.exports = mongoose.model("Users", userSchema);
```

User Controller

```
const User = require("../models/userModel");
const jwt = require("jsonwebtoken"); // Import the jwt library

// Create a User
async function createUser(req, res) {
  try {
    const newUser = await User.create(req.body);
    res.status(201).json({
      message: "User created successfully",
      user: newUser,
    });
  } catch (error) {
    res.status(500).json({ error: error.message });
  }
}

// Get all Users
async function getAllUsers(req, res) {
  try {
    const users = await User.find();
    res.json(users);
  } catch (err) {
    res.status(500).json({ error: err.message });
  }
}
// Login User
async function login(req, res) {
  const { email, password } = req.body;
  try {
    const user = await User.findOne({ email });
    if (!user) return res.status(404).json({ error: "User not found" });
    if (user.password != password)
      return res.status(401).json({ error: "Invalid credentails" });
    return res.status(200).json({
      message: "Logged in successfully",
      email: email,
      fullname: user.fullname,
      userid: user.id,
      token: GenerateToken(user),
    });
  } catch (err) {
    return res.status(500).json({ message: err });
  }
}

// Super Admin
async function superUser(req, res) {
  res.json({ message: "Welcome my super user" });
}

// Admin
async function adminUser(req, res) {
  res.json({ message: "Welcome my admin" });
}

// Admin or Super Admin
async function admin_superadmin(req, res) {
  res.json({ message: "Welcome admin/super admin" });
}

// public user
async function publicUser(req, res) {
  res.json({ message: "Welcome public user" });
}

function GenerateToken(user) {
  const payload = {
    role: user.role,
    id: user._id,
  };
  const token = jwt.sign(payload, "adsfasdfjkh$#asdfasdf.adsfxc");
  return token;
}

module.exports = {
  createUser,
  login,
  adminUser,
  admin_superadmin,
  publicUser,
  superUser,
};
```

User Routes

```
const express = require("express");
const router = express.Router();
const userController = require(”../controllers/userController”);
const validateToken = require(”../utils/auth/auth_middleware”);
const requireRoles = require(”../utils/auth/roles_middleware”);

// create a user
router.post(”/users”, userController.createUser);

// Login User
router.post(”/users/login”, userController.login);

//super user
router.get(
  ”/users/superuser”,
  validateToken,
  requireRoles([”super admin”]),
  userController.superUser
);

//admin user
router.get(
  ”/users/adminuser”,
  validateToken,
  requireRoles([”admin”]),
  userController.adminUser
);

//admin user & Super admin user
router.get(
  ”/users/adminsuperadmin”,
  validateToken,
  requireRoles([”admin”, ”super admin”]),
  userController.admin_superadmin
);

//public user
router.get(
  ”/users/publicuser”,
  validateToken,
  requireRoles([”public user”]),
  userController.publicUser
);

module.exports = router;
```

db.js

```
const mongoose = require(”mongoose”);
mongoose.set(”strictQuery”, true);

mongoose.connect(”mongodb://127.0.0.1:27017/Week8HomeTask”, {
  useNewUrlParser: true,
  useUnifiedTopology: true,
});
```

```
const db = mongoose.connection;
db.on(”error”, (err) => {
  console.log(”Failed to connect with db”);
});
db.once(”open”, () => {
  console.log(”Connected with db”);
});
```